



Electrifying CPG Industries

Challenges and Opportunities in
Consumer Packages Goods Industries

se.com/process-electrification

Life Is On

Schneider
Electric

Table of contents

Executive summary	3
The consumer packaged goods industry is under pressure to decarbonize	4
Operational resilience and compliance are top priorities	4
Electrifying processes helps CPG companies reach their long-term decarbonization targets	6
Electrification is a complex decarbonization solution that uses electricity to power processes and equipment.	6
Case study: How a large pharmaceutical company is using electric chillers to reduce natural gas use	9
A site-wide assessment helps companies determine their electrification approach	11
Electricity availability should not be overlooked	12
There are strategies to improve the electrification business case	13
The benefits of working with trusted experts	15
Conclusion	17

The background image shows a person wearing a white lab coat and white gloves. They are holding a red jar under a silver dispenser that is pouring a white substance into it. The scene is set in a laboratory or industrial environment.

Executive Summary

The consumer packaged goods (CPG) industry is one of the world's largest contributors to climate change. While most major CPG companies have made commitments to reduce their carbon footprint, they still need to make more progress to meet these targets. It is a challenging undertaking because companies must improve sustainability while also maintaining product quality and avoiding production interruptions.

Short payback energy conservation measures (ECM), such as replacing traditional lighting with more efficient LED-based lighting, are the natural first steps of a decarbonization journey. However, they rarely bring more than a 10% emissions reduction.

To reach the next decarbonization milestones, companies should consider long or negative payback ECMs or electrification options. Electrification is one of the most efficient ways to decarbonize the CPG sector because it directly reduces fuel emissions by using electricity instead of natural gas to power processes and equipment.

This eGuide explores what electrification is, why it is important for the industry, how companies can start their electrification journey, and provides examples of how other CPG companies are decarbonizing using electrification.

The consumer packaged goods industry is under pressure to decarbonize

CPG's heating-and cooling-intensive segments are ripe for electrification

Consumer packaged goods (CPG) is one of the world's largest industries. The sector touches most people's lives on a daily basis because it includes a broad category of indispensable products, including food and beverages, cosmetics, toilet paper, cleaning products, and medication. However, producing these goods comes at a heavy environmental cost. The industry is energy-intensive and a major source of global greenhouse gas (GHG) emissions. To reduce this impact, CPG companies need to implement decarbonization

strategies while maintaining product quality and continuing to meet demand.

This ebook focuses specifically on the subsection of CPG where the majority of gas consumption comes from heating and cooling utilities (e.g. generating steam, heating water, and cooling water). These segments include food and beverage manufacturing (largest CPG segment with a 30% market share) , pharmaceuticals, medical devices, and pulp and paper manufacturing plants.

Operational resilience and compliance are top priorities

ESG is a priority for investors and consumers

Sustainability has become a competitive advantage. A majority of investors (89%) take a company's environmental, social, and governance (ESG) practices into consideration when making investment decisions.

Individual product consumers also favor companies that prioritize sustainability. It can be a brand differentiator, which is especially important in an industry in which customers can easily and effortlessly change brands. Research has found that consumers are more inclined to trust and purchase from companies that align with their sustainability values. They are also willing to pay premium for sustainably produced or sourced goods.

CPG companies face reputational risks if they fail to meet climate goals

Most of the world's largest companies, including in the CPG industry, have made strong commitments to improve sustainability and address climate change. However, almost none are on track to reach these goals. This failure can have significant environmental consequences. Inability to meet these commitments is also a reputational risk and could potentially lead to questions about greenwashing.

Climate risks pose a threat to operations

CPG companies are susceptible to the effects of climate change, and risks related to increasingly frequent extreme weather events. For example, climate-related weather events, such as hurricanes and flooding, threaten the availability and quality of essential resources. Sectors like food and beverage are particularly sensitive to climate change effects because droughts and floods could cause crop failures. Disruptions from climate change can also force businesses to close, hurt profitability, and affect companies' ability to meet consumer demand.

CPG companies are required to meet regulations

The industry is coming under increased regulatory pressure. Large CPG businesses in the European Union (EU) will be subject to the EU Corporate Sustainability Reporting Directive (CSRD), which requires them to report their environmental performance (GHG emissions, waste management, resource use, etc.) on a regular basis. The U.S. Securities and Exchange Commission (SEC) has also enacted climate disclosure rules that require all public companies to include climate-related disclosures in their audited financial statements.



