
We don't see waste. We see resources



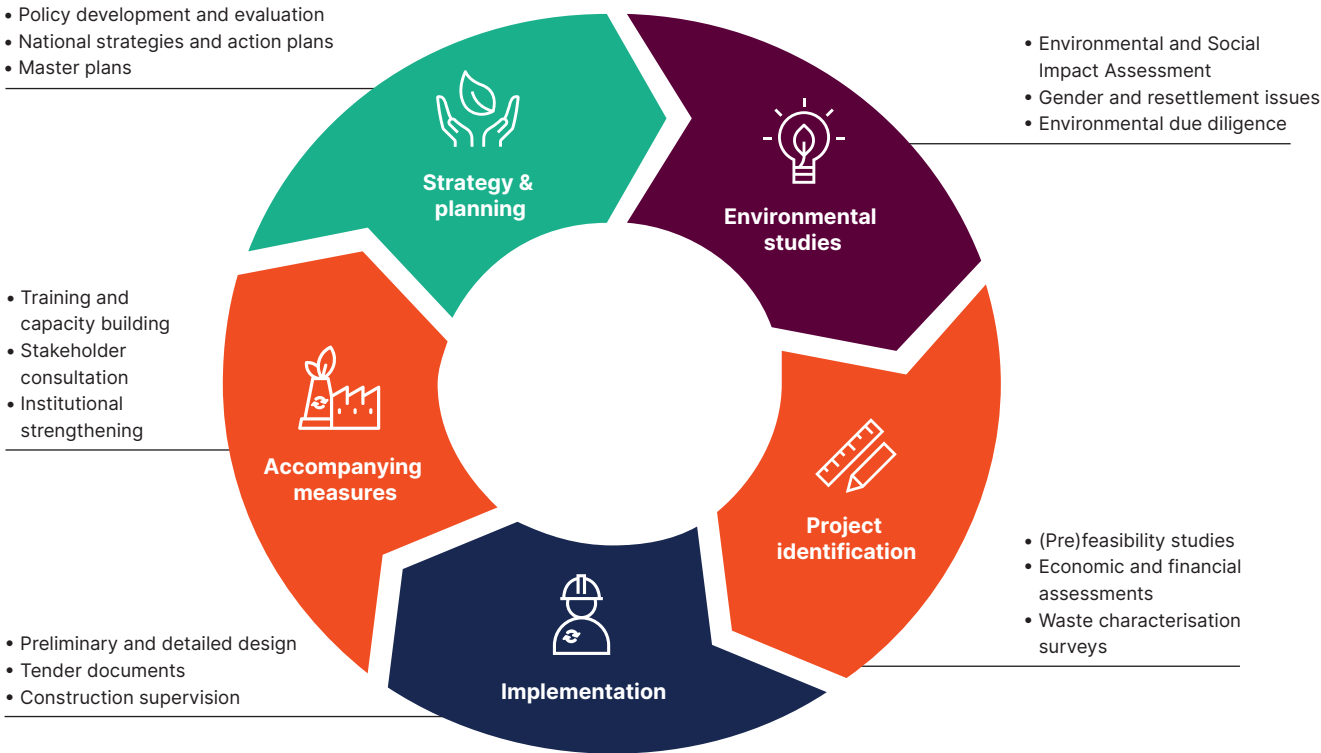
COWI





Resource and waste management

COWI is recognised as a world leader in waste management consultancy and engineering and ranked #1 in the Engineering News-Record (ENR) lists in 2021-2022. About 250 experts across the world work with projects in solid and hazardous waste. For more than 40 years, we have developed solutions that ensure quality and sustainable handling and disposal of waste. We are active on most continents, both through our head office in Copenhagen and our branch and project offices worldwide. Our projects range from rehabilitation of a dumpsite in Kolkata, India, over the development of systems for handling hospital waste in Egypt, to the establishment of waste-to-energy solutions on

