

# Exploring the potential for organic and more environmentally friendly plastics in the building industry

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## 1. INTRODUCTION

Modern building techniques, materials and methods open possibilities for rediscovering and creating new applications for organic and environmentally friendly materials in the building sector. Hemp-based materials are already well established in multiple sustainable products in the building industry. Hemp-lime, hemp insulation or hemp plastics are materials with low carbon footprint which are now gaining place in construction, replacing non-renewable building materials. Hunton Nativo wood fibre insulation is a good example of innovation, while kenaf, reed and bamboo can still be enhanced and utilised in new applications in the building sector and beyond.

## 2. OIL BASED PLASTICS AND CONSEQUENCES

Plastic materials over the last 20 years, have become problematic for the natural environment, human habitat and most alarmig for the world's oceans. Curentlly, the world plastic production is mainly based on non-renewable resources, and non bio degradable. The million tonnes of plastic litter that end up in the oceans every year are one of their most visible and alarming signs of these problems, causing growing public concern.

### The pathway by which plastic enters the world's oceans Our World in Data



Fig. 1 [1]

The plastics industry is very important to the European economy, and increasing its sustainability can bring new opportunities for innovation, competitiveness and job creation, in line with the objectives pursued by the renewed EU Industrial Policy Strategy. [2]

A smart, innovative and sustainable plastics industry, where design and production fully respects the needs of reuse, repair, and recycling, brings growth and jobs to Europe and helps cut EU's greenhouse gas emissions and dependence on imported fossil fuels. [2]

## 3. ALTERNATIVES OF BIODEGRADABLE PLASTIC

A vast array of plastic products cannot easily, affordably and often actually be replaced with biodegradable alternatives. In applications of extreme stress, rough weather, many chemical, medical and other applications there are few if any more environmentally friendly alternatives to oil based plastics.

The environmental footprint of these oil based plastics can be reduced by better managing the materials, by choosing more suitable plastics for the various products and tasks they are designed for, and by recycling more of the plastics. Recycling of plastics is of course a complicated field as there are often uncertainties surrounding the material properties of a plastic mix, which makes it very risky for manufacturers to take the chance on reusing previously molded plastics.

When wanting to help save the environment it is important to delve into the details and understand the challenges associated with recycling. In many cases the cleaning processes, the transport and additives that will be used when recycling plastics and making it ready for being shaped or molded again, can have equally as resource intensive environmental footprints or even worse than using new plastics.

For a wide array of plastic products there are however options, and enormous potential for improvement and more environmentally friendly life cycle footprints by switching to biodegradable products, organic, waste based or even the most easily reusable of petroleum based plastics. Innovations in similar types of plastics to oil based using as an example AirCarbon with its methane based production provide more environmentally friendly versions of the types of plastics which it is hard to replace with more traditional plant based or organic alternatives.

AirCarbon has recently been certified as carbon negative by the Carbon Trust [3]



Fig.2 Biodegradable plastic

Biodegradable plastics is not with the annual needed volume of material for plastic manufacturing, a solution which can be quickly established without negative consequences along the human and animal food chain as an example. However by changing the mentality of the designers, and making slight changes to the product specs for many low stress/load products then resources can be saved in the millions of tonnes of materials + energy annually.

Challenges for companies designing products and manufacturers exists in needing their products to hold up to very high material standards to feel secure about not having to replace products. This is a reasonable way of thinking as many products aren't used in accordance with the intentions, and many users do not read instruction manuals or try to follow them.

Just like BMW, Mercedes, Bentley, Volkswagen and others are making revolutionary changes to the car and manufacturing industries by deliberately seeking to go green by including materials like hemp and kenaf, the building sector still has a huge potential for replacing energy intensive, toxic, polluting and resource intensive products with more sustainable alternatives. Products like spacers, casings, housings, decorative fixtures, ventilation pipes, furniture, kitchen utensils, handles, fans, clothing hooks, bath mats are just a few examples of products that can be made with easily degradable plastics based on organic or biodegradable plastics. Innovative products like QMilch, AirCarbon, alga based bioplastics and many other alternatives can increase the array of possible products and applications, where more sustainable plastics can replace more problematic ones.



Fig.3 Hemp plastic



Fig.4 Hemp-lime

## 4. HEMP INDUSTRY

Provide alternatives to pure fossil fuel-based plastics hemp industry is continuing growing and is proven efficiency with eco-friendly bioplastic, bringing the opportunity to manufacture products plastics that are more earth-friendly, at a comparable price to their fossil fuel-based counterparts.

### Key Features of Hemp Plastic Bioplastics:

- A near term solution to a customer's sustainability objectives
- Colours - 'earthy' appearance
- 10% lighter than many other filled plastics
- Immediately Positive – Reduce CO<sub>2</sub> and Consume Waste
- Consume a massive and growing industrial waste problem

The products feature significant improvements in CO<sub>2</sub> sequestration, use renewable sustainable materials, and, in some cases, are compostable and are generally designed to be drop-in replacements for conventional fossil fuel-based polymers.



## 5. CONCLUSIONS

By better handling our resources, and finding materials that are good enough for their applications, rather than always over shooting for the strongest and deemed safest materials, energy, material, processing and pollution reductions can be made in the millions of tonnes annually. Many sustainable plastic types have advantages over many of the oil based plastics in less toxicity, less allergies, less negative health consequences, reduced shrinkage when shaping and less environmental consequences when the product wear over time.

### References:

- [1] <https://ourworldindata.org/plastic-pollution>
- [2] EU –An European Strategy for Plastics in a Circular Economy
- [3] <https://www.prnewswire.com/news-releases/newlight-technologies-aircarbon-material-has-been-certified-carbon-negative-by-the-carbon-trust-301138193.html>