

# Cryogenic Cold Energy Recovery System

Your Partner in Decarbonization

## We deliver:

- Energy savings of up to 25kWh
- CO<sub>2</sub> footprint reduction up to 89 tonnes per annum
- Icing and fogging risk reduction
- Significant contribution to ISO certifications



## The Right Solution for Your Cooling System

**ECO-CHILLER** is a cryogenic cold energy recovery system, developed by Air Liquide to improve the efficiency of your cooling process. The system works by recycling the cold energy released during the vaporisation of liquid industrial gas and feeding it to your cooling water network. The pre-cooled water thus relieves your cooling.

**ECO-CHILLER** is best suited for liquid industrial gas consumption starting from 100 Nm<sup>3</sup>/hr.

## The Nexelia™ Solution

Air Liquide offers a range of solutions under its unique umbrella brand, Nexelia™. **ECO-CHILLER** is a part of the Nexelia™ for Cooling Systems solution, which combines the best of Air Liquide's gases, application technologies, and expert support to meet the specific needs of your cooling system. As with all solutions under the Nexelia™ label, we work closely with you to pre-define a concrete set of results, and we commit to delivering them.

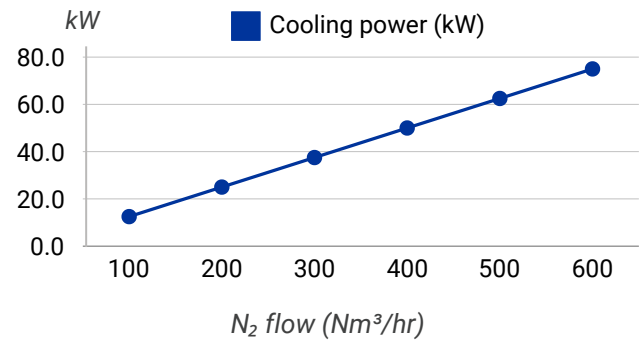
## Applicable Industries

Any Industry that requires cooling down of process water and uses vaporised liquid industrial gas such as Nitrogen, Oxygen or Argon and Carbon Dioxide.



## Your Advantages

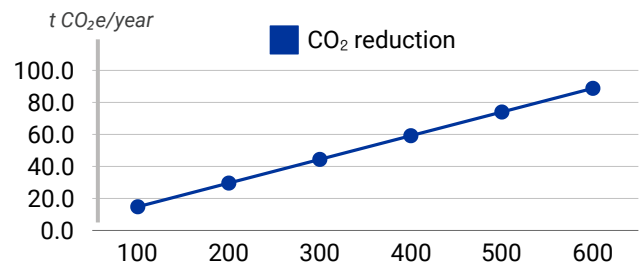
### Recovery of Cold Energy



### CO<sub>2</sub> Footprint Reduction and Contribution to ISO Certifications

The decrease in electrical energy consumption in your cooling system could contribute to reduced Scope 2 emissions for up to 89 tonnes of CO<sub>2</sub> per year and help you achieve ISO 50001 and ISO 14001 certifications.

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**Remark:** The CO<sub>2</sub> footprint displayed in this chart is based on Singapore's published carbon intensity of electricity generation of 0.4057 kg CO<sub>2</sub>/kWh. For other countries, please verify the appropriate CO<sub>2</sub> factor before using this chart.

### Icing and Fogging Risk Reduction

Thanks to the temperature controlled operation, you are able to rely on a more constant gas supply temperature. Icing and fog formation related to vaporisation of liquid industrial gas would also reduce, hence improving your operational reliability.

### Flexibility to Upgrade Capacity

Air Liquide's modular **ECO-CHILLER** gives you the flexibility to upgrade to a higher capacity should your gas usage grow.

