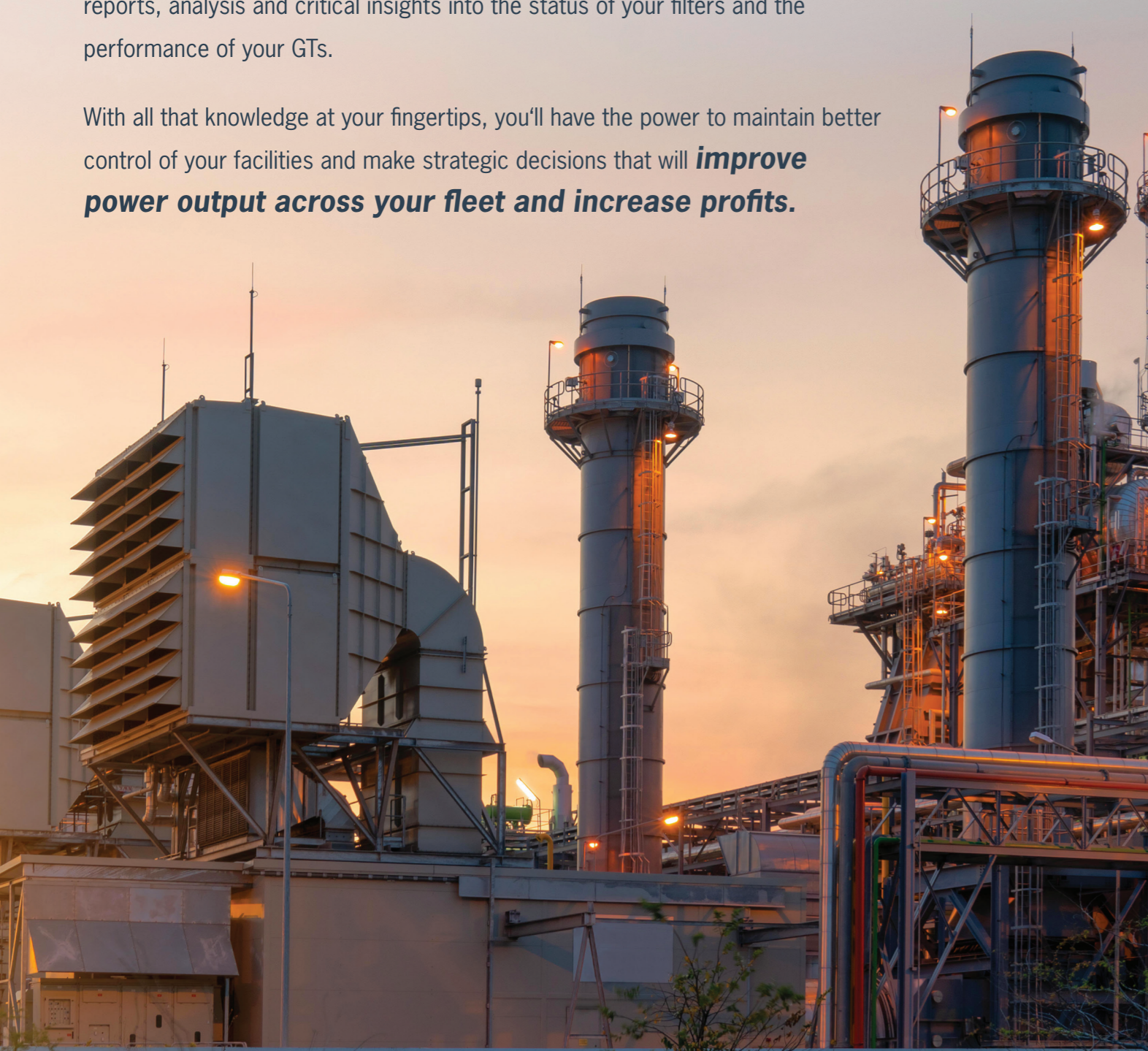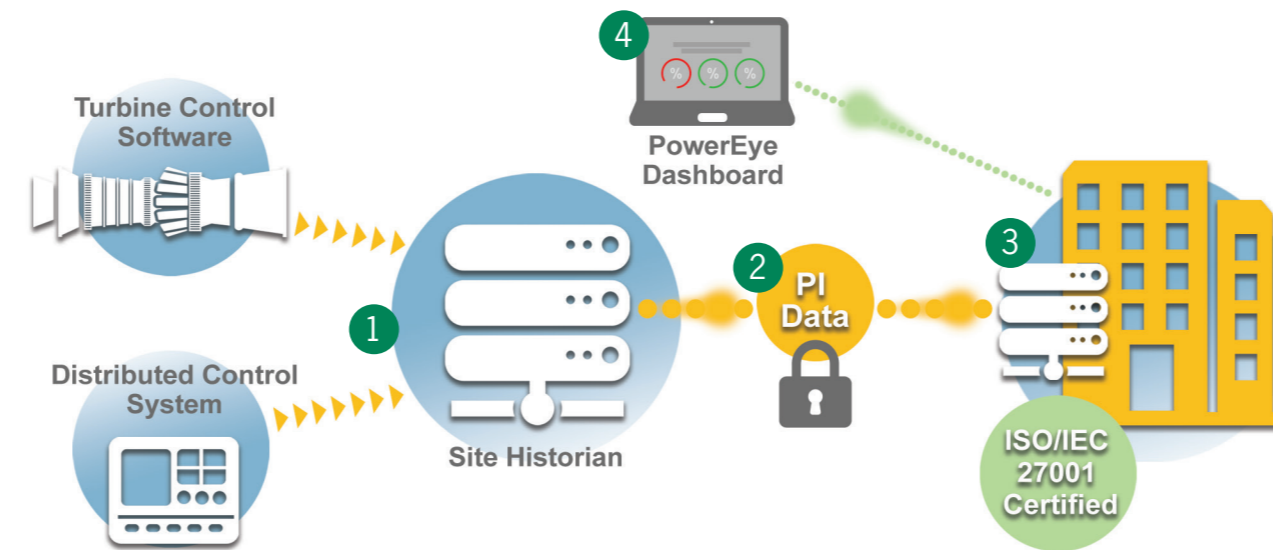# KNOWLEDGE IS POWER

