Cold Chain Energy Week
Day 3: Energy Summit Day

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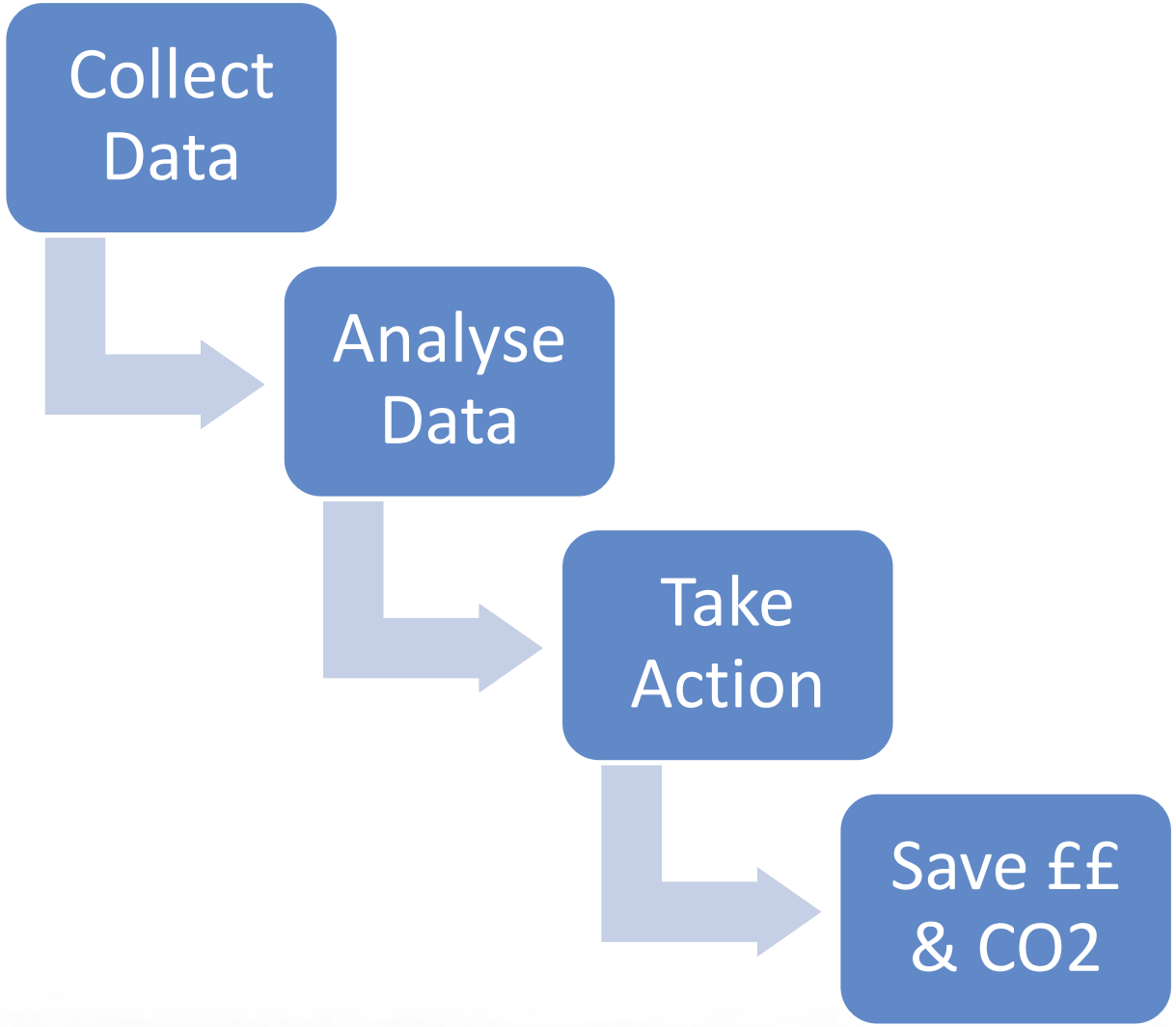
STAR DATA ANALYTICS

What is this all about ?



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Collect Data - Pathways

Web
API

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Collect Data - Standalone Data Logger and Sensors

Advantages

- Fits any system, independent of control system
- Sensors are new, accurate and reliable

Challenges

- Cost (limited number of sensors) and lead time
- Doesn’t have access to internal control values e.g. setpoints
- Some sensor signals have to be copied e.g. slide valve position

