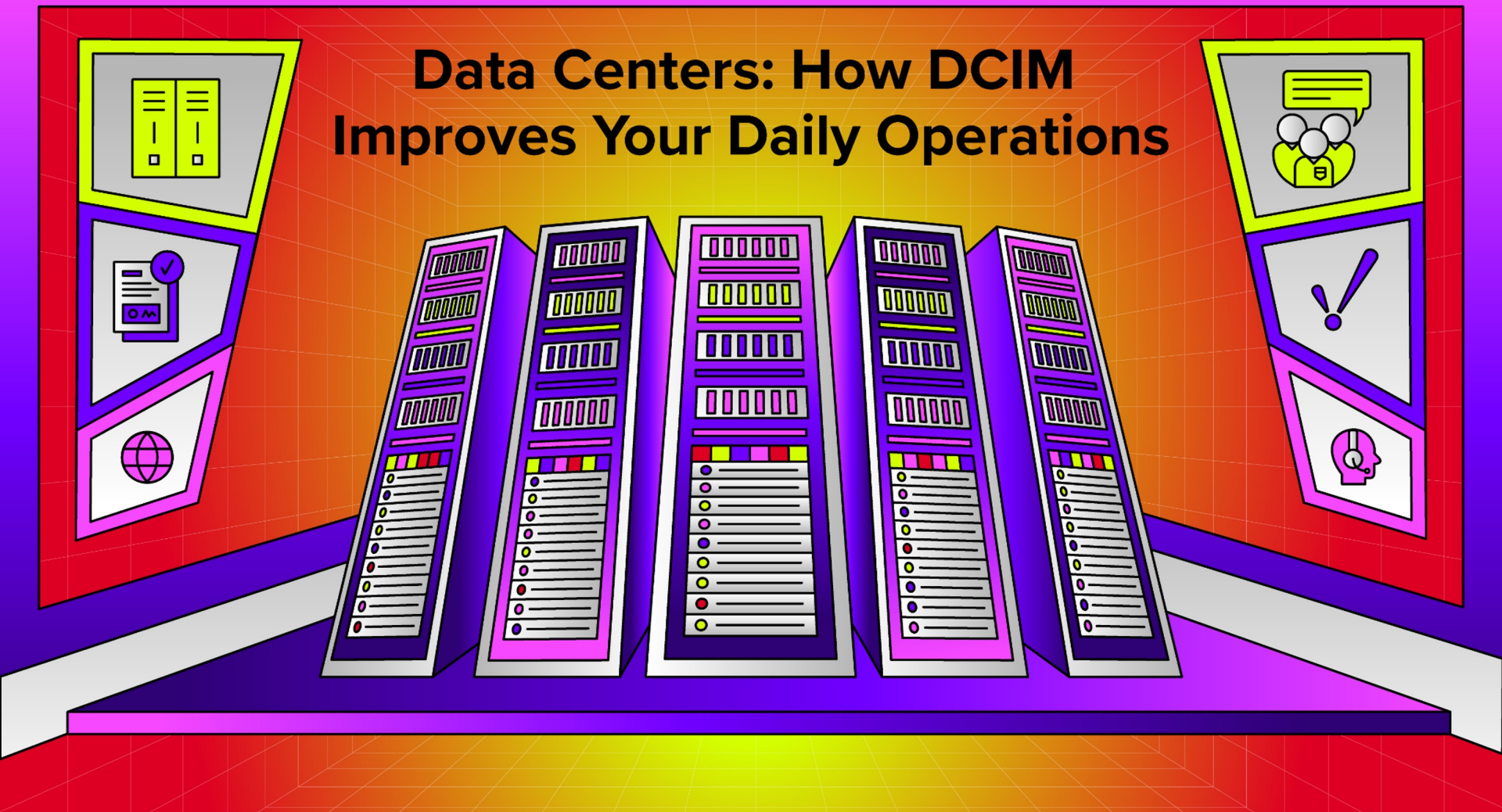
Data Centers: How DCIM Improves Your Daily Operations



Presenters

Dereck Saunders

Application Engineering Manager

Inductive Automation

Martin Matse

Global Business Development Manager – Data Centers

ATS Global

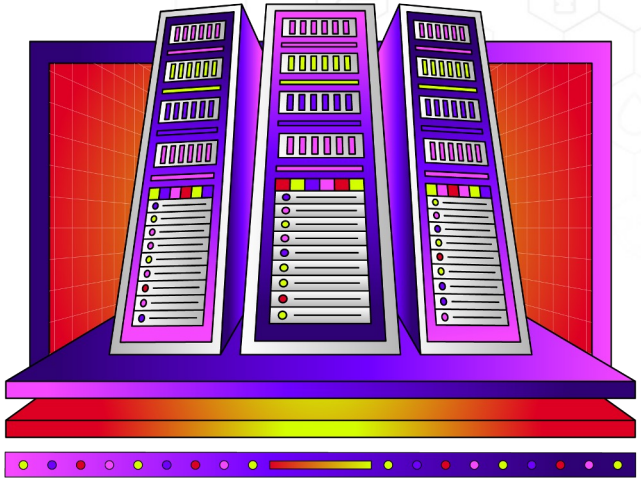
Christopher Markstein

Strategic Industry Account Executive

Inductive Automation

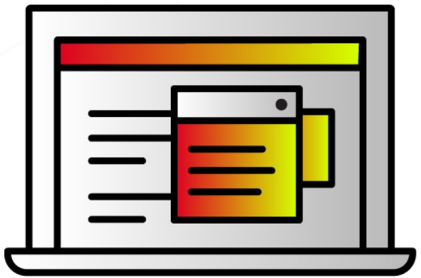
Agenda

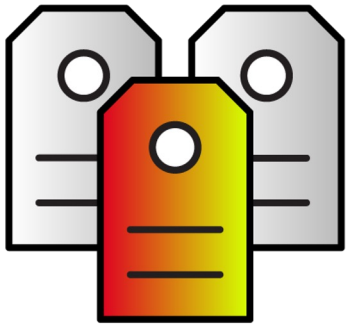
- Intro to Inductive Automation & Ignition
- Data Center Online Demo
- Data Center Industry Pack
- How DCIM Supports Your Operations
- Audience Q&A



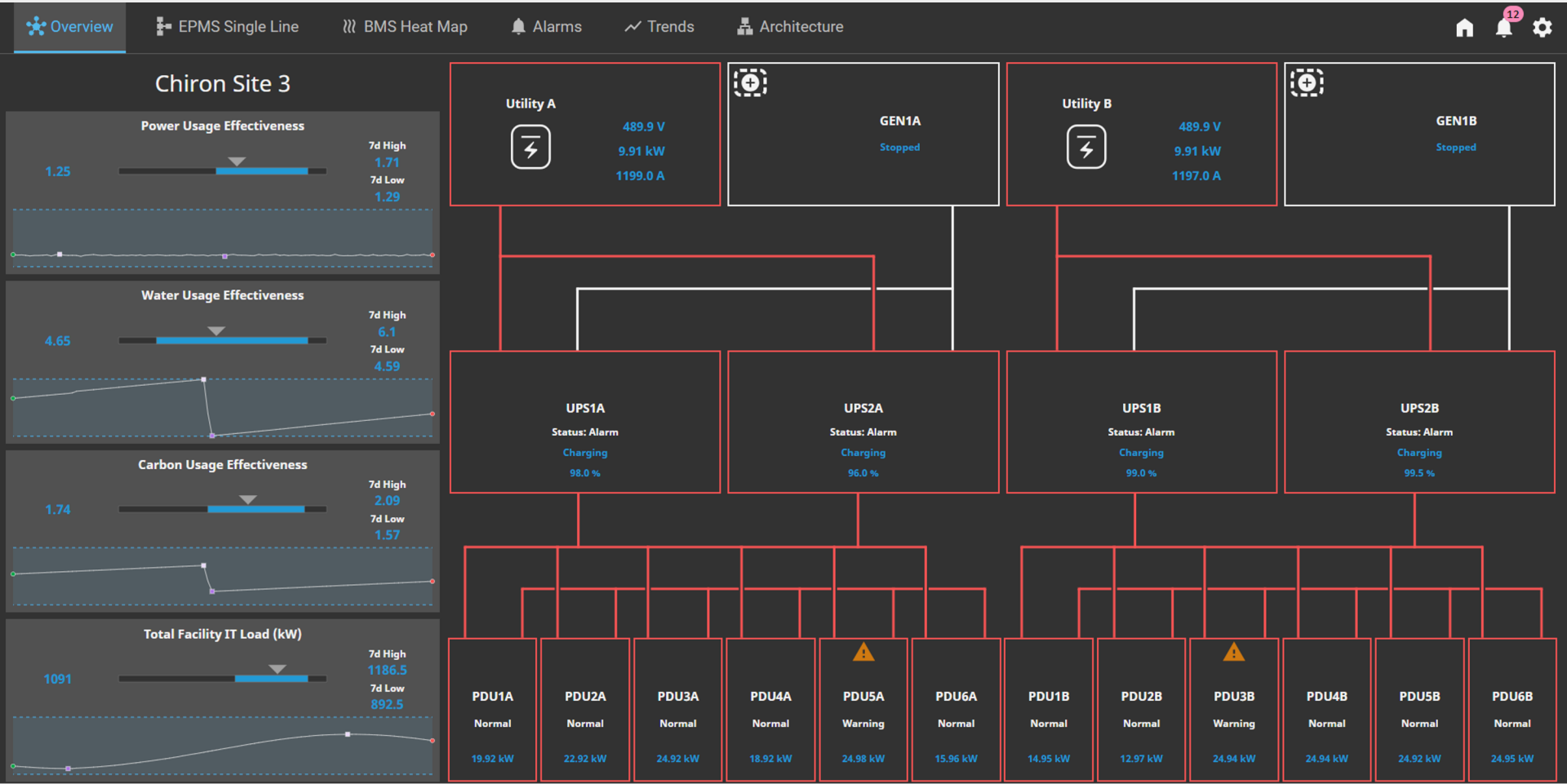

Ignition!
by inductive automation
The Unlimited Platform for SCADA and So Much More
• Connect, Design, Deploy Without Limits:
- One central hub for everything on the plant floor
- Create any kind of industrial application
- Web-deploy clients to desktops, industrial displays & mobile devices
• Unlimited licensing
• Industrial-strength security and stability
• Trusted by thousands of companies worldwide

