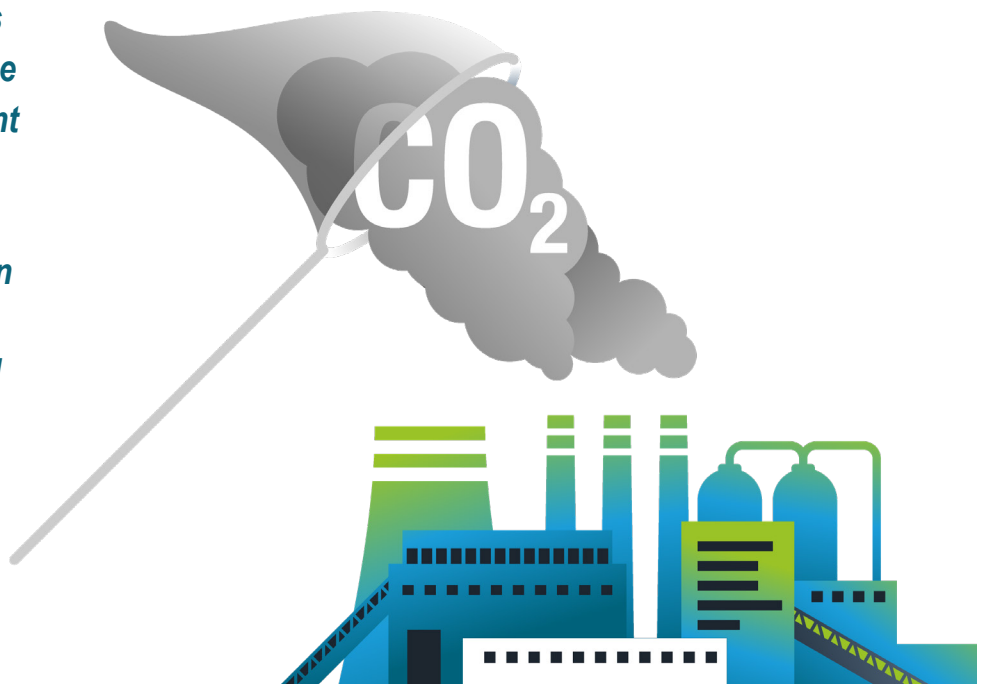


# TWENCE MAKES SUSTAINABLE ENERGY EVEN MORE SUSTAINABLE THROUGH CO<sub>2</sub> CAPTURE



*CO<sub>2</sub> is a greenhouse gas. CO<sub>2</sub> from fossil fuels, along with other greenhouse gases, is causing climate change: the earth is heating up. We want to reduce this worldwide. By capturing CO<sub>2</sub>, Twence contributes to the reduction of CO<sub>2</sub> emissions in the waste to energy sector and to making the region more sustainable.*





# Twence®

## About Twence

More than ever before, it is clear that the key to a better future lies in a sustainable world. This world is the world of Twence. Twence knows like no other how to create sustainable solutions for complex issues such as climate change, shortages of raw materials, and fossil fuels. Twence recovers raw materials from waste, and produces heat, steam, and electricity. With advanced technology and ground-breaking projects, Twence contributes to the developments our world needs. As a public organisation, Twence focuses on the region and is convinced that cooperation is essential to make the region more sustainable. Together with municipalities, companies, and educational institutions. Twence uses knowledge and expertise to convert opportunities into sustainable solutions. By connecting and encouraging, they encourage others to also contribute to a sustainable region.



## Energy and raw materials transition

Our society is on the eve of an energy and raw materials transition. Energy will have to be generated almost completely sustainably. Raw materials will have to be used sparingly and reused as much as possible. In the Paris Climate Agreement of 2015, far-reaching targets were formulated to limit global warming. These have been subsequently translated into national targets. Compared to 1990, the Netherlands has set itself the target of reducing CO<sub>2</sub> emissions by 49% by 2030 and by 95% by 2050. Under the current climate agreement, the waste to energy sector, of which Twence is part, has the obligation to reduce CO<sub>2</sub> emissions by 1.1 million tonnes per year.



## Climate impact

Every tonne (which amounts to 1,000 kg CO<sub>2</sub>) captured sustainably instead of being released into the atmosphere has an impact comparable to planting 31 to 46 trees. Trees remove CO<sub>2</sub> from the air and transform it through photosynthesis into oxygen and plant material. Photosynthesis is the process by which plants convert water and carbon dioxide into glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>) and oxygen under the influence of sunlight<sup>1</sup>.

