Building a Greener and Stronger Future for Oil & Gas

Sustainable solutions from Schneider Electric

schneider-electric.com/oilgas

Life Is On Schneider Electric

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Improve the sustainability index of your oil and gas business

We live in a paradoxical world, a world where we recognize the importance of Oil & Gas in our lives. From the cars that transport us around to the plastic signs that direct us there, from the polyester clothing that we wear to the plastic utensil we eat from, everything is a product of this industry.

On the other hand, we are also well aware of the environmental impact associated with Oil & Gas. It is essential that companies today make the effort to generate clean and affordable energy for the well-being of the generations to come.

Oil & Gas has always been closely impacted by environmental issues across the world. Over the past few years the increasing severity of environmental issues and visible effects of climate change have made sustainability a major priority for the Oil & Gas industry. Businesses across the industry have been working to improve their sustainability index, with the aim of setting new sustainability benchmarks in the energy market. With access to the right solutions and smart business insights, Oil & Gas companies can improve their sustainability index. The tools that can contribute to making your Oil & Gas activity sustainable are:

- Create an active energy management strategy taking into account the system's ecological design and permanent process optimization over the lifetime of the plant. Holistic energy efficiency optimization starting from individual units to the entire system.
- Address health, safety, and environmental aspects and prevent accidental pollution through improved operator training, asset management, and process and safety system optimization.
- Lower the CO2 emissions through the intelligent use of energy management, automation, and software to achieve greater gas expansion efficiency and profitability.

Reducing carbon footprint through diversification into natural gas and renewable energy are some of the more popular and visible sustainable strategies that some major O&G companies are adopting.

Total SA (Total) is on track to becoming a low-carbon organization. This international company is ranked No. 4 in the global O&G industry and is a leader in the European Union biofuels market. As part of its sustainability goals, Total is ambitious and plans to have low-carbon businesses comprise 20% of its portfolio by 2035. In 2011, Total acquired a major stake in SunPower, a world leader in photovoltaic solar energy technology, and formed Total Solar. To meet the 20% renewables target, the company reorganized and created a new segment to spearhead this mission under the Gas, Renewables, and Power Division in 2016. With SunPower and Total Solar, Total will be active across the entire photovoltaic solar value chain: manufacturing photovoltaic cells, designing utility-scale power plants, and installing solar home systems.

Today Oil & Gas companies are looking to innovation as a path that can lead them to a sustainable future. A greener future can be achieved through safer practices, emission of less pollutants, and being more socially responsible as a whole. With our expertise and vast experience, Schneider Electric™ can help companies improve their sustainability index while staying within their existing strategy and operations framework.

How do we measure sustainability?

"We are in a dirty business, but we can do it cleaner than everybody else"

Oil & Gas executive

To improve on something, we first need to be able to measure it. The need of the hour for the Oil & Gas industry is a definite way to measure sustainability.

One of the commonly known and reliable method is the Dow Jones Sustainability Index (DJSI), a set of best-in-class benchmarks for investors who have recognized that sustainable business practices are critical to generating long-term value for shareholders, and who would like their investment portfolios to reflect their sustainability beliefs.

As the first global sustainability benchmark, the DJSI evaluates the stock performance of the world's leading companies in terms of economic, environmental, and social criteria. Of the 3500 companies evaluated every year, only the top 10% companies make it to the Dow Jones Sustainability Indices.

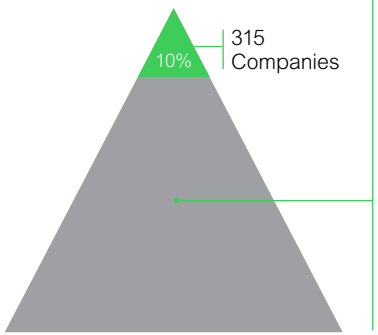
There are many key performance indicators(KPIs) that can be used to measure sustainability. But when it comes to Oil & Gas companies, the biggest priority will always be safety. Safety is important because it impacts human life, production, and the environment. It is also very emotional and visual, especially with regards to catastrophic industrial incidents. Such events can create a negative impression about a brand in the mind of the consumers.