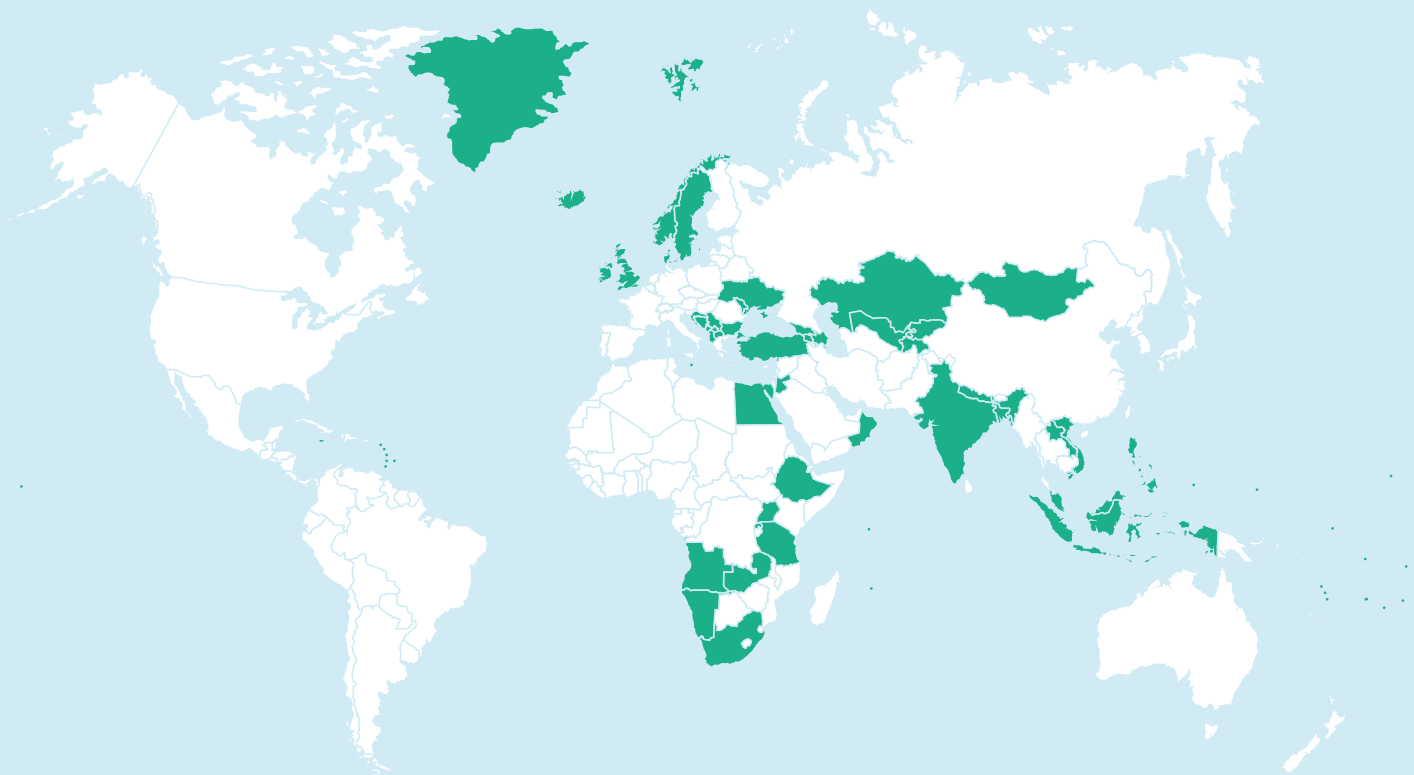
the Majuro Atoll in the Pacific Ocean. We offer the entire range of services, from strategic, institutional and legislative issues over economic and technical planning analyses to design, tendering, construction supervision and optimisation of facility operations. Environmental and climate considerations form an integrated part of all our projects, and we apply internationally recognised safeguard guidelines in our impact assessments. Training and capacity building of local beneficiaries are often important aspects. Our engineering services cover the entire lifecycle of waste management projects, from approach and planning over studies and designs to operation and site remediation and rehabilitation.



Our core business areas

-  Integrated planning and strategies for solid and hazardous waste management
-  Public-private partnership (PPP), organisation and transaction
-  Circular economy
-  Marine plastic pollution
-  Design, procurement and construction supervision
-  Waste-to-energy
-  Climate, environment and resources

100 International projects
in the last 15 years



Project location

- Europe: 35
- Southeast Asia: 12
- Asia: 32
- Africa: 21



Project budget

- < 100,000 EUR: 26
- < 500,000 EUR: 40
- < 1,000,000 EUR: 15
- > 1,000,000 EUR: 19



We work with the main IFIs

Including ADB, EIB, KfW, WB, DANIDA etc.

200 In-house experts with
various academic backgrounds



Solid waste



Sanitary landfills



Hazardous waste management



Circular economy



ESIA



Waste-to-energy



Economics



Institutional expertise



Diverse, multilingual and multidisciplinary team



Circular economy

- We increase capacities of the public as well as private sectors to implement **extended producer responsibility (EPR) systems**.
- We develop policies and strategies to **reduce the consumption of single-use plastic items**.
- We develop tools for waste flow monitoring and promote prevention and minimisation concepts to improve waste management practices and support the introduction of **the concept of green/circular economy**.



Integrated planning and strategies for solid and hazardous waste management

Waste management planning, from policy making to the selection of suitable technical solutions, is increasingly relevant due to the need to develop cost-effective and environmentally sustainable systems. At COWI, we believe that it requires an integrated and multi-disciplinary approach to create successful waste management solutions. In addition to technical aspects, financing, cost recovery and affordability are equally important aspects to consider, together with environmental and socio-economic issues. We use lifecycle thinking to plan modern technical waste management schemes and to advise on the most appropriate set-up.



