

www.tuireann.energy



# Tuireann Energy Ltd

## Nanofluid injection for emission reductions

Company: Founded in Ireland by Dr. Samuel Kyung Hoon Jun (2017). Shareholding 50% open for the next investor.

Company value: €1m. R&D invested €500k since 2010.

**Product:** T1 low metal concentration aqueous nanofluid + T1 Injector through air intake (Air Humidifier).

T1 works for gasoline, diesel and ethanol based engines.

**TRL:** 6-7 with prototype demonstration

Value proposition: T1 improves engine efficiency (= reduces CO2) by 10% gasoline and 8% for diesel

T1 reduces CO, NOx and Soot emissions (5  $\sim$  55%).

Price is 10 ~ 1000 times lower than any other emission reduction technology.

Market size: Global fuel additives market \$8.6b in 2020.

**Customers / users:** Engine manufacturers for OEM & end users e.g. trucks, ships, generators.

**Business model & commercialisation:** 1) Licensing to fuel additive companies and engine manufactures 2) In-house T1 production + retrofit the injector into used cars / trucks. 3) IP transfer to an automotive industry 4) Spin-in to a research institute.

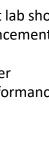
**Projected sale volume in 3 years:** 282,000 litres (= €11.3m sales & €4.2m profit) with in-house production model.

Suggested Investment: €2m for in-house production or €500k for IP transfer strategy.

Speed (km/h)	40	50	60	60	70	70	80	90	100	110	120
Gear	4	4	4	5	4	5	5	5	5	5	5
(a) FE (km/L)	16.9	16.0	15.1	16.5	14.2	15.6	14.6	13.5	12.4	11.1	9.8
(b) FE (km/L)	19.4	17.8	16.7	17.6	15.3	16.8	15.7	14.6	13.2	12.4	11.3
differe nce % = (b-a)/a	+14.6	+11.4	+10.6	+6.8	+7.9	+7.8	+7.9	+8.2	+7.0	+11.4	+15.4

A Car dyno test by an independent lab shows  $6.8\% \sim 15.4\%$  fuel efficiency enhancement.

Wide range of test results are under https://www.tuireann.energy/performance





# Tuireann Energy Ltd

## Nanofluid injection for emission reductions

Tuireann's technology introduction video

Tuireann injector installation demonstration

Tuireann international patent link

Tuireann engine validation report by Coventry & Brighton Universities UK

Tuireann car dyno test report by Inha Exhaust Emission Lab Korea

Tuireann material analysis report by NHL Stenden Netherlands





- ✓ Tuireann is a certified member of a <u>High Potential Start-Up of Enterprise Ireland</u>, which will co-invest as much as private investment.
- ✓ Tuireann completed Feasibility Study from Local Enterprise Office in Wicklow, Ireland.
- ✓ Tuireann is awarded a Seal of Excellence from <a href="Horizon2020">Horizon2020</a> in 2019.
- ✓ Tuireann is awarded an Efficient Solution Label from <u>Solar Impulse Foundation</u> in 2020.
- ✓ Tuireann is a certified member of Accelerator Programme of InvestHorizon in 2020.
- ✓ Tuireann is a certified member of Climate KIC Accelerator Programme in 2020.



# **Tuireann Nanofluid Solution**

## Why now?

**Efficiency or emissions:** Diesel creates less CO2 (=more efficient) but more NOx. Gasoline consumes more CO2.

The electricity for electric vehicles mainly comes from low grade fossil fuels.

There are no other solutions available.



Improvement costs or penalty: To fulfil EU emissions and efficiency targets, engine manufacturers are facing huge development costs.

Diesel cars may be banned because diesel cars show continuous technical problems with exhaust gas recycling devices, particulate filters and selective catalytic reduction devices to reduce emissions.

Gasoline engine efficiency levels have stagnated.

All these will raise the cost for end-users while the owners of aged diesel cars/ships/generators need affordable solutions.

The 3rd world countries will emit more pollutions unless we provide with affordable solutions.

