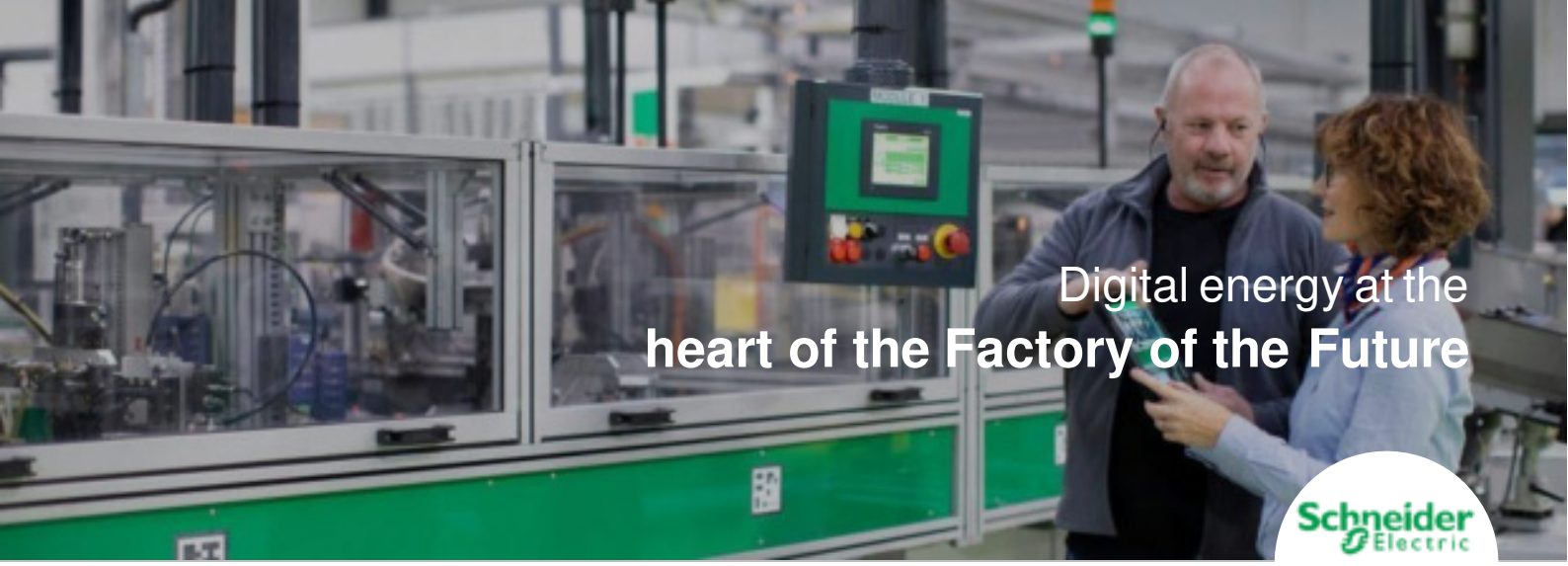

Digital energy at the heart of the Factory of the Future

As part of its "Factory of the Future 4.0" program, Schneider Electric deploys energy monitoring systems on its industrial and logistics sites that optimize energy consumption and reduce associated CO2 emissions.

Starting date of the project	January 2018
Project Localisation Places of implementation of the project at this stage and targeted geography if replicable.	The "Factory of the Future 4.0" program is intended to be deployed in Schneider Electric's major industrial and logistics sites around the world. By the end of December 2020, some 20 sites have already benefited from this program in Europe, while the program is being deployed on other sites. In France, the Vaudreuil factory and the Evreux logistics center are showcases of this program. This project can be implemented at any industrial, logistics or wholesale tertiary site that wishes to improve its energy efficiency.
Project objectives Type of climate innovation of the project with a description of the problem/issue addressed	Reduce energy consumption by implementing digital solutions that optimize the operation of industrial processes and building use.
Detailed project description	Schneider Electric innovates to invent the Factory of the Future 4.0. The Fourth Industrial Revolution is a tremendous lever to accelerate the transformation of industry towards green and sustainable operations. Energy management is at the heart of this industrial revolution: Thanks to the digitization of its energy, the company optimizes its consumption and decouples its industrial production from the generation of greenhouse gases. Since 2018, Schneider Electric has deployed its EcoStruxure digital platfo rm to reduce energy consumption. For example, in its smart factories and smart distribution centers, the company has reduced its energy costs from 5% to 30% and its maintenance costs from 30% to 50%. The use of EcoStruxure solutions have also reduced production interruptions and quality problems by about 15%. In concrete terms, Schneider Electric has deployed energy monitoring systems for natural gas (25% of consumption) and electricity (70% of consumption) on its industrial and logistic sites. Thanks to networked meters linked to the company's EcoStruxure digital architecture, Schneider Electric is able to optimize its energy consumption and CO2 emissions. Supervision systems provide energy dashboards, both global and use-specific, as well as automatic alerts in the event of drift. This allows for robust and responsive monitoring, enabling easier decision-making and faster corrective action. The integration of monitoring into the management processes of the plant enables energy to be put at the heart of industrial performance and can offer new business opportunities for factories by increasing their profitability and productivity.
Main project's drivers for reducing the greenhouse gas emissions	

Reduction levers	**Details on the aspects of the project**
☒ Energy and resource efficiency (including behaviour)	Consumption control through better knowledge of uses
☐ Energy Decarbonisation	
☒ Energy efficiency improvements	Optimization of industrial processes (rapid control of possible drift)
☐ Improving efficiency in non-energy resources	
☐ Emissions absorption: creation of carbon sinks, negative emissions (BECCS, CCU/S, ...)	
☐ Financing low-carbon producers or disinvestment from carbon assets	
☐ Reduction of other greenhouse gases emission	