New Inductive Automation Resources for Data Centers



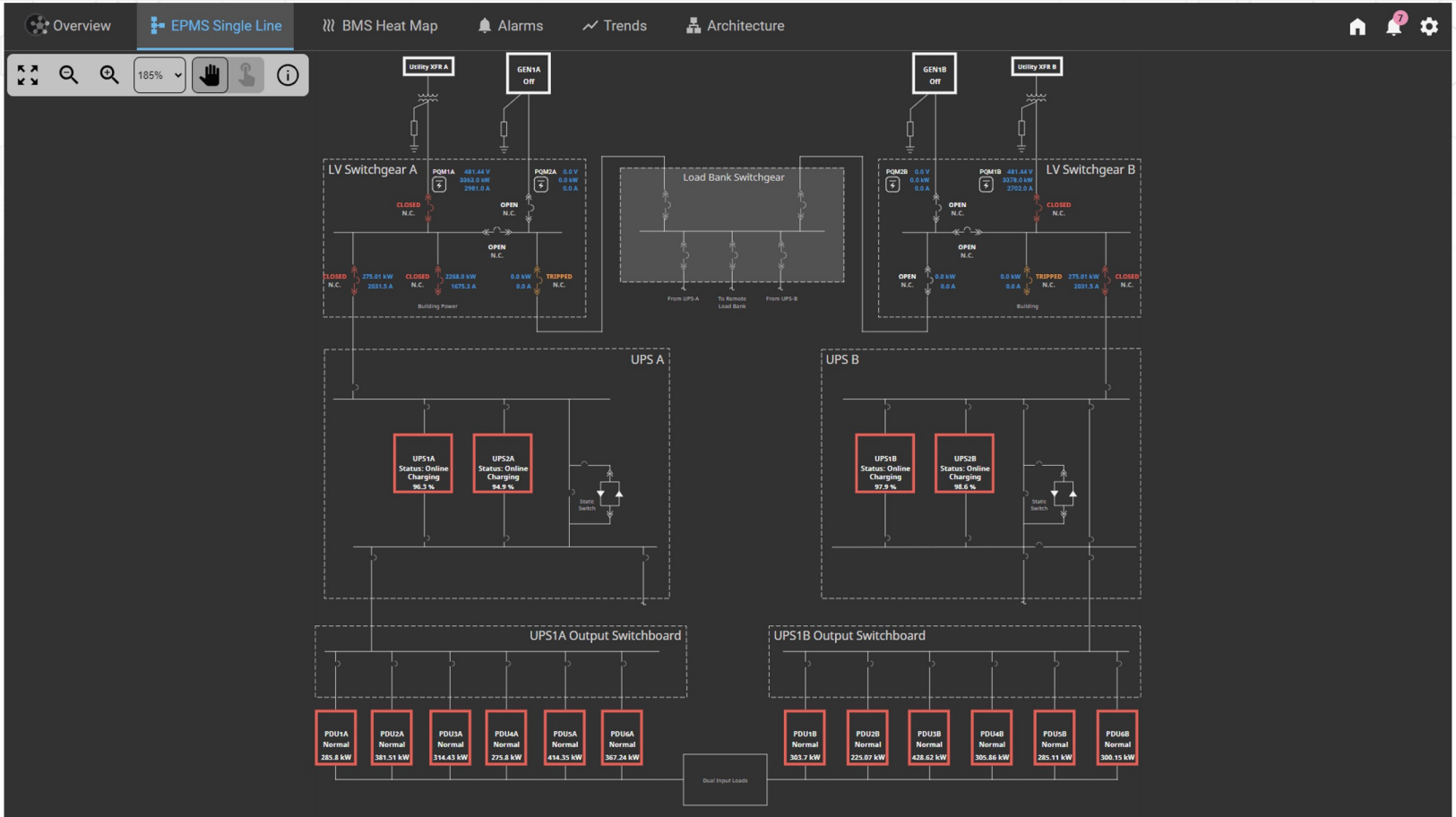


Ignition Data Center Demo

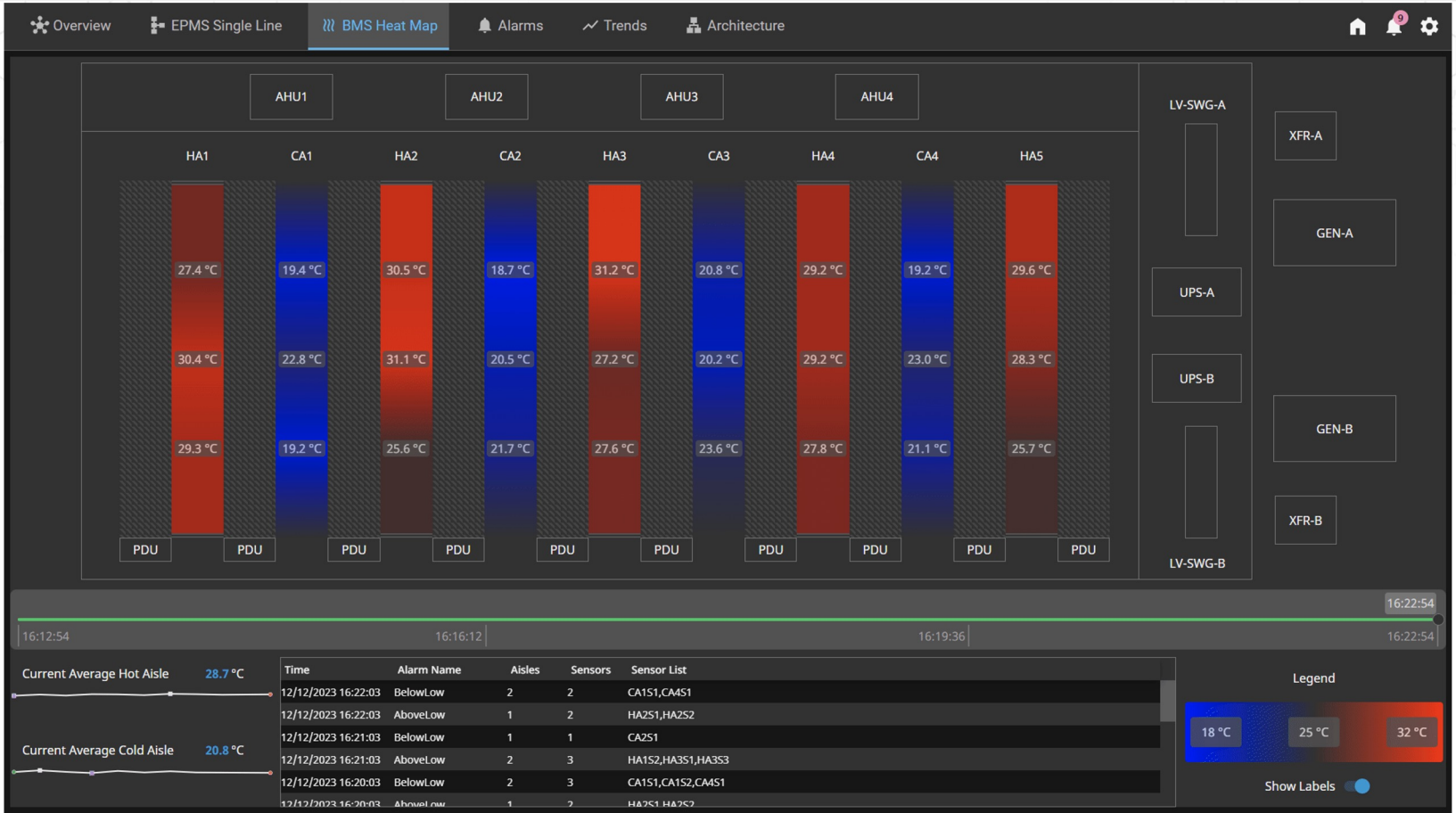


Ignition Data Center Demo - Overview

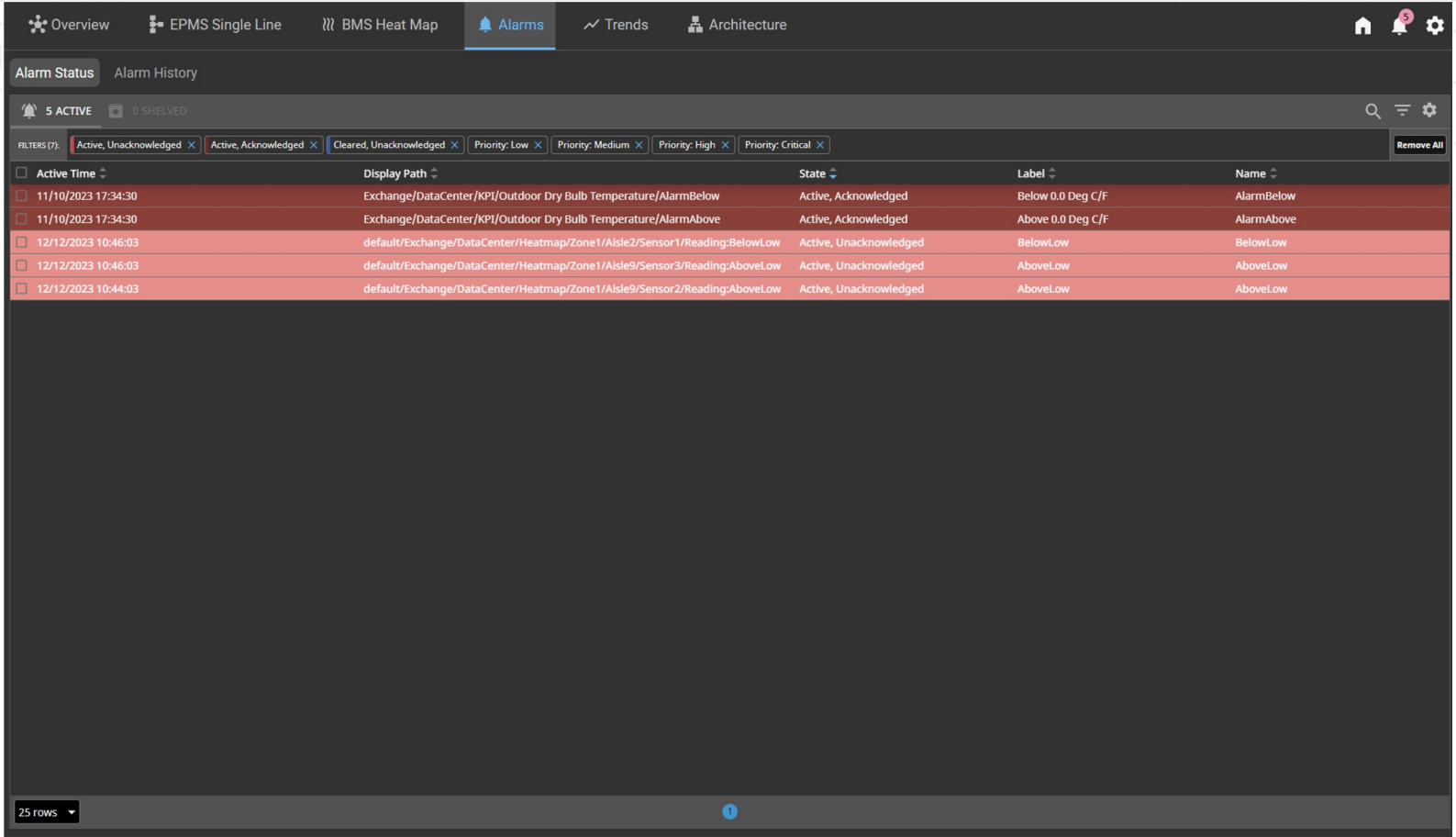
Ignition Data Center Demo - EPMS Single Line



Ignition Data Center Demo - BMS Heat Map

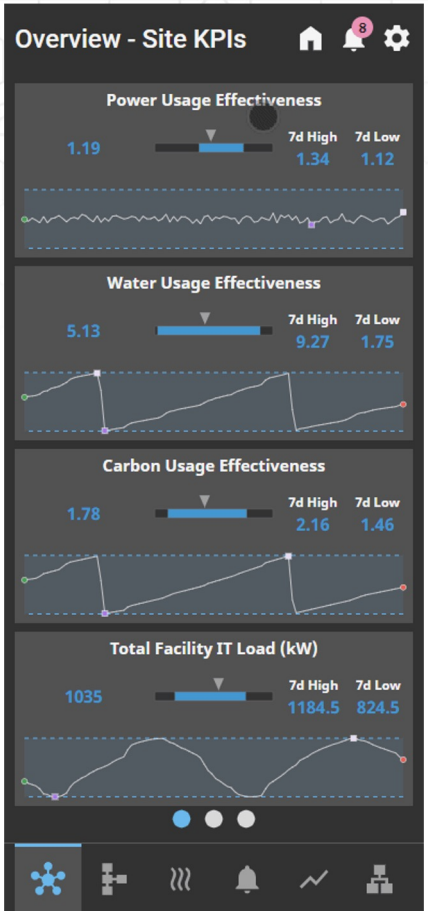


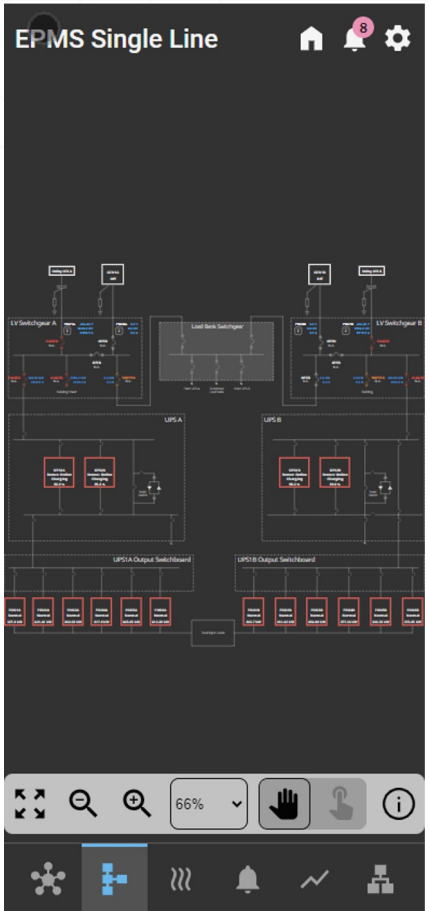
Ignition Data Center Demo - Alarms & Trends

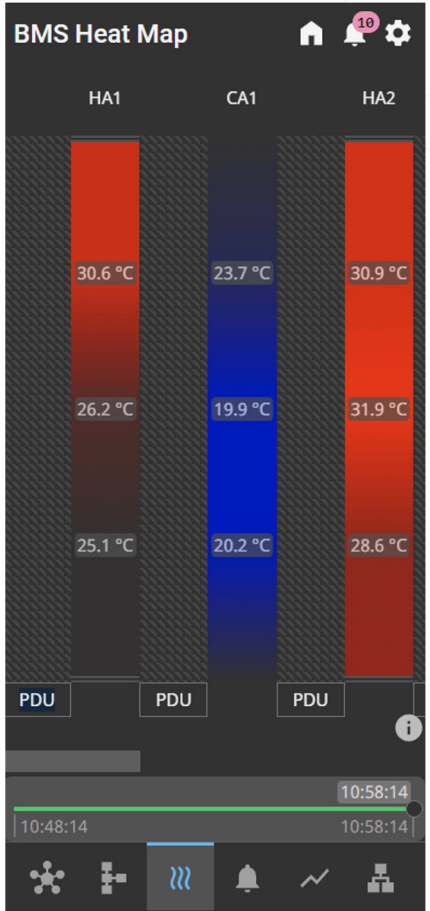


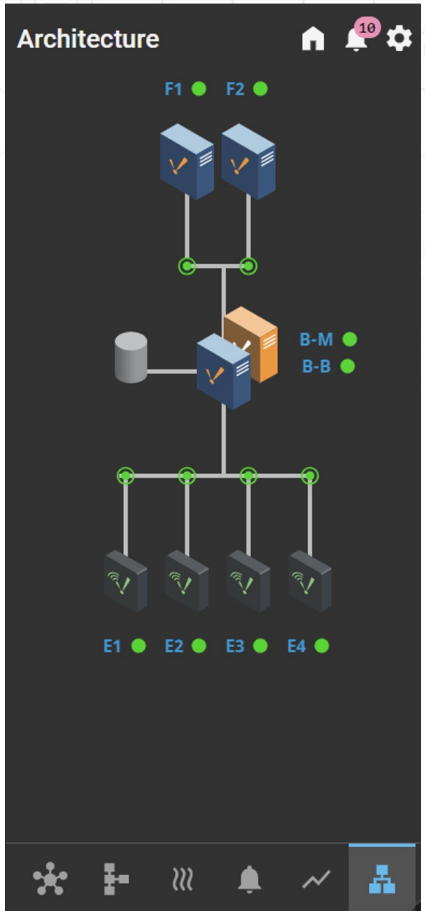
Ignition Data Center Demo - Architecture

Ignition Data Center Demo - Mobile







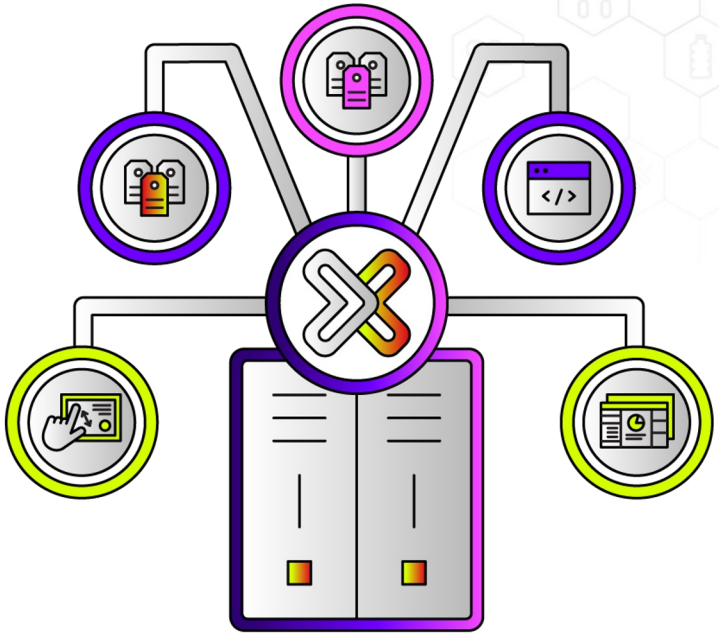


Try the demo for yourself at:

https://demo.inductiveautomation.com/data/perspective/client/data-center-demo/

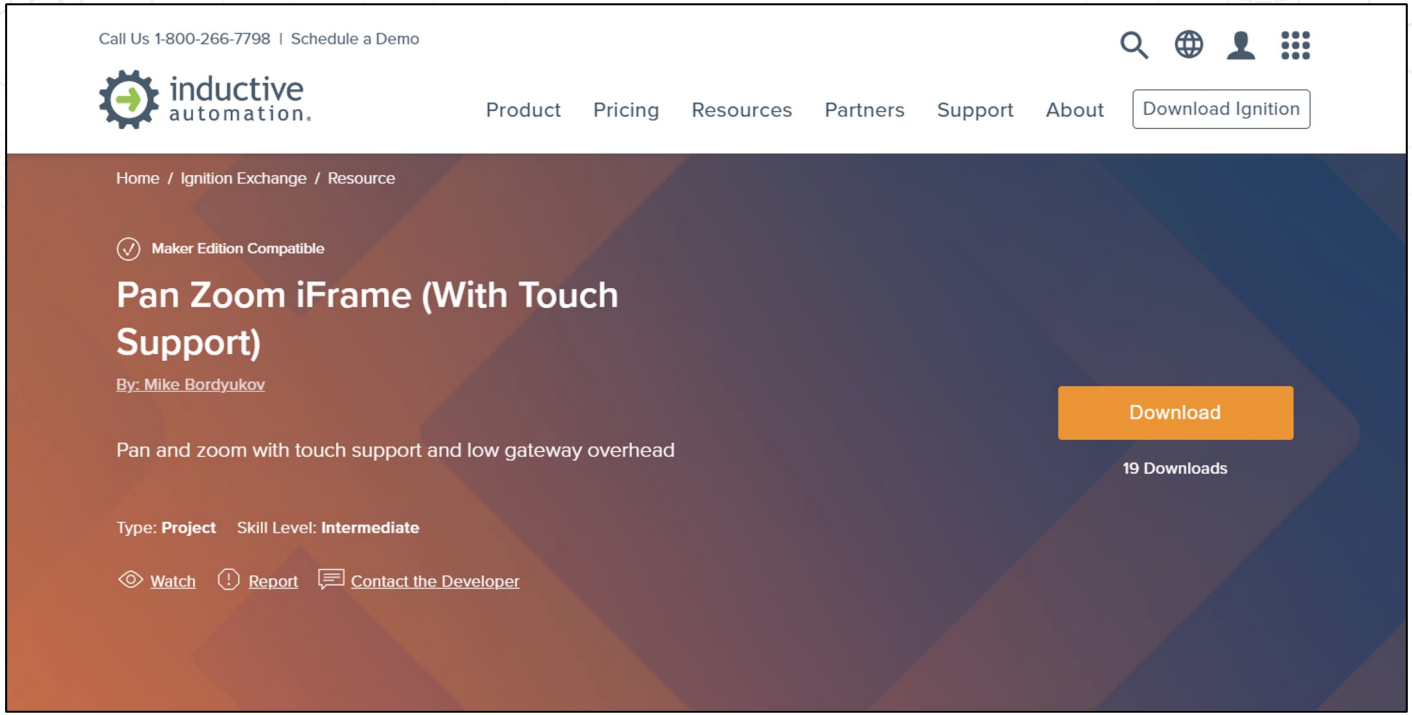
Coming Soon: Ignition Data Center Industry Pack

