
Proven performance for the challenges of the oil and gas industry

siemens.com/oil-gas
Sustainable energy solutions – we accept the challenge.

Oil and gas will continue to be the backbone of the global energy supply, and natural gas will become even more important in decades to come. The industry’s challenge is to employ the right technologies, ensuring reliable production and sustainable supply. Our products, systems, and solutions promote the effectiveness and efficiency of a plant’s processes to achieve maximum success.
“Technologies, solutions, and related services for maximum plant safety, efficiency, and availability – and innovative technical solutions for the sustainability challenge the oil and gas industry faces tomorrow – that’s what we’re working on.”

Lisa Davis, member of the Managing Board of Siemens AG

As one of the global technology leaders and key partners of the industry, Siemens offers a threefold approach to this challenge – with solutions along the entire oil and gas value chain, services throughout the plant lifecycle, and made-to-measure products and technologies for power, automation and IT, water technologies, compression, and drives.

Our technologies contribute to extending global resources ever further, enabling exploration in harsh deep-sea and arctic environments, increasing the use of unconventional resources, and improving production from existing fields. Needless to say, our technologies and solutions fully comply with all environmental, health, and safety requirements.

To Siemens, sustainability is a matter of leveraging the right technology, one that will help us improve a plant’s CAPEX and OPEX as well as its environmental performance. Siemens has long been supplying its industrial automation, power generation, and power distribution strengths and experience to the oil and gas industry. With the acquisition of Dresser-Rand and the Rolls-Royce gas turbine and compressor business, we are increasing our competencies and our portfolio to address the full spectrum of solution and product requirements in upstream, midstream, and downstream applications. Our “all electric oil and gas” concept takes the production and transportation of hydrocarbons to an even cleaner, more efficient, and safer next level.
Collaboration is the foundation of an in-depth understanding of our customers and their needs. Based on our technological expertise in electrification, automation, digitalization, and process solutions both in the oil & gas and in many other industries, we put a lot of effort into our partnerships – with outstanding results for our customers.

**Contributing our technical and engineering expertise**
Our unique range of products and solutions, decades of experience in the implementation of complex projects, and thousands of installations worldwide make us one of the most important technology partners for the oil and gas industry. Siemens is renowned for reliable, innovative, efficient, and eco-friendly products, systems, and solutions throughout the entire value-adding process, and for the entire lifecycle of an investment. Our comprehensive solutions deliver the highest reliability, performance, and economic efficiency.

Our early involvement in project development helps minimize technical risk and allows us to mutually develop the CAPEX and OPEX balance. Our customers’ lasting success is our motivation to further intensify our engagement in the oil and gas industry. With our competitive Oil & Gas portfolio we create innovations that make the difference.

A good example: our integrated plug-and-play platform solutions for complete functionalities, developed in close collaboration with our customers to solve today’s and tomorrow’s challenges.

**Boosting performance**
With a portfolio that extends from power generation, transmission, and distribution to automation and IT, compression, and water treatment, Siemens is a strong and in many fields even unique strategic partner. We consequently strive to become the leading electrical, rotating equipment, and process automation provider in the oil and gas industry – with reliable best-in-class products, solutions, and services. This is our vision.

**Close collaboration from day one**
As more and more technology per barrel is required, oil and gas projects are becoming increasingly complex, calling for an integrated approach with a single interface to the customer. Exchanging technologies, creating partnerships with our customers, and intensifying our collaborations go hand in hand right from the beginning of our projects. This includes helping our customers access our diverse portfolio more efficiently, and streamlining project execution – from start to finish.

**Fully committed to EHS**
Our EHS guidelines are an integral part of our process house, and the rules are being implemented in every project. As a consequence, many of our projects represent not only track records for on-time delivery, but achieve highest levels of safety, too.
Technology

Leading technologies are the basis of successful solutions. With our unique range of products and systems, decades of experience, and thousands of installations worldwide, we are one of the most important technology partners for the oil and gas industry. We stand for reliable, innovative, efficient, and environmentally friendly products, systems, and solutions throughout the entire value-adding process for oil and gas.
Power and electrification

Siemens is a global powerhouse positioned along the electrification value chain – from power generation and transmission to distribution and the efficient application of electrical energy. Our wealth of knowledge and experience in utility and industrial power generation results in dependable, economical, and environmentally friendly solutions for any stage, process, and application.

