For reliable and efficient oil & gas plants

siemens.com/oil-gas
Answering the challenges of the oil and gas industry

Bringing in our technical and engineering expertise
With our unique range of products and solutions, decades of experience, and thousands of installations worldwide, Siemens is 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. Our foremost goal is always the lasting success of our customers.

Leading technological expertise in
• automation,
• electrification,
• digitalization, and
• process solutions
grant a solid foundation for our wide range of high performance products, systems, and services.

Backed by global engineering and project management expertise as well as extensive experience in the implementation of complex projects, we offer comprehensive solutions for the entire lifecycle of an investment. These include everything from studies and front-end engineering design to construction, installation, and commissioning of our technology, as well as comprehensive after-sales service.

More technology per barrel
Oil and gas will continue to be the backbone of the global energy supply for decades to come, as any serious prognosis shows. Natural gas will increase its share in absolute and relative figures. However, there is a catch: The days of easy oil and gas are over for good, and better technology is required if production is to keep pace with the growing demand. As a global technology leader in a competitive market, Siemens accepts this challenge. Only by applying appropriate technologies can global resources be extended further, and peak oil be postponed longer into the future.

Three forces are driving the development of these new technologies: focusing on exploration in so-called harsh environments (for example, deep-sea and arctic regions); the increased use of unconventional resources (for example, the U.S. is transitioning from an importer of natural gas to an exporter); and finally, the use of technologies that better exploit existing fields (no flaring, enhanced oil recovery, and depletion compression are the buzzwords here). Gas-to-liquid (GTL) technology has matured to become an economically robust and environmentally beneficial way of monetizing stranded gas reserves at the wellhead. Siemens drives the development of reliable and innovative products, systems, and services to further improve execution and operational excellence.
Optimizing CAPEX and OPEX

Our early involvement in the concept phase results in the best possible technical solutions, thereby limiting project risks. Packages for entire functionalities reduce interface conflicts to help reduce a plant’s CAPEX and OPEX. Siemens stands for technological progress to provide answers to the challenges of the oil & gas industry: from increased exploitation of a mature reservoir to the expansion of exploration into even harsher environments, and from the utilization of unconventional resources to general improvements along the oil and gas value chain. Siemens is ensuring all HSE requirements. Moreover we support process safety management of our customers through safety consulting and software solutions.

The oil and gas demand will continue to grow by 1% to 2% annually. For obvious reasons, the industry will require innovative, economical and reliable technologies to cope with increasingly difficult production conditions. For example, depleting oil fields need 4% to 5% of production to be replaced every year – and this requires adequate technologies. It is clear that the money for the required investments must be earned in the markets.

On the other hand, cyclic oil price decreases generate problems for financing the investments. For Siemens, this is a situation we actively deal with. We support our customers in overcoming the challenge with

- State-of-the-art technologies to achieve higher plant efficiency and availability (meaning faster CAPEX amortization),
- Standardization, modularization, and the right choice of technology to reduce CAPEX in the first place,
- Improved production costs for existing installations through innovative products and systems.

Better exploitation of fields

Remote operation and the need for flow assurance require specialized technical solutions. Because a well’s bottom hole pressure declines over time, the gas velocity becomes insufficient to transport produced liquids upward through the production tubing. Compressing the gas close to the wellhead lowers the flowing wellhead pressure, which increases the production rate and prevents liquid loading. Siemens’ wellhead compressor solution can thereby substantially enhance the service life of gas wells – and the recovery rate of a field.

Field redevelopment in harsh, remote, and even hostile locations requires a high degree of customization. Both equipment and staff may be subjected to severe climate conditions. Siemens’ mobile production packages, for example gas and oil well solutions, are autonomous units combining wellhead safety functions, flow, pressure, and temperature measurement, corrosion inhibitor injection, automation, and communication on one skid.

Our technological expertise in electrical engineering, power generation, transmission and distribution, rotating equipment, automation, and water treatment is the foundation for our high-performance products, systems, and services along the oil and gas value chain and the entire lifecycle.
Offshore – a particular challenge
Oil and gas producers around the world are focusing their attention on technically demanding reservoirs. These include deep-sea fields where installing facilities is a challenge in itself. These kinds of production applications need enabling systems to improve their recovery rates and minimize operating costs. At the same time, safety and technical reliability are of prime importance, because servicing offshore and especially deep-sea facilities requires a lot of effort.