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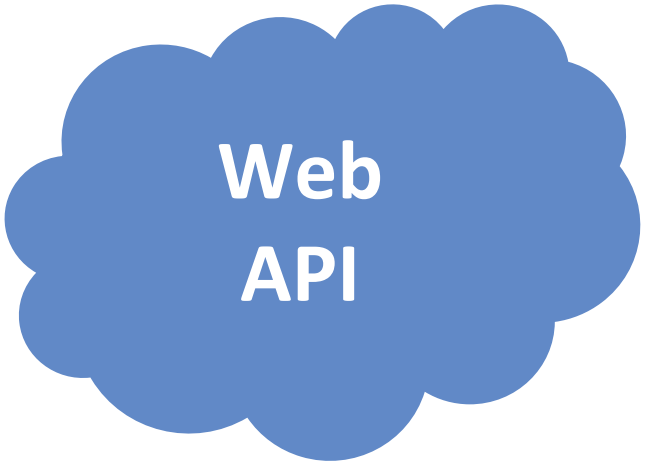
Collect Data - Web API for “Data Rich” Clients



Advantages

- Low cost and can be fast to deploy
- Re-use of existing data, end user retains control, can try out data processing services

Challenges

- Missing sensors
- Out of calibration sensors
- Client has to take on IT responsibility for data collection, storage and transmission

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Collect Data - Network Edge Device and Network Protocol

Modbus / Melsec etc

Advantages

- Low cost and fast to deploy
- Access to full set of sensors and internal control values

Challenges

- Missing sensors / out of calibration sensors
- Needs the protocol map to correctly request and understand data

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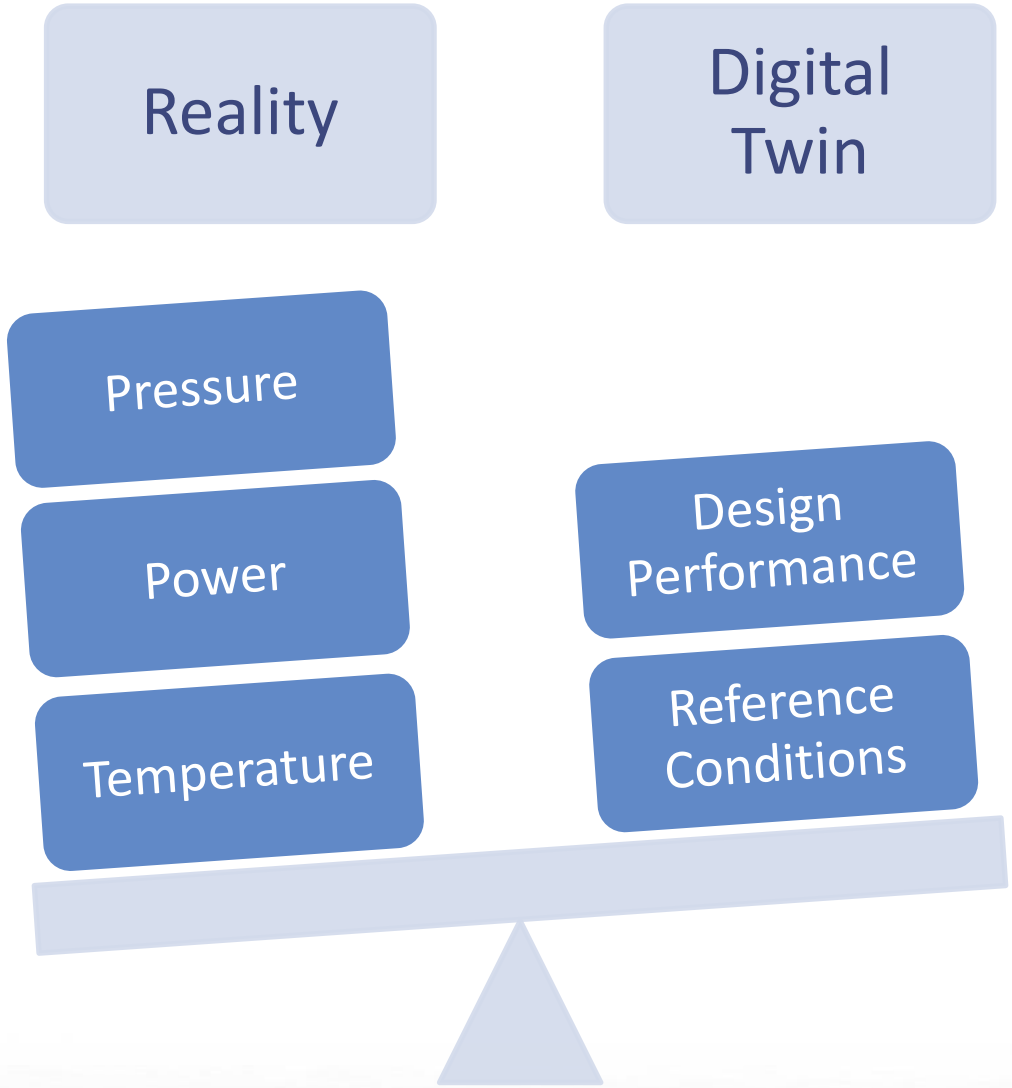
Analyse Data – The Digital Twin



