

ALEXANDER
SCHNEIDER **IT**

 **Liebert**

 **VERTIV**

Datacenter Innovation: The Liebert Smart Aisle

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**Business
Continuity**



TCO
(CAPEX + OPEX)



Agility

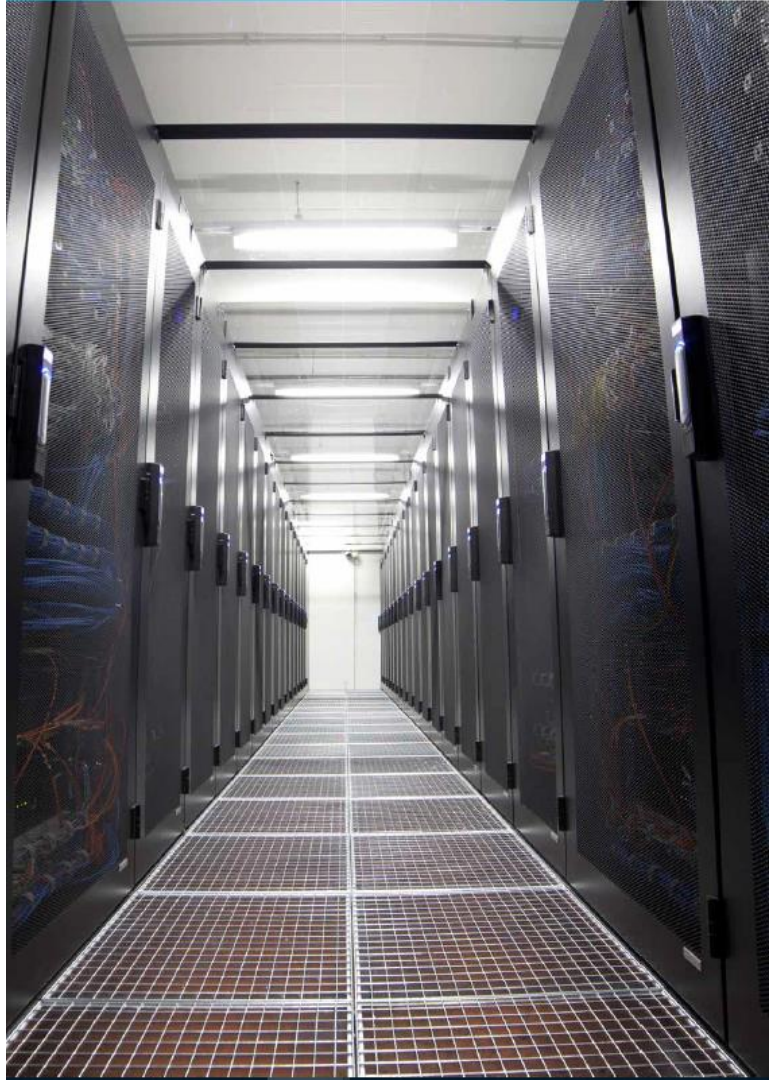
משמעות כלכלית עצומה ליעילות אנרגטית

Case 1: 80KW IT. PUE 2.4

- > Annual Electrical Bill: ₪ 672,768
 - IT: ₪280,320
 - Air-Con: ₪370,023
 - UPS & Other: ₪22,425

Case 2: 80KW IT PUE 1.3

- > Annual Electrical Bill: ₪ 364,416
 - IT: ₪280,320
 - Air-Con: ₪61,671
 - UPS & Other: ₪22,425