Emission scope(s) on which the project has a significant impact and quantification of GHG emission reductions per emission scope

	Aspects of the project contributing to the reduction of emissions by emission category	Quantification of associated GHG emissions by emission category Please follow the quantification methodology used in the Afep guidelines.
Reduction of the company's carbon dependency		
Scope 1 *Direct emissions generated by the company's activity.*	Digital monitoring and optimization of energy consumption	7,000 tCO_2
Scope 2 *Indirect emissions associated with the company's electricity and heat consumption.*	Digital monitoring and optimization of energy consumption	40,000 tCO_2
Scope 3 *Emissions induced (upstream or downstream) by the company's activities, products and/or services in its value chain.*		
Increase of carbon sinks		
Emissions Absorption *Carbon sinks creation, (BECCS, CCU/S, …)*		
GHG emissions avoided by the company at third parties		
Avoided Emissions *Emissions avoided by the activities, products and/or services in charge of the project, or by the financing of emission reduction projects.*		

Clarification on the calculation or other remarks:
In 2020, Schneider Electric's energy efficiency program achieved 10.6% energy efficiency compared to the 2017 reference year, i.e. 3.5% efficiency on average per year on all sites.
From 2017 to 2019, emissions (scopes 1 and 2) from Schneider Electric due to energy consumption were reduced from 500,000 tCO_2 to 240,000 tCO_2, which is an absolute reduction of more than 50% in just 2 years. This reduction is due to both energy efficiency efforts and the provision of renewable electricity.
Over the period 2018-2020 of the "Factory of the Future 4.0" program, energy efficiency gains have reduced CO_2 emissions by approximately 47,000 tCO2 (7,000 tCO2 in scope 1, and 40,000 tCO2 in scope 2).
Amount of energy consumed by Schneider Electric globally: 1.2 TWh per year (70% electricity, 25% natural gas, 5% other). Details of energy and CO_2 reporting are available in the group's annual report.

Modality of verification of the quantification.

Calculation standard used (ADEME base, GHG protocol, etc.): A mathematical modeling of theoretical energy consumption compared to actual consumption, using the energy dashboards of the EcoStruxure tools, enables real time control of the performance of the concerned site. CO_2 emissions associated with energy (scope 1 and 2) are quantified according to the GHG P rotocol, using recognized emission factors databases such as Ademe and the International Energy Agency.

Verification of the calculation (internal or external): External audit: the energy consumption and CO_2 emissions associated with it are audited annually by an independent third party as part of the audit of Schneider Electric's extra-financial performance.

Other environmental and social benefits of the project

This project contributes to the following SDGs:

- SDG 6 Clean water and sanitation: EcoStruxure tools help prevent leakage and control water consumption;
- SDG 7 Clean and Affordable Energy: with the implementation of this project, there is a decrease in energy consumption;
- SDG 9 Industry, Innovation and Infrastructure: EcoStruxure improves the overall management of the site by integrating the energy component.

Project maturity level	☐ Prototype laboratory test (TRL 7) ☒ Real life testing (TRL 7-8) ☐ Pre-commercial prototype (TRL 9) ☐ Small-scale implementation ☒ Medium to large scale implementation **Remarks :** • Internal application on about twenty Schneider Electric sites in Europe, and over 80 sites in the world • EcoStruxure tools and networked meters already marketed, and deployed in over 100 sites worldwide
Capacity and conditions of the project reproducibility, with associated climate impact mitigation potential	Reproducible project at all industrial sites (factories and logistics sites), with significant energy and CO2 emissions savings throughout France.
Amount of investment made (in €)	The investments made depend on the size of each industrial site, its energy consumption, as well as the potential challenges of controlling the quality of the electrical current. Investments are needed to: • Install an energy metering architecture • Deploy EcoStruxure DigitalTools • Create dashboards and set alerts Overall, Schneider Electric invests about 10 million euros per year in its energy efficiency program. These investments allow both the digitization of energy consumption with EcoStruxure and the deployment of the most efficient technologies (LED, heat pumps, cogeneration, etc.).
Economic profitability of the project (ROI)	☐ ST (0-3 years) ☒ MT (4-10 years) ☐ LT (> 10 years) **Remarks:** Overall, the return on investment time on energy savings is 1 to 5 years. The project covers several economic interests: • **Short-term** interest: identify malfunctions causing overconsumption (examples: Night/weekend • consumption; water leakage; load peaks) • **Medium-term** interest: prevention of abuse; monitoring improvements; involvement of maintenance teams, general services in consumer control; awareness and involvement of the management line • **Long-term** interest: justification for investments; prevention of abuse; monitoring of improvements
Engaged partnerships	The project is piloted and deployed internally. The World Economic Forum awarded a factory in Schneider Electric in France, located in Vaudreuil, with the label "Vitrine Industrie du Futur" (“Industry of the Future Showcase”) for the promotion of the Fourth Industrial Revolution.
Open comments from the project owner	/
More about the project	
Contact the company carrying the project	JEAN MIYELI jean.miyeli@se.com
Project URL links	▪ https://www.se.com/ww/en/work/campaign/smart-factory/ ▪ https://www.se.com/fr/fr/work/webmarketing/industrie/evenements-industrie/smart-factory.jsp ▪ https://www.youtube.com/watch?v=N0tnFyZC4bs ▪ https://www.youtube.com/watch?v=cb3-B4osnUs http://www.resourceadvisor.com/
Illustrations of the project	General Consumption Monitoring:

Weekend abnormal consumption alerts:

Forgotten compressor shutdown + calculation of the cost of annual air leakage:

Water Leak Detection and Alert: