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PLANENER : A DECISION-MAKING TOOL FOR OPTIMAL MANAGEMENT OF HEAT ANT POWER COGENERATION PLANTS

PlanEner : un outil d'aide à la décision pour le pilotage optimal des centrales de cogénération Chaleur/Electricité

In a context of sustainable development and increasing global energy consumption, the research focuses on renewable energy sources. However, fossil fuels will remain the main source of energy for many years to come. Representative in France 20 % of the total energy consumption, industry has a major role to play in this context by improving its energy efficiency. In an industrial site, the production of utilities (steam, electricity,...) represents one third of total energy consumption. Cogeneration is a system that improves the energy efficiency of an industrial site while reducing greenhouse gas emissions. Indeed, cogeneration consists in simultaneously producing electricity and hot utilities (steam, hot water) from the same primary energy and within the same installation. Following the liberalisation of the energy market, cogeneration plants have become both interesting contributors to electricity production and a significant source of profit. However, these new challenges have made the management of these facilities noticeably more complex. While satisfying its own technical constraints, the cogeneration plant must be able to optimize its production plan and also benefit from the opportunities of the electricity produced.

The objective of the thesis is to develop a decision support tool dedicated to the management of cogeneration plants that aims to:
 • Solve planning problems by integrating production, technical and environmental constraints
 • Integrate into these plans the opportunities for electrical valorization
 • Define different modeling scopes to manage long-term, short-term plans and near-real-time decisions

The tool will be implemented in several industrial case studies.