



# District Heating in COWI

May 2024

Geneva Master Planning 2019 - 2021

# Core UK Energy Sectors

## Wind & Renewables:

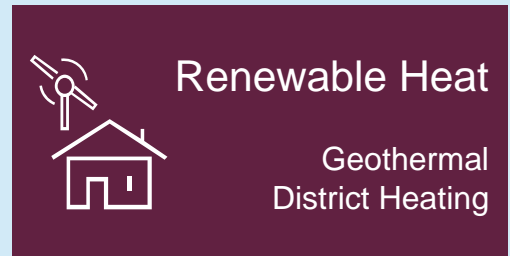
COWI has developed an industry-leading record in the UK **wind energy** market, translating our specialist ground and marine engineering skills as core competencies to serve the civil engineering needs in wind farm development. We also have many decades of experience in **hydro** electric power and pumped storage projects.

## Green Fuels:

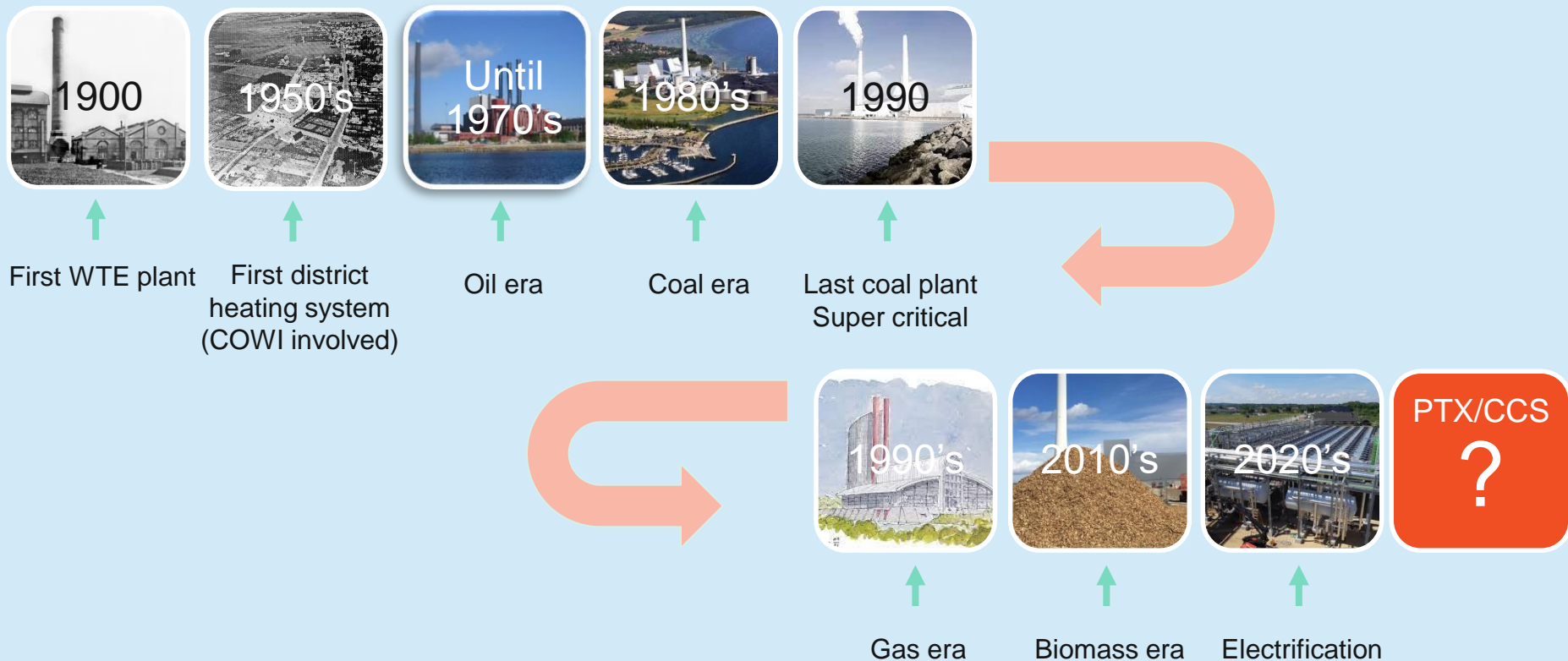
COWI has international experience within **green fuels** and **carbon capture utilisation and storage** (CCUS), and we are also actively involved in several UK projects exploring the potential of CCUS, green hydrogen and ammonia energy generation.

