



ConocoPhillips

Liquefied Natural Gas

 **OPTIMIZED**
CASCADE[®] PROCESS

Our technology and expertise are ready to work toward your LNG future today

It's not just what we do. It's how we do it.

As worldwide energy demand continues to grow, the ConocoPhillips Optimized Cascade® process is well positioned to be your gas liquefaction technology of choice.

With more than five decades of proven LNG technology as its foundation, ConocoPhillips has licensed its innovative Optimized Cascade¹ process for use in 25 LNG trains around the world. By 2020, LNG plants utilizing the Optimized Cascade process expect to have a total global installed production capacity in excess of 100 MTPA, making ConocoPhillips one of the world's largest LNG liquefaction process technology providers.* From plant design to startup and ongoing operations support, our technology and expertise continue to deliver the highest standard of LNG facility performance. When LNG project owners select the Optimized Cascade process, ConocoPhillips' proven track record and experienced team provide management boards and financial lenders with confidence that the right choice for liquefaction technology has been made.

Our Technology

The ConocoPhillips Optimized Cascade process includes proprietary technology necessary to efficiently and effectively liquefy natural gas, while recovering heavier hydrocarbons as a separate product (prevents freezing), and removing nitrogen, if required. The methods we use to integrate the technologies result in a reduction of cost and maximize efficiency of the overall LNG plant.

The Optimized Cascade process is based on three multi-staged, cascading refrigerant circuits using pure refrigerants, brazed aluminum heat exchangers and insulated cold box modules. ConocoPhillips has optimized the heat integration to closely approach the natural gas and refrigerant cooling curves, resulting in a highly efficient process. Pure refrigerants of propane (or propylene), ethylene and methane are utilized, since their physical properties are ideal for heat integration. The refrigerant properties are also well known and predictable, contributing to unrivaled operating ease and flexibility.



*See Cautionary Statement on page 8.

Brazed aluminum heat exchangers and cold box modules allow for highly efficient heat transfer and can be designed to accommodate a wide range of LNG plant sizes. Depending on the natural gas feed stream characteristics, the LNG train can be designed with a customized and integrated heavies removal unit (HRU) and/or nitrogen rejection unit (NRU) to achieve optimal LNG plant performance and maximize the net present value of the facility.

To ensure superior reliability and availability, the process is typically configured in a proven "two trains-in-one" arrangement. This approach, now widely accepted within the LNG industry as a design that provides the highest plant availability, was pioneered by ConocoPhillips, where one train of highly reliable heat exchangers and other process equipment is served by parallel refrigeration turbine/compressor sets.