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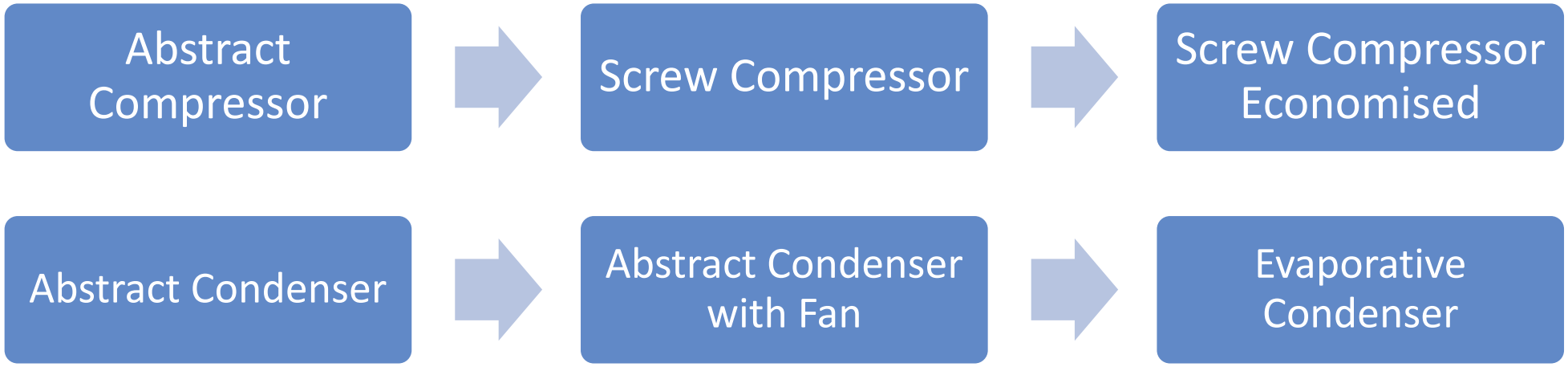
Analyse Data - Building the Digital Twin

- Coded in C# .NET from building blocks that can take advantage of shared code and re-use



- Digital Twin needs to be able to have any sensor from any datasource be mapped to a “model input point”
- Need to “bundle” data over suitable periods e.g. 1 minute or 1 day, etc

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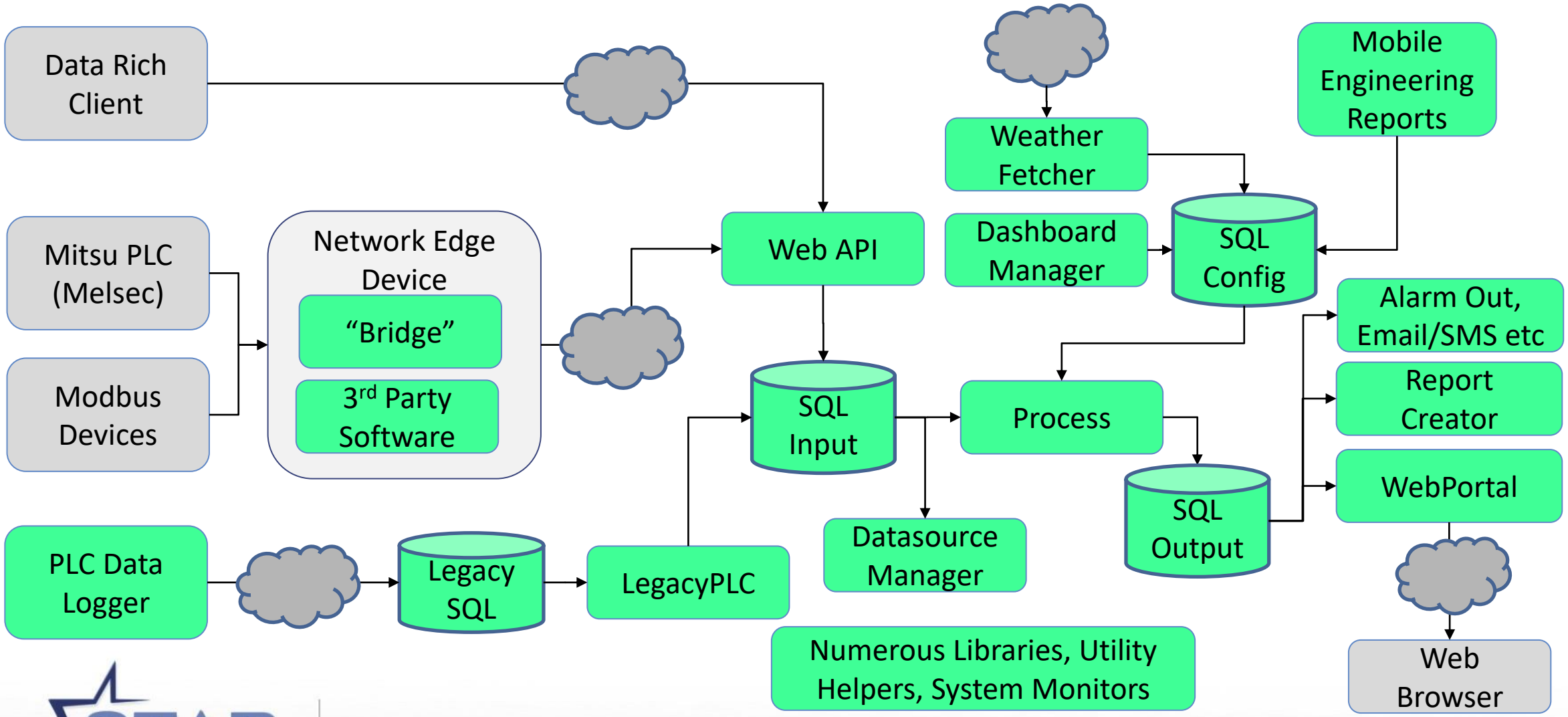
Analyse Data - Deploying in Practice



