# Emissions associated with industrial processes and the cold chain

FRANCE INVEST

# I - Presentation of the source of emissions

**Emissions linked to industrial processes and the cold chain are those linked to their energy consumption (consumption of fossil resources, electricity, heat from heating networks, cold from cooling networks, etc.).**

**French industry represents:**

**20%**
**of national greenhouse gas emissions**

**36%**
**of national fuel consumption**
(heat is generally lost in the form of waste heat)

**The objectives of the NLCS[1] are to reduce greenhouse gas emissions by:**

**35%**
**by 2030 compared with 2015 ;**

**81%**
**by 2050 compared to 2015 ;**

[1] *National Low Carbon Strategy*

# II - Presentation of levers and best practices

Levers in **green** are easy to implement and offer significant gains in terms of GHG emissions, while the **orange** levers are more difficult to implement, but offer significant gains in GHG emissions, and finally the **blue** levers are easy to implement, but offer lower GHG emission gains.

**1. Reduce emissions from industrial processes**

1.1 Have an energy audit carried out by an expert
1.2 Replace ageing machinery with more energy-efficient machines
1.3 Implement an industrial ecology approach (recovering waste, reusing heat from one process in another, etc.)
1.4 Decarbonise energy sources
1.5 Optimise machine operation

**2. Reduce air conditioning emissions**

2.1 Replace end-of-life equipment
2.2 Implement preventive maintenance to avoid leaks and identify them as early as possible
2.3 Ventilate rather than air-condition whenever possible

# 1. Reduce emissions from industrial processes

## 1.1 HAVE AN ENERGY AUDIT CARRIED OUT BY AN EXPERT

- Carry out an energy audit in order to :
  - Identify sources of energy consumption, and possibly wastage
  - Target the most relevant levers for action to reduce consumption, losses and waste
  - Access feedback from companies involved in a similar approach
- Train employees on energy and energy efficiency issues.
- Find out about Energy Savings Certificates (CEE) to create economic value from the improvements made.

## 1.2 REPLACE AGEING MACHINERY WITH MORE ENERGY-EFFICIENT MACHINES

Renewing an ageing fleet of machines can help to:

- Reduce production losses Save energy

With the help of experts in the field, we recommend:

- Analysing machine performance
- Choosing a renewal of the machine installed base based on a lifecycle approach, including:
  - Machine manufacture
  - Machine use (energy consumed, production losses, etc.)
  - The end-of-life of machines

## 1.3 IMPLEMENT AN INDUSTRIAL ECOLOGY APPROACH (RECOVERING WASTE, REUSING HEAT FROM ONE PROCESS IN ANOTHER, ETC.)

Industrial and territorial ecology aims to :

- Pool the resources needed by manufacturers or economic players in the same region.
- Optimise productivity and the use of resources based on the principle that "one person's waste is another person's resource".

A company can :

- Find out about industrial ecology projects being developed in the region.
- Join forces with other industrial companies and economic players in the region to study the opportunities for pooling.

## 1.4 DECARBONISE ENERGY SOURCES

The objective for manufacturers is to :

- Diversify their energy mix.
- Gain independence from fossil fuels. Improve control over
- Energy Budgets

Different technologies can use different solutions :

- High temperature heat (>100°C)
  - Biomass or biogas
  - Heat recovery from other industries
  - Heat recovery from incineration plants
  - High-pressure heating network
- Low-temperature heat (<100°C)
  - Geothermal
  - Heat recovery
  - Solar thermal
- Electricity from renewable sources
  - Solar photovoltaic
  - Wind energy
  - Biomass or biogas cogeneration

### 1.5 OPTIMISE MACHINE OPERATION

- Machines can consume energy even when they are not in operation.
  - Install a master switch at the plant to disconnect all the machines.
  - Set up an automatic equipment regulation system2, to improve the energy efficiency of the process.

## 2. Reduce air conditioning emissions

### 2.1 REPLACE END-OF-LIFE EQUIPMENT

- Replace equipment that has reached the end of its useful life and/or is in poor working order, and choose a system suited to requirements.
  - Prevent refrigerant gas leaks if the appliance becomes defective.
  - Choose an efficient system that reduces energy consumption.

### 2.2 IMPLEMENT PREVENTIVE MAINTENANCE TO AVOID LEAKS AND IDENTIFY THEM AS EARLY AS POSSIBLE

- Refrigerant gases can have a global warming potential (GWP) of up to 10,900 kg CO2e/kg refrigerant gas.
  - Implementing preventive maintenance on equipment can help prevent gas leaks.
  - Proper maintenance of air conditioners ensures optimum performance and reduced energy consumption.

