CHILLVENTA

Chillventa Specialist Forums 2022
Chillventa Fachforen 2022

CONNECTING EXPERTS.

Are self-maintaining systems the future of refrigeration?

More than

4x

Increase in electricity bills

1/3

Of the workforce is set to retire within 5 years

Less than

56%

First time fix rate

ENGINEERING **TOMORROW**

Mechanical failures can take considerable time to return to operation

Unplanned refrigeration outages...

The total cost of an unplanned refrigeration outage is

5X

the direct cost

Direct costs

Maintenance truck rolls

Technician hours (and overtime)

Indirect costs

Store employee time

Lost sales

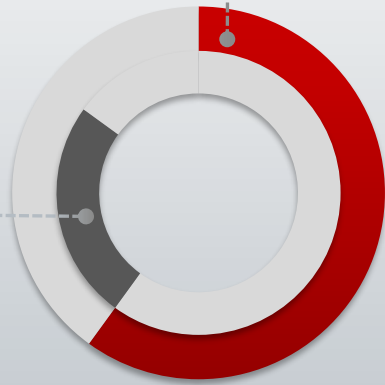Refrigerant

Compliance

Energy

Food spoilage

Employee satisfaction

Customer loyalty

ENGINEERING **TOMORROW**

Refrigeration systems are expensive to operate and maintain – connected systems can reduce costs

~60% **Refrigeration** is the highest energy expense in your energy bill

~25% **HVAC** is the second largest expenditure in a supermarket

Smart Store

CONNECTED SYSTEM

0011010111
0010110010
1100101010
0111000101

Data

Prediction

Automation

Benchmarking

ENGINEERING **TOMORROW**

Danfoss

Leverage existing data
Refrigerant management

Moving from reactive to predictive leak detection enables the possibility to avoid costly refrigerant leaks, and reduce the number of critical service call-outs. All this can be done with the data that are already generated by ADAP KOOL controllers or similar, with no need for extra devices.

WHAT
Data-driven predictive leak detection based on AI, learning from the data that are already generated by your connected systems. Refrigerant monitoring with full history and transparency available for benchmarking with other stores.

WHY
- Avoid refrigerant loss
- Detect even small leaks
- Energy savings due to low charge

ENGINEERING **TOMORROW**

Predictive Maintenance

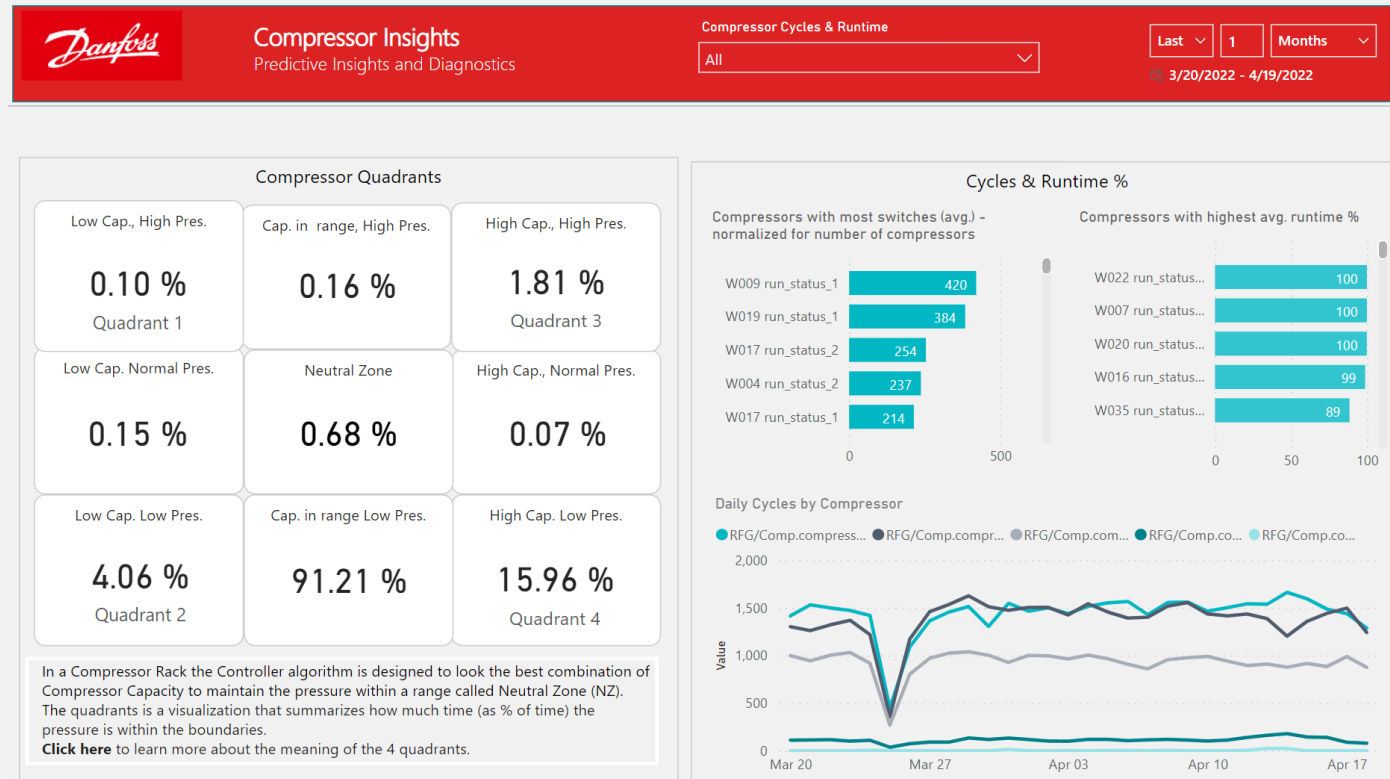## System diagnosis & actionable insights

