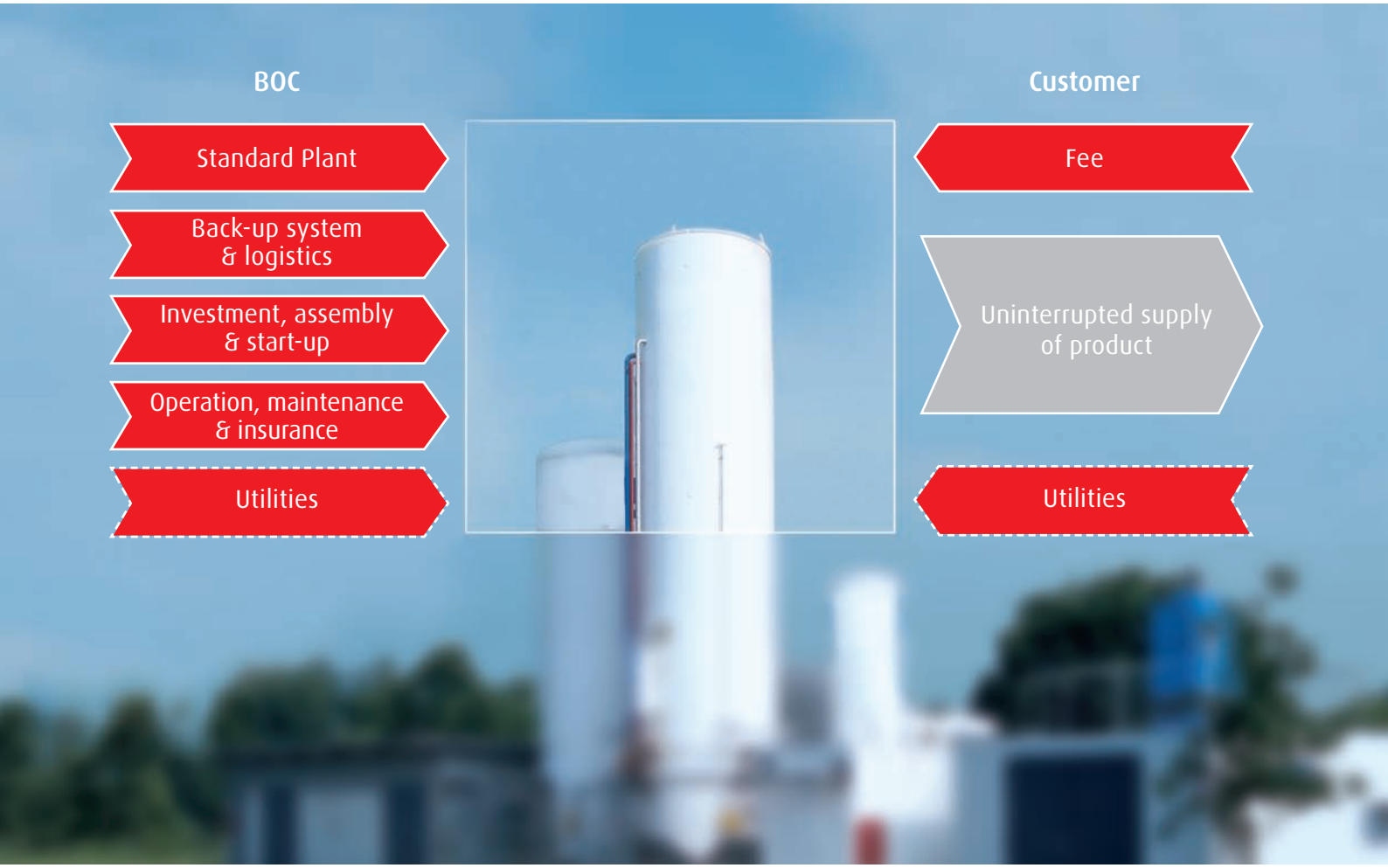
ECOVAR – onsite gas generation solutions

BOC
Member of The Linde Group



BOC works closely with you
to ensure uninterrupted supply.

Uninterrupted gas supply with economical and reliable support from BOC.

The ECOVAR® concept from BOC is the solution of choice.

