



DELION

## Air Separation units

Large, medium and Small-Scale modular air separation units tailored to different markets

### Modular solution

$N_2$

$O_2$

Ar



Any modern factory in any region of the world needs air, oxygen and/or nitrogen

## Partnership

We are a seasoned global market provider of air separation plants. Leveraging our extensive expertise in plant engineering and operation, we have created a range of modular air separation units (ASUs) to address current air separation demands. For more intricate and demanding projects, we design and deliver tailored plants, which we assemble on-site to accommodate specific requirements.





## Addressing the current challenges in air separation

Companies looking to invest in air separation units must weigh several factors. A dependable design that minimizes technical risk and maximizes operational flexibility is crucial for maintaining process continuity and adhering to strict safety standards. Construction logistics and the implementation timeline are also critical factors, especially in challenging or hard-to-reach locations. Moreover, plant owners encounter various financial challenges. Achieving a quick return on investment is crucial in today's highly competitive economic environment. Companies need to consider both capital and operating expenditures (CAPEX and OPEX) throughout the entire lifespan of the plant to accurately assess the total cost of ownership.

### Modular design for improvements in time efficiency, cost savings, and reliability.

Building on our experience in engineering and operation, we have developed a portfolio of modular air separation units to meet today's ASU challenges. These plants provide the best solution for our clients' varied needs, offering:

- Quick time-to-solution achieved through extensive prefabrication and pre-testing.
- Streamlined on-site logistics and reduced CAPEX due to modular design.
- Expedited equipment fabrication and delivery.
- Cutting-edge technology and design for dependable operation.
- Simplified maintenance for reduced OPEX.
- Comprehensive support services, from consulting to commissioning and start-up.
- Confidence assured by our strong commitment to and proven excellence in quality, health, safety, and environmental (QHSE) protection.

ASUs are used in the following industries:

- Metallurgy
- Chemical industry
- Oil and gas industry (GPP, LNG plants ...)
- Healthcare (hospitals, drug manufacturing ...)
- Food processing
- Etc.



## Our ASU portfolio

### Air Separation Unit

We are innovated Large (ASU-L), Medium (ASU-M) and Small (ASU-S) -scale Air Separation Unit, which was designed with low-pressure process. In operation, the advanced technics eliminated the high-power consumption characteristic in conventional designs.

**Plant type:** Skid manufactured unit.

**Product:** instrument air, liquid and gaseous Oxygen (O<sub>2</sub>), Nitrogen (N<sub>2</sub>), Argon (Ar).

**Capacity:** from 500 Nm<sup>3</sup>/h to 120 000 Nm<sup>3</sup>/h

**Purity:** 99.5% to 99.8% oxygen

**Specific energy:** 400 to 700 Kilowatt hours per ton (kWh/t)

### Nitrogen Generation Unit

Nitrogen Generation Units (NGU) are designed and built with the highest standards of reliability and efficiency to meet customers' various demands.

**Plant type:** Skid manufactured unit.

**Product:** Instrument air, liquid and gaseous Nitrogen (N<sub>2</sub>).

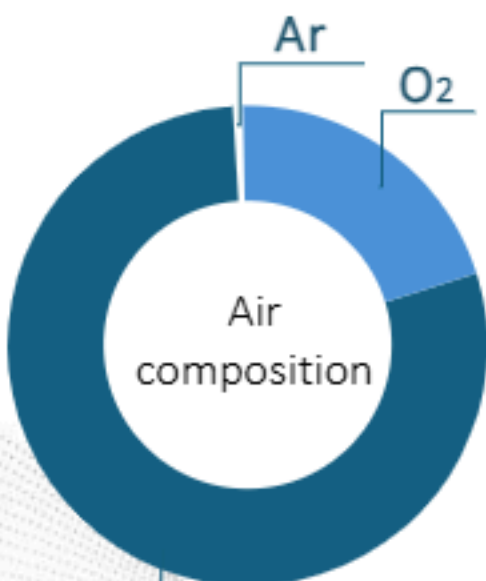
**Capacity:** from 500 Nm<sup>3</sup>/h to 80 000 Nm<sup>3</sup>/h