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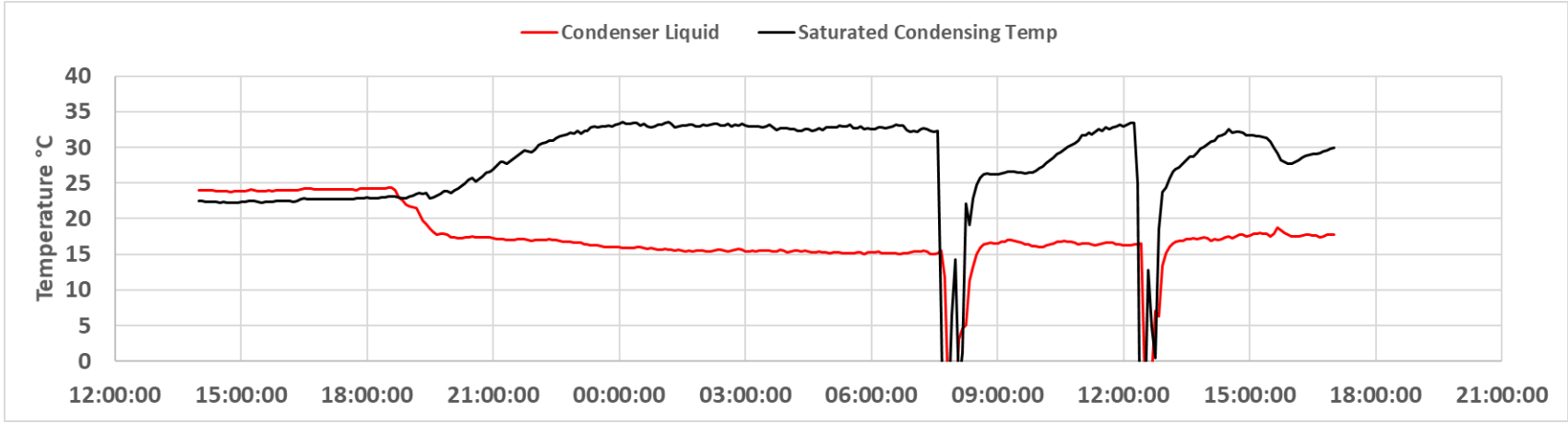
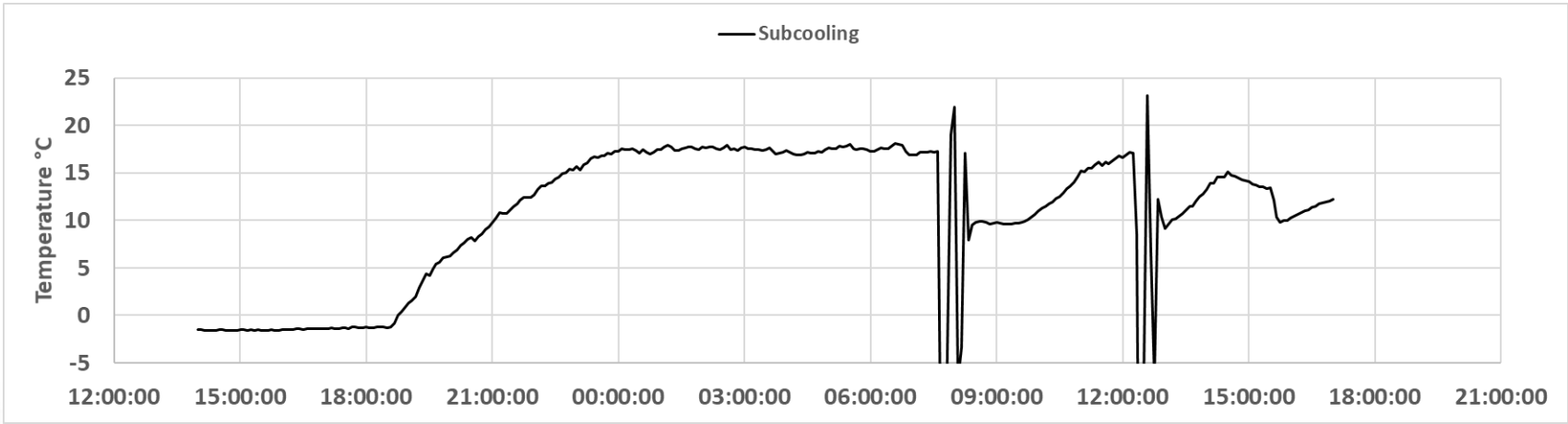
Take Action – Simple Example

