

Is industry compatible with climate?

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The industrial sector is a major consumer of fossil fuels and the biggest emitter of greenhouse gases (GHG), however there are not as many energy efficiency projects - the key to cutting GHG - as there could be and while poor access to funding is one of the main obstacles to their development, it is not the only one. So how can we move the energy transition forward in the industrial sector in these circumstances, especially in developing countries?

While industry accounts for 25% of final energy consumption on a global scale, because of all the electricity it consumes - frequently driven by its use of fossil fuels - it consumes around 40% of the world's primary energy. Consequently, it is one of the biggest GHG emitters.

To cut these emissions, the focus is usually on energy efficiency in buildings or the production of intermittent renewable energy, however the latter will not be able to power the industry of the future, especially in developing countries. At the same time, in the absence of a proper market and sufficient resources, progress in cutting the carbon footprint of industrial processes is painfully slow.

In the past 40 years, industry's share in French GDP has halved, reflecting a pattern observed in practically all OECD countries. This decline has resulted in a lack of interest in industrial innovation, which has been supplanted by digital and service sector innovation. The neglect of innovation in "carbon-light" technologies is also reflected in the failure of its funding model (Gaddy *et alii*, 2016). The system of carbon credits set up as part of the Kyoto agreement does not provide sufficient incentives and at the present time, investment aid and capital expenditure programmes designed to reduce the carbon footprint of industry and energy production in developing countries are virtually non-existent.

The whole question of financing is key and constitutes one of the major obstacles to the energy transition in the industrial sector. But it is not the only one.

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OBSTACLES TO CHANGE

Industrial energy efficiency is not really a key priority for energy sector stakeholders for the moment. This lack of interest affects both energy production (especially oil and gas) and the general preference for creating new production capacity.

Industrial manufacturers often produce their own energy in developing countries. The savings achieved through electrical energy efficiency only concern the fuel saved in producing that electricity. Since power plants are usually thermal and run on coal or heavy fuel oil, the fuel is generally not very expensive, meaning that the energy efficiency gains are relatively meagre in financial terms. Therefore, the main obstacle to replacing fossil fuels with carbon-free alternatives is the low cost of this fuel.

Carbon-light solutions need to be more profitable if they are to emerge. Although levying a carbon tax could help in principle, developing countries cannot afford to tax fossil fuels. Support programmes therefore need to protect new tech sectors from fluctuating oil prices, at least for a while.

The concentration of industrial activity is not always conducive to the deployment of innovative energy-saving solutions. There are numerous reasons for this: manufacturers are reluctant to use outside technologies and expertise or team up with sometimes fragile young industrial SMEs.

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In any case, to gain traction, industrial energy efficiency and carbonless fuel technologies require advocates. Certain engineering consultants who know how to identify needs and resources and are familiar with new technologies are able to advise industrial companies. But without the initial contracts that enable them to acquire useful references and the necessary skills, these prescribers are currently thin on the ground and poorly trained. At the other end of the chain, industrial firms need energy service companies (ESCO) to get these technologies up and running. ESCOs are rare outside of China and fail to capitalise to any great extent on an innovative and targeted tech offering.

Whether we are considering replacing coke by carbonless hydrogen in blast furnaces, converting flared gas into electricity, or recovering unavoidable heat¹ from cement plant stacks, deploying new technologies is a risky business. The small number of ESCOs and industrial firms themselves are not in a good position for bearing these risks on their own. Financing must be made available to enable them to bear these project-related risks and enter into long-term partnerships with new tech sector businesses, for example. This will in turn strengthen their own businesses.

FAVOURABLE CONDITIONS FOR DEVELOPING INDUSTRIAL ENERGY EFFICIENCY PROJECTS

It would appear inevitable that, for a time at least, reducing the sector's carbon footprint will require

subsidies that provide investors with a return on currently unprofitable technologies. Whether this support takes the form of feed-in tariffs, taxes, carbon tariffs or energy savings certificates, the only other alternative is regulatory restrictions – and industrial firms don't like these. Green bonds and impact funds would appear to be relatively ineffective here if they are not combined with these types of mechanisms².

