



Cold generated from cow dung

Cow dung, traditionally used as fuel for heating and cooking in rural Indian households, has far more potential than just domestic fuel. The new GreenCHILL cooling plant, makes use of this potential source of energy as a means to effect cooling. A Güntner AGDF air cooler can cool, for example, up to 15 tonnes of agricultural products or 1,000 litres of milk down to 4 °C using the cooling attained.

India's rural areas are hardly supplied with electrical energy. Even if they are, it is heavily interrupted supply. This is why producers lack the possibility of cooling their foodstuffs which, in turn, results in annual losses of about USD 40 billion; about one third of the agricultural fresh products (fruits, vegetables and milk) spoils due to the lack of a strong cold chain. For this reason, most of India's small and medium sized producers of buffalo and cow milk (one to two cows per farm), locally market their milk not consumed by their own households quickly and at a very low price (subsistence economy).

Cooling capacity of 7 kW

A regenerative cooling plant of small size, independent of the main power supply and specifically developed for rural areas, is a remedy to this economic dilemma now: The small GreenCHILL cooling plant of the Indian New Leaf Dynamic company uses, among other things, buffalo and cow dung available on the farm, other residues from forestry and agriculture and also biogas as primary fuel. The cooling plant has a cooling capacity of 7 kW.

Overview

Line of business:	Industrial refrigeration
Application:	Fruit and Vegetable Cooling Dairy Product Cooling
Country/city:	India/New Delhi
Fluid:	Ammonia
Product:	Güntner AGDF air cooler

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A Güntner AGDF air cooler can cool, for example, up to 15 tonnes of agricultural products or 1,000 litres of milk down to 4 °C using the provided cold.



The small GreenCHILL cooling plant of the Indian New Leaf Dynamic company uses, among other things, the great amount of buffalo and cow dung available in India, other residues from forestry and agriculture and also biogas as primary fuel.

The dry biomass is first burnt inside the furnace of a hot water generator and heats water to 120 °C. Using this process heat available now, chilled water is produced in the connected ammonia-water absorption system of the GreenCHILLer. This chilled water, in turn, supplies a Güntner AGDF air cooler. The fans of this air cooler are supplied with 60 watt of electrical energy produced by a solar power panel.

Higher incomes for farmers

Thanks to this simple technology, the smallest farms have the possibility to centrally cool fruits, vegetables or milk in a cooperative way to increase incomes for all the producers involved. The entire plant can cool up to 1,000 litres of fresh milk down to 4 °C and keep this temperature until the milk is placed on the market. Likewise, 15 tonnes of fruits and vegetables can be chilled down to 4 °C before the harvest is ready to be transported to the market.

The combined GreenChill installation can also be used in cold rooms with controlled humidity, e.g. rooms used to produce mushrooms and hydrocultures and cold stores for ten to 15 tonnes of fruits, vegetables, seafood, wheat or flowers.

As the plant operates completely independent of the mains supply and as the operating costs for fuel are low, the operators of a GreenCHILL plant save – compared to the conventional alternatives (diesel generator and power from the grid respectively) – between 36,000 and 45,000 rupees (470 – 590 euros) per year for cooling 1,000 litres of milk. If the operators use it as cold storage, they even save up to 150,000 rupees (2,000 euros) per year.

The Indian Ministry of Agriculture classified GreenCHILL as clean and sustainable refrigeration technology and supports the market launch of the meanwhile highly acclaimed technology with an investment grant of 35 per cent.