Electrifying processes for long-term decarbonization targets

Electrification is a multifaceted decarbonization solution

Electrification effectively reduces sites' CO₂ emissions by using low-carbon electricity to power processes and equipment that are traditionally reliant on fossil fuels. Direct substitution of fossil-fuel powered equipment, like boilers with electrical equivalents, is emerging as a starting point for electrification. However, such narrow approach scarcely leads to an acceptable business case given the gas/electricity ratio (often higher than 1/3) and it is not always feasible because of electrical grid capacity constraints.

Therefore, a holistic electrification approach is needed for electrification. It should combine thermal efficiency, grid capacity constraints, alternative renewable generation, thermal and electrical, and flexibility opportunities to decrease the cost of electricity.

For instance, when considering electrification, it is important to examine the potential for heat recovery and leverage efficient technologies such as Heat Pump or Mechanical Vapor Recompression. This approach helps sizing fit for purpose configurations that will both reduce the power demand from the grid and bring savings, making the business case for electrification favorable.

Electrification and energy efficiency both deliver decarbonization benefits

It is important that CPG companies understand the difference between electrification and energy efficiency in sustainability initiatives. They are both important tools - and are often used together in decarbonization efforts – but have different aims.

Improving energy efficiency is the first step in a company's decarbonization journey. The typical energy audit focuses on short payback measures (less than 3 years) that reduce fuel consumption and emissions. Energy conservation measures (ECM) typically bring less than a 10% emissions reduction.

Energy efficiency improvements will mechanically reduce consumption, but their ultimate objective is to deliver savings.

To move to the next level of emissions reductions, companies need to extend the scope of their analysis. An in-depth analysis typically studies areas such as waste heat recovery and steam use (i.e. to heat water), which is historically inefficient. That information makes it possible to identify where and how companies can use electrically powered equipment (heat pumps or direct heating) to support decarbonization activities.

An expert energy audit identifies both the low-hanging fruit of energy efficiency and help craft a long-term electrification plan. CPG companies can then create a roadmap that maximizes both types of efforts.



Utilities are the first area to consider for electrification

Utilities (HVAC - Heating, Ventilation and Air Conditioning, steam, cold, etc.) are a good starting place for electrification.

First, their temperature range is compatible with mature and efficient electrification technologies. There are several potential electrification solutions for utilities, such as using an electric boiler or heat pump and vapor compression, instead of a fossil-fueled equivalent.

There are also lower risks when electrifying utilities because the industrial processes do not need to be deeply modified.

For example, a natural gas boiler that generates steam at 10 bar can be electrified.

If steam with such properties is indeed necessary for the process, then the electrified solution will generate exactly the same steam (pressure, flow) as the conventional solution, making it transparent for the process.

Finally, CPG companies can take a staged approach to electrification, rather than making all the changes at once. This is beneficial because it allows companies to quickly start electrifying the straightforward opportunities while also giving them time to create a mapped-out plan that matches their needs, rhythms, and resources. For instance, a water tank heated by steam can be heated directly with resistive elements. Then, it is possible to later replace the steam boiler with a smaller electrified version (less steam to be used thanks to prior electrification of tank).

Other electrification possibilities include:

- De-steaming or reducing steam usage because steam is often used in factories where hot water can be used instead.
- Electrifying directly.
- Using electric boosting for furnaces where electricity can be used as an additional source of heat, which reduces natural gas demand.
- Reusing steam with vapor compression.
- Using electric chillers instead of absorption chillers.
- Electrifying dehumidifiers.
- Electrifying HVAC with heat pumps.

Case study:

How a large pharmaceutical company is using electric chillers to reduce natural gas

A large pharmaceutical company asked Schneider Electric to perform a study of one of its sites. The site's combined heat and power (CHP) units were reaching end of life and the client wanted to create a decarbonization roadmap for its entire site.

The site had been using CHP to generate electricity for the plant. Steam was produced and considered a "free commodity." The site relied on three absorption chillers that essentially used the steam produced from two CHP units to chill water for the process. Operational efficiency was measured to using the Coefficient of Performance (COP) and equaled 1.1 (ratio of useful cooling energy to work energy required to produce it).

We proposed replacing the absorption chiller with electric chillers (which could achieve COP of 6 based on our calculation). This would save steam production of 1 CHP unit (10t/h), which could be substituted with electricity purchased from the grid with the following balance:

Before:

Natural gas consumption 2 x 130GWh

Electricity consumption 30GWh

TOTAL Energy: 290GWh

After:

Natural gas consumption 130GWh

Electricity consumption 80GWh

TOTAL Energy: 210GWh



Asset replacement is also a prime opportunity for electrification

Sites with aging assets that are ready to be replaced can benefit from electrification and its additional advantages (controllability, etc.). Before replacing with electrified equipment, sites should work with electrification experts to determine if the new equipment will meet the site's requirements (provide enough power, etc.). The specialists should also evaluate if replacing a fossil-fueled asset with an electrified asset makes financial sense. The evaluation helps CPGs with multiple sites determine which sites have the most urgent asset replacement needs.

