

The Indirect Evaporative Free-Cooling AHU Cooling Solution



27.04.2017

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The Indirect Evaporative Free-Cooling AHU

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Energy Efficiency Trend

EU Energy Strategy for 2030

Paris Climate Conference 2015 (COP21)

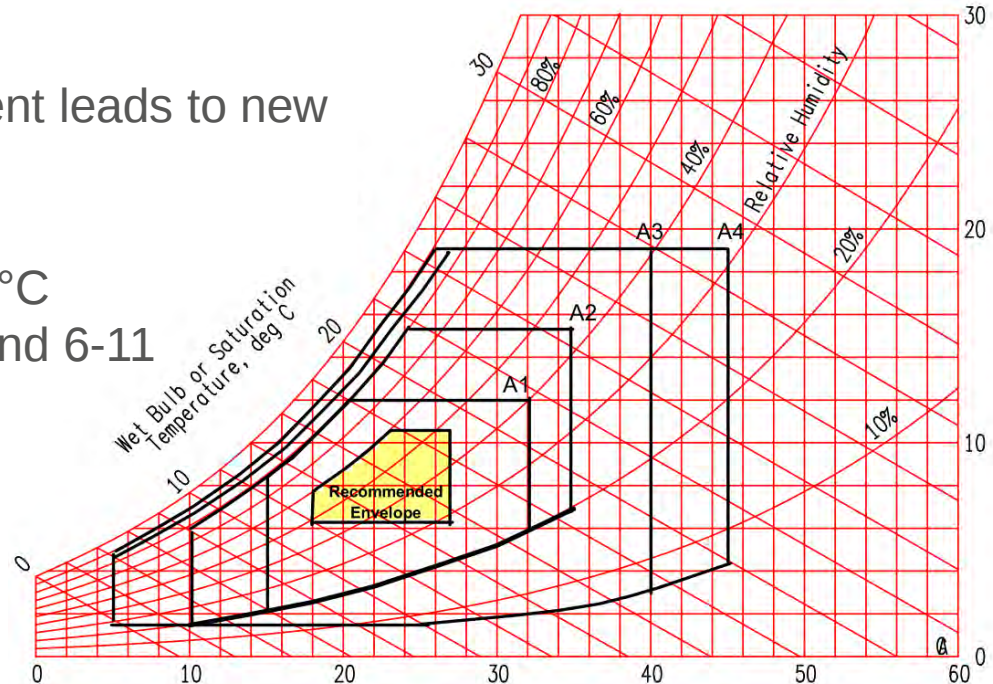
Code of Conduct Data Centers



The Indirect Evaporative Free-Cooling AHU

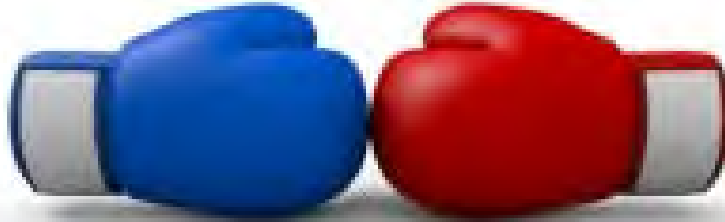
Application Environment (ASHRAE 2013)

- Changes in the IT Environment leads to new technical possibilities:
- Temperature rack inlet 18-27°C
- Humidity rack inlet 30-60% and 6-11 g/kg
- Outdoor temperature
- Wet bulb conditions.



The Indirect Evaporative Free-Cooling AHU

CapEx vs. OpEx



CapEx vs. OpEx

Energy Efficient System, with low operating cost

Vs.