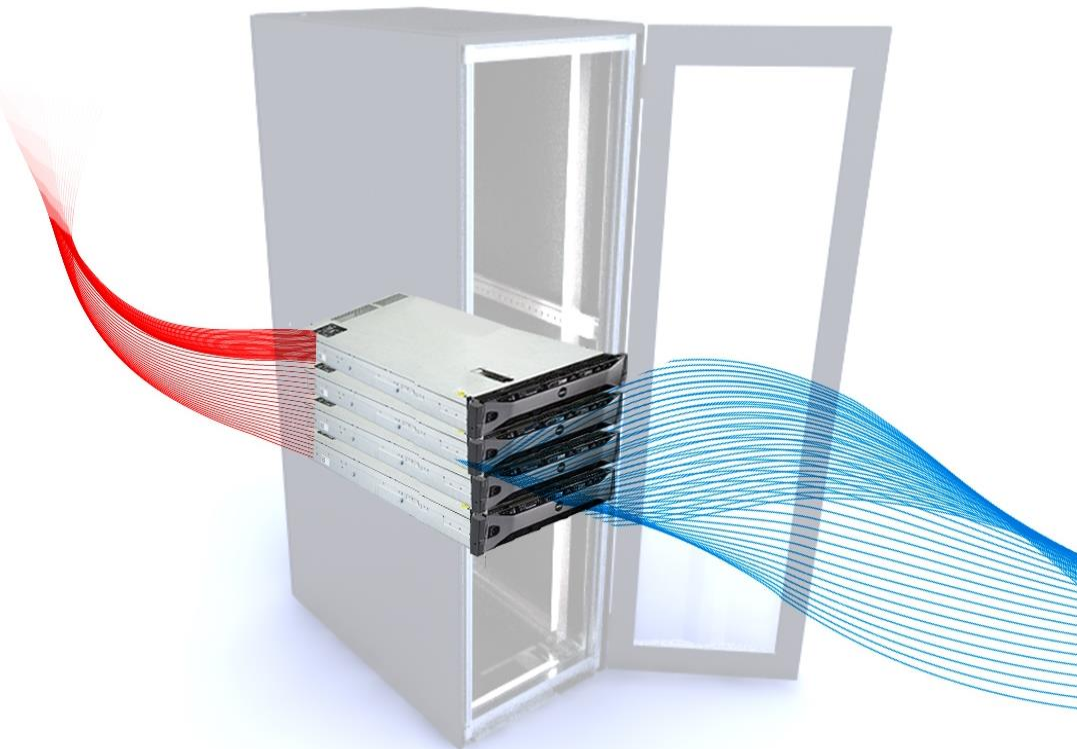




Optimization Of Control Techniques for Air Containments in Data Centers

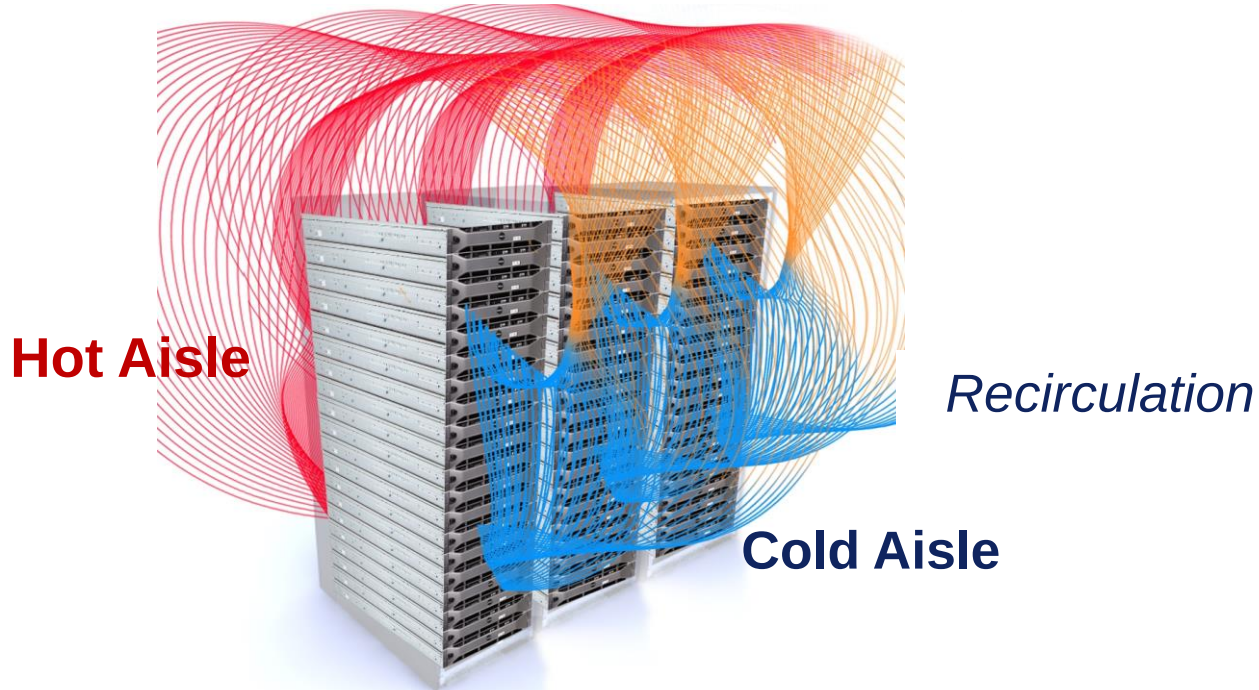
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באופן אידיאלי...

