AVERY DENNISON | Performance Tapes

FAQs

What are we celebrating today?
Today, we are celebrating the successful commissioning of Europe's largest Concentrated Solar Thermal (CST) platform and Thermal Storage unit at the Avery Dennison production plant in Turnhout, Belgium.

The project contains a Concentrated Solar Thermal platform with 2,240 surface mirrors, with a solar field peak yield of 2.7 GWh thermal power, and six Thermal Storage modules with a capacity of 5 MWh thermal power. The installation is able to cover approximately 10% of the total heat demand on site as it is configured today, with 70% provided by the solar field, and 30%provided by the thermal battery.

Who was involved?
For this project, Avery Dennison partnered with:

- Azteq, an organization that builds, develops, and maintains CST facilities,
- Campina Energie: the local community group,
- ENERGYNEST, a long-duration Thermal Energy Storage (TES) provider.

Has there been community involvement?
Tackling climate change requires collaboration and partnership at all levels of society. We saw tremendous community support from Campina Energie, which is engaged in green energy projects and represents more than 1,000 Turnhout residents aiming to make the community carbon neutral by 2050. Campina Energie helped support some of the project's financing.

How large is the installation?
The installation covers a roughly 5,540 square meter area on site and will contain the largest installation of parabolic mirrors with a total of 2,240 surface mirrors combined with thermal energy storage in an industrial setting in Europe.

The platform contains a 5 MWh Thermal Storage platform. Is this the first-ever commercial scale long-duration energy storage?
Yes, it is the largest Thermal Energy Storage installation currently under operation in Europe.

How long did the project take to construct?

Construction began on the renewable energy platform in July 2021 and was commissioned in late August 2023. It is now the largest of its type in an industrial setting in Europe.

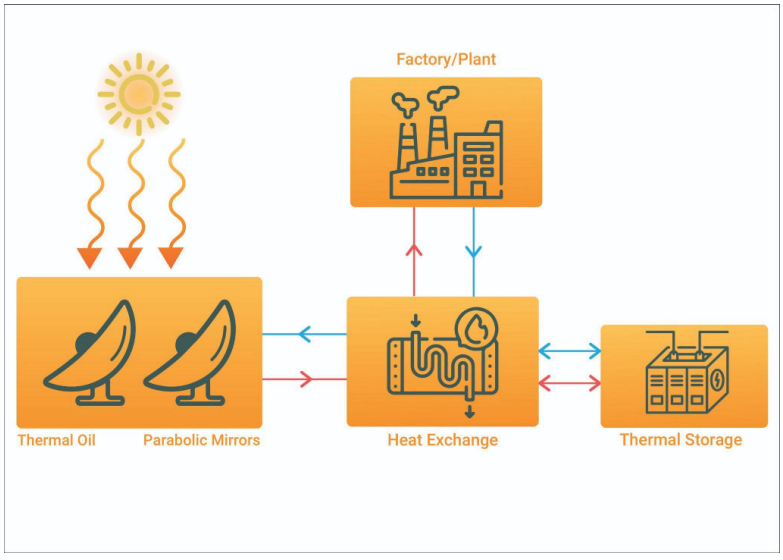
Briefly, how does the project work?

The CST platform will concentrate energy from direct sunlight into a collector tube filled with absorption liquid, in this case thermal oil. In operation, the high-temperature parabolic mirrors concentrate solar irradiation on a collector tube in the focal line. In the collector tube, the thermal oil is heated up to 400 C+ (752 F).

Thermal energy from this process will be stored in ENERGYNEST's ThermalBattery™ via an integration into the thermal oil loop and dispatched on demand as secure, green heat. When coupled with the six battery modules, the CST platform produces and dispatches high-temperature thermal energy day and night.

The solar field, thermal storage and heat distribution system of the Avery Dennison production facility is all connected by the Balance of Plant (BoP) by AURA GmbH & Co. KG, referring to the "Heat Exchange" in the below graphic. It is used for heat shifting between the heat sources and heat sinks.

The solar field provides 70% of the total heat demand, the thermal battery provides the other 30% to supply production on site 24/7 on demand.



Infographic: Concentrated Solar Thermal (CST) platform and Thermal Storage unit together with BoP ("heat exchange") at Avery Dennison factory.

