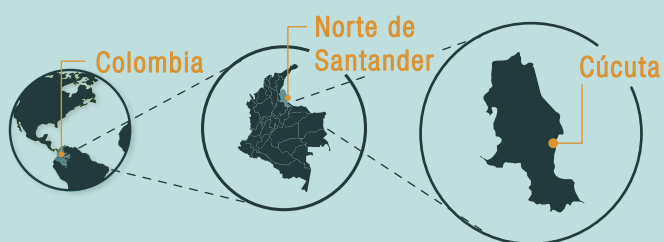


# TECHNICAL AND FINANCIAL FEASIBILITY ANALYSIS OF AN ENERGY DISTRICT PROJECT

FOR THE HEALTHCARE ZONE IN CÚCUTA, COLOMBIA



## GENERAL DESCRIPTION/BASELINE SCENARIO

The Hospital Universitario Erasmo Meoz (HUEM) building is currently operating with direct expansion systems, although its original design included a centralized system that has been dismantled over the years. It currently has an installed capacity of 560 TR.

The Centro Cristiano Los Pinos has direct expansion units totaling 272 TR for air conditioning for the two main spaces. Clínica Medical Duarte has a centralized chilled water plant with a capacity of 500 TR and a 100% backup (1,000 TR in total). The clinic plans to expand in the coming years with a new building expected to demand the same current load.

Clínica Santa Ana has a centralized chilled water system with an installed capacity of 100 TR and a 100% backup (200 TR in total).

The aggregated cooling demand of all studied buildings can be covered by the existing chilled water plant at Clínica Medical Duarte. This plant is operating correctly, and the clinic only demands 10% of its capacity, which makes this option beneficial for all users. The primary energy source is electricity from the grid, with an emissions factor of 0.126 kgCO<sub>2</sub>eq/kWh.

## ENERGY DISTRICT PROJECT

**Energy District Designer and Operator:** Gases del Oriente E.S.P.

**Energy District service end-users:** Three healthcare buildings and one religious center:

- Hospital Universitario Erasmo Meoz (HUEM)
- Clínica Medical Duarte
- Clínica Santa Ana
- Centro Cristiano Los Pinos

**Energy District Application:** Supply of chilled water for health buildings in Cúcuta.

**Renewable Energy:** Photovoltaic energy estimated at 919 MWh/year was incorporated into the design.

**Type of Energy District project:** Cooling District Energy Solution for existing healthcare buildings in Cucuta. (Brown-field).

**Energy District Status:** Under analysis by Gases del Oriente.

**Proposed Energy District scenario:** The proposed chilled water production plant will use water-cooled chillers, which offer high efficiency and could be combined with heat recovery technologies or renewable energy generation.

The plant is proposed to be located at the current Clínica Medical Duarte facility, which has the capacity to provide the demand of the identified buildings.

A photovoltaic plant is planned to be installed on the premises of Clínica Medical Duarte, capable of providing part of the electrical energy in parallel with the grid.

An individual transfer station for each customer is proposed in each connected building, and the distribution network is estimated to be 1,350m long.

## PROJECT BENEFITS

**Energy Benefits:** The photovoltaic energy production is estimated at 919 MWh/year and represents a 23% savings in the energy use of the cooling district.

**Environmental Benefits:** Savings of 704 tCO<sub>2</sub>eq/year were estimated, considering reductions of both direct and indirect emissions and from the photovoltaic installation.

## ECONOMIC INDICATORS

- **CAPEX for the developer:** Estimated at a total of USD \$6,3 million with an IRR of 12% over a 20-year period.
- **OPEX** includes the costs of electricity, replacement water for the cooling towers and general maintenance of the plant and the photovoltaic installation and is estimated at COP \$3,294 million (USD \$0.8 million).

\*COP: Colombian Pesos

## PROJECT SWOT ANALYSIS

**Strengths:** The project could be implemented in the short term at very low CAPEX, since the current systems are efficient and there is enough demand for the cooling service.

**Weaknesses:** Both the production of cooling and renewable energy are planned in the facilities of a client; it is possible that a progressive transfer towards an independent cooling plant will be needed.

**Opportunities:** To demonstrate viable infrastructure even in areas already built in the city of Cucuta and from existing infrastructure, in addition to this the possibility of using a photovoltaic system as a renewable.

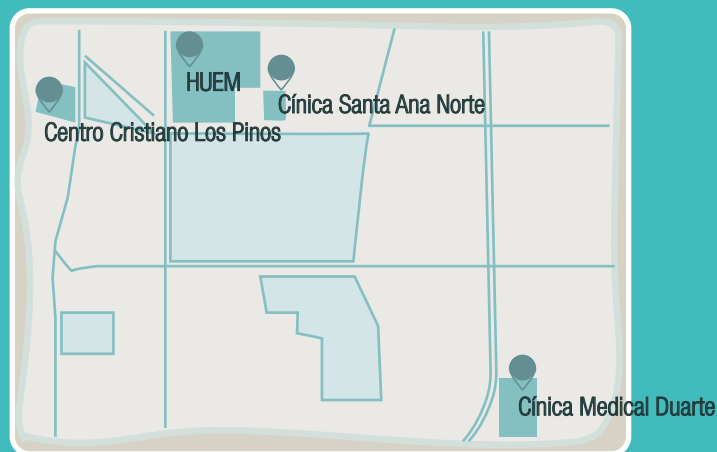
**Threats/Challenges:** For the developer of the cooling service, the challenge lies in presenting the scheme and commercial proposal to the owners of the possible clients.

## NORMATIVE FRAMEWORK

The project to supply cold water by the Energy District of the Cúcuta Health Zone would be planned as an outsourced service scheme governed by a private law contract not regulated by supervisory bodies.

## NEXT STEPS

Accompany and support Gases del Oriente in the preparation of the commercial, financial and technical proposal and support them to successfully submit the proposal to potential clients.



## CONTACT INFORMATION

UNIDO Energy Districts Project in Colombia  
Mrs. Cristina Mariaca M.Sc | [h.mariacaorozco@unido.org](mailto:h.mariacaorozco@unido.org)  
Mr. Ricardo Baquero M.Sc | [r.baquero@unido.org](mailto:r.baquero@unido.org)

BT Consultores  
Mr. Andrés Velasquez  
[aavelasquez@bt-consultores.com](mailto:aavelasquez@bt-consultores.com)