In most major Oil & Gas companies' sustainability programs, the safety aspects are used to measure injury rate, lost time due to injury, and production loss, along with helping to gauge the severity of the accident. It also measures the number of executives and managers who have completed the Health, Safety, and Environmental (HSE) program.

As the DJSI Gold Winner for the last four years (2013-2016), Schneider Electric is in a unique position to guide you along your path to sustainability to improve the standards of safety, energy efficiency, and operator training. To know more, read our Schneider Electric Sustainability Report

Only top 10% companies are selected into Dow Jones Sustainability Indicies (DJSI) of the 3500 companies evaluated every year

3 evaluation criteria (4 sources: Questionaire, **sustainability reports**, media, interview)



Economics	Environmental	Social
Corporate governance	Environmental repoting	Human-capital development
Risk & Crisis management	Industry-specific	Talent attraction and retention
Code of conduct/anti-bribery		Labor practice indicators
Industry-specific		Corporate citizenship/ philanthropy
		Social reporting
		Industry-specific

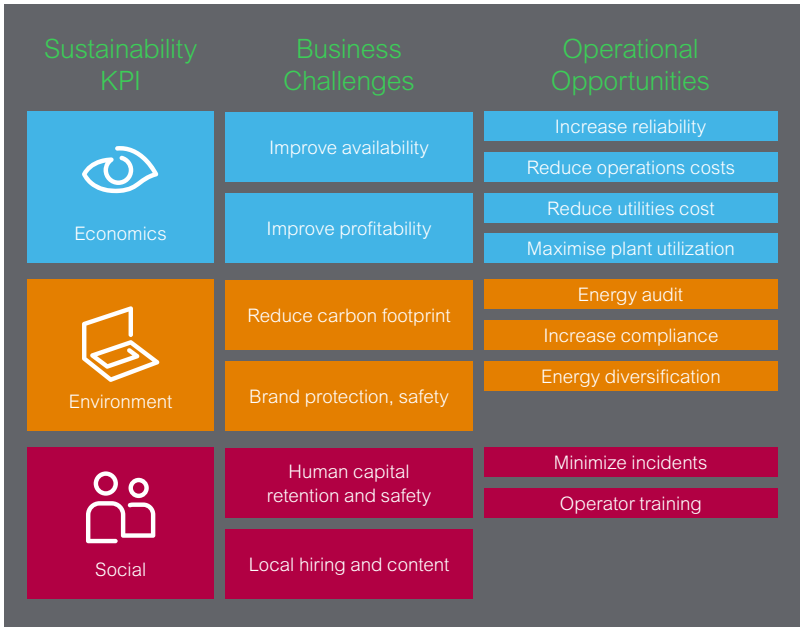
Of the 315 DJSI 2016 winners, 10% are O&G companies

GOLD	SILVER	BRONZE
Enbridge Inc. (Canada)	Galp Energia (Portugal)	AltaGas Ltd (Canada)
PTT Exploration & Production (Thailand)	Total SA (France)	Eni (Italy)
SBM Offshore (Netherlands)	Woodside Petroleum (Australia)	Inpex (Japan)
Thai Oil (Thailand)		IRPC (Thailand)
TransCanada (Canada)		Koninklijke (Netherlands)
		MOL (Hungary)
		Neste Ovi (Finland)
		Organizacion Terpel (Columbia)
		Repsol (Spain)
		Shell (Netherlands)
		S-Oil (S. Korea)
		Santos (Australia)

Linking sustainability KPIs to business challenges

Three KPIs that Oil & Gas companies must consider for better sustainability are economics, environmental, and social.

- For Oil & Gas producers, time is money, and any downtime in the system can result in a loss of productivity. Hence keeping their operations up and running is their biggest focus. Economics are all about availability and profitability-revenue minus cost. The two costs that affect the industry are the operational cost (OpEx) and capital cost (CapEx). In the existing market scenario with the uncertain oil barrel pricing situation, the ability to generate profit, and faster returns on investment is crucial.
- Environment is an important performance indicator that involves reducing a company's carbon footprint, brand protection, and safety. While some companies choose to reduce their footprint by diversifying their investment and energy sources, others opt to improve energy efficiency by optimizing the resources for production to run operations.
- Social is a performance indicator that deals with a company's human capital – the retention and training of employees. With the high retirement rate in the Oil & Gas industry currently, knowledge retention has become critical. In such an environment, technology holds the key to retain knowledge for the next generation of engineers and operators, both in the control room and in the field. Proper training is critical as operator error causes 42% of unscheduled plant shutdowns[1] and 22% of all accidents.[2] Social responsibility also plays an important role when companies do business locally. For example, in one of the Liquified Natural Gas (LNG) facilities in Nigeria, Schneider Electric helped the local government build the infrastructure, create a program for the training of local employees and use as much local resources as possible.



