Road to Net Zero:

Green New Neighbourhood Development - Brief Analysis

Hempcrete Housing Sequestration:

Building a conventional 120m3 dwelling with concrete cement, emits on Avg; >26t CO_2 per dwelling.

Building the same dwelling of 120m3 with bespoke hempcrete elements by MJECT & Co. Sequesters a total Avg of; >-14t of CO_2 per dwelling.

Result: Building the same 120m3 dwelling with hempcrete elements as a substitute-product, sequesters on Avg; > -40t of CO_2, per dwelling.

Tarmac Road Surfacing Sequestration:

The conventional construction of a Hot Mix Asphalt (HMA) layer generates a carbon footprint of; >65.8 kg of CO_2e per km of road.

Building the same road using recycled plastic waste by MJECT & Co. sequesters an average of; >-77kg of CO_2e per km of road.

Result: Laying Road surfaces utilising localised recycled plastic asphalt mix sequesters a total average of; > -142kg of CO_2e per km of eco-road surfacing.

Energy Sequestration:

Globally, buildings are responsible for about 40% of carbon emissions. In the UK houses consume about 40% of all energy produced.

Any solution to the energy crisis will have to address the issue of energy usage in buildings.

The average household in the UK emits on avg 2.7 tonnes of CO_2 every year from heating their home.

The average UK home with solar installed, could reduce carbon emissions by an avg 1.4t per year.

Already at face value from a single hemp house, 1 km of plastic recycled road and solar panels, a magnitude of potential carbon has been completely eradicated.

Now put this on top of the energy producing/saving potential of Advanced Mechanical Recycling systems and the profound insulation properties of hempcrete, and then scale it by 100xhomes, it becomes evident that the optimised energy generation and decarbonisation impact of Green New Neighbourhoods are closer to obtaining a net zero stature then initially assumed.

CO_2e from Material Transpiration BEIS Emission Factors:

The UK default for reference and calculating CO_2 emissions associated with activities:

Ferry Rotterdam to Felixstowe5 of 7 Well to tank (WTT - i.e. emission from extracting oil, through to when it is put in the ship's fuel tank) Emissions factor for average Roll on Roll Off sea cargo 0.009kgCO_2e/tonne.km (or 9g per tonne of goods transported over 1km distance);

220km Rotterdam to Felixstowe; 25tonne loaded HGV = 0.009*25tonne*220km = ~50kgCO_2e Tank to "wake" (i.e. emission to move ferry)

Emissions factor for average Roll on Roll Off sea cargo 0.052kgCO2e/tonne.km (or 52g per tonne of goods transported over 1km distance);

220km Rotterdam to Felixstowe; 25tonne loaded HGV = 0.052*25tonne*220km = ~286kgCO2e 50 + 286 = 336kg CO2e per full lorry load Road;

Felixstowe to Gloucestershire Well to tank (WTT - i.e. emission from extracting oil, through to when it is put in the HGV fuel tank) Emissions factor for average 100% laden HGV (Ave for all HGV class) 0.255kgCO2e/km (or 250g CO2 for every 1km distance;

350km Felixstowe to Gloucester; = 0.255*350km = ~90kgCO2e Tank to "wheel" (i.e. emission to move HGV) Emissions factor for average 100% laden HGV (ave for all HGV class) 1.72kgCO2e/km;

350m Felixstowe to Gloucester; = 1.72*350km = ~600kgCO2e 90 + 600 = 690kg CO2e per full lorry load Total: 336+690 = >1 tonne CO2 / HGV transported from Netherlands;

As this does not include transport from manufacturer to export, there is definitely scope for undertaking a life cycle assessment to quantify the overall carbon benefits, including providing further justification for manufacture close to point of use.

That would not be a quick piece of work but could be something you include in an Innovate UK grant bid application or similar.

Nonetheless, already at initial estimate stages, the carbon sink potential of the material and the decarbonisation affects of the overall operation are both significant and impressive.

Feasibility for this project is high.

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