#### Value proposition:

**Increased efficiency and reduced emissions:** When added to gasoline and diesel based fuel T1 offers CO2 reduction of 8-10%. There are CO and NOx reductions as well.

**Sustainable solution:** The nanofluid is over 99.99% alkaline water it creates no metal nanoparticle related damage to the engine or environmental hazards. In addition, the by-product of manufacturing can be recycled into a solar cell material.

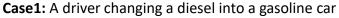
**Affordable solution:** T1 Formula (0.1-1mL) is needed per litre of fuel. Injector installation is ~€100. For the medium size lorry owner who consumes 3,000L/Month of diesel, only 3L of T1 Formula costing €120 is required.

**Tuireann solution = Water injection + Nanotechnology:** Water injection / Air humidification are cutting edge technologies for gasoline engines to boost power and for diesel engines to reduce NOx but with side effects. Nanoparticles fuel additives cannot go to market due to environmental risks. This is where T1 stands out. It's the world's first fuel additive using a nanofluid to replace water injection / air humidification techniques.



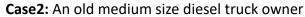
## **Tuireann Nanofluid Solution**

## Target clients example and profitability



He/she will pay 33% more for fuel because of the different fuel price and the lower efficiency.

However T1 can reduce the fuel cost by average €200/year (= €250 fuel save - €50 T1 cost) per passenger car.



He/she could pay at least €10k to retrofit diesel exhaustion treatment devices + €100/month for Adblue to satisfy the new regulation. The fuel consumption goes up by 3% (≈€100/month) because of the exhaustion modification.

If they use T1 system instead, retrofit is €100 (over 100 times less cost) and the owner will save €320/moth

= 8% fuel save by T1 + €100 Adblue cost save + €100 prevention of extra fuel efficiency decrease - €120 T1 cost.

#### Case 3: A luxury car maker

He/she pays €2M/year extra taxes because of the high emissions of the 12 cylinder engine.

If they can show that the emission satisfies Euro 6 by adopting T1 technology, they will save €2M/year tax on top of a better image.

#### Simple Fuel saving calculations: Medium size truck, Diesel price = 1€/L

**Note:** Adblue saving, Post exhaustion SCR installation saving, T1 injector cost not included for simplicity

	1 truck / month	1000 trucks / month	1000 trucks / Year
used diesel	3,000 L	3,000,000 L	36,000,000 L
fuel cost	3,000 €	3m €	36m €
used T1 (1:1000 mixture)	3 L	3,000 L	36,000 L
saved diesel (8%)	240 L	240,000 L	2,880,000 L
saved fuel cost	240 €	240k €	2.88m €
T1 cost without margin (= €37.7 X 3L)	75 €		
T1 price with margin	120 €	170k €	2.112m €
Lorry owner profit (= 240 - 120)	120 €	70k €	840k €
Tuireann profit (= 120 - 75)	45 €	45k €	540k €





# Tuireann proposal for in-house production

#### **Expected growth potential:**

Assumption 1: Sales price of €40/L of T1 Formula

<u>Assumption 2</u>: Production cost of €25/L of T1 Formula (COGS = 62%)

Assumption 3: Employment creation after 1 year of commercialisation

Assumption 4: ROI is calculated as the cumulated gross profit at the third year, against the budget of €2m needed to reach commercialisation

Droduct	Sales (L)			Turnover (€m)			Gross Profit (€m)			ROI	lobe
Product	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	KUI	Jobs
T1	23.6k	115k	282k	0.94	4.6	11.3	0.35	1.73	4.23	3	55

Note: This calculation is only based on truck clients.

Other attracted potential clients are heavy duty machines, agriculture machines, and generators.

If the business gains ship clients, the gross profit would be more than doubled.

Current manufacturing facility: 230 square metre lab, Capacity of 50 L/month of T1 Formula.

