



Worldwide Consultant

in Biomass and Waste Projects

DP CleanTech
Creating value from waste



Worldwide Consultant in Biomass and Waste projects

DP CleanTech Ltd (DP) is an independent, global company specializing in the management and conversion of various waste streams to sustainable energy and products. DP owns the leading European technologies for Biomass to power, Anaerobic Digestion and Landfill Remediation and has completed over 300 projects around the world.

DP is headquartered in Europe and has 7 offices in 6 countries across Europe, Asia and the Middle East, employing ~100 employees worldwide.

DP is well recognised as experts in the design, manufacture and operation of biomass combustion and waste management solutions. DP offers a fully integrated product and services proposition, with capabilities in engineering design; equipment manufacturing and sourcing; installation; commissioning and servicing.

With our considerable experience and technical expertise in all aspects of project design and management, DP also offers an independent consultancy service to provide critical insights for project owners and developers seeking the best advice and information for their new or existing project, wherever it is located. Our operational experience adds a further dimension to our capabilities for troubleshooting problem projects.

DP's Consultancy division is an international team of highly experienced and globally mobile professionals who have worked on projects in all continents. They have unparalleled knowledge of commercial project design and implementation and are supported by Centres of Engineering Excellence in Denmark, Poland and the UK to provide technical advice and analysis.



DP has experience and technologies in



Advanced Combustion



Gasification



Anaerobic Digestion



Waste Sorting and Processing



Materials Recovery



Emissions Management



Landfill Mining



Landfill Remediation

DP's technologies and service projects are referenced in over 300 projects in 42 countries around the world. Some projects have been operating successfully for over 20 years, and our depth and breadth of experience is key to the success of our consultancy business which include clients from all the industry segments: major utilities, governments and municipalities; independent power producers (IPP's); project developers; industrial users; private investors and EPC contractors.

DP technology is behind the first biomass plant in the world in 1996, and the first commercial plant in China in 2006. The technology and knowhow behind the first European waste collection and processing facilities originated with DP engineering experts in the 1990's; and has been further complemented with groundbreaking landfill mining and remediation technologies.



DP Consultancy Services for Biomass and Waste to Power

DP offers services throughout the project development and implementation process across all waste and biomass projects.

Project Development



- Conceptual study
- Pre-feasibility study
- Feasibility study
- Environmental impact assessment (EIA)
- Fuel analysis and feedstock plan
- Waste audits
- Waste management studies, concepts and strategies
- Investment studies and business plans
- Landfill gas surveys
- Landfill remediation studies
- Site selection and site development
- EPC contractor tendering, selection
- Economic impact analysis
- BAT (Best Available Technology)
- Technology due diligence

Project Analysis, Design and Implementation



- Conceptual and Preliminary plant and technology design
- Capex/Opex modelling
- Risk Assessment
- RFQ
- Pre-qualification
- Bid evaluation and contract negotiation (FIDIC or Other)
- Owners Engineer support
 - Procurement
 - Progress
 - Installation
 - Commissioning
- Operation & Maintenance support

Plant Consulting Services for Existing Projects



- Economic modelling
- Plant audits
 - Technical due diligence
 - Process review
 - Automation
- Plant optimisation review
- Plant upgrade
- Plant retrofits



Project References Around the World

Biomass Energy

| Year | Project Location | Scope of Supply | Fuel |
|-----------|------------------------|--|----------------------------|
| 2011-2012 | Poland | Pre-engineering and basic design | Straw and wood chips |
| 2013 | El Salvador | Fuel study and conceptual design | King grass |
| 2013-2014 | Chile | Conceptual design and pre-engineering | Straw and wood chips |
| 2015 | Nicaragua | Fuel study and conceptual design | Giant king Grass |
| 2015 | Ngodwana, South Africa | Pre-engineering and conceptual design | Wood chips |
| 2017 | Punjab, India | Conceptual design | Rice straw |
| 2017 | Australia | Pre feasibility study | Invasive native scrub |
| 2017 | UK | Fuel and design study | Chicken litter |
| 2017 | China | Project corrosion study | Waste wood |
| 2017 | Myanmar | Coal to biomass conversion study and conceptual design | PKS, EFB, fibre, woodchips |
| 2017 | Oahu Hawaii | Fuel study and conceptual study | Waste wood |
| 2018 | Hawaii, Maui | Fuel study and conceptual design | Sorghum |
| 2018 | Mauritius | Fuel study and conceptual design | Arundo donax |
| 2019 | Shinmoji, Japan | Pre-engineering | PKS |

Straw Fired Plant in Winsko, Poland

In 2011-2012, Polish Energy Partners (PEP) started its straw fired power plant program in Poland, and the 29 MWe plant in Winsko was the first project, using straw as the primary fuel. DP's scope was the firstly the preparation of all plant pre-engineering and basic design in order to obtain the water, building and environmental permits required for the project; and secondly to provide the procurement package and BOQ.

