

Considerations and Tactics for Cooling the Coming Heat Wave in Your IT Facility

David Rubcich

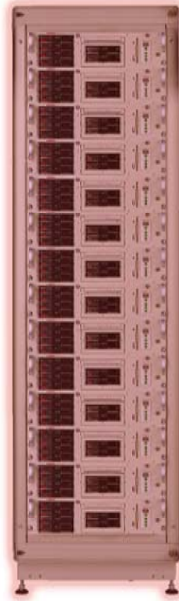
Director of Sales, East Region
Liebert Precision Cooling Business,
Emerson Network Power



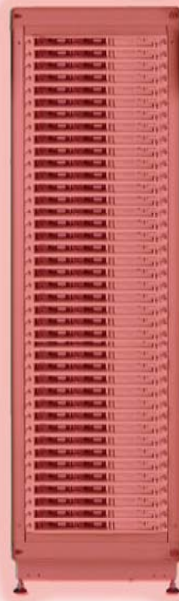
Agenda

- Issues driving change
- What you can do today
- Finding a long-term solution: creating an adaptive environment
- A roadmap to the future
- Summary of best practices

Racks are getting hotter



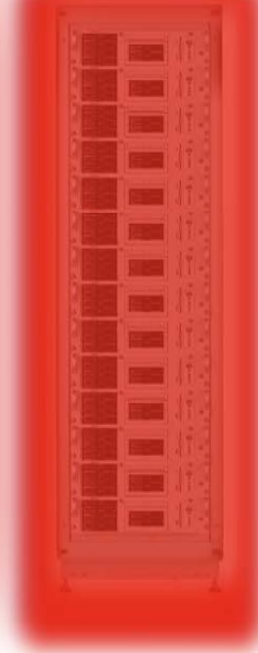
2000
21, 2U Servers
2kw Heat Load



2002
42, 1U Servers
6kw Heat Load

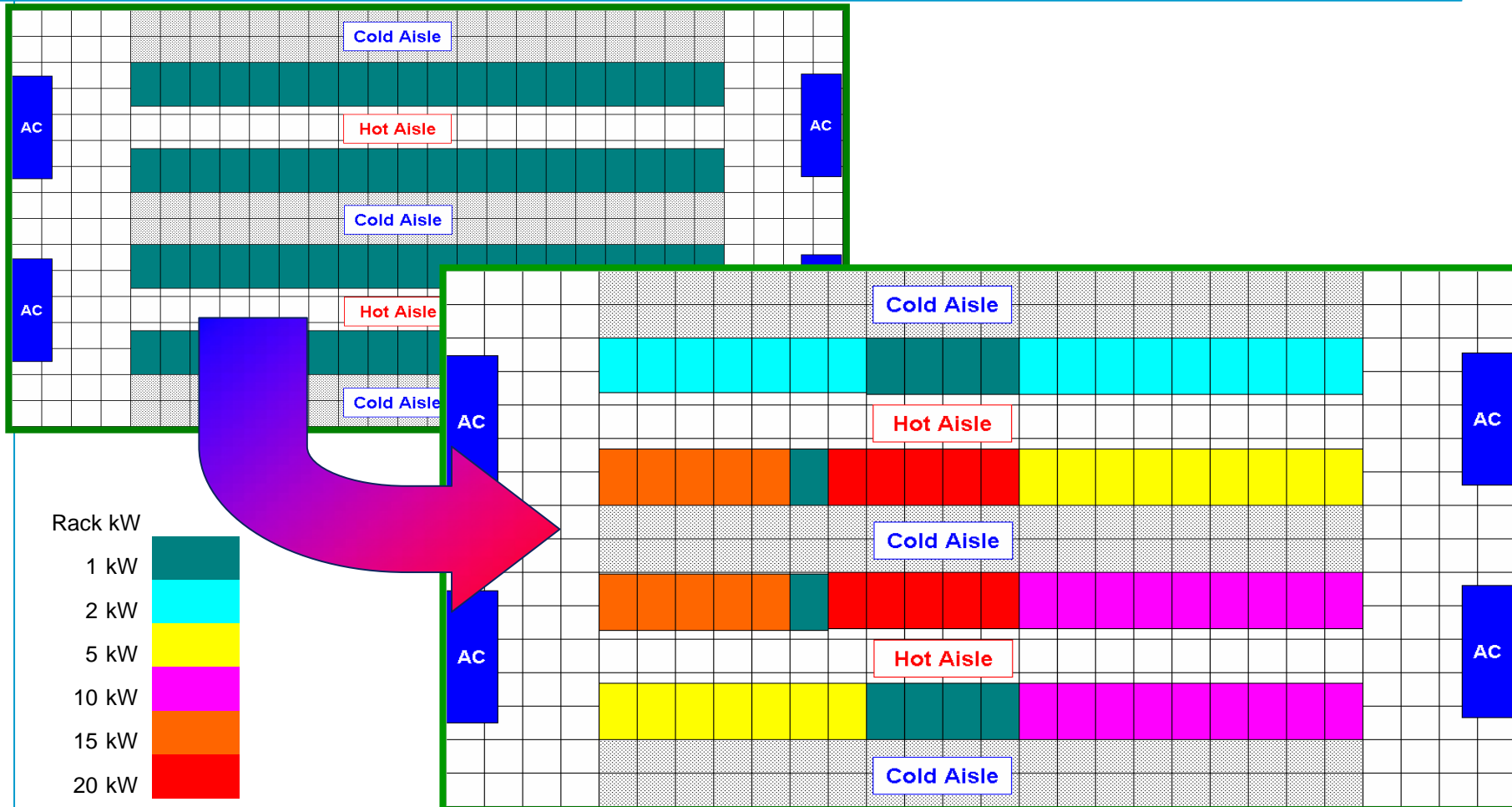


2006
6 Blade Centers
24kw Heat Load



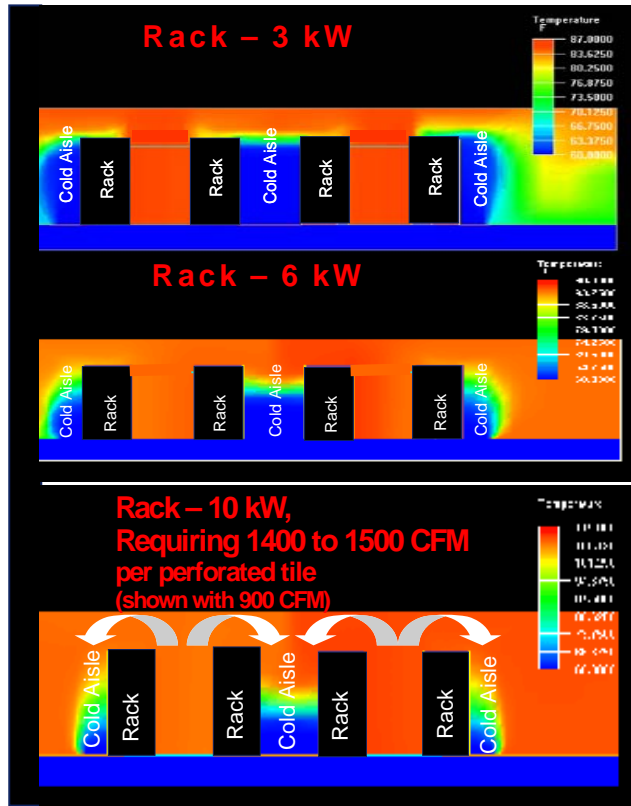
2008?

Diversity within the data center will become greater as systems become more dense