**Purity:** down to 1 ppb of oxygen

N<sub>2</sub>

O<sub>2</sub>

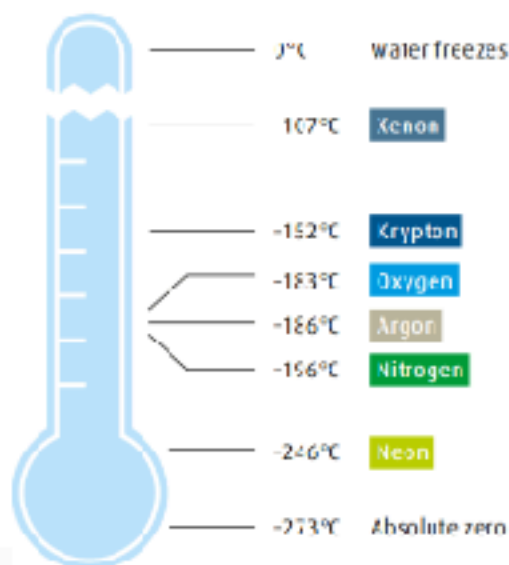
Ar



N<sub>2</sub>

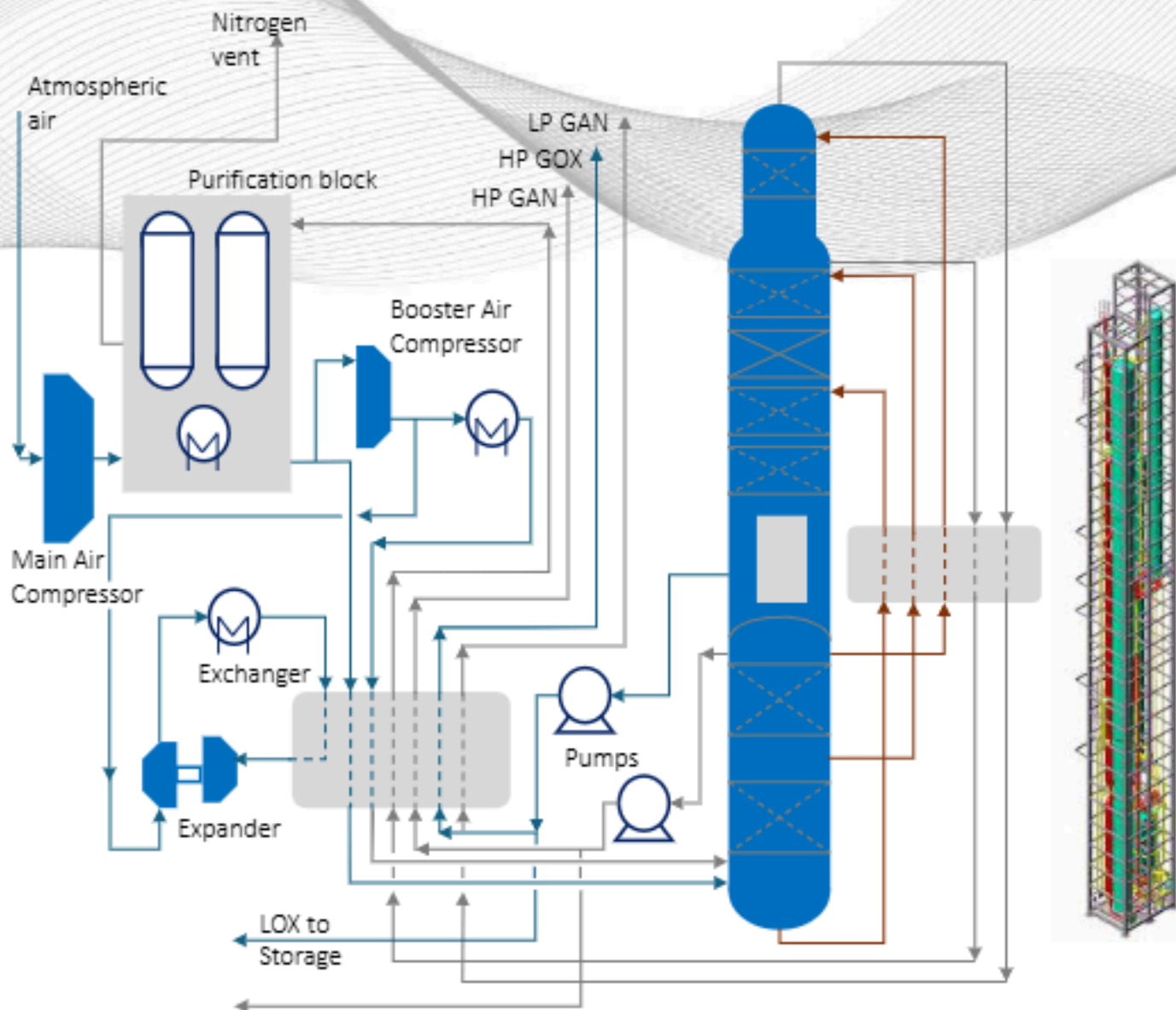
- N<sub>2</sub> - 78,08 %
- O<sub>2</sub> - 20,95 %
- Ar - 0,93 %

Any modern factory in any region of the world needs air, oxygen and/or nitrogen





## Air Separation Unit



Our standardized air separation unit (ASU) is tailored for customers with fast-track projects, where rapid production start-up is a top priority. This unit integrates air compression, adsorption purification, cryogenic distillation of primary components, and internal gas compression to meet the pressure specifications required by the end-user. This fully-packaged, stand-alone unit generates oxygen with a purity of 99.6 to 99.8%. Additional co-products include nitrogen, liquid oxygen, liquid nitrogen, liquid argon, and compressed dry air.

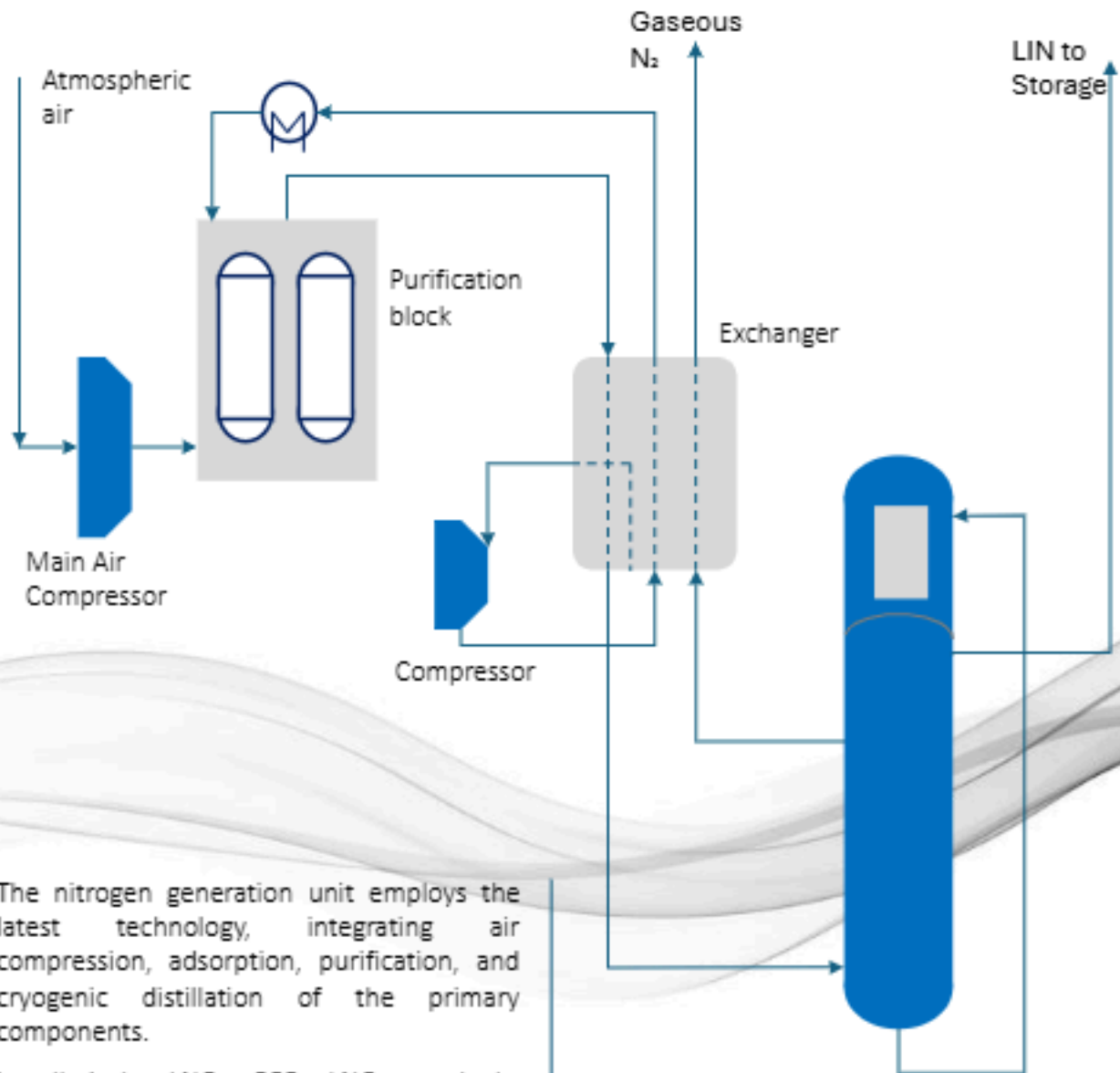
Based on customer requirements, energy costs, and the potential for integration into customer processes, our unit can be configured to optimize either capital expenditures (CAPEX) and/or operational expenditures (OPEX).