**Estimated funding required to reach commercialisation:** €2m for 2 years.

To undertake the project we need to hire automotive and material engineers, an operations manager, finance manager, and marketing manager. Once commercialised we will to scale up our in-house production capacity through debt finance. For this it is required a team of several production and quality control engineers and vehicle installation and monitoring engineers.





# Tuireann Business Proposal

**Current stage of development: (**TRL = Technology Readiness Level)

6	3	

Milestone	Results	TRL	Time	Budget invested
M1. Proof of concept of a new water-based nanofluid discovered through R&D.	Proven that a small dosage of nanofluid could both increase efficiency and reduce emissions.	3	2010 - 2015	€300K
M2. Designed and built a working prototype of T1 Formula and T1 Injector.	Found the optimised injection method through piezo nebulising and the T1 Formula mist provided through the air intake part of the engine.	5	2016 - 2018	€100K
M3. In field testing with gasoline, diesel cars and ethanol generator engines.	Over 10 different cars with real road tests undertaken and 2 different cars on a dyno by an independent lab demonstrating average 10% fuel savings, 15% CO and 57% NOx savings for gasoline cars. All test results can be viewed here: <a href="https://www.tuireann.energy/performance">https://www.tuireann.energy/performance</a>	6	2013 - Now	€100K

Steps planned to take the innovation to the market:					
#1:	Technical: refine T1 Formula reproducibility, consistency and shelf life; improve the design of the T1 Injector for simple installation on IC engines; add sensors and electronic communication and controls.	6 to 7			
#2:	Manufacturing: get both T1 Formula and Injector ready for scaled up manufacturing.	6 to 7			
#3:	Testing objectives: testing of T1 Formula and Injector at accredited testing facilities and on end user vehicles.	7 to 8			
#4:	Establish supply chain and reach agreements with manufacturers, installers and distributors; achieve regulatory compliance; protect IP in preparation for commercialisation; develop marketing and communication.	8 to 9			



# S.W.O.T of Tuireann

	Strengths	Weaknesses
> > > >	Environmentally safer than any other nanofuels.  Uniquely developed and patented solution.  Cannot be replicated by reverse engineering.  Tests so far have shown a significant increase in efficiency and reduction in emissions.  Interested customers, users and installers and distributors.  Core team with strong technical and commercial capabilities.  Ability to be combined with any water injection / air humidification technologies.	<ul> <li>New company and solution with low brand awareness.</li> <li>Low financial capacity and high costs to further develop and commercialise T1.</li> <li>Limited in-house manufacturing capability.</li> <li>Injector installation needs refinement for retrofits.</li> <li>Manufacturing installation and distribution is reliant on third party partnerships that need to be established.</li> </ul>
	Opportunities	Threats
<ul><li></li></ul>	Growing pressure from governments to reduce emissions; Growing pressure from users for more efficient engines; Manufactures looking for low polluting yet efficient engines; Automobile industry is interested in water injection technology. T1 is a niche technology.	<ul> <li>Sudden increase in electric vehicle developments leading to decreased investments for gasoline and diesel;</li> <li>Industry scepticism to new technologies, in particular the association of fuel additives with investment frauds;</li> <li>Industry requesting endless testing reports costing beyond the limit of company's finance;</li> <li>Policies banning retrofits of cars.</li> <li>Manufacturers warranties.</li> </ul>





## Concept

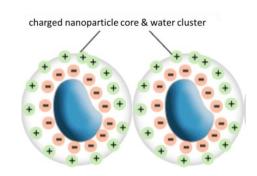
### How is it possible to achieve a high nanoparticle effect with low concentration?

**3** 

Water injection technology is drawing a high attention in engine research nowadays, yet, nobody has thought of injecting a water based nanofluid instead of water. T1 Formula is an aqueous energetic nanofluid containing less than 1 mg/L or ppm of each metal nanoparticles. T1 Formula is typically added at the ratio of fuel: T1 = 1000:1, therefore, total metal nanoparticles involved in the combustion are less than 0.01 ppm of the fuel. The low metal concentration is unique to T1 Formula and it minimises potential hazards to the vehicle safety and the environment.

