

WE DON'T THINK OF WASTE,  
WE THINK OF RESOURCES



COWI



## COWI RESOURCE AND WASTE MANAGEMENT

COWI is ranked 3rd in the world on News-Record's list of International Design Firms in Solid Waste. More than 100 of COWI's specialists work with waste issues and waste-related projects. For more than 40 years we have worked with solutions that ensure quality and sustainability in the handling and disposal of municipal and hazardous waste. We work on waste projects on most continents, and our projects range from rehabilitation of a waste dump in Kolkata, India, over the development of systems for handling hospital waste in Lesotho and Serbia, to the establishment of recycling solutions on the island of Saint Helena in

the South Atlantic Ocean. Our consultancy services cover a whole range of services from organizational, institutional, legislative issues over economic and technical planning analyses to design tendering, construction supervision and optimization of facility operations. Environmental and climate considerations are an integrated part of all our projects and we perform environmental and risk assessments related to the operation of individual facilities as well as regional schemes. Training and capacity building are important aspects in many of our projects.

# INTEGRATED PLANNING AND STRATEGIES FOR SOLID AND HAZARDOUS WASTE MANAGEMENT

Waste management planning from policy making to technical solution is increasingly relevant due to the need for cost-effective and environmentally sustainable solutions. In COWI we believe that it requires integrated and coherent solutions to create successful waste management solutions. In addition to technical aspects, it is our experience that financing, cost recovery and affordability are equally important aspects to consider together with environmental and socio-economic issues. We use life-cycle thinking to plan modern technical waste management schemes and to identify the most appropriate solutions.

## SERVICES

- › Integrated planning
- › Feasibility studies
- › Financial analysis
- › Economic modelling
- › Cost benefit analysis
- › Waste characterisation analysis
- › Materials flow analysis (MFA)



### DELHI WASTE MANAGEMENT MASTER PLAN

Feasibility study and master plan for optimal waste treatment and disposal based on public private partnership solutions and involving CDM option for the Municipal Corporation of Delhi (MCD). State. The project resulted in 1) The most suitable mix of municipal solid waste processing facilities with sustainable commercial viability 2) A plan for implementing the recommended options and 3) PPP-procurement of DBFO services from external waste management contractors. ▲

**CUSTOMER:** UN/UNOPS  
**COUNTRY:** India

### TREATMENT OF HEALTH CARE WASTE IN SERBIA

The healthcare waste management system in Serbia is being improved in accordance with Serbian requirements and EU directives. The results are

1. Develop technical guidelines, standards and policies
2. Develop, implement and maintain a comprehensive monitoring system for healthcare waste and support capacity building and awareness programmes
3. Support the effective implementation of the new healthcare waste treatment equipment in health and veterinary institutions. ▲

**CUSTOMER:** Delegation of the European Union to the Republic of Serbia  
**COUNTRY:** Serbia

### OMAN WASTE CHARACTERISATION STUDY

Execution of a national solid waste quantification and characterisation study for hazardous and non-hazardous waste streams to enhance OESHCO's database on solid waste and to generate additional information for improving diversion efforts and estimating associated costs involved in managing the waste streams. The project included 1) Waste categorisation and classification survey of international best practice 2) Development of electronic waste information system for prognosis of waste generation. ▲

**CUSTOMER:** Beah - Oman  
**COUNTRY:** Oman



### SOLID WASTE MANAGEMENT IMPROVEMENT INVESTMENT PROGRAM

Preparation of 1) A strategic development plan for the waste sector, development of an implementation road map and a long-term investment plan (covering institutional development, sector capacity enhancement, prioritization of required investments over the next 20 to 30 years) 2) Feasibility assessment of the envisaged investment package for individual projects selected from the road map and review and recommendations on institutional management structure (national/regional/municipal). ▲

**CUSTOMER:** ADB  
**COUNTRY:** Armenia

## SERVICES

- › Life cycle analysis
- › Environmental impact assessment
- › Environmental impact statement
- › CO<sub>2</sub> profile
- › Cleaner production
- › Waste minimisation