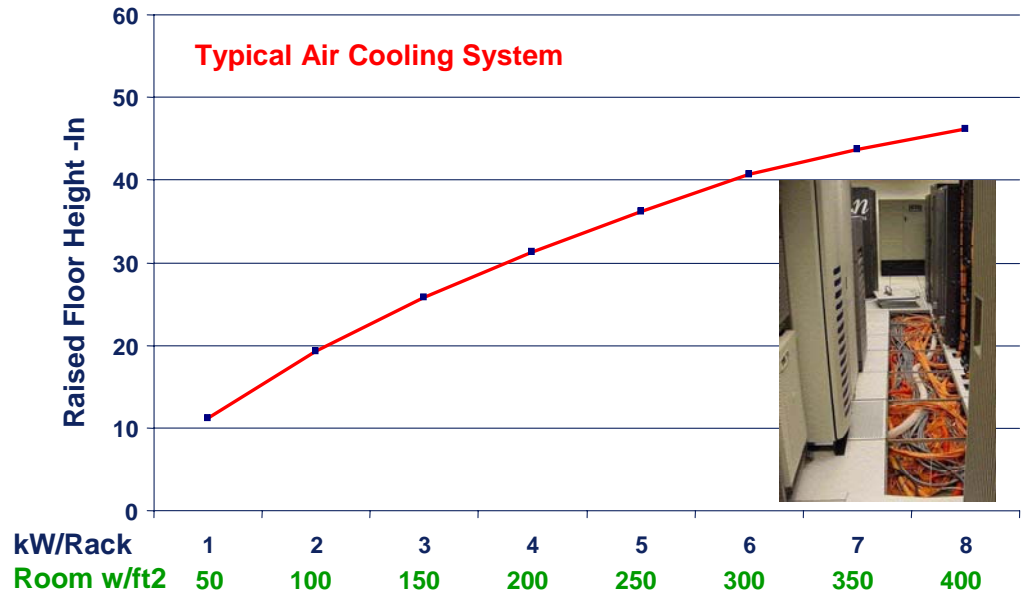


The average server replacement cycle is 3-4 years

The traditional approach has a limit



Minimum Raised Floor Height Vs. Power per Rack