- A collection of Ignition resources specifically for data centers
- Will be hosted on the Ignition Exchange, available for free
- Coming in Q2 2024
- Additional Industry Packs coming in the future



https://inductiveautomation.com/exchange/

Ignition Exchange - Pan Zoom iFrame



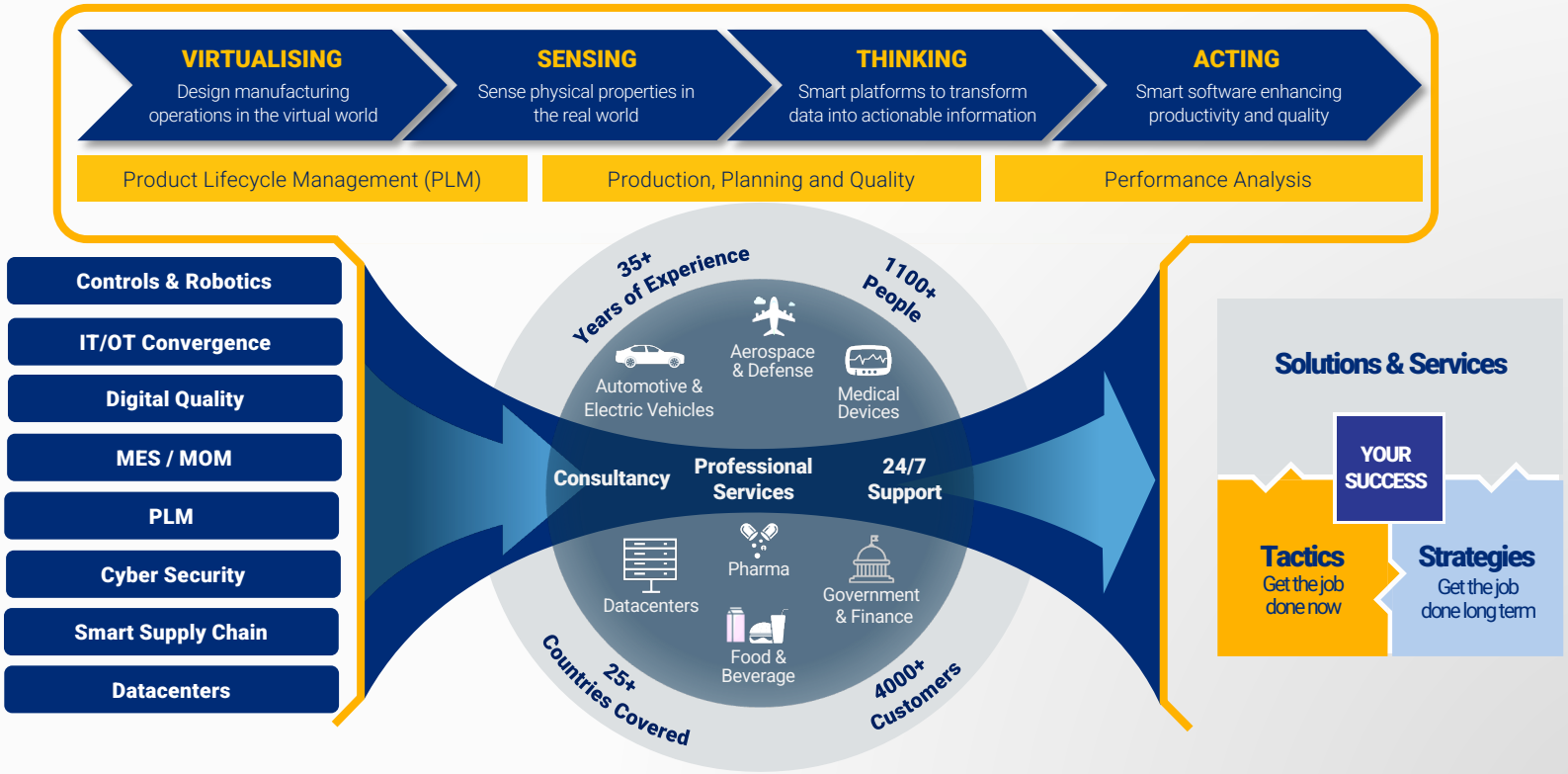
https://inductiveautomation.com/exchange/2586/overview

ATS Global and Inductive Automation

How DCIM supports your operations

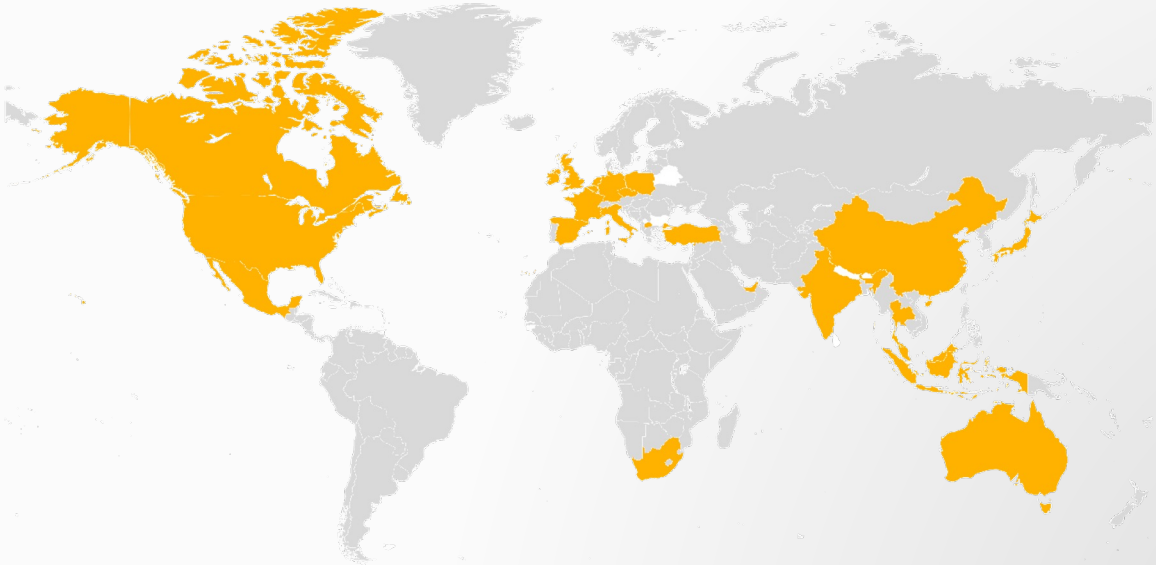
Martin Matse, Global BDM Datacenters

“Our trusted experts lead manufacturers in their digital transformation to achieve sustainable operational excellence”



Group Structure

Australia | China | Czechia | France | Germany | India | Indonesia | Ireland | Italy | North Macedonia
Malaysia | Mexico | Poland | Singapore | Spain | The Netherlands | Thailand | Turkey | United Kingdom | USA



35+
Years in the Market

25+
Countries Worldwide

1,200+
Highly Qualified Experts

4,000+
Satisfied Customers

DATA CENTERS

The Image of the DC & Response from Legislators

Data centers' public image

- Use too much power
- Use all renewable energy (Wind and Solar)
- Use too much land
- Use too much water
- Create hardly any jobs

Administrations respond with regulations and directives

EMEA
- Energy Efficiency Reporting Directive
- Corporate Sustainability Reporting Directive

USA
- California Title 24
- SEC Climate Risk Disclosure

APAC
- Singapore: Data Centre Energy Efficiency Scheme
- Japan: Energy Conservation Act and the act of rational use of Energy
- China: Energy Conservation Law and Energy Efficiency Labeling Program
- Australia: the National Built Environmental Rating System
- India: the Perform, Achieve and Trade of the Bureau of Energy Efficiency

Global
- EN-50600, a European standard for Data Centers that is being embraced by other countries through the world

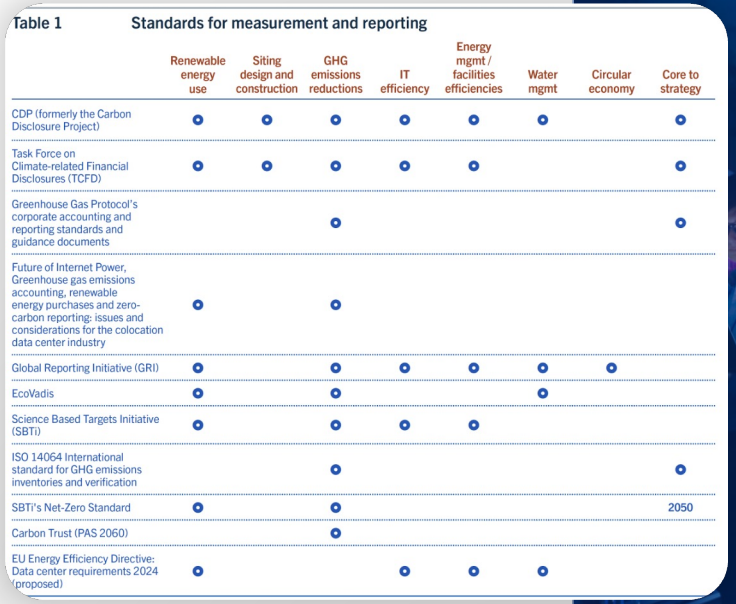


Table 1 Standards for measurement and reporting

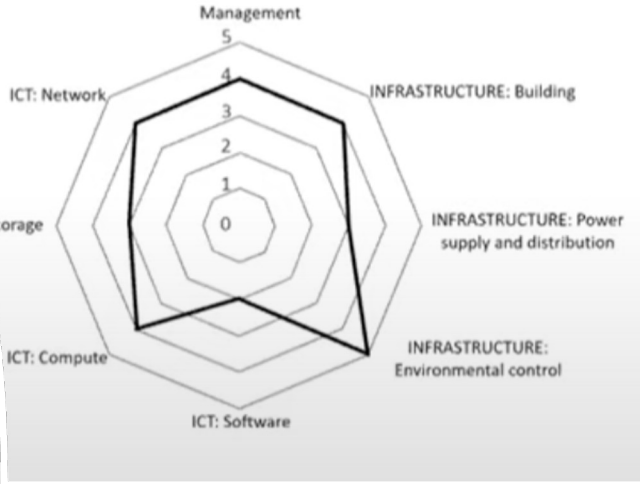
	Renewable energy use	Siting design and construction	GHG emissions reductions	IT efficiency	Energy mgmt / facilities efficiencies	Water mgmt	Circular economy	Core to strategy
CDP (formerly the Carbon Disclosure Project)	●	●	●	●	●	●		●
Task Force on Climate-related Financial Disclosures (TCFD)	●	●	●	●	●			●
Greenhouse Gas Protocol's corporate accounting and reporting standards and guidance documents			●					●
Future of Internet Power, Greenhouse gas emissions accounting, renewable energy purchases and zero-carbon reporting: issues and considerations for the colocation data center industry	●		●					
Global Reporting Initiative (GRI)	●		●	●	●	●	●	
EcoVadis	●		●			●		
Science Based Targets Initiative (SBTi)	●		●	●	●			
ISO 14064 International standard for GHG emissions inventories and verification			●					●
SBTi's Net-Zero Standard	●		●					2050
Carbon Trust (PAS 2060)			●					
EU Energy Efficiency Directive: Data center requirements 2024 (proposed)	●			●	●	●		

What do most directives ask?
Your Concerns

EN-50600

- PUE based on:
  - Power
  - Liquid Fuel
  - Gaseous Fuel
  - Cooling Liquid
  - PUE = E_{DC} / E_{IT}
- Other metrics
  - Renewable Energy Factor
  - Energy Reuse Factor
  - Cooling Efficiency Ratio
  - Carbon Usage Efficiency
  - CO2-Footprint
- Detailed reporting
- Optimization / improvement

5.2.2.3 Environmental control	
DATA CENTRE MONITORING: Energy consumption and environmental measu	
LC/FprTR 50600-99-1:2021	5.1.14, 5.1.15, 5.1.16
TA CENTRE COOLING: Airflow management and design	
FprTR 50600-99-1:2021	5.2.16, 5.2.17, 5.2.18
CENTRE COOLING: Cooling management	
rTR 50600-99-1:2021	5.1.18, 5.1.19, 5.1.20
ENTRE COOLING: Temperature and humidity settings	
TR 50600-99-1:2021	5.1.21, 5.1.22, 5.1.23
NTRE COOLING: Selection of cooling system: High efficiency cooling systen	
R 50600-99-1:2021	5.1.24
NTRE MONITORING: Energy consumption and environmental measurement	
50600-99-1:2021	5.1.26, 5.1.27
TRE MONITORING: Energy consumption and environmental collection and lo	
50600-99-1:2021	5.1.29, 5.1.30

