

What is the real cost of dehumidification?

Published by SOCIETE TECHNOLOGIQUE D'ECHANGEURS MEMBRANAIRES (STEM), June 2025



Some industries must comply with strict instructions in terms of air humidity. Whether in a refrigerated processing workshop, a pharmaceutical cleanroom or a powder production line, excess moisture can lead to serious consequences: condensation, icing, microbial growth, deterioration of product quality and risks of non-compliance.

The solution is known: integrate dehumidification equipment into the entire Air Handling Unit (AHU). But there are many configurations and the problem of total cost - between energy consumption, technological obsolescence and climate impact - is not to be underestimated. It deserves serious analysis.

For this article, we have selected two industrial sites, which we have already analysed in a previous publication ([What is the impact of global warming on your dehumidification installations?](#)) where we already showed that energy consumption can increase by around 50%, in direct connection with climate change. The rise in absolute humidity overloads the equipment, which is often undersized for these new conditions. The strict instructions are no longer respected.

The question therefore arises: with rising and sometimes volatile electricity prices, should you reassess your dehumidification systems?

The figures of two concrete examples

Pharmaceutical Industry in the South-West

In our previous article, we confirmed that in this region, absolute humidity has increased by 25% over the period 2001/2024. As a result, the increase in energy consumption is around 50%.

The industrial site is now equipped with a desiccant wheel, a technology historically used to achieve very low humidity levels. With an average electricity price of around €150/MWh, the annual energy cost is €59.9K.

Manufacture of frozen food products in Brittany

In this region, which is known to be humid, absolute humidity has increased by 12% since 2015.

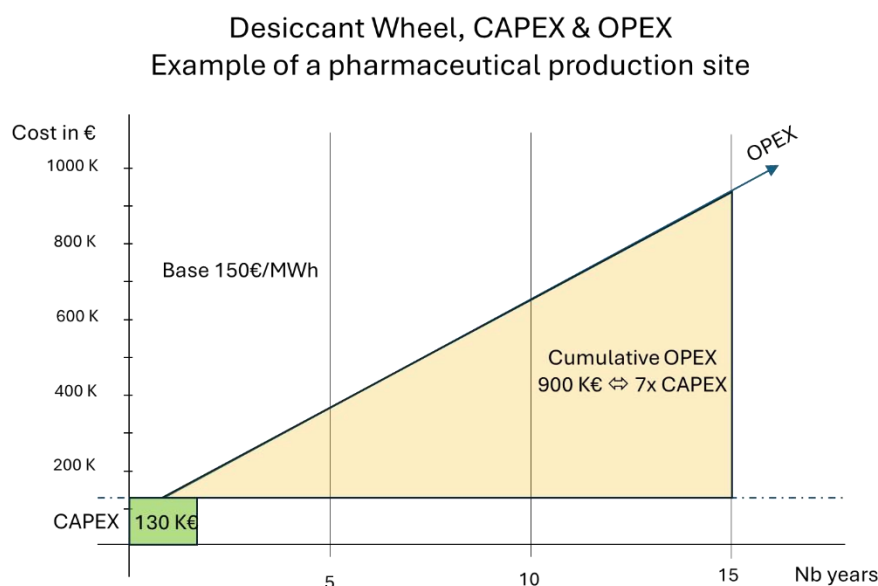
This increase seems measured, but it has serious consequences for a site working at sub-zero temperatures. The plant is equipped with two desiccant wheels and consumption due to the need for dehumidification has increased by nearly 48% in 10 years to reach 105.9 K€ per year!

CAPEX vs OPEX: the balance is broken

Both sites are equipped with desiccant wheels, a mature technology, well mastered and offered by many players on the market. Purchase costs (CAPEX) are relatively stable.

This is not the case for electricity: we have observed very strong variations in recent years.