Economical

ECOVAR® supply systems are built around standardized components to ensure maximum cost efficiencies. Standardized design and dimensions play an important role in cutting the costs involved in engineering, building, installing, operating and maintaining on-site gas supply systems. Through optimal combination of production plant and back-up unit the ECOVAR® concept offers solutions with minimal capital expenditure, operational costs and consumption of utilities, such as energy and water.

Variable

The ECOVAR® portfolio is extremely flexible. Systems and system modules can be combined as required to create tailored solutions that suit local requirements. ECOVAR® systems can be designed for indoor or outdoor installation to fit available space and for availability of utilities (energy, water and compressed air). ECOVAR® plants are generally mounted in cabinets, on skids or in containers for fast, trouble-free installation/commissioning and relocation. To suit individual flow, purity and pressure requirements, BOC has developed a series of standard plant product lines for nitrogen, oxygen and hydrogen.

Reliable

ECOVAR® systems comprise a standard plant and a back-up unit to ensure uninterrupted supply all year round (8760 hours). Automatic control systems track fluctuations in demand, automatically activating the back-up unit to support production peaks. The back-up unit can also be activated in the event of a plant stop. Both the production plant and back-up unit are normally monitored by the nearest BOC center to ensure a reliable gas supply.

Environmentally sound

ECOVAR® systems are more environmentally friendly than conventional supply methods. Product transport and energy consumption are reduced to a minimum by producing the required gas on-site.

ECOVAR® at a glance

- gas supply agreement
- system consisting of a standard plant and a back-up unit
- system built, installed and operated by BOC
- portfolio of standard plants with high flexibility

1. Nitrogen solutions

CRYOSS®

In these plants, nitrogen is produced by fractional distillation of liquefied air using a cryogenic process. This process uses the different boiling points of the various constituents of air.

CRYOSS® HP/UP

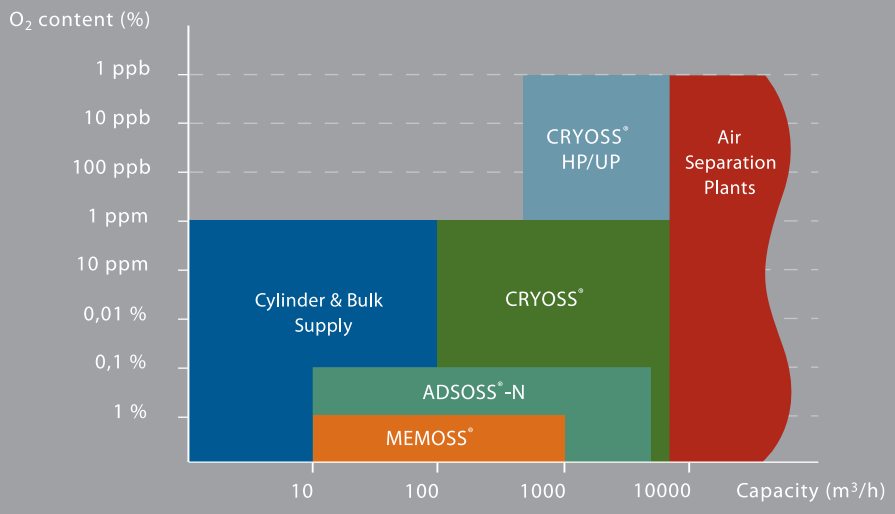
The same basic process is applied, but enhanced to remove impurities. This results in high and ultra-high nitrogen purity grades down to ppb levels.

ADSOSS®-N

ADSOSS®-N uses an adsorption-based carbon molecular sieve (CMS) to separate nitrogen from air. Under pressurized conditions, CMS adsorbs oxygen, CO_2 and water, whereas the nitrogen passes through the sieve. The sieve is cleaned by simply reducing the pressure. ADSOSS®-N systems are designed with two adsorber vessels which alternate (as they become saturated) to ensure continuous operation. This is referred to as pressure swing adsorption (PSA).