Kolkata municipal corporation solid waste management improvement

This project involves technical, economic, financial, social and environmental due diligence for the improvement of solid waste management in Kolkata, the capital of the Indian State of West Bengal, which has 15 million inhabitants. The project's ultimate aim is to structure a USD 500 million investment programme for resilient and sustainable waste and sanitation improvements in the city. Our services include the development of a comprehensive planning model indicating the needs for new waste infrastructure and equipment, as well as preliminary engineering designs.

Client: ADB

Country: India

Period: 2020-2022

Central Georgia solid waste project – feasibility study

This comprehensive feasibility study, financed by KfW and EBRD, aims to determine the type of infrastructure required to optimise waste management in Central Georgia. It includes site selection and preliminary design of two regional landfills and up to five transfer stations, together with an option analysis for waste treatment technologies. An environmental and social impact assessment (ESIA) together with public consultations are to ensure the environmental and social acceptance of the proposed solution.

Client: Solid Waste Management Company of Georgia (SWMCG)

Country: Georgia

Period: 2019-2023



Healthcare waste management in Egypt

The overall objective is to provide health facility staff and the population of Dakhaleya Governorate with an efficient and sustainable healthcare waste management system. The expected results include the establishment of centralised healthcare waste incineration facilities in Dakhaleya, a prominent governorate located in the Nile Delta. These facilities will provide a safer alternative for the treatment of hospital waste and cover the needs of the whole governorate. Our services include development of a communication strategy, tender documents for the procurement of two incineration facilities, development of an overall waste collection and transfer system, and institutional strengthening of the Collection, Transfer and Disposal Department, which is responsible for hazardous medical waste management.

Client: SECO

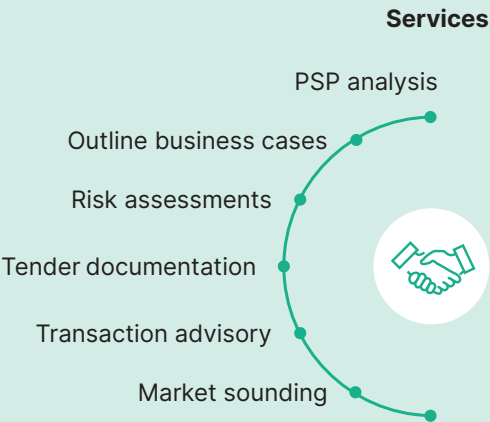
Country: Egypt

Period: 2021-2025



Private-sector participation, organisation, and transaction

In the past decade, the private sector has become increasingly involved in the delivery of waste services. Introducing private-sector participation (PSP) in the development of solid waste services can address the overall challenges of the system, be it waste collection, recycling, treatment through waste-to-energy or disposal in sanitary landfills. COWI assists in identifying advantages and disadvantages and in establishing well-designed and transparent PSP schemes. We regularly act as technical transaction advisor for the IFC, ADB and EIB among others. We have also been involved in the establishment of inter-municipal solid waste management companies in Denmark as well as abroad.



Kampala solid waste management project – technical, environmental and social consultancy

The Government of Uganda seeks to engage the private sector in the integrated management of solid waste within the city of Kampala, and the possible utilisation of landfill gas in the production of energy through a public-private partnership (PPP). COWI assists the IFC and the city in the requisite due diligence, structuring, and bid process management of the project. The overall outcomes of the project are: (I) Improve the efficiency of waste collection and management in the city of Kampala; (II) Avoid or reduce the fiscal burden of building new infrastructure; and (III) Institute a transaction structure that ensures the sustainability of this project and similar future PPP projects.

Client: IFC **Country:** Uganda **Period:** 2012-2022

Public-private partnership in Jamaica's solid waste management system

The solid waste management sector in Jamaica faces several challenges from inadequate collection to poor infrastructure of disposal sites that are unlined, have no leachate control or drainage systems, and have unmonitored groundwater or surface water. Collection is particularly low in rural areas where the main method of treatment and disposal is burning. Introducing private-sector participation in the integrated development of the country's solid waste sector is crucial to addressing the overall challenges of the system. The Government of Jamaica seeks to engage the private sector in the integrated solid waste management of the island and the utilisation of waste in the production of energy through a public-private partnership (PPP). COWI assists the IFC, a member of the World Bank Group, as technical advisor to assess the options for structuring a PPP transaction.

Client: IFC **Country:** Jamaica **Period:** 2018-2019



Supporting preparation of infrastructure projects with private-sector participation in Asia Pacific

Cebu City in the Philippines has a record of unsuccessful waste management practices with many ongoing complex challenges as the city becomes more urbanised. Current waste management practices have triggered legal actions, particularly with regards to Inayawan landfill, contributing to a need for viable and sustainable waste management solutions. Waste service provision is made challenging as some service obligations are being delegated to 80 administrative divisions (barangays), of which not all have functioning waste management departments. The Local Government Unit of Cebu City has received unsolicited proposals from private entities in relation to Cebu City solid waste collection, hauling and treatment. COWI provides transaction advisory services to secure the project – starting with the review of unsolicited proposals, and ending with the signing of final agreements with private service providers.