We provide answers for these challenges: For all types of mobile units and jack-up rigs, we deliver proven solution packages that ensure reliable operation and availability – from power supply (including fault-tolerant systems) through drives for all applications to automation and management systems. Floating Production Unit (FPU) demand the highest availability and operational efficiency as well as an integrated design of all topside solutions. We can offer these features and more, thanks to our cutting-edge technologies, a wealth of experience in equipping FPUs, and comprehensive lifecycle services.

For subsea applications, we supply products and solutions for power, distribution, control, processing, and surveillance. The Siemens subsea power grid – including MV switchgear, step-down transformers, and variable-speed drives – will become vitally important for widespread subsea processing.

Increasing energy efficiency
From well to tank, the oil & gas value chain processes consume around 18% of its production. This corresponds roughly to 833 million metric tons of oil equivalent. Therefore, energy efficiency is a matter of economy and ecology. Electrifying processes can deliver significant energy efficiency improvements.

Centralized power generation and electrically driven rotating equipment instead of decentralized power generation and turbine-driven solutions is a valid answer. With electrification, the energy consumption of oil and gas at up- and midstream operations can be significantly reduced. And the electrification concept not only improves production economics but also enables reaching climate targets and supporting long-term sustainability of the industry.

A holistic design approach combining power generation, electrical distribution, and electric motor, as well as compression and pumping competence is required to plan and implement electrified oil and gas plant concepts. Siemens’ competence and experience with electrification is unrivaled in the industry. Electrification of oil and gas processes utilizes Siemens’ core strengths and expertise in power generation, electric power distribution, and motor-driven rotating equipment. In addition, electrification increases availability of production and is one enabler of automation and digitization that will further improve safety, efficiency, and economics in oil and gas production.
Our all-electric concepts for LNG and pipelines are bringing this idea into operation. For offshore operations we enhance efficiency and minimize environmental impact, while reducing surface footprint in space-constrained environments, with our innovative BlueDrive power and drive systems concept.

**Services along the total lifecycle**

Siemens’ services are aimed at the entire lifecycle of an application, from front-end engineering and EPC functions to operation services. This includes basic maintenance service and spare-part concepts as well as modernizations and upgrades to cybersecurity concepts and advanced process control. Services range from ad hoc help-desk support to plant operations, allowing responsibilities and activities to be tailored according to the customer’s operating philosophy. These services can be offered in an integrated operations concept fully aligned with our customers’ operations, including remote-control rooms and online collaboration.

Our capabilities, tools, and experience ensure rapid, configurable, and auditable transitions from the concept stage to the EPC stage and then smoothly into operations. Seven hundred engineers are currently assisting our customers with all their requirements throughout the lifecycle of their systems and plants – on a 24/7 basis and reaching nearly every location around the world. Our engineers are sited regionally, but as part of our global virtual team they are strategically deployed to ensure the best possible coverage for our customers. Our services and maintenance support are aimed at enabling our customers to get the functionality, reliability, and availability they demand from systems.

**Boosting our portfolio**

The addition of Dresser-Rand and the industrial turbine business of Rolls-Royce to the Siemens portfolio broadens our offerings for the oil and gas industry significantly. Both help us to better serve the oil and gas processes along the whole value chain. The combination of our integrated global service network and competencies will allow for faster responsiveness and service execution.

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**Plant Lifecycle**

<table>
<thead>
<tr>
<th>Concept/FEED/ EPC Phase</th>
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<th>Construction Phase</th>
<th>Commissioning Phase</th>
<th>Operation Phase</th>
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**Lifecycle Management**

- **Engineering/Project Phase**: Engineering & Project management, Documentation, Planning, Procurement, FAT, Delivery
- **Construction Phase**: Preservation, Mechanical completion, Clear punch list
- **Commissioning Phase**: Function checks, Testing & commissioning, Putting into operation, Training, SAT, Completion, As built drawings
- **Operation Phase**: Warranty, Startup support, On-call service 24/7, Preventive and predictive maintenance, Repairs, Training, Upgrading, Retrofitting
Onshore field solutions

From wellhead to export, 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.
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Solutions

