इंडियनऑयल
IndianOil

CRYOGENICS

For New-Age Industrial Excellence

ENGINEERING INNOVATION

for New-Age Industrial Excellence!



IndianOil -
The Energy of India

Indian Oil Corporation Limited (IndianOil) is one of India's largest commercial enterprises and the flagship national oil company invested in the full value chain of upstream, midstream and downstream hydrocarbons industry.

IndianOil's core business has been refining, transportation and marketing of petroleum products. In line with India's growing energy demand, the Company has, over the years, expanded its operations - upstream into oil & gas exploration & production and downstream into petrochemicals, besides diversifying into natural gas and alternative energy resources.

IndianOil continues to expand its business operations abroad through its overseas establishments in Mauritius, Sri Lanka, UAE, Sweden, USA, The Netherlands, Singapore, Bangladesh, Myanmar and Nepal.

US$ 80 billion
(INR ₹5670 billion)
Revenue 2019-20

Over
33,500
Employees

FORTUNE GLOBAL 500

117th Rank
Fortune
"Global 500 List" 2019

Business Profile

Refineries

- Owns 11 refineries
- Capacity: 80.70 MMTPA (1.6 million barrels/day)

Pipelines

- Crude oil and product pipelines : Over 14,200 km
- Throughput: 94 MMTPA for liquid fuels, ~22 MMSCMD for gas

Marketing

- 29,000 fuel stations (Sales: 84.35 million tonnes)
- 12,450 LPG Distributors; 94 LPG Bottling Plants
- 7000 dedicated pumps for bulk consumers
- 119 Aviation Fuel Stations
- 118 bulk storage hubs

Petrochemicals

- Among top 2 players in India.
- World scale plants, world class products.
- Exports to over 70 countries.

Natural Gas

- Present accross natural gas value chain
- Investing INR ₹ 10,000 crore in City Gas Distribution over 8 years.

Exploration & Production

- Upstream portfolio includes PI in 12 overseas and 12 domestic assets.

Alternative Energy & Sustainable Development

- Installed renewable energy capacity of 222 MW (Solar & Wind)
- Making forays into automotive grade Compressed Bio Gas (CBG)

Research & Development

- One of Asia's finest centres in downstream petroleum R&D.
- Over 1000 patents

MMTPA = Million Metric Tonnes Per Annum, MMSCMD = Million Standard Cubic Metres per Day, PI = Participating Interest

Visit www.iocl.com to know more.

Cryogenics Business

IndianOil has a thriving Cryogenics Business with expertise in design & production of state-of-the-art vacuum super-insulated cryogenic storage & transport vessels. The Corporation is one of the largest manufacturers of cryogenic containers in the country. We offer a diverse range of products for long-term cryogenic preservation of biological samples. A wide range of super-insulated liquid Nitrogen tanks are available for laboratories, industries and oilfield service applications. We also offer turnkey Cryobank management systems with fully automated controls. Our Cryogenics business also caters to requirement of pressure vessels in refining, fertilisers and gas industries.

To reach Liquefied Natural Gas to customers located away from natural gas pipelines, IndianOil has pioneered the concept of 'LNG at Doorstep' (LNG by road) in India that is in service for over a decade.

IndianOil is the market leader with nearly four decades of experience in Cryogenic and Vacuum engineering. Through specialized and custom-built product lines, we serve various industries such as refining, aviation, chemicals, animal husbandry, gas etc.

An advanced manufacturing unit, located at Nashik and spread over an area of 36,000 sq. metres, is equipped with specialized sophisticated



machines to manufacture -

- Aluminium Cryocans (1 to 55 litres capacity)
- Small sized industrial use cryogenic vessels (110 to 1000 litres capacity)
- Medium and large-sized cryogenic vessels (3000 to 40000 litres capacity)
- Large & heavy pressure vessels, lube and aviation equipment

Our Brand Promise : *Expertise meets innovation*

To service the varied and specialised needs of our customers, our Cryogenics business team is equipped with a strong engineering background and sophisticated problem-solving skills acquired over years of experience and training.