Assignment

Pre-engineering, basic design and BOQ

Client

Polish Energy Partners SA

Services

Technical assistance, procurement assistance

Plant Information

29 MWe Straw fired plant with fuel consumption of 85 MW/h





Biomass Fired Plant in Ngodwana, South Africa

In 2015 ELB and KCC were selected as the preferred bidder for a 25MW biomass project at Sappi Ngodwana Mill in Mpumalanga, South Africa. The project was selected in the 4th window of the South African Department of Energy's Renewable Independent Power Producers Procurement Programme (REIPPPP). The project partners are a global consortium of Sappi Southern Africa, KC Africa and Fusion Energy.

Assignment

Pre-engineering, basic design and BOQ of boiler Island

Client

KCC /ELB Engineering Services as EPC contractor

Services

Pre-engineering, technical assistance, project management

Plant Information

25 MWe biomass fired plant. Commercial operation to start in 2020



Biomass Fired Plant in NSW, Australia

A 2-phase pre-feasibility study in late 2017 to evaluate the potential for developing Invasive Native Scrub (INS) 30 MWe biomass-fired power plant projects in New South Wales, Australia. The scope was to gather information for informed decision making; identify potential technology and other barriers and the recommended solutions; and establish the best business model and economic viability for development.

The first phase covered site identification and technology selection to support grid connection and permitting. The second phase covered the business and financial model (capex, fuel price, opex and electric power offtake price) .

Assignment

Prefeasibility of 30 MWe biomass fired power plants in NSW, Australia using INS

Client

ECO-Nexus

Services

Technical assistance, commercial assistance

Plant Information

10-30 MWe biomass fired plant. Project not started.



Biomass Fired Plant in Jeongeup, Korea

A 3-phase pre engineering Consultancy project to support the permitting for a 23 MWe wood chip fired power plant in Jeongeup, Korea. The pre-engineering was done for the whole power plant, and was conducted in 3 phases: Technology selection; site identification and the business and financial model (capex, fuel price, opex and electric power offtake price).

Assignment

Pre-engineering and basic design of a 23 MWe biomass fired power plants

Client

Dong Yang P&F, Korea

Services

Technical assistance, commercial assistance

Plant Information

23 MWe biomass fired plant.
Project not started – permitting ongoing



MSW/MRF Solid Waste Treatment

1992-1999

24 Projects in Austria, Canada, Germany, Czech Republic and Greece

| Year | Project Location | Scope of Supply | Fuel |
|------|------------------|--|--|
| 2000 | Lens, France | Consultancy and design services, delivery of special equipment | 100 tpd sorting plant for recyclables |
| 2000 | Paris, France | Consultancy and design services, delivery of special equipment | 220 tpd sorting plant for recyclables |
| 2000 | La Coruna, Spain | Consultancy and design services, delivery of special equipment | 650 tpd MSW treatment plant in front of AD plant with RDF production |
| 2000 | Lucknow, India | Consultancy and design services, delivery of special equipment | 500 tpd MSW treatment plant in front of AD plant with RDF production |



