Cooling for Data Centers

How to improve Your Carbon Footprint

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Valeria Belluco - Product Manager
Attilio Masoch - Business Developer

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Cooling for Data center in a digitalized word

World is increasingly digitalised and Data Centres accounting for about 3% of global electricity demand.

- **+40%** of Data center Energy is related to cooling System

- Increasing Data Center temperature is a viable way to improve efficiency and reduce Energy consumption

- ASHRAE, in its guidance on Data Center temperatures, has increased its "recommended" and "allowable" temperatures.
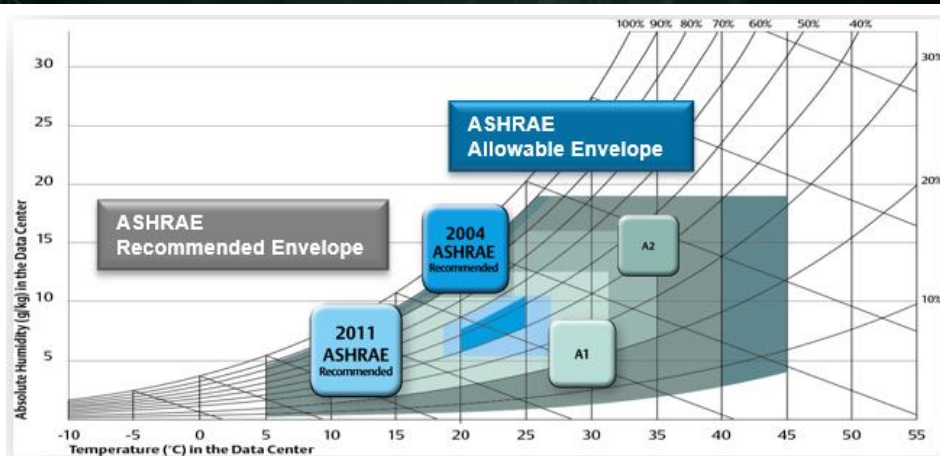
Cooling Systems for Todays Cloud Architecture

CENTRALIZED
Massive compute and storage located in remote areas
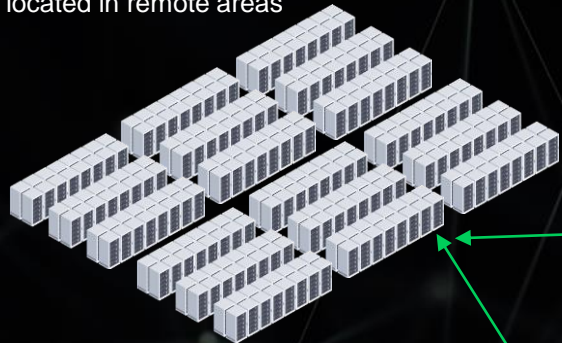
Water Economizer

Retail

Manufacturing

Telco

Education

Healthcare

Local Gov

Food & Bev

LOCAL EDGE
Compute and storage where data is generated and consumed

Indirect Air Economizer

DX Economizer

REGIONAL EDGE
Large compute and storage located in central or urban areas

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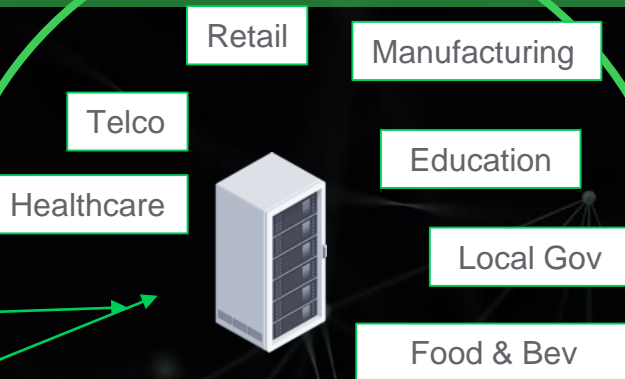
Direct Expansion Economizer – OPEX reduction

CRACs Energy Saving units with VSD compressor reduce yearly energy consumption of **30%**

- **+43% cooling capacity** in the box with the same power consumption figure compared to traditional working conditions

- **+29% cooling capacity** compared to traditional design at same conditions

- ..even with high return air temperature

Cold Season

Full Free Cooling

No compressors power consumption

Mid Season

Mixed mode operation

Compressor operate to assist Freecooling operation and give the missing capacity

Hot Season

Mechanical Cooling

Compressor ON

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Indirect Air Expansion Economizer – OPEX reduction

- Indirect air Economizer Ecoflair takes power that would be used for cooling and makes it available for Data Center operations.

- **Evaporative cooling only** even with hot air and low relative humidity

- **Trim cooling** to supplement the free cooling only at very high temperature and high relative humidity

- Designed to scale with the growing demands of today's Data Centers and to save valuable white space
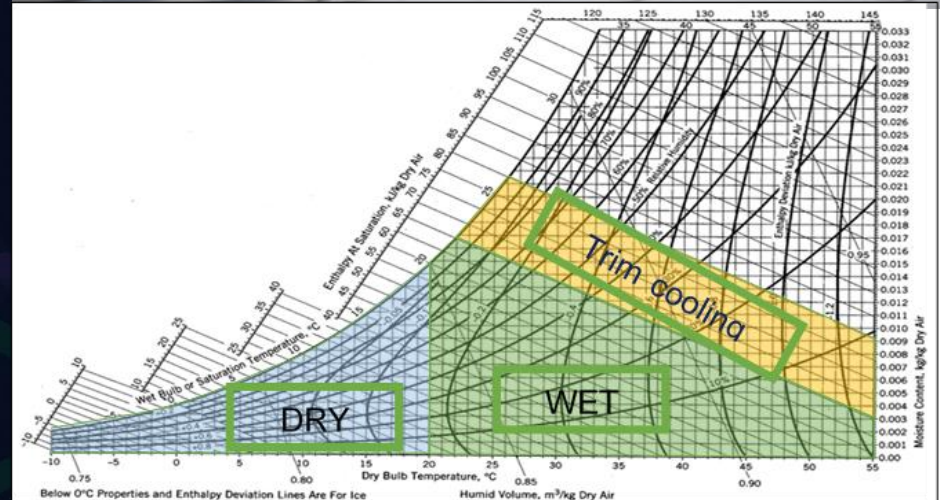
Chilled water system

Traditional temperatures do not optimize summer and economization mode

It is advantageous to move from traditional 7°C or 10°C operation to higher values, up to 20°C

Specialized chiller and CRAH designed for high water temperatures for a Data Center gives benefits as follows:

To improve OPEX by increasing EER and/or extending the free-cooling operation and bordering the main ref. components life-cycle

To allow CAPEX reduction since the chillers can be downsized

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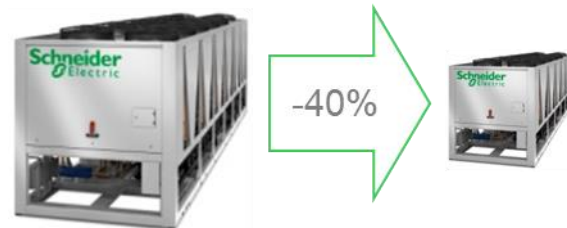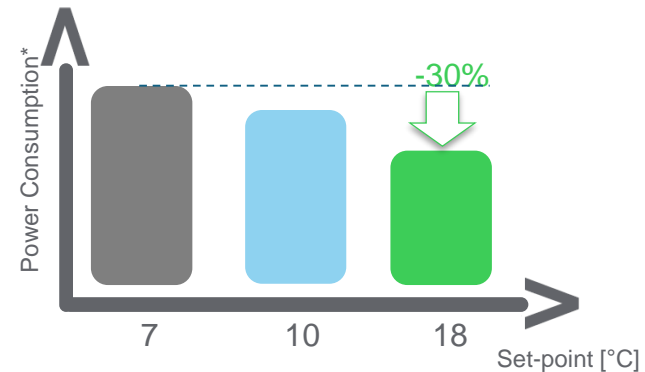
New Frontier in Water Economization

