

**ALEXANDER
SCHNEIDER**

THE POWER OF EXCELLENCE



The Road to 1.2 PUE in Israel

Yigal Schneider, General Manager



Emerson Network Power
is now Vertiv



 **Liebert.**

קצת על אלכסנדר שניידר...



Alexander Schneider IT

Solutions for resilient, energy efficient Critical Sites

- > Air-Conditioning
- > UPS
- > Rack PDUs, Transfer Switches
- > Racks & Cabinets
- > Connectivity
- > Cable Pathways
- > Busways
- > DCIM
- > KVM
- > Professional Services



Alexander Schneider IT

Solutions for resilient, energy efficient Critical Sites



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THE POWER OF EXCELLENCE

THE DATACENTER EXPERIENCE CENTER



Datacenter Objectives



**Business
Continuity**



**TCO
(CAPEX + OPEX)**



Agility

OPEX

חשבון החשמל השנתי למיזוג אוויר בחוות שרתים (נח)

	PUE	PUE	PUE	PUE	PUE
	3	2.5	2	1.5	1.2
100KW	683,280	508,080	332,880	157,680	52,560
200KW	1,366,560	1,016,160	665,760	315,360	105,120
500KW	3,416,400	2,540,400	1,664,400	788,400	262,800
1MW	6,832,800	5,080,800	3,328,800	1,576,800	525,600
5MW	34,164,000	25,404,000	16,644,000	7,884,000	2,628,000

קוּוּט"ש = 40 אג'
הנחה: אובדנים בשל UPS, תאורה והולכה = 8% מצריכת ה IT

חשבון החשמל השנתי בחוות שרתים של מיזוג האוויר בלבד (ש)

	PUE	PUE	PUE	PUE	PUE
	3	2.5	2	1.5	1.2
100KW	683,280	508,080	332,880	157,680	52,560
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חשבון החשמל השנתי בחוות שרתים של מיזוג האוויר בלבד (ש)

חוות שרתים של 100KW IT

	PUE	PUE	PUE	PUE	PUE
	3	2.5	2	1.5	1.2
100KW	683,280	508,080	332,880	157,680	52,560
200KW	1,366,560	1,016,160	665,760	315,360	105,120
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קוּוט"ש = 40 אג'

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חיסכון: ₪ 308,000 בשנה

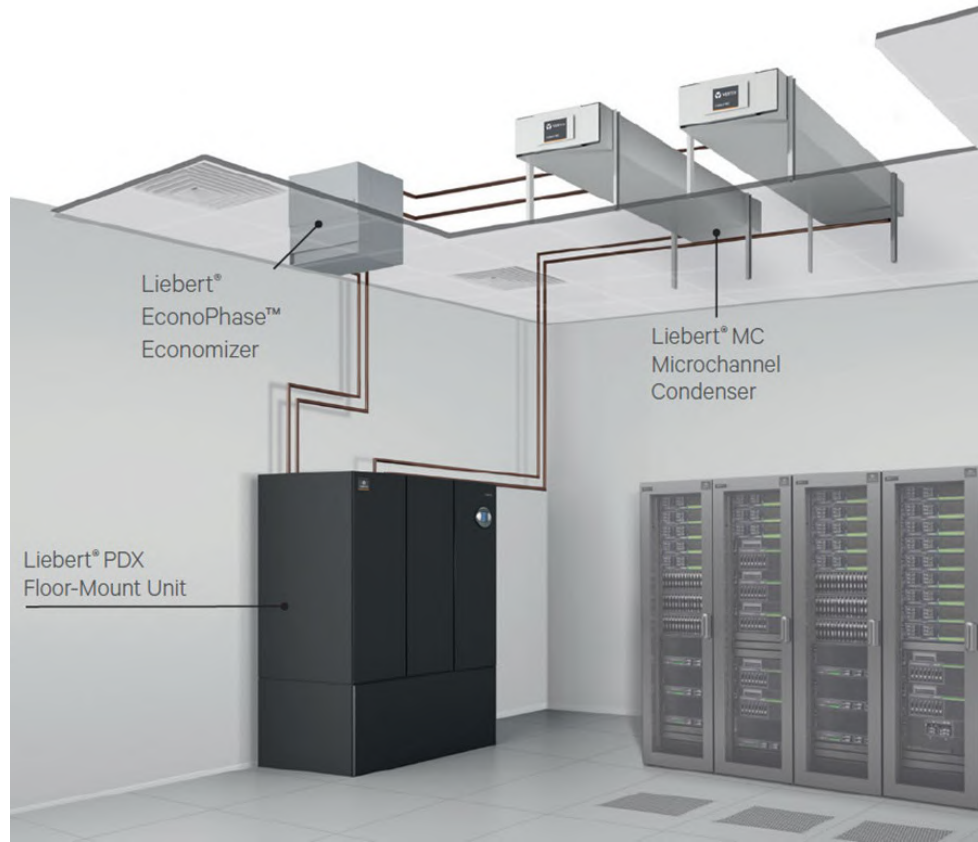
אזור חיפה

Case 1: Legacy. 80KW IT. PUE 2.4

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

Case 2: Econophase: 80KW IT PUE 1.3

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 - Air-Con: ₪61,671
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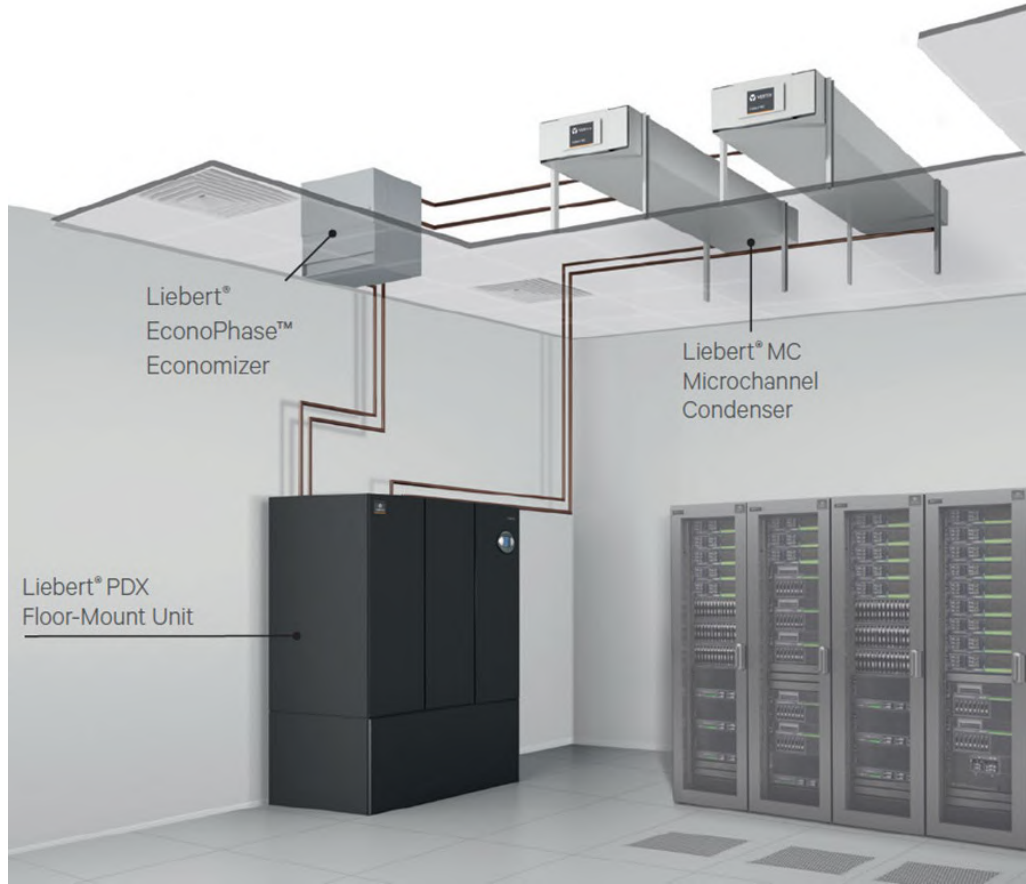