| Year | Project Location | Scope of Supply | Fuel |
|-----------|-----------------------|---|--|
| 2004 | Sharjah, UAE | Consultancy and design services, delivery of all equipment, EPC | 2 treatment plants with each 6.000 tpd of excavated dump material |
| 2004-2005 | Al Ain, UAE | Consultancy and design services, delivery of all equipment, EPC | 1,200 tpd MRF treatment plant with RDF production and compost plant |
| 2006 | Sharjah, UAE | Consultancy and design services, delivery of all equipment, EPC | 2,200 tpd recycling plant for C&D waste |
| 2007 | Czech republic | Design of a 100 tpd food waste treatment plant inside an existing plant. | MSW |
| 2008-2015 | Al Ain, UAE | Operation management for 1,200 tpd MRF, compost and plastic recycling plant | MSW |
| 2009 | Ras Al Khaimah, UAE | Consultancy and design services, Basic and detail design | 800 tpd MBA plant for MSW |
| 2010 | Al Ain, UAE | Consultancy and design services, delivery of all equipment, EPC, supervision of operation | Upgrade of existing compost plant, installation of fully automatic packing plant and installation of 50 tpd automatic plastic recycling plant for HDPE, LDPE, PP, PS |
| 2012 | Cebu, Philippines | Consultancy and design services, Basic and detail design | 250 tpd sorting plant for MSW with the production of RDF and AD plant for the organic fraction |
| 2012 | Addis Ababa, Ethiopia | Conceptual and Basic design | MSW |
| 2012-2017 | Saudi Arabia | Biyearly waste audit at 5000 tpd MSW plant | MSW |
| 2012-2017 | Riyadh, KSA | Supervision and guidance of operation | 5.000 tpd MRF plant |
| 2013-2017 | Riyadh, KSA | Quarterly waste audits | 5.000 tpd MRF plant |
| 2013 | Sibiu, Romania | Consultancy and design services, delivery of all equipment, EPC, supervision of operation | 100 tpd sorting plant for separate collected recyclables and two 100 tpd MBA plants for the collected rejects |

| Year | Project Location | Scope of Supply | Fuel |
|------|------------------------|--|--|
| 2014 | Sibiu, Romania | Design and delivery of special parts | MRF and BMT for 250 tpd MSW |
| 2017 | Sri Lanka | Fuel study and EIA support | MSW |
| 2017 | United Arab Emirates | Technical due diligence | MSW |
| 2017 | Saudi Arabia | Improvement study on existing 5000 tpd MRF plant | MSW |
| 2017 | United Arab Emirates | Improvement study on existing 1000 tpd MRF plant | MSW |
| 2017 | United Arab Emirates | Preparation of technical proposal for an integrated waste management facility | MSW |
| 2017 | Northern Emirates, UAE | Basic design, CAPEX and OPEX estimations, preparation of the documents for public tender | Integrated waste management facility (incl. sorting station, RDF plant and ADOS plant) for 1,000 tpd |
| 2017 | Dubai, UAE | Technical Due Dilligence with improvemens and cost estimations | 800 tpd "dirty" MRF |
| 2017 | Riyadh, KSA | Study with basic design | Improvmnt of exisitng MRF to 7,500 tpd with fully automatic stations and a 500 tpd AD plant |
| 2017 | Dubai, UAE | Technical Due Dilligence with improvemens and cost estimations | 1,000 tpd MRF plant |
| 2017 | Naga,Cebu, Philippines | Design and delivery of special parts | Extension of the exisiting MRF/RDF plant to 500 tpd |

Waste to Energy Power Plant in Addis Ababa, Ethiopia

2012, design on the 1,400 tpd waste plant began.

The Reppie Waste-to-Energy plant in Addis Abbaba receives 1,400 tonnes of municipal waste a day, representing an annual waste-disposal capacity of 420,000 tonnes. This project was an important showcase for other cities and countries across Africa, and DP was involved from the outset in 2012. The consultancy was for the design and supply of the combustion plant, with some specific requirements for a redundant energy generation and evacuation system.

Commercial operation started in 2018 and continues to be successful.

Assignment

Design and supply of 2 x 700 tpd grate, boiler and flue gas cleaning system

Client

Ethiopian Electric Power (EEP)

Services

Design, engineering and procurement of grate, boiler and flue gas cleaning system

Plant Information

2 x 700 tpd Waste to Energy lines with 25 MWe output





Waste to Energy power plant in Colombo, Sri Lanka

The consultancy project was commissioned after a deadly landslide at the vast dumpsite outside Colombo, Sri Lanka.

The project scope was to study the waste profile and conduct a technical and business feasibility study in order to propose a solution. The recommended solution was a combined incineration and Anaerobic Digestion plant with recycling facility, and is the first of its kind in Sri Lanka. The current inputs to the landfill are 640 tonnes of municipal waste a day, 500 tpd to Incineration providing 12 MWe gross; and 160 tpd to the AD plant providing 1.5 MWe gross.

Assignment

Project development, design and supply of 1 x 500 tpd grate, boiler and flue gas cleaning system and AD plant

Client

Fairway Waste Management

Services

Project development, fuel study, technical assistance for permitting. Design, engineering and procurement of grate, boiler, flue gas cleaning system and AD plant.