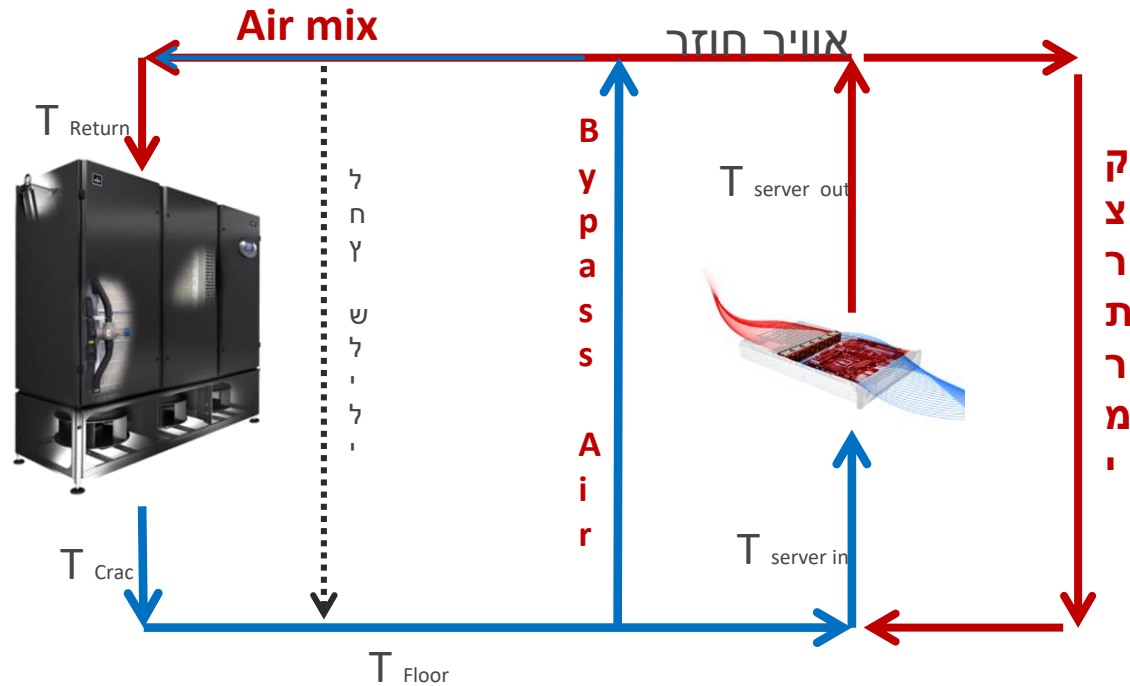


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Airflow is key...



