

COWI IN GREENLAND



COWI is a leading global consulting group that creates value for customers, people and society through our unique 360° approach. Based on our world-class competencies within engineering, economics and environmental science, we tackle challenges from many vantage points to create coherent and sustainable solutions for our customer.

Our Greenlandic experience ranges from environmental and socioeconomic projects to more technically advanced land development and construction and infrastructure projects including geotechnical, geophysical and geological consultancy to the private and public sector in Greenland.

COWI's track record includes more than 500 projects in Greenland since 1940. In the past ten years, we have not

only provided traditional engineering consultancy on buildings, roads, ports and airports. We have also worked on projects creating socio-economic value in energy, transport planning and urban development, as well as environmental value in the fields of mining, wastewater, natural resources management and hazardous waste. Through the years has COWI been advisor on almost every major military facility, civil airports, and harbours in Greenland.

COWI



As an example, COWI carried out the calculations on the cableway in the historic former Lead/Zinc mine in Maarmorilik, West Greenland (see picture above, Maarmorilik mine cableway, Courtesy of GEUS).

COWI works closely together with local Greenlandic partners for the mining and infrastructure sector and has also assisted other consulting companies and regulatory bodies with specific tasks such as modelling of airborne pollution, tailing deposits, geophysical surveys etc.

Since 2017 COWI has been working on the design of the upcoming airports in Ilulissat, Nuuk and Qaqortoq and at the moment COWI is consulting on other infrastructure and construction projects in Greenland and for mining companies.

COWI have conducted planning strategies for Greenlandic municipalities with focus on how infrastructure projects can fit into the unique landscape. COWI has conducted more than 50 local plans for the four municipalities in Greenland.



RECENT PROJECTS IN GREENLAND

Industrial facility project in West Greenland, including among other things:

- › Infrastructure and port design incl. pre-Feed and 3D visualization
- › Geophysical survey (GPR) and geological mapping
- › Environmental baseline sampling for Environmental Impact Assessment (EIA)
- › Permitting process for land allocation
- › Topographic survey (drone)



Botanical survey, East Greenland

Mineral exploration project in East Greenland, including:

- › Environmental baseline sampling and permitting process for EIA
- › Social Impact Assessment (SIA)
- › Navigational Safety Investigation (NSI) for shipping
- › Seismic refraction survey for mining project

Other infrastructure projects in West Greenland:

- › Nuuk Harbour expansion project, design basis
- › Airport development in Ilulissat, Nuuk and Qaqortoq including engineering design
- › Design of mooring system for bulk carriers for a mining project



COWI SERVICES IN GREENLAND

PERMITTING

COWI has vast experience within Greenlandic legislation and permitting processes in relation to the mining sector and other industries operating in Greenland. COWI can help mining projects during the various permitting phases from the exploration to the exploitation phase. The EIA and SIA documents need to be delivered in Greenlandic, Danish and English as well as development of the Impact Benefit Agreement (IBA) between the mining company and the Government of Greenland.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The permitting process for EIA in Greenland follows a number of steps from the Scoping and Terms of Reference, public consultation, White Paper and in the end the final EIA report. COWI has a large group of experienced people working on the permitting process, planning and executing terrestrial and marine environmental baseline sampling programs in the field for the EIA.

SOCIAL IMPACT ASSESSMENT (SIA)

Like for the EIA, COWI has been supporting the mining industry in Greenland with consulting on the SIA process. The process also follows the Scoping and Terms of Reference, public consultation, White Paper and final SIA report but also includes a Benefit Impact Plan (BIP) as

basis for developing the Impact Benefit Agreement (IBA). Baseline data in this regard can be acquired from arranging public information meetings, stakeholder interviews and engagement, and so forth. COWI has this experience in Greenland and the SIA is of equal importance as the EIA, in order to be granted a mineral exploitation licence in Greenland.

NAVIGATIONAL SAFETY INVESTIGATION (NSI)

Sailing on the inland and outer territorial waters off Greenland (i.e., up to 3 nautical miles from the baseline) is regulated by The Danish Maritime Authority (DMA). To be granted a mineral exploitation licence by the Mineral Resources Authority (MRA) under the Government of Greenland, the licensee must fulfil a number of conditions related to the activities and operation. It has been agreed between the MRA and the DMA that one of the conditions is that the applicant – prior to being granted an exploitation licence – must have carried out a navigational safety investigation (NSI) of the conditions in the operational phase in connection with navigation and calls at ports, facilities, anchorages, icing conditions, ice class vessel requirements, emergency response, etc. in the exploitation area. The purpose of the investigation is to illustrate that navigation can be carried out in a safe manner.



GEOSCIENTIFIC INVESTIGATIONS

COWI can provide geoscientific support to the mining industry including related onshore and marine infrastructure development based on geophysical surveys, interpretation of geoscientific data, geological mapping, geotechnical investigations, and drone surveys.

COWI has carried out geophysical surveys with the purpose of characterizing the underground both for planning of future mines and for optimization of existing mines. Recent surveys in Greenland includes refraction seismic, Ground Penetrating Radar (GPR) and other types of geophysical data collection to map permafrost or bedrock conditions for infrastructural planning for mining projects.

COWI can also provide services within processing and interpretation of geophysical data collected from the air, e.g., gravimetric, magnetic and electromagnetic data and can subsequently prepare a geological model of the results. Integrated geological and geophysical investigations (in many cases combined with geotechnical investigations) will reduce the costs and contribute to the most cost-effective solution.

- › Geophysical surveys
- › Data interpretation and reporting
- › Geological mapping and modelling
- › Geotechnical investigation
- › Geohazards evaluation and mitigation
- › Aerial mapping from drones



 GPR survey, West Greenland

BRIDGES, TUNNELLING AND MARINE CONSTRUCTION

COWI are among the leading consultants within complex infrastructure design with particular strongholds within bridges, tunnels and marine structures. COWI has extensive international experience in all aspects of water construction, ports and coasts, and we are of course ISO 9001 certified. Marine terminals, ports, development of coast / waterfront, artificial islands, breakwaters, and special marine structures are our core area, including togmols, floating terminals and bulk terminals, from planning, investigation of fittings, hydraulic surveys, analysis, feasibility studies, sketch design and main design, tender documents, contracting and contract management.

Together with our customers, we deliver infrastructure solutions at all levels of scale and complexity. To optimize the processes and results, we utilize state-of-the-art design technologies within Building Information Modelling and visualization like Virtual Reality and Augmented Reality.

Throughout COWI's history, bridges have been one of our primary services. Today we count a number of the world's highest and longest bridges amongst our most visible accomplishments. Our bridge engineering services cover the entire lifecycle of a bridge, from planning and design to operation and refurbishment or decommissioning.

COWI have been involved in the construction of all manner of tunnels around the world, and in all types of soil. Our services cover the entire lifecycle of a tunnel, from feasibility studies to the operational phase and finally refurbishment.

Recently COWI prepared a master plan for the expansion of the Nuuk Harbour for the Kommuneqarfiik Sermersooq. The harbour should hold a new container port including a deep-water harbour and a cutter quay.

Since 2020 COWI has been advisor in the design phase along with several other studies related to an industrial harbour in South-West Greenland.

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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.