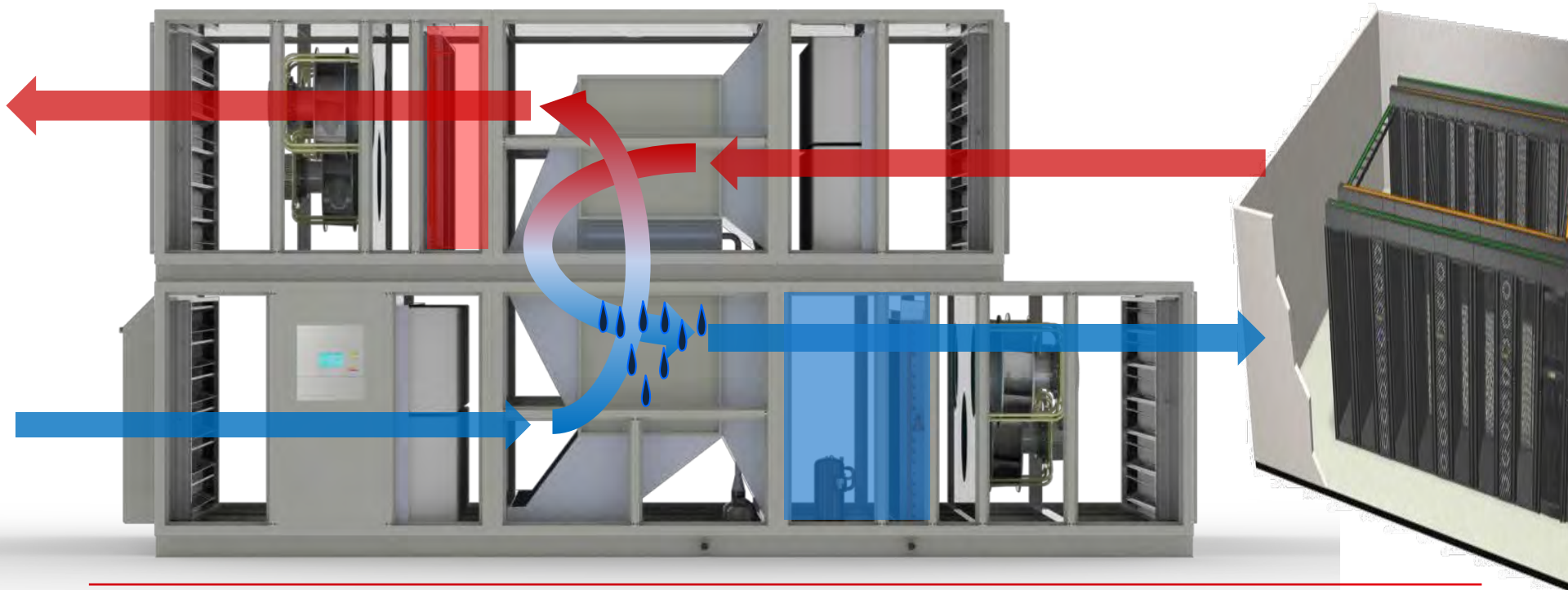
Low Cost System, with high operating cost

Target: Reduce or eliminate the dependency of mechanical cooling

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High Efficient Operation Principle



Indirect Evaporative Free-Cooling AHU

High Efficient Operation Modes (based on ambient air temp.)

■ “Dry Mode” (100% Free-Cooling):

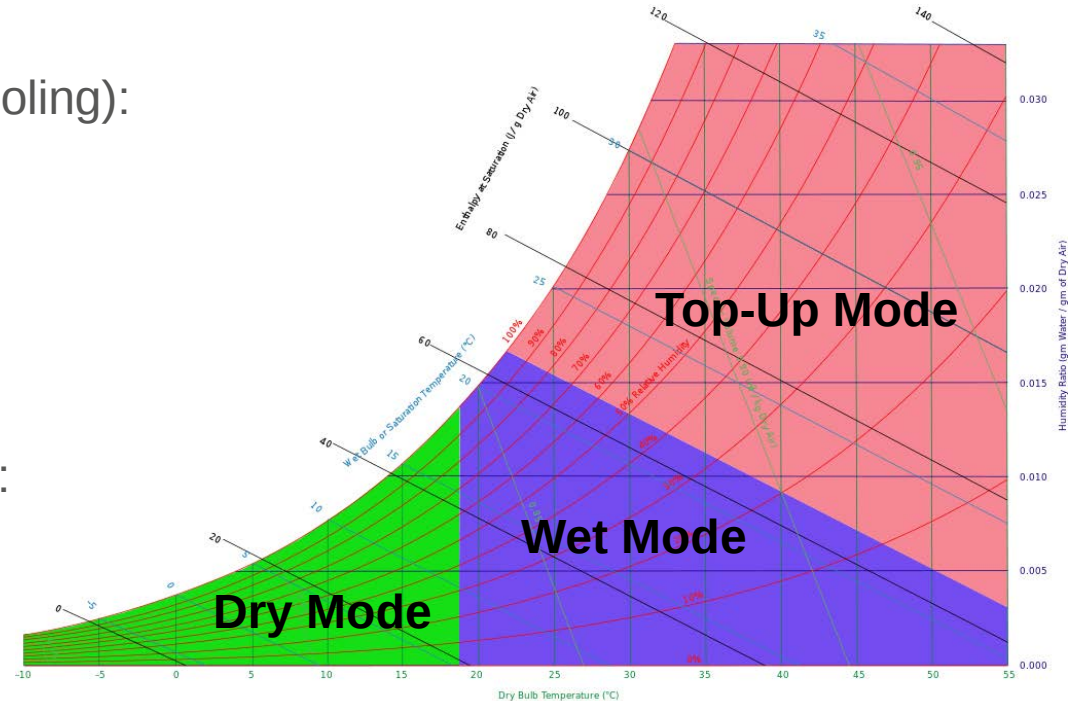
- Adiabatics OFF
- Mechanical Cooling OFF

■ “Wet Mode” (Adiabatic):

- Adiabatics **ON**
- Mechanical Cooling OFF

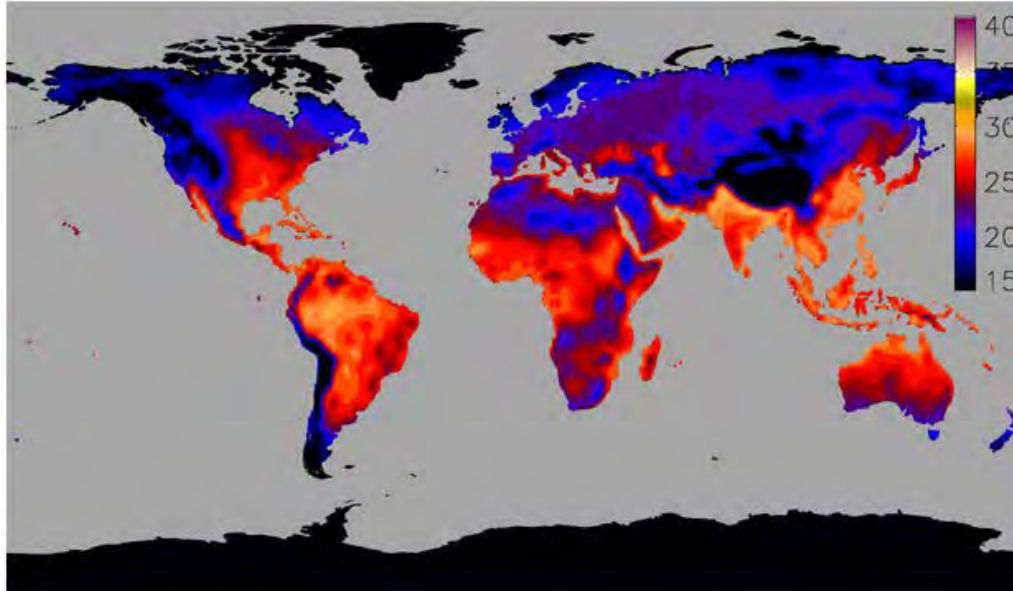
■ “Top-Up Mode” (Mix Mode):

- Adiabatics **ON**
- Mechanical Cooling **ON**



Indirect Evaporative Free-Cooling AHU

Worldwide Adiabatic Cooling “Range”



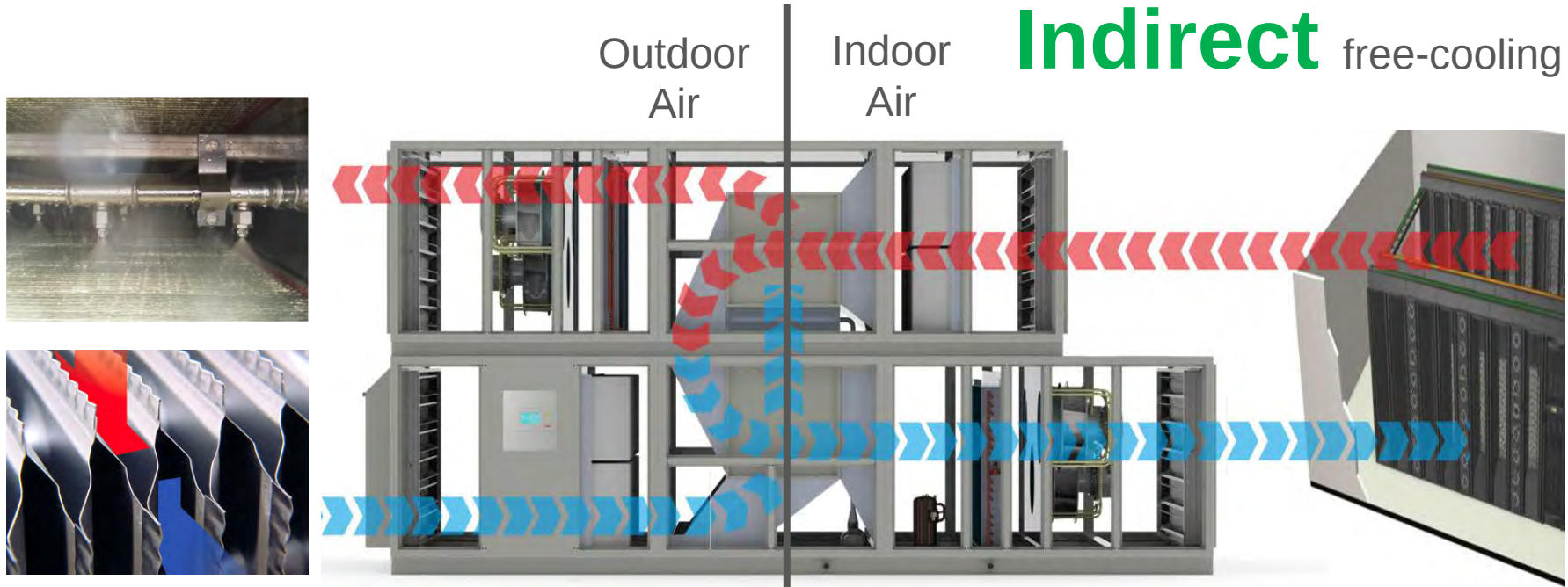
Use of *Adiabatic Cooling* reasonable in all regions from orange to black based on wet bulb temp.

At wet bulb temperatures $< 27^{\circ}\text{C}$ (e.g. 35°C Ambient; 55% RH) high savings can be reached
The lower the WBT the higher the savings will be, until compression cooling is not needed

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Air “contamination/moisture-free” data room

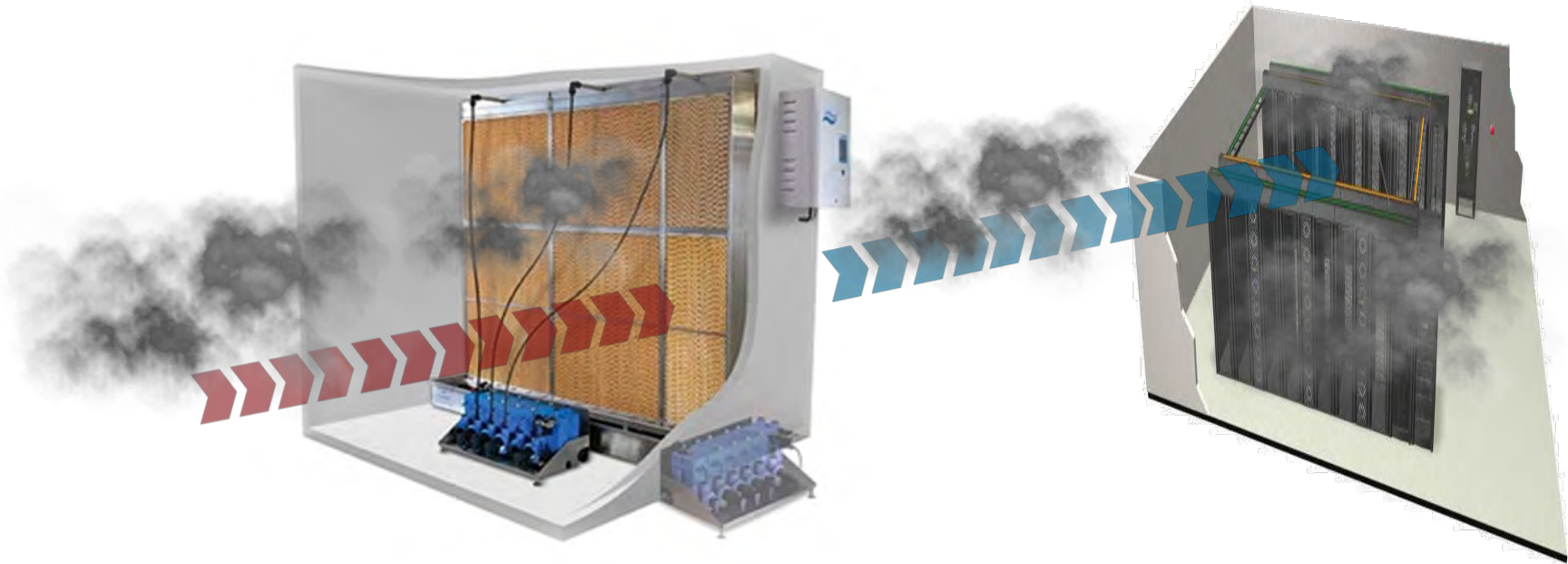


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Outdoor air contaminations into the data room

Direct free-cooling



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Maintenance

- **Not in the Data room**
 - No need to access the DR.
 - Outdoor (roof or wall).
 - In the technical room.
- **Simple**
 - Filter change.
 - Check the fans / motors.
 - DX-system (or CW).
- **Cheap**
 - Reduce maintenance time in each Air Handling Unit.



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Market Trend

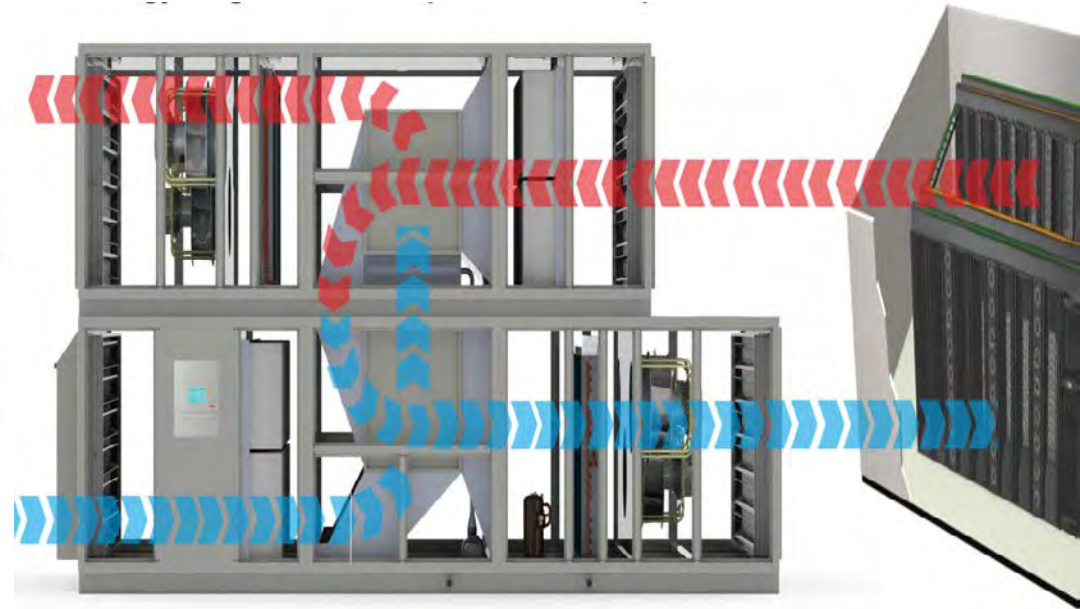


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High Efficiency with unbeatable Low pPUE's

Typical
pPUE
between
1.02&1.10



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Conclusions:

- **Lower Total Cost of Ownership (TCO)**
 - Reduced Capex;
 - Reduced Opex;
 - Reduced maintenance;
 - Reduce electrical infrastructure;
 - Reduced capital cost.

- **Operational Optimization**
 - Faster ROI;
 - More available IT power;
 - No contamination risk if the (whitespace);
 - More resilient system.



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Thank you for your attention

**CLIMATE.
CUSTOMIZED.**