Proportion of liquid cooling in commercial buildings

Can liquid desiccant cooling system be used in commercial buildings?
Therefore, in our research, the liquid desiccant cooling system with packed dehumidifier and regenerator is adopted as the AC system in commercial buildings for the energy performance simulation. Also, energy consumptions of the conventional system in these buildings were calculated for comparison.

How LDCs is used to simulate energy consumption of commercial buildings?
LDCS, which is consisted of the cooling coil and liquid desiccant ventilation system, was adopted in this research to simulate the energy consumption of commercial buildings. Fig. 1 shows the schematic of the whole system. The cooling coil was driven by vapor compressors.

How much water does a commercial building use?
Using water consumption data from the Commercial Buildings Energy Consumption Survey (CBECS),EIA estimates that the 46,000 large commercial buildings (greater than 200,000 square feet) used about 359 billion gallonsof water (980 million gallons per day) in 2012.

Why are liquid air cooling systems better than evaporative cooling towers?
Furthermore,the high energy storage densityof liquid air determines that liquid air-based cooling systems have a greater footprint density compared to evaporative cooling towers. Additionally,liquid air cooling systems do not involve evaporative losses of cooling water,reducing the reliance of data center construction on water sources.

How much power does a liquid air cooling system use?
For an optimized liquid air-based cooling system with an average IT power of 6.97MWh,power consumptions of liquid-air pump and immersion-coolant pump are 0.03 MWh and 0.01 MWh,respectively. According to Eq. (26),the pPUE can be determined as 1.006.

Can space-conditioning loads be simulated in commercial buildings?
This report describes the development of a database of space-conditioning loads for commercial buildings,based on prototypes developed for the EnergyPlus simulation software,with a particular focus on cooling loads. The prototypes cover sixteen building types and three vintages,which were simulated in eighteen climate zones.

Cooling is essential to human health, food security, economic productivity, and is becoming more important due to increasing global mean temperatures accompanied by more extreme heat waves.

Energy-efficient air conditioning with improved building design and system management can keep cooling electricity use stable, while also providing ...

Proportion of liquid cooling in commercial buildings

Heating, ventilation, and air conditioning (HVAC) systems of commercial and institutional buildings consume a large proportion of the energy used worldwide and, as a result, are a ...

Residential and commercial buildings can also be divided into those with small-scale heating and cooling systems or large-scale district heating systems. Each end use has a different current status and pace ...

Reflecting this building trend, heat-pump-driven liquid-desiccant (HPLD) air-conditioning systems have emerged as a promising technology that effectively handles indoor latent ...

As of 2018, China had more than 550,000 data centers, accounting for approximately 1.5% of the country"s total annual electricity consumption. Reducing energy consumption not only ...

With the rapid growth of cloud computing, the number of data centers (DCs) continuously increases, leading to a high-energy consumption dilemma. Cooli...

The findings indicate that, firstly, the classification of cooling systems, optimization strategies, and energy efficiency metrics are the current ...

This paper reviews national standards and guidelines for the energy performance of chiller systems which provide cooling energy in commercial buildings but their operation causes the ...

Their system had a 3-mode operation, consisting of mechanical cooling, liquid pump driven and free cooling and theoretical analysis indicated their system had the lowest energy usage ...

Without a move towards the best available products, and improvements in the performance of the buildings in which they operate, electricity demand for space cooling in buildings could increase by as ...

Cooling of buildings currently represents a considerable fraction of the total energy consumption in the world. Global and local climate change in combination with the projected ...

This study develops simple, interpretable data-driven models using weather- and occupancy-related features to analyze the cooling in different types of co-located buildings. Over five ...

A study of energy performance of 30 existing commercial office buildings in Hong Kong has been carried out. Energy audits have been conducted and the ...

With rack densities set to grow beyond 70kW, the only viable solution for cooling these high-performance servers currently is liquid cooling -- primarily direct-to-chip or immersion cooling, ...

Proportion of liquid cooling in commercial buildings

In terms of building cooling and energy conservation, many people have studied the direction of reducing cooling EC through passive building ...

Buildings sector energy consumption Overview Energy consumed in the buildings sector consists of residential and commercial end users and accounts for 20.1% of the total delivered energy consumed ...

This paper investigated the AC load profiles of three typical local commercial buildings, i.e. office, hotel and retail, and examined the energy consumption of liquid desiccant cooling system ...

On a per unit floor area basis, energy use in large commercial development with full air-conditioning can be 10-20 times higher than that in residential buildings and is an important element ...

This makes it ideal for adding to submersion cooling systems. Mineral oil cooling is odorless, non-toxic and offers significant noise reduction compared to other liquid or air cooling systems. However, ...

This paper reviews national standards and guidelines for the energy performance of chiller systems which provide cooling energy in commercial buildings but their operation causes the major proportion ...

Heat, ventilation and air conditioning (HVAC) systems are responsible for a substantial proportion of energy use in buildings and are closely related to indoor environment quality. ...

A mathematical model of data-center immersion cooling using liquid air energy storage is developed to investigate its thermodynamic and economic performance. Furthermore, the genetic ...

In buildings where occupants are less able to control their environment, e.g. in highly occupied offices or commercial buildings with centralised air conditioning system, the concept of effective ...

Abstract In Hong Kong, conventional air-conditioning (AC) systems cause a high energy consumption and poor indoor thermal comfort. This paper investigated the AC load profiles of three ...