How will this technology be used at the Avery Dennison Turnhout manufacturing facility?
The new renewable Avery Dennison Performance Tapes energy source at Turnhout will supply carbon-free renewable solar energy to partially run the drying ovens on production lines used in the coating process of pressure-sensitive adhesive products manufactured at the site. These products are used in industries such as automotive, building and construction, medical devices and personal care.

What are the expected impacts of the project?
The total installation will provide heat equivalent to 2.3 GWh of gas consumption, reducing the plant's greenhouse gas emissions by an average of 9% annually – compared to current rates. During summer months and high-sunshine periods, it will provide up to 100% of the heat demand to the factory. We project around 500 tonnes of CO2 equivalent to greenhouse gas emissions of 100 cars to be saved per year. *Please note: these are the projected results and savings that will most likely be surpassed by live-run numbers with the now-starting operation. We will provide more statistics after the CST and Thermal Storage platform have run for a few months.*

How does the project fit into the company's climate goals?
The CST installation follows the Avery Dennison Performance Tapes 2017 windmill installation at Turnhout and focuses on moving forward with sustainable practices for its operations. It is one of the largest CST technology installations including a Thermal Storage unit in Europe.

In 2015, we established a goal to reduce our absolute GHG emissions by 3% year-over-year, and by at least 26% compared to our 2015 baseline, by 2025. We exceeded that goal within five years of setting it, cutting emissions by approximately 42% compared to the 2015 baseline in YE 2020. We are confident that we can continue to make substantial progress, and have codified that expectation in our 2030 sustainability goals.

By 2030, we plan to reduce our Scope 1 and 2 GHG emissions by 70% from our 2015 baseline, and to work with our supply chain to reduce our Scope 3 GHG emissions by 30% from our 2018 baseline. Our ambition is to achieve net zero emissions by 2050. We intend to reach these goals by creating more sustainable products and processes, and by collaborating with customers, suppliers, and other stakeholders. This includes specific programs on increasing energy efficiency and sourcing renewable energy.

Why should we care about decarbonizing industrial heat?
Industry is responsible for about 40% of global greenhouse gas emissions, of which industrial heat is the single largest source – that is 12 billion tonnes of CO2 every year. To reach our net zero goals, one of our focus areas is decarbonising industrial processes that require extreme heat. This installation allows us to generate, store and dispatch heat on demand.

Will the project be a permanent feature of the company's manufacturing facility?
With running 24/7 in operation, the renewable energy platform will be a permanent installation at the Avery Dennison Performance Tapes production site in Turnhout. It also has an expected lifetime of >25 years without efficiency losses.

What is Concentrated Solar Thermal (CST) Energy Generation Technology?
CST is a source of carbon-free, renewable thermal energy. In industrial environments, it can be used to heat hot water, steam and thermal oil. Concentration of sun radiation is a sustainable alternative for the production of thermal energy up to 400 °C used for industrial processes. It also offers an environmentally-friendly source for cities in need of ecological district heating solutions.

What is thermal energy storage?
Thermal energy storage (TES) systems can store heat to be used later, under varying conditions in temperature, place or power. Thermal energy storage can help to balance energy demand and supply on a daily, weekly and even seasonal basis, presented in thermal systems. It can also reduce peak demand, energy consumption, CO2 emissions and costs while also increasing the overall efficiency of energy systems.

What is a Balance of Plant (BoP)?
The Balance of Plant (BoP) is an engineering term which refers to the various components which are required for the system to produce energy. With the right choice of auxiliary electrical and mechanical systems, it is possible to optimize the efficiency and reliability of industrial power plants. BoP engineering significantly reduces operational downtime, translating into enhanced productivity and bottom-line.

Why are there sheep grazing under the mirror installations?
Together with our local Turnhout community, Avery Dennison will have sheep instead of lawnmowers for grazing the fields and grass beyond the mirror installation. Sheep do a better job supporting biodiversity than a conventional mower. The so-called "solar grazing" is a common practice as part of "agrivoltaics" and is already used for solar and PV installations. It causes no harm to the animals. (Agrivoltaics is defined as the dual use of land for solar power and agriculture, as a way for both industries to utilize the same ground.