Liebert EconoPhase: Free Cooling DX

Significant End User Savings

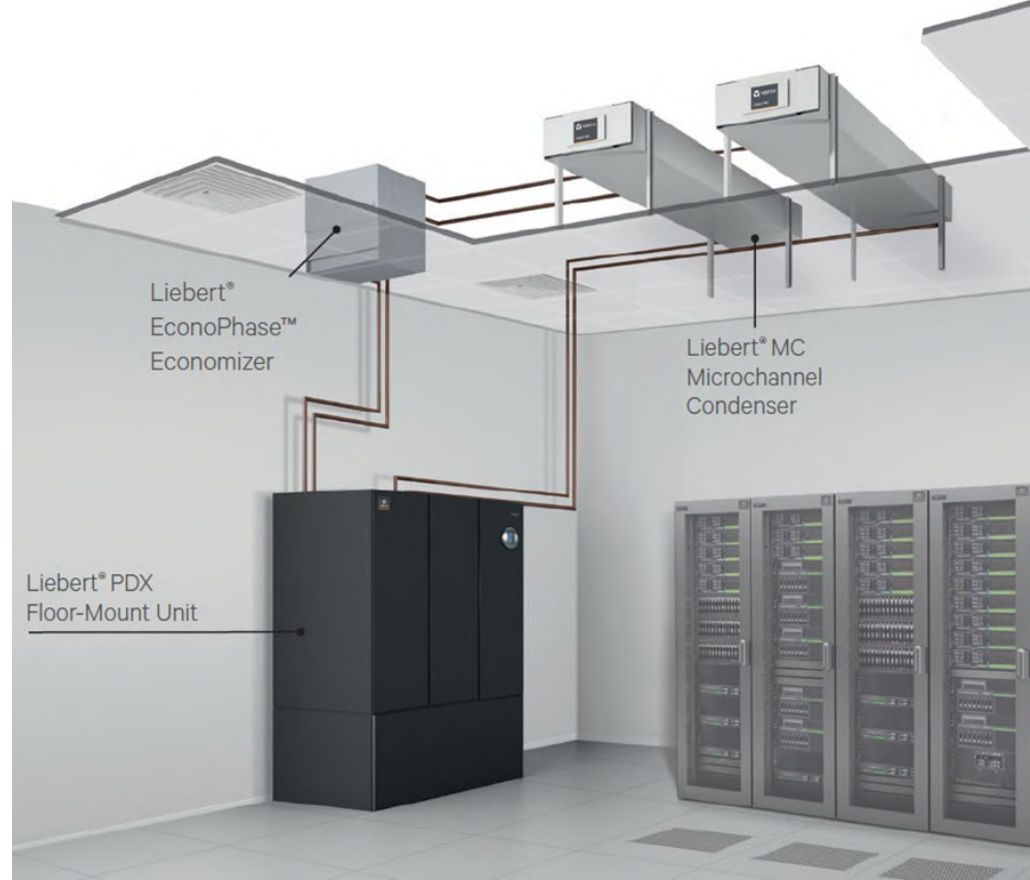
📍 New Rooms

📍 Retrofit



Introducing: EconoPhase: Free Cooling DX

- 📍 For 50KW-500KW sites
- 📍 For maximum benefits, we need to use Best Practices

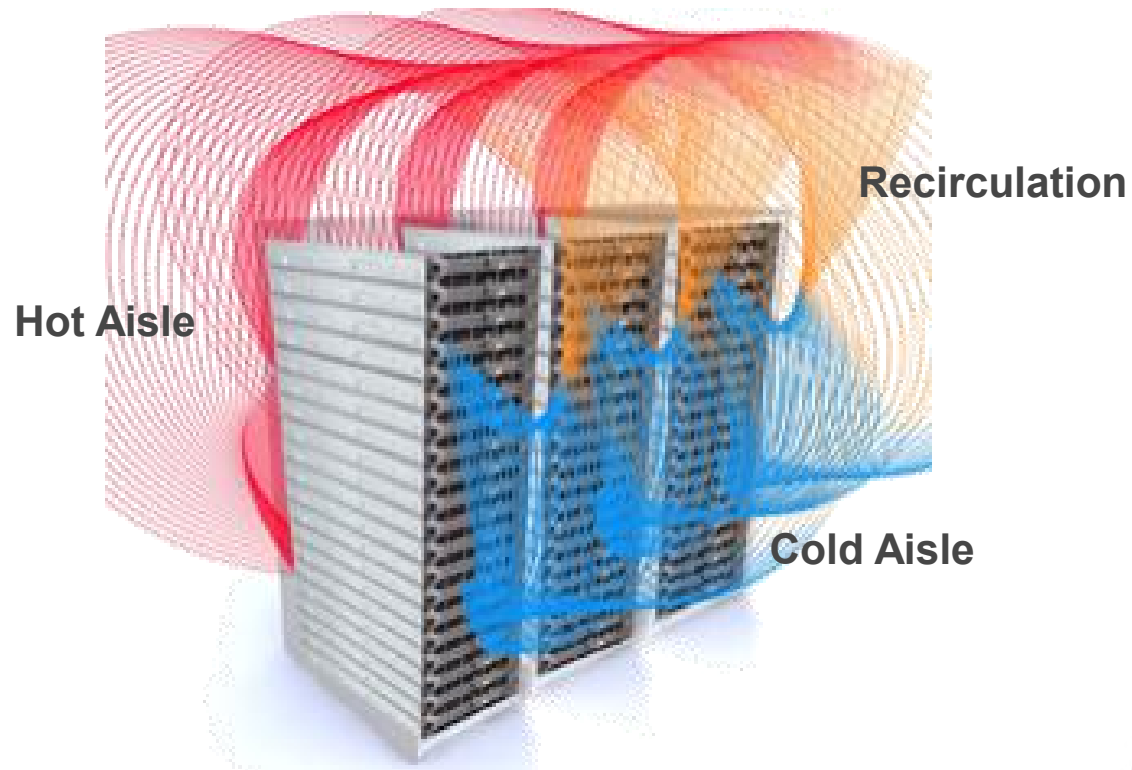


The Road to a PUE of 1.2

- 📍 **Air (Hot/Cold) Containment**
- 📍 Advanced Air Flow Management
- 📍 Efficient CRACs
- 📍 Econophase: Free Cooling DX