MEMOSS®

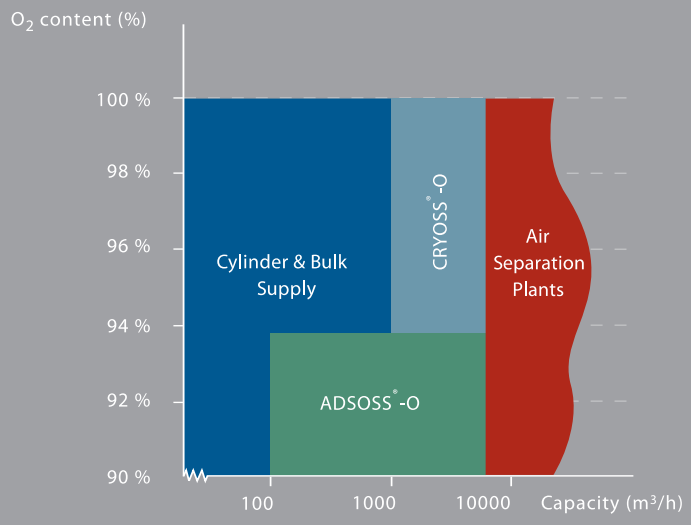
Compressed air passes through extremely thin, long hollow fibers, the walls of which act as semi-permeable membranes. Oxygen penetrates these walls relatively quickly, while nitrogen is generally retained within the hollow fibers until the desired purity is attained.



Choice of product line depends on purity, capacity and pressure requirements.

	CRYOSS®	CRYOSS® HP/UP	ADSOSS®-N	MEMOSS®
Standard sizes	250 – 7000	500 – 7000	10 – 5000	10 – 1000
Flow rates	100 – 7000 m^3/h	500 –7000 m^3/h	up to 5000 m^3/h	up to 1000 m^3/h
Purity	< 5 ppm O_2	high and ultra high purity	98 – 99.99 % (w/o additional purification)	90 – 99.5 %
Pressure	up to 10 bara (w/o additional compression)	up to 10 bara (w/o additional compression)	up to 9 bara (w/o additional compression)	13 bara (w/o additional compression)

The charts and tables give a schematic overview.
For choice of solution please contact BOC.



Choice of product line depends on purity, capacity and pressure requirements.

2. Oxygen solutions

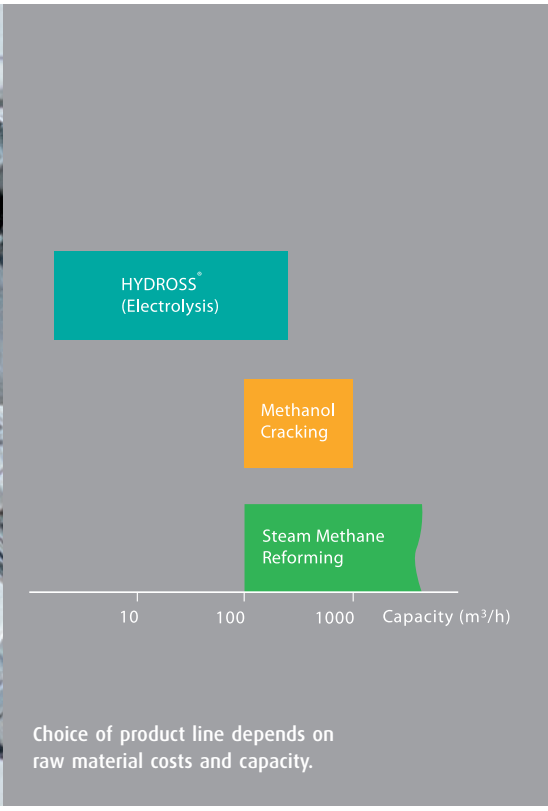
ADSOSS®-O

ADSOSS®-O plants extract oxygen by means of adsorption. Whereas nitrogen, carbon dioxide and water vapor are readily adsorbed by the surface of the special zeolites, oxygen and argon easily pass through the material. The zeolite is cleaned by simply reducing the pressure into vacuum. ADSOSS®-O systems are typically designed with two adsorber vessels. To extract oxygen the vessels are cyclically operated. This is referred to as vacuum pressure swing adsorption (VPSA).

CRYOSS®-O

Oxygen can be generated by separating air with a cryogenic process. This solution can also be designed to produce a combination of oxygen and nitrogen.