## Renewable Heat:

Renewable **geothermal energy** and smart energy are fast-growing markets in the UK. The potential applications for this research and the tools in development include the design and planning of future smart **district heating** networks.



# Energy transition in Denmark



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# Overview of Services

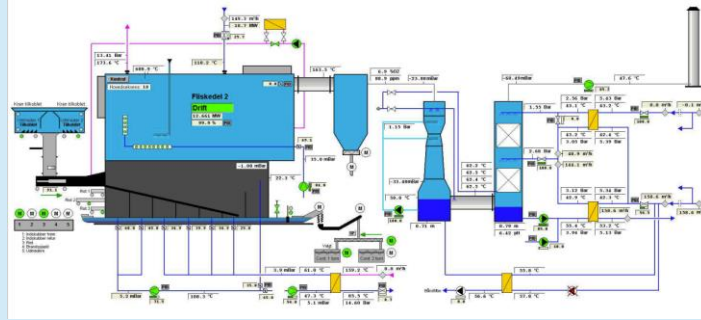
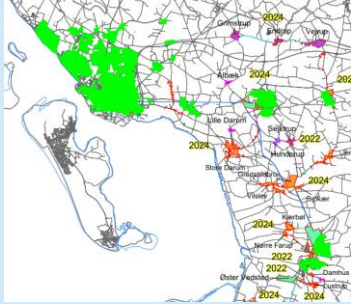
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# District Heating / Low Carbon Heat

- COWI is a **leading international specialist** for optimisation and rehabilitation of district heating and cooling systems.
- We have **decades of experience** in the planning and establishment of systems, design of new systems, optimisation and extension of existing networks, and renewal and replacement of worn-out or outmoded pipeline systems.
- Our team have ongoing Technical Advisory and Owner's Engineer roles for some of the most **significant District Heating Low Carbon Heat systems** in development in Denmark, the UK and Ireland.

# COWI's Services



Energy Masterplanning

Hydraulic Calculations

Detailed Design

Tender

Construction management and supervision

Conversion or new supply area?  
Energy Demand  
Production Units  
Overview of supply area, heat sources and opportunities  
Real-time Modelling

Dimensioning of grid  
Termin / Leanheat  
Flow, pressure loss, pressure gradients, differential pressure

Pre-project  
External pipes  
Placement in ground  
Challenges  
Installation requirements  
Detailed design

Bidder questions  
Correction of material  
Negotiations  
Contracting

Start up meetings  
Construction meetings  
Safety meetings  
Safety supervision

Project	
Lerwick District Heating	1
TECA	2
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New biomass-fired combined heat and power plant at Aarhus Ø, Lisbjerg Aarhus Ø, Lisbjerg	10
Sønderborg District Heating	11
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Working with Mott MacDonald as part of  
GLA Zero Carbon Accelerator (ZCA)

