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Technology and Costs

TECH 2019S11: Air Separation Technology

Air Separation Technology is one in a series of reports published as part of Nexant's 2019 Technoeconomics – Energy & Chemicals (TECH) program.

Overview

Air Separation technology separates air into commodity gases such as oxygen, nitrogen, and argon. These gases find applications in a broad range of markets including healthcare, refining, metal fabrication, steel chemical, and glass manufacturing.

The practice of air separation began in 1895, by Carl Von Linde, following experiments in his laboratory in Munich and the process has evolved over the time. This report discusses the current industrial, and emerging air separation technologies, latest business developments, supply modes, market drivers, and process economics.

The TECH report addresses the following questions

- What are the major technologies available for air separation and how do they differ?
- Who are the major technology licensors and producers globally? What are the licensor's recent business developments?
- What are the industrial applications of these gases and the major market drivers for oxygen and nitrogen?
- How do the process economics compare across different air separation technologies and different geographic regions?

Commercial Technologies

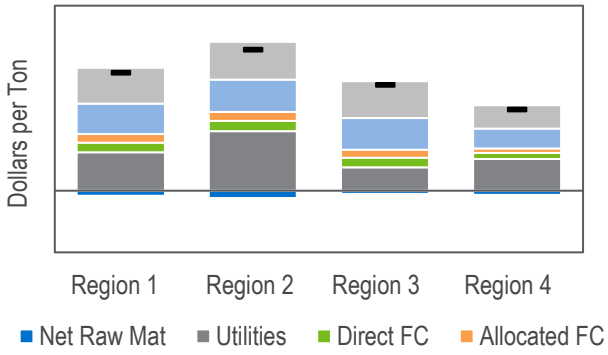
The air separation technologies are categorized into cryogenic and non-cryogenic. The selection of these technologies depend on a variety of factors such as purity, consumption, and demand fluctuations). The non-cryogenic technologies are further sub-categorized into pressure swing adsorption, vacuum swing adsorption, and membrane air separation.

These technologies are provided by major global players such as Air Liquide, Linde, Air Products, Taiyo Nippon Sanso Corporation and the Messer Group. The report provides a detailed description of each of these technologies, the main players and their offerings.

Process Economics

The detailed cost of production for cryogenic and non-cryogenic air separation technologies in the United States, Western Europe, the Middle East, and China is presented. The report also provides a regional assessment and comparison of these technologies.

Regional Cryogenic Air Separation Production Cost Summary



Commercial Overview

Air separation gases are widely used in a variety of industries including chemicals, steel, healthcare, food & beverages, paper & pulp, oil & gas. The demand for these gases has been growing with the rising demand for end-use applications. The report also provides an overview on the major air separation market drivers. While the use of air separation gases is broad and diverse, certain key markets and applications drive overall demand.

Major drivers for oxygen include its use as a reactant in many upstream applications such as coal gasification, sulfur oxygen enrichment, ethylene oxide, and propylene oxide production, and in the steel industry.

However, nitrogen is used largely as an inert gas in applications including enhanced oil recovery, LNG production, refinery operations, and petrochemicals production.

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Technology@nexant.com or www.nexantsubscriptions.com

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The TECH program (formerly known as PERP) is globally recognized as the industry standard source of process evaluations of existing, new and emerging of interest to the energy and chemical industries.

TECH's comprehensive studies include detailed technology analyses, process economics, as well as commercial overviews and industry trends. Reports typically cover:

- Trends in chemical technology
- Strategic/business overviews
- Process Technology:
- Chemistry
- Process flow diagrams and descriptions of established/conventional, new and emerging processes
- Process economics – comparative costs of production estimates for different technologies across various geographic regions
- Overview of product applications and markets for new as well as established products
- Regional supply and demand balances for product, including capacity tables of plants in each region
- Regulatory and environmental issues where relevant

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Technology and Costs comprises the Technoeconomics – Energy & Chemicals (TECH) program (formerly known as PERP), the Biorenewable Insights program (BI), the Sector Technology Analysis, and the new Cost Curve Analysis. These programs provide comparative economics of different process routes and technologies in various geographic regions.

Nexant serves its clients from over 30 offices located throughout the Americas, Europe, the Middle East, Africa and Asia.

Corporate Headquarters
Tel: +1 415 369 1000
101 2nd St Suite 1000
San Francisco
CA 94105-3651
USA

Americas
Tel: +1 914 609 0300
44 S Broadway,
5th Floor White Plains
NY 10601-4425
USA

Europe, Middle East & Africa
Tel: +44 20 7950 1600
1 King's Arms Yard
London EC2R 7AF
United Kingdom

Asia Pacific
Tel: +662 793 4600
22nd Floor, Rasa Tower I
555 Phahonyothin Road
Kwaeng Chatuchak
Khet Chatuchak
Bangkok 10900
Thailand

For more information please contact
Technology@nexant.com or www.nexantsubscriptions.com