Introducing the World’s Lowest-Emission Hollow-Core Slabs

24th BIBM Congress
Mikko Marjalaakso, Senior Sales Manager
28 September 2023, Amsterdam
Building the new era of sustainable living environments

Betolar is a Finnish pioneering R&D and material technology company founded to reduce CO₂ emissions and consumption of natural resources.

>Geoprime® Innovation

Geoprime is Betolar’s 100% cement-free material technology solution that enables concrete manufacturing without cement and become ultra-low carbon emitter.

Betolar offers Geoprime as a licence agreement that includes a new concrete mix designs and R&D services for transferring production on to Geoprime.

>Betolar’s Customer Segments

- INFRASTRUCTURAL CONCRETE PRODUCTS
- PRECAST ELEMENTS
- LANDSCAPING PRODUCTS
- MINING INDUSTRY
- SIDE STREAMS & WASTE UP-CYCLING

>Locations

- **About us**
  - HQ in Finland, personnel >60
  - Listed on the Nasdaq First North Growth Market since 2021
  - Current main market areas: EMEA, India & SEAP
Time to shift focus from energy efficiency to material selection

### SHARE OF BUILDING'S LIFE CYCLE EMISSIONS*

<table>
<thead>
<tr>
<th>Component</th>
<th>Phase</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATERIALS</td>
<td>Construction</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>USE PHASE (ENERGY)</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>REPAIR &amp; DEMOLITION &amp; CONVERSION</td>
<td>8%</td>
</tr>
</tbody>
</table>

- **MATERIALS CONSTRUCTION USE PHASE**
  - Low carbon materials
  - Pre-fabricated modules
  - Sorting and recycling
  - Renewable energy
  - Efficient machinery
- **USE PHASE (ENERGY)**
  - Geothermal heating
  - Efficient cooling systems
  - Waste heat recovery
  - Local energy networks

*YIT Group CMD 2021
Why pay attention to Hollow-Core Slabs?

Hollow-core slabs contribute significantly to a building project's CO₂ emissions.

Hollow-core slabs comprise 32% of the CO₂ emissions of a precast residential building.

- Slabs 32%
- Piles 13%
- Partition walls 13%
- Balcony modules 2%
- Foundations 1%
- Others 39%
Internal 32% of the CO₂ emissions in precast residential building.

**GEOPRIME Hollow-Core Slab**

World’s lowest-emission hollow core slabs.

- **CO₂**
  - 32% of the CO₂ emissions in precast residential building

- Lower emissions compared to conventional product (~75%)
- Compliant (EN 1168)
  - Minimum required 5% cement by European Standards
- Circular Materials
  - Slag binders and alternative materials in development

Compatible with existing production facilities

Available now

Tested and verified with a leading industrial player

Compatible with existing production facilities

BETOLAR

**CONSOLIS PARMA**
## CO₂ Emission Comparison - O37 HCS

<table>
<thead>
<tr>
<th>Product</th>
<th>A1-A3</th>
<th>CO₂ Saving compared to reference</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic O37 Conservative</td>
<td>87,3</td>
<td>-</td>
<td>kg CO₂ /m²</td>
</tr>
<tr>
<td>Generic O37 Typical</td>
<td>72,8</td>
<td>~17 %</td>
<td>kg CO₂ /m²</td>
</tr>
<tr>
<td>Parma OPC</td>
<td>64,6</td>
<td>~26 %</td>
<td>kg CO₂ /m²</td>
</tr>
<tr>
<td>Parma Low Carbon</td>
<td>41,7</td>
<td>~52 %</td>
<td>kg CO₂ /m²</td>
</tr>
<tr>
<td>Geoprime HCS</td>
<td>20,8</td>
<td>~76 %</td>
<td>kg CO₂ /m²</td>
</tr>
</tbody>
</table>

Values are taken from public EPD calculations, Betolar’s A1 & A2 calculations from Betolar database A3 from Consolis Parma’s EPD.
Geoprime Hollow-Core Slab saves up to 266,000 kg of CO$_2$ emissions in a typical 7-storey, precast apartment building.
Thank you!

Q&A

Mikko Marjalaakso
Senior Sales Manager
mikko.marjalaakso@betolar.com