# Unique specialist skills

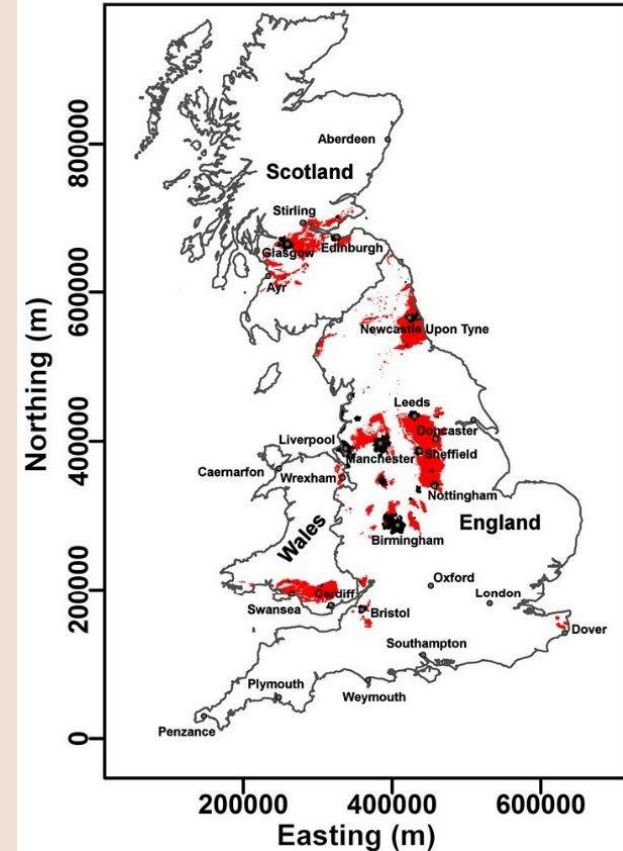
- Boiler systems and auxiliaries
- Turbine plants and auxiliaries
- Flue gas cleaning and heat recovery
- Piping systems including pumps, valves etc.
- Fuel reception, storage and handling
- Electrical systems (LV, MV, HV)
- DCS/SCADA





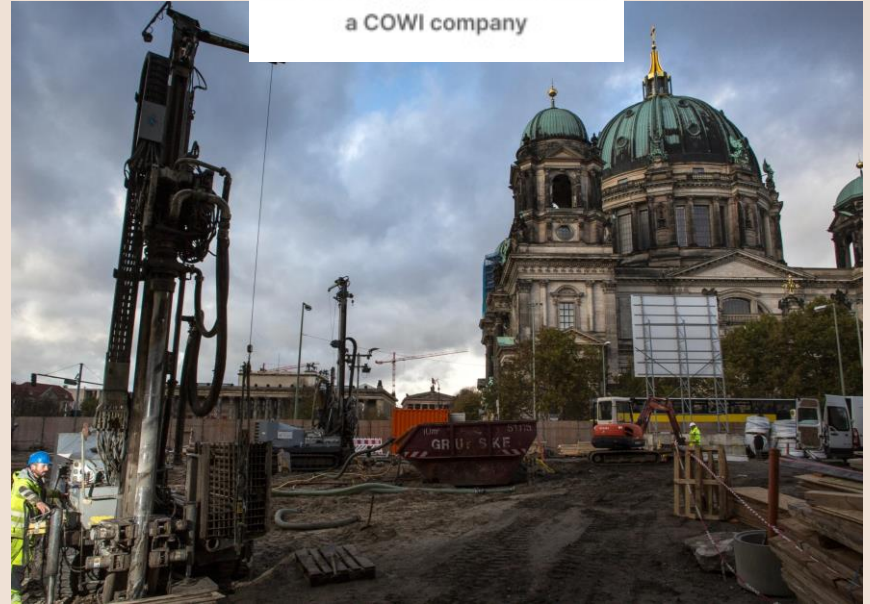
# R&D in Mine Water Geothermal

- Commitment to R&D in COWI is a key element of our culture and values. We have a dedicated foundation, **COWIFonden**, which gives grants to support research and development projects at universities and research institutions across the globe.
- **Geothermal energy is an area of R&D focus in COWI** and we have been working with the University of Strathclyde; SCALGO; The Coal Authority and Technical University of Denmark to look at the potential use of mine water in district heating schemes. The aim of this R&D project is to provide a digital predictive tool that allows long-term and sustainable harvesting of heat from ground/groundwater/water resources.
- The UK offers an exceptionally suitable set of conditions for this project due to the availability of the resource within the flooded, abandoned mine tunnels and shafts. The project involves academia, corporate, government, and startup/entrepreneur, to tackle some of the current gaps in knowledge, which may yield opportunities in the **future market for minewater geothermal**.



# Geothermal expertise

- In 2023 COWI acquired **Geothermie Neubrandenburg GmbH**, also known as **GTN**, a specialised geothermal company based in Germany.
- GTN has a **wealth of experience in geothermal projects**, spanning over 30 years. In Germany, GTN has played a significant role in the success of various geothermal projects, particularly in the northern regions.
- Combining GTN's expertise in geothermal energy with COWI's experience in district heating, we can offer our clients comprehensive solutions to utilities for district heating development, promoting and enabling the transition to renewable energy.
- COWI have also acquired **Mannvit**, an Icelandic consultancy in energy, infrastructure and industry with specialist competencies in geothermal and hydro power, further enhancing our in-house knowledge.



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# Project Case Studies

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District Heating & Low Carbon Heat



DUBLIN, IRELAND

# Dublin District Heating System

**CLIENT:** RPS Ireland Ltd

**PERIOD:** 2023 - present

**COWI'S SERVICES:**

- > Technical Advisory
- > Procurement and Contracting Support
- > Planning and Consenting support
- > Stakeholder Engagement and Consultation

COWI has been appointed as Technical Advisor (TA) for the proposed Dublin District Heating System (DDHP), in collaboration with RPS. The project will be highly significant in meeting Ireland's long-term climate and carbon reduction targets. The system aims to capture waste heat from industrial and Waste to Energy (WtE) facilities and pipe it, through a hydraulic-based system, into homes and businesses in areas of Dublin city. The project to establish sustainable energy infrastructure, become less reliant on fossil fuels and reduce carbon emissions.

Our responsibilities are to assist the end client, Dublin City Council (DCC), in advancing the design and statutory processes for Phase 1 of the project on the Poolbeg peninsula. As part of the role, we will also assist DCC in the procurement of a Joint Venture (JV) partner, to deliver the project and complete its Planning/Implementation through a Design/Build contractor.



ABERDEEN, UK

# TECA Heat Network and Residential Feasibility Study

**CLIENT:** Aberdeen Heat & Power

**PERIOD:** 2023 - 2024

Formation of a network supplied by the TECA Energy Centre. Aberdeen to supply heat/electricity to Craibstone Campus, Newhills Primary School (new build) and Bucksburn Academy.

## **COWI'S SERVICES:**

- Establishing EnergyPRO model of Stockethill and TECA energy center and Analysis
- Establishing a Termis Model
- Hydraulic Analysis – Determining the required dimension of the supply line from TECA energy and Stockethill Network and a scenario evaluation
- Energy planning of new area in Aberdeen using Danish approach for comparison of solutions and for pipe routing using advanced hydraulic simulation tools and energy planning tools.



LONDON, UK

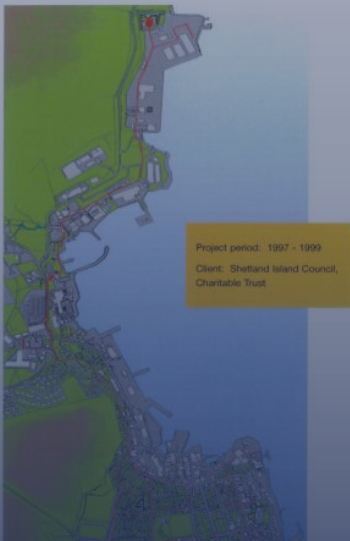
## Battersea District Heating

**CLIENT:** Terra Solutions Ltd

**PERIOD:** 2022 - 2023

The Battersea District Heating project involved the connection of 2 No. 150mm diameter Heating pipes and 2 No. 100mm diameter Comms ducts from Battersea to the Phase 4A Development, underneath the Battersea Park Road (BPR).

COWI were commissioned by Terra Solutions Limited to undertake the role of Principal Designer and to design all permanent works to facilitate the connection from Battersea to the Phase 4A development. The works entailed the design of a 7.5m ID Drive Shaft, approximately 65m's of 1.2m ID Tunnel and a 3.66m ID Reception Shaft. All design checks were carried out in accordance with the appropriate Eurocodes and British Standards.