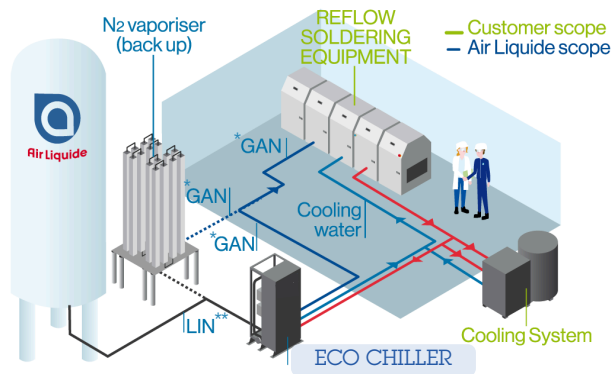
## How It Works

Liquid industrial gas from the liquid storage tank goes through insulated cryogenic piping into the **ECO-CHILLER**. The warm water from your process is then cooled down by the liquid industrial gas via heat exchange that takes place within the **ECO-CHILLER**.

For optimal operational safety, there is an automated switch function in case of:

- Insufficient water flow rate
- Insufficient water temperature
- Insufficient gas temperature

In these situations, the **ECO-CHILLER** is bypassed and the liquid industrial gas is directed straight to the ambient vaporiser to be converted into gas phase for process use.



### Note:

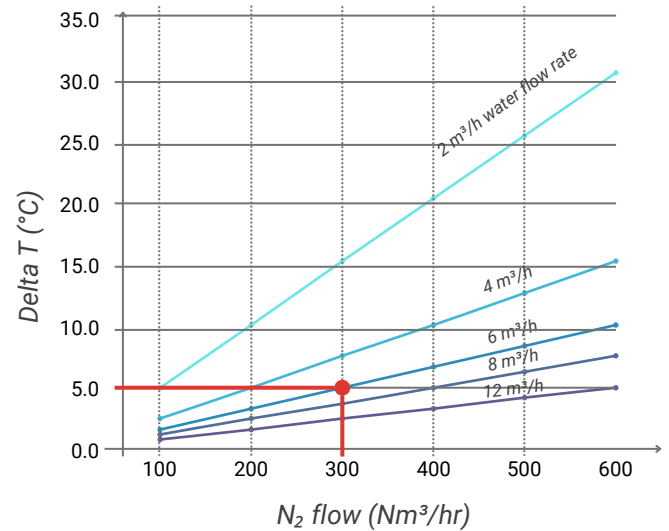
- \* GAN = Gaseous Nitrogen
- \*\* LIN = Liquid Nitrogen

## Standard Models

ECO-CHILLER	100	300	600
Flow Rate (Nm <sup>3</sup> /h)	100	300	600
Weight (kg)	300	500	700
Length (m)	2.8		
Depth (m)	2.2		
Height (m)	1.9		

**Note:** Estimated weight to be validated based on actual requirement. Customisation is also available based on actual gas consumption.

## ECO CHILLER Performance



## How to calculate the water temperature outlet

For example:

- If the N<sub>2</sub> flow rate is 300 Nm<sup>3</sup>/hr and the water flow rate is 6 m<sup>3</sup>/hr, you can refer to the chart to find the corresponding  $\Delta T$  (temperature difference), which is approximately 5°C.
- If the water inlet temperature is 15°C, the water outlet temperature can be calculated as:

$$\text{Water outlet temp} = \text{Water inlet temp} - \Delta T \\ = 15^\circ\text{C} - 5^\circ\text{C} = 10^\circ\text{C}.$$

Remark:

- This chart is based on the estimated **ECO CHILLER** performance at 90% and Pure water (0% glycol content).
- For other conditions, please contact your Air Liquide representative.

## Customer Testimonial

“With the ECO CHILLER, we drastically reduced our energy consumption through cold energy recovery... and by doing so, we reduced our carbon footprint while also generating significant savings.”

Full video here:



Charles GUYOT, La Licorne, Brewerie  
Process and Continuous Improvement Engineer

## Contact us

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