PowerEye is an **advanced predictive analytics engine.** It helps your company understand the impact that environmental conditions, changing weather patterns, and filter status have on the health and performance of your gas turbines.

You get access to PowerEye through an annual service subscription, but it's much more than just data – it's intelligence. Your PowerEye program is **backed by a dedicated team of filtration specialists** who will provide actionable reports, analysis and critical insights into the status of your filters and the performance of your GTs.

With all that knowledge at your fingertips, you'll have the power to maintain better control of your facilities and make strategic decisions that will **improve power output across your fleet and increase profits.**

MAXIMUM DATA SECURITY

Turbine Control Software

Distributed Control System

Site Historian

PI Data

PowerEye Dashboard

ISO/IEC 27001 Certified

The PowerEye connection architecture is designed to maximize the safety of your data, your equipment and your facility. No data is EVER sent directly to your operator systems in the control room – PowerEye never connects directly to any of your critical systems.

PowerEye does not use any Camfil proprietary software for data encryption or transmission.

All secure connections are established by OSIsoft PI – a system that is already vetted, used, and trusted by major power generation utilities worldwide.

1. PI data is pulled from your site historian so no direct connection is established to the turbine control software or the facility control system.

2. The PI data is encrypted and sent via a read-only link so Camfil's server cannot send any data back to your system.

3. The PowerEye Server is located in a facility certified to ISO/IEC 27001 standards regarding information security management.

4. PowerEye analysis and predictions are delivered to your team via an encrypted, web-based dashboard.
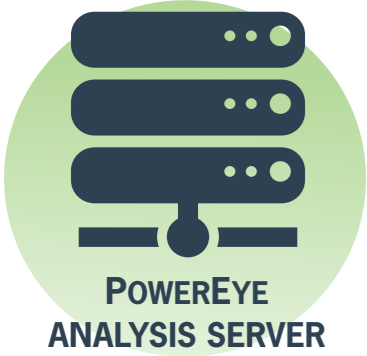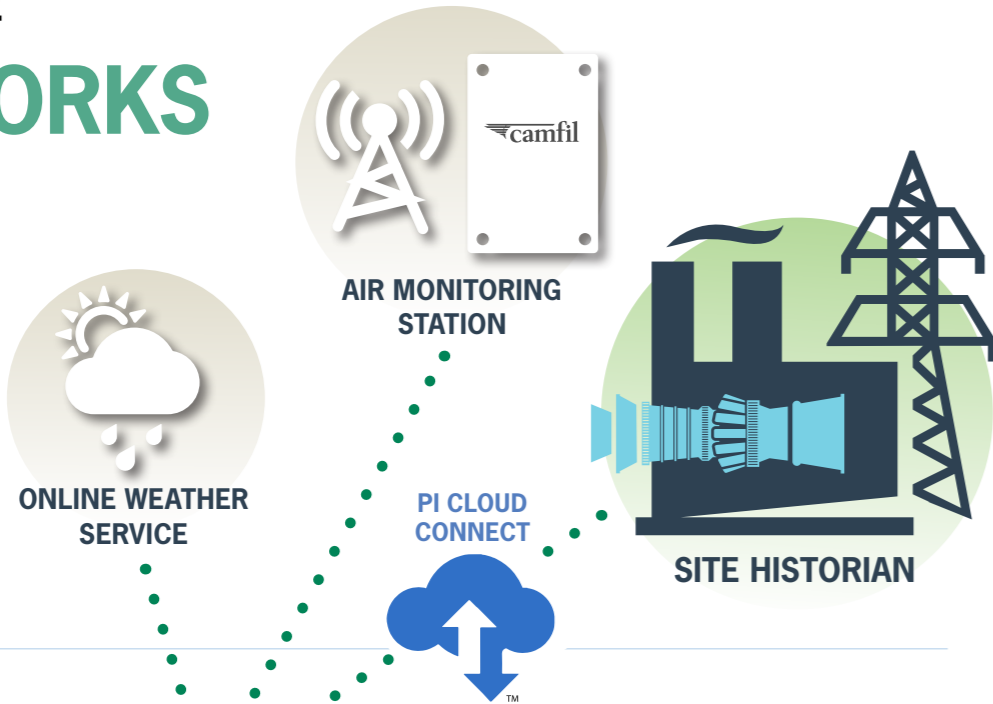
POWER EYE