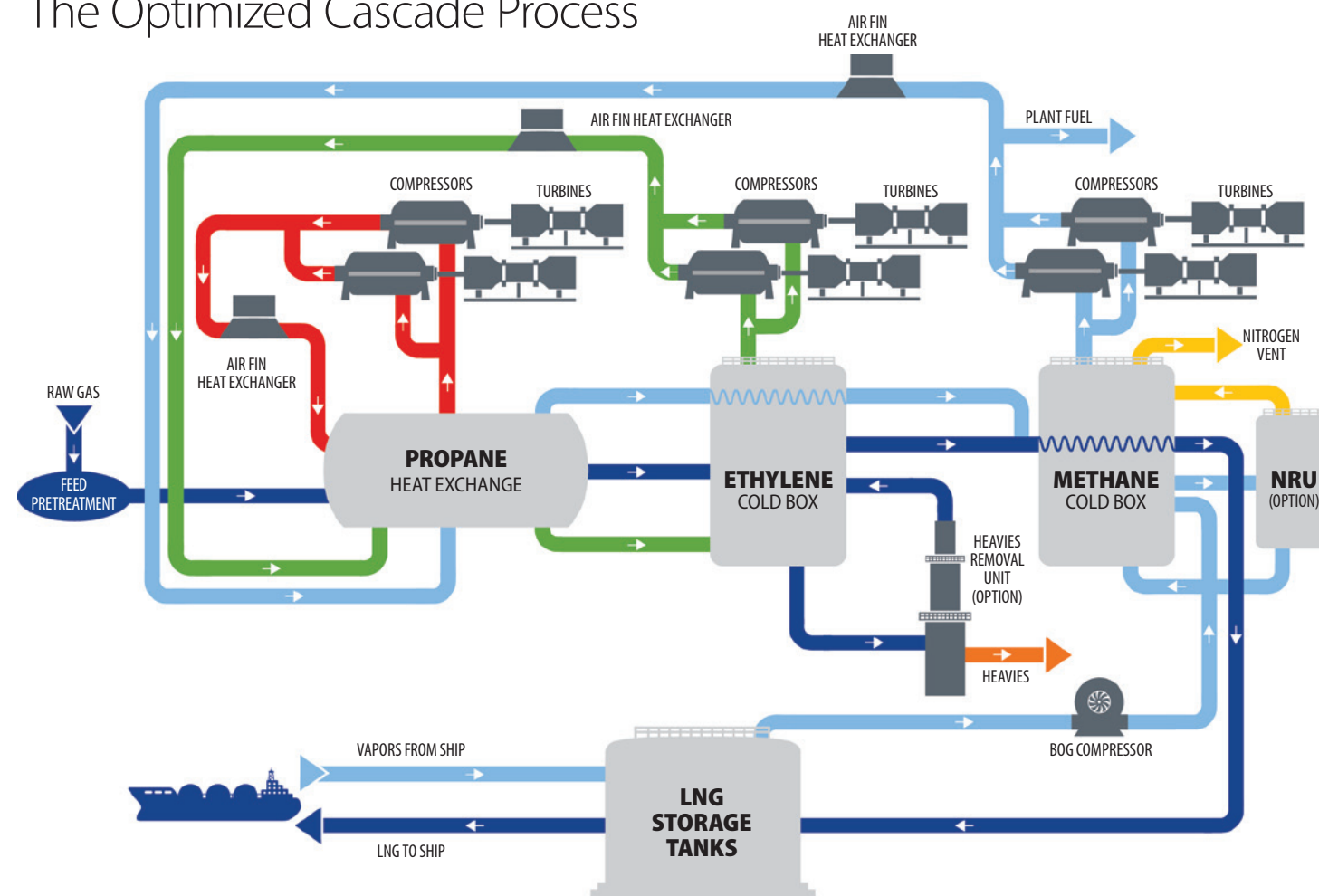
As an owner and operator of the Optimized Cascade technology, ConocoPhillips provides a unique technical expertise and depth in understanding the operation of an LNG plant.

Subject matter experts in every critical discipline required to design, operate, and maintain liquefaction facilities are readily available to Optimized Cascade process licensees.

How the Optimized Cascade Process Works

The schematic below illustrates how the Optimized Cascade process produces LNG. The raw gas is first treated to remove carbon dioxide (CO₂), Hydrogen Sulfide (H₂S) and other sulfur compounds, water (H₂O), organometallic mercury compounds, particulates, and other contaminants before it is routed to the liquefaction section of the plant. The treated gas is then chilled and condensed to approximately -162°C in successively colder heat exchangers, using pure propane (or propylene), ethylene, and methane as refrigerants. The LNG product is then pumped into insulated storage tanks where it remains until shipment. Boil-off gas and ship return vapors are captured and recycled through the Optimized Cascade process for efficient re-liquefaction.