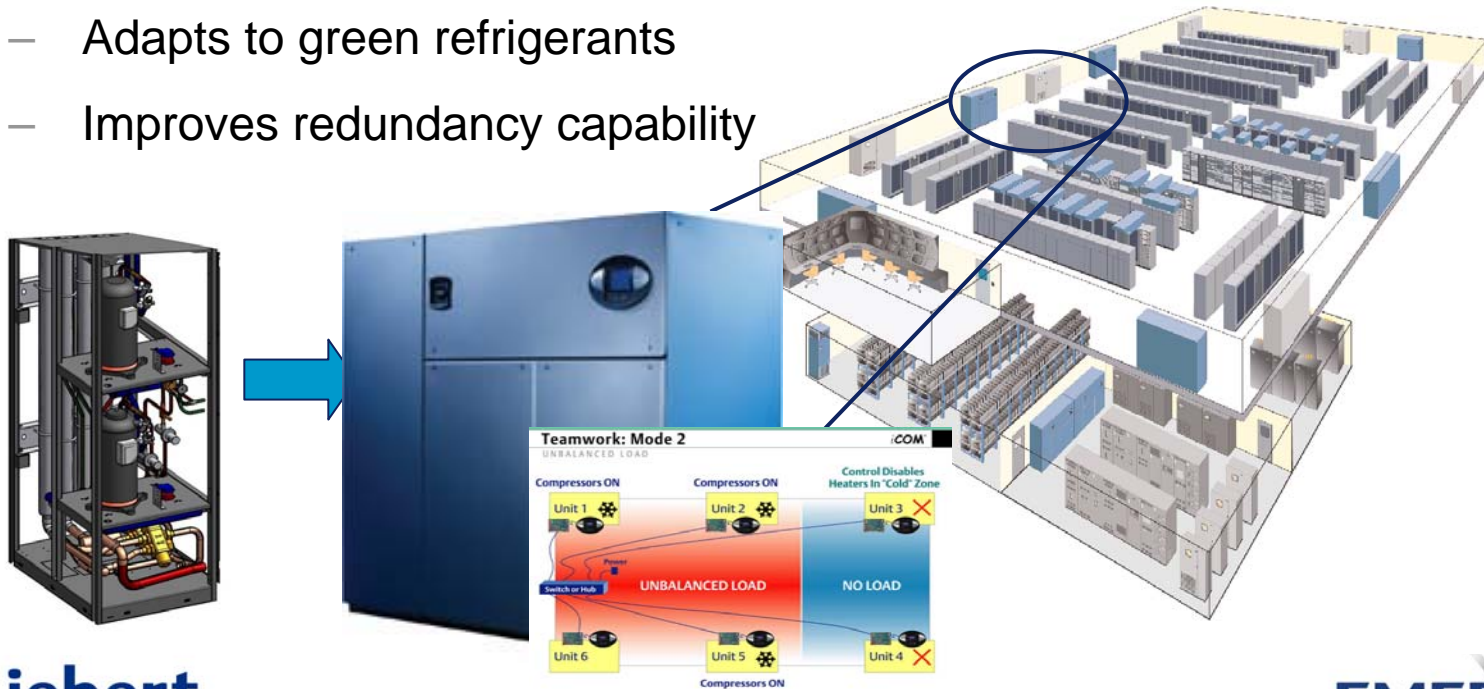


The new IT imperative Liebert Adaptive Cooling



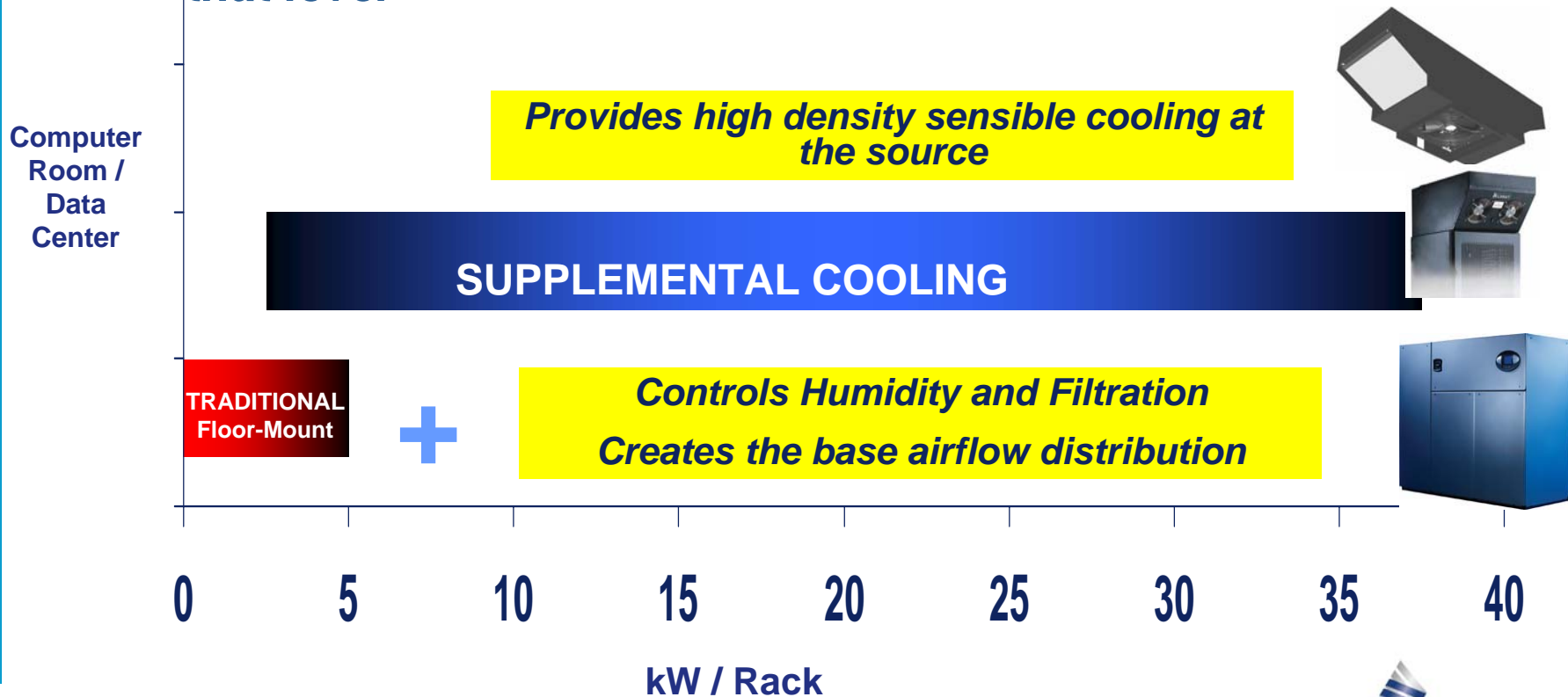
Traditional floor-mount cooling becomes more flexible