- Simple on/off
- E.g. Duration and pattern can sometimes help
  - E.g. non-condensable or liquid backup?





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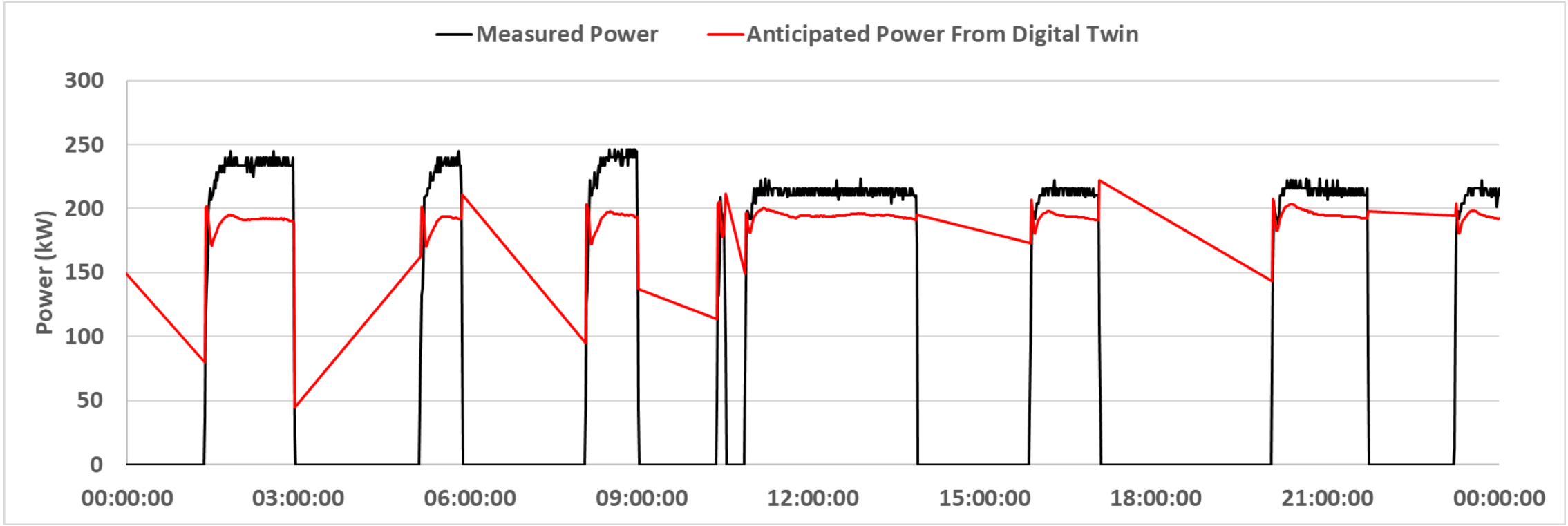
Take Action – Comparison Against Expected