Airflow is the Key





מעבר חם סגור



מעבר קר סגור



מעבר חם סגור



ארונות ארובה

Application Flexibility



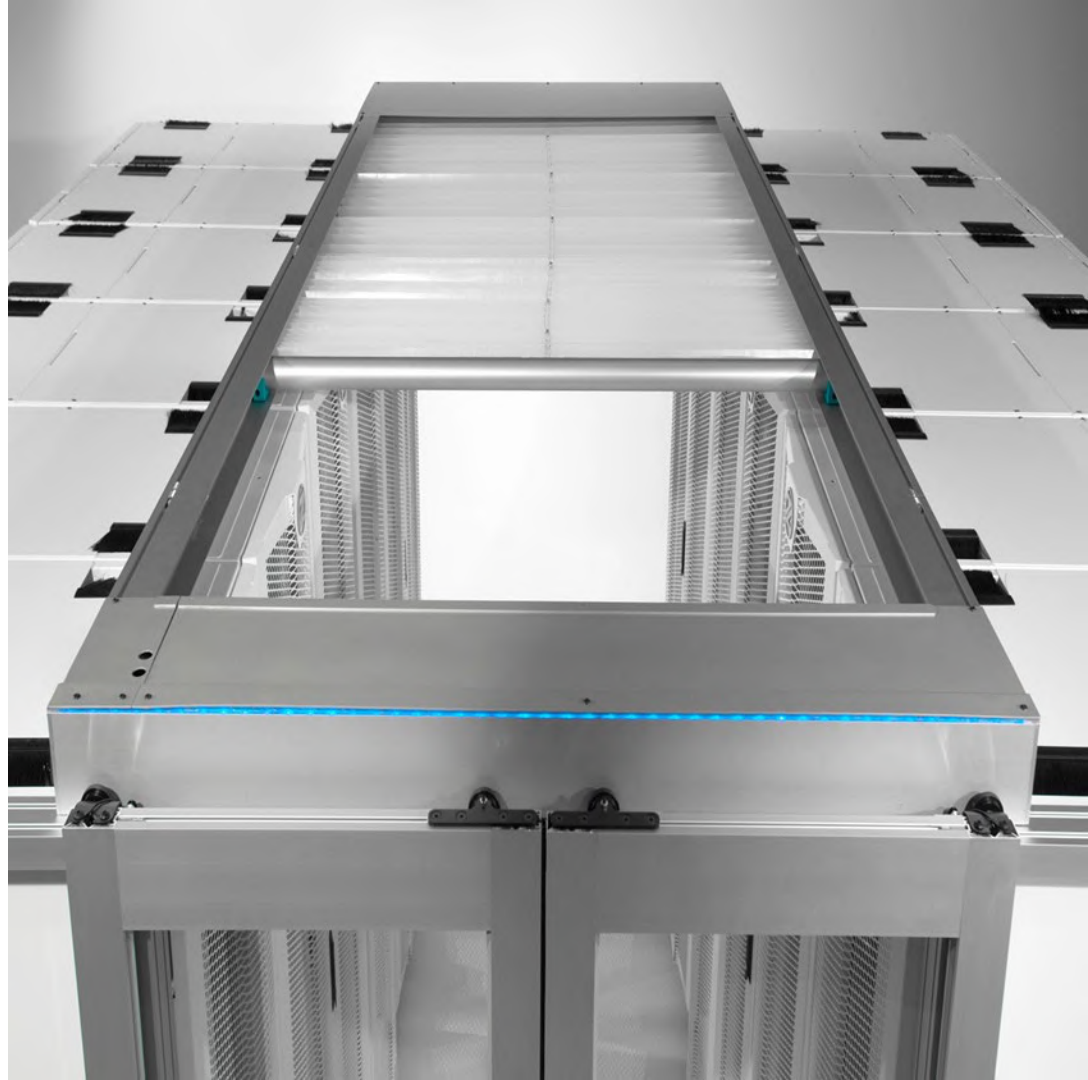
PANDUIT®

**ALEXANDER
SCHNEIDER**

The only NFPA approved
Containment System



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The Road to a PUE of 1.2

- 📍 Air (Hot/Cold) Containment
- 📍 **Advanced Air Flow Management**
- 📍 Efficient CRACs
- 📍 Econophase: Free Cooling DX





Two Levels of Containment Benefits

Level 1: Mechanical Aisle Containment

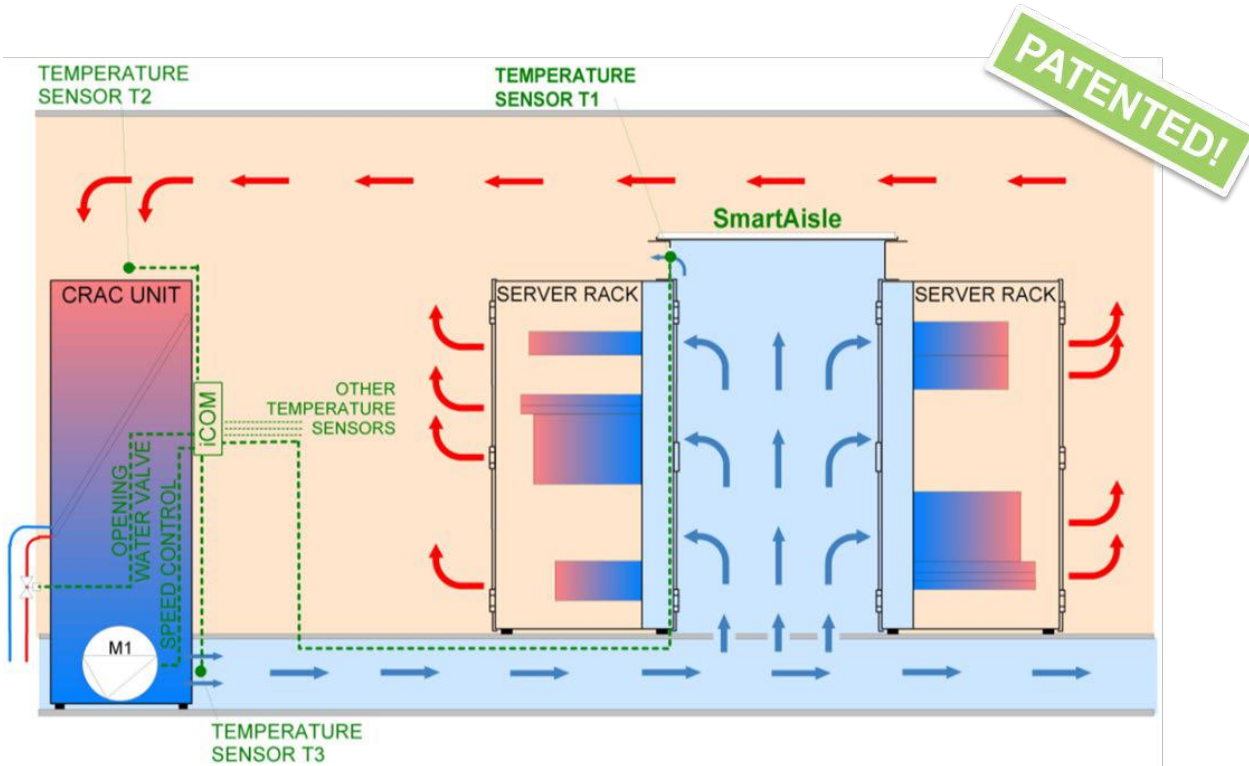
- Improvement but...
- Servers may be under- or oversupplied!