Client: ADB **Country:** The Philippines **Period:** 2019-2020



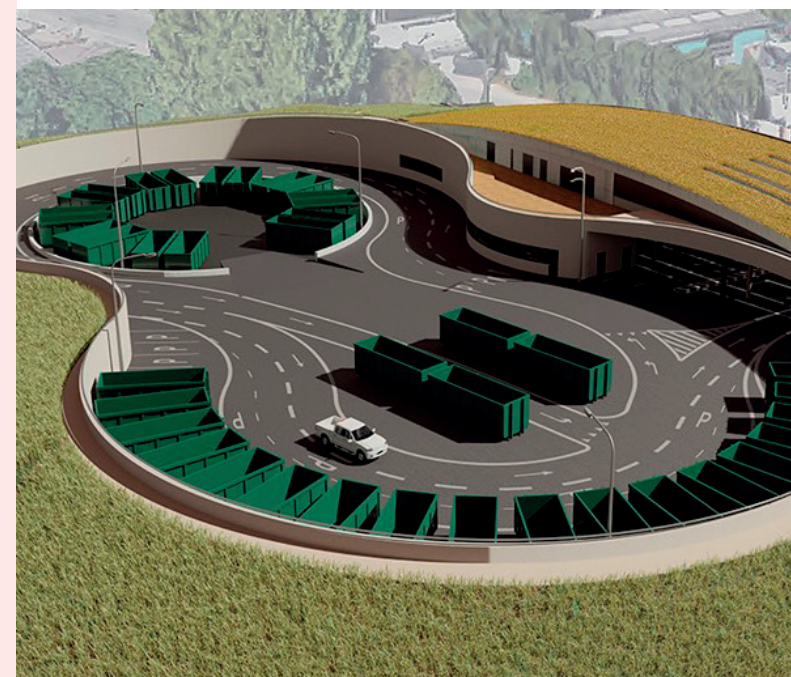
Circular economy

There is an increasing focus on turning waste into resources, both in public-sector and private-sector operations. COWI works closely with our customers to transform their mindset from a throwaway economy into a more sustainable and circular one. COWI has gained comprehensive experience in the establishment of recycling centres and in supporting waste-generating entities in selecting sustainable solutions for managing their waste.

COWI possesses first-hand knowledge of options for reuse of building materials in new builds.

To ensure that decision-makers are well informed on the environmental benefits of a circular approach, COWI has developed lifecycle assessment (LCA) calculation tools highlighting the environmental benefits of moving waste management practices up in the waste hierarchy.

Moreover, COWI has developed the criteria to support sustainable management of packaging waste within the Danish healthcare sector.



Sydhavn Recycling Centre

The Sydhavn Recycling Centre is in all respects a ground-breaking project. It not only converts waste into resources; it is sustainable in itself as it was built using recycled materials, including concrete, wooden elements and lighting fixtures.

Focusing on direct recycling, the centre clearly shows visitors that the delivered waste constitutes a resource that can be used either directly for the same function or in the production of new goods.

The establishment and operation of the centre are in line with the national resource strategy, 'Denmark without waste', which states that by 2022, twice as much of our waste must be recycled, except for construction and demolition waste.

With its remarkable geometry, the centre's shape is reminiscent of a figure-of-eight and includes paved surfaces at different levels.

In the pursuit of a sustainable design and construction, efforts were made to find and use as many recycled materials as possible. For instance, HOFOR's demolished chimney was used as aggregate in new concrete for the building walls facing the recycling site and for the large retaining walls around the driving area.

Client: I/S Amager Ressourcecenter (ARC) and Copenhagen Municipality

Country: Denmark

Period: 2017–2022

Support to waste management and development of circular economy in Georgia

The project aims to promote waste prevention and minimisation concepts (sorting, recycling and reuse of waste) to improve waste management practices and support the introduction of the concept of **Circular Economy** in Georgia's society and economic activities. This involves increasing the capacities of the public (ministries and municipalities) as well as private sectors (producers responsibility organisations) to implement extended producer responsibility (EPR) systems through the support and initiation of regulatory, organisational and technical actions for the separate collection and recycling of EPR waste streams. The project also foresees the development of a contemporary information exchange platform which will promote data flow between stakeholders in the waste management sector.

Client: The European Commission

Country: Georgia

Period: 2022–2024



Climate and environmental calculator for waste management

The project aims to develop a model for analysing climate change and environmental impacts of waste management that the Central Denmark Region can use to compare different future scenarios for its waste management. The tool intends to facilitate decisions that can meet the objectives set out in the Region's Development Strategy 2019–2030.

The tool can calculate the consequences of moving a certain amount of waste from one treatment option to another, typically from incineration to recycling. The tool considers 30 fractions and the following treatment options: landfilling, incineration, recycling in Denmark, recycling in the EU, reuse/product life extension or waste prevention. Input is modelled in EASETECH, which is a lifecycle assessment (LCA) software for waste management. The spectrum of fractions available for consideration is related to household-like waste, but also includes special fractions of waste from hospitals (e.g., textiles, various chemicals and medicine).