Feasibility studies will also need to be funded to highlight the benefits of improved energy efficiency in certain industries in countries with a restricted energy supply. A programme to provide assistance to energy efficiency projects in industry, similar to the existing Program for Energy Efficiency in Buildings (PEEB) would provide a real boost here.

Industrial energy efficiency programmes will not happen without third-party financing³ that enables ESCOs – i.e., energy service companies – to rapidly deploy complex technologies (see Insert). We need to support the creation and funding of this type of player, otherwise it will be impossible to develop new industrial energy efficiency technologies. China is currently a pioneer in this domain: in 2017, it accounted for 58% of all global ESCO-type business, worth approximately \$US 17 billion (IEA, 2019). Europe needs to forge partnerships with China in this area to develop the competitive solutions that Southern countries so badly need.

The industrial conglomerates created over the past few decades have resulted in major groups with a global reach. They should be receptive to a global approach to managing energy consumption, particularly through partnerships that include development stakeholders like Proparco, tech SMEs, ESCOs and engineering consultants. These types of partnership combine co-financing of studies with third-party financing projects via ESCO-type entities. Through an obligation to set aside part of the resulting energy savings, they could help supply public facilities located in or around the factories in question with electricity.



Example of an energy efficiency project led in Thailand

Enertime, in partnership with the Thai company Ensys, has supplied Bangkok Glass with a thermodynamic ORC machine (Organic Rankine Cycle) that produces 1.8 MW of electricity at its Kabin Buri site in Thailand. Heat is recovered from the glass furnace to produce electricity which is then sold back to the factory at a cheaper rate compared to the grid. The project has been developed by an ESCO-type business, Bangkok Glass Energy – a subsidiary of Bangkok Glass – and rolled out by a Special purpose vehicle (SPV), and it is a perfect illustration of how to deploy highly effective industrial energy efficiency solutions. The SPV set up and funded by Bangkok Glass Energy and Ensys is also developing a solar power project that sells electricity back to the factory.

Moreover, all new investments in industrial firms, which are financed or guaranteed by bilateral agencies, need to be able to offer the best energy efficiency technologies available. No sawmill, rice mill or oil mill should be without biomass cogeneration, and no diesel power plant, incinerator or gas

compressor station should be without unavoidable he

REFERENCES

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International Energy Agency, 2019. *World Energy Outlook report.* Available online: <https://www.iea.org/reports/world-energy-outlook-2019> (consulté le 05/09/20)

CONCLUSION

So industry and climate are compatible! We should not forget that while industry is a big energy consumer, it is itself a potential source of “circular” energy. This is already the case in agribusiness for example, where rice husks, sugarcane bagasse and cotton stalks are important sources of energy that are recovered locally. In the cement, glass and natural gas transportation sectors, it is the energy recovered from the flue gas that can be converted into heat and then electricity.

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All of this potential can be harnessed if governments, international organisations, businesses, the countries concerned, their populations and NGOs work together to support energy efficiency projects. Factoring in both the needs of industry and the climate emergency will be easier if China and India participate in international partnerships to deploy innovative technologies that help to drive the indispensable energy transition. The environment is a common good and all stakeholders need to move forward in a concerted manner to protect it.

1 Unavoidable energy (or energy recovery) refers to the quantity of energy inevitably present or trapped in certain processes or products, which may sometimes be - at least partially - recovered and/or reclaimed. This energy may take diff forms (i.e., heat, cold, gas, electricity). Source: Wikipédia, Energie recovery article (consulted on 05/09/20).

2 On this topic, see the following (in French): https://www.xerficanal.com/economie/emission/Anton-Brender-Le-capitalisme-ne-s-adaptara-au-deficlimatique-que-par-la-contrainte_3748380.html (consulted on 05/09/20).

3 The concept of “third-party financing” means providing an energy retrofit offering that covers funding for the operation and subsequent project monitoring so that the owner does not have to finance anything because future energy savings gradually pay back all or part of the investment (source: <http://www.planbatimentdurable.fr/tiers-financement-r210.html> (consulted on 05/09/20)

