Glass fibre recycling

Reinforced thermoplastics

Demonstration of a process to recycle glass fibre wastes to produce polypropylene composites

BEFESA Plásticos

BEFESA - LIFE+ project
LIFE07-ENV-E-802
Summary of project scope

Innovative recycling process, in a demonstration plant to recycle glass fibre wastes (GFW) coming from glass fibre production and consumption markets, using them to reinforce thermoplastics with specific formulation. 150,000 tons per year of different types of GFW go to EU landfills. This project is a new way to introduce them in the market, as part of a plastic compound or composite. The process allows the recycle of reinforced plastics wastes coming from out of use cars and automotive sector. The final product is a recycled glass fibre reinforced plastics granules (rGRP), with adjusted properties for defined applications on automotive and appliance sectors mainly.

Main objectives of the project

To develop an industrial process on a demonstration scale for the recycling of glass fibre wastes, producing polypropilene composites, in such a way that allows the evaluation of its technical and economic feasibility to introduce it on large scale.
To reduce the environmental impact of glass fibre production, as well as the deposition of these wastes on UE landfills.
To recycle parts coming from the dismantle of out of use cars.
To disseminate the result of the project in EU in order to optimize the environmental improvement of the
Glass fibre wastes examples

BEFESA – LIFE recycle compounding process

PP+rGF granules
The project ends with the ok of potential customers to samples. 
- Not entail commercial commitments
- “The material is able to use for defined applications”
The process

- The process is the main innovation of the project.
- Recycling think up. Admit different types of wastes by different presentations.
- Main machinery technologic development to glass fibre wastes processing will allow future developments.
- Production capacity 2,000 Tm x line x year.
BEFESA Plásticos

BEFESA – LIFE demonstration plant
Main figures

Total investment: 6 mill €
Capacity 250 kg/h x line
Total surface: 6,400 m²
Built surface: 2,400 m²
Extension surface: 1,200 m²
Maximum high: 18 m

Production structure weight: 50 Tons
The mechanical properties of the recycled GF reinforced PP granules produced by this new process are between 85 and 95% of the common virgin materials.
Glass fibre production energy consumption
17 GJoules / GF ton

150,000 tons of glass fibre wastes per year
10% of production

2,5 mill GJoules
The energy of 60,000 tons of crude oil

500,000 PP+rGF tons
25% of the total market

GF wastes management cost 10-15% of virgin glass fibre price
PP+rGF granules economic competitive 15% - 30%

This recycled compound gives a way to automotive and appliance sector to reduce raw material costs and improve their environmental objectives
### Inputs

**% formula average**

<table>
<thead>
<tr>
<th></th>
<th>Glass fibre wastes</th>
<th>PP mix recycled 55% + virgin 15%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30%</td>
<td>150,000 tons/year generation of GF wastes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Process**

- Industrial and agriculture plastics wastes
- Thermoplastics market.

- Same energy consumption
  - kg CO₂/kWh

### Origin

**Recycled GF**

<table>
<thead>
<tr>
<th></th>
<th>Tm CO₂/Tm</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 55 / V 15</td>
<td>0,66</td>
</tr>
<tr>
<td></td>
<td>0,38</td>
</tr>
</tbody>
</table>

**Virgin GF**

<table>
<thead>
<tr>
<th></th>
<th>Tm CO₂/Tm</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% V</td>
<td>1,34</td>
</tr>
<tr>
<td></td>
<td>0,38</td>
</tr>
</tbody>
</table>

**Total**

- 1,04
- 2,5

**Reduction Tm Co₂/Tm**

|                | 1,46      |

### BEFESA – LIFE project emissions saving

- The first demonstration line will reduce the emission of 2,920 Tm CO₂ yearly (1.46 x 2,000 Tm).
- The plant is designed for 2 more lines.

**Sources:** SimaPro glass fibre at plant/RER/S 2005, European Platform on LCA, mix eléctrico español, inventario emisiones Befesa Plásticos.
Glass fibre wastes recycled during project execution

Alhama de Murcia
Demonstration plant