In addition, the project team also develops a tool for calculating the region's annual climate change impacts from waste management. The tool is tailored for use in green accounting.

Client: Region Midtjylland

Country: Denmark

Period: 2020–2021



Marine plastic pollution

Plastic pollution is the most widespread problem affecting the marine environment. It also threatens human health, food safety and quality as well as tourism and contributes to climate change. The main sources of marine plastic are land-based: urban and storm runoff, sewer overflows, beach visitors, inadequate waste disposal and management, industrial activities, construction and illegal dumping. COWI delivers consultancy services that specifically address marine plastic pollution. Our activities cover riverine and land-based surveys to quantify and qualify plastic litter as well as the development of action plans with tangible solutions for improvement.



Marine plastics debris sources deep dive study for selected Eastern Caribbean countries

The Caribbean region is extremely vulnerable to the impacts of marine pollution, due to the dependence of its people on natural resources in combination with its vast exposed coastlines. Understanding and addressing marine pollution are economic, environmental and social priorities. This project aims to support customers in the Caribbean region in understanding the sources of solid waste/marine litter, and to provide a comprehensive picture of marine pollution at national and regional levels in order to inform policy makers on how to protect their valuable coastal and marine natural capital.

Client: World Bank **Country:** Eastern Caribbean **Period:** 2020-2021

Diagnostics and advisory services on solid and plastic waste management in Lao PDR

Due to rapid urbanisation and economic development, solid waste volumes are increasing throughout Lao PDR. The project includes activities to support the development of a national plastic action plan, focusing on analytical work and surveys to analyse the types, quantities, sources and impacts of plastic waste that enter Laos's rivers. Furthermore, suitable policies and regulations to reduce the consumption of single-use plastic items are assessed. The overall objective is to generate, compile and disseminate knowledge that informs and shapes the development and implementation of policies and investments for enhanced solid and plastic waste management in Lao PDR.

Client: World Bank **Country:** Lao PDR **Period:** 2020-2021



National action plans for reduction of plastic consumption and marine litter

We are preparing a national action plan for the reduction of plastic consumption and plastic waste (littering) in Greenland. This action plan is inspired by similar action plans from the EU, Denmark and Iceland and identifies relevant focus areas as well as specific instruments, which are described and analysed in detail with respect to their expected effect on plastic consumption as well as economic impacts. It serves as the basis for the local government's future work on the reduction of plastic pollution, improved waste management and reduced marine litter.

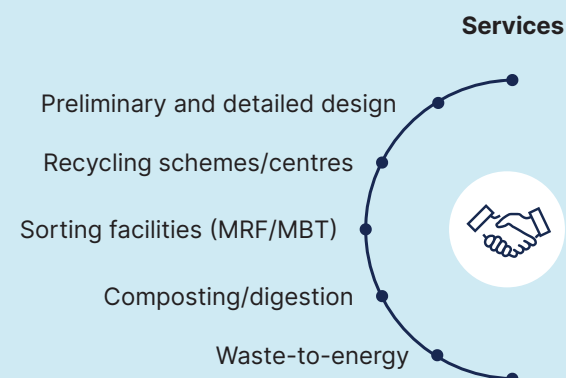
Client: National Government **Country:** Greenland **Period:** 2019-2020



Design, procurement and construction supervision

COWI has contributed to developing the waste collection and treatment sector in a large number of countries throughout the world.

Our direct involvement in planning and design of full-scale solutions has resulted in hands-on experience in all steps of the handling and disposal route. Our experts possess unique expertise in planning and implementing source segregation schemes and in establishing household waste recycling centres for sorting recyclable waste. Our know-how covers highly qualified input to design, procurement and construction of treatment plants, such as waste-to-energy facilities, material recovery facilities (MRF), mechanical biological treatment (MBT) plants, anaerobic digestors, composting plants and modern sanitary landfills.



Design, tendering and supervision of works environment and sustainable energy projects

The project aims to assist the client in implementing five pilot projects in the field of energy and environment in Central Java, Indonesia. The pilot projects are: landfill gas recovery and conversion at Jati Barang Landfill; soil remediation and clean-up in the village of Pesarean; mechanical/electrical works and supply of equipment for Cilacap refuse derived fuel (RDF)/solid recovered fuel (SRF) plant; renewable energy systems on the islands of Parang, Nyamuk and Genteng; and Daleman and Pucang Miliran wastewater project in Klaten. We not only review designs, prepare tender documents and assist during tendering and contract signing; we also act as the FIDIC engineer during construction supervision and defects liability.