- Compressor Vi needing adjustment



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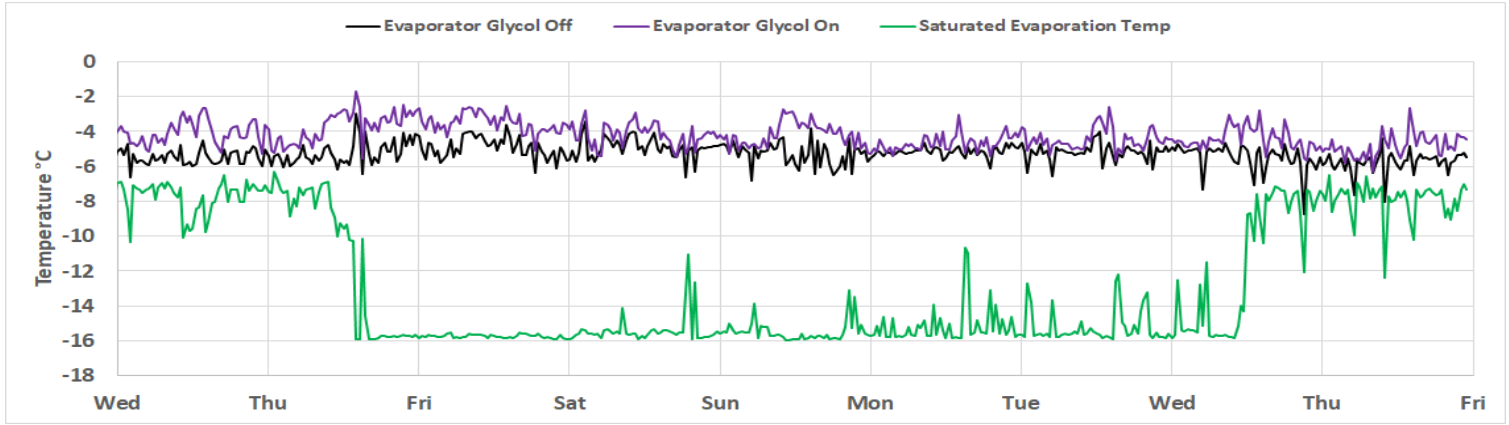
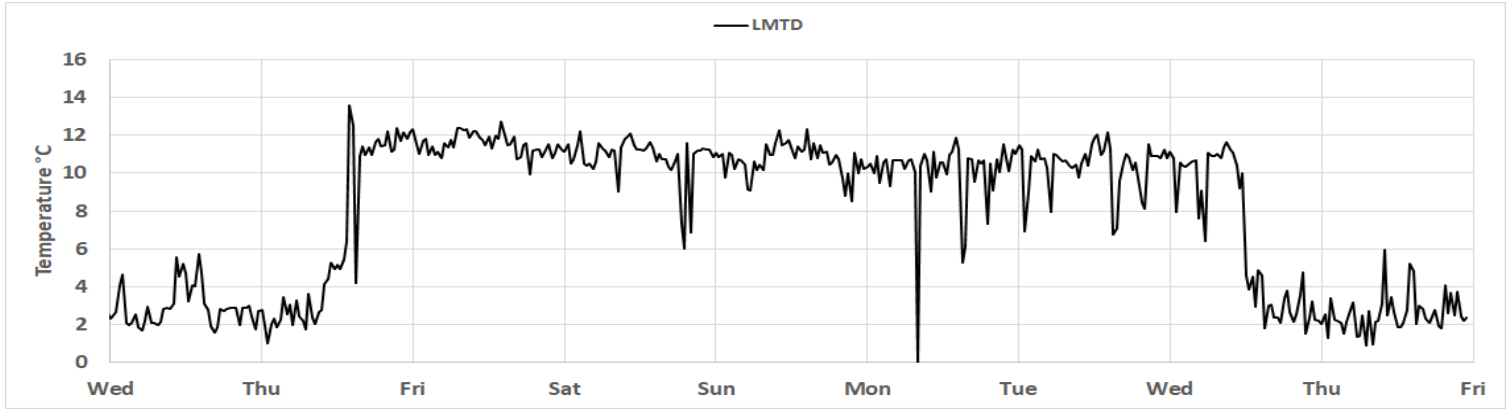
Take Action – Manufacturer Design Condition Re-Rated

- "Heat meter" glycol chiller using on/off
- Take the design condition and re-rate it based on LMTD
- A higher duty in the digital twin means lack of performance





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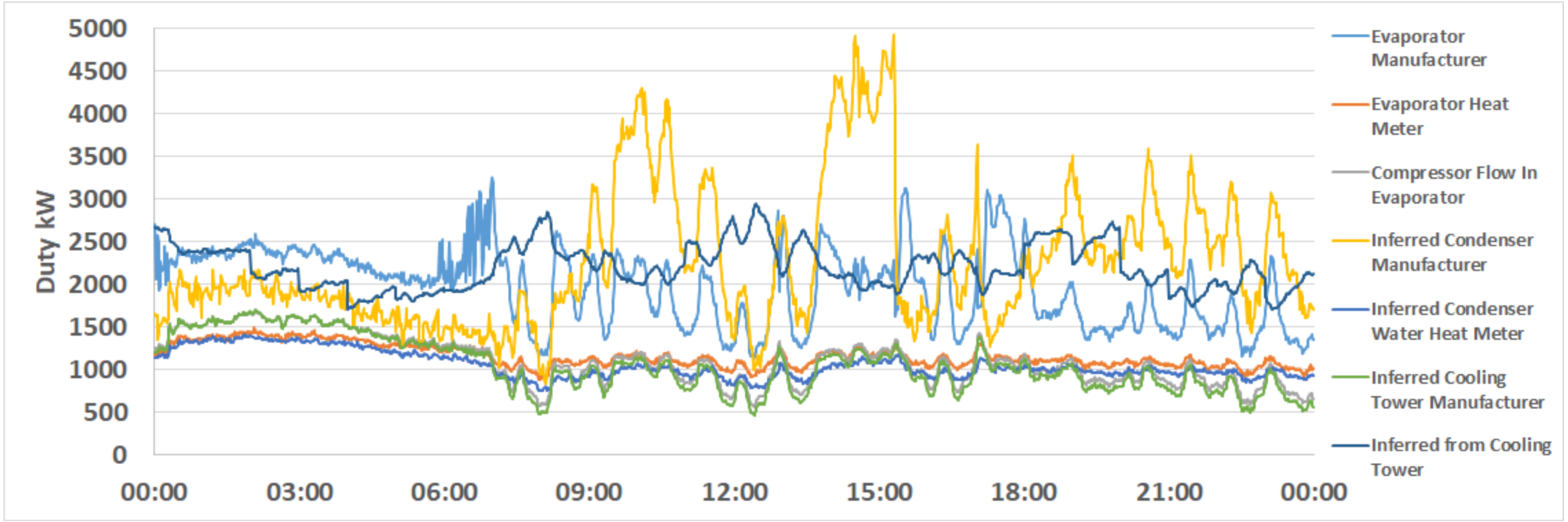
Take Action – Inferring Duty from different parts of the system

