Results of Competition: North East Angel R&D Programme Regional Angel Investment Accelerator Pilot: Round 4

Competition Code: 1911_RAIA_RD4_NE

Total available funding is £624,560

Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.

Participant organisation names	Project title	Proposed project costs	Proposed project grant
PLASTECH INNOVATION LIMITED	A novel way to modify waste plastic for use as a traditional aggregate replacement in construction materials.	£235,094	£117,547

Note: you can see all Innovate UK-funded projects here: https://www.gov.uk/government/publications/innovate-uk-funded-projects
Use the Competition Code given above to search for this competition's results

Project description - provided by applicants
Plastech Innovation's mission is to identify plastic waste streams from various sources and apply our technical knowledge to produce useful innovative materials, creating value from the valueless whilst providing positive social and environmental impacts in the UK and globally. This proposal exploits our patentable technology to transform plastic waste into a partial sand substitute for use in concrete and other construction materials. We will contribute to a circular and sustainable economy by diverting post-consumer, post-industrial and pre-manufacture waste plastic away from landfills and incineration. Plastic production is predicted to double in the next 10 years, meaning a solution that repurposes waste plastic is needed urgently. Globally, 50 billion tonnes of sand are used annually in construction; moreover, not all sand can be used for construction due to the particle shape. Construction-grade sand is usually dredged from rivers and sea-beds, leading to significantly damaging impacts on ecosystems, destroying habitats for marine and freshwater life. The use of aggregate derived from waste plastic will reduce demand for such sand, reduce damage to the environment and offer a solution to global shortages in construction-grade sand. _'For waste management companies, local authorities and_ _plastic manufacturing_ _industries_ _who want new disposal routes for undesirable mixed and low-grade plastic waste,_ _Plastech Innovation provides an alternative_ _that is more cost-effective and eco-friendly than current disposal methods.'_ _'For construction companies_ _who want to reduce transportation costs and their environmental impact,_ _our innovative plastic aggregate is a product_ _that reduces the use of heavy natural aggregates by replacing them with a lightweight eco-friendly alternative.'_ The plastics industry produces only 3% of the mass produced by the concrete industry. The substitution of just 1.3% of construction-grade sand with plastic aggregate would eliminate global plastic pollution. Targeting and disrupting such vast markets, means our aggregate could help provide solutions to some of the most threatening global challenges.

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THERMULON LTD	Thermulon - Production of high-performance insulation - Incorporating waste materials into the production process	£298,434	£149,217

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Project description - provided by applicants
Thermulon is a start-up company headquartered in the North East of England, creating novel chemical processes to produce **high-performance building insulation materials**. Created in part in response to the Grenfell Tower tragedy of 2017, Thermulon started by exploring why flammable plastic based insulation is used and what the current alternatives are. Insulation is installed as panels, batts and blankets within the wall, roof and floor structure, applied specifically to reduce heat loss. The material achieves this through its internal structure, consisting of a high volume fraction of nanopores with inherently low thermal conductivity which thereby limits conductive and convective losses through the material. Successive UK governments have committed to reducing CO2 emissions from buildings, with over 30% of the UK's carbon emissions originating from fossil fuels used to heat homes and offices. In June 2019, the commitment to cut down emissions was galvanised with the pledge to reach **carbon-neutrality by 2050**. Cutting down on emissions from buildings (operational as well as embodied carbon) is necessary to achieve this target. Building regulations have been increasingly tightened to reduce thermal losses from buildings (consolidated in Building Regulations 2010; as amended). For a given thermal conductivity, thermal performance can only be improved by increasing the layer thickness. Therefore builders are using thicker and thicker insulating materials to meet the regulatory requirements; reducing living space. Plastic-based insulation materials are used due to their high thermal efficiency, minimising the layer thickness, however they are combustible and non-breathable. This means they cannot be used on solid-wall or heritage buildings due to damp issues. This leaves the 7.7 million UK solid-wall homes with few insulation options. Some home-owners are willing to take up significant internal floorspace by installing low-performance mineral-wool style materials, but the majority just pay the high heating bills, keeping their homes uninsulated at large monetary and carbon cost (~£435/year / 1770kg CO2; detached house). Thermulon has developed a new manufacturing process for aerogel materials which have excellent thermal properties and are inherently **non-combustible and breathable**. Working with The Welding Institute (TWI Ltd.), Thermulon will scale these materials up to produce a cost-effective insulation material for the construction sector, to be incorporated into a space-saving insulating render/plaster for use on solid-wall buildings; **saving home-owners money and reducing their carbon footprint.**