Companies can resize CPG plants as part of an electrification strategy

Electrification is also an opportunity to address the issue of oversized CPG plants. Plants are often built with a vision of future extensions. For example, a company may have built a site 30 years ago with the objective of adding a 3rd line later. In many cases, those plans have since been discarded. As part of the electrification plan, companies have the opportunity to resize the equipment (e.g. from a 3rd line plant to only two lines). This change reduces investments and improves equipment efficiency because equipment will run closer to its design capacity.





A site-wide assessment helps companies determine their electrification approach

CPG companies benefit from having a site-wide assessment before beginning electrification work. During this assessment, electrification experts focus on a holistic view of the site, rather than on individual pieces of equipment.

The assessment includes steps such as:

- Studying multiple electrification scenarios and assessing them against each other to help companies make the best informed decision.
- Determining what benefits a collaboration between an OEM (Original Equipment Manufacturer) and independent site assessor can bring.
- Taking an in-depth look at the site and areas for improvement. For example, an assessment may look at the possibility of heat recovery at the dryer level and how to best leverage it. It could also consider options such as preheating the dryer air or using this heat to generate hot process water via heat pump.

Site-wide assessments are different than energy audits. While energy audits are a good starting point for emission reductions, they typically only reduce emissions by a few percent.

They focus only on low-hanging fruit and energy conservation measures with a short payback time (typically less than 2-4 years).

For example, changing from direct-on-line (DOL) motors with variable speed drives (VSD) is typically a good first step, but it is often insufficient for reaching decarbonization ambitions. also be used to store and release energy that has been intermittently generated or purchased at a lower price.

Electricity availability should not be overlooked

The electricity grid has become a major bottleneck for electrification initiatives. Site electrification requires a huge increase in electricity use (2 to 5 times more electricity is very common). Some distribution system operators (DSO), such as many in the EU, cannot yet offer this capacity and may not be able to for several years.

In view of these constraints, CPG companies should look closely at the site's electricity availability in the project's early planning stages. This will determine if the site will have enough energy available to support electrification. Sites should also consider how electrification can affect other areas of the site.

For example, any impact on a site's internal electrical infrastructure should be considered early because it will impact capital expenditure (CAPEX). An increase in energy use can also have negative consequences on the site's electrical supply and distribution.

The traditional ratio of electrical and instrumentation (E&I) in project estimates is not always valid for electrification projects because the extra power requirement often mandates deep electrical infrastructure modifications. Companies should also consider the necessary lead time of equipment such as transformers.



There are strategies to improve the electrification business case

Electrification is a strategic, long-term investment in decarbonization. There are clear and immediate environmental benefits. However, in the short-term, electrified systems may be more expensive than traditional solutions and require more funding. This is especially true in geographies with a high cost of electricity.

The business case becomes stronger in the long term because industrial operators may benefit from a decrease in energy costs. For instance, in the coming years renewable energy prices are predicted to become more competitive compared to fossil-fueled power. Increasing the use of renewables would also increase sustainability and strengthen the business case.



How a microgrid reduced the cost of a CPG site's electricity

Microgrid opportunities can help lower electrification costs. For instance, a client in Europe was paying more than 250€/MWh. Its site had a spare surface of 30,000 m². It was determined that an onsite PV plant (either financed by the client or a developer with an on-site Power Purchase Agreement (PPA) option) could help significantly reduce the cost of electricity.

For this project, a developer was approached to build a 1MW peak farm and sign a PPA with the client for the entire production. This allowed the site to reduce the cost of electricity to 230€/MWh without making a significant initial CAPEX investment.

In many geographies, industries can already leverage government incentives to support electrification projects. These tax incentives

or subsidies can significantly improve the business case for industrial operators. With climate-related pressure on regulators and governments, and more and more calls for them to tackle the challenge of excessive electricity pricing, it is expected that this constraint will gradually be removed. This would allow massive electrification deployment with a positive business outcome.

Implementing electrification strategically and opportunistically can also build the business case. For instance, a site could keep its existing gas boiler and add an additional electric boiler in parallel, which could eventually be combined with PV and a battery energy storage system. Variable electricity prices (wholesale market) could be leveraged to run the electric boiler when prices are lower than natural gas. This could ultimately result in a reduction of CO₂ emissions, but there would still need to be other major changes to reach net zero.