Design capabilities

- An in-house fully equipped and skilled design & development team
- Capabilities for design, development and detailed engineering of:
  - » Cryogenic storage and transport vessels conforming to ASME, EN, ADM, BS, IS codes and SMPV rules.
  - » Unfired pressure vessels / reactors conforming to ASME code and SMPV rules
  - » Petroleum product storage tanks confirming to API standards
  - » Lube equipment / grease kettles
  - » Aviation fuel handling equipment, such as double-walled containerised tanks, refuellers, dispensers, etc.
  - » Piping design and analysis
  - » Thermal design and analysis of cryogenic vessels

Manufacturing capabilities

- Design, development, manufacturing, testing and supply of Cryogenic Systems, Vacuum Systems as well as Pressure Vessels for applications in Refinery, Petrochemicals and other process industries.
- Design, fabrication, erection & commissioning of super insulated pipelines (both rigid as well as flexible) for various liquids.
- Special applications and projects involving application of vacuum and cryogenics.
- Insulation of vessels and equipment with Perlite powder or multilayer super insulation with high vacuum.
- Consultancy in selection as well as turnkey project execution for liquid gases storage, gasification, pressurization and filling of cylinders or input to processes.

Software tools & Skills

The team is equipped with skills such as PV Elite, Caesar piping design and analysis, AutoCAD, FE analysis, Thermal design tools as well as 3-D modelling.

Expertise

The Cryogenics business of IndianOil is one of the largest Aluminum welders in the country. Our manufacturing capabilities include –

- Welding
- Dishing
- Plasma cutting
- Multi Layered Super Insulation (MLSI)
- Evacuation/ Vacuumising
- Surface preparation/ Shot blasting and Painting
- Plate bending/ rolling
- Piping
- Material Handling
- Perlite filling
- Non-Destructive Testing (NDT Test)

Recognitions & Approvals

- ISO 9001 certified
- ISI mark for Cryocans - Conforming with ISI 1552 - the first company in India to get ISI mark for this product.
- The only facility to have PESO approval for manufacturing cryogenic and pressure vessels - under SMPV and Petroleum Rules.

Our Specialty Products

1. Cryocan - Liquid Nitrogen Dewars (0.5 to 55 Ltrs.)

Double-walled non-pressurised Aluminum container for storing liquid Nitrogen. Cryocans are mainly used to preserve bull semen under extremely cold temperature i.e -196^{0}C in liquid Nitrogen. The bull semen thus preserved is used for artificial insemination in the field to get a better breed of cows for higher milk yield.

Cryocans are also used for various other applications such as embryos & stem cells preservation by IVF clinics, dermatology and shrink fitting, etc.

It is our signature product and holds the major market share in the country. Cryocans are also exported to Europe, Singapore, Sri Lanka, Bangladesh, etc. We have an installed capacity to produce around 32,000 Cryocans annually.



CRYOCAN -
Containers for cryopreservation of vaccines, stem cells; transportation of liquid Nitrogen, etc.

Major Customers:

- State Animal Husbandry Departments and Livestock Development Boards
- Milk unions
- IVF clinics, laboratories
- Automobile industry (for shrink fitting)





2. Cryovessels - Pressurised large capacity cryogenic containers

Cryovessels are double-walled vessels with inner vessel made of stainless steel and outer vessel of carbon steel. These are used for storage and transportation of liquefied gases like liquid Nitrogen (LIN), liquid Oxygen (LOX), liquid Argon (LAr) and liquified natural gas (LNG). Cryovessels are designed and manufactured conforming to various international codes such as ASME, EN, ADM, BS & ISO under reputed third-party inspection agencies such as LRA, BV, TUV, PDIL, etc. to meet the stringent Indian conditions.

Range of Cryogenic vessels:

- Cryogenic Storage vessels (100 to 150,000 Ltr)
- Cryogenic Transport Vessels (500 to 40000 Ltr)

IndianOil Business Group (Cryogenics) is the pioneer in Multi Layered Super Insulation (MLSI) technology. Transport vessels built with cold stretched process and MLSI insulation offer optimized payload carrying capacity.

Major Customers:

- State animal husbandry departments
- Livestock Development Boards
- Milk unions
- Gas industry (Praxair, Linde, BOC, Air Liquide, etc.)

3. Pressure Vessels

Leveraging its strength in manufacturing pressurised cryogenic storage & transport vessels, IndianOil manufactures stainless steel, carbon steel and alloy steel pressure vessels required by refineries and process industry. We undertake the turnkey job of design, sourcing raw material, fabrication under third party inspection, PMC, testing and supply of pressure vessel with variety of MOC.

Range of pressure vessels:

- Carbon steel pressure vessels (Upto 40 mm thickness, 100000 Ltr)
- Stainless steel pressure vessels (Upto 30 mm thickness, 100000 Ltr)

Major Customers:

- Refineries and Chemical industry



4. Custom-built Special Cryogenic Projects

We execute custom-built special cryogenics projects involving PLC-based control system for various applications. This includes our latest project for LOX Storage and Delivery System for Naval Material Research Laboratory.