# CLIMATE, ENVIRONMENT AND RESOURCES

COWI carries out environmental and social impact assessments (ESIA) and thereby contributes to our customers' sound environmental and social adjustment of their plans and projects. We emphasize a close collaboration among our environmental specialists, the customer and project designers during the projects. In accordance with international guidelines, we place emphasis on a participatory approach in carrying out ESIA studies. Contributions from stakeholders and the public are often mandatory and are likely to result in a smooth process favourable to all parties. As part of integrated SWM planning studies we also involve LCA and "life cycle thinking". Climate and resource considerations thereby form part of the decision making on future SWM strategies and system designs.

### ENVIRONMENTALLY SOUND MANAGEMENT OF STOCKS OF OBSOLETE PESTICIDES (POP)

COWI is in charge of a project for DEPA in Pskov and Vologda with the main objective of demonstrating safe and environmentally sound management of obsolete pesticides. In total, COWI has collected 674 tons of obsolete pesticides. ▴

**CUSTOMER:** Danish Environmental Protection Agency  
**COUNTRY:** Russia



### WASTE MANAGEMENT CENTRE

COWI has carried out an environmental impact assessment of a national waste management centre in Qatar (total capacity 400,000 t/year). The centre is operated by Keppel-Seghers and comprises mechanical sorting of all incoming municipal waste, energy recovery from the combustible fraction, anaerobic digestion of the organic fraction, crushing of construction and demolition (C&D) waste and finally landfilling of all residues and received inorganic waste. The work included assistance in technology assessment, dispersion modelling of air emissions and odour, noise assessment via SoundMap and calculation of the CO<sub>2</sub> balance for the centre. ▴

**CUSTOMER:** Keppelseghers Waste Management Contractor  
**COUNTRY:** Qatar



### BIOLOGICAL WASTE TREATMENT

Together with RPS Consulting Engineers, COWI is the client's representative for a materials recovery facility plant including mechanical biological treatment. The integrated waste centre is established at a greenfield site at Cork, Ireland, for the Cork County Council. ▴

**CUSTOMER:** Cork County Council  
**COUNTRY:** Ireland

### LIFE CYCLE AND COST BENEFIT ASSESSMENT OF RECYCLING EFFORTS FROM DANISH HOUSEHOLDS

The project comprised a Life Cycle Assessment (LCA) and a Cost Benefit Analysis (CBA) of seven different integrated systems for collection, centralised sorting and treatment of household waste. The LCA was carried out based on marginal effects calculating the environmental impacts (green house effect, acidification etc) from all operations in the waste system. ▴



**CUSTOMER:** Danish Ministry of Environment  
**COUNTRY:** Denmark

# DESIGN, PROCUREMENT AND CONSTRUCTION SUPERVISION

COWI has been involved in 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 on all steps of the handling and disposal route. We possess extensive experience with planning and implementing source segregation schemes and in establishing household waste recycling centres for disposal of recyclable waste and other waste fractions. Our know-how also covers highly qualified input to design, procurement and construction of treatment facilities using technologies such as MRF, AD, composting, EfW as well as modernly controlled landfills.

## SERVICES

- › Collection services
- › Transfer stations
- › Recycling schemes
- › Household waste recycling centres
- › Sorting facilities (MRF/MBT)
- › Composting/AD
- › EfW
- › Landfill (rehabilitation, new design)



### ERECTION OF A 180,000 T/ YEAR INCINERATION PLANT IN ESBJERG

The plant converts industrial and household waste to power and heat. COWI was responsible for supervision during the construction phases. COWI's services also included assistance during commissioning and handing over of the waste-to-energy facility as well as provision of maintenance plans and HAZOP study.