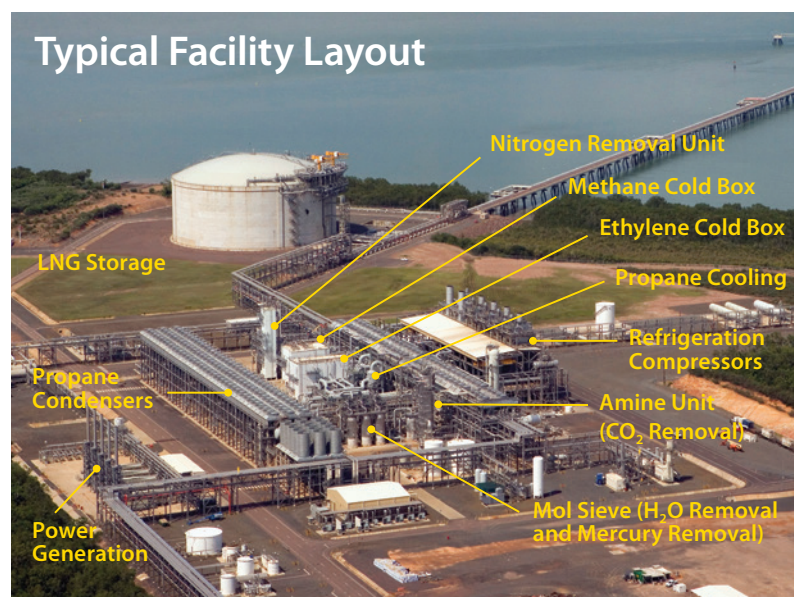
The Optimized Cascade Process



Our Expertise

When you choose the Optimized Cascade process, you get more than just a technology license. You get peace of mind from working with an operator of major international energy facilities and a leader in every aspect of the LNG value chain, from exploration and production, to liquefaction, shipping, regasification and marketing. ConocoPhillips LNG licensing and engineering teams work side by side with project owners to ensure successful project development and implementation. And, our relationship does not stop there. After plant handover, ConocoPhillips' subject matter experts stand ready to provide requested assistance for day to day needs in troubleshooting, shutdown and startup, debottlenecking, process optimization, and answering operational and technical questions.

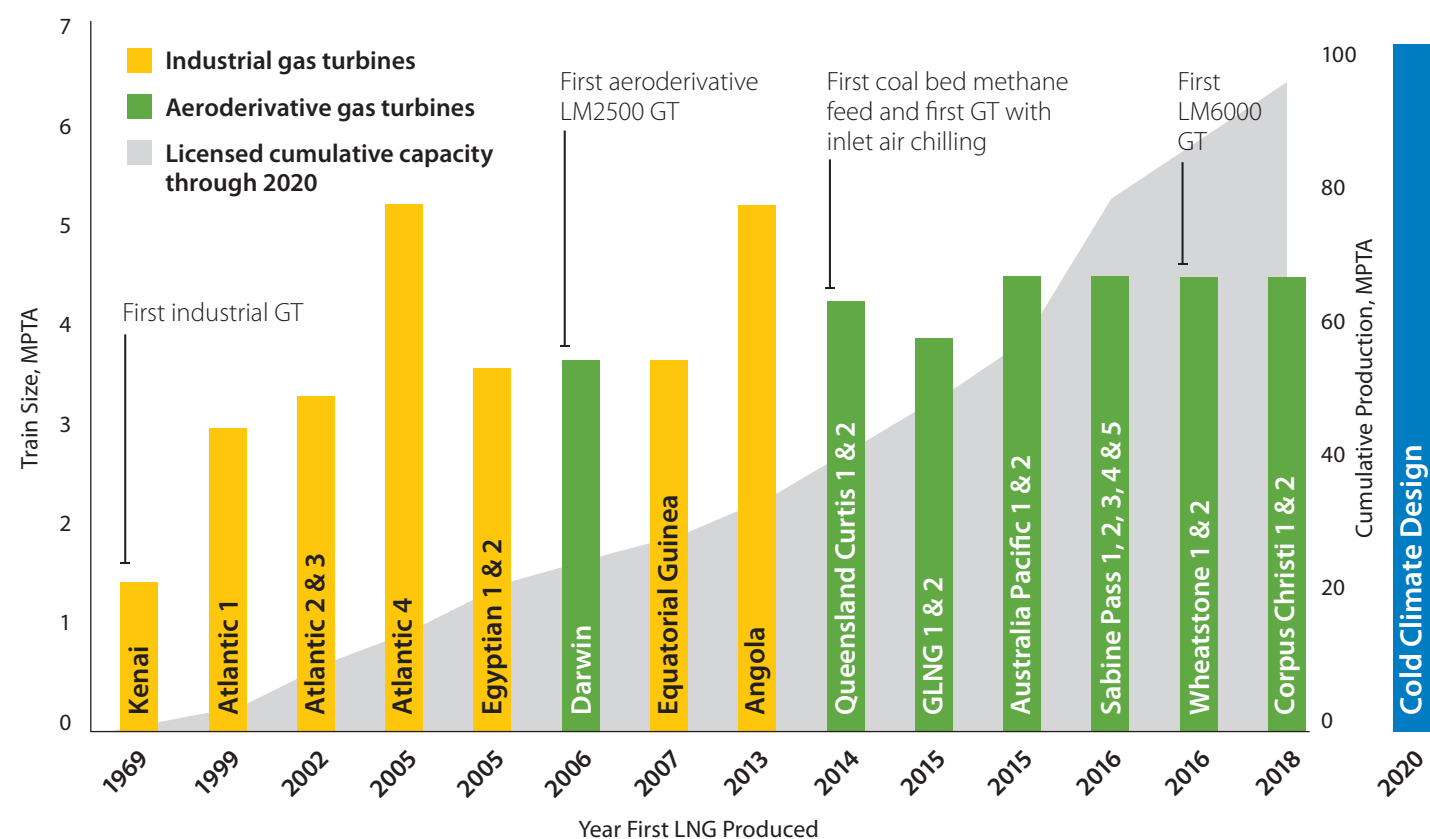
ConocoPhillips has an extensive history of innovation within the LNG industry, always with an eye toward building a better future. The chart below illustrates how purposeful innovation has positively impacted the progression of the size of Optimized Cascade