Deloitte™ estimates that the Oil & Gas industry has lost about 350,000 seasoned professionals, including up to 160,000 in the US alone. In addition, each day 10,000 'Baby Boomers' turn 65 and retire; a statistic projected by the Pew Research Center to be true through 2030.

1. ARC Advisory Group
2. Health and Safety Executive

What Oil & Gas companies are doing to become more Green

Maximizing uptime with EcoStruxure™ Triconex Safety System

More than 18,000 installed systems used today running more than 1 billion hours of safe operation.

"The GlasDowrKitan project has been a tremendous success for all parties. We were impressed with the Schneider Electric attitude throughout the project and their 'change the game' approach. It is one thing to have a good project plan in place, but another to actually execute and deliver."

Ernest Hofstee Senior Project Manager, Bluewater

A company's safety system is its last and strongest defense against any unexpected calamity or catastrophic accident that threatens the safety of people, assets, and the environment. As a result, it has a direct impact on sustainability and the business. This makes having a reliable safety system and a trustworthy technology partner integral for any company that is serious about safety.

With its strong project execution capabilities and thorough knowledge of the Oil & Gas industry, Schneider Electric is the trusted safety partner for some of the biggest names in the industry. Our EcoStruxure™ Triconex Safety System is committed to delivering best-in-class safety solutions with zero tolerance for accidents and injury, making it the Industry's most sought-after solution.

Triconex is a triple modular redundant system, which means that it is fitted with a double backup system, offering companies a holistic and cost-effective way to optimize process safety needs.

With Triconex, Schneider Electric introduces innovations in functional safety technology, software applications, and process safety management solutions that continue to deliver the best safety for your operations.

Triconex includes:

- Emergency shutdown (ESD) – Shut down the plant when hazardous conditions are detected
- Fire and gas control – Detect abnormal situations such as fire or combustible/toxic gas, and provide early warning and mitigation
- High integrity pressure protection – Prevent over-pressurization of a plant or pipeline with advanced high integrity pressure protection system (HIPPS) technology
- Burner management – Enable safe operation and protection of burners, boilers, and heaters with advanced burner management systems (BMS)

Learn more:

EcoStruxure Triconex Safety System

Introduce enhanced safety standards with 3D simulation training for field operators

In today's tech-savvy world, advanced new technologies like virtual reality (VR) and augmented reality (AR) are being used not just for gaming, but to add value to process and manufacturing functions too. Schneider Electric has successfully incorporated these technologies to create SimSci EYESIM, an immersive training simulator to facilitate crew training in a realistic manner. As a 3-dimentional tool, SimSci EYESIM uses VR and/or AR to connect control room operators, maintenance, and field personnel in a single realistic learning environment.

This 3D environment is connected to a high-fidelity dynamic simulation (SimSci DYNSIM) and provides VR/AR functionality for the purposes of:

- Equipment understanding
- Design evaluation
- Operator training (OTS): procedure training, safety scenarios, and crew training
- Maintenance planning and execution
- Real-time enterprise asset management

The SimSci simulator helps in plant safety and combined with Smart Training supports the efficient overall operation of the refinery.

Jamal Abdul-Hameed Al-Humoud
Manager, Research & Technology Group

SimSci EYESIM supports the capture and knowledge transfer of best practices, increasing efficiency and reducing costly errors or unnecessary maintenance.

This high-fidelity training solution creates stimulations of a real, model plant, like a refinery or an offshore platform. This enables the company to train its entire plant crew in standard operating procedures, safety scenarios, environmental protection systems and workflow—all mandatory functions for startup, shutdown, and other (both common and abnormal) situations. Achieving better workforce efficiency takes organizations one step closer to operational excellences and sustainability.

