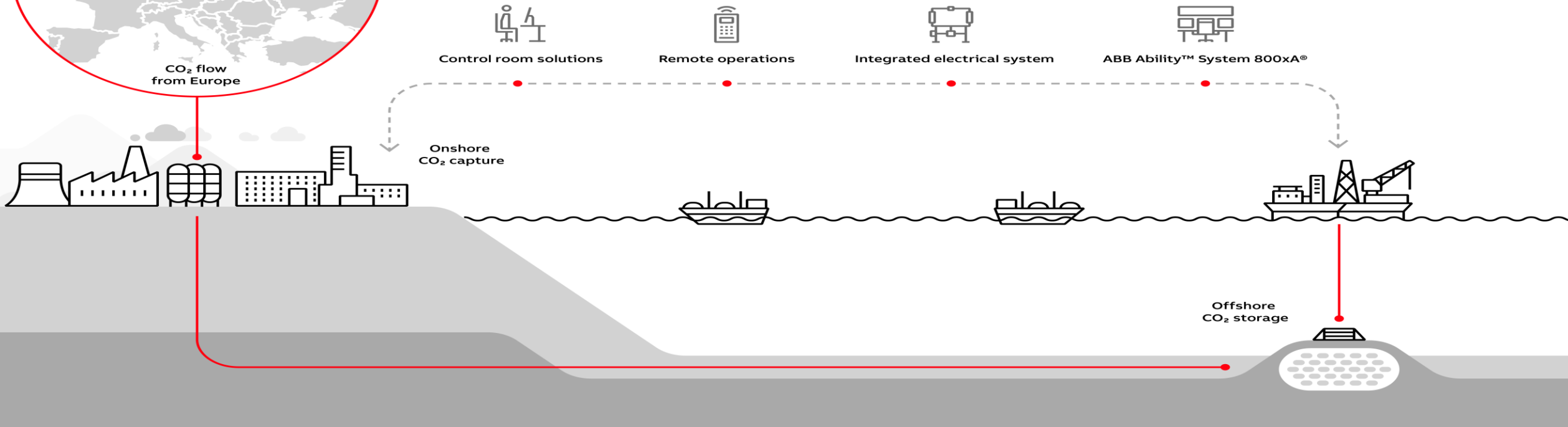


Northern Lights

Industrial decarbonisation, CO₂ storage for Europe



PROCESS AUTOMATION, ENERGY INDUSTRIES

ABB at Northern Lights

Thanks to Aker Solutions and Northern Lights JV with Equinor in the lead towards ABB

Collaboration / Thrust / Competence



Northern Lights – Øygarden plant

Norway

Customer challenge

Northern Lights will be the first ever cross-border, open-source CO2 transport and storage infrastructure network. Phase one of the project will be completed mid-2024 with a capacity of up to 1.5 million tonnes of CO2 per year.

- JV between Equinor, Shell and TotalEnergies.
- Capacity to deliver up to 5 MT/Y CO2 storage service to the EU market.
- Part of the Longship project

Application

CO2 receiving and export terminal

Outcome

Temporary storage of 1,5 MT CO2 per year, including Jetty and CO2 injection

Benefits

Reliable process power and grid connection, and Integrated PCS/SIS with remote control facilities from the Sture Terminal to support the low mannde operational philosophy

ABB solution

ABB will ensure reliable Power and Process control through a complete electrical system from the grid connection, through MV/LV distribution to power consumers and the ABB Ability™ System 800xA for controlling the Process Power and theintegrated process & safety system. The system will in normal operations be operated remotly from the Sture terminal. The system will be controlled locally from a modern Control Room based on our Extended Operator Workplace (Compact solution) and extended with our Digital solutions to increase operational efficiency (Dashboard framework, Alarm & Safety Insight)