Key components of the Optimized Cascade process in use at Darwin LNG

process trains over time, including our cold climate design which offers a train size more than 45 percent higher than current designs.

Optimized Cascade Process — Train Size Progression



ConocoPhillips and Bechtel's Global LNG Collaboration

Background

ConocoPhillips and Marathon Oil contracted with Bechtel to construct the first natural gas liquefaction plant based on a new and innovative liquefaction process, the ConocoPhillips Optimized Cascade process. The result was the Kenai, Alaska LNG facility, which began operation in 1969.

ConocoPhillips' initial intent was to use the technology exclusively on its own equity projects. However, in the mid-1990s, Atlantic LNG sought to build a low-cost, yet reliable, single train LNG facility. After completing a competitively bid front-end engineering design (FEED), with ConocoPhillips' support, Bechtel won the engineering, procurement and construction (EPC) contract, resulting in the first externally licensed application of the Optimized Cascade process and the next opportunity for ConocoPhillips and Bechtel to work together in the field of natural gas liquefaction.

As a result of this achievement, ConocoPhillips and Bechtel formed a Global LNG Collaboration (the "Collaboration") in 1998 to capitalize on ConocoPhillips' LNG technology and operations expertise and Bechtel's world-class design and project execution know-how of LNG facilities. Since then, the Collaboration has become a leading player in the LNG industry with a reputation for building efficient LNG plants on schedule and at a competitive cost.

Bechtel's Extraordinary Capabilities

When innovative design solutions, execution excellence, and superior value in all phases of a gas project are needed, the industry looks to Bechtel to achieve these goals. Whether building complex projects in remote locations under difficult conditions, supporting customers in arranging international financing, or tackling complicated logistics, Bechtel provides customers with cost and schedule savings breakthroughs. Bechtel is unique among EPC contractors because of its vast ability to design and direct construct multiple LNG projects simultaneously. This is



Sabine Pass Liquefaction — Five LNG trains in construction

most recently demonstrated by concurrently executing six LNG mega-projects:

- two-train Queensland Curtis LNG project (Queensland, Australia)
- two-train Gladstone LNG project (Queensland, Australia)
- two-train Australia Pacific LNG project (Queensland, Australia)
- two-train Wheatstone LNG project (Western Australia)
- five-train Sabine Pass Liquefaction project (U.S. Gulf Coast)
- two-train Corpus Christi Liquefaction project (U.S. Gulf Coast)

Most Bechtel LNG projects are constructed under lump sum turnkey contracts. Bechtel's unique approach to modularization, combined with its unprecedented worldwide resources to support construction, facilitates predictable outcomes. Project owners know they can depend on Bechtel to deliver.