- Take the re-rating of duty and apply it to every component



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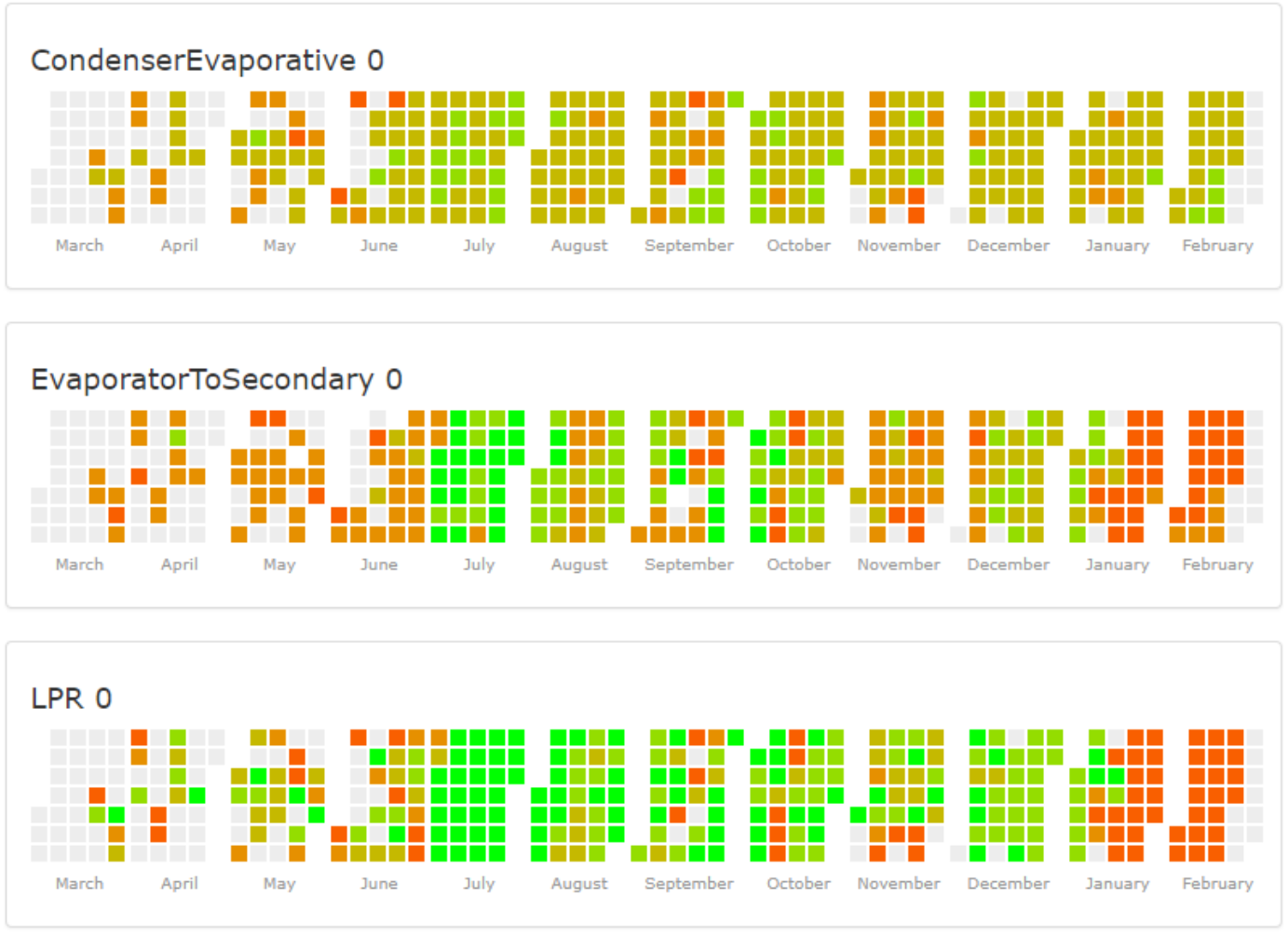
Take Action – Communicate the findings

