

From burden to asset: turning big emitters into energy and flexibility suppliers



So-called “energy-intensive industries” account for 25% of global CO2 emissions. Yet, this burden can be turned into an asset for the grid and the Planet. Crucial for this change of paradigm is “flexibility”: a novel bottom-up approach promising to decarbonise and transform them into energy and stability providers

Steel, cement, chemicals, glass and paper are among the so-called “energy-intensive industries” (EIs) – these key sectors, together with refineries and minerals, [employ some 3.2 million European citizens](#) and [account for around 11% of total employment in industry, but also for 25% of global CO2 emissions](#) and [2/3 of the industrial sector](#). “Before the energy crisis, for an average German company, energy represented for instance 2 to 3% of the total costs, while for many energy-intensive industries this share substantially increased, when prices doubled or tripled for a while, and jumped easily to 15-



30 or 50%”, explains [Stefan Buettner](#), Director of Global Strategy & Impact at the [Institute for Energy Efficiency in Production](#) in Stuttgart, Germany. **Embedded in many strategic value chains, EIs make up more than half of the energy consumption of the EU industry**, hence the challenge of transitioning towards a less consuming industry sector, while preserving its competitiveness, set by the European Commission. Progress has been made in the last decades, but a [recent EU report](#) warns that **we won’t be able to hit our environmental targets, “without a wide and accelerated scale-up and roll-out of innovative climate-neutral technologies in energy-intensive industries.”**

Yet, if they increased their share of renewables and implemented the appropriate measures, **energy-intensive industries would not only cut their consumption but also contribute significantly to the stability of the electricity grid**. It’s what insiders call **“flexibility”**. “If big and very energy-consuming players learned to manage their internal resources differently, they would not only relieve the grid during their peaks in demand but also support it and supply it with their energy,” says Bruno Sodiro, co-coordinator of [FLEXIndustries](#), a European project aimed at fostering the decarbonization of **energy-intensive industries**. While in the old paradigm, energy-intensive industries were just considered as ‘passive consumers’, companies only consuming huge amounts of energy, “our goal is to reverse the typical top-down approach of the energy market and **turn them into big, active players, capable of providing it with services and added value**, aimed at relieving the load of the distribution and transmission grid, and thus helping it manage a growing share of renewables”, he points out.

This is exactly the challenge that has been taken up by the [Italian facility of the chemical-pharmaceutical company Suanfarma](#). Based in Rovereto, northern Italy, it is among the demo-plants testing the solutions developed within FLEXIndustries across different countries and industry sectors. “Practically all of the active ingredients we produce come from fermentation on a fairly large scale, a process that requires a great deal of energy. **For electricity alone, our consumption nears that of a small town, so any change on our part, has a significant impact on the grid,**” explains Michele Creazzi, its Head of Engineering and Energy Manager. Recently equipped with a 500 kW PV system, the plant had already implemented two natural gas cogeneration plants that produce electricity, thermal- and cooling energy, and a co-generator powered by biogas, resulting from their by-products. Yet, besides a heat-pump, with respect to flexibility **the next and crucial step will be the installation of a storage system**. “It will help us maximise our self-consumption and use of our solar energy, but the point will be especially to **test how a storage system can contribute to regulating the impact of energy-intensive factories like ours on the electricity grid,**” explains Creazzi.

Experts agree that flexibility can also help achieve benefits far beyond energy savings, thus further incentivising the uptake of renewables. “One of our main purposes is to integrate into digitally-enabled flexible industrial plants: waste-heat recovery and waste-heat to power technologies, electrical renewable energy sources and storage systems. And in parallel, we explore new possibilities in terms of business models. The core of this strategy is to **optimise the value of the self-produced energy, which can both represent important streams of renewable energy and revenues for the facility and for the grid,**” explains Erik Garofalo, FLEXIndustries co-coordinator. The **need for new business models** is also stressed by Sodiro, who regrets that **the existing ones are “not suitable to encourage big players such as the energy-intensive industries to opt for flexibility.”** “Injecting the energy you produce into the grid and then buying it back at a lower price does not necessarily decongest the grid,” he says. “This approach primarily benefits the energy producer through cost savings but doesn’t address the key issues related to grid congestion.” Significant to the uptake of a flexible approach are also the rigidity of the energy market and its lack of interaction with the industry sector, points out Sodiro: **“The energy market regulation should be reviewed, and information should be shared on open-source management platforms** to allow industries to participate. In



countries like Spain the energy market is very open, while in others like Greece or Bulgaria, there are many more restrictions.”

What makes the decarbonisation of energy-intensive industries particularly demanding is also technical challenges, depending on their specific processes and workflow. **“Some 2/3 of their emissions arise from the consumption of energy**, such as burning coal or gas, but whilst these ‘energy-related emissions’ can be addressed through energy efficiency measures and the use of different energy sources, **the remaining third are so-called ‘process-related emissions’, which are much trickier to tackle** and represent a major issue, especially in the cement industry,” explains Buettner. What’s more, **for industries mostly working 24/7 as EIs, intervening in the processes is very complex and expensive**. “Plant managers are often hesitant toward the integration of innovative technologies and procedural transformations, citing potential downturns in productivity. Within this context, actively engaging stakeholders becomes a considerable challenge,” states Garofalo.

Another major factor to address is the need to make all stakeholders aware of the opportunities of decarbonisation. “All industries perform very badly, but it is especially surprising that with 60 to 70% of their energy consumption going into processing heating and cooling, energy-intensive industries don’t see what’s in it for them,” says Buettner. **“Heat recovery, for instance, not only promises huge savings but on a much shorter term than switching to hydrogen or electrifying all the operations**. It could be used for processes on-site, but also to heat up entire urban districts as is the case in Hamburg, for instance.” Yet, he acknowledges, as change is always hard, **we should pay special attention to leaving no-one behind**. “When we face something new, there’s always some hesitancy, and there are always winners and losers. **A transition path must be found for those who will lose their jobs and their future too**, and this also for the economic reason that they might otherwise oppose all progress.”

Article by Diego Giuliani

Photo Credit: [Johannes Havn](#)

Contributors:

Bruno Sodiro
Erik Garofalo
Michele Creazzi
Stefan Buettner

Contacts:

Project coordinator:

Erik Garofalo, Rina Consulting SPA - coordinator@flexindustries.eu

Communication Manager:

Leonardo Improta, ICONS - info@flexindustries.eu

Project website: [Homepage - FLEXIndustries](#)

Twitter: [@FLEXInd EU](#)

LinkedIn: [FLEXIndustries](#)



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.