Level 2: Dynamic Control

- High resiliency against failure
- Optimal efficiency
- Agility

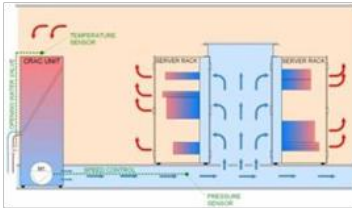
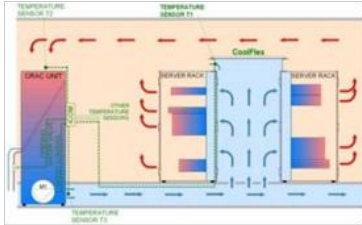
Containment with Active Airflow Management is Key

SmartAisle™ Dynamic Control



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SmartAisle™ vs. Pressure Control

	Pressure Control	Liebert SmartAisle
		
Pressure	20 Pa	0...1 Pa
Effective Total Area Slots	→ 0,882 m ²	→ 0,899 m ²
Air Volume	(52.800 m ³ /h)	(52.800 m ³ /h)
→ Necessary Air Volume	→ 72,021 m ³ /h	→ 55.973 m ³ /h
Difference 16.048 m ³ /h		

Substantially smaller air flow with SmartAisle control

Air Flow Control Methods - Comparison

Power for run of the CRACs	Pressure Control	SmartAisle
No control (3 CRACs 90KW, oversupply)	fan speed 100% 15,03 kW ≈ 59,000/year	
“full-load operation” (3 CRACs)	fan speed 98% 14,43 kW	fan speed 67% 5,25 kW
“normal operation” (4 CRACs)	fan speed 78% 10,76 kW	fan speed 52% 3,40 kW ≈ 13,400/year

Reducing Power Big Time With SmartAisle!

The Road to a PUE of 1.2

- 📍 Air (Hot/Cold) Containment
- 📍 Advanced Air Flow Management
- 📍 **Efficient CRAHs**
- 📍 Econophase: Free Cooling DX



Power Input and Annual Electricity Cost

at 70KW net sensible cooling

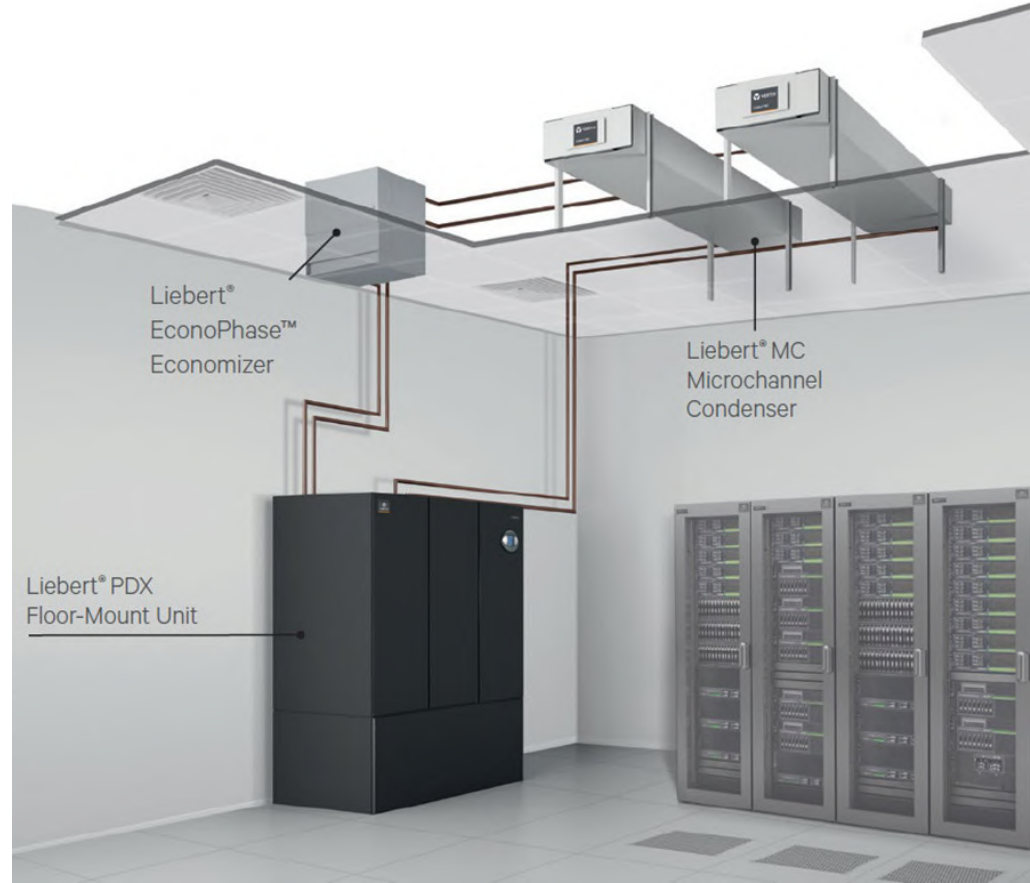
Model	Description	Power input KW	Annual KWh	Annual €	Max Net sensible capacity KW	Dimensions mm W x D x H
New Liebert PH066DL	Extended	0.75	6,570	3,198	95KW	1750x890x2570
Currently Installed 17-year-old CRAC	Standard	7.2	63,070	30,703	70KW	

@ 7-12 CW, 30C return air, 70KW

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The Road to a PUE of 1.2

- 📍 Air (Hot/Cold) Containment
- 📍 Advanced Air Flow Management
- 📍 Efficient CRACs
- 📍 **Econophase: Free Cooling DX**



What is Liebert EconoPhase™?