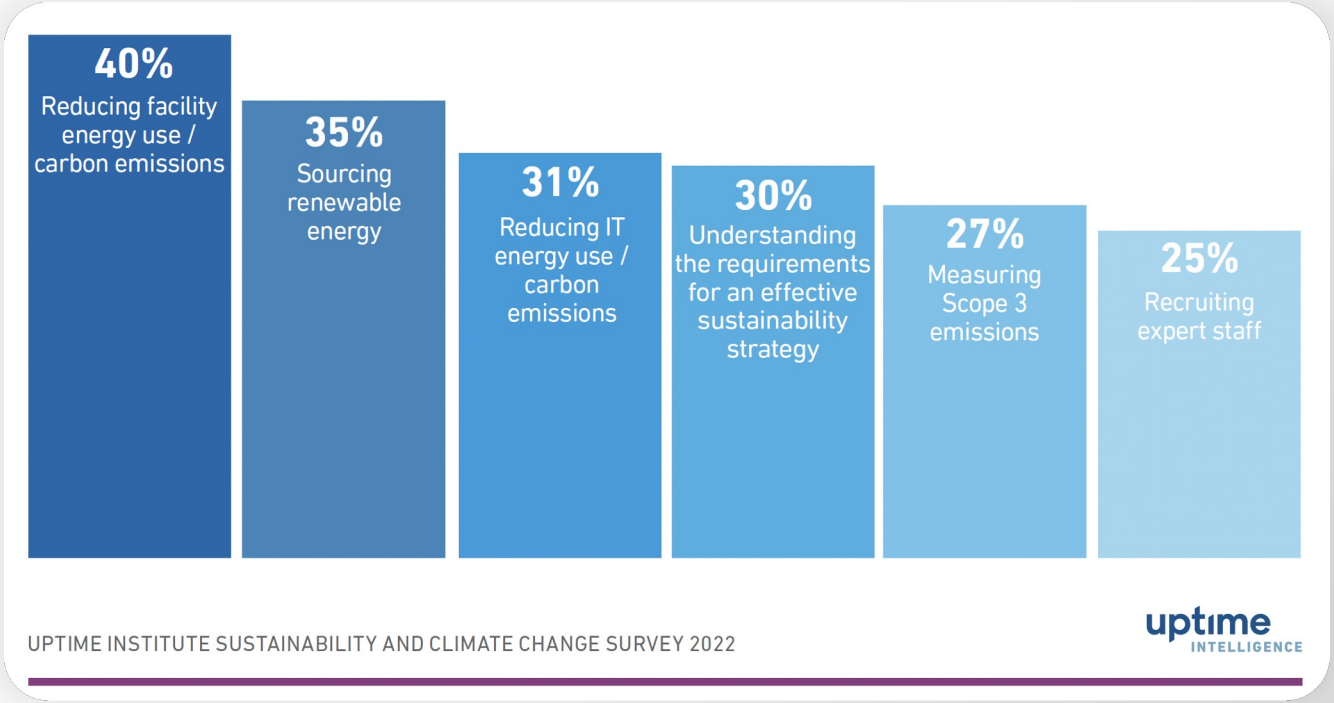


EERD: Energy Efficiency Reporting Directive

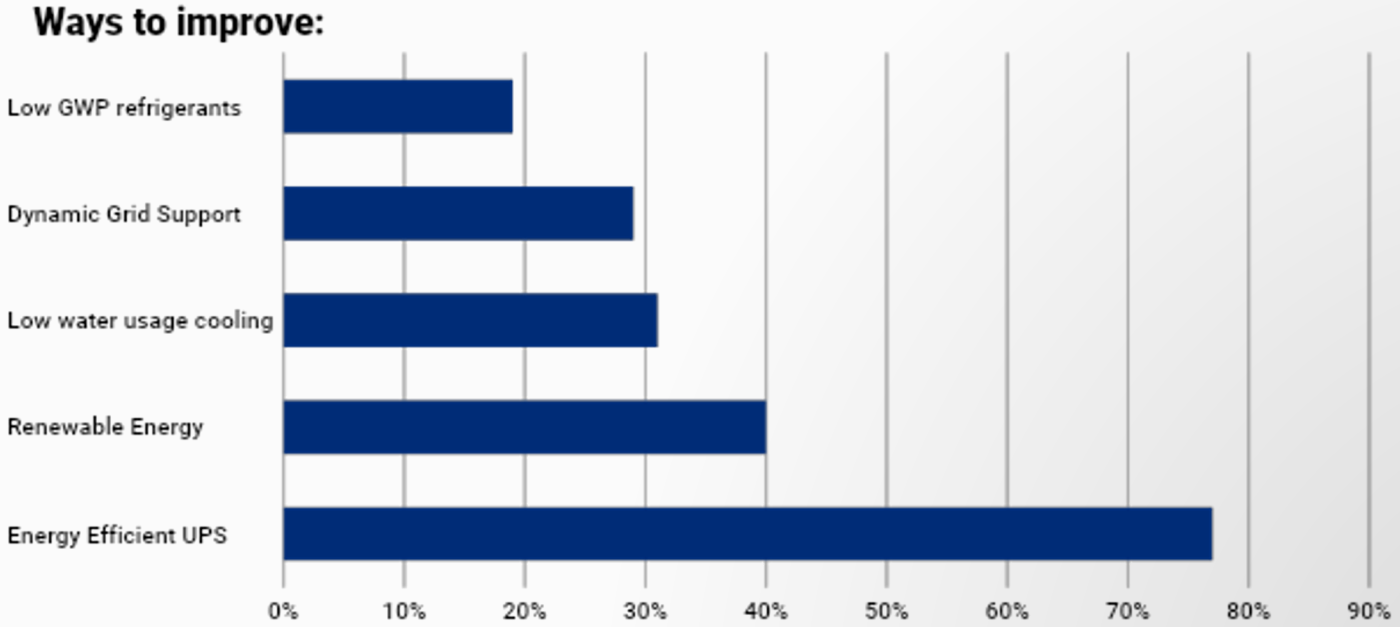
Requirements

- Be based on up-to-date, traceable data on energy consumption and load profiles
- Comprise a detailed energy consumption review
- Identify energy efficiency measures to decrease energy consumption
- Identify potential cost-effective use or production of renewable energy
- Build on life cycle cost and long-term savings
- Annual in/out data traffic
- Be proportionate and sufficiently, drawing a reliable picture of overall energy performance and reliable identification of most significant improvement opportunities
- Certified E(P)MS is mandatory

Data Centers concerns



A survey from one of the HW vendors: sustainability driven by tech.



Performance

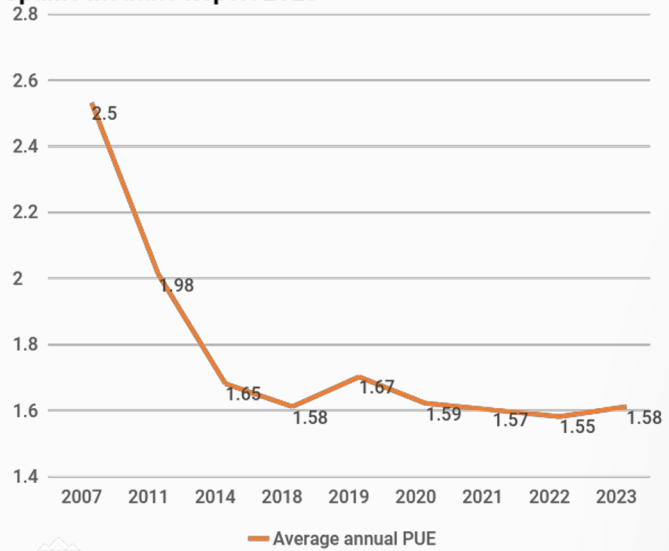
in detail through time

Performance Management

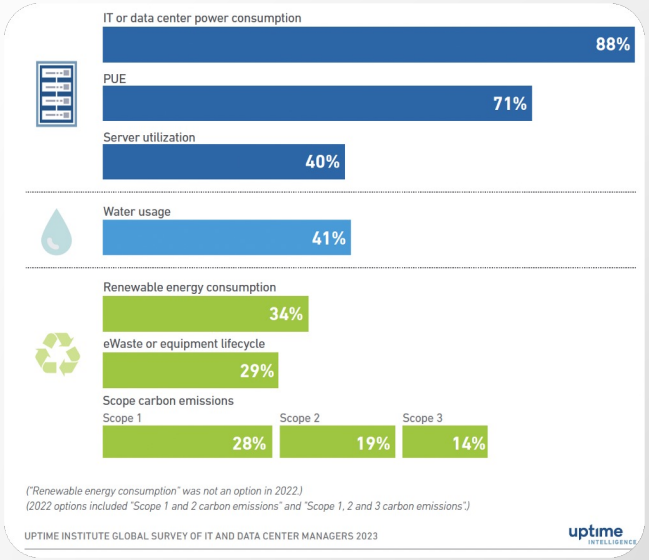
- PUE = Power Usage Effectiveness
- PUE = Total Power / IT Power

PUE gains have stalled since 2013

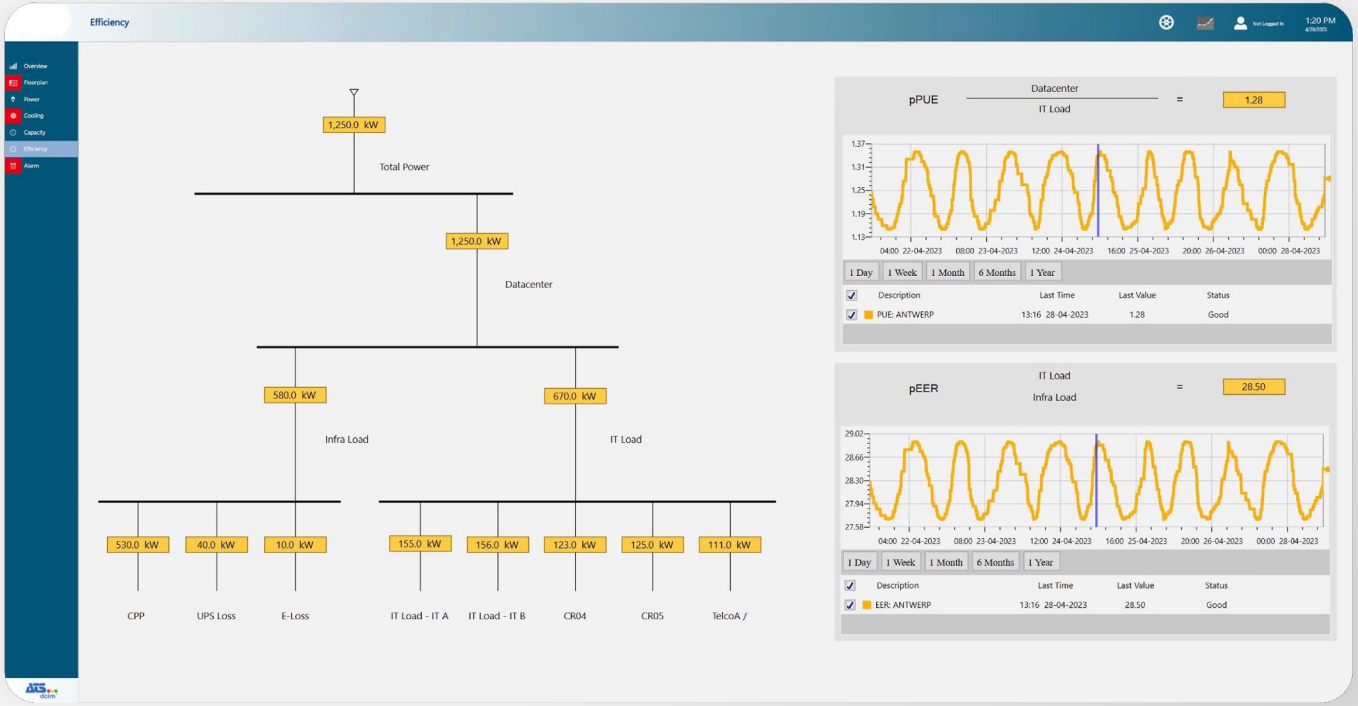
Uptime Institute Report 2023



- Improvement 2007-2013, after that more or less a flatline
- Why does it flatten?
  - Most easy methods are used
  - No real idea how to improve further



A Performance Dashboard



Now back to you and your Data Center

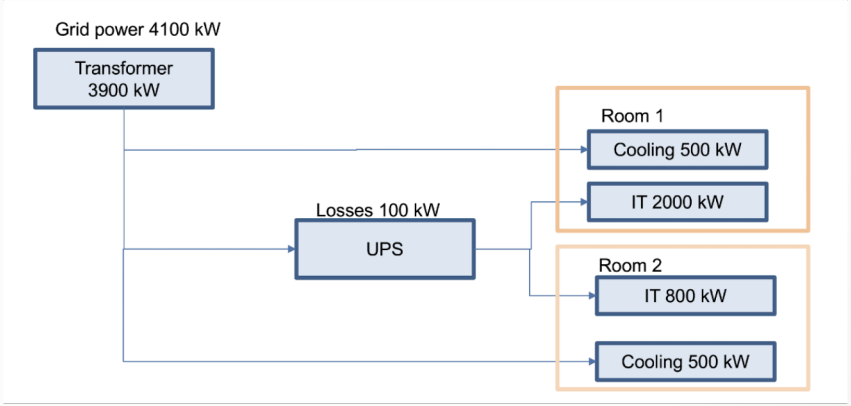
You and your Data Center

Responsible for a Data Center and you want to:

- Improve your asset utilization
  - Decrease outage risk
  - Manage your CAPEX and OPEX
- Improve your performance and reduce costs
- Want to have inside information about your energy balance
- Comply with the coming directives/legislation and mandatory reporting like:
  - The Energy Efficiency Reporting Directive (15-3-2024)

Conclusion: “we need a DCIM solution to help us”

Administration to CEO



Total power = 4100 kW

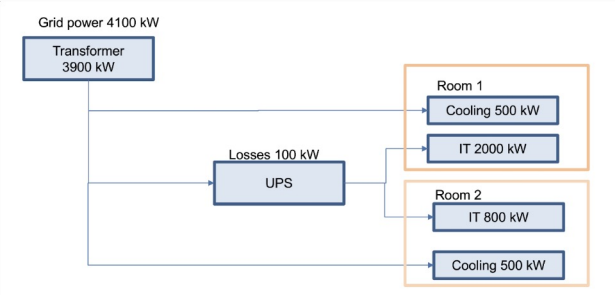
IT load = 2000+800= 2800 kW

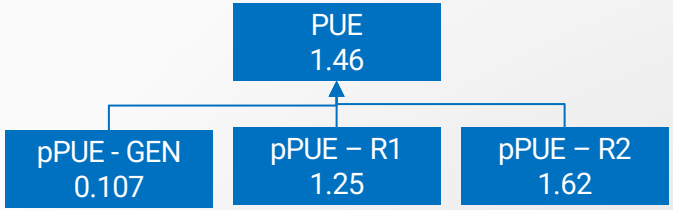
PUE= 4100/2800 = 1.46

Local administration to the DC-CEO:

- Your PUE = 1.46
- Your permit only allows a PUE of 1.3 Max!
- You have 12 months to bring your PUE to 1.3 or lower!