- Gas lift, treatment, and export
- Heavy oil production
- Depleted gas fields
- Unconventional oil fields
- Wellhead compression, power supply, and gas treatment
- Unconventional gas field processing and power supply
- Produced, injection, and wastewater treatment
- Power generation turnkey plants and power islands
- Power transmission and distribution
- Energy automation
- Compressors
- Safety and security
- Telecommunications
- Electrical instrumentation, automation, and control
- Process instrumentation, metering, and analytics
- Lifecycle management software

Systems

- Separators, hydrocyclones, and flotation systems
- Monosep High-Flow Walnut Shell Filtration System
- EcoRight Membrane Bioreactor (MBR) System
- Industrial gas turbine trains for power generation
- Aeroderivative gas turbine trains for power generation
- Steam turbine trains for power generation
- PostCAP CO2 capture units
- Waste heat recovery systems
- High-voltage alternating current (HVAC) and direct current (HVDC) systems
- Centrifugal and reciprocating compressors
- E-houses
- Substation automation
- Energy management systems
- Protection for power systems
- Power quality systems
- Integrated drive systems
- Fire and leak detection
- Automated wide area surveillance
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Temperature, flow, level, and position management
- Process gas chromatography
- PLM software

Products

- Walnut shell filter
- Gas turbine mechanical drives
- Aeroderivative mechanical drives
- Steam turbine mechanical drives
- Generators
- Transformers
- Gas- and air-insulated switchgears
- Low-voltage switchboards
- Motor control centers
- Arc protection
- Motor and generator protection
- Sealless compressors
- High-pressure injection compressors
- Low-, medium-, and high-voltage motors
- Low- and medium-voltage and variable-speed drives
- Gears and couplings
- Flow and level measurement
- XHQ – Operations Intelligence
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Coriolis flow meter
- Teamcenter
- NX Suite
Offshore drilling

Innovative solution packages for offshore drilling that secure reliable operation and availability are in high demand. Such solutions are exactly what Siemens has to offer – 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.

Moreover, thanks to long-standing business partnerships with leading shipyards, naval architects, and drilling service operators, Siemens understands the needs and demands of the markets – and how to deliver exact solutions.
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### Solutions

- Power transmission and distribution
- Energy automation
- Telecommunications
- Electrical instrumentation, automation, and control
- Marine applications

### Systems

- E-houses
- DP3 closed ring – dynamic positioning power supply
- Uninterruptible power supply systems and battery banks
- Energy management systems
- Protection for power systems
- Power quality systems
- Integrated drive systems
- Integrated telecommunication and navigation systems
- RuggedCom
- Ballast and cargo control systems
- SIMATIC industrial automation
- SIMATIC SCADA

### Products

- Low-voltage switchboards
- Motor control centers
- SIPLINK power distribution
- Arc protection
- Motor and generator protection
- Low-, medium-, and high-voltage motors
- Low- and medium-voltage and variable-speed drives
- Top drive drilling motors
- BlueDrive thruster drives
- Jacking motors and gears
- Drawback motors
- Gears and couplings
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
Offshore production

To exploit the enormous reserves offshore, fixed platforms, semisubmersibles, and floating production and offloading vessels (FPSOs) are employed.

On board, a modular, space-saving design of all topside solutions and maximized availability and operating efficiency are imperative. Offshore production solutions from Siemens are built to meet tough challenges, with concepts that optimally fulfill the specific needs of construction and operation – with a focus on reliable technology offering maximized performance.
## Solutions
- Gas lift, treatment, and export
- Depleted gas fields
- Produced, injection, and wastewater treatment
- Power generation turnkey plants and power islands
- Power transmission and distribution
- Energy automation
- Compressors
- Telecommunications
- Electrical instrumentation, automation, and control
- Process instrumentation, metering, and analytics
- Lifecycle management software

## Systems
- Separators, hydrocyclones, and flotation systems
- Monosep™ High-Flow Walnut Shell Filtration System
- Industrial gas turbine trains for power generation
- Aeroderivative gas turbine trains for power generation
- Steam turbine trains for power generation
- PostCAP™ CO₂ capture units
- E-houses
- Reciprocating compressors
- Centrifugal compressors
- Energy management systems
- Protection for power systems
- Power quality systems
- Integrated drive systems
- Fire and leak detection
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Temperature, flow, level, and position management
- Process gas chromatography
- PLM software