Rotating equipment and water technologies

Siemens is a leading rotating equipment company. Our strength is matching and integrating rotating equipment, controls, and other auxiliaries into operating packages that precisely meet our customers’ processes and power requirements. Our water-processing systems operate in production fields around the globe. Based on this broad experience, we can meet the industry’s needs in wastewater and produced water treatment and for water injection.

Automation and digitalization

Automation and digitalization are among the central focus areas of Siemens. We offer an unprecedentedly comprehensive spectrum of products, systems, and integrated solutions. As a leading software supplier, Siemens optimizes the entire value-added chain from production through transmission to refining of hydrocarbons.
Leading technologies – the basis for successful solutions

A solid foundation for our wide range of high-performance products: leading technological expertise in electrical engineering, power generation, transmission and distribution, rotating equipment, automation, instrumentation and IT, water treatment, and our own product development and production facilities.

Compression and pumping

We seek to provide lowest total cost of ownership solutions for your oil and gas production, gas processing, refining, petrochemical, and environmental facilities. Available with a wide range of power ratings, our solutions are designed to match the needs of all stages and aspects of gas and oil transmission. Our custom designed machines meet specific customer requirements, e.g. in solutions with extended operating area to cope with daily or seasonal swings in demand. In addition, we offer a range of pre-engineered standard packages for compression and pumping, while all our solutions undergo elaborate testing of all string components before delivery to your site, ensuring that tight project schedules won’t be obstructed by unforeseen problems.

The result of more than a century of design and manufacturing expertise, our compressors have established an outstanding record for performance, efficiency, reliability, and low maintenance in the most demanding upstream, midstream, and downstream applications, including process and separable gas-field compressors manufactured to stringent specifications.

With the integration of Dresser-Rand we added a great number of powerful centrifugal, axial, reciprocating and rotary screw compressors to our portfolio, as well as thousands of turbo machinery units in operation, adding up experience from our customers. The innovative design and superior components give Dresser-Rand DATUM® centrifugal compressor line their competitive edge of improved efficiency, reduced emissions, low noise, and easy and fast maintenance.

Industrial and aeroderivative gas turbines for all on- and offshore needs

Our gas turbines play a critical role for establishing a reliable offshore power source. With their Dry Low Emission (DLE) combustion systems they help reduce environmental impact in power generation. However, our gas turbines in offshore operations usually have to cope with associated gas for fuel, posing a number of additional challenges for operators, as its composition may change from field to field, well to well, and over time. Additionally, there may be an insufficient supply of associated gas to fuel a power plant over the lifetime of a field. More than 450 Siemens gas turbines with DLE combustors provide reliable power for oil and gas, 60 of them in offshore operations. And pioneering aeroderivative gas turbines, Rolls-Royce has delivered over 5,200 high-efficiency industrial gas turbines to over 500 customers in more than 80 countries, achieving over 145 million hours of operating experience.

For most efficient operation: Siemens automation and control systems

Siemens is a worldwide leader in the fields of automation systems, low-voltage switchgear, and industrial software. We offer a comprehensive spectrum of products, systems, and integrated solutions in the field of electrical equipment unprecedented in the industry. With increasing
competition as a common reality of many industries, outperforming others in terms of speed, productivity, or ease of operations management is often determined by the quality and range of the employed industrial IT solutions. Siemens Industrial IT delivers the most advanced IT solutions for the oil and gas industry. Designed to ensure full interoperability with the business level, visibility for fast decision making, and complete integration of the supply chain, Siemens IT solutions are seamlessly integrated, from automation to ERP and MES levels. They deliver comprehensive and dependable real-time operations intelligence, considered best-in-class by many majors in the oil and gas industry. Dedicated plant packages are available for a range of applications, including pipeline operations and tank farms.

E-houses and modules: modular one-stop plug-and-play solutions
Why would you buy from multiple equipment suppliers when we can offer you a fully integrated module from a single source? We have developed modular one-stop solutions for electrical substations, power generation, and process gas compression equipment, including automation systems, drives, and switchgears, among other components. Tailored to the requirements of your operation, these fully integrated, single-lift packages are manufactured off-site and delivered as plug-and-play systems.

Prefab e-house for offshore and onshore applications
Our full range of e-house solutions creates the link from power generation to the consumer terminals or sockets. It covers MV gas- and air-insulated switchgear, LV switchgear, power and distribution transformers, the cable connections and bus ducts, the motor control center, and all protection and energy automation. The modular components are standardized and perfectly matched.