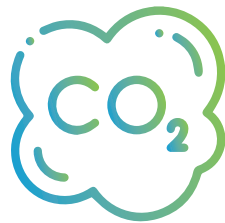
## Sources

<sup>1</sup> <https://www.encon.be/nl-BE/berekening-co2-compensatie-bomen>



## Waste is a source of energy

Twence tries to recycle waste as much as possible. But there is always some waste and business waste left that cannot be recycled and that is processed in the Waste Energy Plant (WEP). Twence mostly generates energy from this. Twence is the largest producer of sustainable energy in Overijssel. Twence produces 502 GWh of sustainable heat and 290 GWh of sustainable electricity annually. That is enough to supply 65,600 households with heat and 150,000 households with electricity for a year. What used to be regarded as waste is now a source of energy.



## Generation of CO<sub>2</sub> from waste

But what actually is the relationship between CO<sub>2</sub> and waste? During the combustion process in the WEP, flue gases are generated. Flue gases contain CO<sub>2</sub>. This CO<sub>2</sub> is extracted from the flue gases in three stages. During the first stage, the flue gases are cooled together with the CO<sub>2</sub>. In the second stage, the CO<sub>2</sub> is absorbed from the flue gases using solvent. The flue gases without CO<sub>2</sub> are returned to the WEP. In the third stage, the flue gases with CO<sub>2</sub> are separated as pure gas from the solvent by boiling it with residual heat from the WEP. However, in order to transport it, the CO<sub>2</sub> must be liquid.



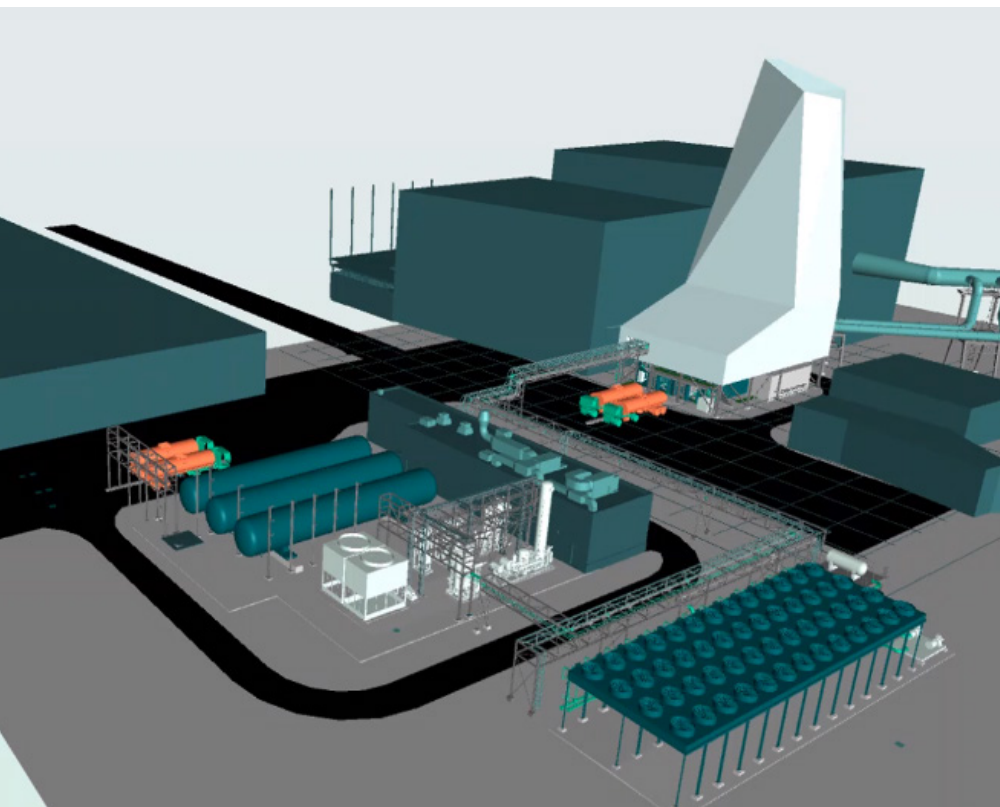
## Under pressure, everything liquefies

The gaseous CO<sub>2</sub> is captured, dried, further purified and liquefied by pressurising and cooling it. The CO<sub>2</sub> is then stored for subsequent transportation to the end user.