Our Team

The Collaboration offers customers a world renowned team of skilled professionals. We have integrated teams of LNG technology and EPC experts who are devoted solely to the development of the design and optimization of LNG projects using

the Optimized Cascade process. These experienced teams have worked together for years on a variety of projects around the globe, continuously improving designs and incorporating lessons learned from previous projects. The continuity of the Collaboration team is one of the keys to the Collaboration's overwhelming success.



Operations specialists at Darwin LNG

Product Development Center (PDC)

The Collaboration established the Product Development Center to focus cooperative intellectual effort on continuous improvement of the overall LNG plant design, project execution costs and schedule, and plant operations and reliability relating to an LNG plant utilizing the Optimized Cascade process. The Collaboration has invested in more than 100 studies over the years, enabling early adoption of new innovations into each project, as appropriate, and constantly seeking to improve

the total life cycle value for each project owner. Relevant PDC study results are shared with customers to assist in their decisions on particular process designs. This advance information allows owners to make key decisions about plant design early in a project's life and to assist in minimizing the time and cost of performing Pre-FEED or FEED studies.

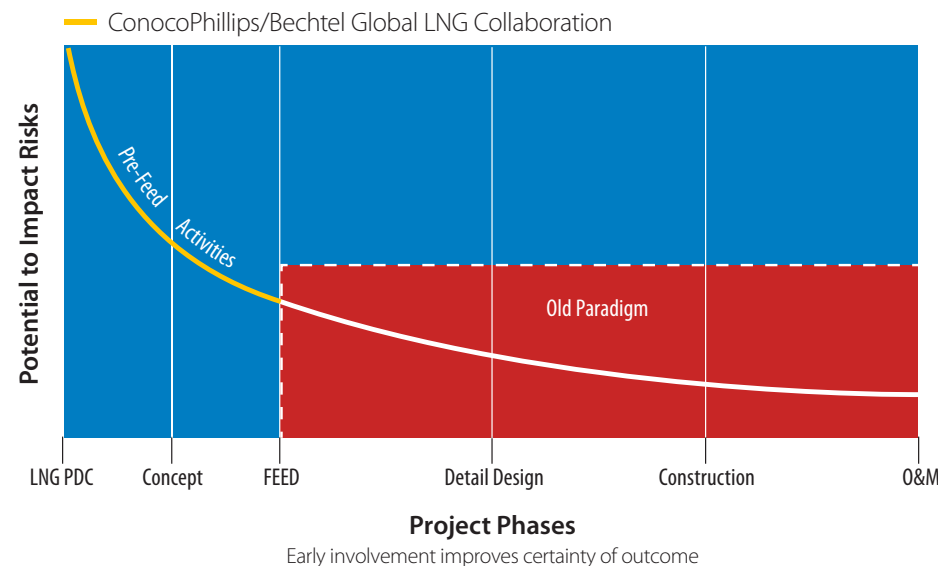
Front-End Optimization

The concept is simple: decisions made and activities undertaken in the early stages of a project have the greatest impact on risks, cost and schedule. By involving the Collaboration early in the decision-making process, our customers benefit from the consistent application of our front-end optimization in all phases of a project. The Collaboration has decades of experience in a wide variety of LNG projects, from the study phase through construction and operations.

Sustainable Development

At ConocoPhillips and Bechtel, sustainable development is about conducting our business to promote economic growth, healthy environments and vibrant communities, now and into the future. We recognize that significant advantages of LNG include that it connects natural gas producers and end users on multiple sides of the world, brings the benefits of natural gas to more end users, and spurs economic growth in producing and consuming regions. ConocoPhillips and Bechtel work closely with customers and contractors to ensure the Optimized Cascade process maximizes each LNG plant's efficiency and economics, while at the same time minimizes the LNG plant's environmental footprint.