Economizer for
space cooling

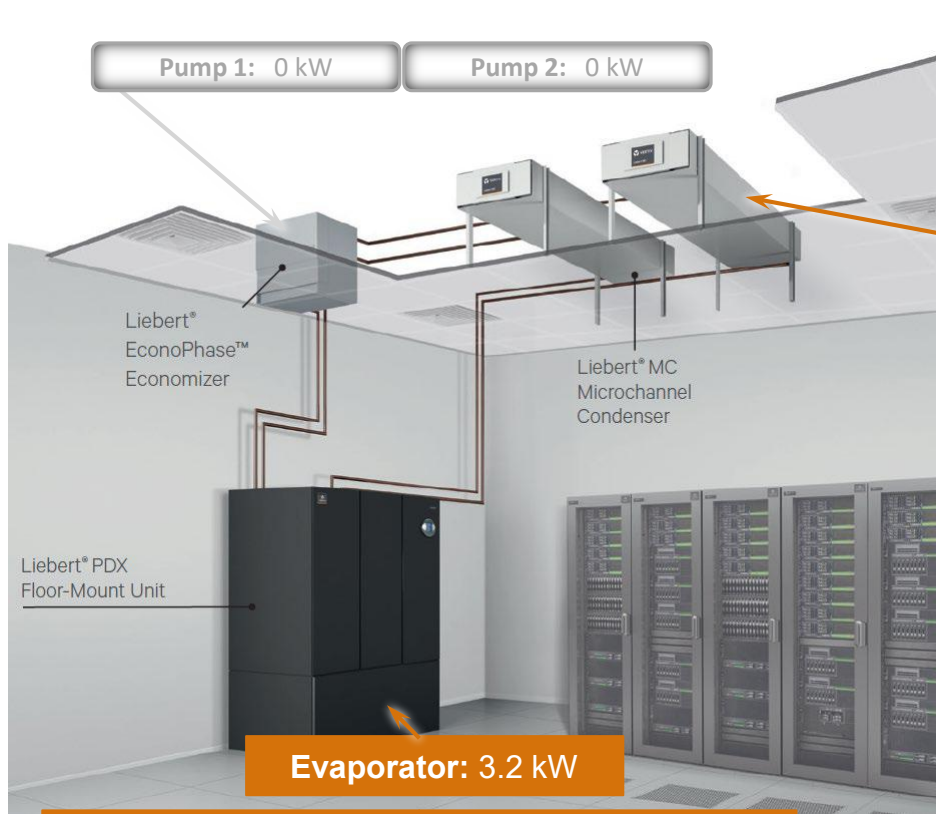
Pumps become
active when ΔT is
good for operation

Pumps use
approximately 10%
of the compressor
power



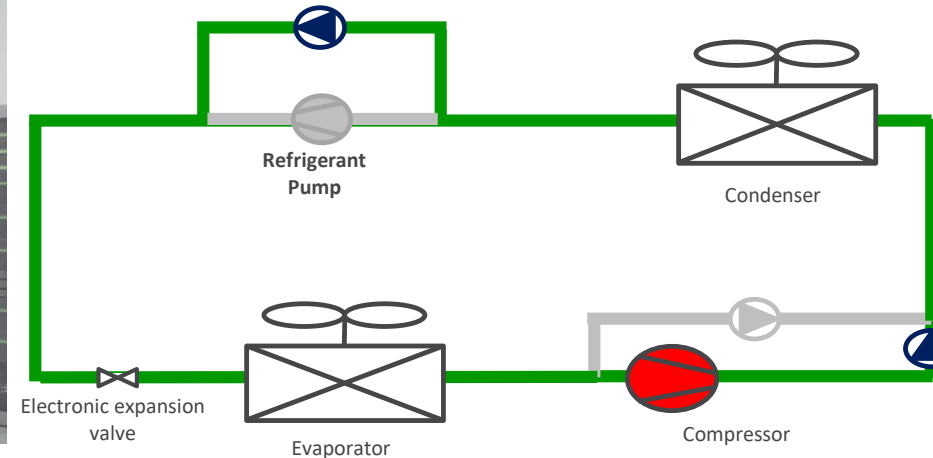
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The Most Efficient System: DX operation mode



