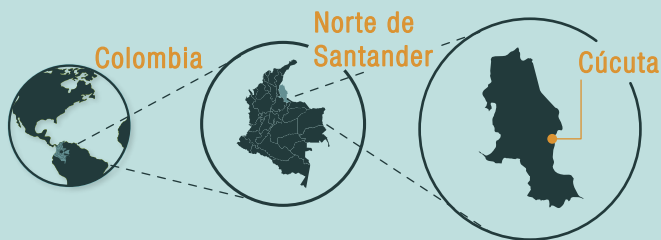


TECHNICAL AND FINANCIAL FEASIBILITY ANALYSIS OF AN ENERGY DISTRICT PROJECT

AT “ZONA CENTRO” IN CÚCUTA, COLOMBIA



BASELINE SCENARIO/GENERAL DESCRIPTION

Four commercial and health-services buildings with air conditioning systems for cooling due to the high city's temperature, ensuring comfort for their employees and clients.

These buildings currently operate a wide variety of cooling equipment and systems, such as chillers, mini splits, cooling towers and VRF systems that use HFC 134a, HCFC 22 and HFC 410A refrigerants. A total demand of 1,295 TR is estimated.

The current installed cooling capacity in the four buildings is 2,740 TR and only 1,598 TR is really used. The average COP is 2.5, using national grid power as primary energy source. (EF 0.126 KgCO₂eq/KWh)

ENERGY DISTRICT PROJECT

Energy District developer: Centrales Eléctricas del Norte de Santander S.A E.S.P – CENS.

Energy District service end-users: Four existing buildings (Ventura Plaza Shopping Center, Casino International Hotel, Holiday Inn Hotel, and San Jose clinic).

Energy District Application: Chilled water supply for commercial and healthcare buildings in downtown Cucuta.

Renewable Energy: Photovoltaic farm to cover 18.7% of the cooling plant's energy consumption.

Type of Energy District project: Mixed, commercial, hotel and hospital sector. (Brown-field).

Energy District status: The project is currently under analysis by CENS.

Proposed Energy District scenario: The proposed location for the chilled water production plant is the parking lot of the Ventura Plaza Shopping Center, one of the clients to be connected to the cooling district. The legal feasibility and the possibility of integrating photovoltaic energy production within the cooling district area are being evaluated.

It is proposed to install a 1,760 TR cooling plant with four electric chillers to cover 100% of demand with 50% back-up capacity. A heat-transfer station is proposed for each building to be connected. The longest distribution-network branch would be 272m long.



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PROJECT BENEFITS

Energy Benefits: Electric power savings of 45%, equivalent to 3,254,000 kWh/year.

Environmental Benefits: GHG emissions reduction of 274 tonCO₂eq/yr (including both emissions from energy consumption and emissions from refrigerant leaks), that is 92.7% of baseline scenario.

ECONOMIC INDICATORS

CAPEX for the developer: The investment to connect the existing client buildings is COP \$10,785 million (USD \$2.7 million), which includes the production plant, the distribution system, and the transfer stations.

In a 20-year scenario, the IRR for the developer/investor is estimated at 21.01%

CAPEX for the clients: Cost of internal retrofits to connect to the district-cooling network

- Ventura Plaza Shopping Center - COP \$224.42 million (USD \$56,100).
- Casino Internacional Hotel - COP \$469.81 million (USD \$117.500).
- Holiday Inn Hotel - COP \$349.47 million (USD \$87,400).
- San Jose Clinic - COP \$255.43 million (USD \$63,900).

Profits/Savings: Over the proposed time horizon, the financial analysis shows savings for each user: 63.5% for the Ventura Plaza Shopping Center, 61.9% for the Casino Internacional Hotel, 57.8% for the Holiday Inn Hotel, and 75.8% for the San Jose Clinic.

PROJECT SWOT ANALYSIS

Strengths: Technical and financial analysis indicate that this infrastructure project is highly feasible for implementation.

Weaknesses: End users were involved, but not deeply integrated.

Opportunities: It is a “sustainable urban infrastructure in existing buildings” demonstrative project. This could be advantageous due to the city’s all-year-long high temperatures and the diversity of cooling demand profiles among the project potential clients.

Threats/Challenges: For the operator of the cooling service, the challenge lies in presenting the scheme and commercial proposal to each user and negotiating each individual contract.

NORMATIVE FRAMEWORK

The cooling supply project from the “Zona Centro” in Cucuta would be proposed as Cooling as a Service scheme (CaaS) governed by a private law non-regulated contract.

NEXT STEPS

Support CENS to build technical capacity among its technical, commercial and financial staff, and to elaborate and successfully submit its commercial proposal to prospective clients.



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