Plant Information

1 x 500 tpd Waste to Energy lines with 12 MWe output.
1 x 160 tpd AD plant with 1.5 MWe output.
Commercial operation is expected in 2020.



Waste to Energy power plant in Bornholm, Denmark

DP was the engineering consultant for 2 stages of upgrade development for a waste to energy plant in Bornholm, Denmark. In 2010 DP was requested to redesign the plant to improve the waste throughput from 20,000 TPY to 26,000 TPY. DP designed a Water Tube boiler to replace the Smoke Tube boilers; a freestanding economiser as 3rd pass after the boiler and installed a new chute and pusher system on the boiler/grate.

In 2018 a further increase in throughput from 26,000 TPY to 31,000 TPY was required. DP designed a new 3rd pass with water tubes connected to the boiler and a new, enlarged freestanding economiser.

Assignment

Project development
2010 Upgrade the plant from 20,000 to 26,000 TPY of waste throughput.
2018 Upgrade the plant from 26,000 to 31,000 TPY of waste throughput.

Client

BOFA

Services

Project development, engineering, project management, supply of equipment

Plant Information

1 x 100 tpd Waste to Energy line



Biogas

| Year | Project Location | Scope of Supply | Fuel |
|-----------|-------------------------|---|---|
| 2006 | Benešov, Czech Republic | Consultancy and design services, delivery of all equipment, EPC, supervision of operation | 105 tpd AD plant with ADOS system for separate collected organic waste |
| 2006-2011 | Singapore | Consultancy and design services, delivery of all equipment, EPC, supervision of operation | 300 tpd AD plant with ADOS system for separate collected organic waste |
| 2007 | Mimon, Czech Republic | Consultancy and design services, Basic and detail design | 100 tpd AD plant with ADOS system for separate collected organic waste |
| 2013 | Zhengzhou, China | Consultancy and design services, basic and detail design | 300 tpd AD plant with ADOS system for separate collected organic waste |
| 2014-2016 | Cebu, Philippines | Consultancy and design services, delivery of all equipment, EPC, supervision of operation | 130 tpd dry anaerobic digestion plant (DAD System) for organic waste |
| 2014 | Benešov, Czechia | Monitoring of technology and economics with monthly reports | 100 tpd Anaerobic Digesting plant |
| 2017 | Benešov, Czechia | Detail design and tender documentation | Extension of the plant with a buffer tank |
| 2017 | Benešov, Czechia | Supervision of construction | Extension of the plant with a buffer tank |
| 2017 | Bratislava | Basic and detail design for a biogas plant | 200 tpd AD plant with ADOS system for OFMSW |
| 2017-2018 | Czech Republic | Design of a refurbishing of an existing biogas plant | Biological treatment |
| 2017-2018 | Philippines | Basic & detailed design of extension of MRF, RDF and DAD plant in Naga | MSW |
| 2018 | Naga, Cebu, Philippines | Design and delivery of special parts | Extension of the existing anaerobic digestion plant with an ADOS system |
| 2019 | Benešov, Czechia | Design of the extension of the plant with a digestate storage tank | |
| 2019 | Malta | Design and delivery of special parts for the upgrade of an existing Biogas plant | 250 tpd separate collected kitchen waste |





Landfill Remediation

1992-1999

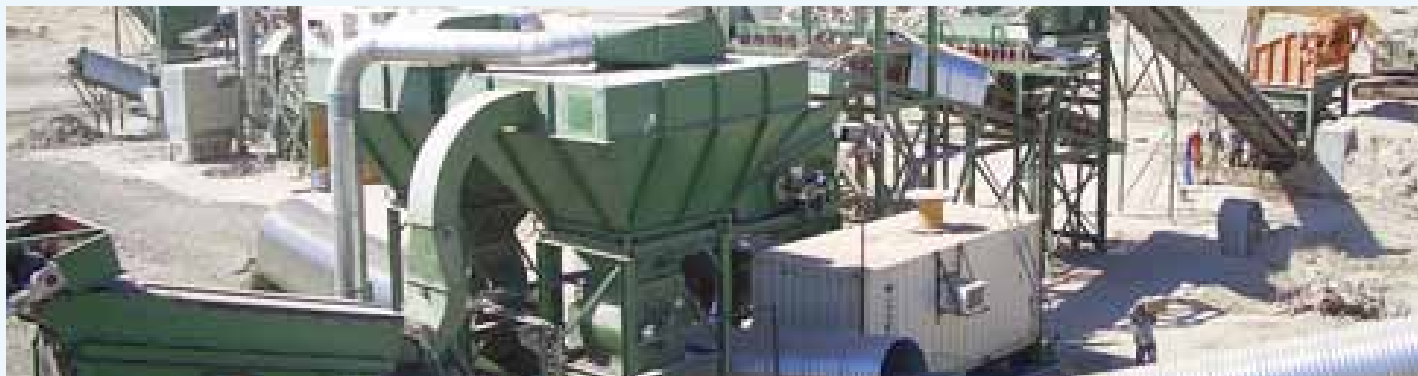
12 Landfill remediation projects in Germany, Czech Republic, Austria and South Korea