- Adaptive Cooling starts with base-load floor-mount cooling
- Modular expansion
- Provides humidity control and filtration
- Digital scroll compressor technology
 - Adapts to green refrigerants
 - Improves redundancy capability



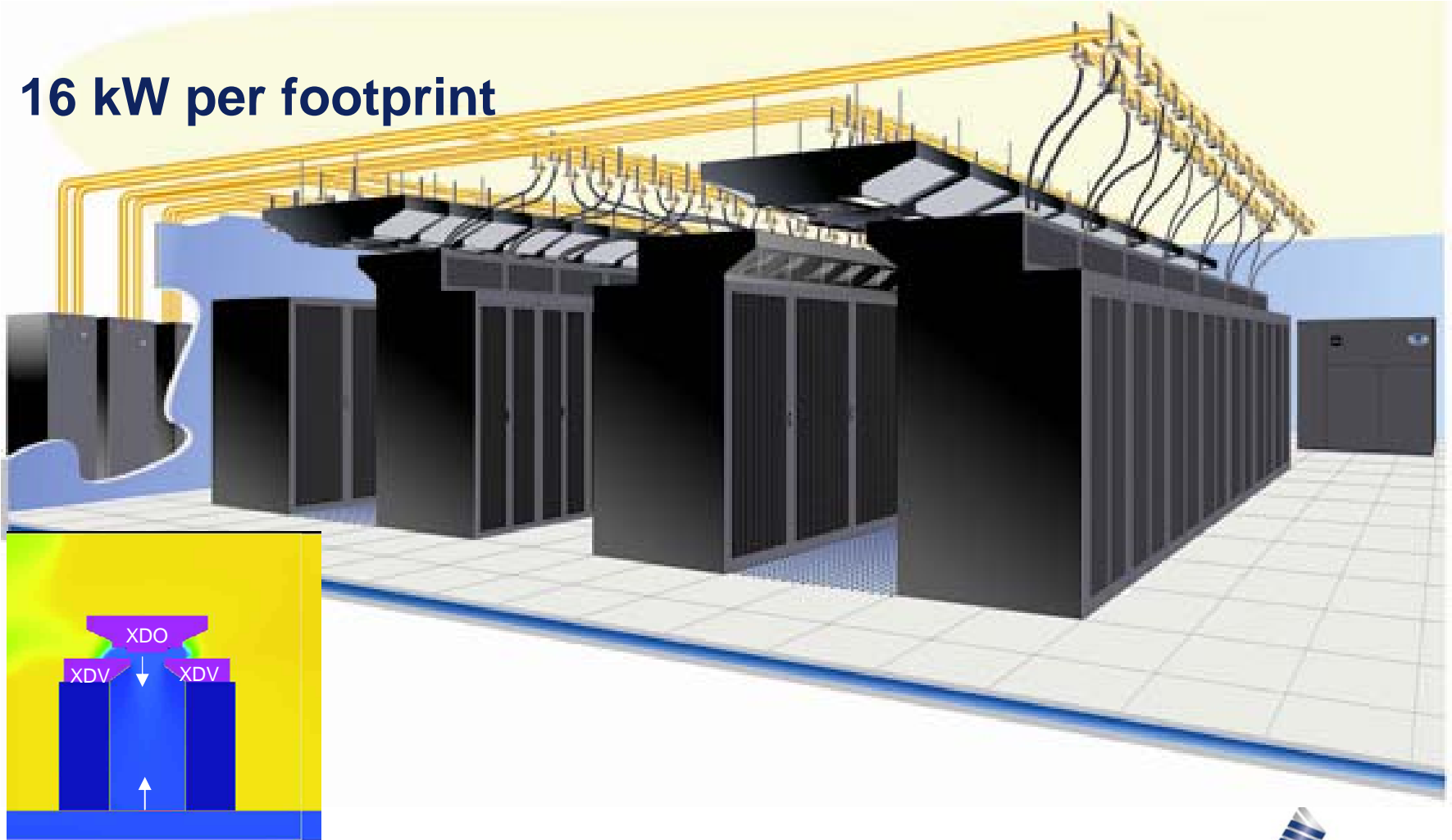
Solving the heat density challenge

Traditional Floor-Mount through the first 100-150 w/sq ft (or 3-4 kW per rack) and Supplemental Cooling above that level