- Display high level component health



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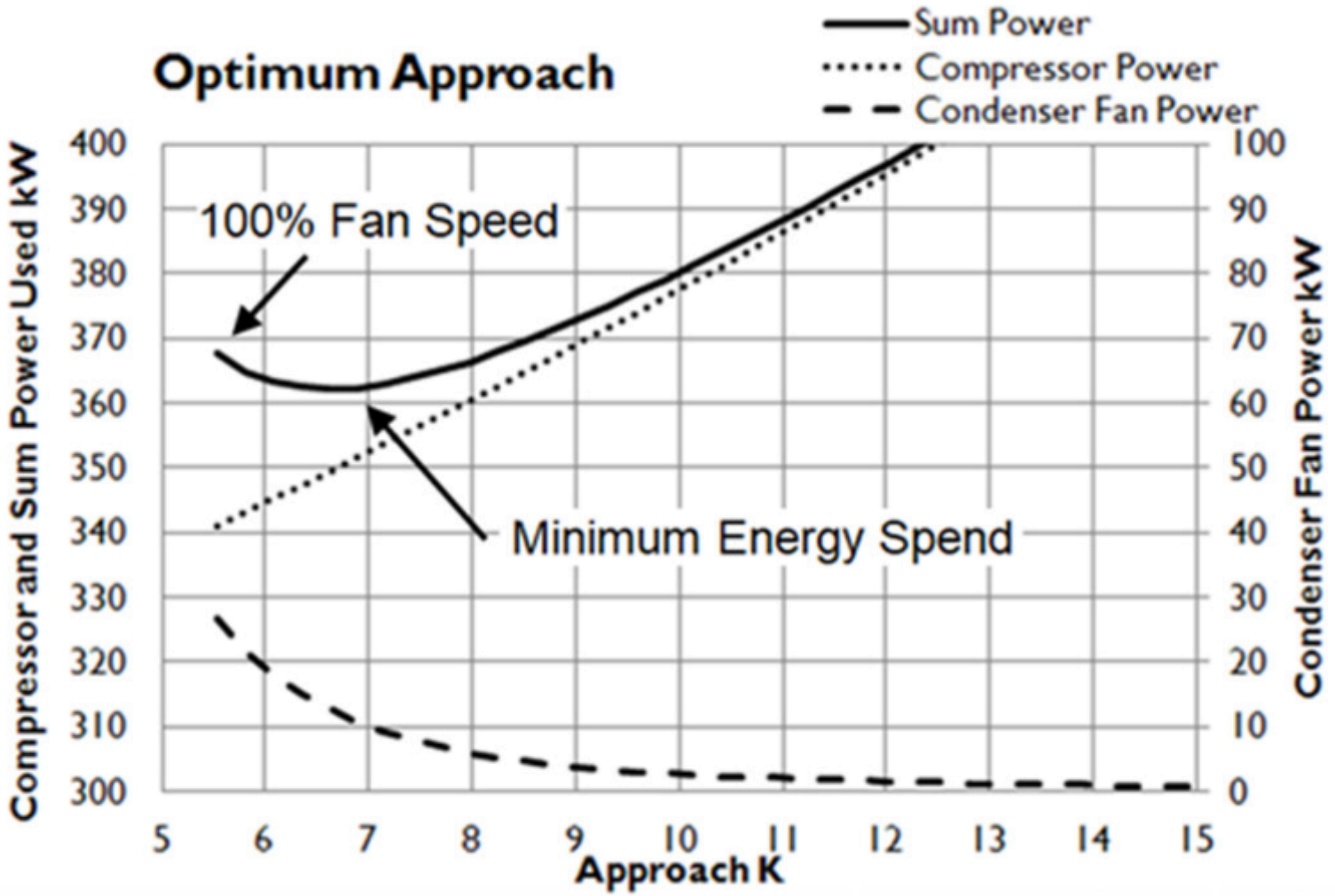
Take Action – Review Control

- Calculate 0% to 100% fan speed and find the minimum power usage

- Compare against actual control and adjust to maximise savings



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Conclusion

- Only if you use the data and take action will there be benefit
- Data is easier than ever to capture, even from old systems
- Data can be meaningfully processed automatically
- Putting a £ value on action motivates but you need a champion
- We’re yet to find a system that hasn’t had something to improve

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