



DISTRICT COOLING SYSTEM IN MALAYSIA

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BACKGROUND



As temperatures continue to rise worldwide, air conditioning (AC) has become a necessity for most people. However, conventional AC systems have significant drawbacks, including high energy consumption, costly maintenance, and environmental pollution.



District cooling (DC) systems, on the other hand, offer an alternative that is gaining popularity as a more sustainable and cost-effective way to cool buildings. The aspect are more distinctive as compare between district cooling versus conventional air conditioning and examine the advantages and disadvantages of both.



BACKGROUND

- District Cooling is a fundamental aspect of utility in order to increase sustainability of an urban development. It is the backbone of a green and smart city. The system relies on a centralized cooling plant which supplies thermal cooling energy to connected buildings within its network via underground Chilled Water (CHW) pipelines. Each customer building is equipped with Energy Transfer Station which allows the cooling energy to be transferred from the CHW pipe to the buildings internal piping through a Heat Exchanger. The warm heat transferred from the buildings will then be returned to the District Cooling Plant (DCP). The CHW served to customers are at 6 degC and returned to the DCP at 13 degC.
- This setup is suitable for high density developments such as university campuses, government buildings, business districts, industrial area, commercial and retail buildings, hotels and residential towers, airports, etc. The usual minimum requirement for a connection application is 20,000 sqft of cooling area which is equivalent to 100 RT (Refrigerant Tonne).

INTRODUCTION



- Established in the 1990s
- More than 6 major local DCS service providers



- Unregulated market
- No specific policies on DCS unlike some countries
- General and indirect energy policies and regulations exist (*Electricity Supply Act, Factories and Machinery Act, Electricity Regulations*)



- Market driven between DCS service providers and developers/ building owners
- Chilled Water Supply Agreements (CWSAs) varies in tariff, duration performance and guarantees etc.
- Business model varies among DCS service providers – (*owner-operator, operator, full-turnkey*)



- Customers vary from single-buyer to multiple users
- Single building to city-wide development areas, ranging from 1500RT onwards.



- Sporadic location
- Mostly in Klang Valley and major cities



- Electric and gas-fired chillers commonly used
- Thermal Energy Storage(TES) application for electrical load management

MAIN BENEFITS OF DISTRICT COOLING SYSTEM

1

Low energy requirements

District cooling consumes less energy stemming from more efficient technology and plant's ability to maintain steady level of efficiency over time. This also leads to reduction in CO2 emissions.

2

Peak period saving potential

District cooling offers storage capability that can smooth out power requirements throughout the day, thereby reducing strain on power systems. In-building systems impose full load on power systems at peak times.

3

More efficient use of space

District cooling typically requires less capacity for the same cooling loads due to flexibility in capacity design and installation.

4

Flexibility to varying cooling demand

The pattern and timing of cooling requirements in a building vary depending on building use and weather. With conventional cooling system, meeting air-conditioning requirements at night or on weekends can be difficult and costly. With district cooling, these needs can be met easily and cost-effectively whenever necessary.

***Main benefits of
district cooling
system over
conventional
cooling***

DATA COLLECTION



Under the Electricity Supply Act 1990 [Act 447] and Electricity Supply (Amendment) Act 2015 [Act A1501] any public and private installation that produced electricity need to submit their data to Energy Commission of Malaysia



While under the Efficient Management of Electrical Energy Regulations 2008 [P.U.(A)444] any users of electricity that consumed electricity equal or more than 3,000,000 kWh in six consecutive months need to report their data to Energy Commission of Malaysia



Malaysia District Cooling companies that falls under these two categories need to submit their data to Energy Commission of Malaysia

DATA COLLECTION

Reported data only related to power sector, such as the input and output from co-generators that involved gas district cooling companies

These gas district cooling plants are registered under the co-generation license

In the National Energy Balance publication, the data for input and output of co-generators will be reported under the Self-Generation / Auto producers



DATA COLLECTION

- A discussion with the Malaysian District Cooling Association (MDCA) has been carried out in August 2023
- A trial run of data collection of DCS in Malaysia is now under the progress and will be expected to finalise by end of 2023
- Will share the trial data to ESTO once completed.

Thank You

zaharin@st.gov.my

<https://meih.st.gov.my>