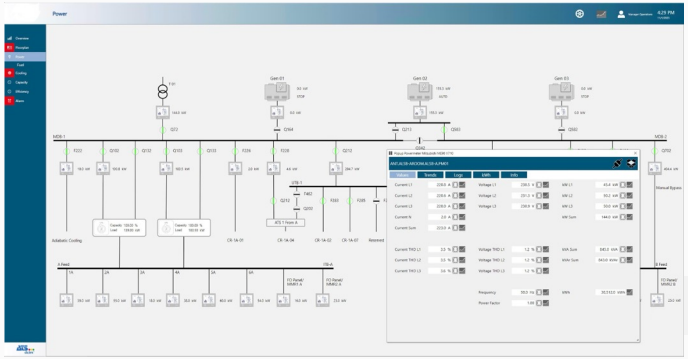
CEO to Operations Manager and response



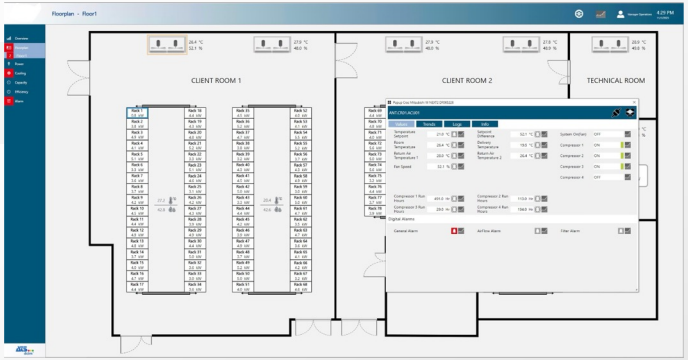


- CEO to Operations Manager: our PUE must become 1.3 in the coming month
- OM to CEO
  - “My EMS tells me: Our best partial PUE I have is 1.32 and worst 1.65”, what can I do?”
  - “We already did Cold Aisle containment and I think CRAC controls are optimized, set-up by vendor”
  - “The design PUE is 1.25, so it is up to sales!!!!!”
  - “Sales should sell more, increasing load will improve my efficiency”
  - “There is nothing I can do”

Integrated system

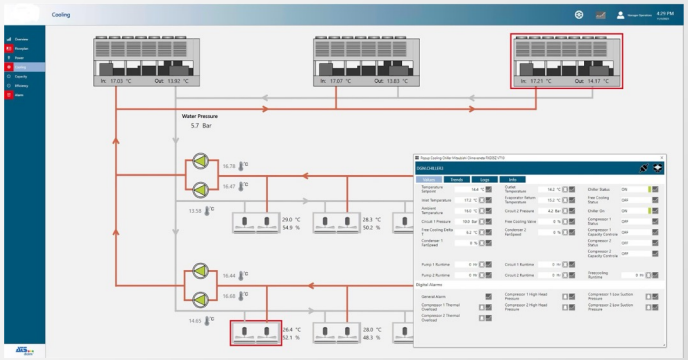


EPMS

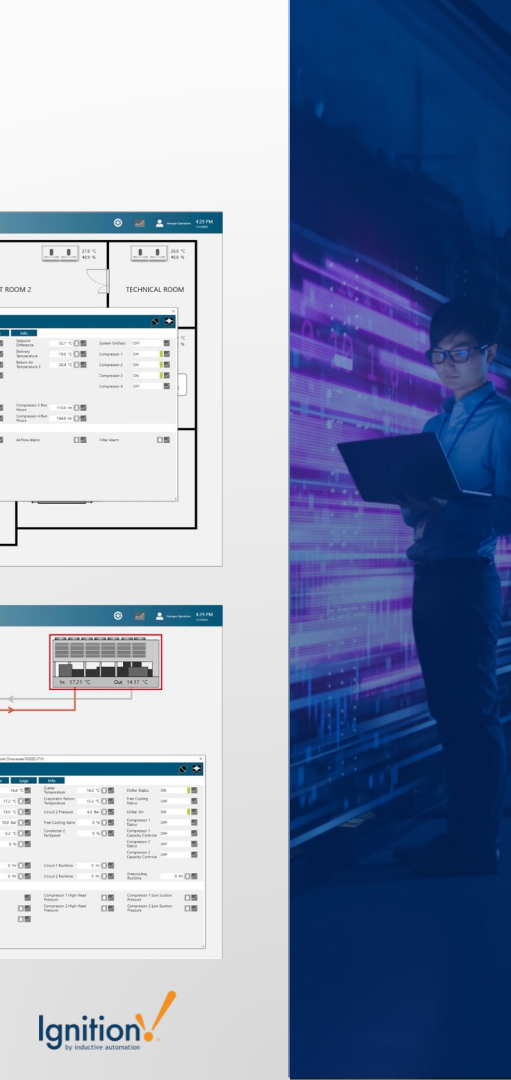


White Space

BMS



CMS



DATA CENTER PERFORMANCE SCORECARD

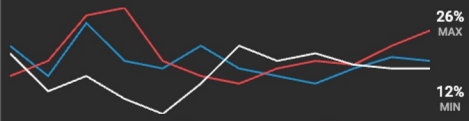
33% ACTIVE POWER CAPACITY

LAST 8 HOURS

27% 35% 29% TOTAL UPS CAPACITY

UPS1 CAPACITY

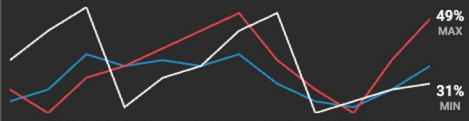
LAST 8 HOURS



● PHASE A: 18% ● PHASE B: 23% ● PHASE C: 19%

UPS2 CAPACITY

LAST 8 HOURS



● PHASE A: 36% ● PHASE B: 47% ● PHASE C: 39%

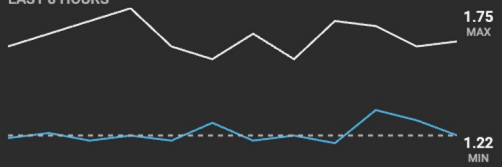
SLA COMPLIANCE

SECTION 1 ✗		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	FALSE	N+1	TRUE

55 COMPOSITE PERFORMANCE INDEX

1.46 POWER USAGE EFFECTIVENESS

LAST 8 HOURS

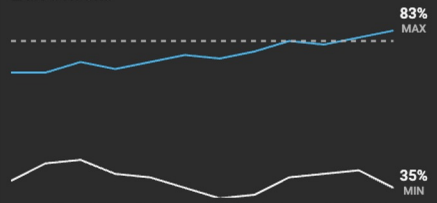


- - TARGET: <1.25 ● SECTION 1: 1.25 ● SECTION 2: 1.62

ACTIVE COOLING CAPACITY 60

SECTION 1	SECTION 2
83%	38%

LAST 8 HOURS

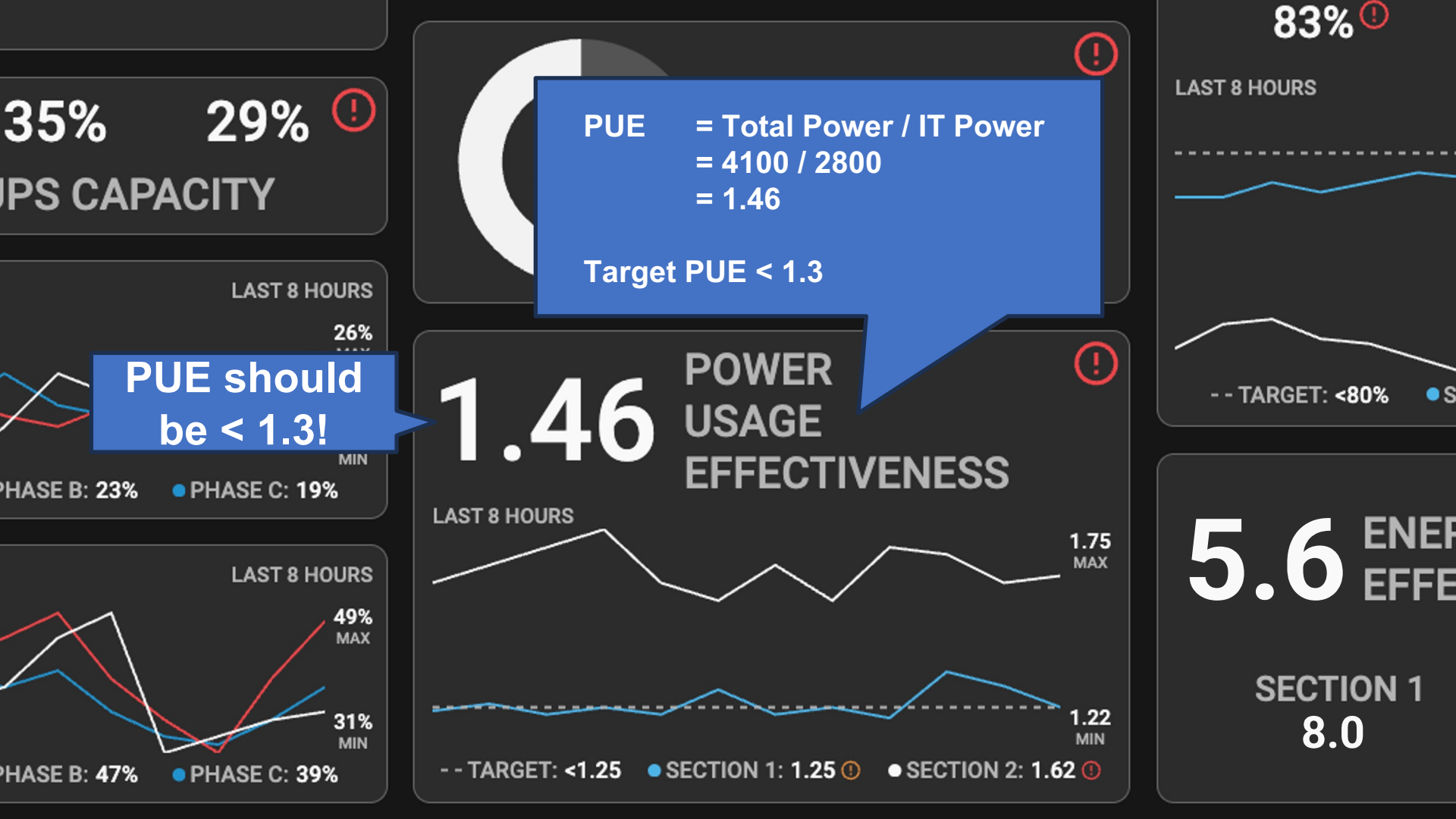


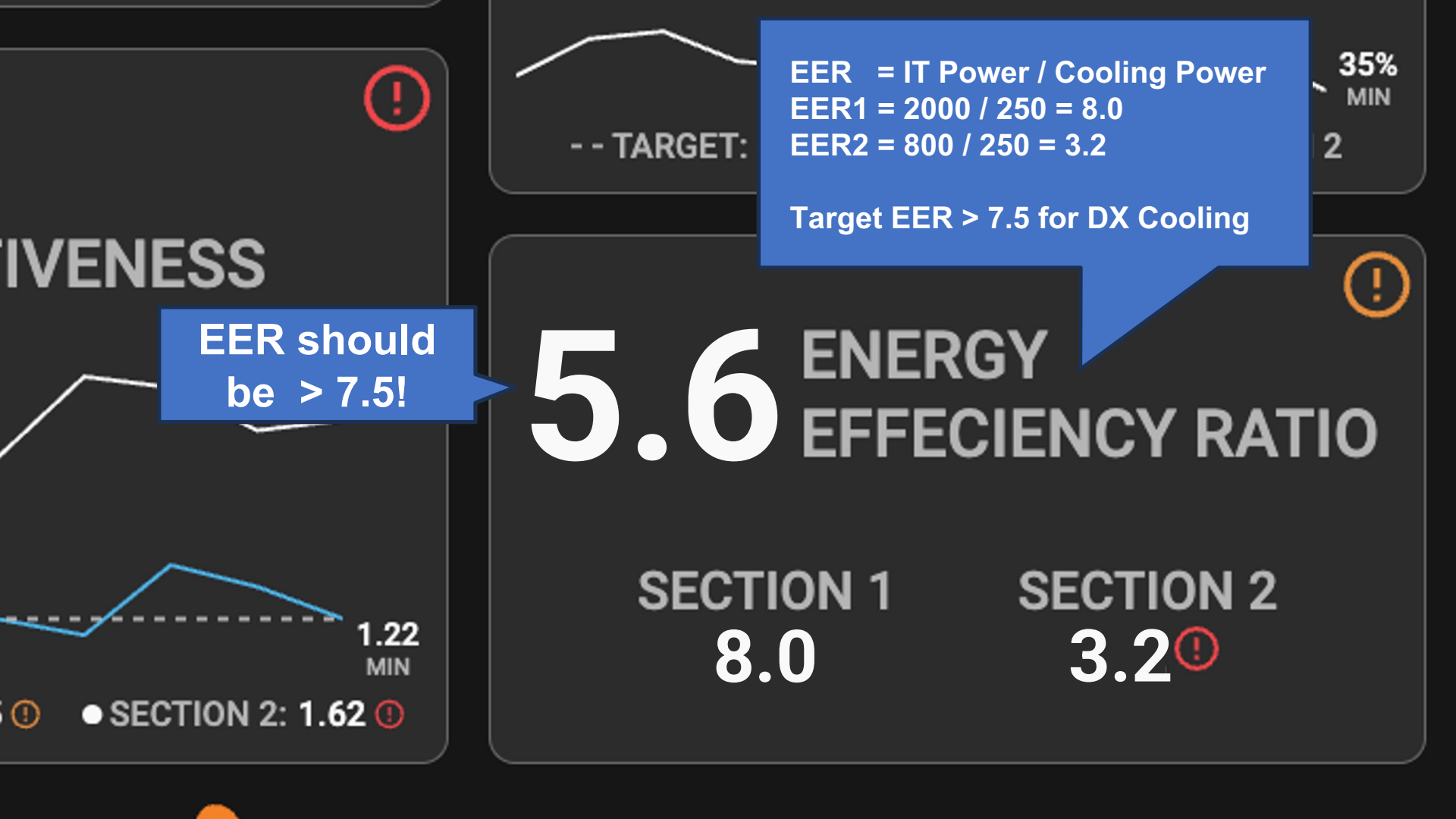
- - TARGET: <80% ● SECTION 1 ● SECTION 2