Compact, clean, and reliable – power generation modules
Efficient power generation and environmental compatibility are of high importance for oil and gas plants. Strict requirements in terms of safety and reliability have to be met. Siemens’ program of lightweight heavy-duty industrial gas turbines is the perfect fit for these demanding applications.

Efficient, fully integrated, and safe – compression modules
Compression applications are found along the entire oil and gas value chain. Their design determines operational costs as well as environmental performance and safety to a great extent. Siemens offers a broad array of compressors of different types matching the diverse needs of the industry, fully integrated into plug-and-play compressor modules. These fully tested modules include the compressor, gas turbine or motor with variable speed drives, process equipment, and the electrical and control system.
Centralized and decentralized power solutions for onshore and offshore plants
Siemens draws on a wealth of knowledge and experience in utility and industrial power generation, resulting in dependable, economical, and eco-friendly solutions for any stage, process, and application in the oil and gas industry. Prompted by the surging power demand from oil and gas facilities, design and engineering tasks such as providing reliable power generation, fuel flexibility, modular designs, service-friendliness, and the reduction of lifecycle costs are becoming paramount in importance. They result in all-electric plant models and the replacement of mechanical drives with sophisticated e-drives. Our steam turbines from 45 kW upward and our 15 gas-turbine models with capacities from 4 to 375 MW are designed to address the specific requirements of your particular application. They are efficient, reliable, and environmentally compatible, and offer the best possible return on investment.

Main Motors and Drives Contractor (MMDC)
From the first feasibility study at the outset through to commissioning, most oil and gas projects require large capital expenditures and years for project realization. Throughout this process, the project’s progress may be impaired by multiple challenges. To manage these, Siemens has developed the MMDC concept. It is a comprehensive concept that enables us to assume responsibility for the project’s overall success – from the feasibility study through planning to the technical realization of all rotating equipment and the power supply, automation, and electric equipment. MMDC encompasses the installation of the products and systems as well as comprehensive services across the entire lifecycle.

Better from the start: tools for improved planning and operation
With our broad portfolio of software solutions, we can ensure perfectly coordinated planning, engineering, installation, and operation of your production assets. The exchange of all required information throughout the asset lifecycle makes for transparent processes. From initial planning with the Oil and Gas Manager and lifecycle engineering with COMOS to real-time information with XHQ, we support planners, builders, and operators of onshore and offshore oil and gas production sites around the world.

Monitoring your asset security: facility and communication technology
With our comprehensive set of security solutions, you can take appropriate measures to protect your facilities (including pipelines) against unlawful attacks.

To fully supply the high rated current and short-circuit demand, our air- (up to 38 kV) and gas-insulated medium-voltage (MV) switchgear (up to 40.5 kV) are maintenance-free and operate independent of pollution and humidity. Air-insulated switchgear in withdrawable design has fused contactor feeder panels with only half the width of a circuit-breaker panel. Both the air-insulated and the gas-insulated switchgear have an extremely good safety record with high reliability and availability.
Efficient water technologies for all needs

Produced water treatment made to measure:
Along with oil and gas, water is brought along to the surface. Our product portfolio includes a complete range of solutions for cleaning this produced water prior to discharge or reinjection. Primary produced water treatment removes sand and separates oil and water. Our liquid/liquid hydrocyclones are field-proven for efficient, optimized deoiling. For sand cleaning, our solid/liquid hydrocyclones allow for as little as 5-micron removal of sand. All our hydrocyclones are offered in a variety of sizes and materials. Secondary produced water treatment is accomplished with compact dissolved gas flotation or induced gas flotation in various configurations. The vertical or horizontal dissolved gas flotation units offer increased treatment efficiency and reduced float volume compared to induced gas flotation. Tertiary produced water treatment is achieved with our walnut-shell filters, media filters, adsorption filters, or other compact cartridge filters.

Highly economical process water treatment:
Process water quality and reusability are an important factor in production, and the cost and availability of raw water is becoming more of an everyday concern. Along with increasingly tighter restrictions on wastewater discharge, this means that the entire process water handling system must be properly designed, maintained, and run.

Water solutions from Siemens can help you produce more product less expensively, with fewer complications and restrictions.

Comprehensive wastewater treatment solutions from one source:
In wastewater treatment, Siemens is uniquely equipped to handle all requirements, ready to address concerns of safety, toxicity, and hazardous materials control and VOC containment. Whether it's oil/water separation, biological treatment, recycle/reuse, or in-process treatment: We deliver complete and economical solutions and services, such as laboratory and pilot studies, wastewater equipment design and supply, and wastewater treatment process evaluations.
Solutions

Siemens offers a broad portfolio of solutions along the entire oil and gas value chain. Our competencies in power engineering, rotating equipment, water technology, and automation and IT make it happen. Integrated functionalities, standardization, and modularization are special drivers to fulfill the technical and economic challenges and to achieve excellence in the relevant processes.
Upstream
From exploration to field development and production, Siemens stands for cost-saving, integrated equipment and solutions. This includes subsea, on-, and offshore operations, from wellhead to export.

Midstream
The Siemens midstream solution portfolio comprises energy generation and distribution, compression and pumping, automation and control, telecommunications, industrial IT, safety, and lifecycle services for gas and liquid pipelines, LNG concepts, and storage facilities.

Downstream
Siemens’ large range of field-proven compressors and drives offers state-of-the-art compression solutions for just about any refinery and petrochemical process; for example, fluid catalytic cracking, hydrocracking, coking, platforming, sulfur recovery, and hydro-treating.
Balancing CAPEX and OPEX along the entire value chain

Having Siemens experts involved early in the concept phase is the best possible start for a performance-driven solution. The result is the finest technical solutions offering high productivity, low lifecycle costs, and reduced project risks. Considerable cost savings both on CAPEX and OPEX are achieved through customized package solutions that encompass entire functionalities.

Economical offshore drilling
We stand for innovative solution packages for offshore drilling that secure reliable operation and availability. Our solutions are based on broad expertise in electrical, instrumentation, and telecommunication (EIT), rotating equipment, and water treatment solutions, as well as years of hands-on experience in the oil and gas business and marine applications.

Our scope of supply covers the entire lifecycle of equipment and assets, thus ensuring long-term reliability and ideal investment protection. Moreover, thanks to long-standing business partnerships with leading shipyards, naval architects, and drilling service operators, we understand the needs and demands of the markets – and how to deliver exacting solutions.

Utmost reliability for offshore production and processing
For all types of mobile units and jack-up rigs, we deliver proven solution packages for reliable operation and high availability – from power supply (including fault-tolerant systems) through drives for all applications to integrated process solutions for gas and water, as well as automation and management systems and marine systems.

Floating Production Units (FPUs) also call for the highest operational efficiency as well as an integrated design of all topside solutions. We can provide this, thanks to our cutting-edge technologies, our wealth of experience in furnishing FPUs, and our comprehensive lifecycle services, safeguarding the highest performance of all components at any time.
The key to subsea success: products, systems, and lifecycle services for deepwater developments
Siemens enables enhanced recovery in the most challenging locations, covering everything from connectors and sensors to topside and onshore power supply, in-field subsea power distribution, control, surveillance, and processing technologies. Our portfolio includes subsea products, systems, and exemplary service and support.

Our subsea products include market-leading brands like Tronic, Matre, and Bennex. The reliable Tronic line of DigiTRON, SpecTRON, FoeTRON, and ElecTRON products provides electrical and fiber-optic connector systems for subsea power and communications. Our Matre wellhead pressure sensors, pressure temperature sensors, and differential pressure transducers are renowned for delivering optimal performance and reliability. The Siemens subsea offering also includes high-performance Bennex equipment for power solutions, fiber-optic, and seismic applications.

Reliable, optimized onshore production and processing
From wellhead to export, the Siemens Oil & Gas portfolio includes equipment for all stages of onshore production, including gas lift, gas treatment, export gas compression, and power supply. Dedicated compression solutions are available for dirty-gas applications, tight-gas production, and for mature fields requiring a wide operating area. Completely integrated facility automation and control systems provide for consistent operations management from the local control room to the dispatching center. Moreover, the Siemens scope of supply covers the entire lifecycle of equipment and assets, ensuring long-term reliability and ideal investment protection.