Reducing Risk: Total Life Cycle Focus



Advantages of the Optimized Cascade Process Technology

High availability	<ul style="list-style-type: none"> • “Two-trains-in-one” configuration yields approximately 95% plant availability, with high efficiency during turndown
Proven technology	<ul style="list-style-type: none"> • More than 45 years of operation • 25 trains licensed at 12 plants, in excess of 100 MTPA of capacity • Designed and built plants with broad range of ambient temperatures and feed compositions
Flexible operations	<ul style="list-style-type: none"> • Easy to start up, shut down, operate and maintain, with fast startup cycles and wide operating range • Cold boxes retain cold temperatures during extended outages, which greatly facilitate faster startup cycles • Highest plant turndown capability • Rebalancing between refrigeration circuits allows for quick response to changes in operating conditions
High thermal efficiency and low emissions	<ul style="list-style-type: none"> • Use of brazed aluminum heat exchangers, aeroderivative gas turbines, and waste heat recovery integration, yields up to 96% LNG facility thermal efficiency and lower emissions • Refrigerants retained in process and not flared during shutdowns
Integrated design options	<ul style="list-style-type: none"> • Improve overall LNG plant efficiency and economics with integrated heavies removal and/or nitrogen rejection units • Increase LNG production and efficiency with: <ul style="list-style-type: none"> – Combined cycle/cogeneration – Gas turbine power augmentation – Gas and flashing liquid expanders

Advantages of the Global LNG Collaboration

Reputable licensor and EPC contractor — “One Team”	<ul style="list-style-type: none"> • ConocoPhillips as an owner, licensor and operator of LNG facilities, and Bechtel as a world class EPC contractor offer: <ul style="list-style-type: none"> – consistent development and application of best practices for more than 20 years – credibility to LNG developers and their financial institutions
Predictable outcomes	<ul style="list-style-type: none"> • Bechtel's unparalleled track record of constructing successful projects on time and within budget • Together, ConocoPhillips and Bechtel provide a performance guarantee for LNG production
Owner's perspective	<ul style="list-style-type: none"> • As an owner and operator of multiple LNG facilities, ConocoPhillips has broad experience in all aspects of the LNG value chain and shares valuable design and operational insight with licensees
Services and support expertise	<ul style="list-style-type: none"> • The Collaboration provides experienced subject matter experts to: <ul style="list-style-type: none"> – contribute in all project phases – provide quality assurance of key equipment – ensure safe, successful commissioning and startups – train operators and provide post startup operational support

Optimized Cascade Process reference list

Kenai LNG	1 train	1.5 MTPA	Kenai, Alaska, USA
Atlantic LNG	4 trains	14.8 MTPA	Point Fortin, Trinidad and Tobago
Egyptian LNG	2 trains	7.2 MTPA	Idku, Egypt
Darwin LNG	1 train	3.7 MTPA	Darwin, Australia
Equatorial Guinea LNG	1 train	3.7 MTPA	Malabo, Equatorial Guinea
Angola LNG	1 train	5.2 MTPA	Soyo, Angola
Queensland Curtis LNG	2 trains	8.5 MTPA	Curtis Island, Australia
GLNG	2 trains	7.8 MTPA	Curtis Island, Australia
Australia Pacific LNG	2 trains	9.0 MTPA	Curtis Island, Australia
Sabine Pass Liquefaction	5 trains	22.5 MTPA	Cameron Parish, Louisiana, USA
Wheatstone LNG	2 trains	8.9 MTPA	Ashburton North, Australia
Corpus Christi Liquefaction	2 trains	9.0 MTPA	San Patricio County, Texas, USA
TOTAL	25 trains	101.8 MTPA	



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¹Optimized Cascade® is a registered trademark of ConocoPhillips Company in the United States and certain other countries.

CAUTIONARY STATEMENT

These materials contain forward-looking statements. We based the forward-looking statements on our current expectations, estimates and projections about ourselves and the industries in which we operate in general. We caution you these statements are not guarantees of future performance as they involve assumptions that, while made in good faith, may prove to be incorrect, and involve risks and uncertainties we cannot predict. In addition, we based the forward-looking statements on assumptions about future events that may prove to be inaccurate. Our actual outcomes and results may differ materially from what we have expressed or forecast in the forward-looking statements. Economic, business, competitive and regulatory factors that may affect ConocoPhillips' business are set forth in ConocoPhillips' filings with the Securities and Exchange Commission, which may be accessed at the SEC's website at www.sec.gov.