Learn more:

3D virtual technology

Improve energy efficiency with accurate process modeling and real-time optimization

The two highest costs of a refinery or chemical plant are feedstock and energy. According to the U.S. Energy Information Administration, more than 40% of the overall refining operating expense (excluding feedstock) comes from energy usage. In the E.U., refineries currently spend 60% of their cash on energy. Complicating matters further, is the refining paradox—more stringent fuel specifications require more energy and increase greenhouse gas emissions—that further restricts operations and increases costs.

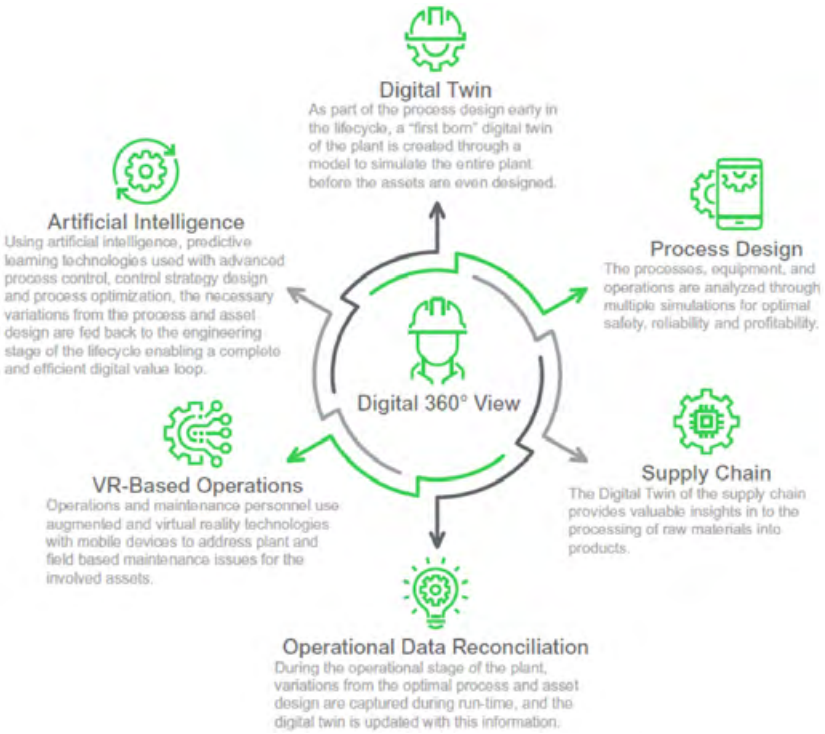
While the energy usage, consumption, and intensity in the hydroprocessing industry varies drastically globally, everyone agrees that there's an immediate need to improve energy efficiency and reduce energy consumption.

Refineries are very complex. Constructing a plant model to understand its behavior allows you to optimize how the plant operates. A sustainable, optimized process model drives both profitability and safety.

Today's simulators typically only support a single phase of the lifecycle and are often based on different thermodynamics and calculation methods. This limits model sustainability and forces users to deal with substantial rework by having to build a new model in each new tool. This process can lead to data entry errors and makes results difficult to compare.

Schneider Electric's introduction of SimCentral's™ Unified Lifecycle Simulation means that one process model is extended throughout the entire lifecycle of the plant, from concept to operations. The user can toggle back and forth between process design mode, a fluid flow/ rating mode, and a dynamic mode. Optimization may be introduced to any mode. This one model becomes the first Digital Twin and matures as you move from one phase to another.

Improving energy efficiency begins with the Digital Twin. By considering energy usage/ consumption during each phase, and not strictly during operations, companies can reap the inherent benefits incremental optimization provides, thus driving sustainable profitability and safety.