In the case of the pharmaceutical site, over a 15-year period, **energy expenditure represents more than 85% of the total CAPEX + OPEX.**



The solution to reduce expenses: NEODRY®

Faced with this observation, several actors have undertaken research efforts. This work has led to an innovation led by **STEM** (stem-tech.fr), a spin-off of the Mines Paris PSL laboratory: **NEODRY®**.

This technology is based on the use of **membranes that are permeable to water vapour**, and a **saline solution** (CaCl₂) that captures moisture without the need for high regeneration temperatures.

The water vapour contained in the air passes through the membranes and is captured by the desiccant solution circulating behind it. In contrast to desiccant wheels, no intense heating is required for regeneration, which drastically reduces energy consumption.

Reading [the NEODRY®](#) presentation will allow you to learn more about the technology implemented in this solution.

Why does NEODRY® consume up to 75% less energy?

- No energy-intensive regeneration: the saline solution is regenerated at low temperatures (30–40 °C)
- Reduced pressure drop: the tangential air circulation reduces the ventilation energy.
- Cooling of dehumidified air possible without additional energy costs.

Financial Comparison: NEODRY® vs Desiccant Wheel

On the two cases selected in paragraph 1, we were able to calculate the potential savings. Based on an average electricity price of €150/MWh, the results are very convincing.

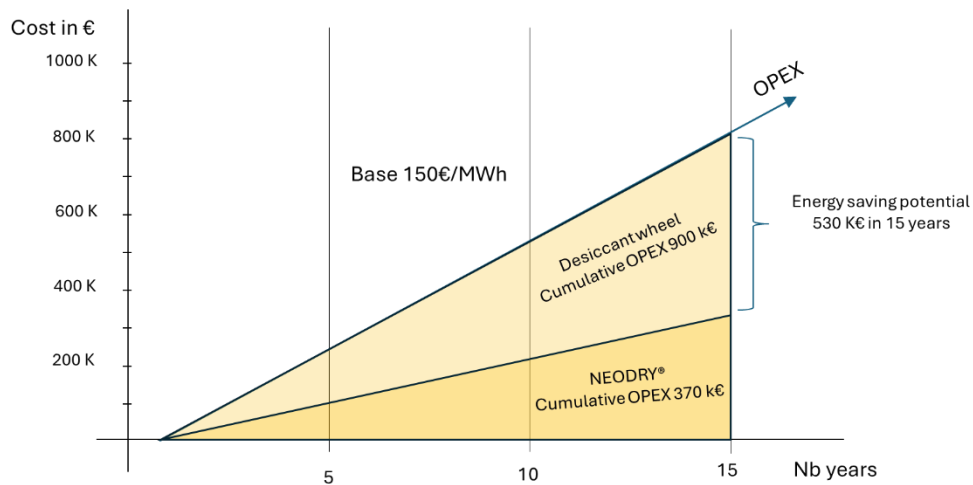
Pharmaceutical industry (South-West)

- Current cost (desiccant wheel): 59.9 k€/year
 - Estimated cost with NEODRY®: 24.4 k€/year
 - Savings over 15 years: €532.5k
 - Additional NEODRY® investment cost: 107 k€
- ✓ Every euro invested in NEODRY® generates 5 euros in savings.

Frozen products (Brittany)

- Current cost: €105.9k/year
 - Cost with NEODRY®: 34.2 k€/year
 - Savings over 15 years: €1,075k
 - Additional NEODRY® cost: 122 k€
- ✓ Every euro invested in NEODRY® generates 9 euros in savings.

Savings potential with the NEODRY® dehumidification solution Example of a pharmaceutical production site



Conclusion

Global warming is making many dehumidification plants designed more than ten years ago undersized and obsolete. As [our study has shown](#), the increase in absolute humidity leads to an increase in electricity consumption throughout France.

With **NEODRY®**, manufacturers now have an available, proven and efficient solution, capable of reducing consumption by up to **75%** depending on the configuration.

The real cost of dehumidification no longer lies in its initial investment. It's time to reconsider your facilities, not only to save money, but also to protect yourself against future climate and energy constraints.