The inventor found that a certain condition with metal nanoparticles can charge water droplets, creating "nanoparticle-water" cluster, which can show catalytic effect of fuel combustion. The nanoparticles work as a seed of the cluster, therefore we need only a minor quantity of nanoparticles unlike other nanoparticle fuel additives. As the temperature and pressure of the combustion chamber increases, explosive breaking of the cluster prior to the main explosion spreads the ionised water and metal nanoparticles in the chamber uniformly. This explosive migration and collision enhance the uniformity of air-fuel mixture in the chamber. In this process, the heat is absorbed by the water and the cluster. Therefore, the combustion temperature is lower, while the mechanical movement in the combustion is enhanced. *Through this effect, fuel consumption and NOx can be reduced together.* In addition, the ions in T1 Formula inhibit the nucleation of particle precursors showing any detergent effect.

Optimised results are achieved through a special injection method we have developed. *The T1 Injector atomises and provides the T1 Formula through the air intake part of the engine. With this controlled size of mist, T1 Formula can work for various types of engines.* The T1 Injector can be installed onto new engines and also retrofitted onto in use engines via the air intake of the engine.







## **Unique selling proposition**

T1 is the world's first water-based nanofluid fuel additive that significantly improves efficiency and reduces emissions at an affordable price. T1 is a game changer for the IC engine market offering an alternative to meet expected demand and increasingly stringent regulations.



#### Comparison of T1 with the claims of other market leading fuel saving additives

	T1	<u>Envirox</u>	XMILE	<u>Dipetane</u>
Fuel saving "up to"	15%	11%	8%	10%
Fuel saving "average"	8% for diesel 10% for gasoline	5%	7%	None
Independent Lab test	VW engine, Kia Soul, Hyundai Sonata	None	None	None
Mixture ratio (additive/fuel)	0.01 - 0.1%	0.025%	0.01%	0.5%
Composition	Over 99.99% Alkaline water + under 1ppm each nanoparticle	Solvent + CeO2 Nanoparticles over 20,000ppm	Solvent + Enzyme	Solvent based, Ingredient (undisclosed)
Mixing method	Optimised injected through the air intake	Direct mixture into the fuel	Direct mixture into the fuel	Direct mixture into the fuel
Patent	Since 2020	Not by them	Expired	None
<b>Academic Research</b>	Yes	Yes	Yes	None



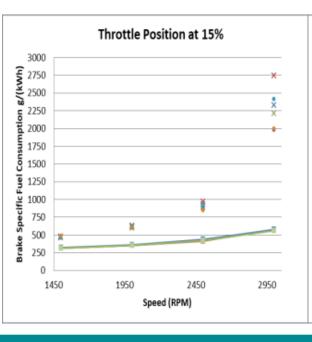
## Lab Test of T1 / T2 as fuel additive

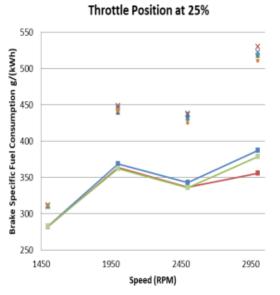
## **Evaluation by University of Brighton (2019)**

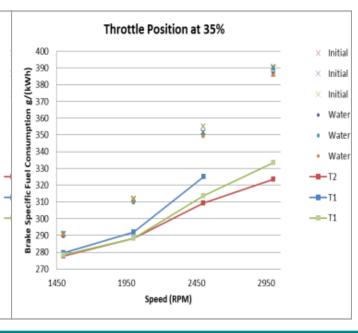
AVL Dyno system with VW Gasoline 1.0 L engine













## Lab Test of T1 / T2 as fuel additive

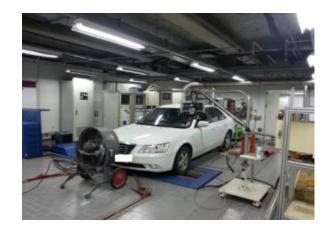
## **Evaluation according to Korean government standard set-up (2014)**



