

# Big Data Analytics

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# Power Monitoring



- 1-ph | 3-ph non linear loads are used in industry networks right through to office blocks:
  - VFD Drives HVAC | Process | Lifts.
  - Lighting controls for headlamps & low energy bulbs.
  - IT infrastructure.
  - PV Inverters & UPS

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# Power Monitoring



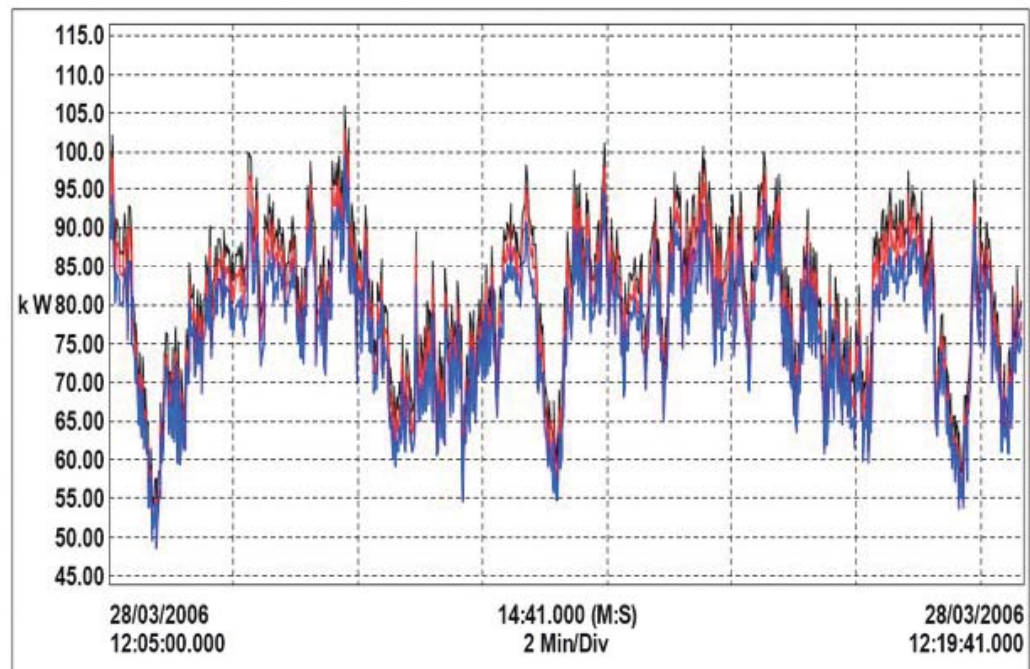
- Demand side management
- Load Shedding algorithms
- Energy measures performance
- Harmonics
  - THD | Voltage
  - THD | Current
  - TDD full load conditions
- Current | Voltage unbalance

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# Power Monitoring



- Voltage dips & interruptions
- Phase shifting & Reactive power
- Flicker
- RCM
- Transients