Installed in plants in the steel (e.g. basic oxygen furnaces, blast furnaces, electric arc furnaces), chemicals (e.g. ethylene oxide, ammonia), and oil refining (e.g. desulphurization, gas-to-liquid) industries.





## Nitrogen Generation Unit

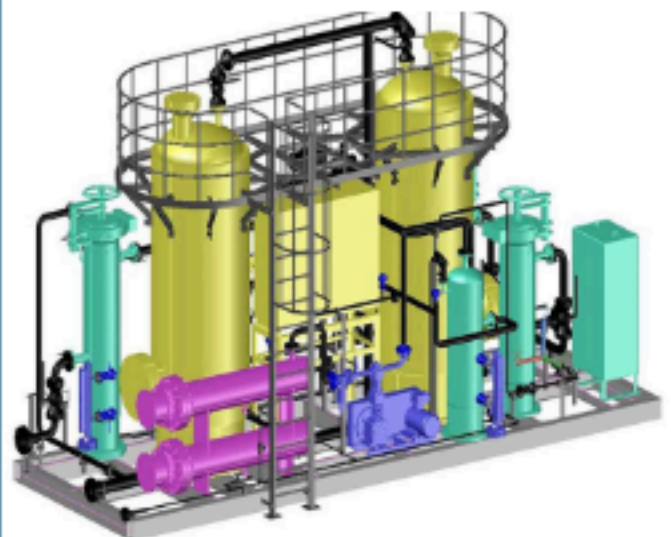


The nitrogen generation unit employs the latest technology, integrating air compression, adsorption, purification, and cryogenic distillation of the primary components.

Installed in LNG, GPP, LNG terminals, electronics plants, and oil refineries etc.

The unit is fully packaged, enabling easy installation. Depending on customer requirements, it can be configured to optimize capital expenditures (CAPEX) and/or operational expenditures (OPEX). The unit can also be customized, with options that include:

- back-up vaporizers and storage for increased availability and reliability;
- liquid co-production to refill back-up liquid storage.





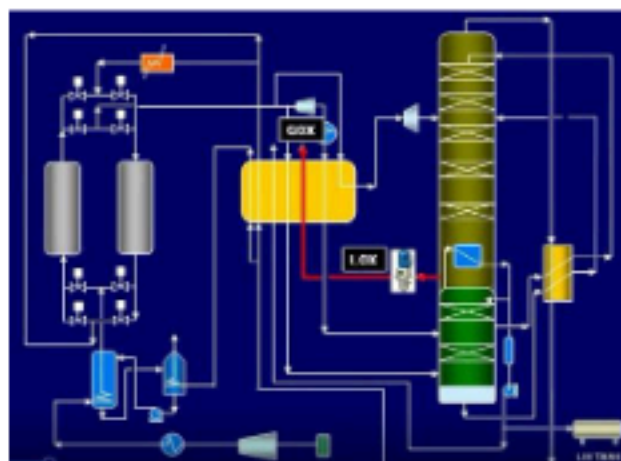
## According to local needs

### Best solutions

A modular design standardizes all key plant components, ensuring maximum cost efficiency and ease of deployment. Our modules are pre-fabricated at our partners workshops to the maximum possible extent. The successful combination of our engineering excellence and our production capabilities gives you the best results.

