

Med *Clean* *Propre* *Limpio*



Regional Activity Centre
for Cleaner Production



Generalitat de Catalunya
Government of Catalonia
Department of the Environment
and Housing

No. 99

Pollution prevention case studies

Tuning of chilled water production

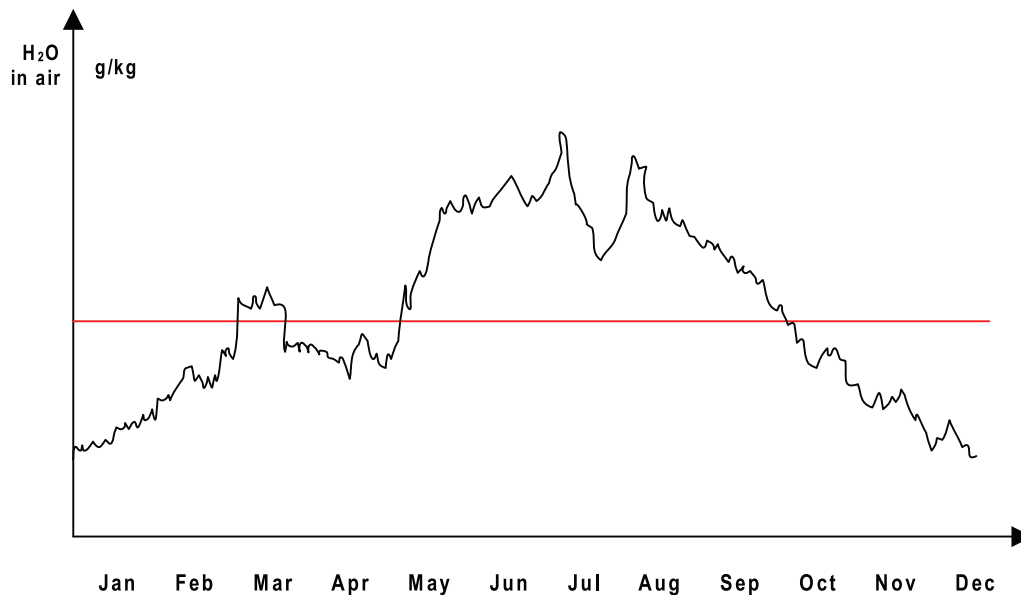
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|-------------------------------------|---|
| Company | STMicroelectronics srl - Catania Site. |
| Industrial sector | Semiconductor manufacturing. |
| Environmental considerations | During the manufacturing processes electronics circuits are reproduced on silicon wafers in a microscopic scale. For this reason the operations are performed in a special environment called "Clean Room"; in this enclosed area a strict control on temperature, airborne particles, humidity and pressure is required, using chilled water at 5°C mainly for dehumidification of the clean room air. |
| Background | <p>STMicroelectronics was created in 1987 by the merger of SGS Microelettronica of Italy and Thomson Semiconducteurs of France. Since 1999, it has been one of the world's Top Ten semiconductor suppliers. Their commitment to environmental responsibility has resulted in substantial reductions over the years in the consumption of energy, water, hazardous chemicals, increased recycling of waste products and a significant cut in greenhouse-gas emissions.</p> <p>Catania semiconductor historically managed three different cooling water flows at different temperature:</p> <ul style="list-style-type: none"> · Chilled water (CHW) 5°C. · Cooling coil water (CCW) 13°C. · Process cooling water (PCW) 18°C. <p>Usually a single chilled water plant produces CHW at 5°C with a standard COP (coefficient of performance) of 4.5. The other cooling water flows are then produced using heat exchangers.</p> |
| Summary of actions | <p>During the winter (Catania weather conditions change seasonally), the external air humidity is lower and this drops the humidity set point of the clean room.</p> <p>For this reason, the dehumidification process is not required and the production of CHW 5°C can be halted.</p> <p>The set point of the chilled water plant can be adjusted (rising to 13/15°C) and this allows an increase of the COP and the reduction of the electric energy consumption.</p> <p>To avoid the manual set point adjustment (seasonal) and progress further in the improvement of the chilled water plant, the company decided to install an automatic system for the set point adjustment, based on weather conditions:</p> |

Diagrams or photos

Catania site



Air humidity yearly trend (typical for south Italy)



Balances

Energy savings

720,000 kWh/y

Total annual saving

50,000 €/year

Investment in installations

Automatic system for set point adjustment

€46,000

Payback period

About 11 months

Conclusions

This project gave its contribution to a wider energy saving program launched in ST Catania site. Thanks to this program during the last five years the energy consumption of the Catania installation has remained fairly steady (240,000 MWh) despite the production volume having increased.

NOTE: This case study seeks only to illustrate a pollution prevention example and should not be taken as a general recommendation.

Case study presented by:

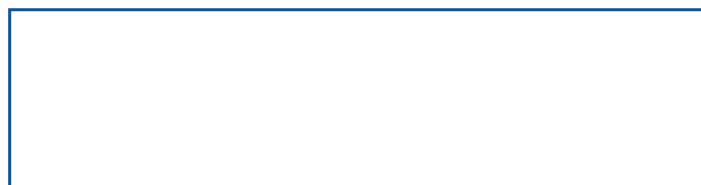
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