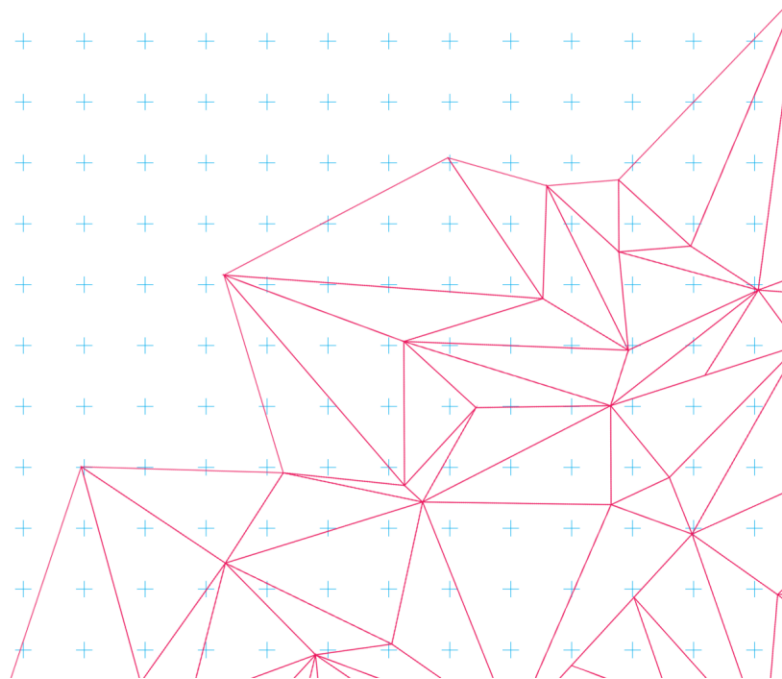


Challenge name	<i>Waste to Infrastructure & Other Applications</i>
Challenge owner	<i>Engineering Without Borders, Henny Romijn</i>
Brief summary	The Waste to Infrastructure project is an Engineers Without Borders NL initiative to work with partners in West Africa to turn the huge plastic waste problem into an entrepreneurial opportunity. Together with local businesses in West Africa, EWB-NL is looking to build a consortium of stakeholders in plastic waste to share knowledge and coordinate activities.

About the challenge owner

Engineers Without Borders (EWB) is a non-profit organization that brings together engineers and professionals to tackle global challenges through engineering and technology solutions. EWB is committed to improving the quality of life in disadvantaged communities worldwide by providing sustainable and innovative engineering projects and initiatives. EWB aims to create a global network of engineers and partners dedicated to tackling global development issues through innovative engineering solutions.

<https://www.ewbnl.org>



Challenge description

The initial goal is to grow the plastic recycling industry in West Africa by building basic infrastructure out of plastic bricks produced by local businesses. This is a diverse, ambitious project with many stakeholders and fields of knowledge. The plastic waste problem in Africa (and other parts of the Global South) is enormous. Landfills are overflowing and a lot of waste is also dumped and burnt in various non-designated places for lack of government means to organize proper collection everywhere. Degrading plastics find their way into water bodies and the food chain, endangering public health and food security.

The first example which has been realized is the construction of a school washroom in Northern Ghana out of plastic waste. The school lacked a real washroom and this creates hygiene and attendance issues amongst the students, especially girls. Working conditions of informal sector plastic waste collectors were also improved with protective gear. This example challenge was part of the TU/e USE-track called Decisions under Risk and Uncertainty (DURU) in in Q1 of 2022-2023.

Students could be working on a variety of directions, including:

- Enhancing the economic, environmental and social impact of the informal sector in the plastic waste value chain
- Environmental and techno-economic assessment of different recycling technologies
- Strategy and sustainable business model development for the plastic waste recycling market

Any of the topics of interest can be further developed and tweaked if it fits the objectives of challenge-based learning.

Challenge pictures and company logo



Input and involvement of challenge owner

EWB NL will function as the go-between between the TU/e students and teachers and the local EWB team in Ghana and the local communities who are involved in the plastic waste collection and development of re-use possibilities.

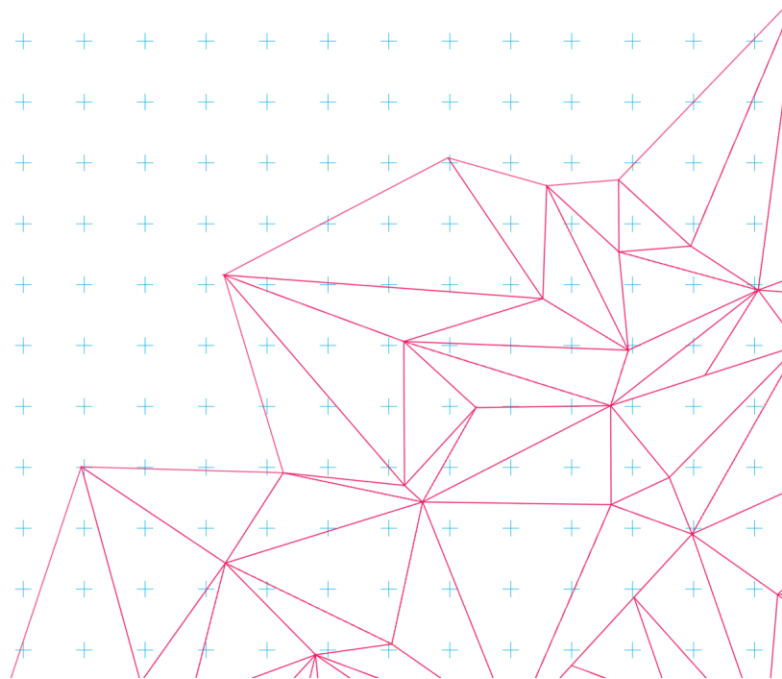
Resources

What resources are necessary for the students to work on the challenge?

It would depend on the specifics of the challenge(s) that would be chosen.

What resources do you offer to students?

EWB's expertise; international development cooperation; engineering ethics; design.



Roles of different disciplines (only for ISBEP)

Architecture, Urbanism and Building Sciences	Constructing houses and other buildings from plastic bricks requires knowledge about structural design, structural safety, and material properties. Students AUBS could assist with this.
Industrial Engineering	Expertise in the logistics and value-chain of bricks from plastic waste can be very helpful in understanding the potential business models and business ecosystems.
Mechanical Engineering	Material properties of plastic bricks is needed to understand the rigidity of buildings that are created with it. It might be that for larger buildings, other or stronger materials are needed to support the use of plastic bricks.
Sustainable Innovation	Using a waste product as raw material for building new buildings should reduce the amount of plastic waste that countries in West Africa struggle with. What this means for the sustainability of the system as a whole is yet unknown. In addition, issues around engineering ethics and the impact of sustainable innovations on a society can also be studied.