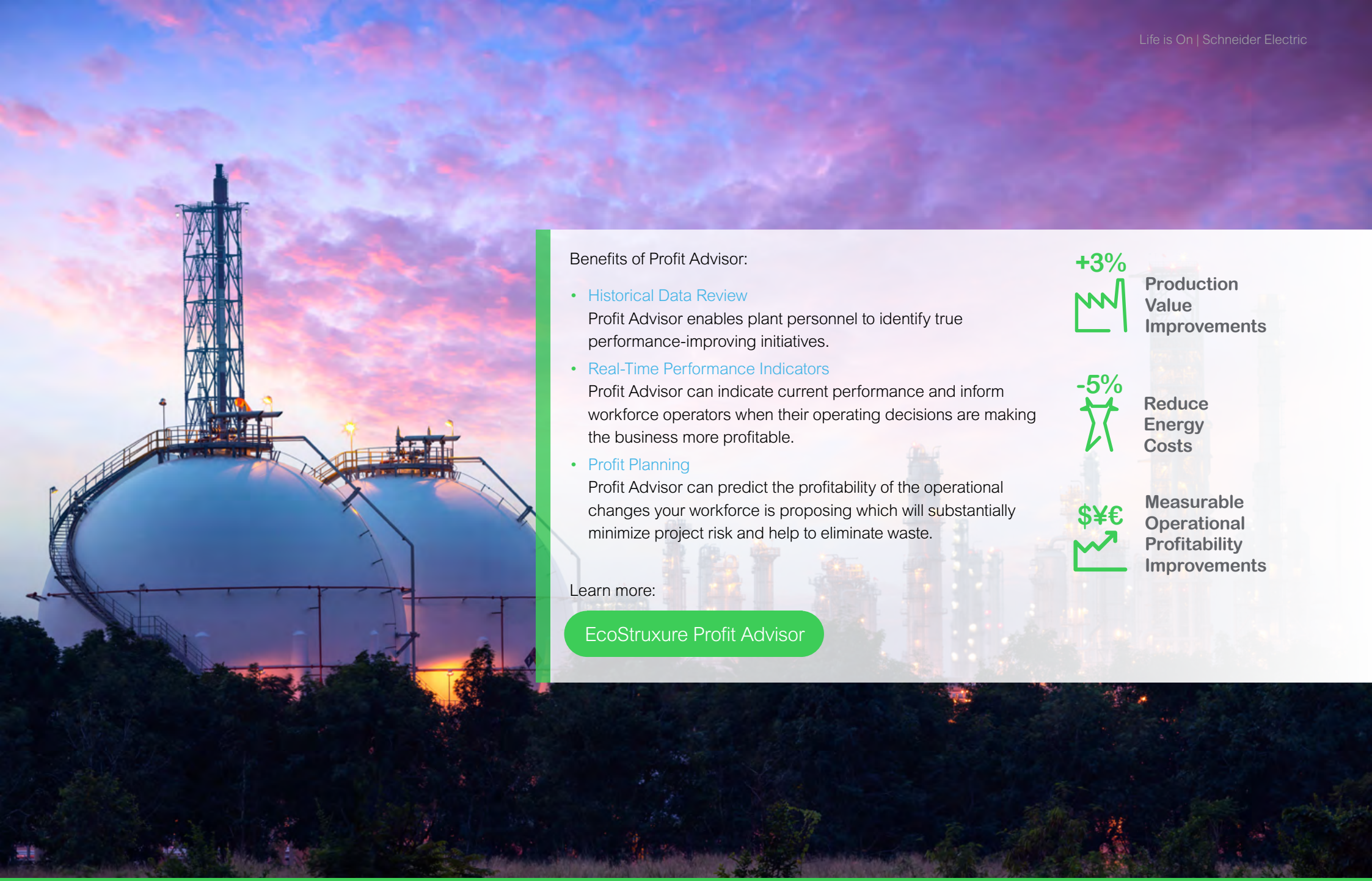


Empower your workforce to drive operational profitability - safely and sustainably

Automation can be the profit engine for the Oil & Gas industry. With EcoStruxure Profit Advisor, real-time and historical process data is fed into Schneider Electric's industry-specific real-time accounting and roll-up models to identify profit contributions across equipment, unit, area, and plant asset hierarchies.

