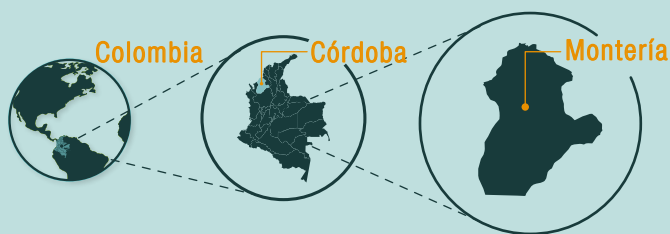


# TECHNICAL AND FINANCIAL FEASIBILITY ANALYSIS OF AN ENERGY DISTRICT PROJECT IN THE NORTH OF MONTERÍA, COLOMBIA



## BASELINE SCENARIO/GENERAL DESCRIPTION

Various healthcare and commercial buildings currently have air conditioning systems for cooling due to the city's high ambient temperature and to ensure comfort and quality of service delivery.

Two of the buildings represent 67% of the cooling demand and have centralized systems that would facilitate their connection to the district cooling network. The other buildings require redesign for their future connection. Oversizing of the current cooling capacity and low efficiencies in their operation have been identified.

The cooling demand by potential users was estimated at 1,300 TR. COPs between 1.5 and 3.9. Some buildings have chiller and mini split units, using refrigerants such as HFC 134a and HFC- 410A, and the primary energy source from the electric grid has an emissions factor of 0.126 kgCO<sub>2</sub>eq/kWh.

## ENERGY DISTRICT PROJECT

**Energy District Developer and Operator:** Surtigas E.S.P.

**Energy District service end-users:** Seven Existing Buildings (Medicina Integral, Clínica IMAT 1, Clínica IMAT 3, Clínica Montería, Clínica CUMI, Cine Colombia, and Centro Comercial Buenavista).

**Energy District Application:** Supply of chilled water for healthcare and commercial buildings in the northern Montería.

**Renewable Energy:** Evaluation of the use of water from the Sinu River as a supply for the condensation system of the cooling district.

**Type of Energy District project:** Cooling District solution for existing health and commercial buildings (Brown-field).

**Proposed Energy District scenario:** The chilled water production plant was evaluated under electric operation and cogeneration with natural gas. The use of condensation water from the Sinu River was considered but is currently not feasible due to the administrative cost of using the resource.

The cogeneration proposal with combustion engines has good financial closure, but the contribution to GHG emissions is high, therefore, this alternative is not recommended.

The cooling plant is proposed to be located near Clínica Montería, the most central point with available real state for its construction.

A total demand of 1,030 TR was determined, and a cooling production plant of 1,600 TR was designed with four electric chillers and a total COP of 4.88.

A custom transfer station for each client is proposed in each connected building, and the distribution network is estimated to be a total of 1,600m in length.

**Energy District Status:** Under analysis by Surtigas.

## PROJECT BENEFITS

**Energy Benefits:** The proposed cooling plant electricity consumption savings are 47.9%, equivalent to 5,361,127 kWh/year.

**Environmental Benefits:** In the scenario of using only electric energy, the total reduction of GHG emissions is 656 tonCO<sub>2</sub>eq/year (considering emissions from energy consumption and refrigerant leaks), which represents a 32.17% reduction from the current baseline scenario. For the cogeneration scenario, there is no reduction in GHG emissions.

## ECONOMIC INDICATORS

**CAPEX for the Developer:** Gross margin of 74% during the first 10 years for the cogeneration scenario, and only a 15% margin during the first 5 years for the all-electric scenario. Investment of USD 9 million.

**CAPEX for each client:** The cost of internal adjustments is established for each client, the two main ones: IMAT 3 COP \$1,752.8 million (USD \$438,200), Buenavista Shopping Center COP \$1,506.4 million (USD \$376,600).

**Savings per user in 20-year scenario:** 12.4% for IMAT 3, 22.5% for Clínica Montería, 10.0% for Centro Comercial Buenavista, and 10.2% for CUMI.

\*COP: Colombian pesos

## PROJECT SWOT ANALYSIS

**Strengths:** Technical and financial analyses show a highly viable infrastructure project for implementation.

**Weaknesses:** A decision regarding the plant's primary energy source is required, in terms of profitability vs. environmental impact.

**Opportunities:** It is a project with high potential and an opportunity to demonstrate viable infrastructure even in areas already built in the city of Montería.

**Threats/Challenges:** For the cooling service operator, the challenge is to present the scheme and commercial proposal to each user and negotiate the contracts.

## NORMATIVE FRAMEWORK

The project must be planned as an outsourced service scheme governed by a private non-regulated law contract.

## NEXT STEPS

Support Surtigas in the commercial proposal and assist the internal technical and financial staff to successfully submit a proposal to prospective clients.



## CONTACT INFORMATION

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