Major Customers:

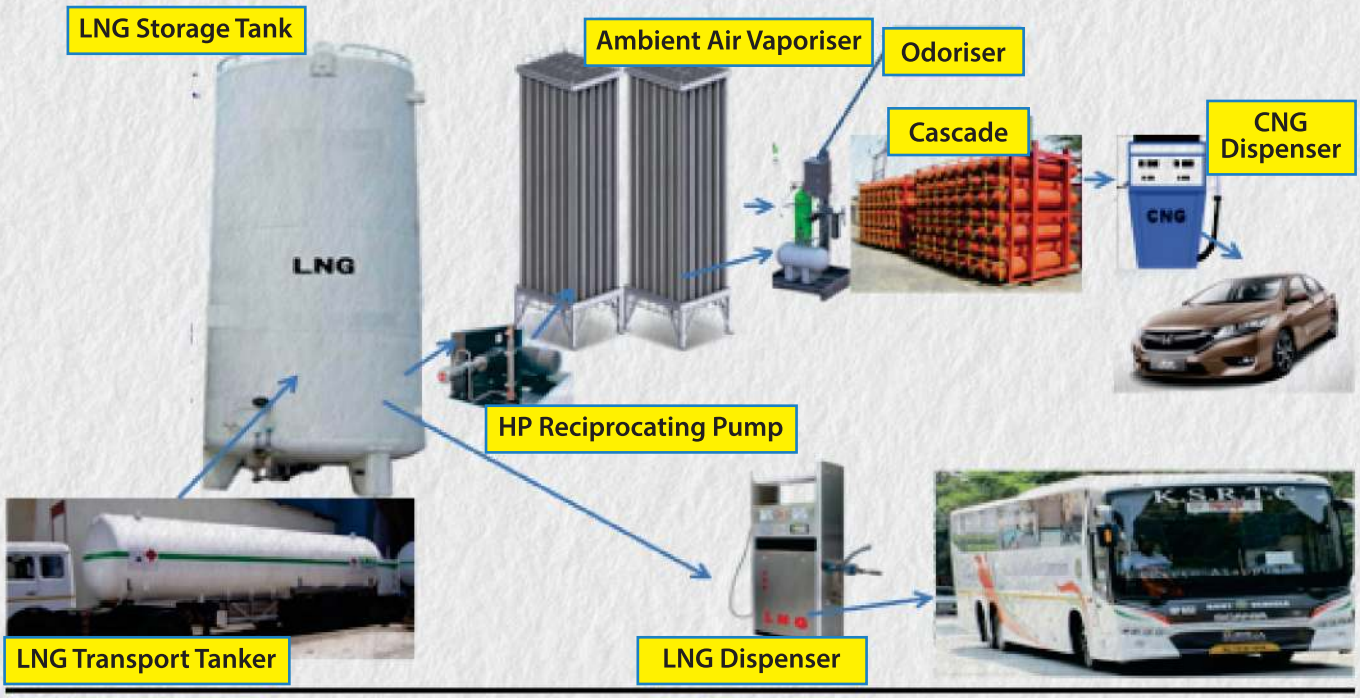
- Defence and Space industry
- Research laboratories

5. LNG logistics and regassification systems

For the LNG businesses, we offer customised cryogenic solutions for storage and transport of Natural Gas. Currently, a Liquefied CNG/LNG fuelling facility, a first-of-its-kind in the country, is being set up on turnkey basis at IndianOil's integrated fuel complex at Anayara in Thiruvananthapuram, Kerala.

Major Customers:

- Bulk Natural Gas users
- Fuel Stations selling CNG
- Glass and ceramic industry (For LNG storage and regassification systems)



6. Aviation Equipment

a) Containerised Aviation Fuel Tanks

Our expertise in manufacturing double-walled containers is leveraged to develop customised solutions for the Aviation industry. A space-saving design for containerised aviation fuel tanks (of 35 kl capacity) has been developed and deployed resulting in speedy set-up of small sized Aviation Fuelling Stations.



IndianOil's BG (Cryo) Nashik Plant has the unique distinction of being the only facility certified by PESO for manufacturing under SMPV rules as well as Petroleum rules.

b) Refuellers



This is the latest addition to our business offerings. Ability to manufacture aviation refuellers has proven to be a shot in the arm for IndianOil's aviation business. It offers a platform to develop next generation refuelling solutions and curtails dependence on external resources.



We have already manufactured and delivered 6KL aviation refuellers to various aviation fuelling stations and Army locations. Currently, batches of 11KL and 16KL refuellers are in final stages of manufacturing.

For business enquiries, please contact

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IndianOil

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