

# Bentofix® Carbofol® Secutex® - Emission Reduction in Cities - Indonesia

## Lining System

- **Project Name**  
Emission Reduction in Cities (ERIC):  
Solid Waste Management, Indonesia
- **Supplier**  
PT. Geotechnical Systemindo (GSI) – Jakarta, Indonesia
- **Consultant**  
Fichtner GmbH & Co. KG – Jakarta, Indonesia
- **Product**  
Bentofix® NSP 3300  
Secutex® MR 1201  
Secutex® R 2001 (only used in Sidoarjo Landfill) Carbofol® HDPE 406 2,0 F/F GM13  
Carbofol® HDPE 406 2,0 s/s GM13





## Challenge

Indonesia is the fourth most populated country in the world, undergoing rapid urbanisation. With a population of over 276 million people and an urban population of approximately 57% (World Bank, 2021), Indonesia has been struggling with extensive greenhouse emissions. Especially inappropriate solid waste management is critical, particularly due to the lack of environmental infrastructure negatively affecting tourism. With that respect, the Government of Indonesia has set a target of reducing greenhouse gas emissions by 41% by 2030, where the improvement of solid waste infrastructure plays an important role in its national climate change strategy.

## Solution

On behalf of the German Federal Ministry for Economic Cooperation and Development, KfW Bank provided financial support to the Indonesian Government to implement solid waste disposal solutions according to state-of-the-art technical solutions at 4 locations: Malang, Jambi, Jombang and Sidoarjo.

As a base sealing system of the four sanitary landfills, a composite lining system containing a Bentofix® geosynthetic clay liner, a Carbofol® geomembrane and a Secutex® nonwoven geotextile, has been proposed and supplied by Naue and their partner PT. GSI. The consultant has approved this. The Naue composite lining system comprises of a Carbofol® geomembrane as the primary sealing layer and Bentofix® GCL as the secondary sealing layer. As a protection layer for the geomembrane, Secutex® nonwoven geotextile has been selected due to high protection efficiency.

A total of over 200.000m<sup>2</sup> of each geosynthetic clay liner, geomembrane, and nonwoven geotextile was supplied to the four landfills over three years. The application of Naue products ensured that all four sanitary landfills operate in an environmental, social and economic manner and secures greenhouse gas emissions reduction along with the protection of groundwater and surrounding habitat and biodiversity.

The project was initiated in 2019, with the first landfill to be built then in Jambi, followed by the landfills in Malang and Sidoarjo. The construction of TPA Banjardowo in Jombang faced a slight delay due to the pandemic and eventually started in 2021. The project was finished in mid-2022, and all four landfills are successfully operating.