Hyundai NF Sonata Gasoline 2.0 L

### 4th gear

Speed [km/h]	40	50	60	70
Baseline FE [km/l] (a)	16.9	16.0	15.1	14.2
Additive FE [km/l] (b)	19.4	17.8	16.7	15.3
%Difference = (b-a)/a	+14.6%	+11.4%	+10.6%	+7.9%



## 5th gear

Speed [km/h]	60	70	80	90	100	110	120
Baseline FE [km/l]	16.5	15.6	14.6	13.5	12.4	11.1	9.8
Additive FE [km/l]	17.6	16.8	15.7	14.6	13.2	12.4	11.3
%Difference = (b-a)/a	+6.8%	+7.8%	+7.9%	+8.2%	+7.0%	+11.4%	+15.4%



## Lab Test of T1 / T2 as fuel additive

## **Evaluation according to Korean government standard set-up (2014)**



#### Kia Soul Gasoline 1.6 L Automatic Transmission

Speed (Km / h)	Baseline Fuel Efficiency (Km/L)	T1 Injection Fuel Efficiency (Km/L)	Fuel Saving (%)
40	17.0	23.1	36
50	19.4	21.8	12.7
60	19.0	22.5	18.4
70	19.5	21.1	8.2
80	18.9	19.3	2.2
90	16.9	17.1	0.9
100	14.8	15.2	2.8
110	12.7	12.9	1.5
120	11.2	11.6	3.6



	CO (mg/Km)	NOx (mg/Km)	
Baseline	134	7	
T1 Injection	114	3	
	15% reduced	57% reduced	

CVS 75 Mode (equivalent to FTP 75 Mode) confirmed CO and NOx reduction.



## **Generator Tests**

### **Energy production with 3 kW gasoline generator (2018)**

9.5 % enhancement of energy production via air intake injection.





### **Energy production with a 5 kW diesel generator (2018)**

**8.0** % enhancement of energy production via air intake injection.

Condition	Mixing Method	Fuel saving	со	NOx
Product D	1% mixing with fuel	2.3%	8% decrease	5% decrease
Product S	0.05% mixing with fuel	1.7%	15% decrease	4% increase
Product E	0.1% mixing with fuel	2.3%	9% decrease	3% increase





### Tuireann Founder



#### Samuel K. H. Jun

Ph. D. with Amorphous Silicon Solar Cells
was Research Professor at KAIST, Korea
was Researcher at Research Center Jülich, Germany
https://www.linkedin.com/in/samuelkhjun/



Please contact +353 852108198 or samuel.jun@tuireann.energy or samuelkhjun@gmail.com

#### **Academic Collaborators:**

<u>Dr. Brendan Duffy (CREST, Ireland)</u>, <u>Dr. Nwabueze Emekwuru (Coventry University, UK)</u>, <u>Dr. Steven Begg (University of Brighton)</u>, <u>Dr. Lwueton Agostinho (NHL Stenden, Netherlands)</u>





Lee Bateup Head of Innovation Concepts, Innovation & Pre-Development Pyms Lane, Crew, Cheshire CW1 3PL, England

> +44 7951 621969 lee.bateup@bentley.co.uk

> > 05/05/2019

Alan McDonnell, Strategy & Development, Tuireann Energy Ltd., Rathnew, Wicklow, Ireland.

Subject: Letter of Support in Tuireann Energy's project within the H2020 "SME Instrument".

Dear Sir/Madam,

Our Innovation team at Bentley have been investigating ways to help solve the serious challenge facing our company and the automotive industry – reduction of emissions. We have engaged Tuireann Energy since January 2019 regarding their innovative nanofluid fuel additive. On the 2<sup>nd</sup> of April they visited our facility in Crew to present their solution and open themselves to questions from our various engineering teams. While they are claiming positive emissions and fuel efficiency results we feel that they need to run some further independent validation tests to prove their results, specifically WLTP and RDE.