Comprehensive solutions for unconventional gas
Tight gas, shale gas, and coal-bed methane will help meet the growing demand for natural gas in many regions of the world. With our unconventional gas portfolio, you can rely on tested and field-proven equipment for all production stages, including gas lift, gas treatment, gas gathering, export gas compression, power supply, water treatment, and the LNG process. Precisely adapted system components with proven performance right from start-up are the basis for all of our solutions. An integrated electrical solution from Siemens reduces the number of interfaces and therefore your production risks.
Safe and efficient gas and liquid pipelines
Pipelines are indispensable for the safe, reliable, and efficient transportation of oil and gas and represent a fundamental lifeline for every national economy. Siemens serves the customer as an independent consultant for partial FEED activities and as a provider of integrated solutions for gas pipeline machinery, automation, electrical, security, and communication systems. This enables Siemens to supply true one-stop solutions, which make a decisive contribution to the optimization of the total cost of ownership.

The clever solution: liquified natural gas (LNG)
Partly due to growing global demand, LNG is becoming increasingly popular. To make LNG even more attractive, we have developed improvements to the reliability, efficiency, and environmental impact of the entire LNG process chain, allowing the cost-effective use of existing natural gas deposits anywhere in the world. Especially for LNG receiving terminals we offer a comprehensive energy supply, automation, drive, and IT approach – all from a single source. Dedicated plant packages include integrated automation and control solutions for unloading (jetty, berthing, mooring), storage plant, storage tanks, boil-off gas compression, vaporizer systems, and send-out.

What’s more, Siemens delivers boil-off gas (BOG) compression solutions of unparalleled performance. Documented by references, their innovative designs as well as their extraordinary durability and extended operating life made Siemens the worldwide market leader in BOG recovery technology.

Tank farms and terminals
Tank farms play an important role in the logistics of crude oil and natural gas. Like underground gas storage, they can help reduce the impact of demand spikes, and are also an important energy trading tool. We can simplify your tank farm and terminal operations and reduce your operating costs. Integrating these assets into one of our supervisory control and data acquisition (SCADA) systems allows you to closely monitor all automated processes, providing quick problem identification and isolation, saving you time and money. Our portfolio includes automated loading systems, tank gauging, distribution planning, and batch management, blending, and rebranding facilities.

Reliable and economical: gas storage
Underground gas storage facilities are an essential part of all natural gas planning...
and logistics. With a capacity of billions of cubic meters, they smooth out daily and seasonal swings in demand, and ensure that there will always be enough gas for customers at any time of year. Siemens solutions for underground gas storage include the full scope of rotating and electrical equipment needed to operate the facility. Compressors, gas turbines and e-drives are available with a wide range of power ratings to match specific volume flows and dynamics. Our globally recognized automation and control technology integrates all assets, ensuring maximum availability and efficiency of the complete station, and allowing fully remote-controlled operation.

Gas-to-liquid – a well-developed future technology
With rising crude oil prices and tightening environmental specifications for sulfur and aromatics in diesel fuel, gas-to-liquid (GTL) plants become ever more profitable. Their economics can be further improved by optimizing plant efficiency and availability. Siemens is a prime supplier to many GTL projects around the world, providing high-power, high-volume compressor trains for such processes as the gas reforming stage or for the cryogenic separation process used to convert natural gas to syngas. What’s more, with power generation and distribution, water management, automation and control, industrial IT, and lifecycle services all from a single source, we provide a host of solutions helping to integrate utilities, run plants at optimal levels of efficiency, and ensure maximum availability.

New levels of safety and efficiency for the refining and petrochemical industry
Keeping process safety up and operating costs down, and ensuring a reliable and continuous power supply: Those are the major challenges in the refining industry today. We answer them with our comprehensive technology portfolio, featuring field-proven compressors and drive solutions for just about any refinery process, from fluid catalytic cracking, hydrocracking, and coking to platforming, sulfur recovery, and hydrotreating.

This is complemented by our range of fire and gas systems, emergency shutdown safety systems, and our pressure relief systems management service, while our economical and dependable power supply solutions guarantee power throughout your plant, right down to the motors and consumer terminals.