## Closing loops

Residual waste is not only a source of energy. As demonstrated, Twence also extract raw materials such as liquid CO<sub>2</sub> to make greenhouse farming more sustainable. And so this closes the loop and makes Twence sustainable energy even more sustainable. This enables Twence to make a great contribution to the circular economy.



## Capturing 100,000 tonnes of CO<sub>2</sub>

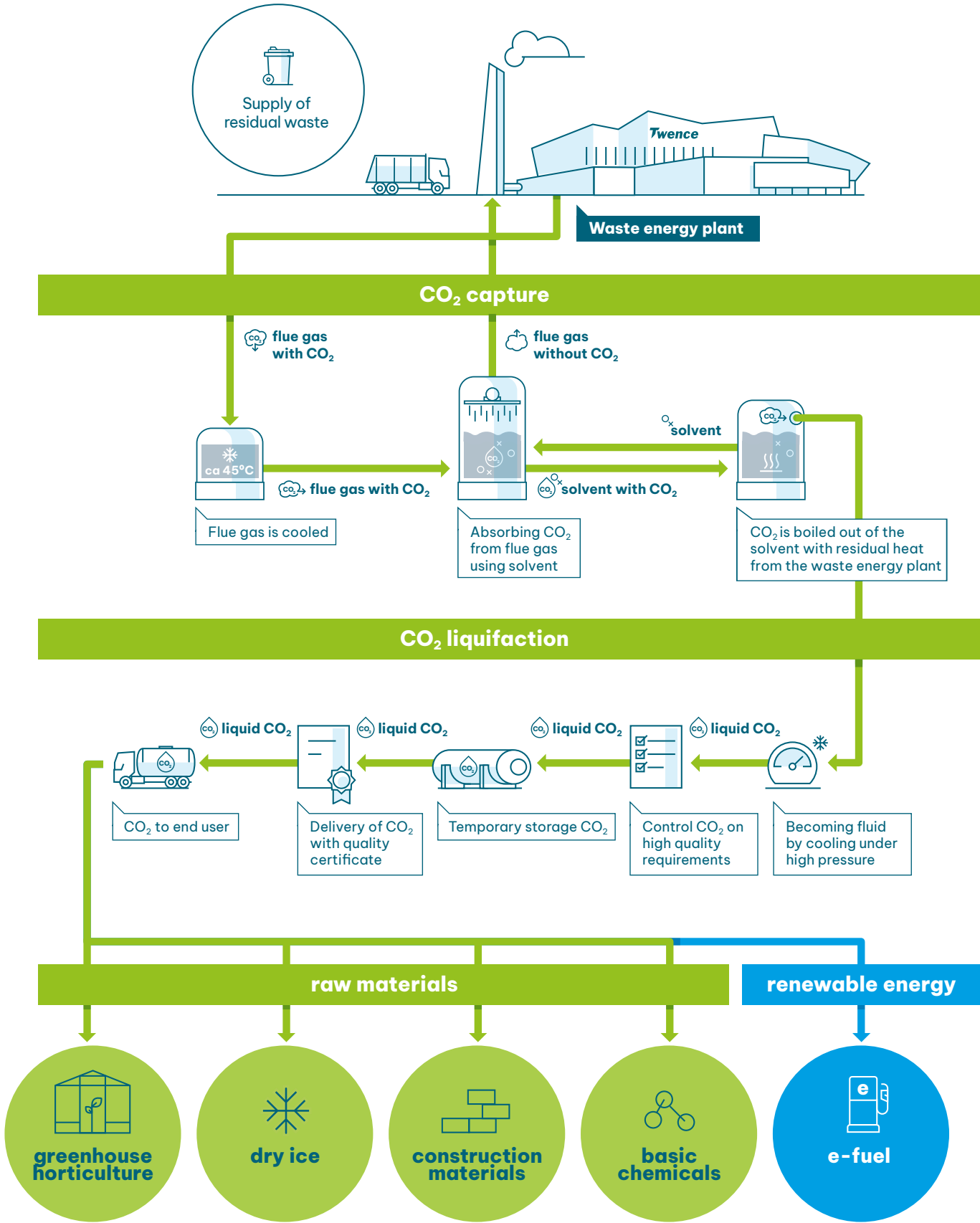
Twence is currently constructing a large-scale CO<sub>2</sub> capture plant that will be able to capture up to 100,000 tonnes of CO<sub>2</sub> per annum. The plant is expected to be operational by the end of 2023. ■

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# Process CO<sub>2</sub> capture



Would you like to know more? Please visit our website: <https://www.twence.com/projects/large-scale-co2-capture>