	ADSOSS®-O	CRYOSS®-O
Standard sizes	100 – 6000	1000 – 6000
Flow rates	100 – 6000 m³/h	1000 – 6000 m³/h
Purity	90 – 94 %	90 – 99.95 %
Pressure	up to 1.3 bara (w/o additional compression)	up to 2.5 bara (w/o additional compression)



Choice of product line depends on raw material costs and capacity.

3. Hydrogen solutions

HYDROSS®

Depending on raw material costs (power, natural gas and methanol) BOC can offer the optimum hydrogen solution based on electrolysis of water, steam reforming of natural gas or cracking of methanol. HYDROSS® plants produce hydrogen by electrolysis requiring only power and water. When a direct current is applied to electrolytic cells, oxygen is produced at the anode and hydrogen at the cathode. The standard hydrogen purity is 99.9 % but this can be increased through purification. High purity oxygen can also be produced.

	HYDROSS®
Standard sizes	5 – 250
Flow rates	5 – 250 m^3/h 2.5 – 125 m^3/h oxygen
Purity	99.9 % (w/o additional purification)
Pressure	10/25 bara (w/o additional compression)

The charts and tables give a schematic overview.
For choice of solution please contact BOC.

Whatever your requirements – we have the right supply solution.

Choosing the right plant type and capacity is one of the biggest success factors in designing a cost-efficient gas supply system.

Design determinants for your on-site plant

- capacity of plant, back-up unit and buffer vessel (if applicable)
- availability and cost of utilities (energy, water, compressed air)
- product purity and pressure
- availability of space, authority requirements and other environmental concerns
- development of future product needs

Various criteria must be carefully evaluated to ensure that the right decision is made.

Consumption profile

The product cost are lowest if the plant operates at full capacity without interruption. Reduced output increases specific costs by spreading fixed costs over a reduced yield. It is important to analyse the required consumption profile over time to determine whether a larger plant with a fast response time or a smaller plant with back-up support is the most effective solution.

Purity

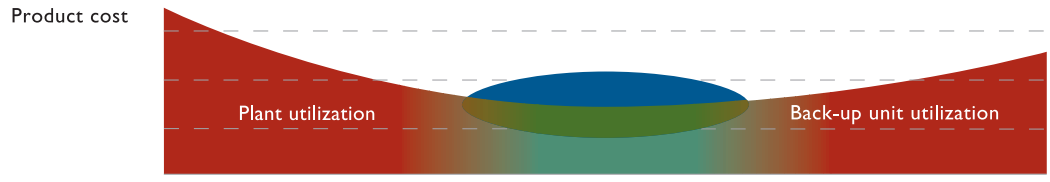
The ECOVAR® product lines are designed to deliver different levels of gas purity. Generally speaking, the lower the purity, the lower the product cost.

Pressure

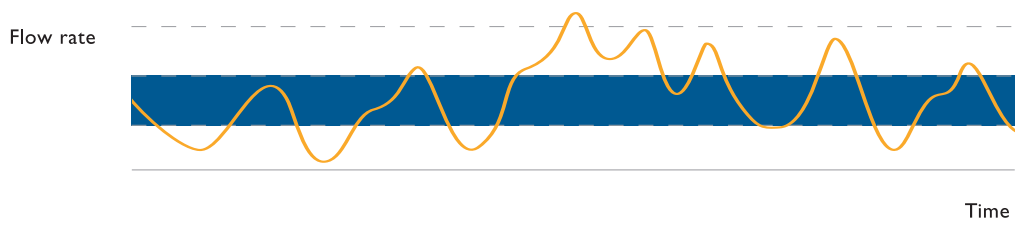
The product pressure can also be an important cost factor. To avoid unnecessary costs, it is essential that the needed product pressure is accurately assessed and the plant designed accordingly.

Energy

The energy required for air separation is one of the biggest production costs. The choice of plant must carefully balance gas needs against the cost of energy and capital costs.