As a market leader in rotating equipment for methanol, olefin, and ammonia production, we can offer compressor trains for virtually all your needs, including crack gas, refrigeration, feed gas, synthesis gas, charge gas, recycle gas, natural gas, and CO₂. To help you operate your processes and plants with maximum efficiency, our distributed control systems (DCS) integrate all associated process instrumentation and integrated data visualization software.
Lifecycle Management

Technical equipment can only contribute to the bottom line when it is fully available and accessible at all times. Siemens Lifecycle Management offers solutions to engineering and maintaining the robustness of the equipment and adapting to the latest and ever-evolving technology developments. Siemens’ services cover the spectrum, from front-end engineering through EPC functions to operation services.
With our wide range of consulting services and extensive technological portfolio, we can guide our customers through all stages of a project, from initial concept development and front-end engineering design to project execution and operation.

Modernization and upgrade

Life extension of an existing installation often is the most cost-effective means of continued operation. We provide our customers with the latest OEM-proven technology for extended economic viability of the asset.

After-sales services

From training to help desk support, and from maintenance to plant operations, we offer the full spectrum of services totally aligned with our customers’ operations, including remote control and online collaboration.
Consulting, engineering, and services along the lifecycle

Our technical reputation is firmly supported by Siemens Lifecycle Management with a best-in-class global customer support structure, local support offices, and remote services. This ensures fully fledged and qualified support even at the most remote location. Our service agreements ensure 24/7 availability of competent services wherever you need us.

The Siemens Lifecycle Management concept offers solutions to maintaining the robustness of your equipment and adapting it to the latest technology developments. It extends from front-end engineering (FEED) via EPC functions to operation services, and includes basic maintenance and spare-part services, modernizations, and upgrades as well as cybersecurity concepts, advanced process control, and loop tuning assistance.

All consulting services can be integrated into a fully aligned operations concept, including remote control rooms and online collaboration. Our capabilities, tools, and experience help ensure rapid, configurable, and auditable transitions from initial concept development and front-end engineering design to project execution and operation.

Optimal support for your individual goals: consulting services
Siemens Oil & Gas Consulting offers agile, accurate, and flexible field development planning, concept selection and design, and FEED for onshore and offshore upstream projects. Our capabilities, tools, and experience speed up the transition from concept to EPC stage, covering all aspects of technical definition, capital expenses, and operational cost estimates.

Relief system management
More than 3,000 baseline studies conducted worldwide underscore our comprehensive expertise to analyze, design, document, and manage your pressure relief systems, the final protection layer when other control mechanisms have failed.

Process safety management
As process facilities around the world age, our process safety expertise helps optimize mechanical integrity and provides strategic and proactive analyses of the condition of process equipment, evaluating its remaining life, reliability, and lifecycle costs.

Subsea engineering and consulting
To achieve the biggest cost benefits, we concentrate on the initial conceptual, feasibility, pre-FEED, and FEED stages, providing objective assistance with technology evaluation and selection for the development of subsea oil and gas production fields. In addition, we can help you with all the details, from studies, design, procurement, and assembly to testing and installation.
Excellence from day one: tools for improved planning and operation
Planning and calculating with the Oil and Gas Manager reduces development time and costs and integrates design preferences, benchmarks, and past project experience that drive consistency and traceability of results.

XHQ eliminates operational inefficiency by targeted aggregating and processing of operating data, and linking it in real time with business-relevant data to achieve the highest levels of plant performance, enabling better, faster, more informed decision making at all levels.

COMOS leads the way from “Integrated Engineering” to “Integrated Operations” by integrating project assets over the entire lifecycle of an installation into a unified data platform. This provides plant engineers, construction companies, and operators with a seamless flow of project-relevant data across all business levels and all project stages. Our Product Lifecycle software goes beyond the benefits of computer-aided design and program management, enabling an essential environment for immersive engineering, testing, and construction management of onshore and offshore assets.

Enterprise Asset Performance Management (EAPM) is a one-stop shopping tool providing asset lifecycle information as well as standard calculated operational, safety, and risk-control performance indicators to decision makers and specialists. This helps ensure improved operations, maintenance, reliability, and business processes along with compliance and safety practices.

After-sales services: more than a must
Choosing us as the service provider for your project ensures the efficient maintenance of the machines, appropriate retrofitting, and support for your employees. Our services span the entire product and system lifecycle, saving you both money and time and increasing the annual hours of machine and system operation.

Besides a full range of services from our local and regional organizations, from on-call services to all-inclusive operation and maintenance, our centralized support center offers you wide-ranging after-sales support services customized to your long-term operation plan on a 24/7 basis. For even more peace of mind, all our rotating and electrical equipment can be connected to our Global Service and Diagnostic Centers for continuous online performance monitoring.