Cooling Mode	Outdoor Temp. (°C)	pPUE
Full Compressor	35	1.28

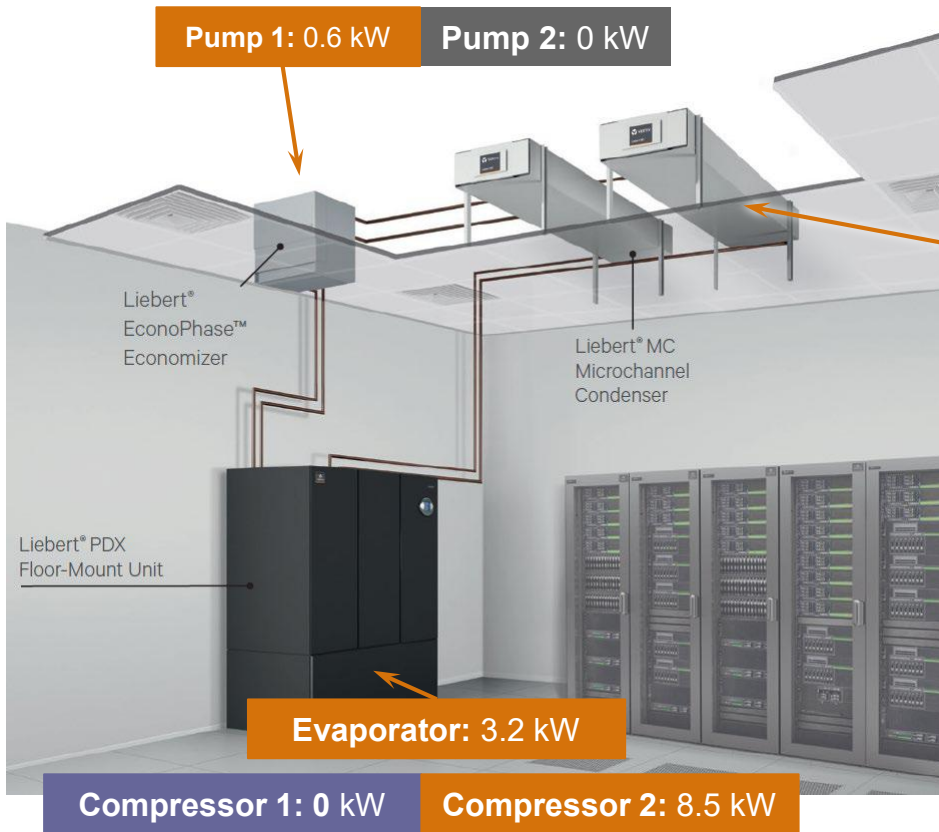
Condenser: 3.9 kW



Compressor 1: 8.5 kW Compressor 2: 8.5 kW

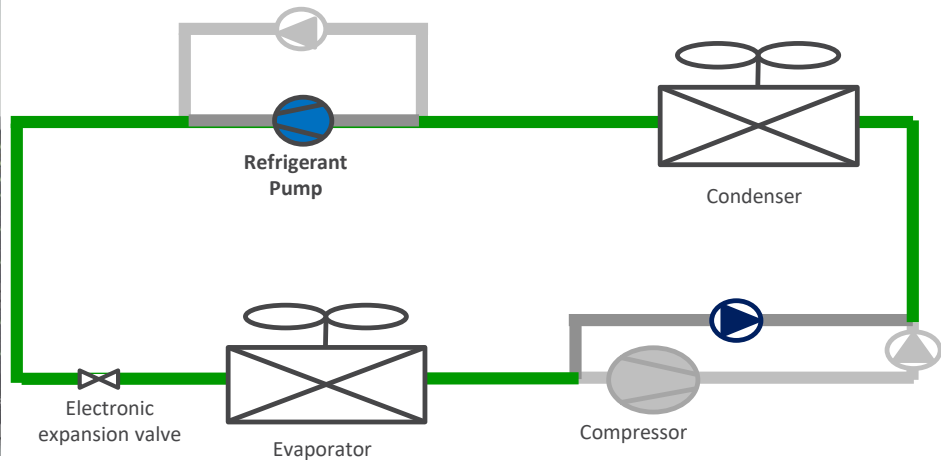
DX Operation Mode

Most Efficient System: Full and Partial Economization



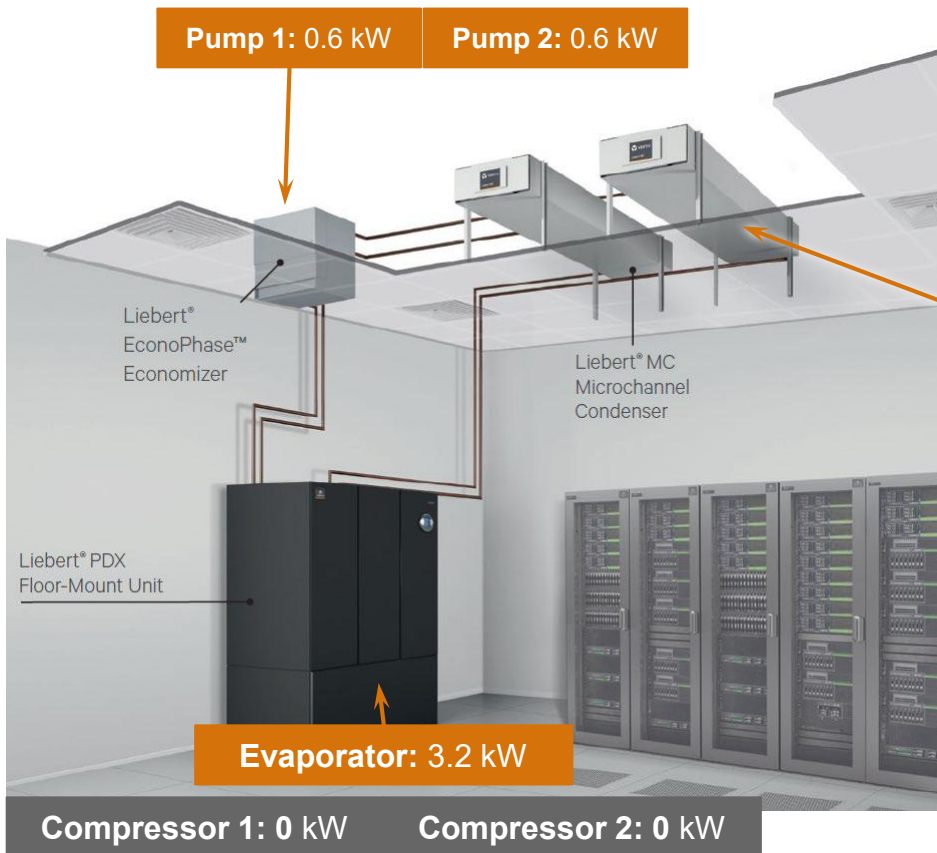
Cooling Mode	Outdoor Temp. (°C)	pPUE
Full Compressor	35	1.28
Partial EconoPhase	18	1.17