## Products
- Sulfate removal units
- Chemical injection units
- Electrochlorinators
- Deaerators
- Walnut shell filter
- Gas turbine mechanical drives
- Aeroderivative mechanical drives
- Steam turbine mechanical drives
- Generators
- Transformers
- Gas- and air-insulated switchgear
- Low-voltage switchboards
- Motor control centers
- Arc protection
- Motor and generator protection
- Sealless compressors
- High-pressure injection compressors
- Low-, medium-, and high-voltage motors
- Low- and medium-voltage and variable-speed drives
- BlueDrive thruster drives
- Gears and couplings
- Flow and level measurement
- XHQ – Operations Intelligence
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Coriolis flow meter
- Teamcenter
- NX Suite
Subsea

Siemens subsea systems solutions contribute toward increased oil recovery and, reduced operation cost and risk, as well as being environmentally friendly.

Siemens is known for its power, distribution, and automation technologies, which give us an excellent background for providing state-of-the-art systems for subsea applications.
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**Solutions**
- Power transmission and distribution
- Electrical instrumentation, automation, and control
- Reservoir exploration and monitoring

**Systems**
- Integrated drive systems
- Subsea power grid
- Direct electrical heating power systems
- Subsea surveillance systems
- Permanent reservoir monitoring
- Electromagnetic geoscience power supply
- Subsea distribution systems
- SIMATIC industrial automation
- SIMATIC SCADA

**Products**
- Transformers
- Gas- and air-insulated switchgear
- Low-, medium-, and high-voltage motors
- Low- and medium-voltage and variable-speed drives
- DATUM centrifugal compressor
- Subsea transformer
- Subsea switchgear
- Subsea variable speed drive
- Subsea control unit
- Subsea pressure and temperature sensors
- Medium- and high-power electrical connectors
- Electrical, fiber-optic, and hydraulic connectors
- Hydraulic power supply units
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
Pipelines

From engineering and design to all core technologies and all the way to monitoring and control, we are there to make pipelines sustainably safe and economical.

Our primary aim is to ensure maximum performance and minimum total cost of ownership throughout the entire lifecycle of a pipeline.
Solutions

- Compressor and pump stations
- Power transmission and distribution
- Energy automation
- Compressors
- Safety and security
- Telecommunications
- Electrical instrumentation, automation, and control
- Process instrumentation, metering, and analytics

Systems

- Industrial gas turbine trains for power generation
- Aeroderivative gas turbine trains for power generation
- Pipeline compressor packages
- Integrated drive systems
- Fire and leak detection
- Pipeline station security systems
- Automated wide area surveillance
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Temperature, flow, level, and position management
- Process gas chromatography

Products

- Pipeline compressors
- Gas- and air-insulated switchgear
- Low-voltage switchboards
- Motor control centers
- Low-, medium-, and high-voltage motors
  and variable-speed drives
- Gears and couplings
- Flow and level measurement
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC IIoT systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Coriolis flow meter
Liquified natural gas (LNG)

To make LNG even more attractive, improvements in reliability, efficiency, and environmental impact to the entire LNG process chain are required to allow cost-effective use of deposits.

As a leading technology supplier, Siemens is at the forefront of this development. Especially in the area of natural gas liquefaction, we see considerable room for improvement in overall efficiency. Our components equip all kind of concepts: mechanical drive LNG, all-electric LNG, floating LNG, and small and midsize LNG facilities.
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### Solutions
- Power generation turnkey plants and power islands
- LNG compression
- Electric LNG
- Power transmission and distribution
- Energy automation
- Distributed LNG plant
- Telecommunications
- Electrical instrumentation, automation, and control

### Systems
- Industrial gas turbine trains for power generation
- Aeroderivative gas turbine trains for power generation
- Steam turbine trains for power generation
- PostCAP™ CO₂ capture units
- High-voltage alternating current (HVAC) and direct current (HVDC) systems
- Waste heat recovery systems
- E-houses
- Substation automation
- Energy management systems
- Protection for power systems
- Power quality systems
- Main refrigerant compressor trains
- Integrated drive systems
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Mini- and midsize LNG
- Floating LNG

### Products
- Gas turbine mechanical drives
- Aeroderivative mechanical drives
- Steam turbine mechanical drives
- Generators
- Transformers
- Gas- and air-insulated switchgear
- Low-voltage switchboards
- Motor control centers
- Arc protection
- Motor and generator protection
- Boil-off gas compressors
- Refrigerant compressors
- Low-, medium-, and high-voltage motors
- Gas and Diesel engines
- Low- and medium-voltage and variable-speed drives
- Gears and couplings
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Auxiliary compressors for fuel gas, feed gas, and flash gas
Tank farms and terminals

Supplying reliable solutions that meet the special needs of tank farm and terminal operators requires years of experience in oil and gas processes, innovative strength, and a thorough understanding of complex challenges.