INTELLIGENT DATA TO MAXIMIZE GT PERFORMANCE AND POWER

94%

65%

96%

Clean air solutions for turbomachinery
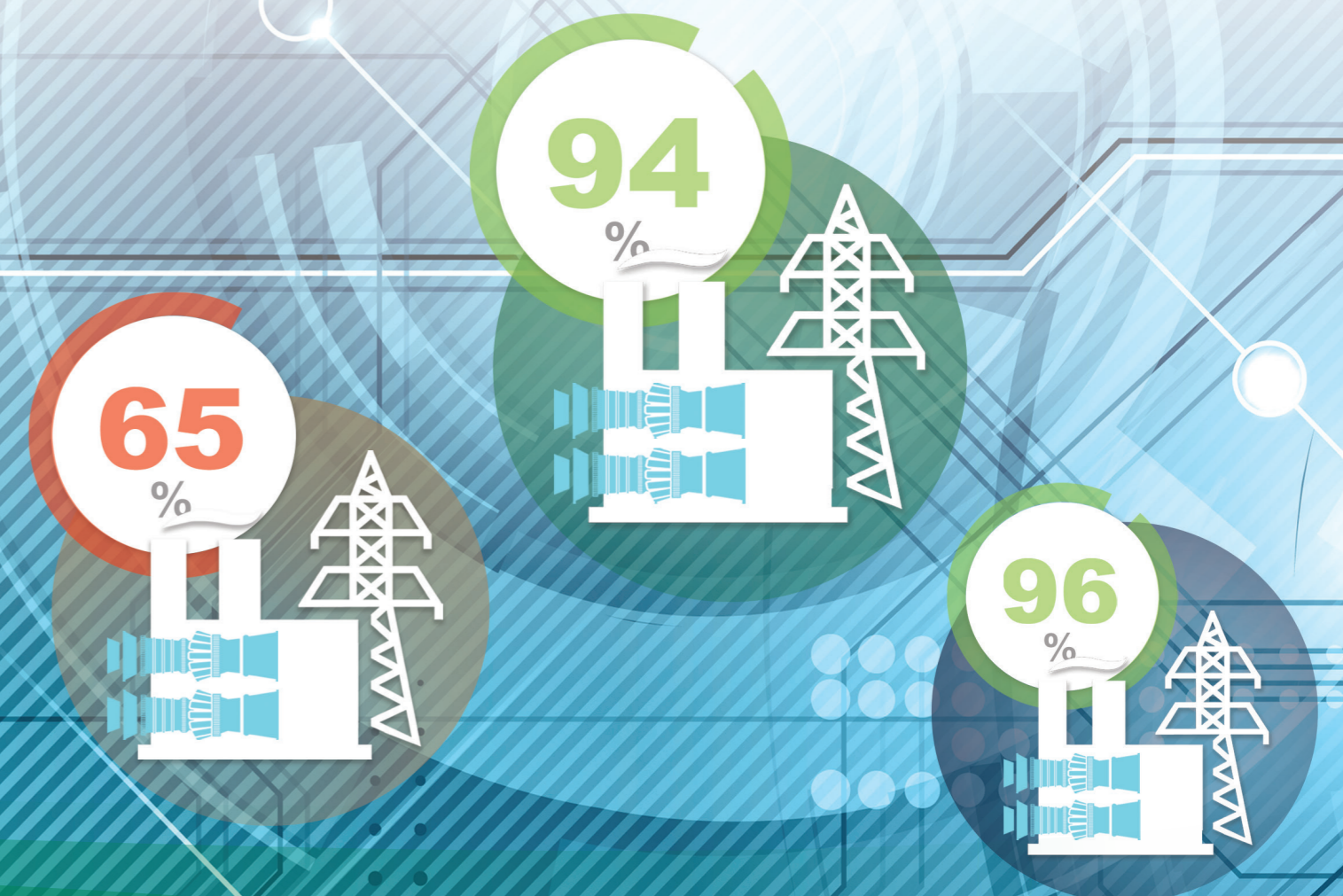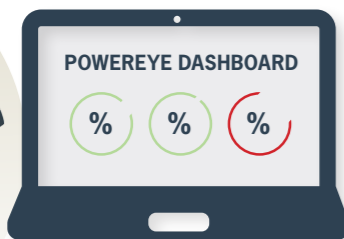
POWER EYE
HOW IT WORKS