The need of the hour for operational leaders today is to find a way to ensure profitability for the business. These leaders often successfully ensure operational excellence by balancing productivity and maintenance in a safety-first environment - only to learn from accounting that profitability targets were missed. This might be a result of processes optimized to deliver short term results, but not ready to capture opportunities that improve sustainability. With Profit Advisor, Schneider Electric sees a future where customers will no longer be surprised by the disconnect between operational, financial performance, and continuous sustainability; instead, by proactively controlling real-time operations to optimize financial performance for profit via the asset model, they will be able to target sustainable operations.

Profit Advisor allows plant personnel to see and understand the return on investment (ROI) and business value that their actions, activities, and assets are contributing to the business in real time. It empowers the workforce to make better business decisions with a variety of data analytics, which can be displayed in various formats, to help drive operational profitability improvements safely. It also fosters a deeper understanding of the impact of their choices on sustainability, enabling better alternatives while assuring the expected profitability.



Benefits of Profit Advisor:

- Historical Data Review
  Profit Advisor enables plant personnel to identify true performance-improving initiatives.
- Real-Time Performance Indicators
  Profit Advisor can indicate current performance and inform workforce operators when their operating decisions are making the business more profitable.
- Profit Planning
  Profit Advisor can predict the profitability of the operational changes your workforce is proposing which will substantially minimize project risk and help to eliminate waste.

Learn more:

EcoStruxure Profit Advisor

+3%
Production Value Improvements

-5%
Reduce Energy Costs

$¥€
Measurable Operational Profitability Improvements

Rethink your energy system design and make it sustainable

Lower CapEx by 16% with energy efficient design and Schneider Electric electrical power distribution architecture optimization.

With the current oil prices and bleak market scenario, the focus of the industry has turned to CapEx reduction with a plan to go lean and modular.

Our engineered solutions are specially developed for Oil & Gas projects and based on innovative methodology that optimizes medium volt (MV)/low volt (LV) architecture by using standard products.

Key features:

- A 'fit for purpose' approach that delivers bespoke solutions that gives you exactly what you need
- Total integration to guarantee ready and on-time installation
- Bespoke solutions that reduces the project footprint by up to 25%

Key Benefits:

- Reduces the customer's power distribution solution CapEx by up to 16%, by adopting a 'fit for purpose' approach
- Reduces the project footprint by up to 25%
- Reduces the equipment weight

By engaging early on with the client under the umbrella of our Power Distribution Architecture Optimization program, Schneider Electric helps clients determine the optimized E-House footprint and power system that will meet their needs safely and cost effectively.

This approach promotes sustainability in terms of reduced power requirement, reduced energy consumption, reduced equipment footprint, and reduced engineering man hours. This can be achieved through disruptive and innovative methodologies, along with early collaboration with the clients and Energy Performance Contractors (EPC) to identify areas where they can optimize MV/LV architecture based on just enough technologies and standard equipment. A modular E-House approach and Flexible Lean Execution(FLEX) automation engineering methodology guarantees ready-to-install and just on-time operations.

Get started with our EcoStruxure Energy and Sustainability Services

Organizations today have been proactively tackling sustainability. What they need most is a long-term sustainability strategy that takes into account the ever-changing business, political, social, and global dynamics.

With the increasing demand for transparency, sustainability reporting has emerged as an important factor. Sustainability-focused organizations are taking the lead in reporting and proving their commitment to transparency and to the stakeholders concerned. Ensuring a reduction in operating costs and increased power reliability have become a priority. While resources are limited, it is important that organizations have the right data to get an overview of their current state, and prioritize projects accordingly.

Over the years, Schneider Electric has earned a reputation for developing thriving sustainability programs across economic, environmental, and social dimensions for organizations. As a global leader in sustainability services, we provide end-to-end solutions that integrate strategy, technology, and implementation capabilities that truly sets us apart. The result is accelerated business performance for our clients.