ABB as a System Vendor to Northern Lights

Reliable Process Power and Operations

Electrical System

Electrical Design and verification studies

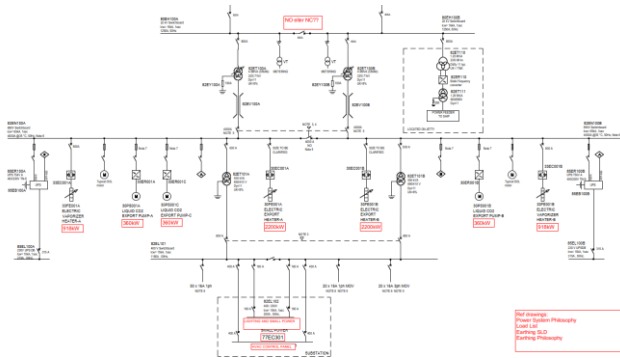
22kV Switchgear

Oil filled transformers for 22kV/690V

LV Switchboard 690 & 400 V Distribution

UPS

Dry type transformer for 690/400VAC



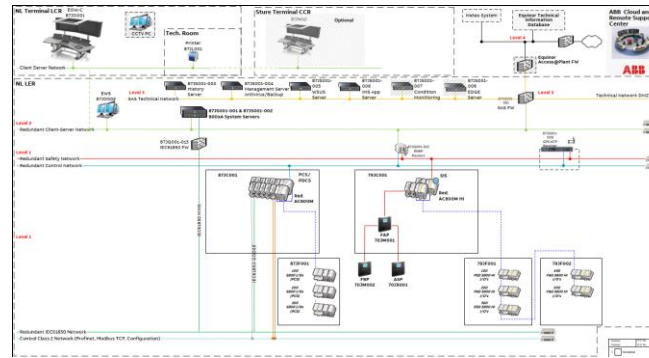
Automation system

Integrated SAS (PCS, SIS) and PPM system based on ABB Ability™ System 800xA

ABB Extended Operator Workplace (EOW Compact)