| Year | Project Location | Scope of Supply | Fuel |
|-----------|--|---------------------------------|---|
| 1997-2001 | Landfill Krizne Cesty Buchlovice, Czech Republic | General contractor | LFG degassing system |
| 1997-2002 | Landfill Chodov, Czech Republic | General contractor | LFG degassing system |
| 1997-2002 | Landfil Seninka, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 1997-2004 | Landfill Pribysice, Czech Republic | General contractor | LFG degassing system |
| 1997-2004 | Landfill Bopo, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 1997-2004 | Landfill Solecka, Czech Republic | Consultancy and design services | Monitoring of landfill |
| 1997-2004 | Landfill Zdounky, Czech Republic | Consultancy and design services | Closing and recultivation |
| 1998-2004 | Landfill Grygov, Czech Republic | Consultancy and design services | Closing of landfill, leachate and LFG solution |
| 1998-2006 | Benešov, Czech Republic | General contractor | 280,000 m ³ landfill remediation project. SWS and treatment. |
| 1999-2001 | Landfill Praksice, Czech Republic | General contractor | LFG degassing system |
| 2000 | Landfill Zivotice, Czech Republic | Consultancy and design services | Closing of landfill, leachate and LFG solution |
| 2000 | Landfill Doubrava, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2000 | Sita di Fungaia, Italy | General contractor | 50,000 m ³ landfill remediation project. SWS and treatment |
| 2000 | Santa Fiora, Italy | General contractor | 220,000 m ³ landfill remediation project. SWS and treatment |
| 2000 | Braambergen, The Netherlands | General contractor | 460,000 m ³ landfill aeration project with SWS |
| 2000 | Omuta City, Japan | General contractor | 60,000 m ³ landfill remediation project. SWS and treatment |



| Year | Project Location | Scope of Supply | Fuel |
|-----------|---------------------------------------|---------------------------------|--|
| 2000-2004 | Landfill Petruvky, Czech Republic | General contractor | LFG degassing system |
| 2000-2004 | Landfill Békéscsabai / H | General contractor | Closing of landfill, leachate and LFG solution |
| 2000-2004 | Landfill Brezova | Consultancy and design services | LFG pumping test and prognosis |
| 2000-2004 | Landfill Temice | Consultancy and design services | LFG pumping test and prognosis |
| 2001 | Landfill Babica, Slovakia | Consultancy and design services | LFG pumping test and prognosis |
| 2001 | Landfill Mrsklesy, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2001 | Landfill Bohumin, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2001 | Landfill Vestin, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2001-2002 | Landfill Ticha, Czech Republic | General contractor | Closing of landfill, leachate and LFG solution |
| 2001-2004 | Landfil Sovinec, Czech Republic | General contractor | LFG degassing system |
| 2002 | Landfill Getini, Estland | General contractor | LFG degassing system |
| 2002 | Landfill Senec, Slovakia | Consultancy and design services | LFG monitoring |
| 2002 | Landfill Rejchartice, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2002 | Landfill Orlik, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2002-2004 | Landfill Kozlany, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2002-2004 | Landfill TKO Pravetin, Czech Republic | Consultancy and design services | LFG monitoring |