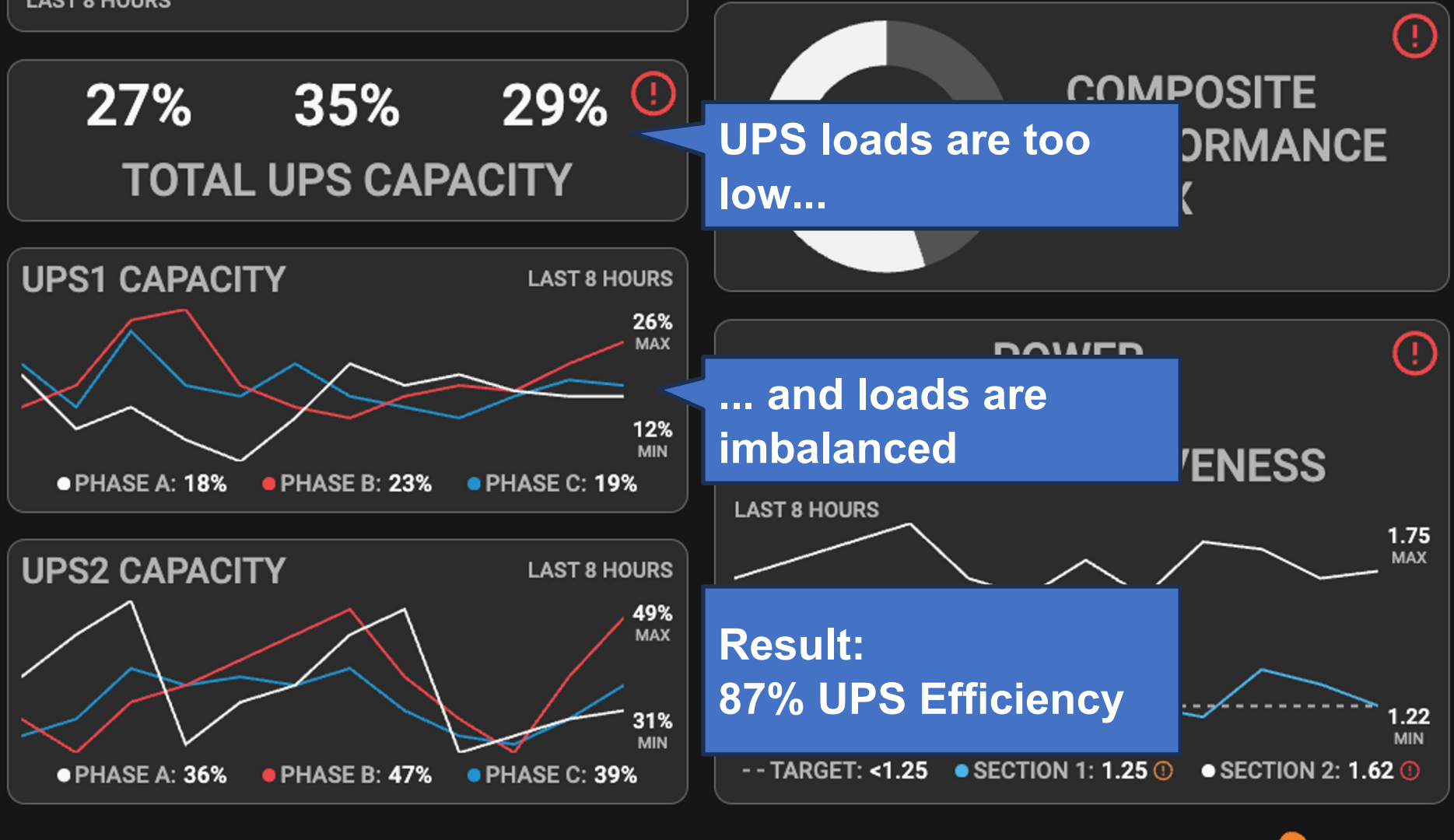
5.6 ENERGY EFFECIENCY RATIO

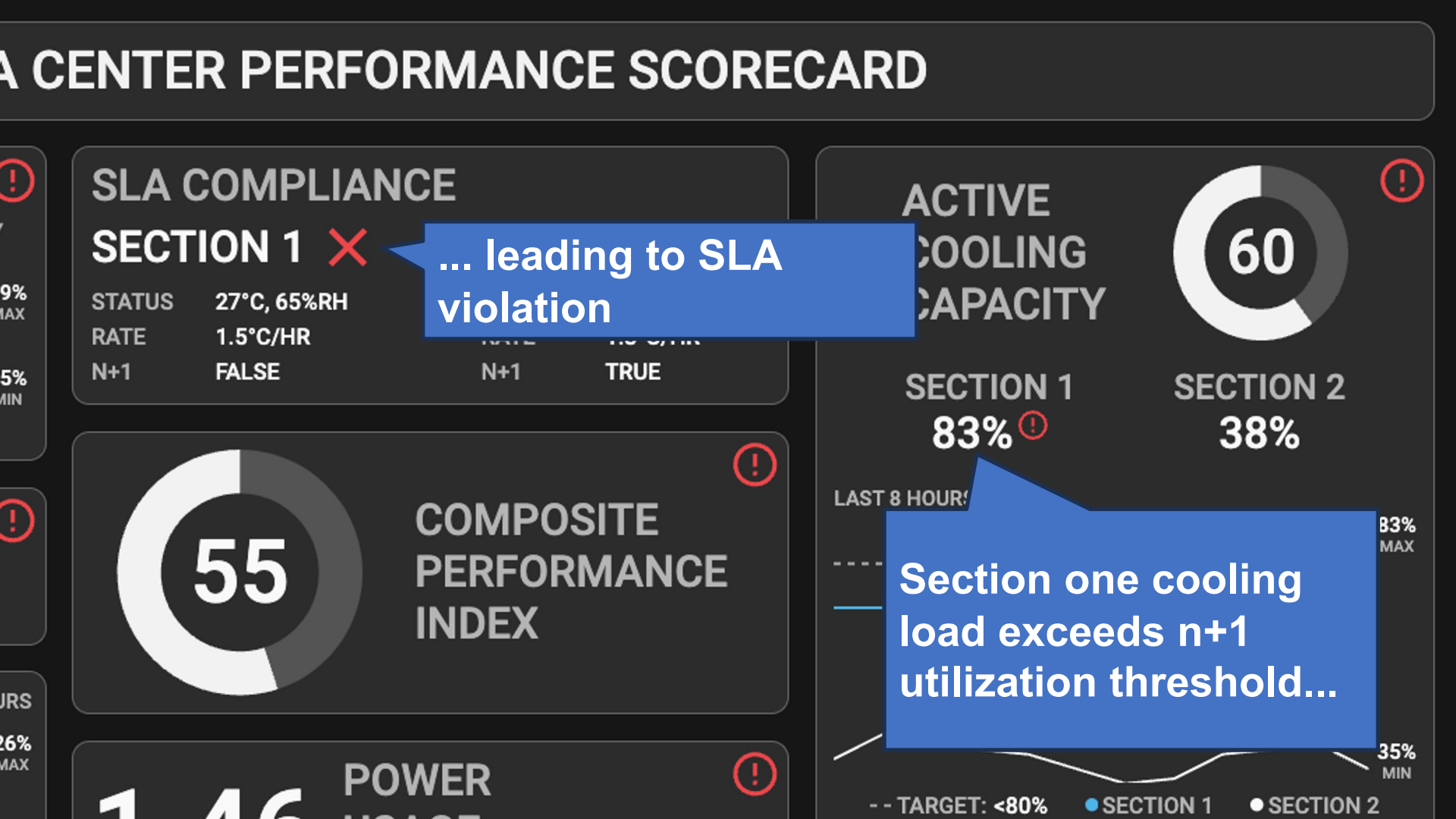
SECTION 1	SECTION 2
8.0	3.2

Powered by Ignition!


35%
29%
UPS CAPACITY
LAST 8 HOURS
26%
MIN
PHASE B: 23%
PHASE C: 19%
LAST 8 HOURS
49%
MAX
31%
MIN
PHASE B: 47%
PHASE C: 39%
PUE = Total Power / IT Power
= 4100 / 2800
= 1.46
Target PUE < 1.3
PUE should be < 1.3!
1.46
POWER USAGE EFFECTIVENESS
LAST 8 HOURS
1.75
MAX
1.22
MIN
TARGET: <1.25
SECTION 1: 1.25
SECTION 2: 1.62
83%
LAST 8 HOURS
TARGET: <80%
5.6
SECTION 1
8.0


EER = IT Power / Cooling Power
EER1 = 2000 / 250 = 8.0
EER2 = 800 / 250 = 3.2
Target EER > 7.5 for DX Cooling
- - TARGET:
35%
MIN
2
TIVENESS
EER should be > 7.5!
5.6
ENERGY EFFECIENCY RATIO
SECTION 1
8.0
SECTION 2
3.2
1.22
MIN
SECTION 2: 1.62


27%
35%
29%
TOTAL UPS CAPACITY
UPS loads are too low...
COMPOSITE
ORMANCE
UPS1 CAPACITY
LAST 8 HOURS
26%
MAX
12%
MIN
PHASE A: 18%
PHASE B: 23%
PHASE C: 19%
... and loads are imbalanced
VENESS
LAST 8 HOURS
1.75
MAX
1.22
MIN
UPS2 CAPACITY
LAST 8 HOURS
49%
MAX
31%
MIN
PHASE A: 36%
PHASE B: 47%
PHASE C: 39%
Result:
87% UPS Efficiency
TARGET: <1.25
SECTION 1: 1.25
SECTION 2: 1.62


A CENTER PERFORMANCE SCORECARD
SLA COMPLIANCE
SECTION 1
STATUS 27°C, 65%RH
RATE 1.5°C/HR
N+1 FALSE
N+1 TRUE
... leading to SLA violation
ACTIVE COOLING CAPACITY
60
SECTION 1
83%
SECTION 2
38%
55
COMPOSITE PERFORMANCE INDEX
LAST 8 HOUR
83% MAX
35% MIN
Section one cooling load exceeds n+1 utilization threshold...
POWER
TARGET: <80%
SECTION 1
SECTION 2

ACTION 1: Move IT from Section 1 to Section 2

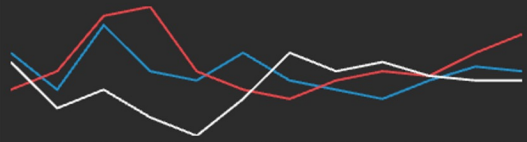
33% ACTIVE POWER CAPACITY

LAST 8 HOURS

27% 35% 29% TOTAL UPS CAPACITY

UPS1 CAPACITY

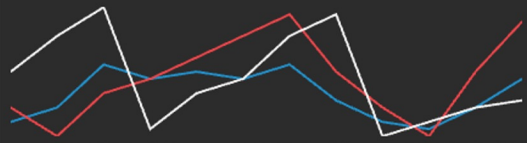
LAST 8 HOURS



● PHASE A: 18% ● PHASE B: 23% ● PHASE C: 19%

UPS2 CAPACITY

LAST 8 HOURS



● PHASE A: 36% ● PHASE B: 47% ● PHASE C: 39%

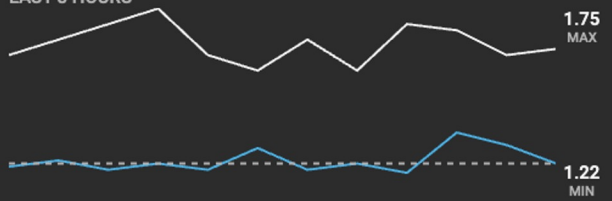
SLA COMPLIANCE

SECTION 1 ✗		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	FALSE	N+1	TRUE

55 COMPOSITE PERFORMANCE INDEX

1.46 POWER USAGE EFFECTIVENESS

LAST 8 HOURS

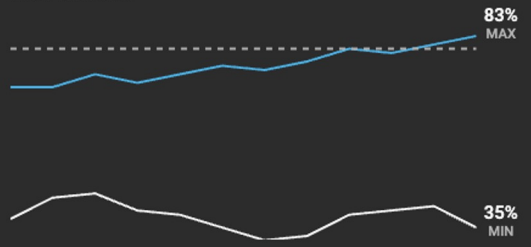


- - TARGET: <1.25 ● SECTION 1: 1.25 ● SECTION 2: 1.62

ACTIVE COOLING CAPACITY 60

SECTION 1	SECTION 2
83%	38%

LAST 8 HOURS



- - TARGET: <80% ● SECTION 1 ● SECTION 2

5.6 ENERGY EFFECIENCY RATIO

SECTION 1	SECTION 2
8.0	3.2

ACTION 1: Move IT from Section 1 to Section 2

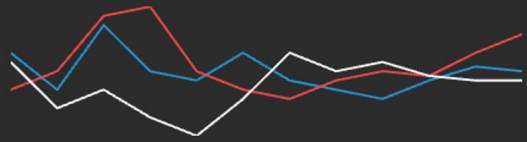
33% ACTIVE POWER CAPACITY

LAST 8 HOURS

27% 35% 29% TOTAL UPS CAPACITY

UPS1 CAPACITY

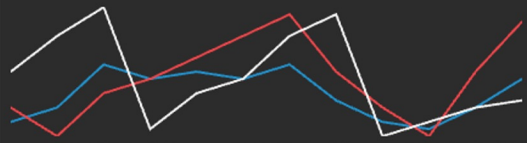
LAST 8 HOURS



● PHASE A: 18% ● PHASE B: 23% ● PHASE C: 19%

UPS2 CAPACITY

LAST 8 HOURS



● PHASE A: 36% ● PHASE B: 47% ● PHASE C: 39%

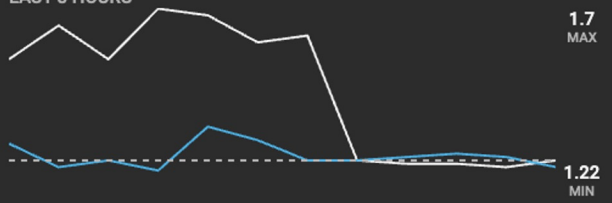
SLA COMPLIANCE

SECTION 1 ✓		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	TRUE	N+1	TRUE

76 COMPOSITE PERFORMANCE INDEX

1.31 POWER USAGE EFFECTIVENESS

LAST 8 HOURS



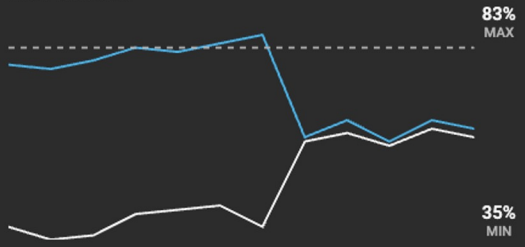
- - TARGET: <1.25 ● SECTION 1: 1.23 ● SECTION 2: 1.25

ACTIVE COOLING CAPACITY 60

SECTION 1 61%

SECTION 2 59%

LAST 8 HOURS



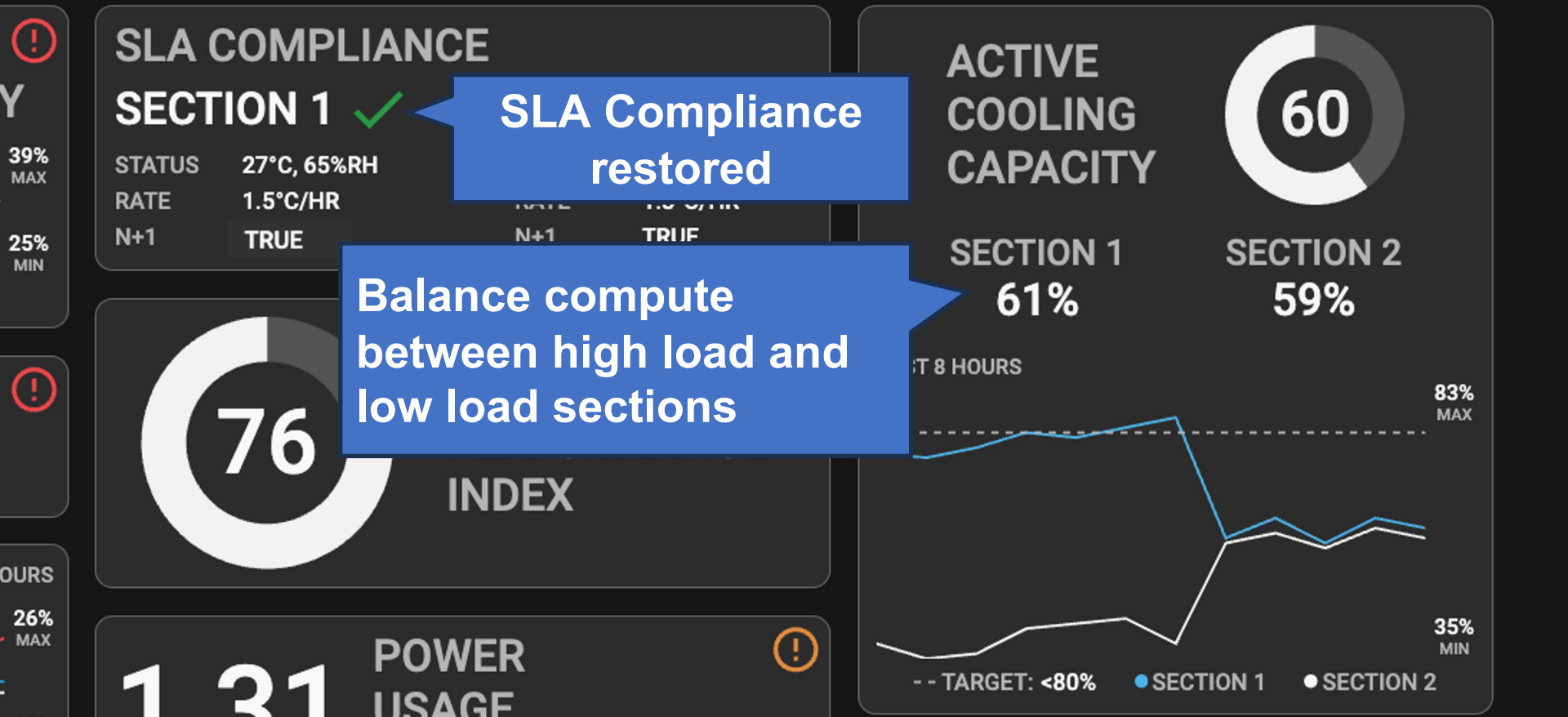
- - TARGET: <80% ● SECTION 1 ● SECTION 2