Finally, COWI prepared an environmental impact assessment (EIA) of the entire plant in order to obtain authority approval of the plant. ▾

**CUSTOMER:**

Danish Waste Supplier Association, L90

**COUNTRY:**

Denmark



### POLICY STATEMENT ON THE DESTRUCTION OF HAZARDOUS WASTE BY INCINERATION

COWI is assisting the Department of Environmental Affairs and Tourism in South Africa with developing a policy statement on the destruction of hazardous waste by incineration, and a policy on the use of hazardous waste in cement kilns as a fuel replacement. ▾

**CUSTOMER:**

Department of Environmental Affairs and Tourism

**COUNTRY:**

South Africa

### ARC MATERIALS RECOVERY FACILITY

ARC is an intermunicipal waste management company in the Capital City of Copenhagen. The materials recovery facility will include automated mechanical sorting of up to 40,000 tons of pre-sorted household waste. The facility is designed for advanced and efficient separation of paper, cardboard, plastics and metals of up to 95% purity. ▾

**CUSTOMER:**

ARC

**COUNTRY:**

Denmark



### COPENHAGEN LANDFILL

The landfill is situated at reclaimed land 10 km from the city centre. It covers an area of 40,000 m<sup>2</sup> and has a potential waste volume of 2 mill. m<sup>3</sup>. The landfill is divided into 10 separate cells lined with in-situ clay liner. It receives approx. 100,000 tons of waste per year covering non-combustibles, asbestos and other special waste streams as PVC, impregnated wood and car shredding waste. ▾

**CUSTOMER:**

AV Miljø landfill company

**COUNTRY:**

Denmark



### COMMUNITY RECYCLING CENTRES

Community recycling centres often form an integral part of the collection of recyclable materials and special waste fractions - again forming part of an integrated and coherent solution on waste handling, resource recovery and waste disposal. COWI has planned and designed more than 40 community recycling centres.

Each of these is designed based on the cradle to cradle principles involving environmentally friendly and CO<sub>2</sub> neutral design, use of secondary raw materials in the construction as well as of cost effective layout and daily routines. ▾

**CUSTOMER:**

Affald Plus

**COUNTRY:**

Denmark

## SERVICES

- › PPP analysis
- › Outline business cases
- › Risk assessments
- › Procurement services
- › Transaction DBO and DBFO/BOO/BOOT services

# PPP, ORGANISATION AND TRANSACTION

During the last decade, the private sector has become increasingly involved in the delivery of waste services. COWI assists in identifying advantages and disadvantages and in establishing well-designed and transparent PSP schemes including public private partnerships (PPP). On several International Finance Corporation and other transaction projects we have been acting as the technical consultant. COWI has also been involved in the establishment of inter-municipal solid waste management companies in Denmark as well as in other countries.



**CUSTOMER:** World Bank/PPIAF  
**COUNTRY:** Croatia

### PPP IN WASTE MANAGEMENT IN CROATIA

COWI has provided the Croatian Northwest Regional Waste Management Facility (JUSZH) with advice on international best practice examples in the structuring of waste facility projects under a PPP. COWI helped determine the most suitable PPP options in accordance with the constraints of the project, conducted a market-testing workshop, presented the advantages and disadvantages of these options to JUSZH founders and other relevant authorities in a clear and concise manner, and finally decided what type of further external advice JUSZH needed for the tender process. ▴

### PUBLIC-PRIVATE PARTNERSHIPS IN ROMANIAN WASTE MANAGEMENT

Arges County in Romania is introducing an integrated waste management system. COWI provides the consultancy on how to involve the private sector in managing waste in the county. Drawing on state-of-the-art international best practice in the PPP field and the waste sector, COWI has carried out detailed due diligence analyses of the existing operations and systems and advised the county on the structuring of the PPP transaction. COWI has also prepared the PPP tender and contract material. ▴