Client: DANIDA

Country: Indonesia

Period: 2019-2024

Mare Chicose Landfill

Mare Chicose sanitary landfill is the only engineered landfill of Mauritius and covers an area of about 40 hectares of land. The project includes the preparation of bidding documents for post closure works at the landfill, supervision of works and operation over a period of 42 months, the preparation of bidding documents for landfill gas to electricity works on a build-own-operate (BOO) basis together with the preparation of preliminary and detailed design documents, as well as construction supervision for a new waste disposal cell. Since expansion of the landfill over adjacent areas is limited, vertical expansion without disruptions in the ongoing operation of the landfill is a critical element of the project.

Client: Ministry of Social Security,
National Solidarity and Environmental and
Sustainable Development

Country: Mauritius

Period: 2016-2022



Feasibility study and detailed design for the construction of a sanitary landfill in Kigali

The Water and Sanitation Corporation (WASAC) Ltd of the City of Kigali, Rwanda, with financing by Swedfund, hired us to carry out a feasibility study for a new municipal solid waste management (MSWM) system and prepare the detailed design for the construction of a new sanitary landfill in Kigali and the closure of two existing dumpsites, together with an associated environmental and social impact assessment (ESIA). The main objective of this project is to provide sustainable solutions for the improvement of solid waste management in general and for safe disposal and utilisation of waste in particular.

Client: Swedfund

Country: Rwanda

Period: 2020-2021

Monitoring of waste management contracts in Dili

In an effort to significantly improve waste storage, collection and disposal in Dili, the Government of Timor-Leste, represented by the Ministry of State Administration, has launched three sets of international competitive tenders for the solid waste management project in Dili, consisting of the following contracts: (I) supply of collection and landfill operations equipment, (II) collection and transportation of urban solid waste services, and (III) a design, build, rehabilitate and operate (DBRO) contract for the landfill located at zzBay in Liquiça Municipality, about 10 km west of Dili. We are there to provide performance monitoring support – from design review to periodic checks of operational performance – and to train project management unit staff in all aspects required to oversee and manage the contracts in the long run.

Client: ADB

Country: Timor-Leste

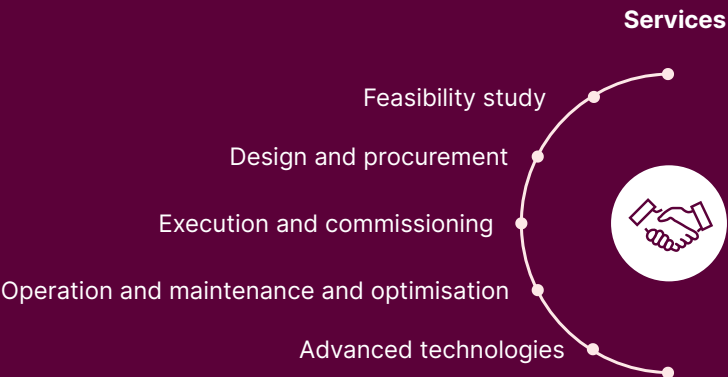
Period: 2021-2024





Waste-to-energy

The increasing focus on climate change calls for new sustainable solutions. Waste-to-energy is one of them. Energy from municipal solid waste substitutes fossil fuels and thus reduces CO₂-emission to the atmosphere. COWI has comprehensive experience in the thermal conversion of waste, from combustion in traditional boilers to the most advanced systems for gasification. We have assisted customers in numerous projects for combined heat and power plants (CHP), and for boiler units producing steam for industrial purposes. All these plants use refuse derived fuels or biomass.



Amager Power Station – BIO4 (incl. new biomass-fired CHP)

A new biomass-fired CHP plant unit (BIO4) is established at Amager Power Station, contributing to realising the City of Copenhagen's strategy to become the world's first carbon-neutral capital by 2025. The project consists of a new import harbour including woodchips storage and a power unit consisting of a circulating fluidised bed (CFB) boiler, flue gas cleaning/condensing plant and a turbine/generator unit. The turbine produces both electricity and heat for district heating. In the flue gas condensing unit, the moisture content in the flue gas is utilised for district heating, resulting in a total net efficiency of 112 per cent. Our services range from concept and detailed design, procurement including tender specifications, tendering and contract negotiations, to contract management and supervision during construction and commissioning.

Client: HOFOR
Energiproduktion A/S

Country: Denmark

Period: 2014-2020

New waste-to-energy facility in Malta

COWI acts as owners engineer to the government-owned Wasteserv Malta Ltd. The project involves construction of a waste-to-energy facility on the Maltese Islands with an expected annual capacity of approximately 190,000 tonnes per year. The overall objective of this infrastructure investment project is to oversee and manage the construction of a state-of-the-art waste-to-energy treatment facility, covering the preparation of necessary studies, documentation, and construction supervision, and ensuring its adequate integration into the municipal waste management system in Malta, contributing towards Malta's climate change obligations. We provide consultancy and supervision during the detailed design, construction and commissioning works, as well as during the operations monitoring period.