Tuireann have advised that they are also collaborating with Coventry University, NHL University Leeuwarden and Erciyes Turkey to help fully characterise their nanofluid and to evaluate, develop and provide a means of delivering the nanofuel into an ICE and to test the nanofuel performance. These academic teams have expertise in nanofuels, their performance, behaviours and applications.

We feel the work Tuireann Energy are doing is leading edge in the area of nanofluids and we feel that the H2020 SME Instrument will give them a great opportunity to continue evaluating and improving the characteristics and impacts of their solution and help refine it for real world manufacture.

We understand and support their innovative project and their application for the SME Instrument in the Horizon 2020 call.

Best Regards

Lee Bateup Head of Innovation



3 Cedar Crescent Cedar Park Westport Co. Mayo F28 PN47 Ireland

t: +353 (98) 39130 e: info@truckscience.com

11/03/2019

Attn: Alan McDonnell, Tuireann Energy Limited, 31 Westland Square, Dublin 2, D02 AW71, Ireland.

#### Letter of Support for Tuireann Energy's project within the Horizon 2020 "SME Instrument"

To Whom It May Concern:

TruckScience has been developing solutions for the commercial vehicle industry since 1985, including a Fuel Consumption Simulation engine, which has been proven accurate in extensive independent tests in the field.

Our customers in the road haulage industry face many challenges, one of the greatest of which is the need to reduce fuel consumption and increase fuel efficiency. We understood their challenges, and the importance of employing innovative technologies to address them.

We understand that Tuireann Energy proposes a unique and ground-breaking solution to the challenge of reducing fuel consumption.

We know that fuel efficiency is of utmost importance to our customers in the transport operator segment, and we expect that any innovation that reduces Fuel Consumption would have significant potential in the market.

We wish Tuireann Energy every success with their application for the SME Instrument in the Horizon 2020 call.

Yours faithfully.

Sorcha O'Grady

Director - Sales & Marketing



www.truckscience.com

#### LAWLORS' AUTOMOTIVE SOLUTIONS LTD

Logistical Security, Electronic and after-market product providers for the automotive industry

Tuireann Energy Limited, 31 Westland Square, Dublin 2, D02 AW71, Ireland.

12/08/2019

<u>Subject:</u> Letter of Support in Tuireann Energy's project within the Horizon 2020 "SME Instrument".

Dear Dr. Samuel Jun,

We at Lawlors' Automotive Solutions Limited have been modifying vehicles since 2014. We provide modifications such as aftermarket cruise control and other aftermarket modifications to vehicles such as Mercedes, BMW, Porsche etc..

We are interested in offering T1 Formula and T1 Injector to our clients. There is interest among our clients for solutions that can increase engine efficiency and reduce emissions. We look forward to following the progress of the project as well as receiving further information about the results.

Best Regards

Anno Lawlor

Anne Lawlor Director



Tuireann Energy Limited, 31 Westland Square, Dublin 2, D02 AW71, Ireland. 11/03/2019 Simonstown Coole Mullingar Co. Westmeath

Tel: 044-9661597 Fax: 044-9661597 Mobile: 087-2838220 Email: 121safety@eircom.net

Web: www.121safety.ie Web: www.121safety.com

Subject: Letter of Support in Tuireann Energy's project within the Horizon 2020 "SME Instrument".

Dear Sir/Madam,

We at 121 Safety Ltd. provide the highest quality Health & Safety training and consultancy available in Ireland. Our trainers and consultants work throughout the country carrying out a range of courses and managing road traffic management around key infrastructure projects. We are constantly travelling to site and use diesel vans to transport our resources plus equipment.

Running costs are a key factor for us because of the distances we travel. We have a small fleet of trucks however every penny counts for our bottom line. Tuireann energy contacted us in Q4 2018 about their Innovative Fuel additive technology. We see this is something that is unique and could really be beneficial to us and other companies. It has also great potential to reduce the environmental impacts of the automotive industry. We understand that their innovation can work when either directly inserted into the engine or indirectly injected via the air intake. We have never seen this before, and we have tried a number of fuel additives already.