Increase your energy efficiency and profitability with Schneider Electric through:

- Energy consulting: Our experts help you find efficiencies in your operations to optimize energy use and resources in your facilities worldwide
- Sustainability services: Discover cost-effective opportunities to embed sustainability into your business goals and increase corporate transparency
- Strategic energy sourcing services: Leverage our experts to help you reduce energy costs, mitigate risk and increase earnings
- Energy monitoring and reporting: Use EcoStruxure Resource Advisor, our web-based tool, which monitors and analyzes resource consumption to find opportunities for energy efficiency. With Resource Advisor you can centralize information, plan initiatives, and manage progress

Why Schneider Electric is your ideal sustainability partner:

- Experienced sustainability professionals guiding clients to a successful program
- Ability to integrate global environmental, economic, and social sustainability initiatives into one program
- Schneider Electric's global reach with regional expertise
- Independent and unbiased opinions and recommendations on the market and its regulation

Learn more:

EcoStruxure Energy & Sustainability Services

One step into the future: Smart microgrids to optimize offshore energy resources

Schneider Electric has implemented many smart grid programs throughout the world, primarily land based grids. A portion of future energy demand is driven by offshore platforms. Therefore, new grid solutions and energy resources are needed to optimize energy requirements for offshore facilities. In some cases, solar and wind resources can provide ways to eliminate the need for turbines and generators on platforms. Smart microgrids can be integrated to optimize renewable energy for offshore installations. For example, solar or wind resources close to offshore or on a platform can be tied to an onshore grid.

Looking ahead, the Oil & Gas industry will take advantage of offshore wind power or solar power. In such cases, a smart microgrid can optimize loading for the power systems.

Future energy resources will be utilizing offshore solar and wind sources. Smart microgrids will play a vital role in connecting new energy resources to onshore power grids

Delivering expertise powered by people with Field Services Solutions

With improved management and maintenance of assets, Oil & Gas organizations can increase the safety and reliability of their facility. Schneider Electric's Asset Management Life Cycle offers end-to-end asset management including electrical and process Front End Engineering Design (FEED) consultancy, rigorous Factory Acceptance Test (FAT), and optimized onsite startup and commissioning, training and maintenance, installation assessment, and modernization solutions.

- Schneider Electric's expertise in process and electrical distribution minimizes CapEx and OpEx through:
  - Electrical and process pre-FEED / FEED studies and support
- Schneider Electric helps convert your designs into reliable and safe processes through:
  - Design and engineering
  - Project management
  - Optimized startup and commissioning
- Schneider Electric helps you secure your critical systems availability, security and safety, and control your budget through:
  - Service plans
  - Expert technical support
  - Preventative, predictive maintenance
  - Spares management
  - Operator training and competence build-up
- Schneider Electric provides maximization of safety and security, availability and reliability, and mitigates operating risks through:
  - Installation assessment and optimization consultancy
- Schneider Electric provides you with long-term operating efficiency and plant availability, with minimized process disruption during implementation, and compliancy upgrades with:
  - Modernization solutions with minimum downtimes
  - Infrastructure obsolescence management with systems upgrades or replacement

100%
of product in R&D are designed with Schneider ecoDesign Way

74.6%
of product revenue is made with Green Premium eco-labell

64%
the Employment Engagement index remains at the target level

Why Schneider Electric?

- Original manufacturer, design, and quality
  - » As the original designer and manufacturer of products and equipment, Schneider Electric can provide the best and most extensive maintenance service.
  - » Schneider Electric collects all manufacturing data for all products, and thus has the necessary diagnosis tools and specific competencies to detect any possibility of failure. No other installer/facility manager has access to such a data base.
- Guarantee of availability
  - » Schneider Electric is able to provide spare parts with a 24/7 delivery (emergency), and even on public holidays. Installers/ facility managers have no stock of spare parts, or they have to order them from Schneider Electric.
- Key contributor to customer satisfaction
  - » Our field service engineers are trusted advisors for the customers. They can provide the most relevant information, such as obsolescence, support for operation, etc.

Discover our gas solutions that transform challenges into opportunities

Global warming, a term that was once regarded as an abstract concept, is slowly becoming an uncomfortable reality. Industry forecasters predict that in the next 40 years, energy consumption will almost double. In order for the global community to achieve its goal of limiting global warming to 1.5 °C – the mandate reached at COP21 – CO2 emissions must be cut in half. What we need right now are low-emission alternatives and solutions that enable us to become three times more energy efficient than we are today.

As the cleanest burning fossil fuel option, the demand for natural gas is set to grow at 1.8% per year (2014-2035), and a cumulative of 44% (2014-2035).