Early system diagnosis and actionable insights for improved work order management and the possibility to prepare and optimize service visits. Data driven system diagnosis therby contributes to time optimization and improved operational efficiency for service providers

WHAT
With compressor insights you get data-driven insights and early warnings for compressor operation. Anomalies are triggered using a trained algorithm applied to key data points relating to the compressor system

WHY
- Spot anomalies before they trigger alarms, turn into critical issues, and drive-up energy consumption.
- Improved efficiency in terms of: Energy savings, operation optimization, time savings, maintenance/technician savings

ENGINEERING **TOMORROW**
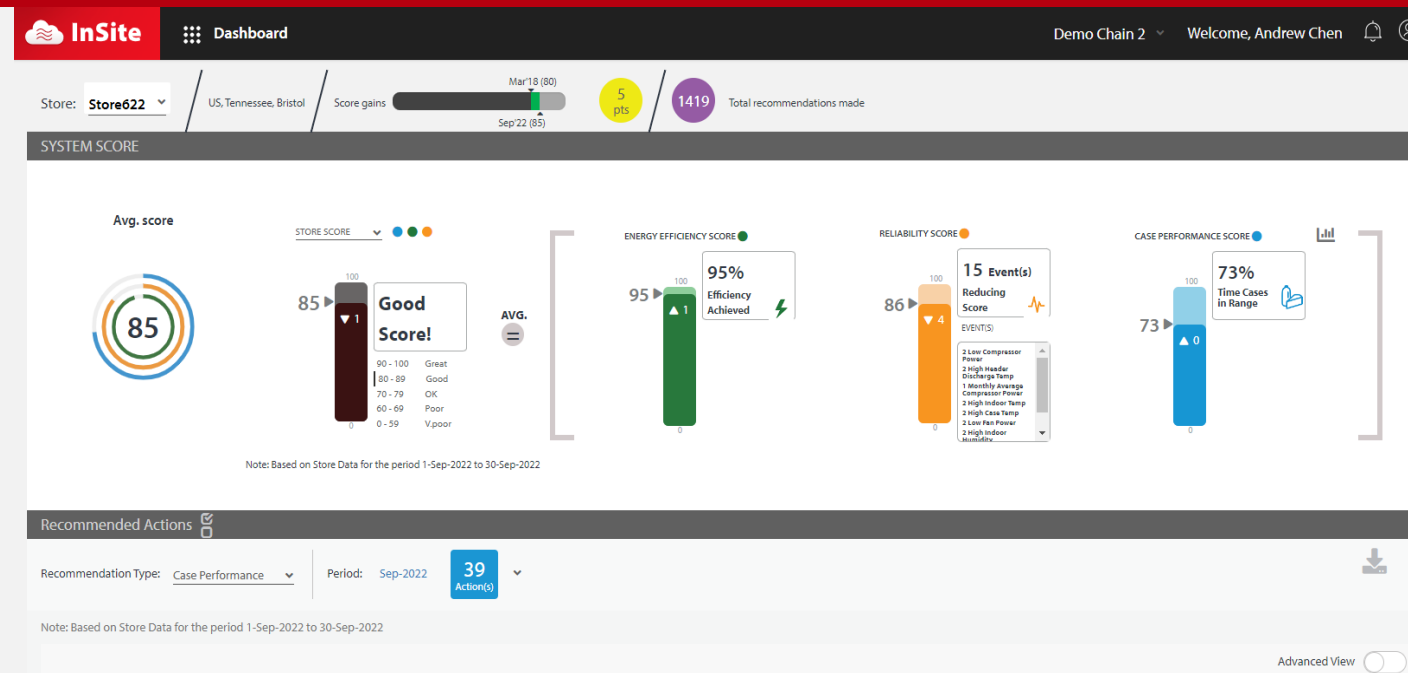
Benchmarking
Optimization across systems

Enterprise benchmarking allows for normalized data comparison across systems. Besides spotting estate level optimization potential it helps prioritize retrofitting and investment cases ensuring the right focus and attention to the systems that require it most urgently.