F&G System and Field instrumentation

Cyber Security



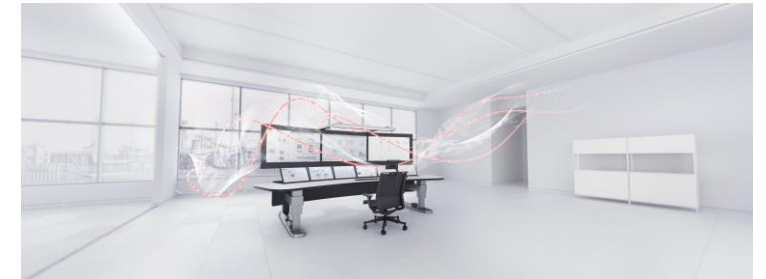
Digital and operational support

ABB Ability™ System 800xA History and ABB Insight core and Dashboard framework

AlarmInsight

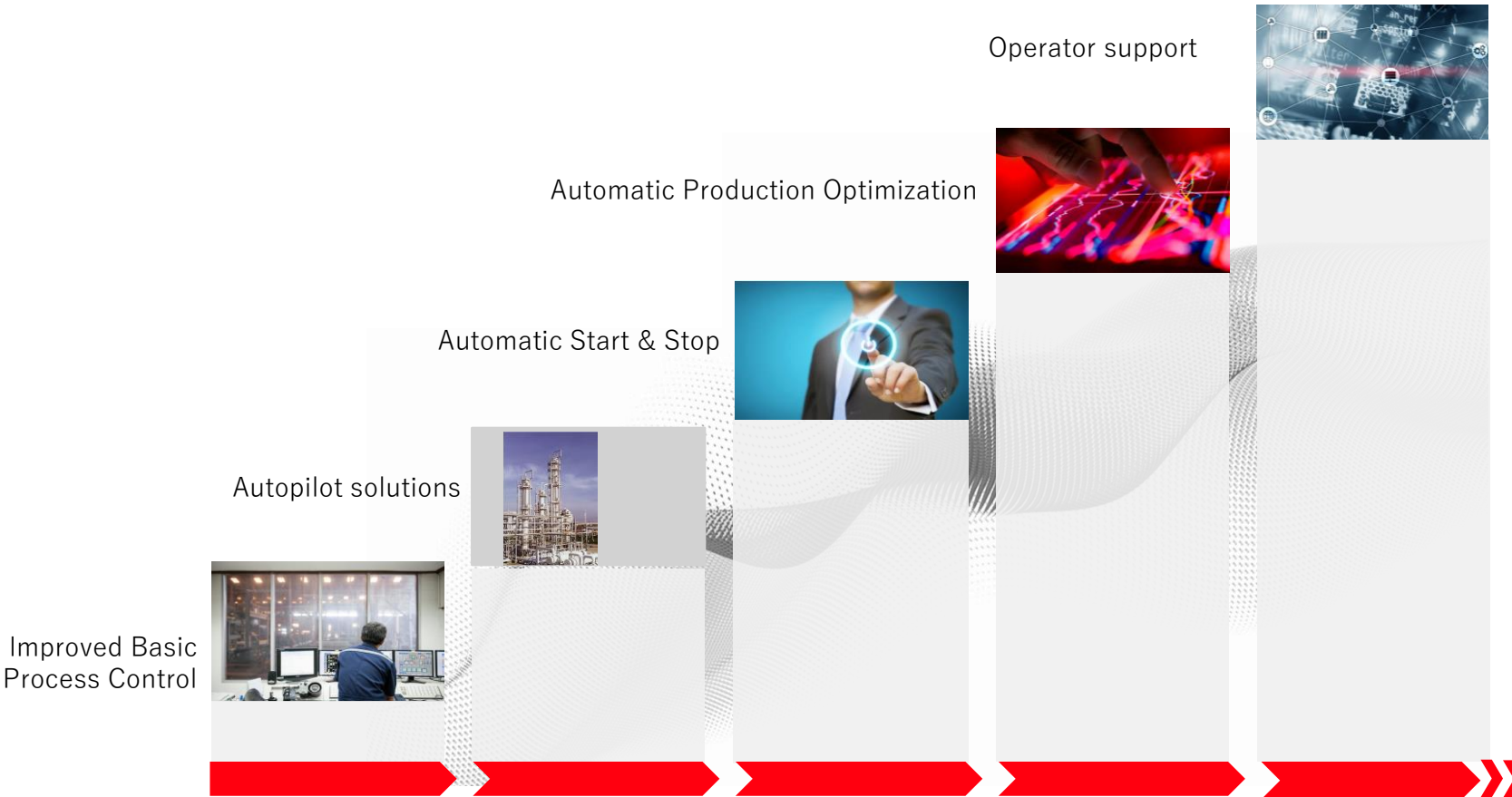
OperationInsight

SafetyInsight



What could be next focus on NL ?

Towards Autonomy - From a control room operator point of view.



Energy Division Norway's ongoing contribution to Customers Energy transition & Sustainability

8,567K

 Tonnes CO2 equivalents each year

Total ongoing project volume (MNOK)

Total ongoing volume	8,394M
Total climate related volume	3,756M
Ratio climate related volume	45 %

Fixed

Floating

Gas Pro...

LNG, G...

Refining

Chemical

Infrastru...

Hydro P...

Water &...

Aquacul...

Tunnel

Offshor...

Offshor...

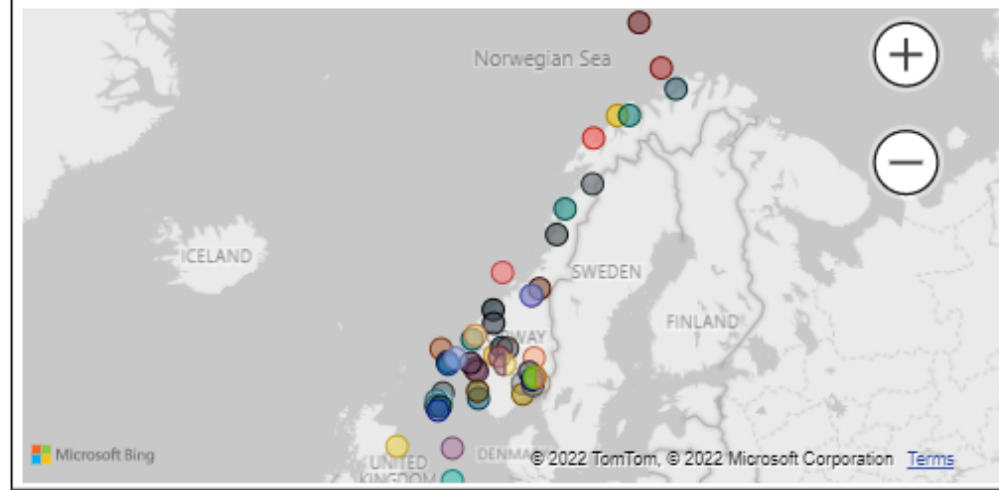
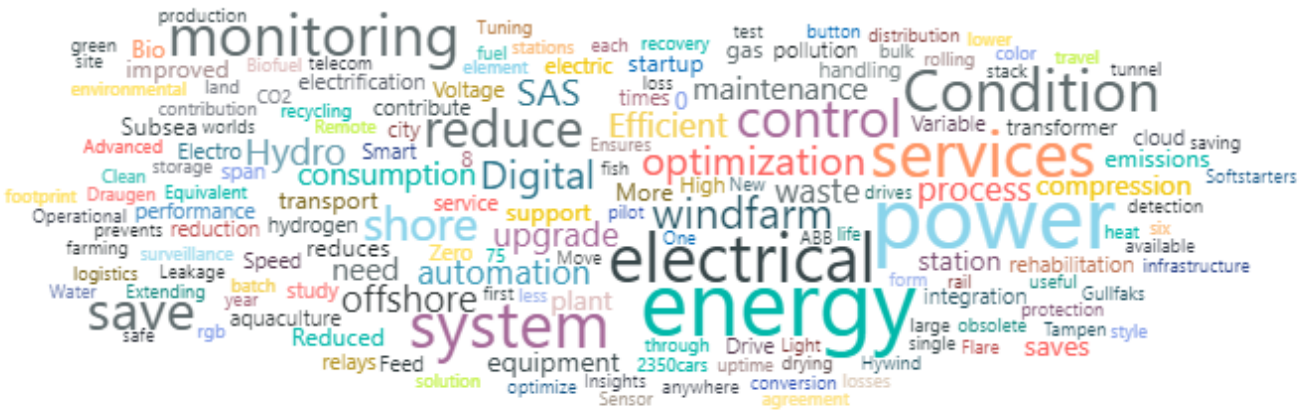
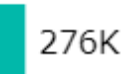
Subsea

Power t...