On 10 October 2000 Shetland Heat Energy and Power won the 2000 Environment Award for Engineers. This Award was launched in 1990 by HRH the Duke of Kent and was this year sponsored by Lloyd's Register, British Energy, Rolls-Royce plc, the Engineering Council and the UK Association of Professional Engineers.

Bruun & Sorenson Group's project manager, Mr. Jan Clement, took part in the ceremony at the Science Museum in London. Among the finalists, the district heating project was appointed the overall winner. In the presentation of the project it says:

Shetland is Britain's remotest and one of the smallest communities. The remoteness limits the options for recycling and what to do with its waste. Shetland Islands Council decided to construct a waste to energy plant with the objective to attract waste from Orkney and offshore installations, create jobs and provide energy to the local economy.

Shetland Islands Council Charitable Trust, with EU funding, invested £7 Million in a district heating scheme to distribute heat. In less than two years the scheme gained customers from all sectors of the economy. Customer feed back has been excellent and the system is now selling itself by word of mouth resulting in a long waiting list for connections.

When a major extension currently underway is completed over half the Lerwick population (9000) will be within reach of the scheme. The scheme is unique in Britain in that it based on the Danish model by aiming to serve the whole town.

An consulting engineer Bruun & Sorenson was appointed to provide the energy plant from 1994 and of the district heating network since 1997. An essential consistency demanded by the client has been to introduce the scheme in connection with the district heating network and of the heating strategies.

# SHETLAND COOPERATION SINCE THE 90s



Shetland Islands, UK

## Circular economy on the Shetland Islands

**PERIOD:** 1998 – present

**CLIENT:** SHEAP

**THE PROJECT:**

COWI have acted as a trusted advisor for +25 years, supporting the development of a district heating scheme for the Shetland Islands. Our services have included Network design, Hydraulic simulation, provisions for control strategies and waste heat utilisation. In the process we have created a digital twin and monitored learnings throughout the project to inform a future development, maintenance and improvement.

### Lerwick District Heating Scheme - timeline

1998	Waste to Energy facility commissioned & First Customer connection
2002	Sound area of Lerwick connected
2006	Hot water storage tank installed
2008	Additional boiler installed
2011	1000 <sup>th</sup> domestic customer connection
2017	New Anderson High School connected
2022	LPS connection for use of surplus heat