Achieving sustainability is possible. It is the perfect opportunity to integrate, simplify, and standardize your systems via the Innovation at Every Level model. But it is also critical that sustainability is supported by profitability, especially in a lower price market as before. The Industrial Internet of Things (IIoT) arises as a creative solution that could mitigate profit issues as well as transform the gas business.

With over 30 years of expertise and a legacy of processing 60% of the world's LNG, Schneider Electric delivers comprehensive enterprise-level solutions for your business. Over the years, we have partnered with gas processing and LNG businesses to eliminate risk, improve business performance and efficiency, and ensure timely budget executions. No matter what stage of operation you are at, Schneider Electric is in the unique position to help you navigate this complex and rapidly changing world. From energy management to digital services, our comprehensive range of hardware, software, and infrastructure solutions are created to deliver success that is driven by excellence.

The Schneider Advantage

- Improve asset performance: Increased operational reliability and collaborative insights using a cloud solution
- Simplify decision-making: Visibility on strategic and operational KPIs with connectivity and mobility innovations
- Enhance operational intelligence: Increased safety and asset integrity with shared workflows and predictive analytics

How can Schneider help?

With natural gas in the limelight, LNG and gas processing companies have been presented with a tremendous opportunity to increase capacity and grow the business. Intelligent use of energy management, automation, and software will be the key to accomplishing this expansion efficiently and profitably:

- Reduce manufacturing costs, both CapEx and OpEx
- Improve plant yield and early stabilization for commercial production, stabilizing the increase in plant capacity
- Curb knowledge drain due to an ageing workforce
- Simplify operator training
- Improve knowledge that enables best practices
- Find a reliable partner that owns project implementation
- Improve safety, reliability, and environmental compliance
- Stabilize process, critical in those stages of gas processing related to mercury removal, dehydration, sour gas removal, and production of helium

Learn more:

LNG & Gas Processing Solutions

How Schneider Electric can help

Bridge the gap between operations and enterprise with EcoStruxure for Oil and Gas.

The next few years promise to be a game-changer for oil and gas industry leaders that embrace big data, the Internet of Things and advance analytics. Teaming up with a domain expert like Schneider Electric will give you the edge you need to stay ahead in the rapidly changing oil and gas landscape. Our end-to-end solutions and comprehensive enterprise-level gas portfolio addresses your greatest challenges by helping you improve asset performance and optimize production rates.

All Schneider Electric solutions described here are part of our EcoStruxure for Oil and Gas platform. You can now make the most of digitization with the help of EcoStruxure, our IoT integrated system architecture. Built to offer innovation at every level, EcoStruxure enhances the value of safety, reliability, efficiency, sustainability, and connectivity for your business.

With proven expertise in industrial automation and IoT, we can guarantee that a partnership with Schneider Electric can deliver:

- Complete automation and energy management solutions: Connecting machines, hybrid and continuous processes, from the field to the enterprise, with industry-leading connected products, edge control, and analytics.
- An open, cybersecure platform: An IoT platform that simplifies connectivity by supporting open industry standards, leveraging cloud-based architectures, with an open development platform for an extensive ecosystem of partners.
- Unmatched Oil and Gas applications and digital services: Process expertise to deliver digital services and industrial IoT-ready applications to maximize business results.
- Choice of access: You have the flexibility to access the data on premise and on the cloud.

Learn more:

EcoStruxure for Oil and Gas

How Schneider Electric Solutions contribute to Sustainability KPIs

	EcoStruxure Triconex Safety System	SimCentral Unified Lifecycle Simulation	Power Distribution Architecture Optimization	EcoStruxure Profit Advisor	SimSci EYESIM 3D simulator training	EcoStruxure Energy and Sustainability Services	Field Services
Increase Reliability	✓		✓		✓		✓
Reduce Operations Cost (reworks, downgrades)	✓	✓	✓	✓	✓		✓
Reduce Utilities Cost (electricity, steam, etc.)		✓	✓	✓		✓	
Maximize Plant Utilization	✓	✓	✓	✓	✓		✓
Energy Audit						✓	
Increase Compliance	✓				✓	✓	
Minimize Incidents	✓		✓		✓		✓
Operator Training					✓		

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December 2017

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