The Reality of Air Flow





מעבר חם סגור



מעבר קר סגור



מעבר חם סגור

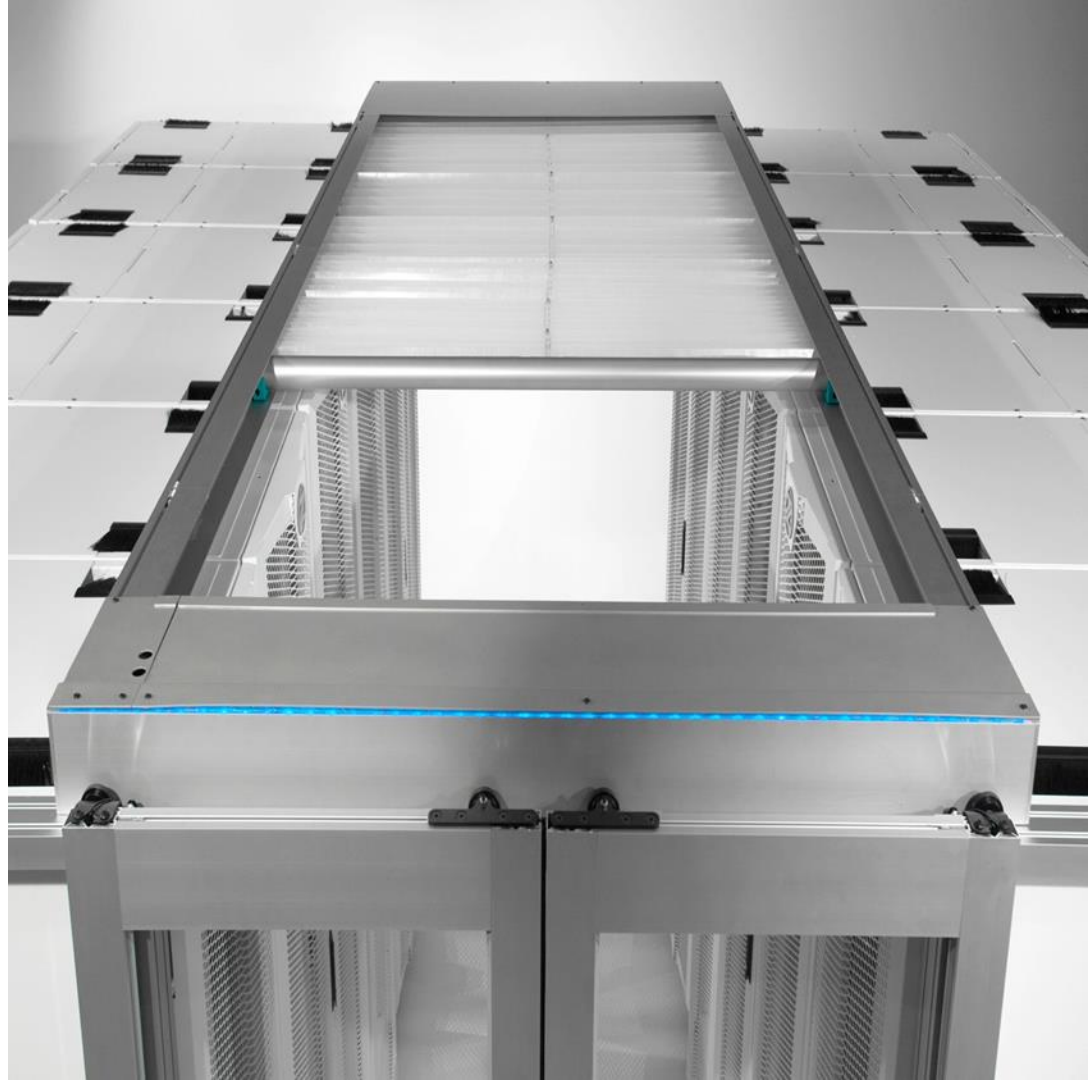


ארונות ארובה

The only NFPA approved
Containment System



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Two Levels of Containment Benefits

Level 1: Mechanical Aisle Containment

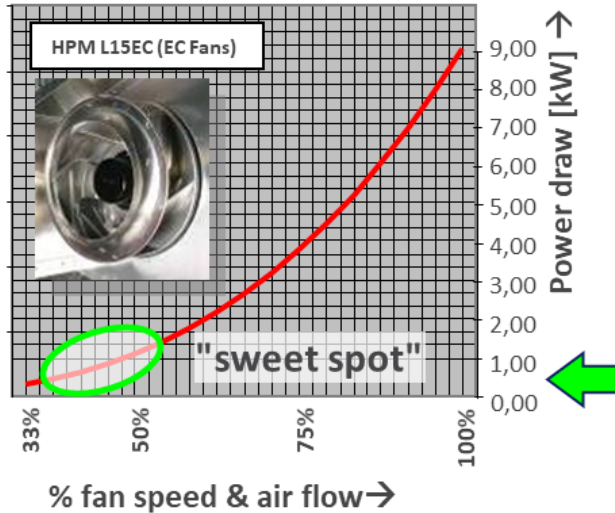
- Improvement but...
- Servers may be under- or oversupplied!