### 2.3 VENTILATE RATHER THAN AIR-CONDITION, WHENEVER POSSIBLE

The ADEME recommends :

- If possible, design the building to prevent heat from entering.
- Ventilate the building when it is coolest and close the windows when it is warmest outside.
- Use air conditioning sparingly (change the set temperature from 22°C to 27°C and switch on the air conditioning when the temperature rises above 30°C, not 27°C).
- Use the "free-cooling" method, the aim being that when the outside temperature is low enough, the water is cooled directly by the outside air and the chiller is switched off

[2] *A motor-regulated system saves between 25% and 40% of the energy used by the motors.*

# III - Case study

A European leader in the transformation of polymers, composites and precision metal parts, CLAYENS NP is reducing and optimising its energy consumption with the aim of reducing its carbon footprint by 4.2% per year (scope 1 and 2, by volume), in line with the objectives of the Paris Agreement. Electrification of machines (particularly presses), switch to green energy from controlled sources, ISO 50001 (energy management) certifications, LED lighting: many good practices are already in place at most of the Group's French and international sites, which plan to roll them out across the board in their five-year plan up to 2025.

Clayens is working in particular to limit Scope 2 emissions linked to its industrial processes: 70% of sites are now equipped with variable-speed air compressors, and 33% with free cooling of water. Clayens has also installed equipment to detect and optimise compressed air leaks - a crucial investment in limiting its impact, as compressed air accounts for 8% of the electricity consumed by its plants. As part of the drive towards carbon neutrality, customers are also actively supported in their search for recycled, bio-sourced materials and those with a reduced carbon footprint.

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Foodles is a fast-growing scale-up operating in the B2B2C Foodtech market. It supplies smart, connected fridges installed in the premises of medium-sized and large companies, giving employees 24/7 access to fresh, good-quality, affordable food within their buildings. Foodles has taken concrete steps to amplify its positive ecological footprint throughout the value chain. This year, Foodles' commitment has resulted in a change at the highest management level, with the move to "Mission Company" status, requiring declared social and environmental objectives, from June 2022.

Food is responsible for 25% of greenhouse gas emissions in France. Foodles aims to source responsibly and reduce its carbon footprint. Foodles has put in place a responsible purchasing charter that includes 100% French poultry, 100% sustainable fish, only seasonal fruit and vegetables, 20% organic ingredients, no added preservatives or additives, and promotes short supply chains. Foodles wants to raise awareness of the impact of animal proteins and, although they haven't completely removed them from the menu, they offer a range of vegetarian options to their customers. Vegetarian recipes now account for an average of 40% of their offer (compared with 30% in 2020). 33.33% of vegetarian meals sold represent 5.3% of the carbon weight, while 11.2% of red meat meals sold represent 33.9% of the carbon weight.

On a like-for-like basis, Foodles has reduced the carbon emissions of a meal by 22.5% between 2020 and 2021. This is thanks in particular to a 28% reduction in scopes 1 and 2 and more efficient internal logistics (-53.8% in emissions linked to deliveries). To go further and reduce the carbon footprint of meals by a further 10% by 2023, 4 initiatives have been identified: going beyond the 40% vegetarian recipes by supporting diners in new ways of eating; continuing to equip as many customers as possible with the new deposit model; reducing the impact of external deliveries with audited and certified suppliers; going below the 10% food waste mark with new actions such as daily special offers on fridges and Foodles counters.

# IV - Openness to other environmental issues

Reducing GHG emissions associated with industrial processes and the cold chain can have co-benefits on other environmental issues, including :

- **Air pollution :** Industrial processes can contribute to the deterioration of air quality. Some actions can have a co-benefit on this criterion.
- **Fossil resources and raw materials :** Improving industrial processes can save fossil resources and raw materials.

# V - To find out more

Here are a few resources for a more in-depth look at industrial processes and the cold chain :

- Ademe guide to decarbonisation
- Finance ClimAct's sectoral transition plans
- ADEME recommendations on air conditioning
- ADEME guide to energy certificates

# VI - Appendice

| Regulatory method version 5 Category | Item | GHG Protocol Scope | Category |
|---|---|---|---|
| 1. Direct GHG emissions | 1.1 Direct emissions from fixed sources of combustion | Scope 1 (direct) | Direct emissions from fixed sources of combustion |
| | 1.2 Direct emissions from mobile combustion sources | | Direct emissions from mobile combustion sources |
| | 1.3 Direct emissions from non-energy processes | | Direct emissions from physical or chemical processes |
| | 1.4 Direct fugitive emissions | | Direct fugitive emissions |
| | 1.5 Emissions from biomass (soil and forests) | | Optional information |
| 2. Indirect emissions associated with energy | 2.1 Indirect emissions from electricity consumption | Scope 2 (indirect) Generation of energy consumed | Indirect emissions linked to electricity consumption |
| | 2.2 Indirect emissions from energy consumptionother than electricity | | Indirect emissions linked to the consumption of steam, heat or refrigeration |
| 3. Indirect emissions associated with transport | Goods transport, commuting and business travel, etc. | Scope 3 (indirect) | Transport and distribution, commuting and business travel, products and services purchased, upstream leasing assets, waste generated, processing, end-of-life use and treatment of products sold, etc. |
| 4. Indirect emissions associated with products purchased | Purchasing goods and services, upstream leasing assets, waste management, etc. | | |
| 5. Indirect emissions associated with products sold | Use and end-of-life of products sold, investments, etc. | | |
| 6. Other indirect emissions | 6.1 Other indirect emissions | | |

Emissions item concerned by the sheet

Emissions item not concerned by sheet


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