WHAT
Normalization of data allows comparison of systems factoring in system type, weather and other factors. Benchmarking will help prioritize system upgrades across the estate.

WHY
- Avoid inefficient systems – high operational costs
- Increase value of maintenance budget

ENGINEERING **TOMORROW**

Classified as Business

Automation - Smart energy example
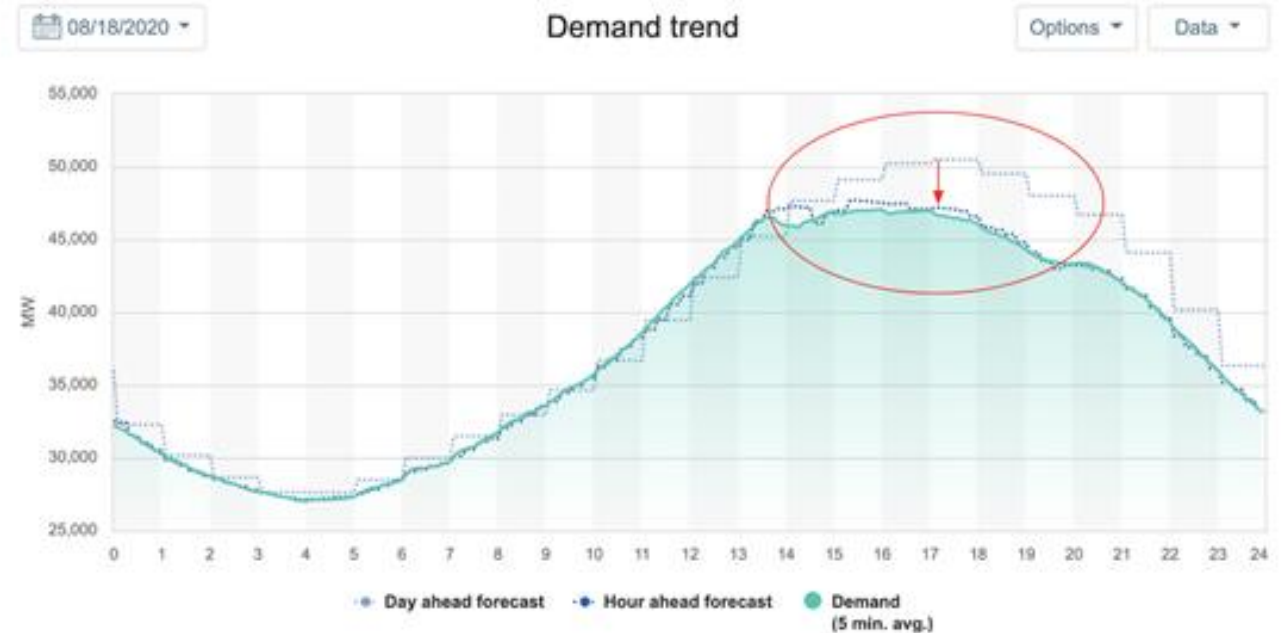## Optimization across sites

Automated and **data-driven** energy management helps you to optimize energy spend and shift energy loads at pricy peak periods.

WHAT
- Dynamic energy visualization
- Energy optimisation with peak shaving.
- Energy flexibility with automated demand response.

WHY
Reduce the complexity of energy management and reduce energy consumption during high demand periods in return for monetary reward.

CASE
This picture is from a case from 2020 during the massive fires in California. The utility company had forecasted exceedings of the total capacity, causing blackouts. Through demand response services, the load from refrigeration of major super markets were shifted, keeping the energy for Covid-19 patients in the hospitals.

ENGINEERING **TOMORROW**

Are self-maintaining systems the future of refrigeration?

- IoT is a proven technology
- 5G and general connectivity increasing (xx number of machines getting connected daily)
- AI becoming more mature

- Refrigeration is complex, and multifacetted
- Legacy systems
- Data security

ENGINEERING **TOMORROW**

Future visions

Hyper automation
From reactive to predictive

New business models
Cooling as a Service

ENGINEERING **TOMORROW**

CHILLVENTA

Chillventa Specialist Forums 2022
Chillventa Fachforen 2022

CONNECTING EXPERTS.