Level 2: Dynamic Control

- High resiliency against failure
- Optimal efficiency
- Agility

Huge Savings from Fan Speed Control

EC fans - speed control

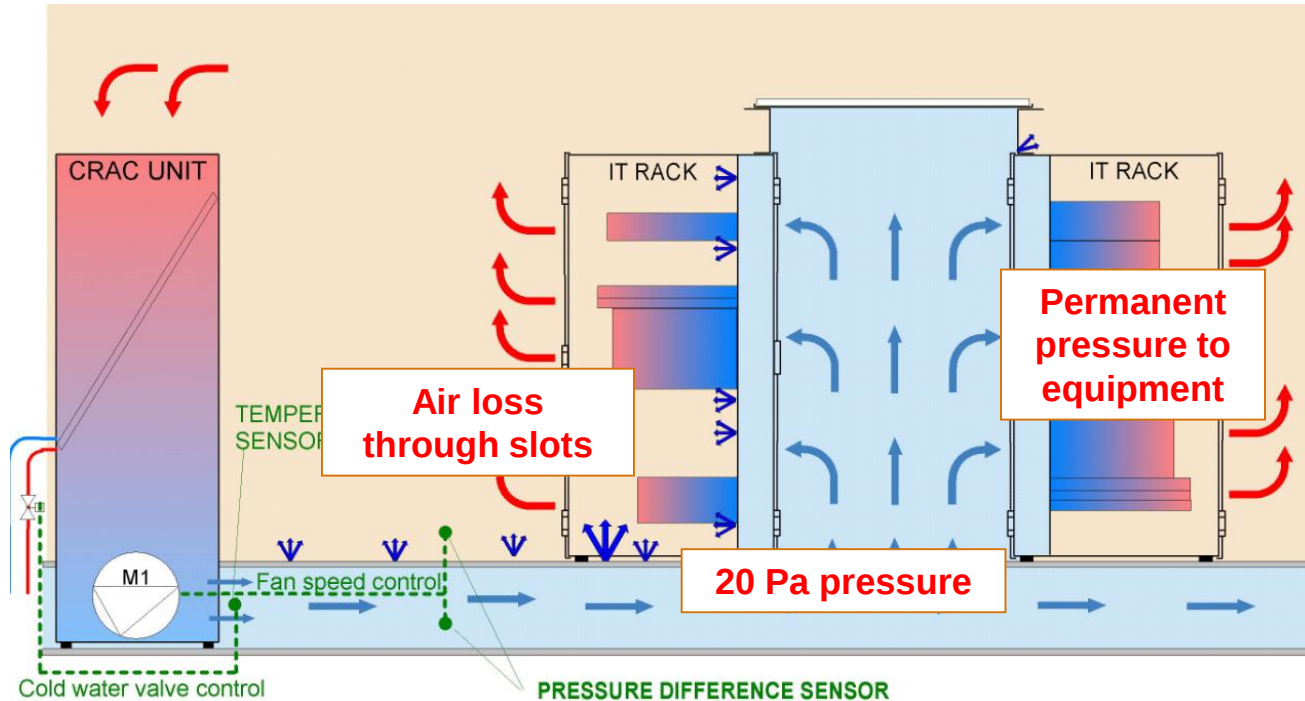


Fan speed control bears enormous savings:

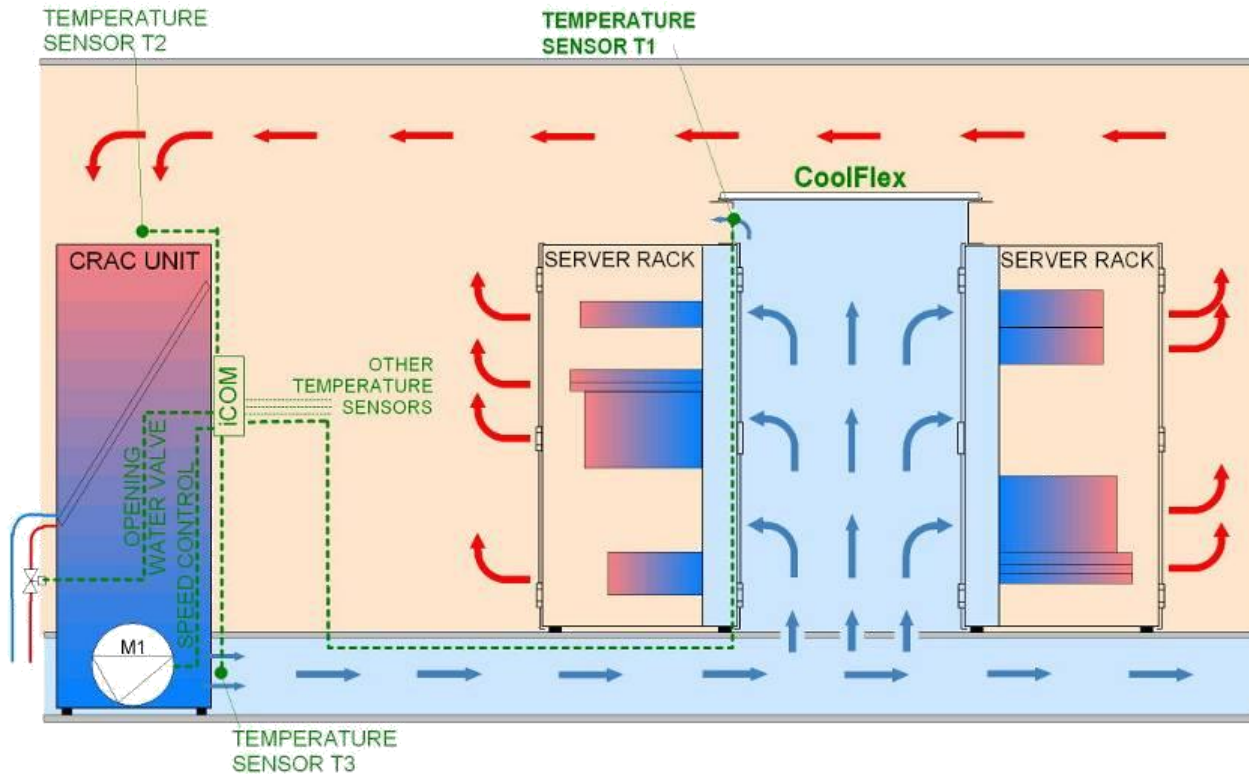
⇒ 1/2 speed ~ 1/8 power

It's all about supplying just the right amount of air ...

Conventional Pressure Difference Control



Advanced SmartAisle Control



Comparison Of Control Principles

Pressure Difference Control

- Pressure under raised floor and within the aisle is kept about 20 Pa above room pressure ...
- Considerable amount of excess air escapes through unavoidable gaps and slots between the components
- Servers are constantly over-pressurized

Dynamic "SmartAisle" Control

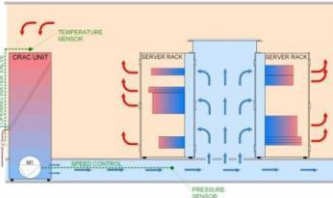
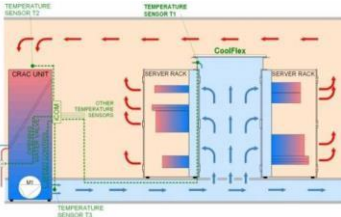
- Temperature sensors in bleeding openings detect in- or outflow of air
- Very sensitive system keeps pressure in the aisle < 1 Pa above room
- Very little excess air escapes
- Servers run under zero pressure difference



Case Study: 240 kW IT-Load

- > 3 cold aisles with 2 x 8 racks
- > 5 kW per rack, 240 kW in the room
- > Equipment Delta T = 15 K
- > Air cooling unit Liebert PH091EL
 - water supply temp. 15°C; water return temp. 20°C
- > Power costs: NIS 0.45 per kWh