8.3 ENERGY EFFECIENCY RATIO

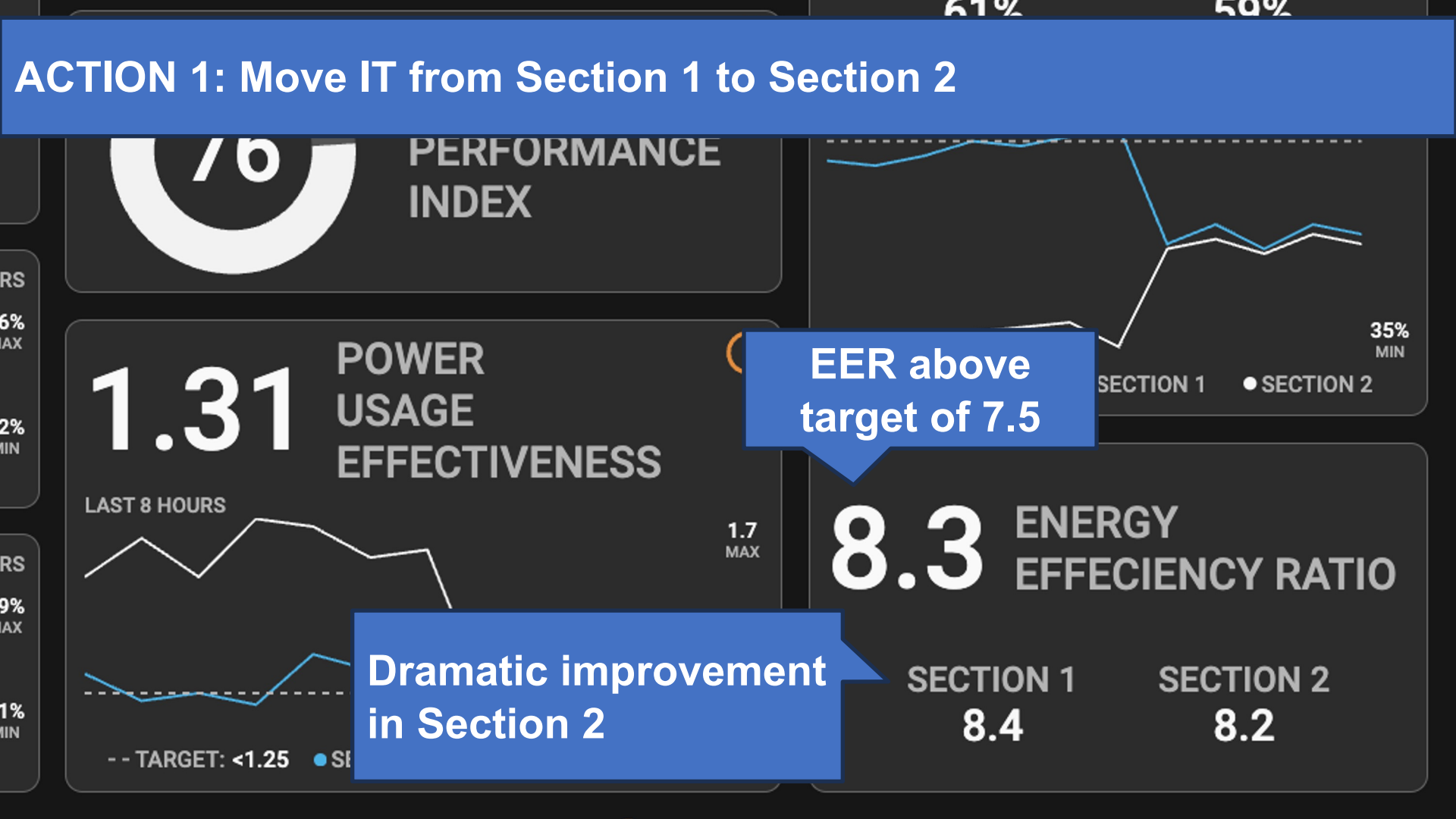
SECTION 1 8.4

SECTION 2 8.2

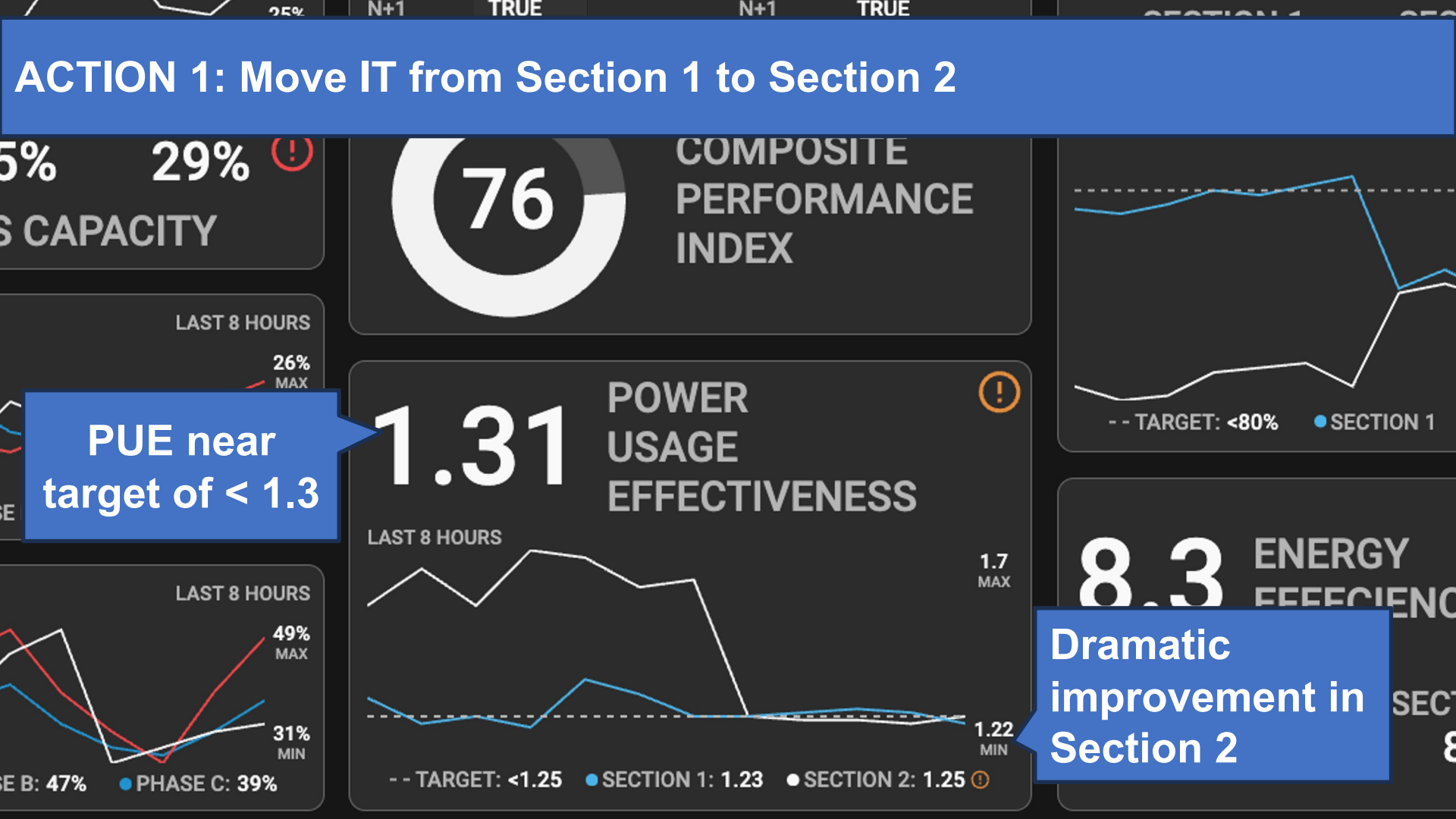
ACTION 1: Move IT from Section 1 to Section 2



ACTION 1: Move IT from Section 1 to Section 2



ACTION 1: Move IT from Section 1 to Section 2



ACTION 2: Decrease UPS Capacity + Load Balancing

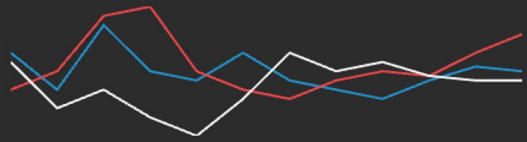
33% ACTIVE POWER CAPACITY

LAST 8 HOURS

27% 35% 29% TOTAL UPS CAPACITY

UPS1 CAPACITY

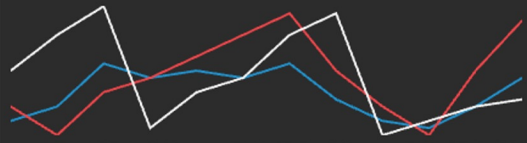
LAST 8 HOURS



● PHASE A: 18% ● PHASE B: 23% ● PHASE C: 19%

UPS2 CAPACITY

LAST 8 HOURS



● PHASE A: 36% ● PHASE B: 47% ● PHASE C: 39%

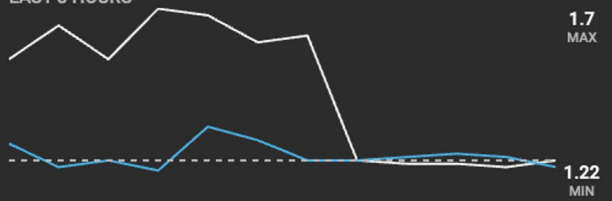
SLA COMPLIANCE

SECTION 1 ✓		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	TRUE	N+1	TRUE

76 COMPOSITE PERFORMANCE INDEX

1.31 POWER USAGE EFFECTIVENESS

LAST 8 HOURS

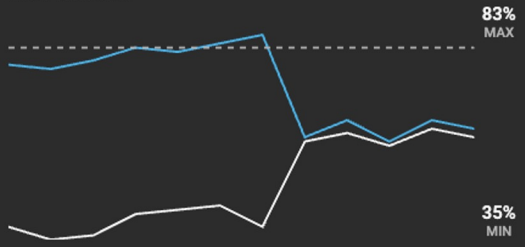


- - TARGET: <1.25 ● SECTION 1: 1.23 ● SECTION 2: 1.25

ACTIVE COOLING CAPACITY 60

SECTION 1	SECTION 2
61%	59%

LAST 8 HOURS



- - TARGET: <80% ● SECTION 1 ● SECTION 2

8.3 ENERGY EFFECIENCY RATIO

SECTION 1	SECTION 2
8.4	8.2

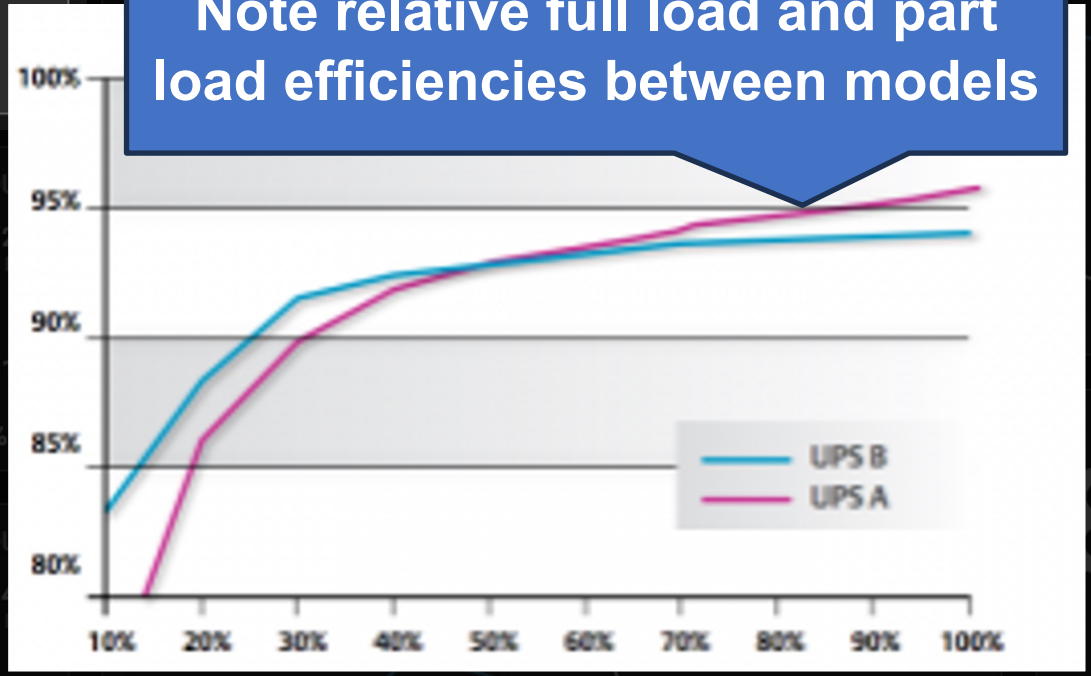
ACTION 2A: Decrease UPS Capacity

27% 35% 29%

TOTAL UPS CAPACITY

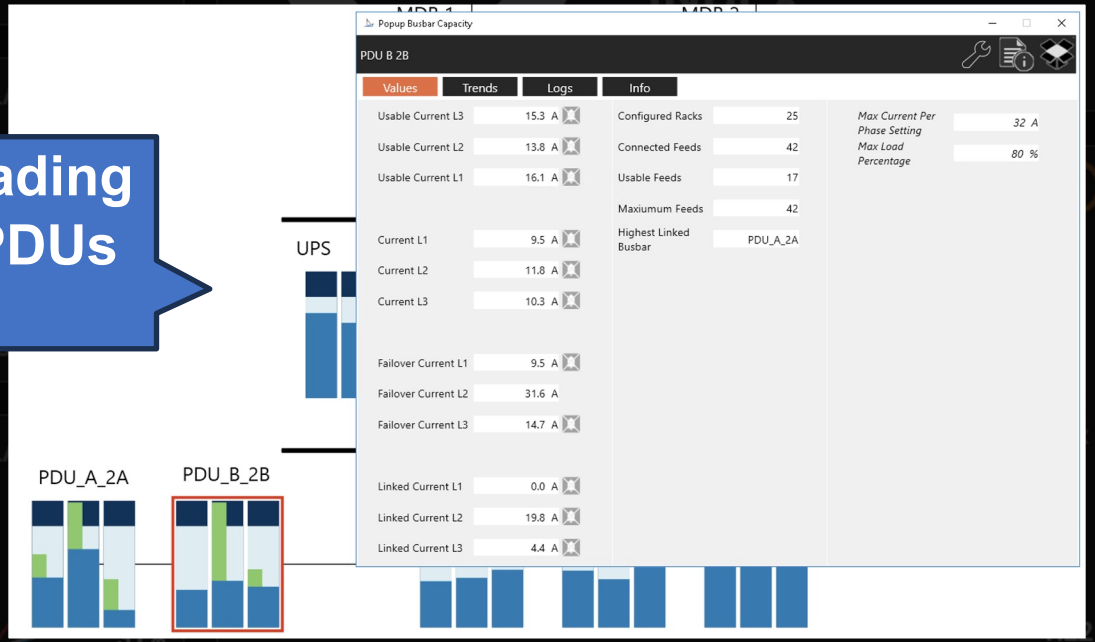
Optimize capacity to prevalent load conditions