High-density cooling implementation

16 kW per footprint



Weigh your high-density cooling options carefully

- **The Considerations**

- Reliability
- Ability to accommodate change and growth
- Achieving lowest total cost of ownership
- Facility needs (size and square footage)
- Energy efficiency / TCO

The Choices

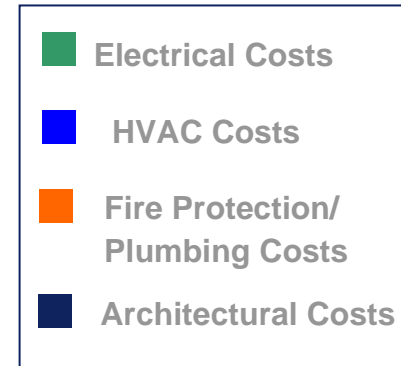
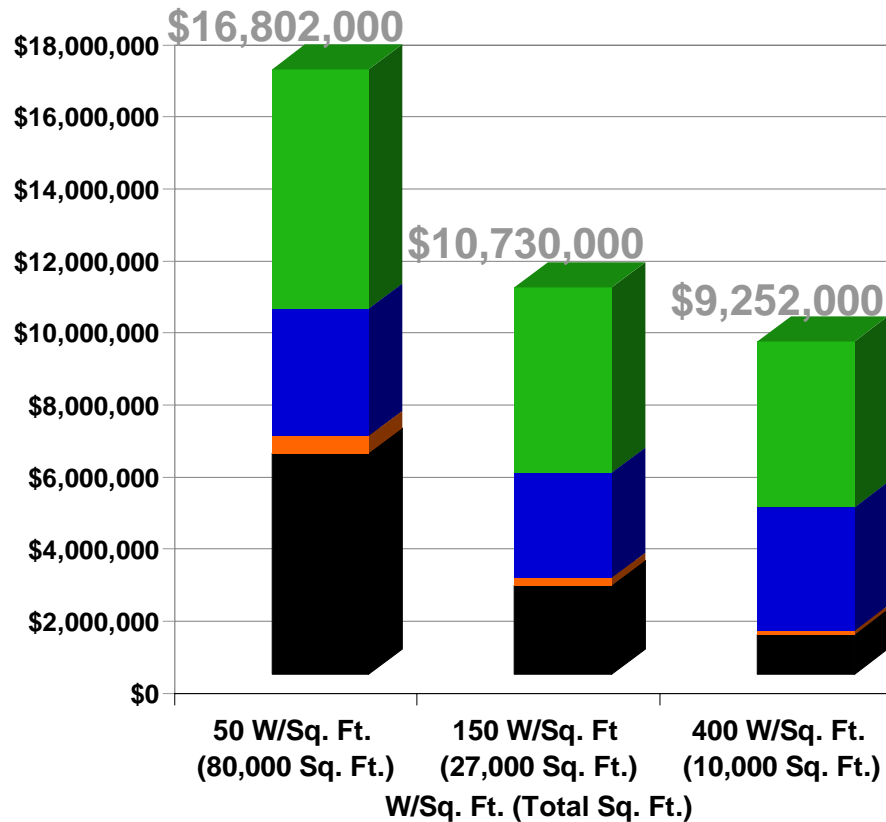
- Liquid cooling technologies: Water vs. refrigerant
- Cooling architectures: Open vs. closed

Supporting high-density systems is cost-effective

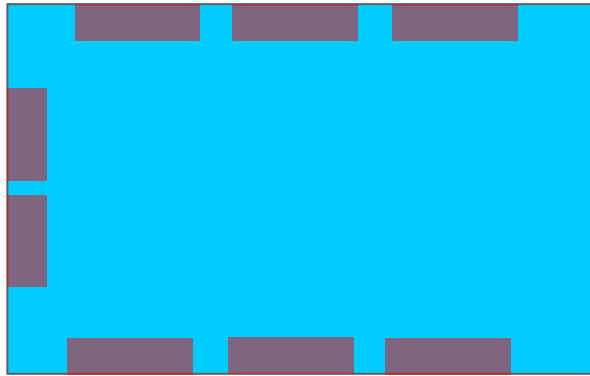
Data Center Cost (New)

Fixed Load of 4,000 kW

Total Building Costs (Less Land)



Supplemental cooling saves floor space



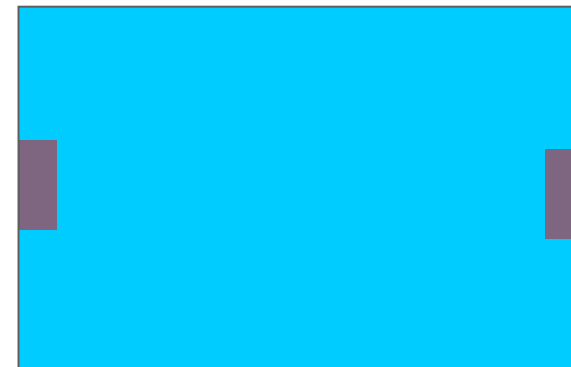
Traditional Cooling Only

Eight 30-Ton Precision
Air Conditioners

(N +2)

284 tons chiller plant

3,000 sq ft



Traditional + Supplemental Cooling

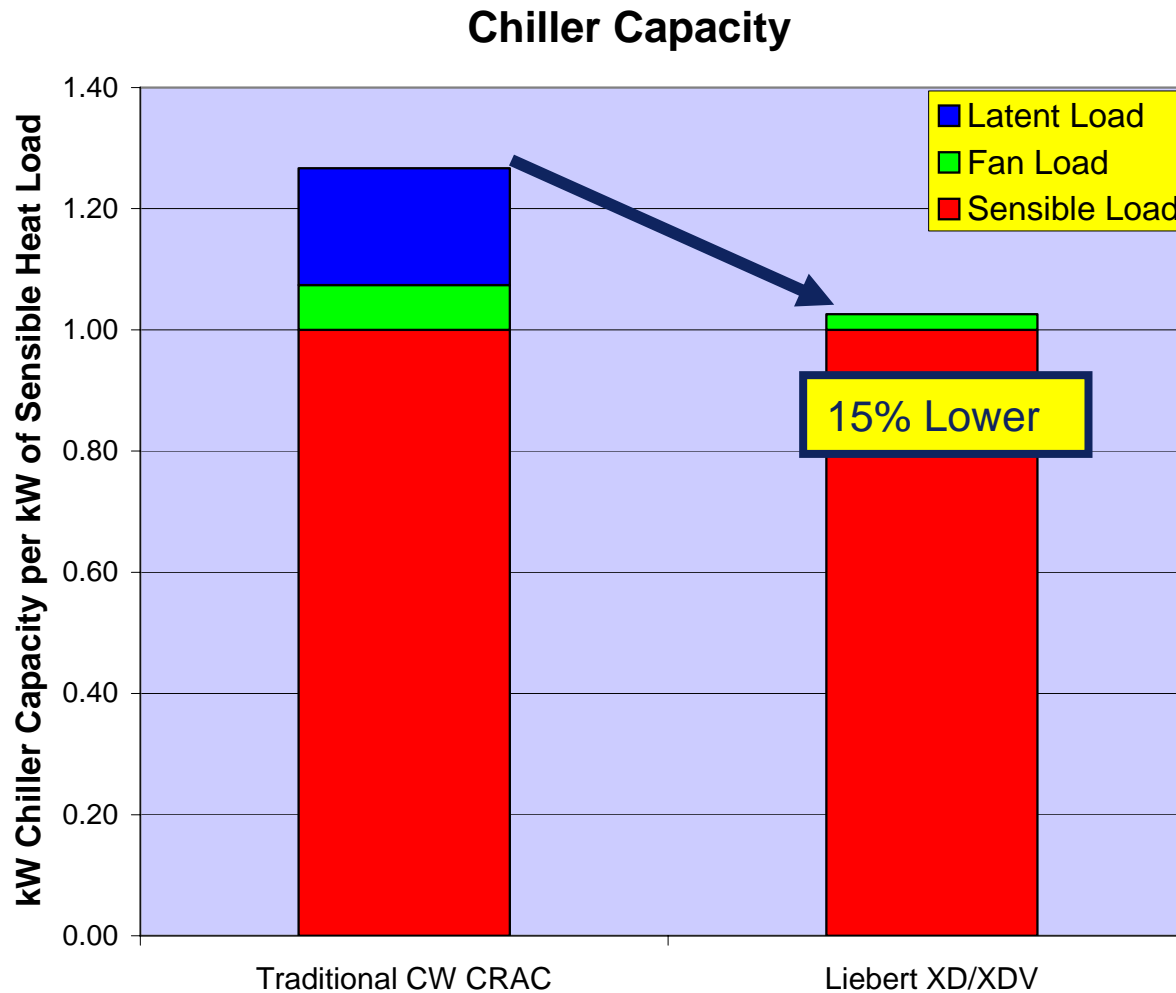
Two 20-Ton Precision
Air Conditioners and 60
zero-footprint high density
cooling modules

33% redundancy

182 tons Chiller Plant

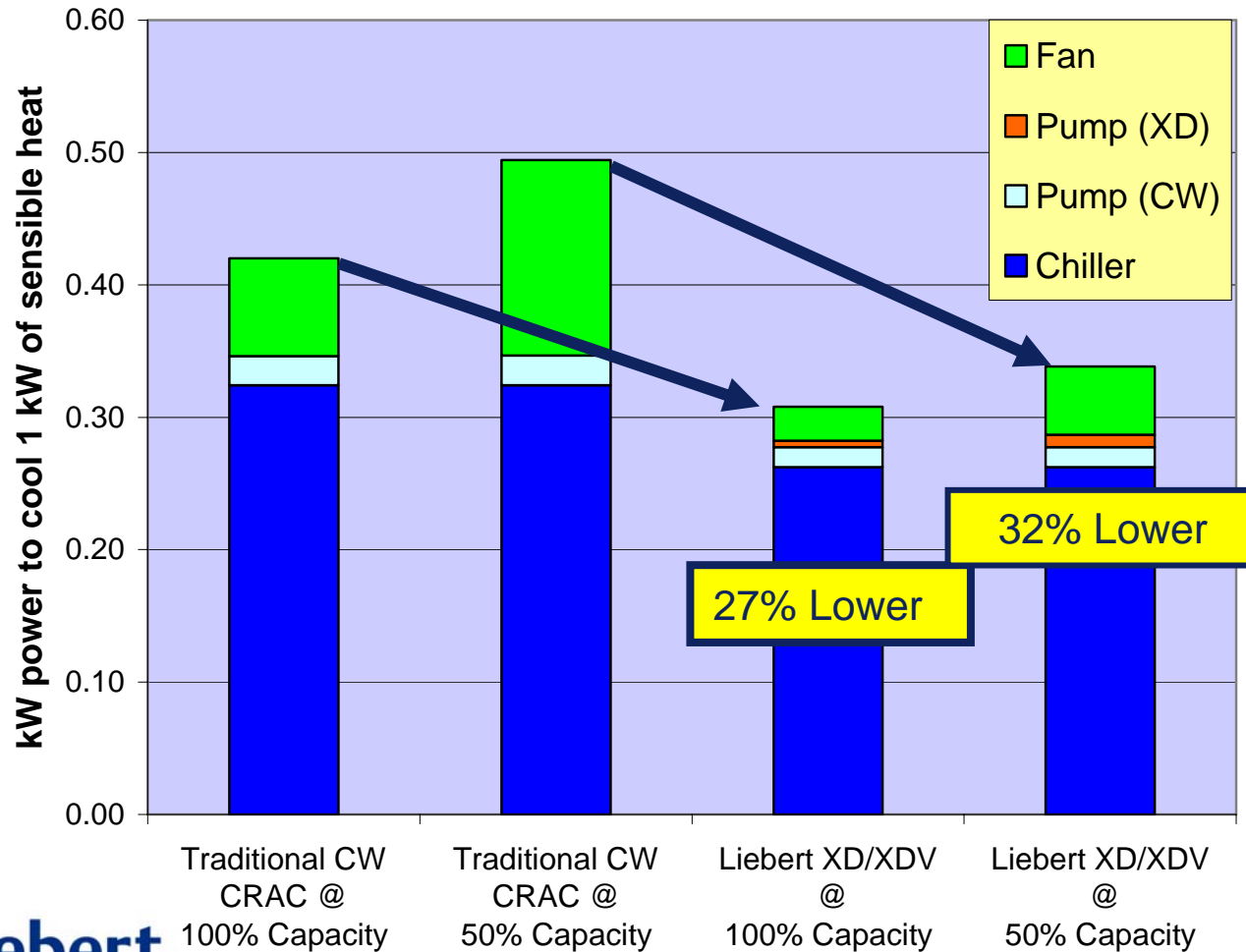
1,500 sq ft

Supplemental cooling requires less chiller capacity



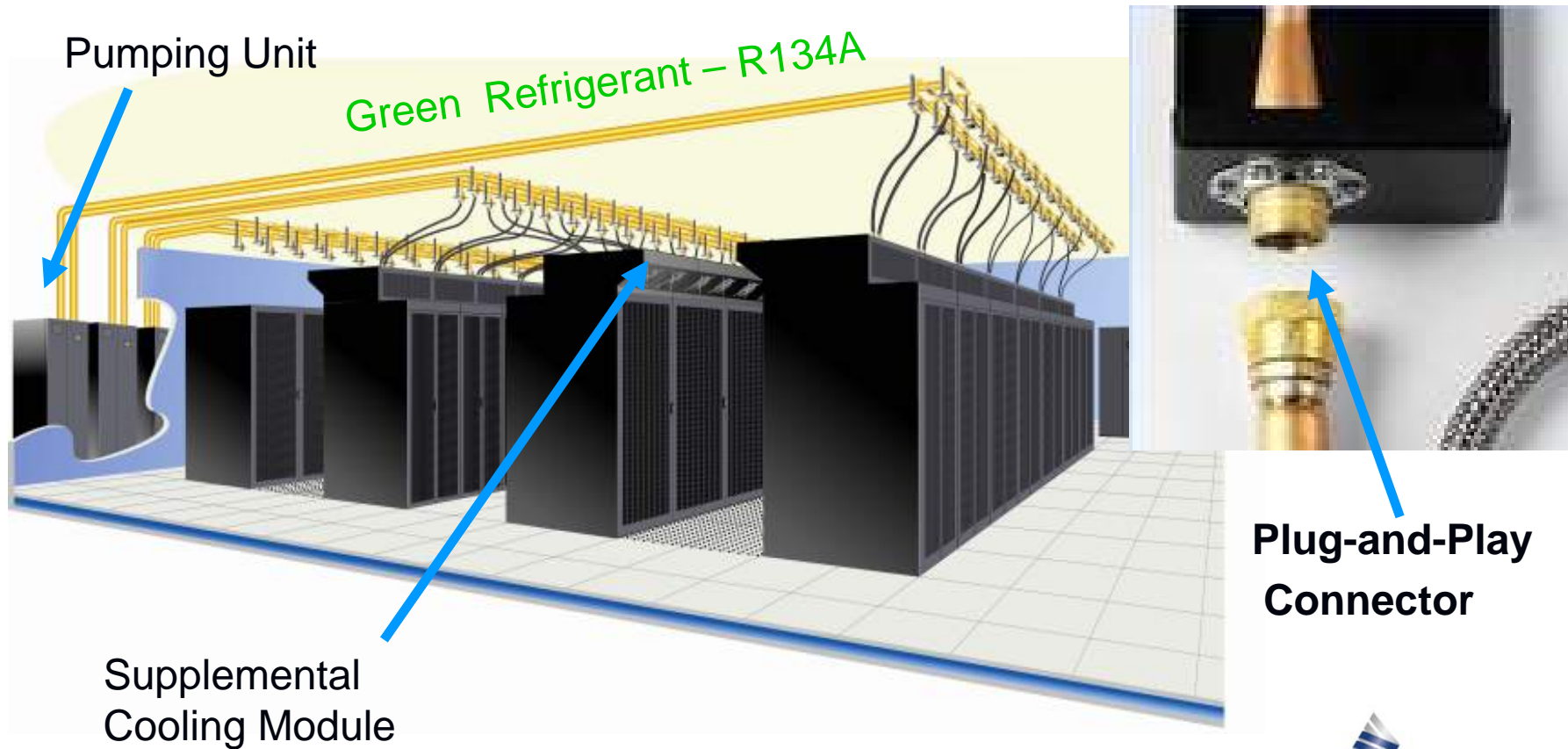
Supplemental cooling lowers operating costs