| Year | Project Location | Scope of Supply | Fuel |
|-----------|---|--|---|
| 2003 | Landfill Nová Role, Czech Republic | Consultancy and design services | LFG monitoring |
| 2003 | Landfill Jílové, Czech Republic | Consultancy and design services | LFG monitoring |
| 2003 | Landfill Hradec u Pacova, Czech Republic | Consultancy and design services | LFG monitoring |
| 2003-2004 | Landfill Nemecice na Hane, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2004 | Landfill Suchy důl, Czech Republic | Consultancy and design services | LFG pumping test and prognosis |
| 2004-2010 | United Arab Emirates | Project management of a 7.5 Mio m ³ landfill mining project. | Landfill remediation |
| 2004-2010 | Sharjah, UAE | General contractor | 7.5 Mio m ³ landfill remediation project, SWS system and treatment |
| 2006-2010 | UAE | Operation supervision for the Sajja landfill management and CDW recycling plant operation. | MSW |
| 2006-2010 | Sharjah, UAE | O & M Contract | Sajja landfill and CDW plant operation and management |
| 2007 | Québec, Canada | General contractor | 3.5 Mio m ³ landfill remediation project. SWS and treatment |
| 2007-2008 | Beograd, Serbia | Consultancy and design services | 400,000 m ³ landfill remediation project. SWS and treatment |
| 2007-2010 | Sharjah, UAE | General contractor | Construction of a new landfill cell with a volume of 3.5 mill m ³ , upgrade of existing landfill with new infrastructure |



| Year | Project Location | Scope of Supply | Fuel |
|------|-------------------|--|---|
| 2008 | Minsk, Belarus | General contractor | 3 MW LFG collection and co-generation plant |
| 2013 | Bacau, Romania | General contractor | LFG collection and flaring system |
| 2014 | Sibiu, Romania | Consultancy and design services, pumping tests, delivery of equipment | Closing of Remeta landfill with LFG collection and flaring system |
| 2016 | Dubai, UAE | Design of the extension of an existing LFG collection plant with 4 MW cogeneration | |
| 2017 | Braambergen, NL | General contractor | Long time aeration of 450.000 landfill with SWS system |
| 2017 | Weeringermeer, NL | General contractor | Long time aeration of 430.000 landfill with SWS system |

Sanitary Landfill Zdounky, Czech Republic

In 1995 the new sanitary landfill Cell I was designed and constructed by IUT Group company Dekont Umwelttechnik spol.s.r.o. Zlín . in Czech Republic.

The landfill was further developed with new Cells II and III. Environmental and operational monitoring was provided from 1995 till 2006.

The scope of the consultancy included the entire design of the new phases of non-hazardous landfill, including related facilities (landfill gas collection, leachate collection, operations building, access roads, storm water system design, monitoring system design and operation, weighbridge etc). and closure design for older parts of the landfill. This was preceded by a hydro-geological survey, environmental studies for new sanitary landfill, and was followed up with the annual environmental monitoring of the LFG, leachate, ground water and the capacity and stability of the landfill.

Assignment

General designer, authorized supervision, consultancy

Client

DEPOZ Zdounky

Services

Pre-engineering
Technical assistance
Project management

Plant Information

Sanitary landfill for Non Hazardous waste



Landfill Remediation in Sibiu, Romania

The Remetea landfill in the eastern part of Sibiu had been operating from 1983 to 2004, during which time an estimated 239,000m³ of waste was deposited.

IUT was called in to review the landfill and provide the required data needed to decide on the design for landfill closure and degassing technology. The scope included an initial landfill gas extraction test to obtain actual gas production data and its intensity within the waste. This data was to be used to decide on a proposal of a degassing system - gas treatment technology.

Assignment

Basic and detail design for landfill closure, LFG (landfill gas) sucking test and gas production prognosis

Client

SC FINARA CONSULT SRL

Services

Technical assistance and testing



Contact Us

DP has 7 offices around the world in 6 countries – China, Denmark, Poland, Thailand, UAE and UK.

To ensure that we can address your needs appropriately, please email info@dpcleantech.com for enquiries or further information.

About DP CleanTech

- ✓ Founded in 2004, DP CleanTech Group designs, engineers, manufactures and commissions complete solutions for managing waste materials; and for conversion of waste materials into clean energy.
- ✓ DP's core technologies originate in Europe and are behind over 300 biomass and waste-related projects around the world.
- ✓ DP's has a broad portfolio of innovative Waste-to-Energy and environmental management technologies with which to lead the advancement of renewable energy and environmental protection.
- ✓ DP technology was behind the first biomass power plant in both Denmark and the first commercial power plant in China.
- ✓ DP has facilities and multiple references across Europe and Asia; and has projects under development in Africa and South America.



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