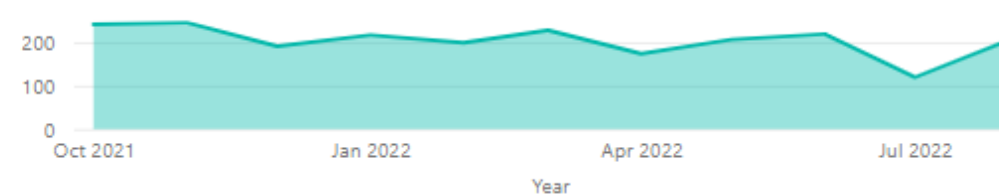
Supporting Contributor



Direct Contributor



Last 12 months Work effort in Full Time Equivalents



Reference	1st source on Internet	2nd source on Internet	Owner or Operator source on Internet
Aker BP common			

Number of Projects	Number of hours
87	911,290

ABB References - CCS in Norway

Sleipner Offshore Complex

Norway

Customer challenge

Gas and condensate production field with a focus on a low CO2 footprint achieved through an unmanned CO2 processing platform, which requires an efficient and reliable Technology platform delivered by ABB.

Developed through further tie-ins and along term partnership with Equinor to ensure the technology is maintained .

➤ **The world's first large-scale carbon capture and storage**

➤ 19 MT CO2 captured and stored by end of 2020.

➤ Gas connection point for export to Europe.

Application

Process and Safety Control system including our Simulator solution, Electrical distribution system, Telecom and several of ABB's advanced applications (alarm Insight / Control loop monitoring and Operations Insight)

Outcome

Reliable Gas and Oil production, with a lowered CO2 footprint.

Benefits

Stripping the carbon dioxide from the natural gas, compressing it and injecting it into a storage reservoir 1,000 meters beneath the seafloor significantly reduces greenhouse gas emissions and avoids a considerable cost.

ABB solution

At Sleipner, an ABB integrated distributed control solution manages all subsea and topside operations including the subsea and wellhead control systems, the safety, shutdown and fire and gas protection systems, and the carbon capture and storage process. ABB extended automation System 800xA monitors and controls the site, using its unique integrative capability to control not only the complex carbon capture process but the entire production processes as well, Electrical equipment integrated includes LW / MV (MNS + UniGear) and Exition System Unitrol 6000



Sleipner Area



The Sleipner area embraces the gas and condensate fields Sleipner Øst, Gungne and Sleipner Vest. The Sleipner installations are also processing hydrocarbons from the tie-in fields Sigyn, Volve, Gudrun and from 2017 also rich gas from Gina Krog.

Sleipner consists of the following installations:

Sleipner A - Processing, drilling and Living quarter platform

Sleipner R - Riser platform for gas export and condensate export

Sleipner T - Processing and CO₂ removal platform

Sleipner B - Unmanned production platform.

Sleipner has since 1996 performed removal of CO₂ from produced gas, and injected and stored more than 19 million tonnes of CO₂ in the Utsira formation (by end of 2020).

Snøhvit LNG

Carbon capture and storage



- CO₂ from well stream is separated from the natural gas
- CO₂ is export through a 153 km long subsea pipeline and injected into the formation 2600 meter under seabed
- The plant can capture and store 700 000 tones of CO₂ per year

ABB scope of supply:

- Integrated Safety and Automation System
- Subsea control system
- Electrical equipment, LV motors and drive systems
- Power distribution control system
- Power management system
- Field instrumentation and analyzers
- Simulator

Test Center Mongstad

Carbon capture and storage



- Test facility for Carbon Capture Technology where technology providers can verify their technology.
- TCM delivers a framework to test based on a industrial flue gases onsite from Mongstad refinery and has a pre-built infrastructure to be used. Including in this is the Technology platform which is delivered & Maintained by ABB
- TCM's CO₂ capture facilities consists of an amine plant and an ammonia unit in addition to a module site for emerging technologies. Hence the Technology platform consist of a common utility and two separate systems from ABB.

ABB scope of supply:

- ABB 800xA Integrated Safety and Automation System, including Electrical control / Power distribution control & Management system based on IEC6150 (22kV, 6kV)
- Electrical equipment : MV / LV / Transformers / Motors and drives.

ABB

ABB Vision

CCUS Balance of Operations