Condenser: 3.9 kW

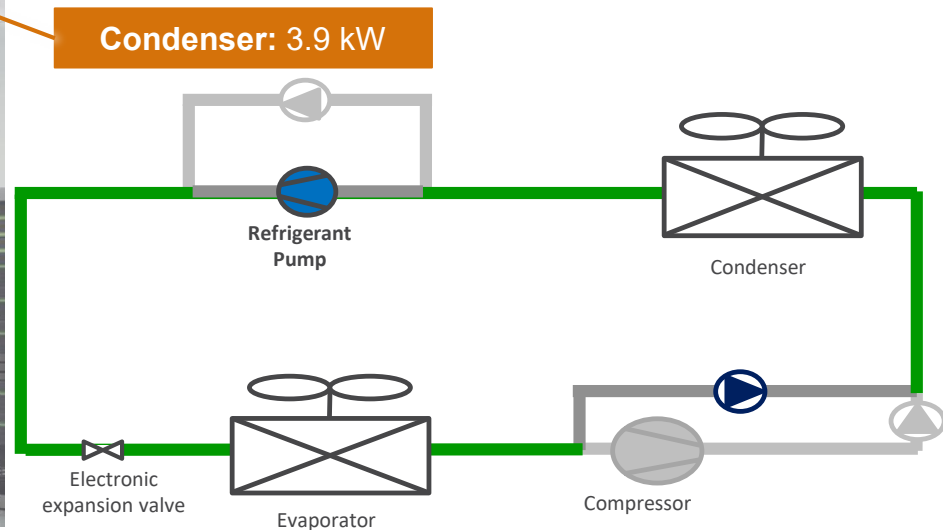


Full and Partial Economization

Most Efficient System: Full Economization

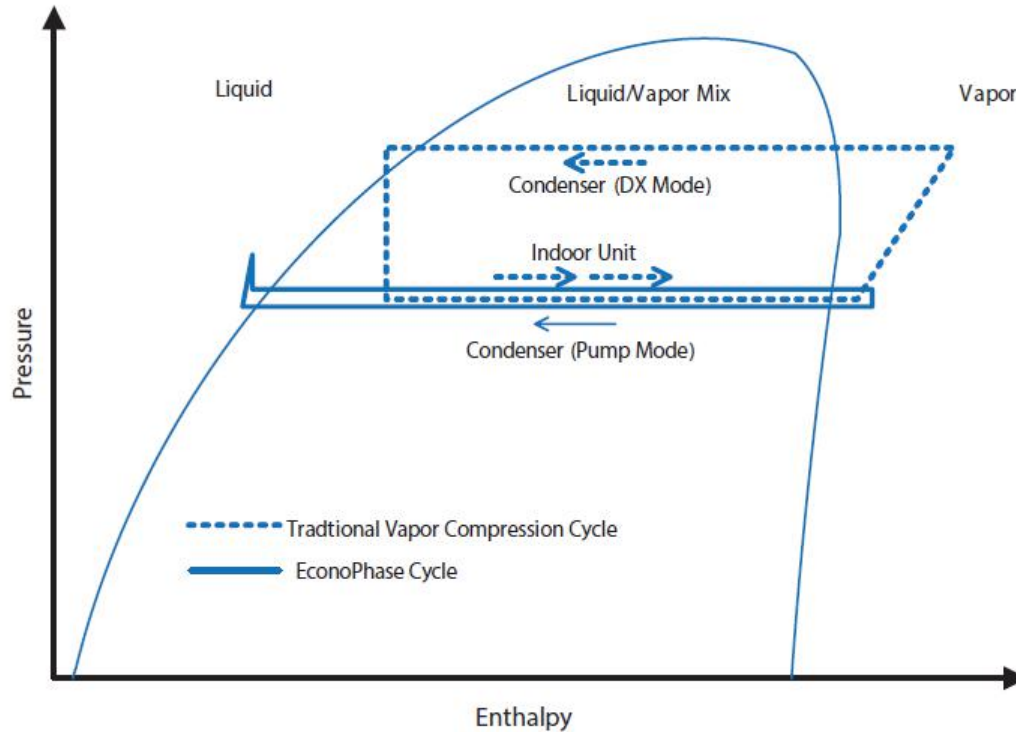


Cooling Mode	Outdoor Temp. (°C)	pPUE
Full Compressor	35	1.28
Partial EconoPhase	18	1.17
Full EconoPhase	7	1.09



Full Economization

What's Behind?

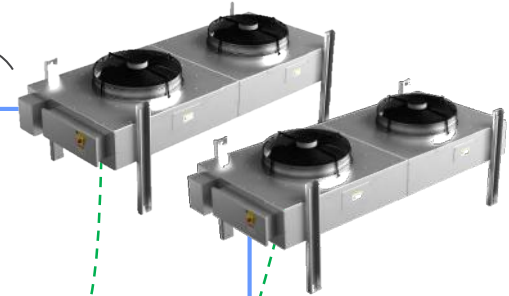
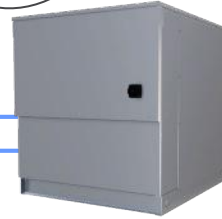


It's All About
Physics & ...

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Flexibility in Design: Total Distance

Equivalent Length up to 100 m
Geodetic 0 / + 18 m

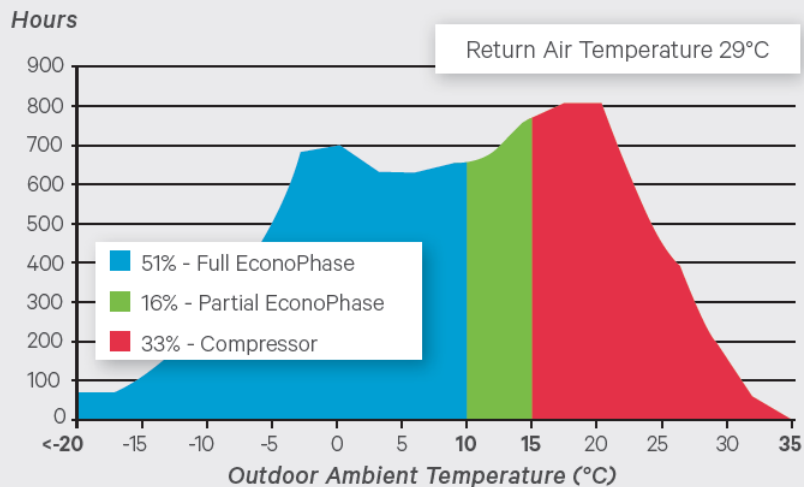


Up to 150 m of cabling
Shelded Twisted Pair CAN Cable

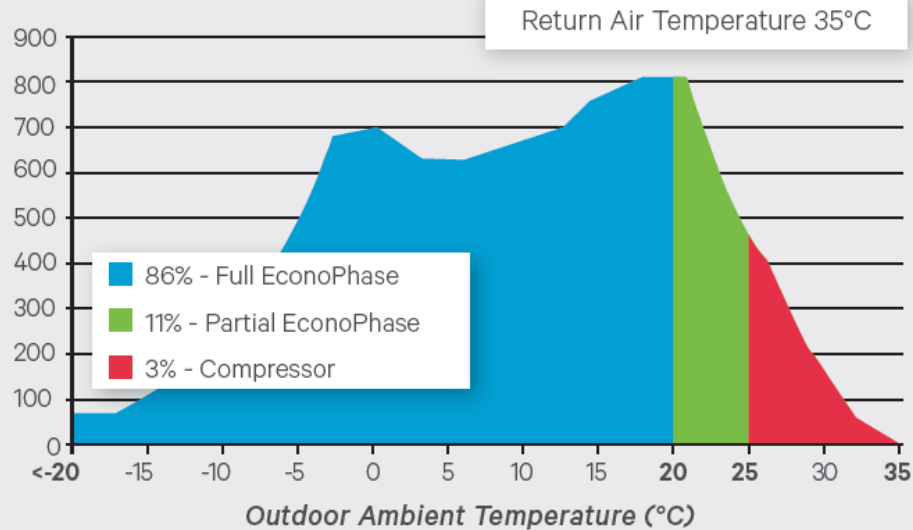
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Unmatched Efficiency with Hassle-Free Economization

Gains in Freecooling with Temperature Increase



Hours



Liebert EconoPhase usage increases significantly as return air temperatures increase, providing more cost-effective cooling.