We provide a broad range of complete tank terminal solutions for liquid handling, from tank metering and loading/unloading bays to truck and railcar loading stations and inline blending.
Solutions

- Power transmission and distribution
- Safety and security
- Telecommunications
- Electrical instrumentation, automation, and control
- Process instrumentation, metering, and analytics

Systems

- Tank farm management
- Tank and tank farm automation
- Fire and leak detection
- Automated wide area surveillance
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Temperature, flow, level, and position management

Products

- Flow and level measurement
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Coriolis flow meter
Refineries and petrochemical industry

Encompassing a wide array of processes, oil refining and oil and gas processing pose a number of challenges. Economies of scale, an ongoing quest for productivity, and process safety needs are of chief concern. Based on our diversified portfolio, Siemens is one of the few companies able to help you with all these issues. As the market leader in providing rotating equipment for the production of methanol, olefin, and ammonia, Siemens is perfectly placed to provide our customers with a wide range of innovative rotating, electrical equipment, and automation solutions for refineries and petrochemical plants.
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**Solutions**
- Process and wastewater treatment
- Power generation turnkey plants and power islands
- Energy automation
- Compressors
- Safety and security
- Telecommunications
- Electrical instrumentation, automation, and control
- Process instrumentation, metering, and analytics
- Lifecycle management software
- Safety systems
- Pressure relief systems management services

**Systems**
- Separators, hydrocyclones, and flotation systems
- CO2 capture units
- Waste heat recovery systems
- High-voltage alternating current (HVAC) and direct current (HVDC) systems
- E-houses
- Substation automation
- Energy management systems
- Protection for power systems
- Power quality systems
- Crack gas compressor trains
- Pure phthalic acid (PTA) trains
- Integrated drive systems
- Fire and leak detection
- Automated wide area surveillance
- RuggedCom
- SIMATIC industrial automation
- SIMATIC SCADA
- Temperature, flow, level, and position management
- Process gas chromatography
- PLM software
- Fire and gas (F&G) systems
- Emergency shutdown safety systems

**Products**
- Zimpro® Wet Air Oxidation
- Gas turbine mechanical drives
- Aeroderivative mechanical drives
- Steam turbine mechanical drives
- Generators
- Transformers
- Gas- and air-insulated switchgear
- Low-voltage switchboards
- Motor control centers
- Arc protection
- Motor and generator protection
- Air compressors
- Low-, medium-, and high-voltage motors
- Low- and medium-voltage and variable-speed drives
- Gears and couplings
- Flow and level measurement
- XHQ – Operations Intelligence
- Telecontrol systems
- Network automation
- SIMATIC controllers (PLCs)
- SIMATIC I/O systems
- SIMATIC control systems
- SIMATIC programming software
- SIMATIC programming devices
- Coriolis flow meter
- Water analytics
- Teamcenter
- NX Suite
Lifecycle services

Backed by global engineering and project management expertise as well as extensive experience in the implementation of complex projects, we offer comprehensive solutions for the entire lifecycle of an investment.

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Planning, engineering, installation

- Feasibility studies
- Technical consulting and engineering
- Front-end engineering design
- COMOS for integrated lifecycle engineering
- Oil & Gas Manager software
- PLM Product Lifecycle Management
- Safety systems consulting
- Process safety management
- Financial engineering
- OEM installation and start-up
- Testing

Operation and maintenance

- Online technical support
- Spare parts
- Preventive maintenance
- Condition monitoring
- Repair services
- Field services
- Training
- XHQ operations intelligence
- Pressure relief management

Modernization and upgrade

- OEM services
- Upgrade packages
- Power enhancements
- Energy savings
- Emissions reduction
- Lifetime extension
- Packaged solutions and brownfield integration
- EOR products and systems