### Advanced technology

Plant designs are developed using advanced process simulation and sophisticated engineering design tools. A proven control concept, enhanced by cutting-edge software, ensures reliable, convenient, and economical plant operation. The control equipment is housed in a container for easy installation.



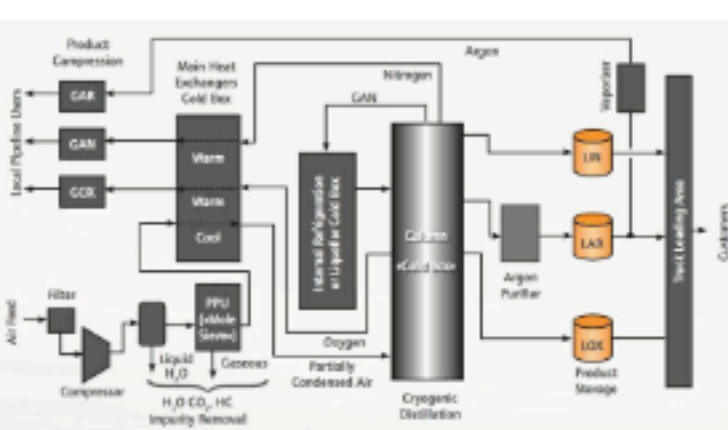
### Modularized design for rapid delivery and start-up

Key components such as the air compressor, molecular sieve valves, turbine and cold-box are delivered completely pre-packaged and tested. The exchangers and columns are installed in self-supporting cold-boxes. In addition, the sizes of the cold-boxes are designed for road transportation, which also eases on-site installation. Other modules such as the valves and pumps are installed in skids to the maximum degree possible for prefabrication and testing.

Electrical and instrumentation equipment is delivered in plug-and-play containers. The plant control system together with the operator station(s) and analysis equipment come in an air-conditioned container, ready cabled and shop-tested, with the DCS preconfigured for rapid start-up. A separate shop-assembled container is supplied for all electrical medium-voltage switchgear, transformers and low-voltage switchgear, including VFDs for pumps and other electrical equipment. All of these modules and skids are equipped with remote I/O modules for easy bus connection. This pre-assembled, packaged design minimizes on-site erection timelines.



## According to local needs



## Safe operation with highest quality standards

In our Company, we are firmly committed to the highest quality, safety, health and environmental (QSHE) standards. We are supply safe and economical plants equipped with the latest technology.

In addition, sophisticated interlock functions protect our ASUs against any unforeseen failures or maloperation. They also ensure the plant remains in a safe condition even in the event of a power failure. Protective measures are applied wherever the safety of operating personnel may be jeopardized by the process, rotating machinery or exposure to extreme temperatures.

All our projects are executed to the following rigorous standards to ensure the highest levels of quality:

- Local standards
- EN ISO 9000 : 2000
- ISO 9001
- ISO 14001
- PED 97/23/EC
- OHSAS 18001
- ASME code, (U Stamp)
- SCC checklist
- Work safety and environmental protection legislation

## Competitive costing with partner's manufacturing

Our modular plants are engineered to minimize total cost of ownership throughout their entire lifecycle. This begins with the cost efficiencies achieved through local production, supported by the technological leadership of our engineered cold-boxes.

Manufacturing of the heat exchangers, columns, cold-boxes, skids, electrical and instrumentation containers by global leaders allows us to combine the benefits of competitive costing with high quality standards.

We use a high-quality aluminum and/or stainless steel is used for piping and columns.



## Ease of operation

Our modular plants are designed for ease of operation. Made by internationally renowned manufacturers, all instruments are engineered to the highest standards of quality and reliability. The instrumentation panel is connected to a safe and sophisticated process control system, using the latest proven digital control technologies for optimum reliability.

Advanced control functions can support fully unattended operation, automatic start-up from cold conditions, automatic load changes and production adaptations.





## Our Services

### Engineering

The engineering services provided include the following:

- Basic design
- FEED (for Large scale)
- Detailed Design.
- Equipment Design
- Skid Design

### Procurement

The procurement services provided include the following:

- Supplier management
- Production quality control
- Acceptance testing
- Certification

### Site Services

The site services provided include the following:

- Installation advising
- Commissioning training
- Staff training



### Remote Support

Remote support for a ASU involves providing expert technical assistance, monitoring, and troubleshooting from a remote location, ensuring continuous and efficient plant operations. Key aspects include:

**Real-Time Monitoring:** Utilizing advanced software and sensors to remotely monitor plant performance, including key parameters like pressure, temperature, flow rates, and equipment status.