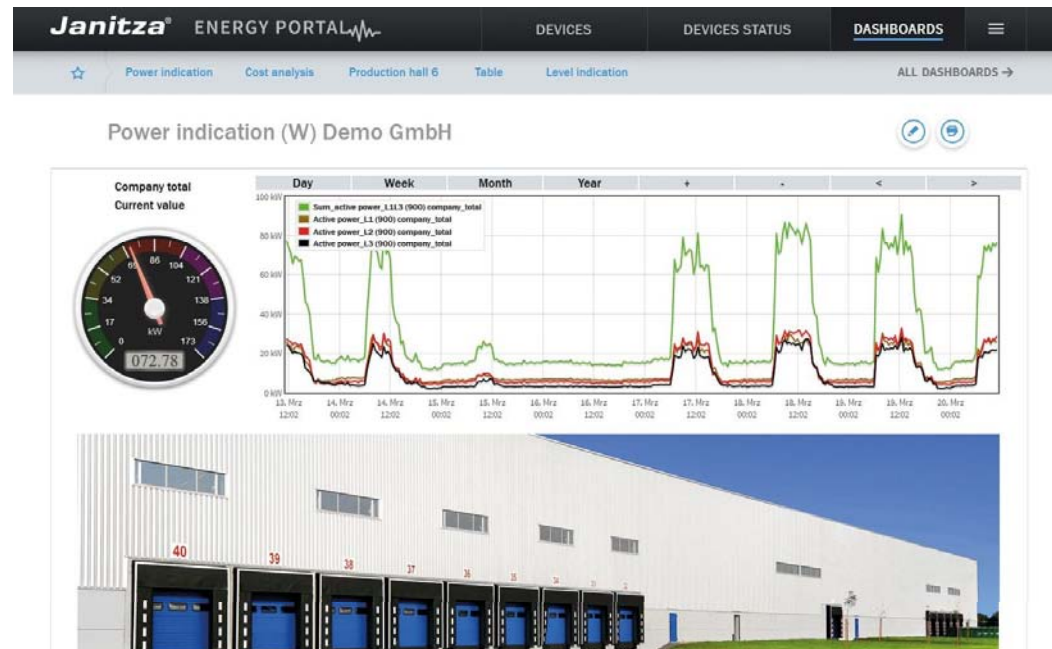


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# Energy Monitoring & Targeting



- Daily | Monthly Energy profile, versus:
  - Working hours
  - Sales
  - Equipment
  - Lighting
  - Specials
  - Etc.