Strategic electrification

Schneider Electric simulated a reference production site for a client using this approach. The site originally relied on a single natural gas boiler to produce steam and hot water. Experts simulated opportunities that could result in installing an additional electric boiler, heat pump, and thermal storage on this site. Optimization of the fuel source was conducted based on wholesale markets, using Energy Management System (EMS).

The result: The simulation showed that this scenario could lead to a 20% reduction in fuel costs and a 15% CO₂ reduction. Balancing service participation could even bring increased financial benefits.

On-site power generation avoids power availability issues

A Schneider Electric client wanted to electrify operations, but because of transmission grid congestion, it would take 10 years before adequate electrical grid capacity would be provided. As a solution, experts investigated the opportunity to build on-site generation with gas turbines. They were sized for the electrical capacity requirement at the end of the electrification roadmap. They provided ancillary services with the necessary spare capacity until the electrification roadmap is completed (10-year roadmap with major milestones every 3 years). The conclusion demonstrated that the income from the balancing markets would cover the investment after 8 years.



The benefits of working with trusted experts

Companies benefit from working with trusted experts to build an electrification roadmap

CPG companies optimize their electrification efforts by collaborating with industry experts to develop a comprehensive electrification strategy. By working with a team who understands the entire electrification process – from initial site assessment through project completion – companies ensure their roadmap addresses the project's technical, financial, and practical aspects. For example, experienced partners can assess implementation costs and determine the expected payback, both positive and negative. An experienced team

helps companies avoid disastrous pitfalls – like implementing a project only to realize the site cannot support its power needs.

The individualized strategy takes into account factors like asset aging so that companies are prepared to replace emissions-intensive equipment with electrified alternatives at end of life. The plan can also show the exact impact of CAPEX, operating costs, and emissions per year, and explain sequencing if there are multiple sites involved.



Learn more about
**Electrification
Consulting**



How an electrification roadmap is helping a U.S. manufacturer reduce its CO₂ footprint while increasing production

A U.S. client needed assistance improving sustainability at one of its sites while also making operational improvements. These improvements had already begun with the site's procurement of a clean-in-place (CIP) skid, which will be used to increase production.

Schneider Electric conducted a study to propose the best path for the site to achieve its net-zero ambitions while also providing the energy required for the new CIP skid. After auditing the site to understand its current situation and challenges, Schneider Electric consultants proposed an electrification roadmap that minimized the cost of operations and investments and also reduced the CO₂ footprint to net zero.

The study first established a picture of the current situation based on a site audit, design documents, and the site's energy bills. It then presented different electrification alternatives that took into account the production increase that came from commissioning the newly procured CIP skid. The study assessed the impact that electrification would have on the site's current electrical distribution system to validate the concept and estimate CAPEX, OPEX, and CO₂ emissions.

This study demonstrated that both a production increase (up to 20%) with CIP skid time reduction and a path to net zero can be achieved with electrification. It also determined that electrification did not require major modifications to the site's electrical infrastructure. The proposed path to net zero relies on energy efficiency improvements (more than 19% compared to baseline) and electrification. This roadmap was synchronized with major equipment aging (gas boiler and space heaters) to maximize their usage.



Conclusion

Electrifying industrial processes is a powerful solution for reducing CPG companies' carbon emissions. By replacing fossil fuel-dependent systems with electrified alternatives, they can significantly lower their greenhouse gas output. This electrified green transition helps companies' meet their environmental objectives, while also preparing for upcoming regulations and consumer and investor demands.

About the Author



Antoine Meurville is the Head of Domain Expertise in Schneider Electric's Electrification Consulting. He holds an MSc in Engineering from École Centrale de Lyon, with a focus on computer science and mathematics.

Antoine began his career in embedded software development and joined Schneider Electric in 2006, working on Modicon PLCs within the R&D department. In 2009, he moved into a software architect role, focusing on SCADA products. Over the following years, he held various roles including technical leader, business manager, project manager, and solution architect, primarily within customer project departments.

Currently, Antoine applies his comprehensive experience in industrial control systems, industrial networking, software development, manufacturing execution systems, and artificial intelligence to support industrial and infrastructure transformation and electrification projects.

Life Is On



Schneider Electric Industries SAS

35, rue Joseph Monier
CS 30323
92506 Rueil Malmaison Cedex
France

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.se.com

10-2025
ART960003

© 2025 - Schneider Electric. All Rights Reserved.
All trademarks are owned by Schneider Electric Industries SAS or its affiliated companies.
Document reference: 998-24615950

This document has been
printed on recycled paper