**Troubleshooting and Diagnostics:** Offering immediate technical support to diagnose and resolve issues, minimizing downtime by addressing problems as they arise without the need for on-site personnel.

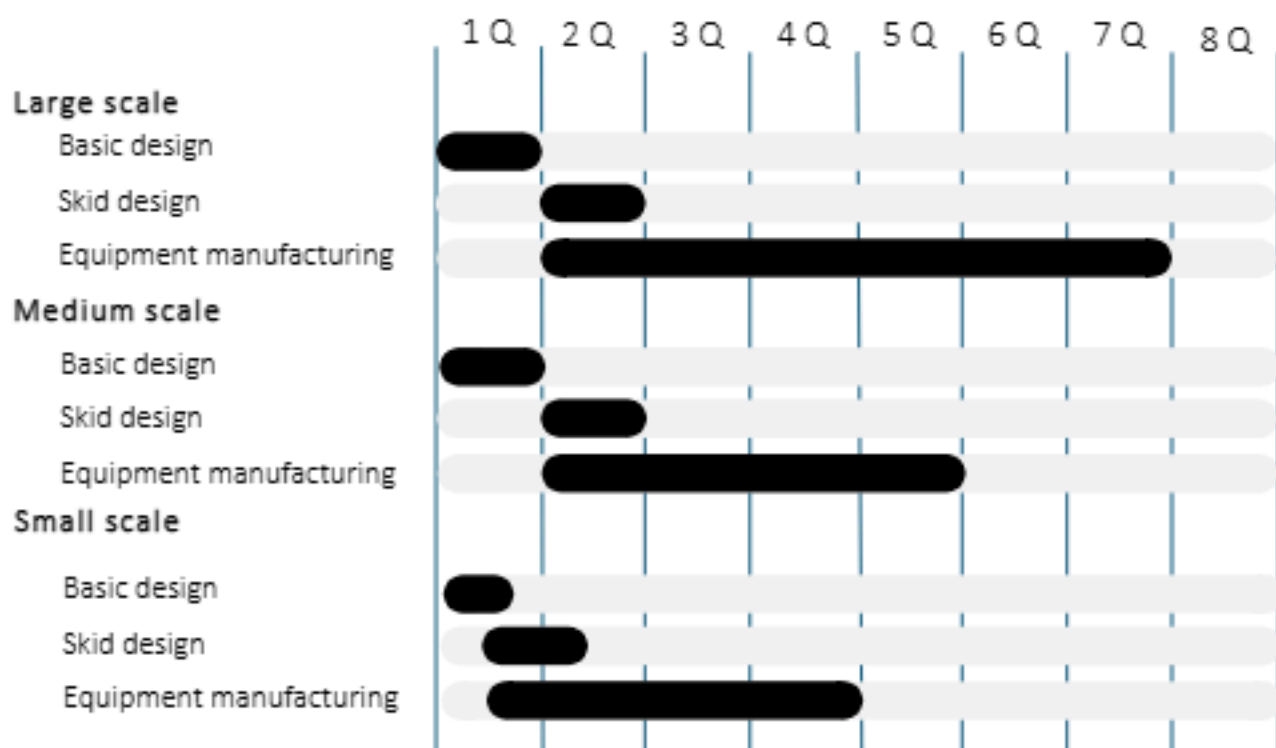
**Process Optimization:** Providing ongoing remote analysis and recommendations to optimize plant processes, improve efficiency, and reduce operational costs based on real-time data.

**Preventive Maintenance:** Monitoring equipment health remotely and scheduling preventive maintenance activities to avoid unplanned shutdowns and extend the lifespan of critical components.

**Emergency Response:** Providing 24/7 remote support to quickly respond to emergencies, coordinating with on-site teams to manage incidents and mitigate risks.



## Standard schedule



\*) The above schedules are typical and will be adjusted depending on the Customer's requirements.

## Our guarantees

### Process guarantees

We are ready provided the following process guarantees:

- Capacity guarantee
- Products quality guarantee
- Energy consumption guarantee

### Other guarantees

We are ready provided other guarantees:

- Mechanical warranty
- Spare parts guarantee



## Our major partners

Technology partners



Exchanger Suppliers



Control systems



Workshop