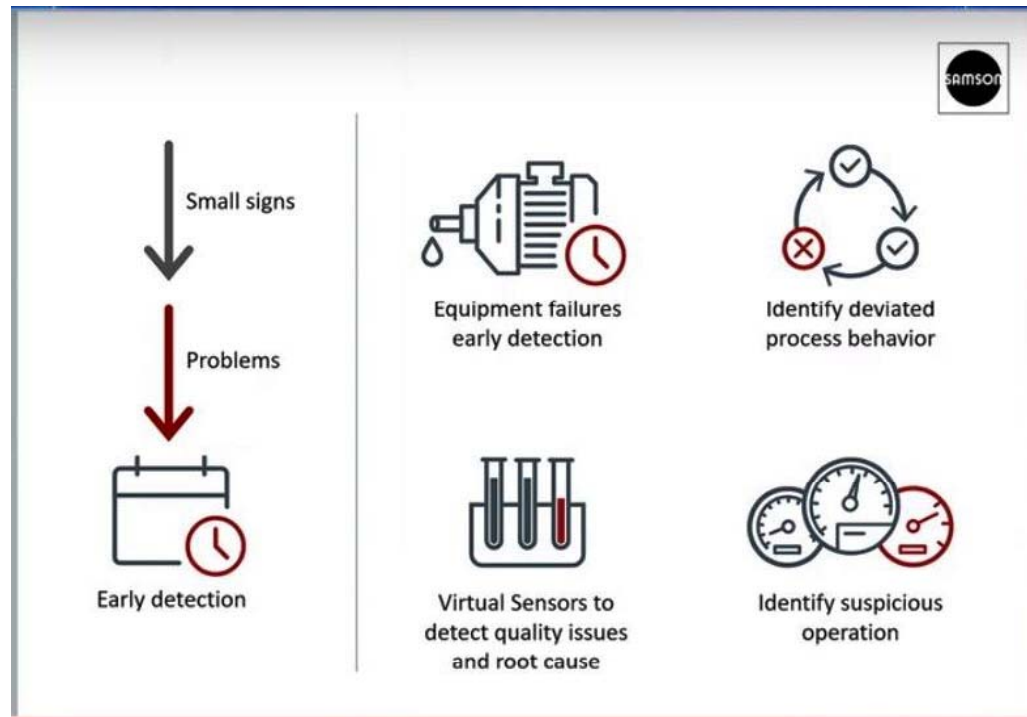
CHAZAPIS COMMISSIONING

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# SYSTEMS: HVAC & R



- Alarms
- Faults
- Priorities
- Diagnostics



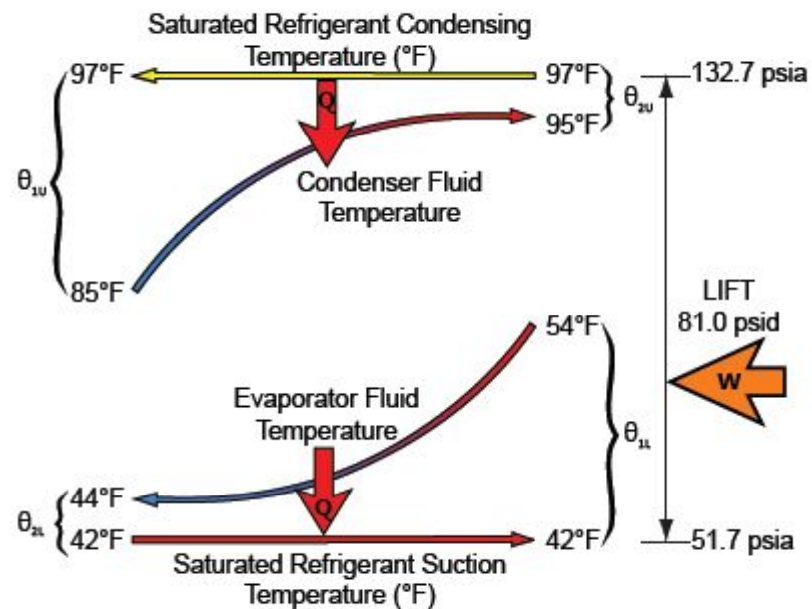
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# SYSTEMS: HVAC & R



- Refrigeration:
  - Cabinets
  - Central plant

Figure 4: Heat Exchanger Performance[PH1]  
R-134a LMTD and Lift



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# SYSTEMS: HVAC & R



- Ventilation:
  - AHU's
  - Exhaust Fans

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>...air quality conditions are:</i>	<i>...as symbolized by this color:</i>
0 - 50	Good	Green
51 - 100	Moderate	Yellow
101 - 150	Unhealthy for Sensitive Groups	Orange
151 - 200	Unhealthy	Red
201 - 300	Very Unhealthy	Purple
301 - 500	Hazardous	Maroon

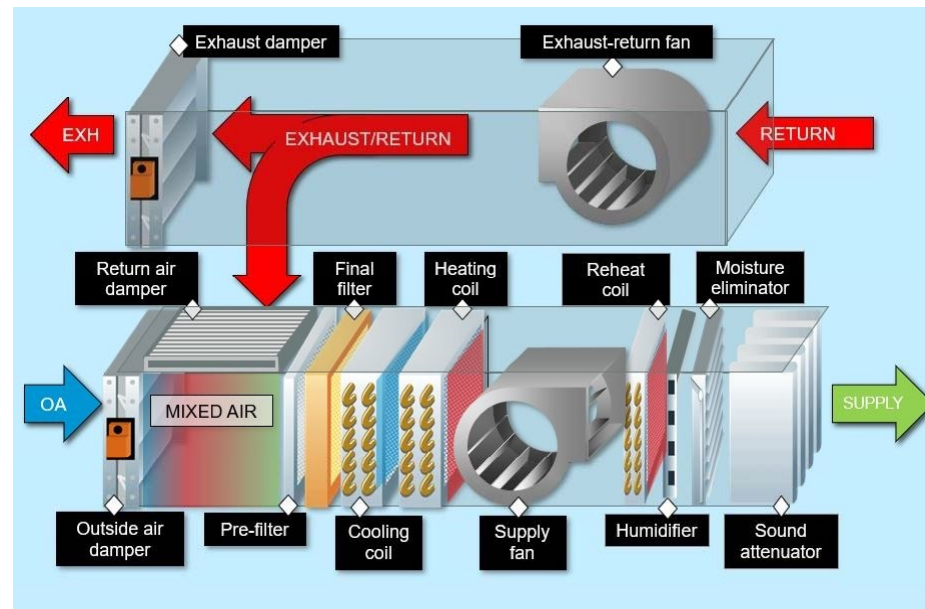
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# SYSTEMS: HVAC & R



- Comfort Heating & Cooling
  - Roof top units
  - VRF systems
  - other



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Who benefits from AHU Commissioning?

# LIGHTING SYSTEMS



- Internal:
  - Cabinets
  - Specials
  - Space
  - Retrofit

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# LIGHTING SYSTEMS



- External:
  - Existing
  - Retrofit
  - Other

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# ERP



- Data integration from ERP
- Other

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