Note relative full load and part load efficiencies between models



ACTION 2B: Load Balancing

Analyze phase loading and reconfigure PDUs and IT to balance



ACTION 2: Decrease UPS Capacity + Load Balancing

RATE 1.5°C/HR RATE 1.3°C/HR

27% 35% 29%

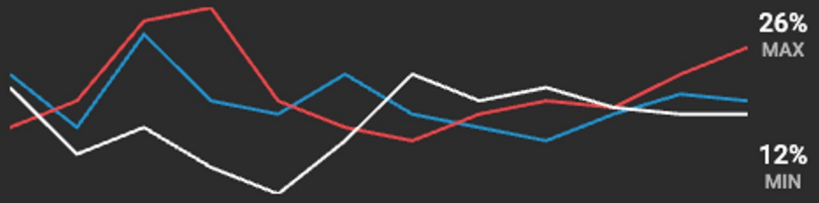
TOTAL UPS CAPACITY

76

COMPOSITE PERFORMANCE INDEX

LAST 8

UPS1 CAPACITY LAST 8 HOURS

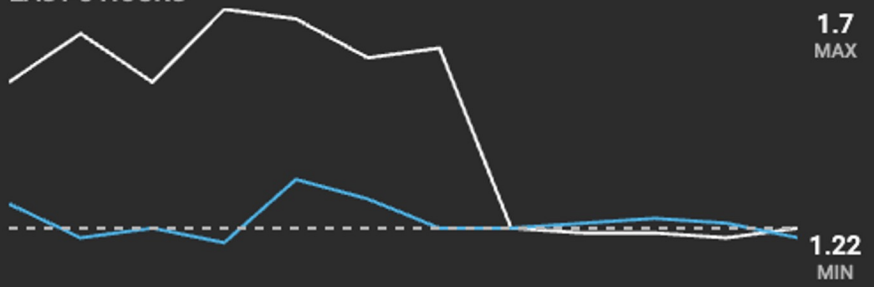


PHASE A: 18% PHASE B: 23% PHASE C: 19%

1.31

POWER USAGE EFFECTIVENESS

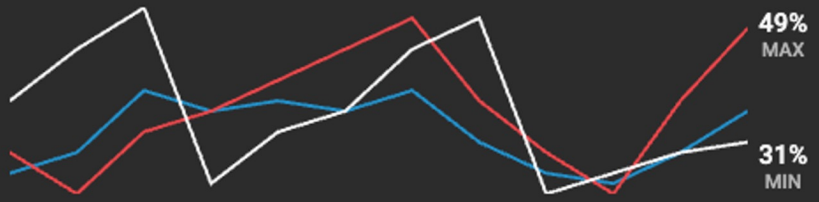
LAST 8 HOURS



TARGET: ≤1.25 SECTION 1: 1.23 SECTION 2: 1.25

8

UPS2 CAPACITY LAST 8 HOURS



PHASE A: 36% PHASE B: 47% PHASE C: 39%

RATE 1.5°C/HR RATE 1.3°C/HR

ACTION 2: Decrease UPS Capacity + Load Balancing

80% 80% 80%

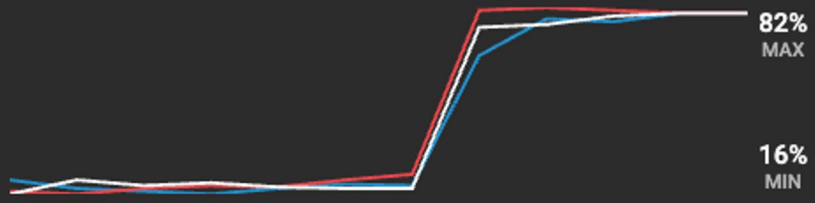
TOTAL UPS CAPACITY

90

COMPOSITE PERFORMANCE INDEX

UPS1 CAPACITY

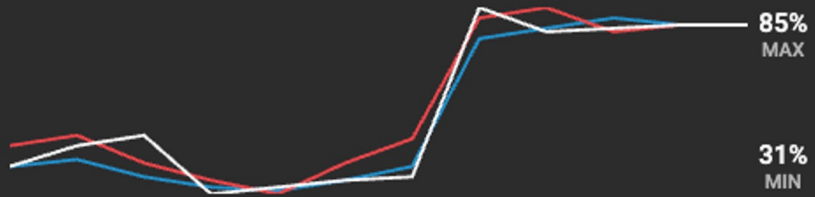
LAST 8 HOURS



PHASE A: 80% PHASE B: 80% PHASE C: 80%

UPS2 CAPACITY

LAST 8 HOURS

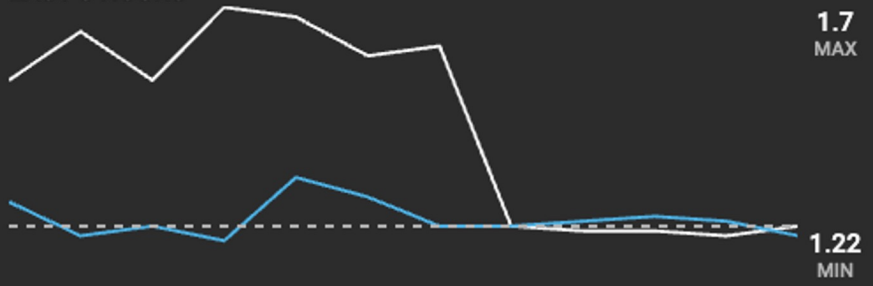


PHASE A: 80% PHASE B: 80% PHASE C: 80%

1.25

POWER USAGE EFFECTIVENESS

LAST 8 HOURS



TARGET: <1.25 SECTION 1: 1.23 SECTION 2: 1.25

LAST 8

8

ACTION 2: Decrease UPS Capacity + Load Balancing

RATE 1.5°C/HR RATE 1.3°C/HR

80% 80% 80%

TOTAL UPS CAPACITY

Loads are balanced, Efficiency > 94%

OMPOSITE
ERFORMANCE
IDEX

LAST 8

UPS1 CAPACITY

LAST 8 HOURS

82%
MAX

PHASE A: 80% PHASI

PUE is below target (1.3)

1.25 POWER USAGE EFFECTIVENESS

LAST 8 HOURS

1.7
MAX

1.22
MIN

TARGET: <1.25 SECTION 1: 1.23 SECTION 2: 1.25

8

UPS2 CAPACITY

LAST 8 HOURS

85%
MAX

31%
MIN

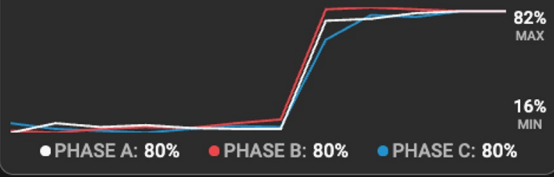
PHASE A: 80% PHASE B: 80% PHASE C: 80%

DATA CENTER PERFORMANCE SCORECARD

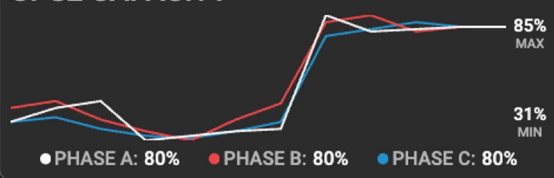
80% ACTIVE POWER CAPACITY

80% 80% 80% TOTAL UPS CAPACITY

UPS1 CAPACITY



UPS2 CAPACITY

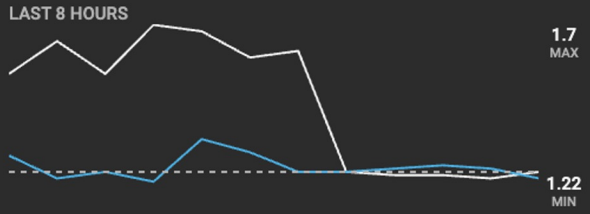


SLA COMPLIANCE

SECTION 1 ✓		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	TRUE	N+1	TRUE

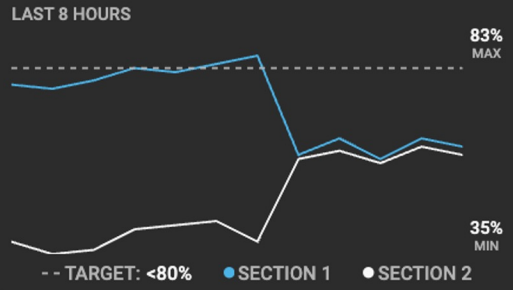
90 COMPOSITE PERFORMANCE INDEX

1.25 POWER USAGE EFFECTIVENESS



ACTIVE COOLING CAPACITY

SECTION 1	SECTION 2
61%	59%



8.3 ENERGY EFFECIENCY RATIO

SECTION 1	SECTION 2
8.4	8.2

DATA CENTER PERFORMANCE SCORECARD

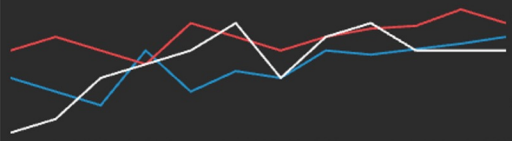
80% ACTIVE POWER CAPACITY

LAST 8 HOURS

80% 80% 80%
TOTAL UPS CAPACITY

UPS1 CAPACITY

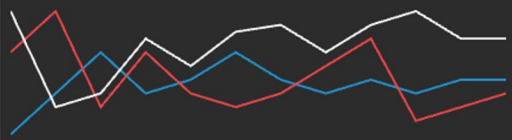
LAST 8 HOURS



● PHASE A: **81%** ● PHASE B: **83%** ● PHASE C: **82%**

UPS2 CAPACITY

LAST 8 HOURS



● PHASE A: **83%** ● PHASE B: **79%** ● PHASE C: **80%**

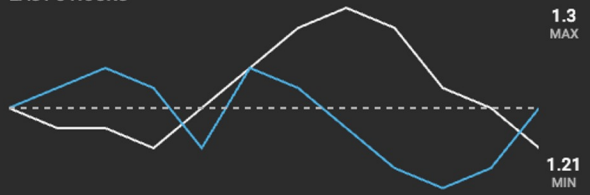
SLA COMPLIANCE

SECTION 1 ✓		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	TRUE	N+1	TRUE

COMPOSITE PERFORMANCE INDEX

1.25 POWER USAGE EFFECTIVENESS

LAST 8 HOURS



- - TARGET: **<1.25** ● SECTION 1: **1.23** ● SECTION 2: **1.25**

ACTIVE COOLING CAPACITY

SECTION 1	SECTION 2
61%	59%

LAST 8 HOURS

- - TARGET: **<80%** ● SECTION 1 ● SECTION 2

8.3 ENERGY EFFECIENCY RATIO

SECTION 1	SECTION 2
8.4	8.2

DATA CENTER PERFORMANCE SCORECARD

80% ACTIVE POWER CAPACITY

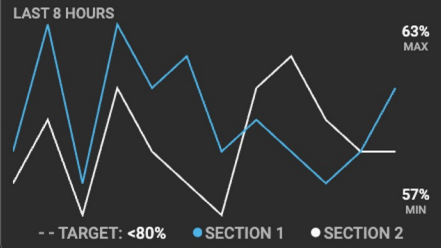
LAST 8 HOURS

SLA COMPLIANCE

SECTION 1 ✓		SECTION 2 ✓	
STATUS	27°C, 65%RH	STATUS	26°C, 67%RH
RATE	1.5°C/HR	RATE	1.3°C/HR
N+1	TRUE	N+1	TRUE

ACTIVE COOLING CAPACITY

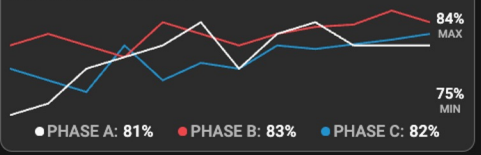
SECTION 1	SECTION 2
61%	59%



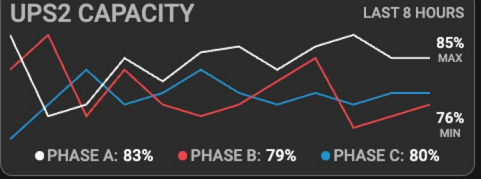
80% 80% 80% TOTAL UPS CAPACITY

90 COMPOSITE PERFORMANCE INDEX

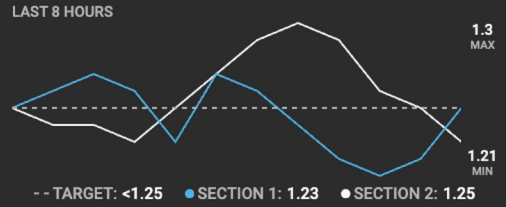
UPS1 CAPACITY



UPS2 CAPACITY



1.25 POWER USAGE EFFECTIVENESS



8.3 ENERGY EFFECIENCY RATIO

SECTION 1	SECTION 2
8.4	8.2

Powered by Ignition!

Show me the money

- Colo: size 12,000 m2
- Uses 15 MWh
- Energy purchase price $ 0.10 / kWh
- PUE 1.46
- Yearly Energy costs $ 13,140,000

- New PUE 1.25,
  - Old Energy consumption 15 MWh
  - New Energy consumption 12.842 MWh

- Yearly Energy costs $ 11,250,000

- Compliancy with **your local legislation**
- Saving on energy costs **$ 1,890,000 yearly**
- DCIM ROI **4 - 6 month**

ATS Datacenters

Martin Matse
Global BDM Datacenters
+31 653 20 42 36
Martin.matse@ats-global.com

Ready to Try Ignition for Yourself?

Download the full version for free at:
inductiveautomation.com

inductiveuniversity.com

Ignition User Manual also available at:
docs.inductiveautomation.com

International Distributors

Brazil	FG Automação Industrial	www.fgltda.com.br
Central America	NV Tecnologías S.A.	www.nvtecnologias.com
France	AXONE-iO	www.axone-io.com
Italy	EFA Automazione S.p.A	www.efa.it
Middle East/North Africa	Clarien Solutions	www.clarien.solutions
Norway & Sweden	Autic System AS	www.autic.no
South Africa	Element8	https://element8.co.za
Switzerland	MPI Technologies	https://mpi.ch

Contact International Distribution Manager Yegor Karnaukhov at: ykarnaukhov@inductiveautomation.com

For More Information, Please Contact:

Martin Matse
ATS Global
+31 653 20 42 36
Martin.matse@ats-global.com

Christopher Markstein
Inductive Automation
+1 727 358 5800
cmarkstein@inductiveautomation.com

Thank You

Stay connected to us on social media
& subscribe to news feeds: