Improve OEE, Reduce Energy & Predict Breakdowns with Centrica's IIoT 4.0, Wireless, Real-time Technology

Solutions

Productivity Solutions

- Machine Vision
- Robotics
- Pick to Light /Put to Light

Cost Optimization Solutions

- Enterprise wide management – Visibility & Controls
- Lighting Controls & Optimization
- HVAC, Chiller Plant & AHU Management, BMS
- Energy, Water, Heat, OEE, Harmonics, VFD Management
- MHE EV – Automated Charging Schedule
- UPS, Genset, Bus Bar Monitoring, Predictive Maintenance
- Real-time Power Factor correction with Advanced IGBT kVAR compensation

Centrica's completely **Wireless** technology offer **Real-time "Circuit level" intelligence with 10 second** data transmission interval

Wireless communication from M/C or Asset

Bridge/ Gateway (LAN, Wi-fi)

Wireless communication from LT Mains/PCC/MCC

Power Sensor (PAN-42)

- Patented
- Wireless Sensors
- Data Transmission interval 10s
- Non-invasive
- Self-powered
- Maintenance free
- Real-time Alerts
- Stores data

Power Radar Energy Analytics Platform

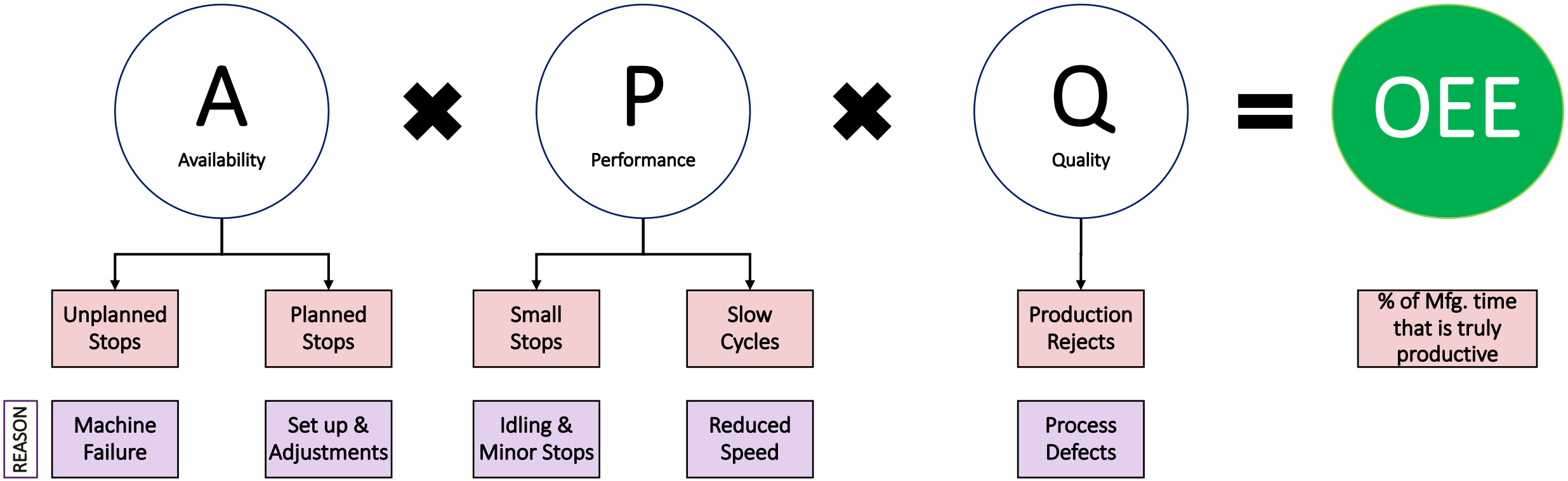
USE CASE

- Improve OEE
- Reduce Energy
- Predict Breakdowns

Increase **Production** & Improve **OEE** by capturing losses with Centrica's tech (**10sec** data transmission interval)

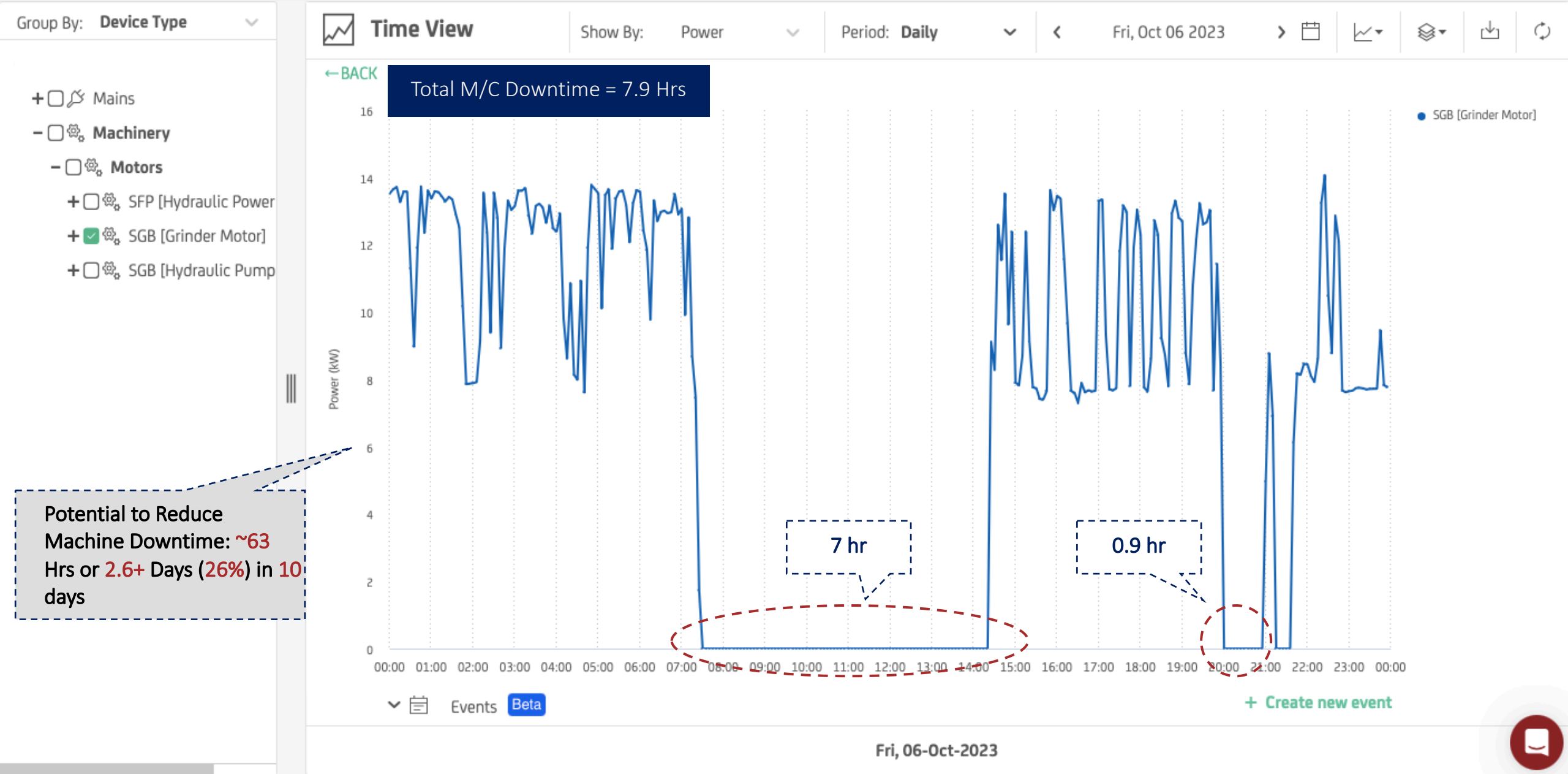
- **Reduce the Idle time** during the operation
- **Reduce M/C downtime**
- **Reduce Air cutting time** to shorten the processing time
- **Visibility** on how operator is operating on the machine in Real-time
- **Improve Manpower productivity**
- **Enterprise wide visibility** of your production

Centrica's tech helps you capture the losses in Real-time and improve OEE & productivity



AVAILABILITY

Reduce M/C downtime (due to changeovers, maintenance, no production planned, manpower productivity issues, others)



Potential to Reduce Machine Downtime: ~63 Hrs or 2.6+ Days (26%) in 10 days

PERFORMANCE

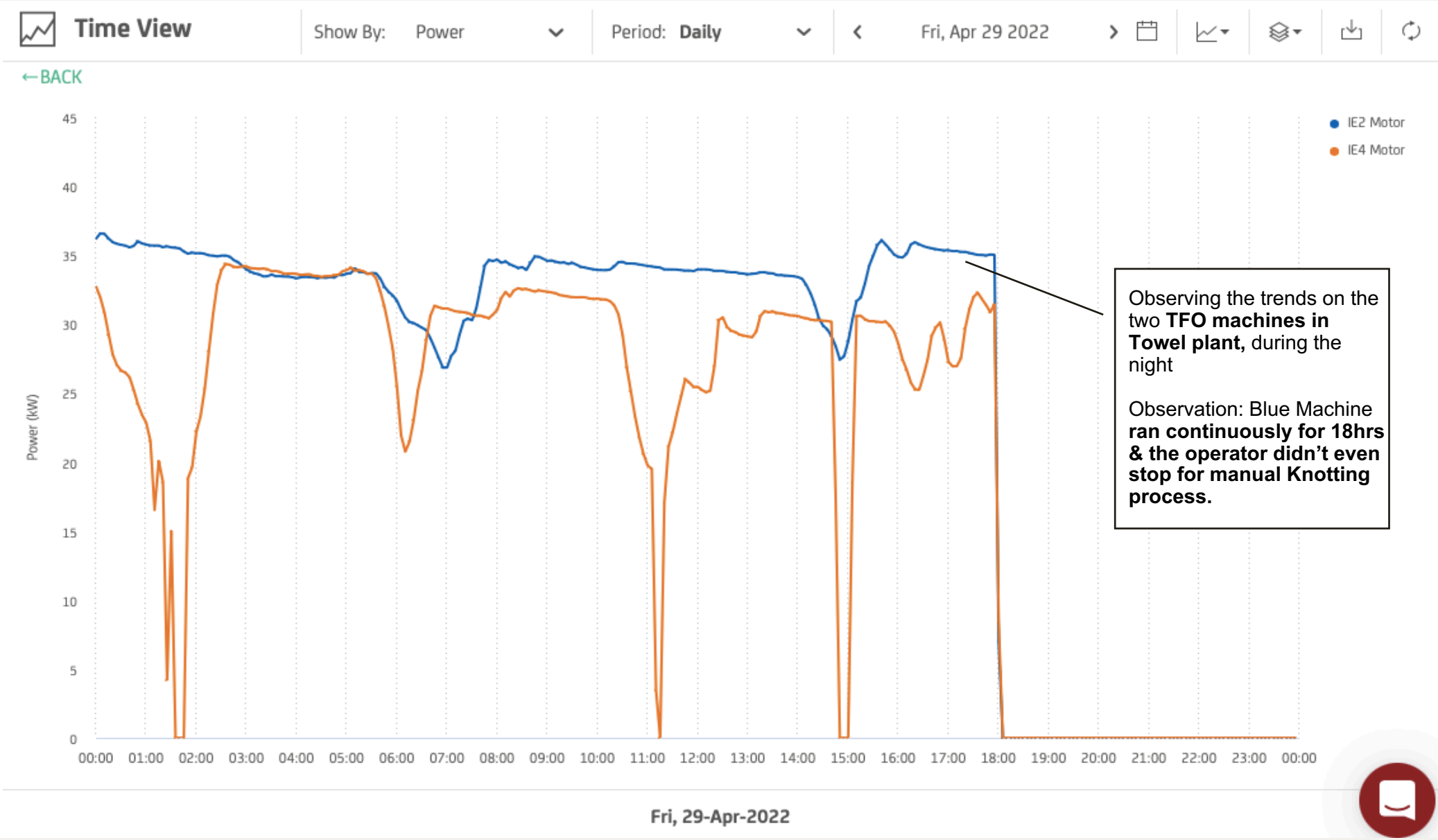
Reduce Idle Time

Potential to Reduce Idle Time on the machine: 40+ Hrs or 1.7+ Days (24%) in 7 days

"Shop managers can conduct time studies of operator setup times to get a better sense of the process and find areas for improvement"

Visibility on how the operator is operating on the machine in Real-time - **Track Manpower productivity on each machine**

- Setting time, Loading & Unloading time
- How many times the operator switched off the machine?
- Idle hours on each machine
- Track Manpower productivity
- Drive Behavioural Change

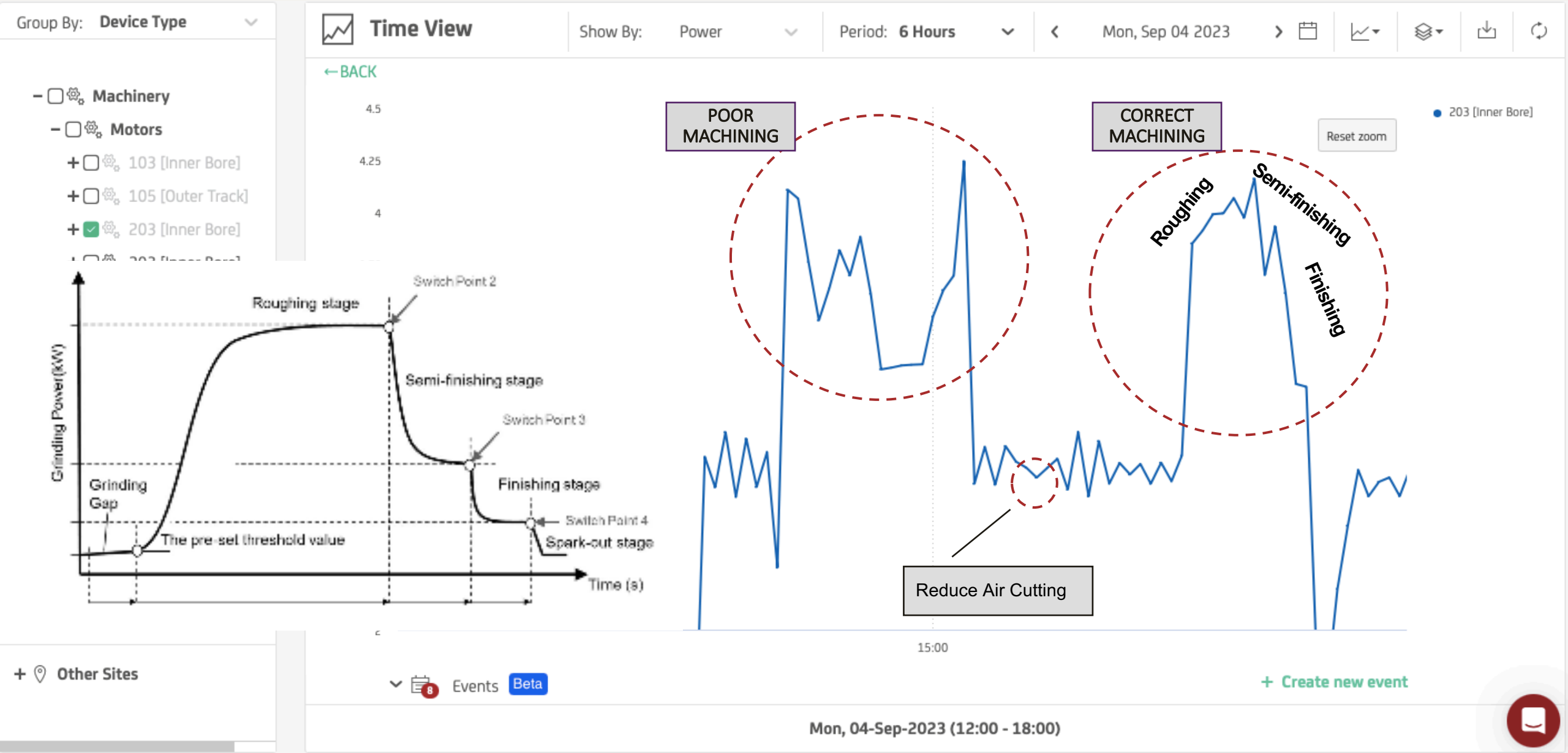


Observing the trends on the two **TFO machines in Towel plant,** during the night

Observation: Blue Machine **ran continuously for 18hrs & the operator didn't even stop for manual Knotting process.**

PERFORMANCE

Visibility on how the operator is operating on the machine in Real-time – **actual vs. ideal load curve**



QUALITY

Identify product/ process defects which impact **Quality**

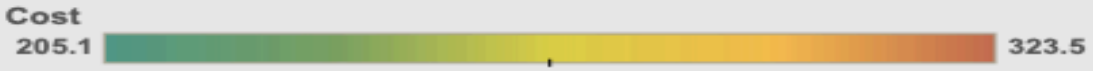
Energy Management through **Time series analysis, SEC, Benchmarking, Heat map & Real-time Alerts at Asset-level**

- Enterprise wide visibility of assets & energy consumption
- Reduce Energy consumption at **Motor-level**
- Digitally Track **Carbon Emissions**

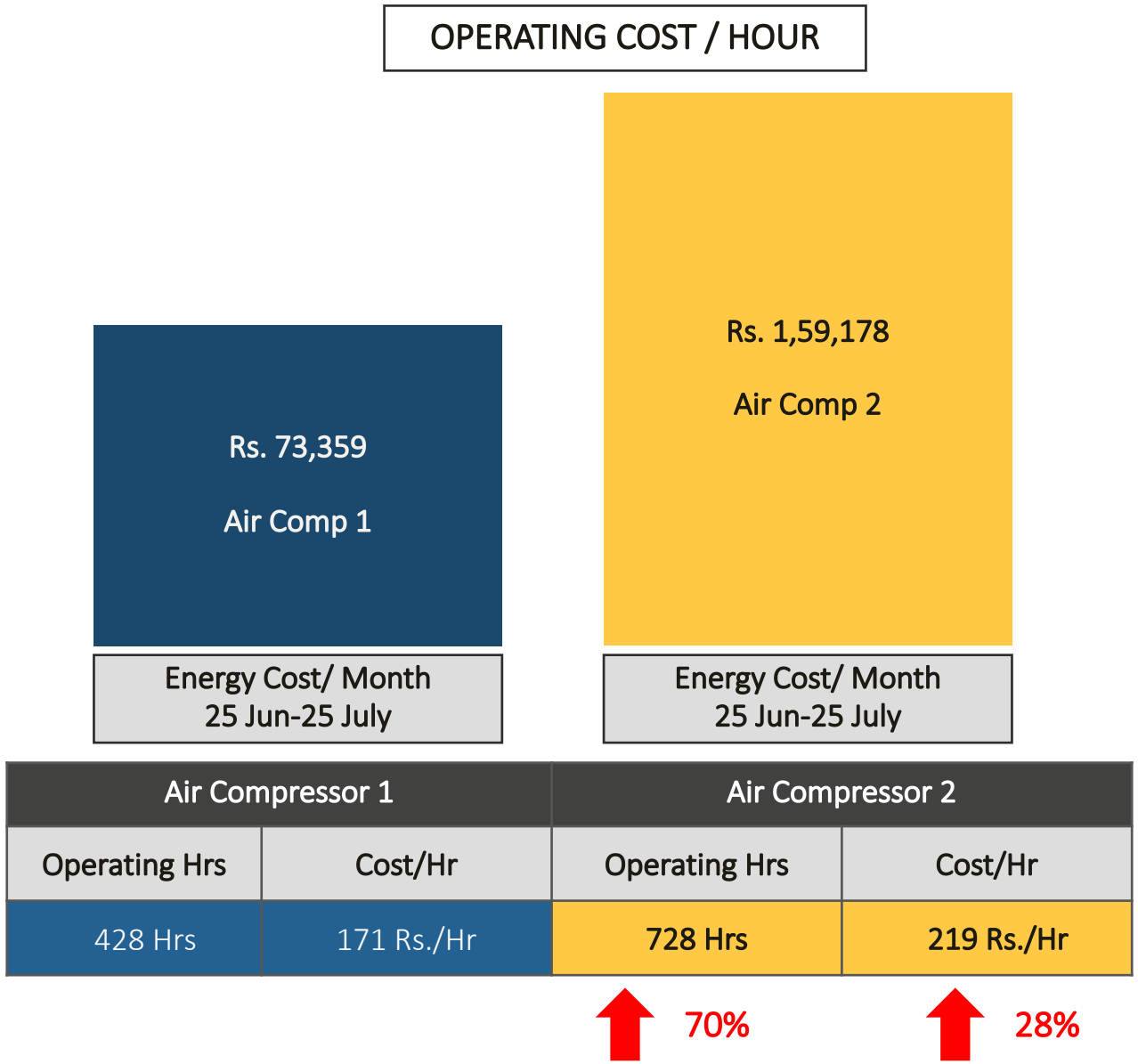
Identify **invisible Power/Energy wastage and cost reduction opportunities on each machine** through 24 Hr power consumption **Heat map**

What led to high energy consumption on Sunday and Tuesday?

Hours	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0	₹275.74	₹259.52	₹262.01	₹272.46	₹252.04	₹264.11	₹242.05
1	₹275.12	₹250.50	₹262.77	₹267.84	₹261.34	₹245.34	₹223.91
2	₹272.52	₹261.68	₹266.73	₹275.27	₹243.68	₹243.48	₹218.03
3	₹262.71	₹259.65	₹255.84	₹273.75	₹246.41	₹233.45	₹226.09
4	₹273.39	₹245.23	₹263.55	₹277.52	₹239.09	₹208.57	₹233.86
5	₹263.43	₹262.36	₹265.05	₹276.64	₹246.60	₹226.22	₹256.71
6	₹266.64	₹266.69	₹243.35	₹266.14	₹248.90	₹206.38	₹241.12
7	₹251.95	₹256.25	₹250.73	₹264.16	₹261.11	₹205.07	₹242.61
8	₹265.78	₹265.94	₹263.59	₹262.33	₹248.05	₹249.84	₹239.65
9	₹264.80	₹266.15	₹257.60	₹268.17	₹250.12	₹261.37	₹242.21
10	₹316.45	₹266.67	₹253.25	₹265.47	₹237.24	₹252.17	₹261.20
11	₹320.51	₹262.30	₹258.07	₹268.41	₹217.48	₹258.75	₹265.73
12	₹311.87	₹274.86	₹257.01	₹267.72	₹231.83	₹285.24	₹249.77
13	₹270.62	₹265.69	₹247.28	₹263.54	₹255.74	₹266.07	₹264.44
14	₹289.73	₹261.16	₹260.84	₹265.21	₹261.57	₹236.89	₹258.62
15	₹319.23	₹261.88	₹323.52	₹269.48	₹257.88	₹238.19	₹275.01
16	₹302.56	₹272.33	₹313.33	₹254.53	₹268.84	₹270.15	₹280.27
17	₹269.65	₹262.72	₹265.82	₹269.97	₹248.22	₹252.85	₹260.78
18	₹261.20	₹259.89	₹258.02	₹268.30	₹260.54	₹263.70	₹266.22
19	₹268.79	₹265.75	₹259.34	₹248.21	₹256.73	₹263.04	₹245.07
20	₹274.97	₹272.59	₹275.98	₹261.26	₹262.25	₹255.76	₹260.26
21	₹266.99	₹268.73	₹265.91	₹264.27	₹245.68	₹264.53	₹271.97
22	₹273.27	₹278.78	₹276.47	₹265.00	₹270.02	₹262.12	₹272.36
23	₹281.25	₹274.06	₹273.99	₹264.39	₹259.23	₹252.96	₹257.56



Opportunity to optimize **% Loading & Operating hours** of Comp. 2 as its Operating Cost/Hr is 28% times higher than Comp. 1

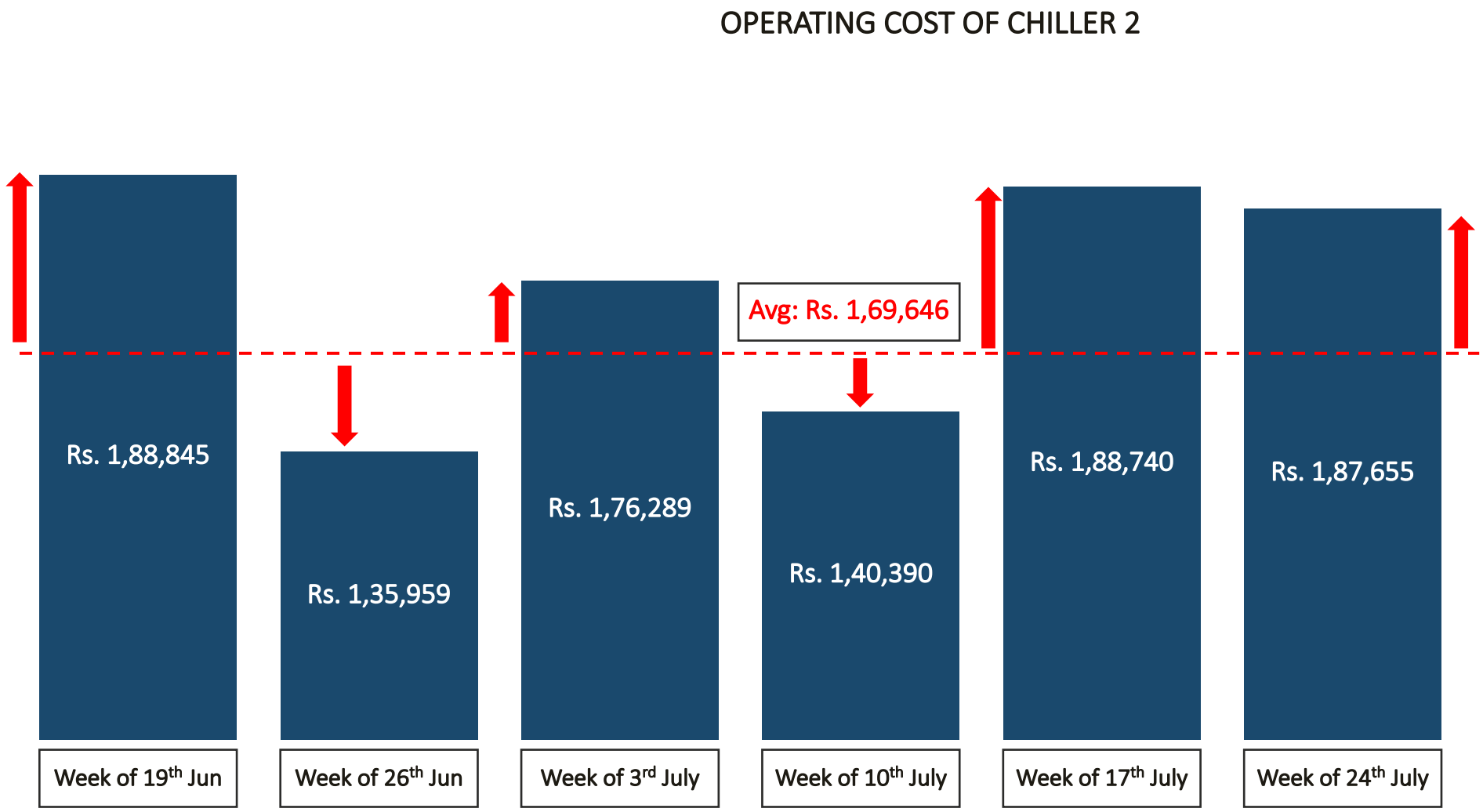


Air Compressor 1		Air Compressor 2	
Operating Hrs	Cost/Hr	Operating Hrs	Cost/Hr
428 Hrs	171 Rs./Hr	728 Hrs	219 Rs./Hr

70% 28%

- Operating Cost/Hr is of Comp. 2 is **28%** higher than Comp.1
- Operating Hours of Compressor 2 is **70%** more than Compressor 1 in a month
- If Flow meter is installed, **KW/cfm** can be measured in real-time

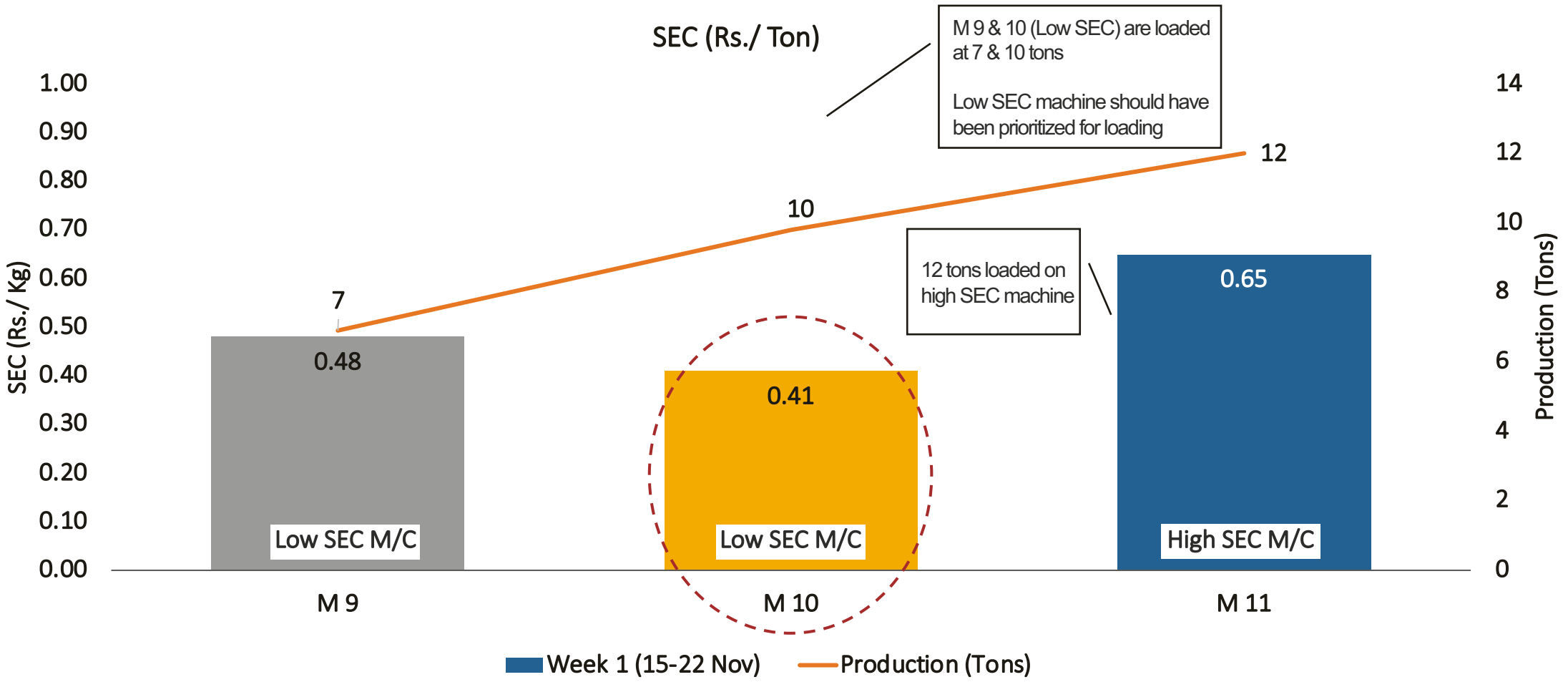
Weekly **Energy Cost** can be correlated with **production data** to create a baseline and find excess energy wastage. Also, **KW/Ton** should be benchmarked to find the excess consumption



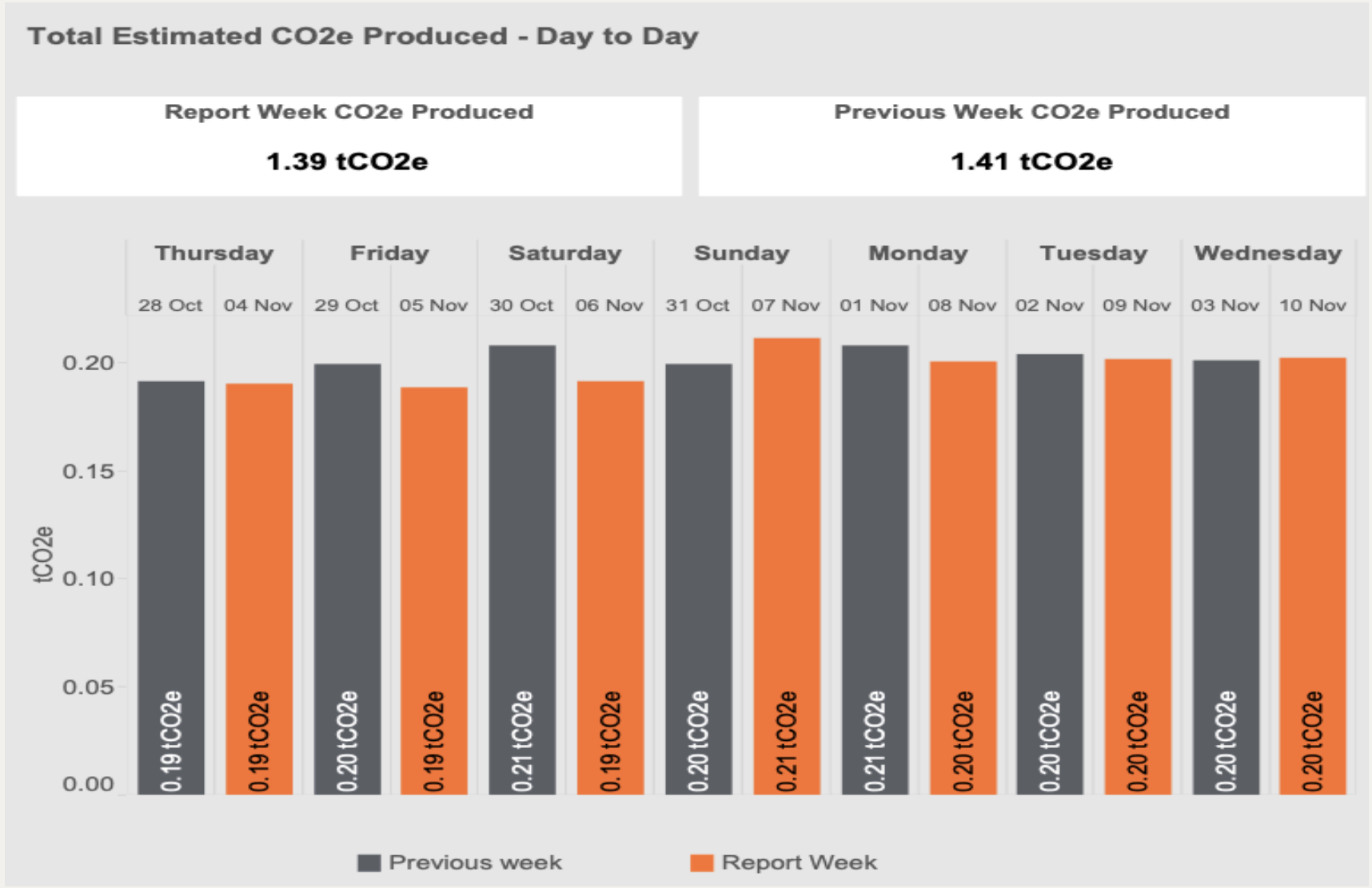
- Average operating cost of Chiller is Rs. 1,69,646
- Weekly Cost should be correlated with production data to create a baseline and find the optimum level
- KW/Ton should be benchmarked to optimize the consumption
- Real-time BTU meter should be installed

Benchmark – Identify Low SEC machines – Better production planning through M/C Sequencing

Drive energy productivity through Machine-level SEC analysis, Sequencing - Low SEC machines (M 9 & M 10) to be prioritized over M 11



Carbon emissions tracking helps in managing the **Carbon footprint** of your facility to achieve your **Net Zero Target**



Machine is directly communicating the Carbon Footprint

Draw Carbon baseline
– Science based carbon reduction roadmap

Digitally Track & Report CO2e emissions
ISO 14001, 50001, PAT, BRSR

Reduce maintenance costs with real-time Condition Monitoring & Predictive Maintenance

- **Predict** machine breakdown through Real-time Alerts
- Real-time **Condition Monitoring** of Motor / Asset
- Validate **quality of maintenance** – with before and after data
- Reduce **Preventive maintenance Cost**

Real-time Condition monitoring of Motors

- Reduce system **inefficiencies**,
- Increase **motor life**
- Drive **lower Energy Cost** – *"90% of the Lifecycle Cost of a Motor is Energy Cost"*

Insulation failures, Rewinding Quality, Bearings jammed

Over loading/ Over Current

Underloading / Low Capacity Utilization
Operating below 50% loading – leads to reduced efficiency & power factor

Voltage & Current Phase Imbalance
Voltage Phase balance should be within 1% to avoid distribution system losses and motor efficiency

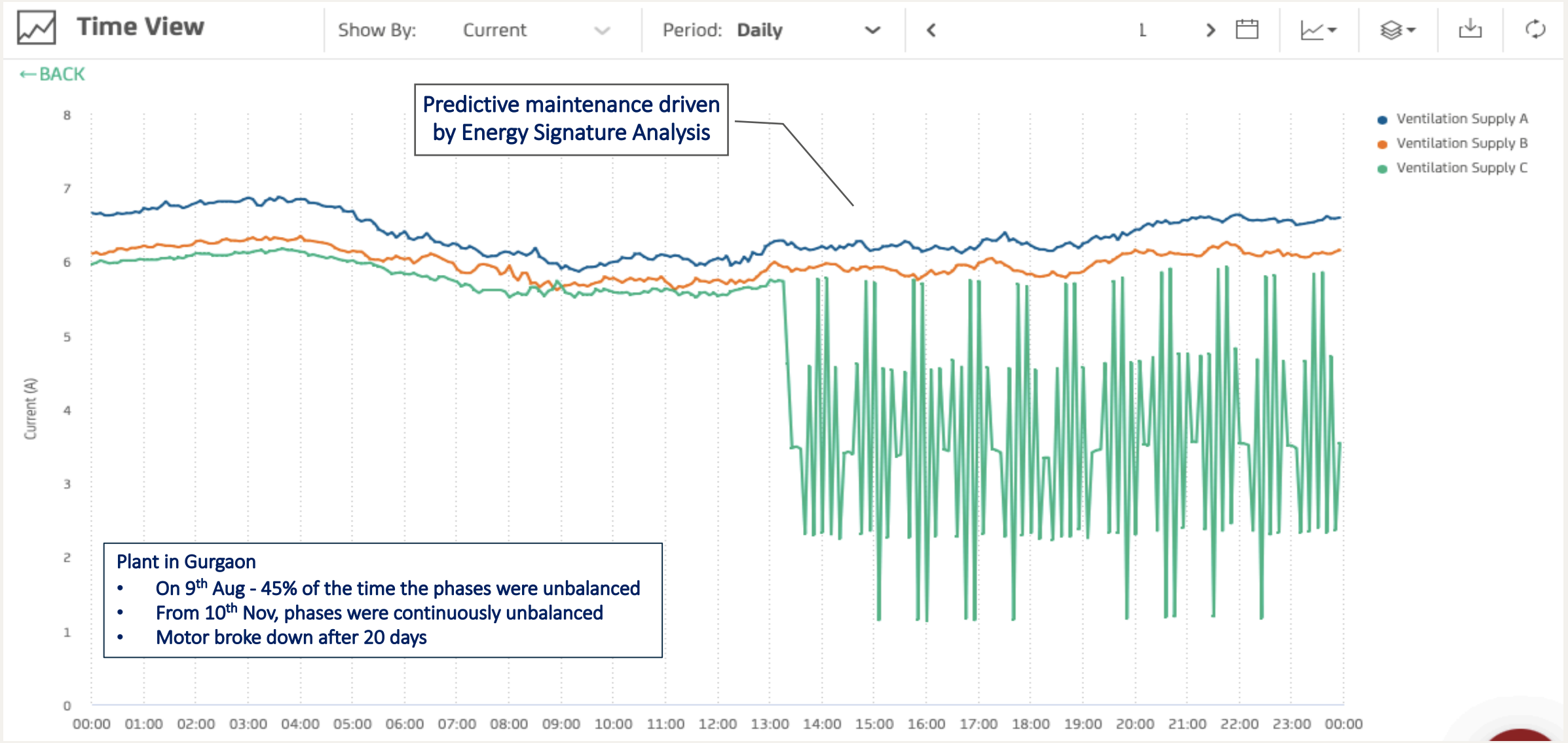
Voltage Level deviation
Even a +/- 5% deviation from nameplate voltage leads to reduced efficiency, power factor, service life, increase in temp

Low power Factor, Effective Service Factor

Idle Hours, Off Hour consumption

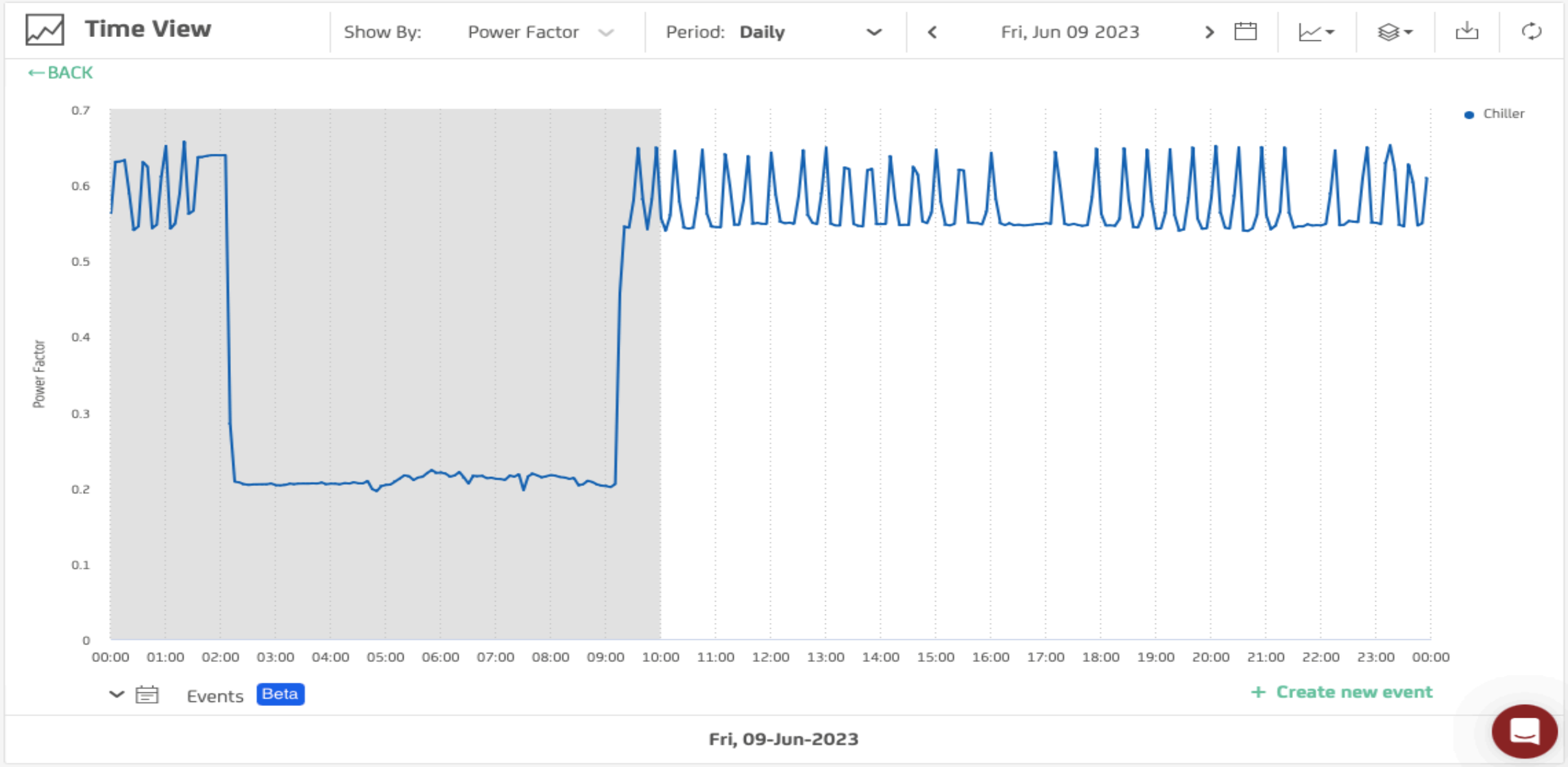
Frequency Variations

Centrica's **predictive maintenance** helps to minimize machine breakdown through early failure detection as well as helps to **reduce preventive maintenance cost**

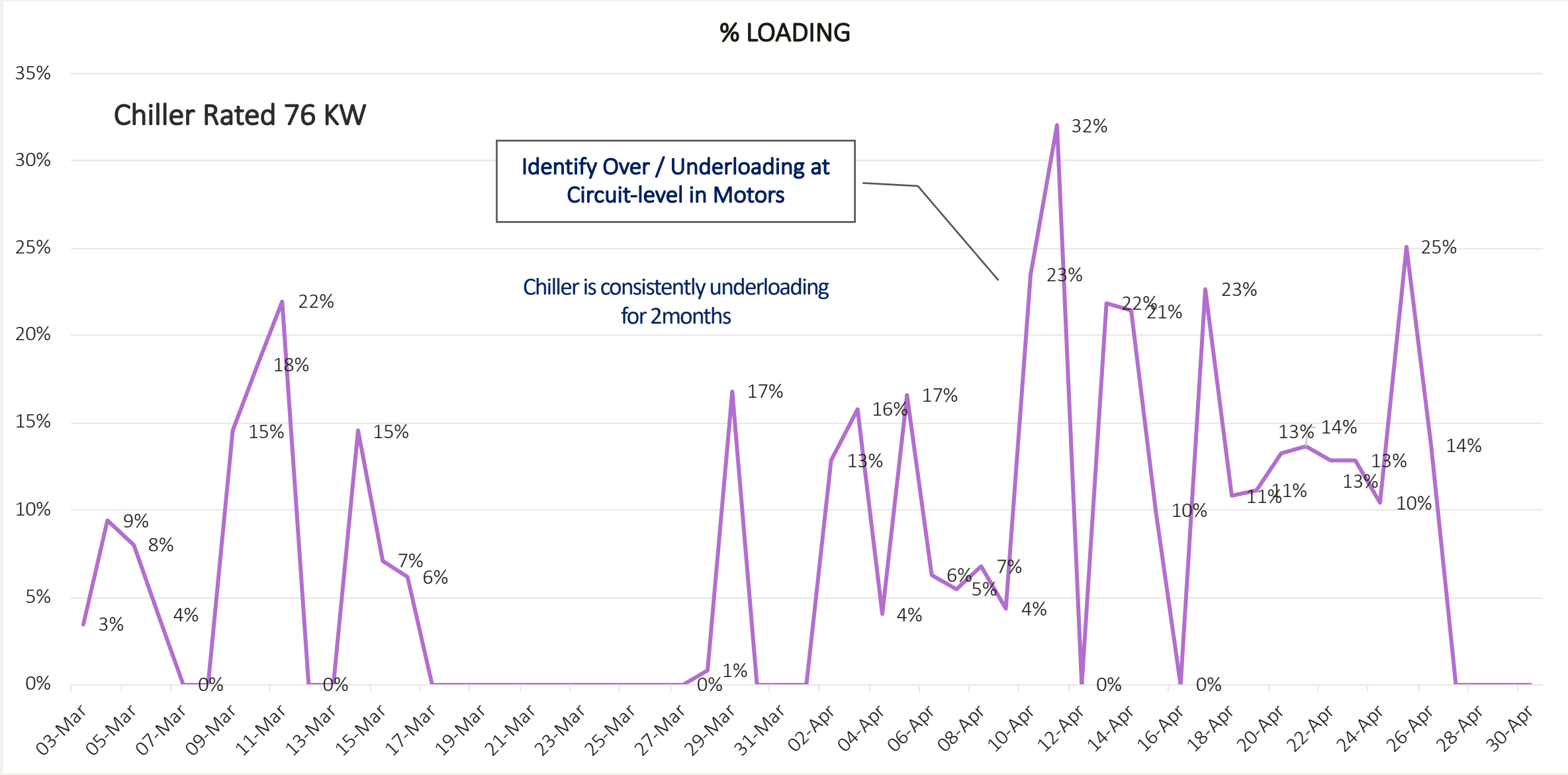


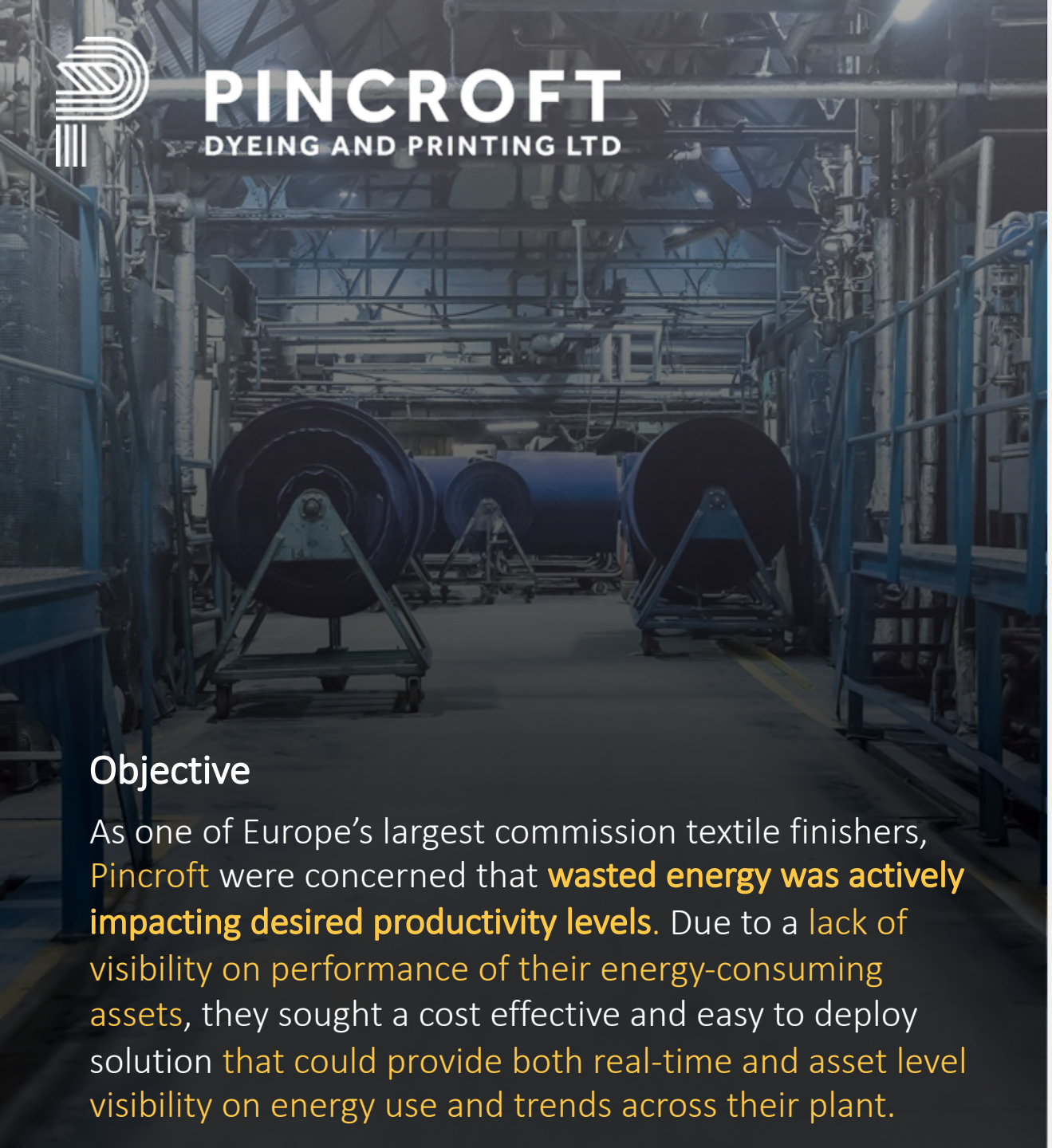
Spike in motor current can easily be identified and alerted with **Real-time mobile alerts**

