# ISSUE BRIEF: CLIMATE CHANGE

## HOW DOES THE EU BEET SUGAR SECTOR CONTRIBUTE TO THE GREEN DEAL OBJECTIVES AND PREPARE FOR CARBON NEUTRALITY BY 2050?

With the publication of the European Green Deal in December 2019, the European Commission set the goal of EU carbon neutrality by 2050 and introduced a new intermediate reduction target of at least 55% for 2030[1]. Members of the EU Beet Sugar Sustainability Partnership (EUBSSP), a collaboration between sugar beet growers and sugar manufacturers, support the Green Deal's ambition to pave the way to an economy combining sustainability, circularity and innovation. This document will outline some historic milestones and future transformational issues.

### CONTINUOUSLY IMPROVING BEET GROWING

As for all agricultural crops, climate change will affect sugar beet growing in the long term. An increased likelihood of extreme weather patterns, in particular drought periods and a change in rainfall patterns over the season, will affect yields negatively and lead to an increased incidence of plant diseases.

Since the establishment of sugar beet nearly 200 years ago, continuous improvement of beet growing techniques and sugar beet varieties have been cornerstones of the European sugar beet sector. The beet sugar sectors research institutes conduct field trials, analyse the results and work towards improving growing practices, transferring knowledge and innovation to growers.

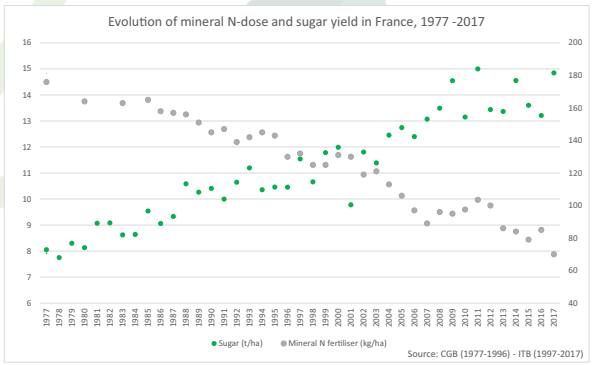
### WHERE DO BEET EMISSIONS COME FROM AND WHAT IS THE EUROPEAN BEET SECTOR DOING?

Most Greenhouse Gases (GHG), mainly $CO_2$ and $N_2O$, in beet growing result from using mineral fertilizers, natural processes in the soil (so called indirect emissions) and the use of fossil fuels to power tractors and harvesters.

A key factor in emission reduction over the last decades has been an increase in nitrogen use efficiency, as sugar beet can grow with relatively small amounts of nitrogen. To increase soil fertility and to have good nitrogen use efficiency, soil analyses to determine nutrient requirements are widely adopted among growers. Additionally, placement of fertilizers closer to the row crops has helped reduce the amount of fertilizer needed. Nitrogen use efficency will increase further with farmers using variable rate applications (VAR), based on satellite and yield maps.

FIGURE 1: EVOLUTION OF SUGAR YIELD AND N-DOSE IN FRANCE, 1977-2017

Source: French Technical Institute of Beet, ITB




### SUGAR BEET AND CARBON FARMING

The role of agriculture in mitigating GHG emissions is crutial. Therefore implementation of the new CAP from 2023 as well as carbon farming initiatives to be put in place should improve good practices further to increase carbon storage and reduction in GHG emission.

However, adapting good agricultural practices requires financial support to farmers, who should be rewarded for their actions to develop and adopt low-emission practices. In this context, certification of low-carbon farms to remunerate emission reductions and/or carbon sequestration would be a step in the right direction.

According to the study "Operationalising an EU carbon farming initiative"[2] published by the European Commission, carbon farming refers to "the management of carbon pools, flows and GHG fluxes at farm level, with the purpose of mitigating climate change

[1] 2030 climate & energy framework | Climate Action (europa.eu).

[2] Corporate author(s): COWI , Directorate-General for Climate Action (European Commission), Ecologic Institute , IEEP, available at https://op.europa.eu/en/publication-detail/-/publication/b7b20495-a73e-11eb-9585-01aa75ed71a1/language-en/format-PDF/source-search

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change. This involves the management of both land and livestock, all pools of carbon in soils, materials and vegetation plus fluxes of $CO_2$ and $CH_4$, as well as $N_2O$. It includes carbon removal from the atmosphere, avoided GHG emissions and emission reductions from ongoing agricultural practices".

EUBSSP members look forward to the Commission proposal on carbon farming and to have more clarity on modalities in certifying carbon removals based on robust and transparent carbon accounting. The cultivation of sugar beet has great potential to contribute to this new business model which can provide farmers with a new source of income and help decarbonise the EU sugar beet chain.

## CASE STUDY 1: LIFE CYCLE ASSESSMENT (LCA) STUDY ON SUGAR PLANTS

**European beet sugar production has a formidable performance in comparison to imported raw sugar. A Life Cycle Assessment (LCA) study on beet sugar, cane sugar and glucose syrup, carried out by Blonk Consultants, peer reviewed by three independent organisations (SGS Search, DSM and Milieu Centraal) and published in January 2020, concluded that the climate impact of Brazilian cane sugar is four times that of Dutch beet sugar, while the climate impact of Indian cane sugar is 37% higher than that of Dutch beet sugar.**


## IN THE FACTORY

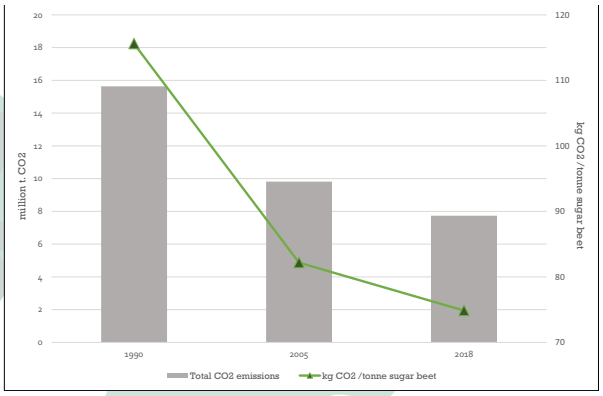
Energy is used throughout sugar manufacturing to extract the sugar from the beets during the diffusion process, during evaporation and crystallisation. The drying of beet pulp also requires a significant amount of energy.

