

Closing the carpet production cycle

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Credit: Karolina Grabowska from Pexels

Current trends show worldwide demand for carpet rising five percent annually, with production projected to reach 18.6 billion square meters per year by 2016. Good environmental performance and sustainability are now key priorities in this burgeoning industry.

To meet the challenge, the EU-funded project EUROCC2C CARPETCHAINS ('Towards closed loop chains in Europe') has set up a pilot [carpet](#) return and recycling programme in cooperation with flooring manufacturers, flooring contractors and waste collection and reprocessing companies.

"To close the production cycle, it is essential to be able to take back and process old carpets," says Marco van Bergen of project coordinator Desso. "Traditionally, the carpet manufacturing sector has operated in a linear fashion - virgin raw materials are transformed into yarn, backing and other elements used to make carpet. Later, at the end of its life, discarded carpet is simply thrown into municipal incinerators, cement kilns or landfill."

The process is, by definition, unsustainable, as modern carpets are largely made from synthetic, fossil fuel-derived materials, harmful to the atmosphere when burned, and non-renewable. "Moreover," says van Bergen, "we are living in a resource-constrained world where the linear economy of 'take, make and dispose' is unsustainable. There is a better way: reshaping businesses so that products are made to be made again in a circular fashion as seen in nature."

At Desso headquarters in the Netherlands, EUROCC2C CARPETCHAINS researchers set up an innovative pilot plant for the sorting and separation of carpet waste.

"The first step is to determine the yarn type," van Bergen explains. "To do this we use a special near-infra-red analyser. In 2009 we developed an innovative separation technique 'Refinity', which enables us to separate the yarn and other fibres from the backing. Thereby producing two main material streams which can be recycled. After an additional purification stage, the yarn, with the required purity, is returned to the yarn manufacturer for the production of new yarn."

"In the process, some virgin material is needed to compensate for losses and process inefficiency. For Polyamide 6 yarn this process takes place at Aquafil; one of our yarn suppliers. They are able to turn recovered post-consumer polyamide 6 carpet fibres into new polyamide 6 again and again."

The polyolefin-based layer of Desso's EcoBase backing is fully safely recyclable, whereas the bitumen backing currently used in most [carpet tiles](#) in Europe is reused in the road and roofing industry. All non-recyclable fractions can be used as secondary fuel in the cement industry.

One of the key results of the project, he says, is the recovery of polyamide 6 carpet fibres into new polyamide 6 again and again. In this way Polyamide 6 can be re-used for the production of new yarn, known as ECONYL yarn.

"We are continuing to develop the pilot installation," van Bergen says. "Further improvements will include efficiency upgrades and we will add necessary additional purification steps, but ultimately we do have high confidence that we can market the technology in the medium term."

EUROC2C CARPETCHAINS received about EUR 800 000 in EU funding and was completed in July 2013.

More information: [eaci-projects.eu/eco/page/Page ...ect_detail&prid=1933](http://eaci-projects.eu/eco/page/Page...ect_detail&prid=1933)

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