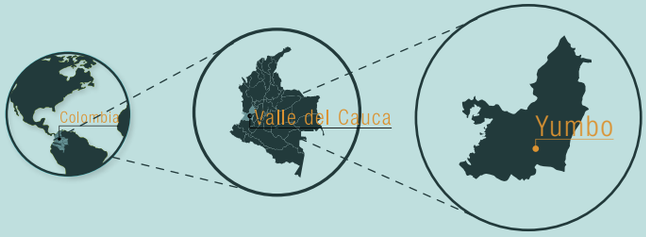
TECHNICAL AND FINANCIAL FEASIBILITY ANALYSIS OF AN ENERGY DISTRICT PROJECT

FOR THE INDUSTRIAL FACILITIES OF ALDOR-PLASTICEL IN YUMBO, COLOMBIA

DISTRITOS TÉRMICOS
COLOMBIA



BASELINE SCENARIO / GENERAL DESCRIPTION

Currently, the industries Aldor and Plasticel, immediate neighbors, operate independently from each other, with similar and in some cases complementary operating schedules.
The Aldor plant requires 808 TR of cooling, supplied by cooling systems that are halfway through its useful life and offers an average efficiency of 1.3 kW/TR. The Plasticel plastic manufacturing plant has cooling production equipment nearing obsolescence, providing 320 TR of capacity with an efficiency of 1.4 kW/TR. Finally, a third user (Lloreda Grasas Industry) consumes 480 TR for process cooling with an efficiency of 1.6 kW/TR.

The aggregated energy consumption is estimated at 19,266 MWh/year.

INTERCONNECTION OF CHILLED WATER NETWORKS IN INDUSTRIAL FACILITIES

Sectors involved:
Industrial facilities for the manufacturing of food and plastics.

Energy Districts service end-users: Aldor food plant and Plasticel plastic manufacturing plant, with possible expansion to cover other industrial facilities in the area (Lloreda Grasas).

Energy District Application: Interconnection of the chilled water networks of two industrial facilities, using excess installed capacity in one and substituting obsolete equipment in the other.

Renewable Energy: Industrias Aldor is building a 1.5 MWp solar farm - independent of the cooling generation project.

Type of Energy District project: Industrial park solution in existing industrial facilities (brown-field).

Energy District Status: Conceptual engineering discussed with Aldor and Plasticel management level.

Proposed Energy District scenario: The project proposes to reorganize Aldor's chilled water systems and interconnect the chilled water distribution network to supply cooling process to Plasticel's plant, thus avoiding the initial purchase of new equipment and inefficient performances at both plants.

During its first stage, the district would have a capacity of 1,300 TR for Aldor and Plasticel (using existing chillers) and could grow to 1,900 TR to connect Lloreda Industry with 25% backup capacity upon purchase of additional chillers.

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PROJECT BENEFITS

Energy Benefits: The project would offer savings of 7,494 MWh/-year, equivalent to 39% of current consumption.

Environmental Benefits: The project offers a GHG emission reduction of 2,040 tonCO2eq/year (from energy consumption and refrigerant substitution).

ECONOMIC INDICATORS

The Investment Project for the integration of the cooling plant and distribution networks is:

- **Total CAPEX for implementation:** USD $0.9 million for Aldor - Plasticel option.
- NPV of USD $450,000 and an IRR of the project is 10.79% for the Aldor - Plasticel option.

PROJECT SWOT ANALYSIS

Strengths: The operation schedules and shifts are complementary, thus optimizing the use of the installed capacity for cold generation. The relationship between companies is cordial and there is a willingness to collaborate.

Weaknesses: The cost-benefit for Aldor is not compelling. The national economic outlook presents great uncertainties in the short, medium, and long term, which is why the investment return times does not meet the criteria of some of the project's users, especially for Aldor.

Opportunities: The project is in a highly industrialized area, which is why any initial success could easily be replicated by extending the distribution network to other neighboring facilities such as Lloreda Grasas or PACTIA.

Threats/Challenges: Aldor efforts and contributions to the project as a major player in the district, are disproportionately high with respect to its neighbors, and would not be rewarded by the adoption of a homogeneous tariff scheme. Therefore, a differential tariff scheme is necessary to compensate Aldor accordingly, and for the energy savings that primarily would benefit other users.

NORMATIVE FRAMEWORK

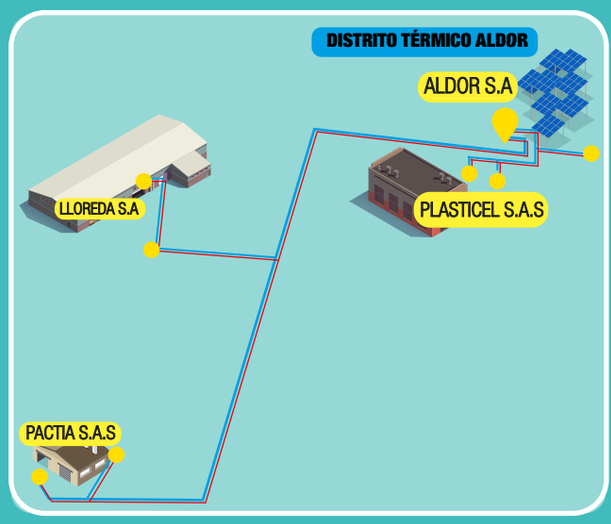
The project is eligible for tax benefits for energy efficiency projects promoted by the national government.

The connection of potential second-line customers involves the crossing of national roads, or the easement of land owned by third parties.

Licenses or concessions for water use are critical in the area.

NEXT STEPS

To propose financial improvements and project conditions for Aldor.



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