Chiller is consistently operating at a **Power factor in the range of 0.55 to 0.65**, which leads to higher Energy cost and shortens motor life



Chiller is consistently operating under 32%, over last 2 months – leads to low power factor & lower efficiency driving higher Energy cost





Objective

As one of Europe's largest commission textile finishers, Pincroft were concerned that **wasted energy was actively impacting desired productivity levels**. Due to a lack of visibility on performance of their energy-consuming assets, they sought a cost effective and easy to deploy solution that could provide both real-time and asset level visibility on energy use and trends across their plant.

94%

reduction in weekend energy costs

29%

reduction in weekday energy costs

3

months payback period

Solution

Centrica's sensors were deployed to monitor all HVAC, lighting and production equipment. Pincroft now has a comprehensive visibility into energy consumption of critical equipment enabling them to identify opportunities to improve efficiencies and reduce waste, all in real time.

With a **payback of just 3 months**, Pincroft has reduced their weekend energy spend by 94% and weekday energy spend by 29%. Furthermore, Pincroft is **saving 0.84 kWh per metre of fabric** produced – a significant carbon and cost saving for a company that produces **20 million metres of fabric each year**.

9.6
MWE

Power monitored

100%
COVERAGE

Total Consumption Coverage

12
DAYS

To complete the project

- Candiani needed a **quick and non-invasive way to monitor the energy consumption at its production plants** to comply with Italian Legislative Decree 102/14.
- Candiani's 2 facilities in the Metropolitan City of Milan employ around 650 workers and produce approximately **25 million metres of denim fabric per year.**
- In December 2017, in order to comply with Italian Legislative Decree 102/14, Candiani decided to implement Centrica Business Solutions' Panoramic Power solution, installing **230 wireless sensors** and **25 grid bridges**, harnessing the power and flexibility of PowerRadar software to monitor consumption in real time. The solution was implemented in just 12 days, monitoring a total of 9.6 MWe of power.

- The system enabled Candiani to comfortably surpass the minimum coverage percentages outlined in ENEA (Italian national agency for new technologies, energy and sustainable economic development) guidelines on monitoring systems for industrial sites — it ensured 100% of consumption related to general operations and auxiliary services was covered, with 145 measurements in the first facility and 53 in the second.
- The solution enables the energy carriers at both production sites to be monitored, reported and understood from a single platform, controlling consumption in real time and better managing energy to establish saving strategies.

Centrica's sensors enabled global building materials giant CEMEX to make direct cost savings and efficiency improvements at sites across the UK

Looking for a solution to build on

CEMEX is one of the world's biggest producers of building materials, with operations in more than 50 countries. Its industrial-scale plants and equipment consume large quantities of electricity at hundreds of production facilities, quarries, distribution centres and marine terminals.

Savings on an industrial scale

Centrica initially deployed its energy insights solutions at three CEMEX locations in the UK. The deployment involved applying wireless, self-powered sensors **to monitor a range of essential machinery, including pumps, conveyors and crushers.** Managers could see immediately that the granular data and accompanying reports to fix under-performing or faulty equipment and to organise its maintenance programmes more efficiently.

The results

Detailed analysis showed that an aggregate conveyor motor at one of CEMEX's quarries was overloading and tripping out, creating a bottleneck in the process. Fixing it immediately increased production. When added to further energy saving measures made possible by the PowerRadar analysis, the solution delivered significant annual savings.

As a result, CEMEX rapidly expanded the use of energy insights with more than 1,600 sensors now monitoring equipment at 42 of its UK quarries.

Saint-Gobain Nor Pro site in Soddy-Daisy, Tennessee, USA

Objective:

Decrease peak demand, which accounted for almost 30% of the annual electrical energy costs in 2016

Case Studies and Identified projects

- Device Analyzer KPI tool for more predictive equipment maintenance
- Identical equipment with different electrical loads
- Batch process cycling longer than needed
- Dryer fans left on continuously

Results:

Centrica's solution resulted in 14% savings of 2017 electrical spend.

This was driven by the following:

- **2% savings -** Identical equipment with different electrical loads. Most efficient compressor was selected as the lead, leaving the least efficient as a back up.
- **7% savings -** Batch process cycling longer than needed
- **5% savings -** Dryer fans left on continuously

Case study

Net Zero target is no longer mission impossible

centrica
Business Solutions

TARGET –

- **BioMar** is one of the world's **top aquaculture companies**. They have announced their intention to set science-based targets in line with the stricter 1.5°C standard on emission reduction and to achieve Net Zero within their own operations no later than 2050.
- Using 2020 figures as a baseline, they also plan to reduce the carbon footprint per tonne of feed produced by one-third by 2030.

SOLUTION –

- **Centrica was asked to deliver a science-based pathway to Net Zero** within BioMar's own operations for Scope 1 and 2 that would allow BioMar to align to SBTi and do that as cost effectively as possible
- Centrica **used their Energy management and Monitoring solution to obtain a granular view of existing energy usage and carbon emissions**
- It then **used science-based targets to define various glide paths to Net Zero** within BioMar's own operations, **outlining the Technologies** that could be used and the **financial implications** of each.

Thank You

Hi-Tech Facility Engineers is an Automation, IIoT Solutioning, Robotics & Machine Vision company driving operational efficiency & productivity across organizations

Centrica Plc *is a UK based technology,* ***FTSE 100*** *(London Stock Exchange)* ***MNC with an annual turnover of USD 30 Bn*** *& businesses spreading across oil & gas exploration, nuclear power generation, electricity & gas distribution, energy marketing and trading and integrated energy solutions for a low carbon future*