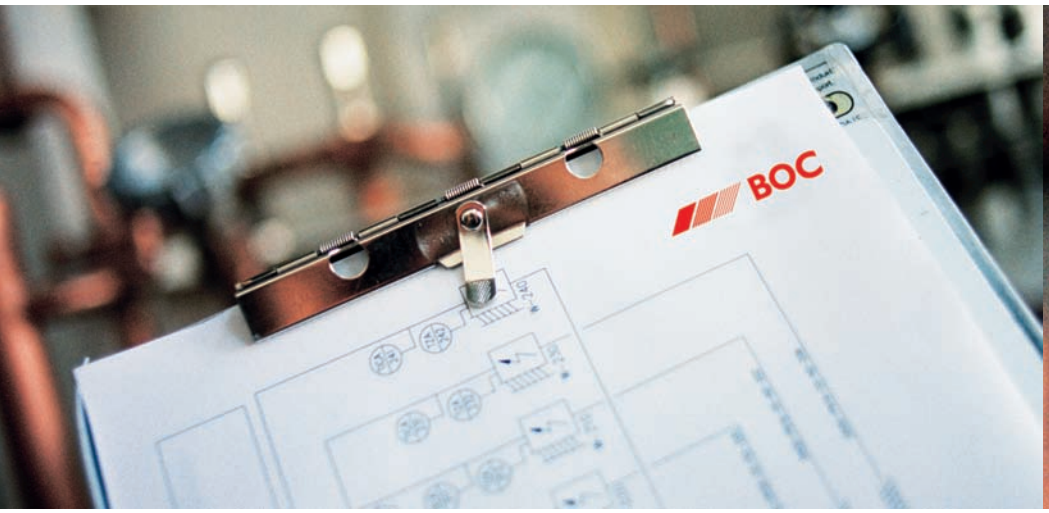


Product cost as a function of utilization degree of the ECOVAR® System.



Short and long-term consumption profile evaluation.


BOC
BOC
Liquid Oxygen
2P
1073


BOC

Partnering with BOC means

- freedom to focus on core business
- state-of-the-art technology
- maximum supply reliability
- long-term cost efficiency

CRYOSS® 250

Helping you make the right choice.

BOC leverages many years of experience in the field of on-site supply systems to make sure you make the right choice and that your gas supply contract works to your favour.

Services include:

- Analysis of demand profile in close collaboration with customer
- Detailed cost-efficiency and long-term viability analysis
- Evaluation of optimum supply concept, plant type, plant size and back-up unit
- Support in all plant planning and engineering tasks
- Plant financing
- Supply, assembly and commissioning of the plant by skilled technicians
- Operation, maintenance and insurance of the ECOVAR® system
- Remote monitoring and control (with 24-hour surveillance) from a BOC center

Benefits of ECOVAR®:

- Freedom to focus on core business
- Transparent overview of long-term costs
- No upfront investment costs
- No operating risk
- No personnel expenditure
- Zero maintenance and service effort
- No need to keep spare parts in stock

ECOVAR® is a cost-effective solution if you have:

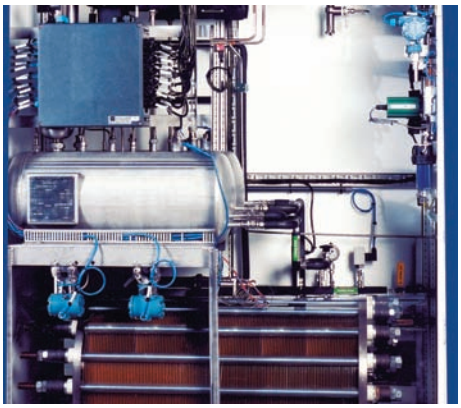
- Long-term gas needs
- A relatively constant base load
- A high annual output (in terms of operating hours)

ECOVAR® is successfully deployed in the following industries and sectors:

- Electronics/semiconductors
- Metallurgy
- Pulp and paper
- Chemicals and petrochemicals
- Glass
- Waste recycling and incineration
- Water treatment
- Food and beverages
- Pharmaceutical

MEMOSS® 300

ADSOSS®- N 500



HYDROSS® 10

Getting ahead through innovation

With its innovative gas supply concepts, BOC is playing a pioneering role in the global market. As a technology leader, our task is to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

BOC offers more. We create added value, clearly discernible competitive advantages and greater profitability. Each concept is tailored specifically to meet our customers' requirements on a unique and individual basis. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimization and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but, more importantly, with you. After all, joint activities form the core of commercial success. BOC – ideas become solutions.

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General enquiries please contact **0800 222 888**
to get further information or a budget quotation

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