Unit PX120EP
 Room Air Temperature 34.0 °C
 Room Air Relative Humidity 30.0 %
 Air flow configuration Downflow Down
 Compressor type Digital Scroll
 Fan modules Premium
 Condenser Units 2 x MCL110-1
 Without Humidifier
 Electronic thermostatic valve

City Haifa
 Net sensible cooling capacity 80.0 kW
 Unit airflow 18300 m³/h
 Condenser airflow (@ max speed) 30902 m³/h
 Annual absorbed energy 113805 kWh
 Annual cooling energy 700855 kWh
 ESP 20 Pa

Annual Consumption

Haifa					
Text	Hours	Capacity	Pabs	Ener.Mec	Cons
°C	h	kW	kW	kWh	kWh
40	0.12	80.00	20.95	10	3
39	0.12	80.00	20.41	10	2
38	0.71	80.00	19.79	57	14
37	0.83	80.00	19.13	66	16
36	2.73	80.00	18.39	218	50
35	6.28	80.00	17.74	502	111
34	13.63	80.00	17.15	1090	234
33	30.34	80.00	16.61	2427	504
32	82.72	80.00	16.13	6618	1334
31	193.06	80.00	15.69	15445	3028
30	332.79	80.00	15.31	26623	5095
29	437.09	80.00	14.96	34967	6539
28	565.00	80.00	14.67	46800	8582
27	617.23	80.00	14.40	49378	8891
26	571.72	80.00	14.18	45738	8105
25	467.43	80.00	13.98	37394	6533
24	429.98	80.00	13.78	34398	5924
23	403.07	80.00	13.62	32246	5491
22	359.10	80.00	13.52	28728	4854
21	367.16	80.00	13.43	29373	4931
20	394.30	80.00	13.35	31544	5262
19	454.27	80.00	13.89	38342	6217
18	498.72	80.00	11.86	39698	5917
17	474.42	80.00	11.81	37954	5603
16	426.86	80.00	11.76	34133	5015
15	387.19	80.00	9.99	30975	3869
14	333.03	80.00	9.97	26642	3322
13	288.94	80.00	9.97	23115	2880
12	211.20	80.00	9.64	16896	2037
11	161.77	80.00	9.63	12942	1557
10	102.87	80.00	9.62	8230	989
9	59.97	80.50	7.14	4828	428
8	33.42	80.40	7.13	2687	238
7	18.49	80.40	7.13	1487	132
6	8.77	80.30	7.13	704	63
5	3.44	80.30	7.13	276	25
4	0.71	80.30	7.12	57	5
3	0.47	80.30	7.12	38	3

1.16 pPUE in Haifa

$$\text{pPUE} = \frac{\text{IT} + \text{Aircon}}{\text{IT Power}}$$

$$\text{pPUE} = \frac{700,855 \text{ KWh} + 113,805 \text{ KWh}}{700,855 \text{ KWh}} = 1.16$$

34°C Return Air Temp

- 80KW Sensible Cooling
- Server Inlet Air 20.4°C
- RH 30%

אתר ID 80KW

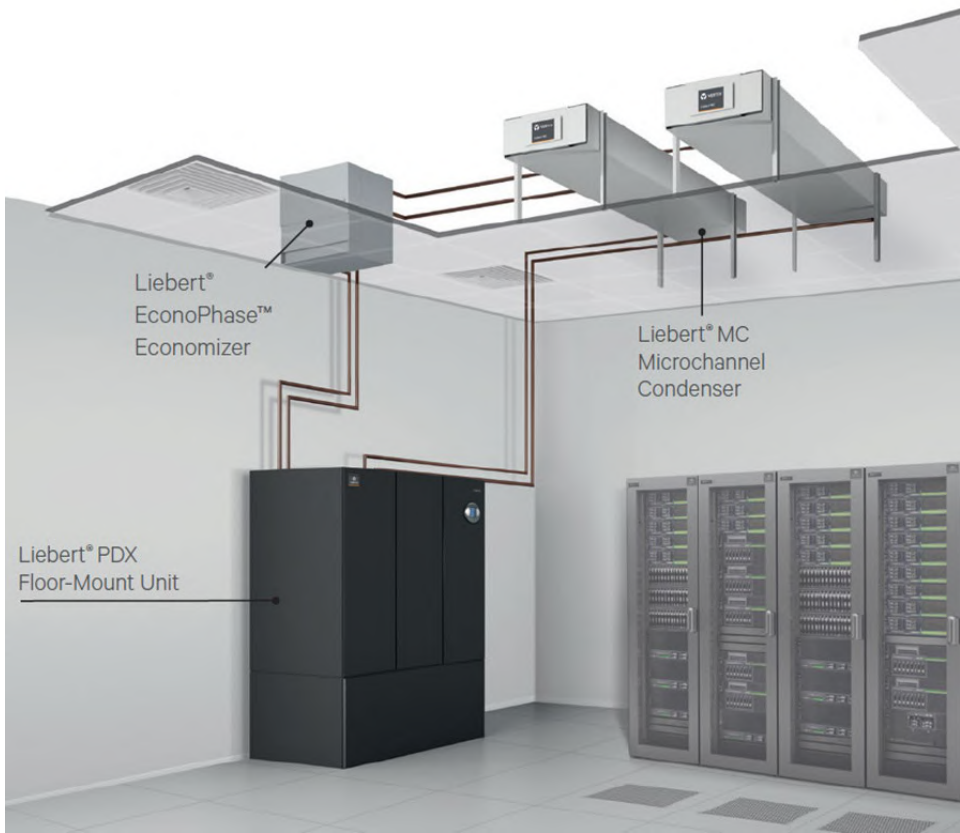
חיסכון: 308,000 ₪ בשנה

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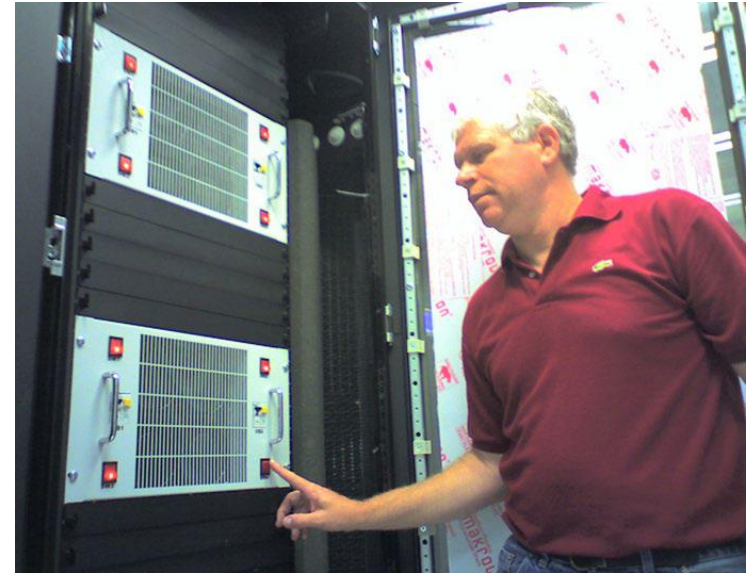
Need Verification?

> Eurovent



> Factory Witness Test

> Real-World Commissioning



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Let's Talk



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052-3615117