London, UK

## Low temperature heat study for London

**PERIOD:** 2012 – 2013

**CLIENT:** Buro Happold

### **THE PROJECT:**

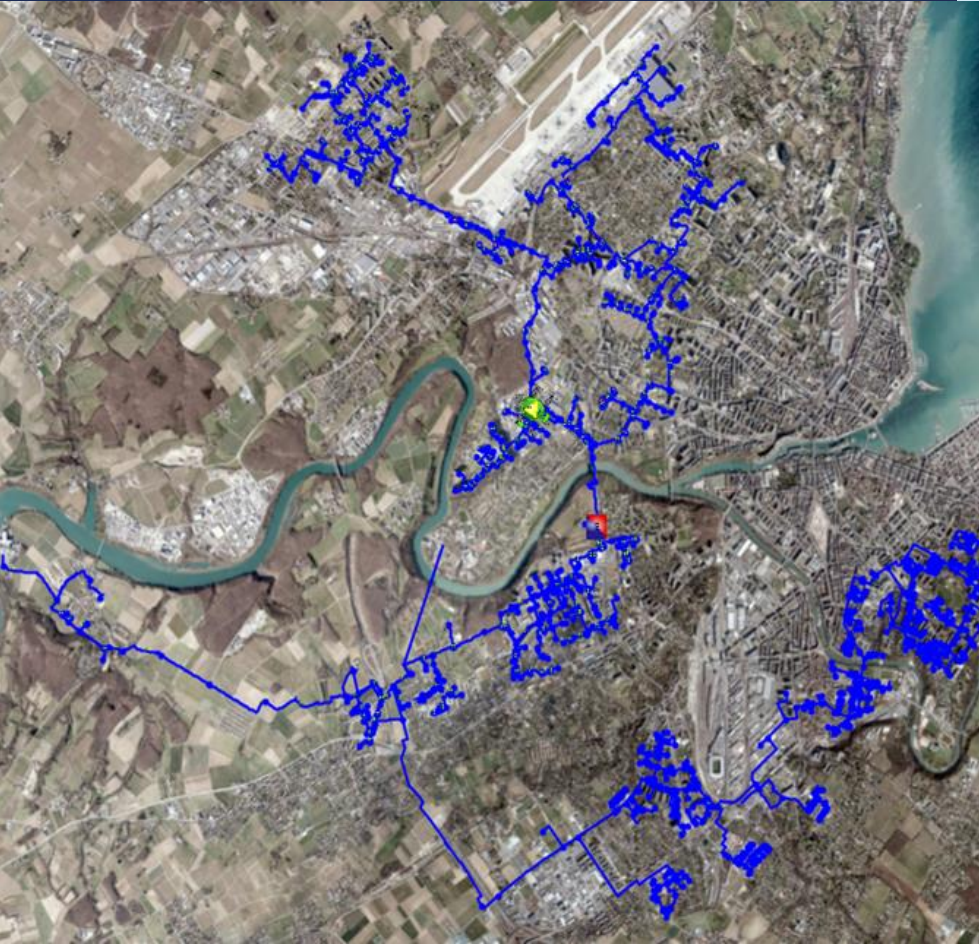
Commissioned by the Greater London Authority (GLA), the study aimed to analyse the potential use of local “secondary” sources of energy in London to facilitate the transition to zero carbon.

### **COWI'S SERVICES:**

COWI carried out a review of scope of potential energy resources, including low temperature heat from the tube network and sewage system. The team provided advice on the potential technologies for capturing the energy from the resource (e.g. heat pump technology) and on the development of heat networks. This included expert input into the potential issues and barriers of connecting a low temperature heat network to either an existing district heat network and/or existing buildings.

The assessment of network and energy system impacts included analysis of a pilot area and indicative network modelling.





Switzerland

## Geneva Master Planning

**PERIOD:** 2019 - 2023

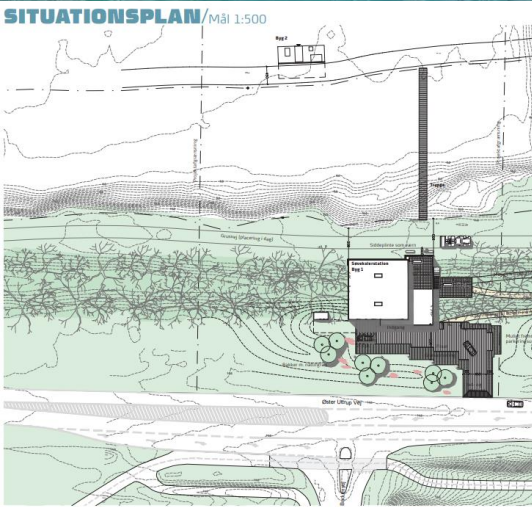
**CLIENT:** SIG - Services Industriels de Genève

**THE PROJECT:**

Connecting networks and preparing for the future: Move towards a sustainable and connected society.

**COWI'S SERVICES:**

- District Heating Planning and Project Design
- Termis Hydraulic Simulations
- Real-time Modelling & Optimizations
- Pipe Network Design
- Integration with District Cooling (lake Geneva)
- Integration of Energy Production



Denmark

# District Cooling in Aalborg

**PERIOD:** 2019-2022

**CLIENT:** Aalborg Forsyning

**THE PROJECT:**

Detailed design of lake water intake pump and heat-exchanger station as well as water distribution network and installations at the new regional hospital in Aalborg.

**COWI'S SERVICES:**

- Planning and approval process
- Detailed Design of building and installations
- Pipelines design
- Architectural design
- Tendering
- Supervision and commissioning

# Contact us

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