Modernizations and upgrades: reliable performance for years to come
Operating a facility with outdated technology can result in loss of efficiency and incremental loss of production. Upgrading equipment directly increases production performance, reliability, and operator safety. Replacing outdated, obsolete technology, we upgrade existing components or equipment with state-of-the-art features and designs to provide optimum customer value and system efficiency.
Innovations

Innovative applications from Siemens are the result of extensive, market-oriented research and development programs with a view to providing key enabling technologies for emerging processes and applications. The underlying philosophy behind all of its development activities is to provide its customers with the best possible products, services, and value for money.
### CAPEX

Highest possible CAPEX productivity calls for highly efficient solutions. Our innovations help you achieve outstanding results, and allow production in harsh environments, as well as a better exploitation of reservoirs and a more efficient transport and conversion of hydrocarbons.

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<th>Single-lift packaged solution</th>
<th>Containerized artic wellhead compressor</th>
<th>Gear unit for jack-up rig</th>
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### OPEX

Operational excellence includes aspects such as availability, HSE, and flexibility to respond to market changes in highly integrated markets. Integrated automation and IT are levers to achieve best overall results.

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### Less environmental impact

Energy sustainability is the key challenge. We need to secure a reliable and affordable energy supply for the growing world population. This must be combined with the environmental consequences. We accept this challenge.

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Driving innovations for oil and gas

Siemens has been a renowned driver of technical innovation for more than 160 years. The oil and gas industry needs innovative, safe technology for exploration and production in harsh environments, to better exploit existing reservoirs and to protect the environment. A few examples illustrate our broad array of activities.

Efficiency at its best: our all-electric concept
With energy efficiency as a key factor for cost reduction and environmental concerns in mind, we have developed the all-electric concept, a solution that combines environmental and efficiency aspects ideally. With centralized, highly efficient power generation and an electric drive of rotating equipment at the core of this concept, decentralized maintenance expenses are perceptibly reduced, and emissions are concentrated in one place, where they can best be kept under control. In addition, the concept requires less energy, so that more product is available for sale.

Siemens e-LNG technologies, which use an electric motor drive for the liquefaction train, help lower operating and maintenance costs while providing higher availability, outstanding energy efficiency, and environmental compatibility. All-electric LNG plants powered by Siemens stand out as an economical and ecological approach – even though the majority of today’s refrigeration compressors in LNG liquefaction trains are driven by gas turbines. The electric drives’ higher availability quickly compensates for the higher initial investment in the required thermal power plant.

In pipeline projects, too, environmental demands are steadily moving into the foreground. With the all-electric concept, we have developed a solution that optimally combines both environmental and efficiency factors. Siemens’ all-electric concept will unlock the efficiency potentials of your facility – whether it is newly installed or as part of a modernization. The additional investments are usually amortized within a few years.

Enabling large-scale subsea processing: the subsea power grid
Subsea processing facilities are critical to boosting recovery volumes. They consist of multiple components, including pumps and compressors, all of which require power. Today, however, there are limited means for transmitting power underwater over long distances. Single power feeders are typically run from topside facilities to each specific consumer on the sea floor. These solutions add complexity and costs to subsea operations; in addition, they are simply not viable options for long step-outs, or for situations that require higher power outputs or that serve a large number of power consumers.
Already a premier provider of subsea solutions to the oil and gas industry, Siemens is in the advanced stages of developing its subsea power grid, designed to optimize power distribution to subsea processing equipment. Our groundbreaking technology represents a radical departure from more conventional approaches to subsea power distribution, such as running single power feeders from land or placing power equipment on floating facilities. It holds the potential to make previously unrecoverable hydrocarbon resources available.

The Siemens subsea power grid is based on our proven, high-quality industrial components: transformers, switchgear, and variable-speed drives. These power components can be installed on a common base frame distributed at the seafloor, and all components in the Siemens subsea power grid are retrievable.

**Electromagnetic heating for oil sands (EMSAGD)**

Over 40 percent of Canada’s oil production is from oil sands. However, the technologies used until now require great amounts of energy, pollute large volumes of water, and involve the destruction of large surface areas. Siemens has improved the steam-assisted gravity drainage (SAGD) process. Operating as an electromagnetic underground heating, this in-situ technique dispenses with the need to dig up large areas. Using electrical induction to heat the bitumen to the precise viscosity makes oil extraction easier to target, improves the extraction rate with less water and energy, and leaves the surface largely untouched.