Client: Wasteserv
Malta Ltd

Country: Malta

Period: 2019-2024



Technical advisory on the construction of a waste-to-energy facility

Our team has been appointed to undertake basic and detailed engineering design for a 160 MW thermal power plant in Singapore. The project marks the first phase of a GBP 900 million integrated waste management facility, set to become the largest of its kind in the world. Phase 1 will have the capacity to incinerate 2,900 tonnes of combustible waste per day, generating 160 MW of electricity. The overall facility will be designed for a future Phase 2 expansion to arrive at a total waste incineration of 5,800 tonnes per day and will be integrated with a sludge disposal and food waste treatment facility. When completed, the overall integrated waste management facility (Phases 1 and 2) will combine a new three million tonnes waste-to-energy facility with a new sewage treatment and water purification plant.

Client: HOFOR
Energiproduktion A/S

Country: Singapore

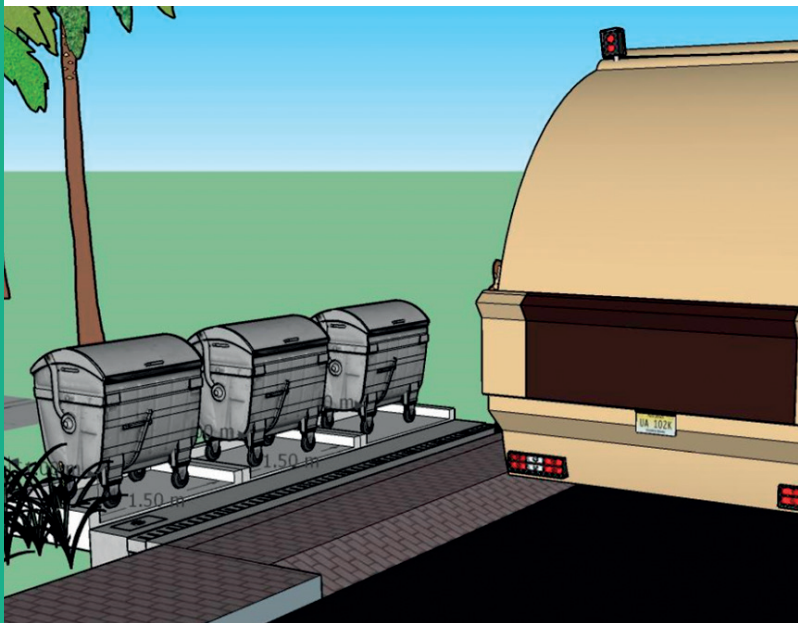
Period: 2019-2020



Climate, environment and resources

COWI carries out environmental and social impact assessment (ESIA) studies and thereby contributes to our customers' sound environmental and social adjustment of their plans and projects. This work is based on close collaboration between our environmental and social specialists, the customer and the project designers. We prepare ESIA documentation in line with international and national requirements for environmental and social safeguards. Contributions from project stakeholders at national, regional and community levels are integral parts of the ESIA procedures we follow during the preparation of investments for improvements in solid waste management systems.

As part of integrated solid waste management planning studies to ensure cleaner production and waste minimisation, we perform lifecycle analysis (LCA), material flow analysis (MFA) and also calculate expected reductions in emissions of greenhouse gases (GHGs) due to the proposed investments. Climate change and resource efficiency considerations thereby form part of the decision-making basis.



Moldova solid waste project feasibility assessment

The Ministry of Environment (formerly MARDE) of Moldova is the main authority developing waste management policies and regulations and the main promoter of the National Solid Waste Programme considered by the EBRD and EIB for financing of critical improvements in the solid waste management (SWM) system across the country. The feasibility studies and environmental impact assessment reports for investments prepared in 2017-2020 for waste management zones 1, 2 and 8 are reviewed by COWI. The identified gaps in the technical, institutional, financial, environmental and social components are identified and addressed in the updated project design, and the priority investment programme (PIP) for each of the zones to support the preparation of a bankable investment project. COWI's services include, e.g., a green economy transition (GET) analysis, an assessment of climate change trends and potential impacts on the project, as well as an assessment of measures recommended to enhance the adaptation and resilience of the improved SWM system.

Client: EBRD **Country:** Moldova **Period:** 2021-2023

Nal solid waste management programme (NSWMP) – consultant for Programme (BE) implementation – lot B

COWI supports the governorates of Kafr El-Sheikh and of Gharbia, located in the Nile Delta, in the preparation and implementation of investments in solid waste management (SWM) infrastructure including the regional landfills, waste transfer stations and MBT facilities planned within the NSWMP. COWI's services include the option analysis, updating of integrated SWM master plans, elaboration of preliminary design and performing the environmental and social impact assessment the ESIA for each of the planned investments. The ESIA's including the stakeholder consultation were conducted in accordance with international best practice, Egyptian regulations and the KfW Sustainability Guideline. The vulnerability of informal waste pickers and other social groups, as well as the employment opportunities and working conditions during construction and operation of the planned solid waste management facilities are among the issues addressed in the ESIA's. The tender documents prepared by COWI include environmental, social, health and safety (ESHS) specifications for the construction contacts under the NSWMP.