Annual Power Consumption



Supplemental cooling delivers flexibility

Liebert XD plug-and-play connections and flexible tubing enable cooling to be reconfigured as room conditions change

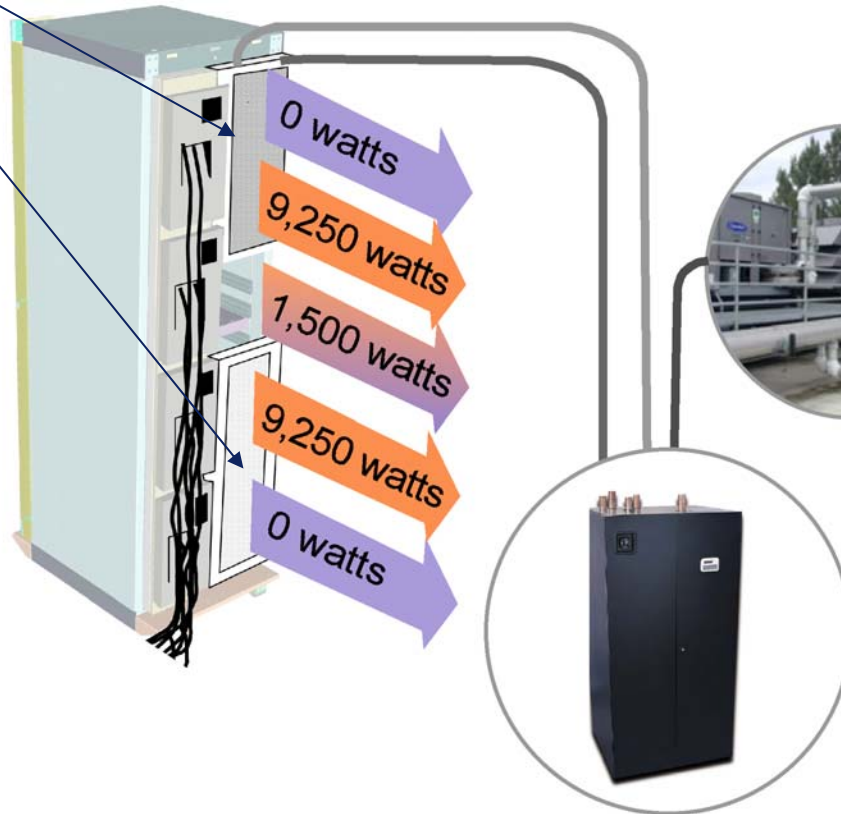


Cooling to the Rack – Liebert / eGenera CoolFrame Technology

Liebert XD CoolFrame Modules

Data Center
Cooling Load
WITHOUT
CoolFrame
Solution
20,000 WATTS

Data Center
Cooling Load
WITH
CoolFrame
Solution **1,500**
WATTS!



Existing
building chillers

Liebert **XDP/XDC**

160 kW liquid
cooling pump unit

Can support 8
BladeFrames

Conclusions

- New technologies will drive higher heat densities at the rack level, however, the data center will continue to have a mix of low- and high-density loads that require a flexible set of solutions
- Leverage the cost advantage of higher density data centers
- To support cooling higher heat loads into the future, it will be necessary to have a reliable fluid delivery means for
 - Rack-centric cooling modules
 - Future embedded and on-chip cooling
- Cooling and solutions must have the capability to adapt to future configurations to protect today's investment tomorrow
- Cost-effective cooling solutions exist that can be employed today that take you into the future

Plan for an adaptive architecture for cooling that meets your needs today and into the future