Energy use is optimized by using combined heat and power (CHP) systems and heat recovery in sugar factories. Steam and electricity are both used in the sugar production process. High pressure steam drives a turbine and generator to produce electricity needed to power the factory. The low-preassure steam originating from the exhaust leaves the turbine only to be used to heat the sugar juice throughout the process (i.e. evaporation, crystallisation). Furthermore, that steam is used several times in the process through multi-effect evaporation.

The beet sugar manufacturing industry has reduced emissions by 51% compared to 1990 levels. However, to reach carbon neutrality by 2050, more efforts still need to be made and adequate legal and financial tools are needed to support this transition.

FIGURE 2: EVOLUTION OF $CO_2$ EMISSIONS PER TONNE OF SUGAR IN CENTRAL AND NORTHERN EUROPE

Source: Confidential survey among CEFS members (led by PwC)




## REDUCING IMPACTS, IMPROVING PERFORMANCE

The transformation away from fossil fuels in beet sugar factories has already started. Renewable biogas from on-site wastewater treatment or fermentation to power operations is already in place in some factories. The biogas generated in the anaerobic wastewater treatment plants is burned in the boilers and driers, thus reducing the use of fossil fuels and in turn GHG emissions. Additionally, EU beet sugar manufacturers are already producing biogas from beet tops and tails, to meet part of their energy requirements. They also supply growers with biogas digestate, which can be used as fertiliser.

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### CASE STUDY 2: BIOGAS

**HUNGARY: Since 2007, AGRANA's sugar factory situated in Kaposvár (Hungary) has been extracting biogas from processed sugar beet cossettes. With a volume of 23 m³ in the 2019|20 financial year, this factory covered around 73% of its own primary energy requirements during the sugar beet processing campaign and was therefore able to produce sugar largely self-sufficiently in terms of energy. In 2019, AGRANA's green gas covered the heating requirements of around 2,050 households.**

**NETHERLANDS: Cosun Beet Company is one of the largest producers of green gas in the Netherlands. Since 2018, over 25 million m³ of green gas have been produced annually, which then goes to the grid but is also partially used in Cosun's own beet processing.**

The use of biomass and of beet for biofuel (notably bioethanol, which is produced from sugar beet in 4 EU Member-States from a beet area representing around 8% of the EU's total beet area) production, the production of biogas from organic materials (including beet and beet residues) and the conversion of agricultural renewable materials into biochemicals play an important role in shifting the current fossil-based economy towards a green, circular and biobased economy - and therefore needs to be supported and stimulated in every way possible.

Substitution of fossil fuels in beet processing is possible and can be reached by 2050 at the latest. To be faster in the move towards the use of renewable energy, the higher investment and operational costs need adequate policy support and a framework for rewards.

Substitution of fossil fuels in beet processing will only be possible with:

- environmental policies that are coherent and consistent at international level,
- access to affordable, renewable energy and investments in rural energy infrastructure,
- investment aids that take into account the seasonality andenergy intensity of the sector's activity.

In order to prevent carbon leakage, rules should be adapted for our sector, which lies at the heart of European rural communities.

### SUGAR MANUFACTURERS ENGAGEMENT TOWARDS CLIMATE NEUTRALITY AND SUSTAINABILITY

Science Based Target initiative (SBTi)

Cristal Union and Nordzucker AG have committed to the Science Based Target Initiative, to place their emission reduction in line with the Paris Climate Agreement.
This decision concerns greenhouse gas emissions relating to direct energy from own process energy (Scope 1), purchased energy (Scope 2) and emissions of all contributing factors (Scope 3) such as agricultural, transport, purchase of packaging materials and other contributing emissions.

Carbon Disclosure Project (CDP)

Several beet sugar manufacturers joined the CDP and provide transparent information on challenges and opportunities arising from climate change, aiming to build more trust through transparency and to respond to the rising environmental concerns of customers, consumers and investors.

Tereos and SUEZ partnership

Announced on 29 March 2021, this partnership aims at reducing gas consumption in Origny-Sainte-Benoîte distillery, in the Aisne region. This project is based on the supply by SUEZ of renewable and recovered energy in the form of steam produced from solid recovered fuels (SRF). Through this project, SUEZ will support Tereos in the energy transition of the site and will promote the development of a circular economy with a local loop. This should provide direct jobs (+ 50 units for the creation and valorisation of the chain) and support competitiveness in the region. It will offer the production of alternative thermal energy, delivered in the form of steam, covering nearly 40% of the site's energy needs.

### MORE INFORMATION

See Good Practices

**Part A – Beet Cultivation:**
6. Emissions
   6.1 Energy efficiency
   6.2 Protecting carbon sinks

**Part B – Processing:**
4. Energy use
   4.1 Energy efficiency
   4.2 Reduced carbon emissions