**Most effective water filtration: the Monosep™ walnut-shell filter system**

The Siemens Monosep high-flow walnut-shell filter was developed for advanced filtration with a high oil-loading capacity to improve water treatment. The Monosep high-flow walnut-shell filtration system has proven to be effective for removing free oil, grease, and suspended solids in upstream and downstream produced water. The simplified proprietary filter design requires no moving equipment to perform backwashes, and greatly reduces the volume of backwash water produced compared with other walnut-shell filter designs. In addition, the filter’s design helps reduce weight and footprint and lowers the cost of multiple filtration systems. A new proprietary media offers the potential for a filter to be able to withstand significantly higher oil loading and longer loading durations before requiring a backwash.

Minimizing environmental impact – maximizing production: electromagnetic heating of oil sands

Seawater reverse osmosis

Opening up new subsea production opportunities: the Siemens subsea power grid
Powerful and reliable dirty gas compression
Unlike a conventional compressor, the STC-ECO is hermetically sealed and canned. This means that no contact between key components (like the motor stator and the magnetic bearings) is made with contaminated gases. This results in lower service requirements and 5-year maintenance intervals, offering superior availability and unparalleled lifetime value.

The sealless STC-ECO has been specially designed to meet the requirements of the most demanding upstream oil and gas applications. These applications have either suffered from poor seal reliability – notably upstream of the glycol dehydrator – or involve hazardous and toxic gases, containing H₂S, mercury, CO₂, etc. The STC-ECO helps increase uptime and provides zero emission compression. Its focus applications include field depletion, gas and oil separation, gas gathering, gas lift, and many others.

Low-voltage offshore drives: reducing fuel, emissions, and weight
Our BlueDrive CLEAN systems represent a spectrum of new technologies that significantly reduce fuel, emissions, weight, and size of equipment and improve fault tolerance and uptime. We have developed a range of standard offshore low-voltage drives that can fit all essential applications on an offshore vessel. These drives, ranging from 75 to 5,500 kW, ensure a high degree of standardization, which results in minimized maintenance costs, easy servicing, and extensive spare part interchangeability.

Siemens BlueDrive CLEAN Production is a compact electrical variable-frequency drive solution designed for offshore needs. It is a standardized system for a wide range of applications that provides control over any electrically driven process, ensuring the highest levels of flexibility, safety, and reliability.
Less fuel, fewer emissions, more performance: power and drive systems for offshore drilling
High rig rates, increasingly stringent environmental regulations, and space constraints are among the challenges that offshore operators contend with on a daily basis. Siemens mitigates these challenges with a range of highly innovative technologies. These include the DP closed-ring power system and the BlueDrive CLEAN offshore drive system.

Our fault-tolerant DP closed-ring power system for mobile offshore drilling units ensures a redundant power supply to vital consumers like drilling and thruster drives. It minimizes the number of engines online, for optimized operational performance. Specific advantages of its unique design include reduced fuel consumption, lower emissions, and diesel engines that run at a higher load level. The highly compact BlueDrive CLEAN offshore drive system is widely used in the marine and offshore oil and gas industries. Applications include drilling, thrusters, and electrical jacking. Regardless of the application, BlueDrive CLEAN delivers field-proven dependability and a space-saving design.

Safe, efficient, and clean: diesel-electric propulsion system
BlueDrive Plus C™
Siemens’ BlueDrive Plus C™ diesel-electric propulsion system offers an attractive alternative to more conventional propulsion systems for offshore service vessels. The system is built to maximize fuel efficiency and significantly reduce emissions of greenhouse gases. In addition, its innovative design helps reduce engine maintenance costs and total energy consumption compared with other diesel-electric propulsion systems.

Modular LNG production plant
Dresser-Rand’s LNGo™ system is a modularized, re-deployable natural gas liquefaction plant capable of producing 6,000 gallons of LNG per day. This point-of-use production plant is a standardized product made up of four packaged skids: a power module, compressor module, process module and a conditioning module. Inlet natural gas is converted to LNG product and used as a process refrigerant. A small portion of the inlet gas is used to power the plant. With a small footprint, low emissions, skid-mounted portability, and no external power utility requirement, liquefied natural gas is ready at hand with the LNGo system.