Client: KfW **Country:** Egypt **Period:** 2016-2023



Consulting services for conducting environmental and social impact assessment of the Ddundu Waste Treatment and Disposal Facility (DWTDF) in Kampala

The Kampala Capital City Authority (KCCA) prepares the establishment of Ddundu Waste Treatment and Disposal Facility (DWTDF) as part of the PPP arrangement for the development and implementation of an integrated solid waste management system for Kampala allowing to close the existing Kiteezi waste disposal site. COWI has been contracted to prepare the ESIA and a resettlement action plan for the planned DWTDF project to meet the requirements of the national policy, legal and regulatory framework, as well as the IFC Performance Standards on Environmental and Social Sustainability (2012). The ESIA includes an assessment of potential impacts of climate change on the operation of landfill and composting plant, landfill gas management system, leachate collection and treatment system included in the DWTDF project. A set of measures is proposed for mitigating the impacts and for adapting the facility throughout the project lifetime.

Client: Cities and Infrastructure for Growth (CIG) **Country:** Uganda **Period:** 2020-2022

COWI's map of the world 2023

**Reference**

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Together with customers, partners and colleagues, we shape a future where people and societies grow and flourish. We do that by co-creating sustainable and beautiful solutions that improve the quality of life for people today and many generations ahead.

Our starting point is gaining a deep understanding of our customers, their aspirations and concerns. This is what sets us apart and how we deliver long-term value.

Primarily located in Scandinavia, the UK, North America and India, we are currently 7,500 people, who offer our expertise in engineering, architecture, energy and environment.

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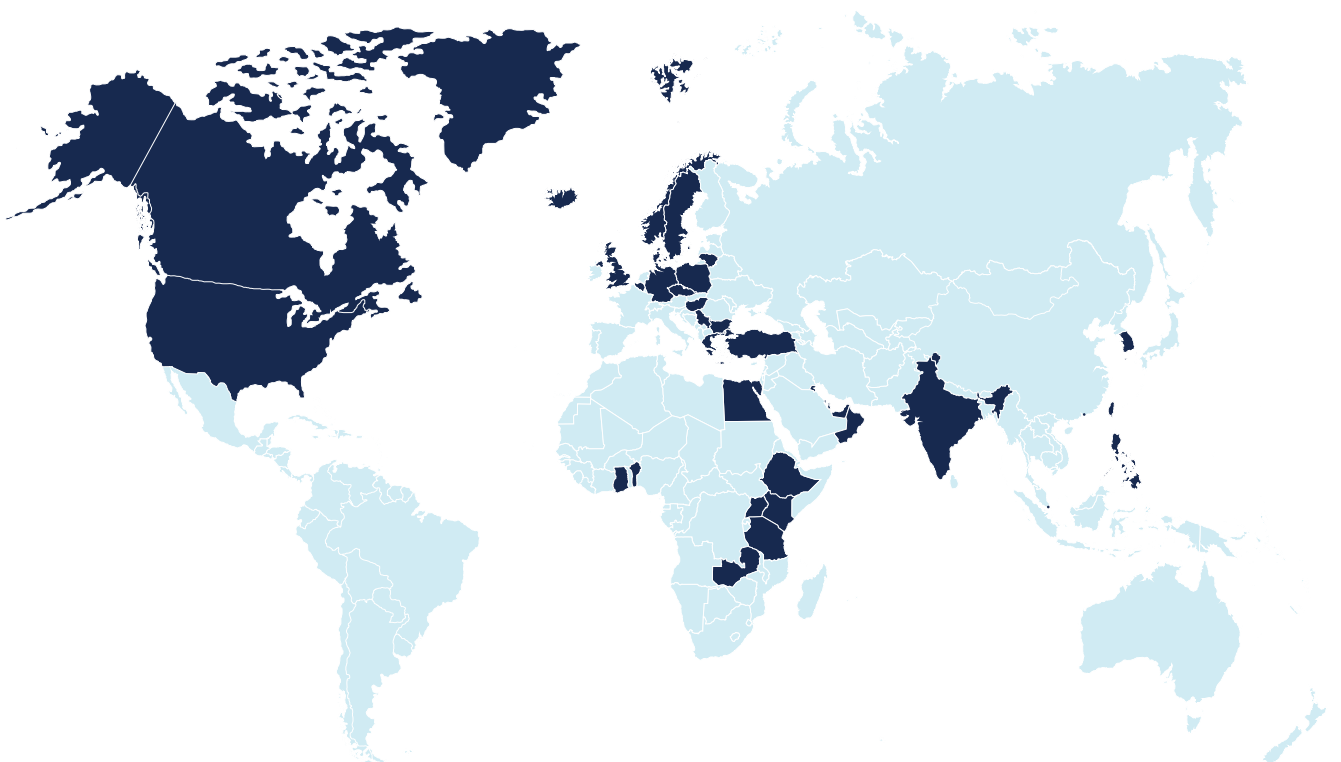
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