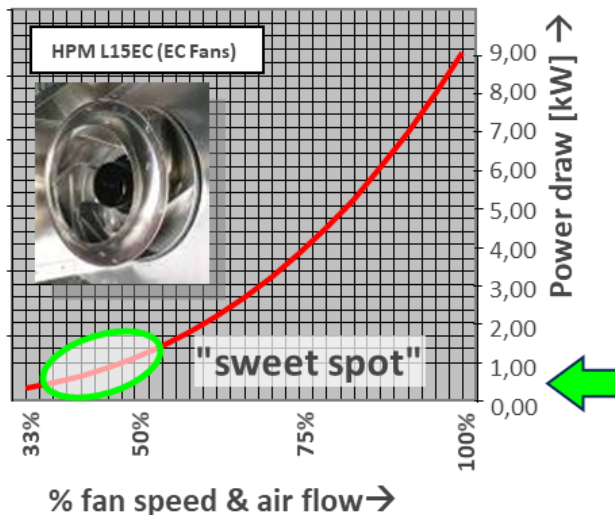
SmartAisle™ vs. Pressure Control

	Pressure Control	SmartAisle
		
Pressure	20 Pa	0...1 Pa
Effective Total Area Slots	→ 0,882 m²	→ 0,899 m²
Air Volume	(52.800 m³/h)	(52.800 m³/h)
→ Necessary Air Volume	→ 89.567 m³/h	→ 57.307 m³/h
Difference 32.260 m³/h		

Substantially smaller air flow with SmartAisle control

Remember the Fan Characteristics ...

EC fans - speed control



Fan speed control bears enormous savings:

⇒ 1/2 speed ~ 1/8 power

Less air leads to huge power savings!



Case Study: 240 kW IT-Load

- > 3 CRAC units* are sufficient
- > For n+1 redundancy, 4 units are required
- > 4th unit adds huge savings
- > The lower air flow with "SmartAisle" control leads to substantially greater savings

דוגמא: המשמעות הכלכלית של משטר ניהול ספיקת האוויר

- > 240 KW IT load
- > 4 x CRACs, N+1

No Control Fans @ 100%	Pressure Control	Liebert Smart Aisle TM
3 Active + 1 off	4 Active units	4 Active units
15.10 KW	10.76 KW	3.4 KW
₪ 56,948 /year	₪42,416 /year	₪13,403 /year

7,250 ₪ הפרש בעלות החשמל השנתית לכל יחידת מ"א

דוגמא: המשמעות הכלכלית של משטר ניהול ספיקת האוויר

- > 270 KW IT load
- > 4 x CRACs 90KW, N+1

No Control Fans @ 100%	Pressure Control	Liebert Smart Aisle TM	
3 Active + 1 off	4 Active units	4 Active units	מס' יחידות
15.10 KW	10.76 KW	3.4 KW	צריכה כוללת
₪ 56,948 /year	₪42,416 /year	₪13,403 /year	עלות חשמל כוללת לשנה
	₪ 10,604	₪ 3,351	עלות חשמל לשנה ליחידה

7,250 ₪ הפרש בעלות החשמל השנתית לכל יחידת מ"א

Smart Aisle is a Standard Option in Liebert

- > Sensors
- > Software
- > For CW CRACs and In-Row
- > For DX CRACs and In-Row



Conclusion

- > Air Flow control is Key to efficiency
- > **Smart Aisle** achieves Considerable savings over Pressure control or no-control of air



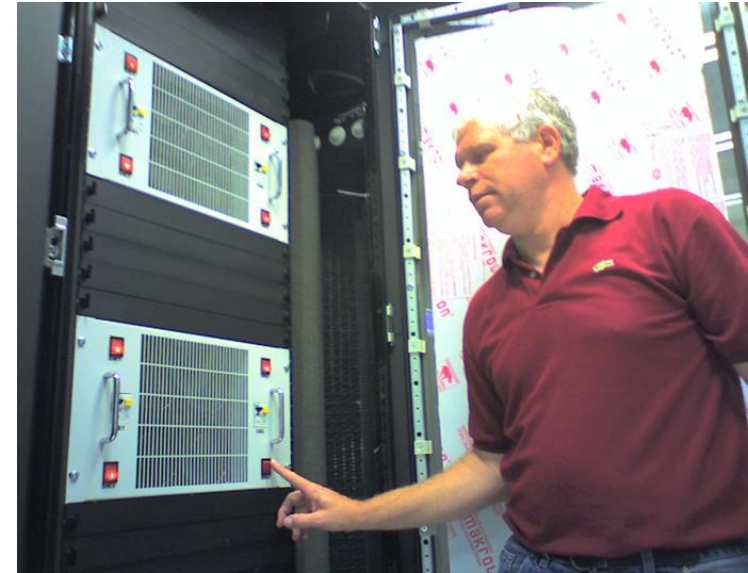
Need Verification?

> Eurovent



> Factory Witness Test

> Real-World Commissioning





Best of Breed

Solutions for resilient, energy efficient Critical Sites



Let's Talk



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