Underfloor CRAH

CRAC optimized to operate with high temperatures (air & water)

Uniflair Cooling for the Future

Uniflair Cooling Solution reshapes the free-cooling on water based solutions

Trim Chiller

Innovative free-cooling trim chiller to maximize system efficiency, leveraging on free-cooling as primary source

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Uniflair LE HXCV – Undefloor CRAH optimized for High temperature

Uniflair HXCV HT

Single Coil version optimized for 10°C DT
(EWT=20°C – LWT=30°C)

Uniflair HXCV HTE

Single Coil version optimized for 12°C DT
(EWT=20°C – LWT=32°C)

Uniflair HXCV DC

Dual Coil version optimized for 6°C DT
(EWT=18°C – LWT=24°C)

140 kW → 250 kW

Opex and Capex Optimization

Specific design for high water temperatures to leverage on Free Cooling operation with external free cooling trim chillers

Average **25% less power consumption** delivering the same airflow of traditional units

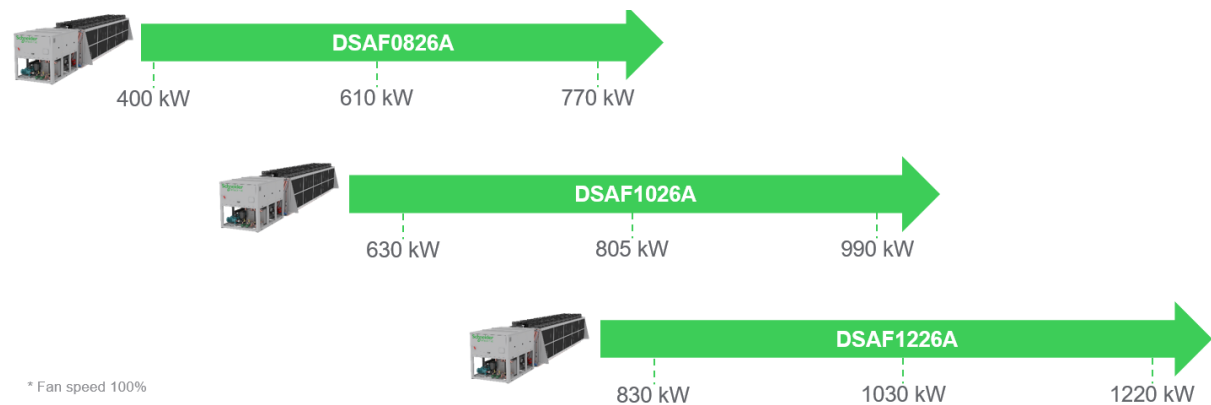Average **30% more capacity** on the same perimeter

Uniflair DSAF – Innovative Freecooling Trim Chiller

Complete range of Dry coolers

DSAF0800A	DSAF1000A	DSAF1200A
780 kW*	1130 kW*	1560 kW*

…and Trim Chiller to leverage on free cooling

DSAF0826A

400 kW   610 kW   770 kW

DSAF1026A

630 kW   805 kW   990 kW

DSAF1226A

830 kW   1030 kW   1220 kW

* Fan speed 100%

Water temperatures 32/20°C, 20% gly, Ambient temperature: 35°C dry bulb, RH 40%, Adiabatic OFF,

Advanced adiabatic system with dynamic pads the power consumption of the is decreased in dry mode. The **water recirculation system** avoid to waste the water that is not evaporated

+10% of full free cooling operation running in Dry mode*

-40% power consumption running with fixed adiabatic system*

-47% power consumption with wings adiabatic system *

*Paris, water 20-32°C,20%gly

Reduce the energy bill with Economization!

There are various strategies to improve the efficiency of the cooling system in order to save energy. **Economization is a viable one.**

Continuous cooling systems innovation maximize the efficiency and reduce the Energy spent to keep cool Data Centers

1MW IT, water 20/30°C, IT return air 37°C/30% RH, discharge air 23°C

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