**CUSTOMER:** EU  
**COUNTRY:** Romania



**CUSTOMER:** Greater Dublin Waste Authorities  
**COUNTRY:** Republic of Ireland

### GREATER DUBLIN WASTE TO ENERGY PROJECT

Transaction project for the procurement of a DBFO contract with a public private partnership (PPP) company for thermal treatment of 400,000 tons of municipal waste per year. The project included 1) preparing regional waste management strategies and plans 2) setting up business cases for waste handling and disposal 3) carrying out tender procedure 4) preparing technical specifications for the DBFO contract 5) handling negotiations with suppliers and contractors. ▴



**CUSTOMER:** World Bank/IFC  
**COUNTRY:** Azerbaijan

### PRIVATE SECTOR PARTICIPATION IN AZERBAIJAN WASTE SECTOR

The main objective of the project is to prepare a solid waste management private sector participation strategy paper. The strategy paper is to provide policy recommendations to assist the Government of Azerbaijan in developing a national strategy for integrated solid waste management for improving solid waste management infrastructure, service levels and financial sustainability through options of increased private sector participation. In particular, the analysis will undertake a legal and institutional review; identify investment needs and potential funding sources and inform the Government on necessary steps to improve the framework conditions for private sector participation (PSP) in solid waste management. ▴

# LEGAL AND INSTITUTIONAL ARRANGEMENTS

COWI offers solid legal advice for the waste management sector, and has been involved in a wide range of projects in the waste management area. Our experience ranges from legal gap analyses, drafting of national framework and sector-specific legislation, including secondary regulation, instructions and guidelines, over the preparation of local by-laws, to monitoring and enforcement issues. At the same time, COWI covers aspects related to the public administration of legal, regulatory and institutional arrangements involving capacity development and strengthening of the public sector responsible for these aspects. Public awareness and information/education measures are also important components in our solid waste management projects.

## SERVICES

- › Regulatory instruments
- › Gap analysis of legislation
- › Institutional strengthening
- › Public awareness campaigns
- › Public opinion surveys



**CUSTOMER:**  
EU

**COUNTRY:**  
Turkey, Bulgaria,  
Romania, Croatia

### CAPACITY DEVELOPMENT OF ENVIRONMENTAL AUTHORITIES

COWI provided technical support to and on-the-job training of task managers in the ministries of environment and planning/finance in each of the four countries and training in environmental policy issues and environmental financing strategies. COWI also developed national environmental financing strategies for each of the four countries especially related to the water and waste sectors, but also addressing air and industrial pollution. ▾

### LITHUANIA'S WASTE AND INDUSTRIAL POLLUTION PREVENTION AND CONTROL (IPPC) APPROXIMATION PROJECT

The purpose of the project was to strengthen Lithuania's capacity for implementing EU environmental legislation and approximate Lithuania's laws on waste management and on industrial pollution prevention and control (IPPC) to EU requirements. COWI facilitated the creation of a coherent waste sector in Lithuania which is financially, institutionally and environmentally sustainable. Main outputs were five new regulations within waste management and landfilling and four new regulations within IPPC. Landfill guidelines framework for an operational recycling system for Lithuania were also prepared. ▾

**CUSTOMER:**  
Danish and Lithuanian  
Ministries of  
Environment  
**COUNTRY:**  
Lithuania



### RUSTAVI SOLID WASTE MANAGEMENT PROJECT

COWI assisted Rustavi in establishing a landfill management company and in selecting human resources with relevant/suitable qualifications. COWI also prepared a list of equipment needed for proper functioning of the company and carried out initial training of staff on the basics of landfill management. ▾

**CUSTOMER:**  
EBRD

**COUNTRY:**  
Georgia

# COWI'S MAP OF THE WORLD 2013

With more than 6,200 employees and offices in more than 20 countries worldwide, we have executed projects from the suburbs of St Petersburg to the top of the Mount Everest. At any given time, we are involved in more than 17,000 projects all over the world.



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## POWERING YOUR 360° SOLUTIONS

COWI is a leading consulting group that creates value for customers, people and society through our 360° approach. We tackle challenges from many vantage points to create coherent solutions for our customers.

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