We plan to run a trial in Q2 2019 with Tuireann and hopefully then we will use their additive to save fuel for us. Their technology is innovative (nanofuels, injection method, 99.99% water based) and we fully endorse their endeavours and this application for the SME Instrument in the Horizon 2020 call.

We look forward to following the progress of the project as well as receiving further information about the results.

**Best Regards** 

Signature

Anthony McMahon MD, 121 Safety Ltd.

Directors: Anthony McMahon & Sinéad McMahon

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Alan McDonnell, Tuireann Energy Limited, 31 Westland Square, Dublin 2, D02 AW71, Ireland.

08/04/2019

<u>Subject:</u> Letter of Support for Tuireann Energy's project within the Horizon 2020 "SME Instrument".

Dear Madam/Sir,

My colleagues and I at Coventry University have been working with Tuireann Energy since January 2019 on their innovative nanofluid fuel additive. We are currently planning a 3 year programme, 'Nanofuels for Internal Combustion Engines' (NICE), with them.

During this programme we will be collaborating with Tuireann and academic institutions in the Netherlands and Turkey specialising on fuel injection and combustion processes. The key objectives of our collaboration are to evaluate nanofuel formulation and production techniques, define their thermodynamic characteristics, and develop a means of delivering the nanofuel into an internal combustion engine and test the emissions levels.

In Coventry University, we work on Mechanical and Automotive engineering technologies with a special interest in nanofuels, ranging from their fundamental thermofluids characteristics to their applications. We have strong links with industry, including Jaguar Land Rover and have funded projects evaluating nanofuels with the Hindustan Petroleum Company in conjunction with the Indian Institute of Technology, and the UK Fluids Network in conjunction with the University of Brighton. We are interested in the work Tuireann Energy are doing because we consider it leading edge in this area and we can offer expertise on the understanding of the fundamental thermofluids processes occurring with their system and help to optimise it for real world production and applications.

We believe that their project is innovative and we support their application for the SME Instrument in the Horizon 2020 call.

Best Regards,

Nwabueze Emekwuru

MPhil PhD CEng FHEA MIMechE MSAE Senior Lecturer – Mechanical and Automotive Engineering

nwabueze.emekwuru@coventry.ac.uk

dr. ir. Luewton Lemos F Agostinho Professor (Lector) Water Technology NHL Stenden University of Applied Sciences Room S119, Van Hall Larenstein Building Agora 1, 8934 CJ, Leeuwarden, The Netherlands luewton.agostinho@hvhl.nl / IJ.f.agostinho@nhl.nl 00 31 6 24377484

Alan McDonnell, Tuireann Energy Limited, 31 Westland Square, Dublin 2, D02 AW71, Ireland.

27/03/2019

<u>Subject</u>; Letter of Support in Tuireann Energy's project within the Horizon 2020 "SME Instrument".

Dear Sir/Madam.

I and my team in NHL University have been liaising with Tuireann Energy since January 2019 on their innovative nanofluid fuel additive. We currently have an ongoing project with them to help them become ready to manufacture at scale. Our specific task is to help them fully characterise the nanofluid and help them clarify the fluid's behaviours as it leaves their injector technology and gets sprayed into the combustion process. This is intricate to their technology and product offering as it will help clarify what the product is for their customers.

My team in NHL specifically work in the area of water technologies. We have very strong links with industry and work with companies such as Wetsus and Bosch to develop innovative systems and solutions around water technology. We are specifically interested in the work Tuireann Energy are doing which we feel is leading edge in the area of nanofluids, specifically water based (their solution is 99.99% water).

We understand and support their innovative project and their application for the SME Instrument in the Horizon  $2020\,\mathrm{call}$ .

Best Regards

Signature

Dr Luewton Lemos F Agostin 19 9900 cg Leeuwardt

Professor (Lector) Water Technology NHL Stenden University of Applied Sciences