

Canadian Dew Technologies Inc.

WaterProducer™ drinking water plant for Cebu City, Philippines

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Introduction

Drinking water supply alternatives are sought for Cebu City. Canadian Dew Technologies Inc. (CDTI), whose mission is to provide clean, safe, affordable drinking water to communities, was asked to outline a practical system for producing drinking water at the rate of 200,000 litres per day.

Our expertise is in atmospheric water vapour processing (AWVP), the technology of condensing moisture from the ambient air, turning it into drinking water. This method is attractive in regions faced with scarce or contaminated surface water or groundwater. Large-scale dehumidification of air by using water-cooled coils is a proven technology, used worldwide in commercial, industrial, and institutional applications for drying and cooling the ambient air.

Desalination by reverse-osmosis (RO) is another widely used solution for drinking water supplies. AWVP's advantages over RO are:

- Pure fresh water production (RO water has residual salt content (typically 300–500 ppm) and
- No brine by-product that harms local ecosystems.

AWVP for Cebu City

Cebu is an ideal location for AWVP. Three factors combine to make this so. These are:

- Climatology—consistently high moisture content of the air,
- Oceanography—adjacent to cold, deep ocean water,
- Geology—saltwater intrusion through porous carbonate rocks

Climatology

Cebu's climate is intermediate to Manila's (Fig. 1) and Davao's (Fig. 2). Water vapour density, representing grams of water in each cubic metre of air, exceeds 20 g/cu m most months. The consistently high moisture content of the air allows about 200,000 litres per day of fresh water to be produced by a machine processing about 382 cu m of air per second.

Oceanography

Bathymetry

Proximity to deep, cold ocean water is favourable in the region of Cebu City, Mactan Island, and Olango Island (Fig. 3).

Temperature profiles

Oceanographic stations provided four temperature profiles for Tanon Strait to the west of Cebu and four profiles for Camotes Sea and Bohol Strait to the east of the island (Fig. 3 and Fig. 4, data from NOAA, 2004).

West of Cebu, in Tanon Strait, which has shallow water at its north and south connections to the surrounding seas, 200 m depth temperatures are about 18°C. In contrast, east of Cebu, in Bohol Strait and Camotes Sea, which are connected to deep water to the N and S, 200 m depth temperatures are about 15°C. The latter is an ideal coolant temperature for the WaterProducer™.