DATA COLLECTION

PowerEye pulls data from three main sources – The Air Monitoring Station, the facility site historian and online weather service. The Air Monitoring Station is a proprietary device – provided by Camfil – that monitors temperature, humidity, pressure and dust concentration in real time. PowerEye uses engine data from the site historian – pulled from 20-40 data points.

ONLINE WEATHER SERVICE

AIR MONITORING STATION

PI CLOUD CONNECT

SITE HISTORIAN

POWEREYE ANALYSIS SERVER

DATA TRANSMISSION

All data is transferred back to the central PowerEye Server for analysis. Intake air data from the Air Monitoring Station is sent directly via a wireless connection in the device. Engine performance data is sent from the historian via PI Cloud Connect – a hyper-secure, read-only connection. Weather data is pulled directly from an online weather service.

ANALYSIS

Once collected in the central analysis server, all data is run through the PowerEye Predictive Analytics Engine. This engine features intelligence from Camfil's extensive filtration database – including load data on all types of filters. The PowerEye engine calculates the impact of ambient conditions and inlet filtration on the performance of your combustion turbines.

CAMFIL FILTRATION DATABASE

PREDICTIVE ANALYTICS ENGINE

TEAM OF FILTRATION EXPERTS

POWEREYE DASHBOARD

ACTIONABLE INSIGHTS

Your PowerEye service agreement includes proactive support from a team of filtration experts. They deliver:

- Clear insights on turbine performance data
- Prediction of day-ahead power output
- Pressure drop trends
- Filter life predictions and change recommendations
- Optimal offline water wash schedules.

You can access all data and predictions via a web-based dashboard with up to 25 users per facility.

The insights and predictions you get from PowerEye can save you millions in operational expenses every year.

FILTER & WATER WASH MANAGEMENT

Your maintenance teams will be able to plan the timing of filter change-outs and offline water washes to coincide with scheduled outages. You save money on logistics, maintenance costs and – most importantly – avoid lost revenue from unplanned outages. And before you make any filter investment, PowerEye can provide hyper-accurate predictive models and life cycle costs analyses that show how different filter configurations and water wash schedules will impact your facilities' performance and your budget.

FLEET ASSET MAINTENANCE & MANAGEMENT

Your gas turbine fleet is spread across many locations with different weather and environmental conditions. Each environmental condition has a different impact on the performance of the intake filters and the engines. PowerEye gives you the vision to see which locations and assets are underperforming so that you can allocate resources and take action where it will have the most impact.

POWER OUTPUT PREDICTIONS

PowerEye enables your facilities to predict future power output with a high degree of accuracy. Your company can make commitments and deliver power to the grid with confidence. So you meet your contractual obligations and avoid the penalties and other costs of under-delivering.

INSTALLATION
PROCESS

1. Mount the Air Monitoring Station

Camfil will deliver the units for your maintenance teams to install. They should be mounted to a wall or other structure near the air inlet for each turbine with a similar elevation and orientation as the inlet and shielded from direct sunlight and precipitation

Each Air Monitoring Station requires 110-volt to 240-volt inlet power and features two LED lights to indicate that the unit has power and is getting a signal.

The small, rectangular units weigh just 1.5 kg (3.3 lbs) and once installed requires no further maintenance by facility personnel.

2. Map out engine data from the historian

To monitor engine performance and accurately predict power output, PowerEye needs access to a set of site data points from the historian.

Camfil will provide a detailed list of the 20-40 data points that are required – including fuel consumption, power outputs, engine efficiencies, etc. – and work with site personnel to identify naming conventions and the units that will be used at each site.

3. Establish a secure connection to PowerEye

Camfil will provide your IT team with a diagram of the PowerEye connection architecture. This document maps out the connections that enable the flow of data from your historian to the PowerEye Analysis Server.

If your facility already uses OSIsoft PI, the process is very straightforward:

- You can use a PI Cloud Connect license provided by Camfil to push the tagged engine data points to Camfil
- Engine data will flow to the PowerEye Analysis Server

If your facility does not use OSIsoft PI, the process is as follows:

- Camfil will provide an on-site desktop server for your facility
- This server will have a PI system installed – with PI Cloud Connect – and interfaces needed to read data from your DCS/SCADA/historian
- Once your IT team connects the server to the internet, Camfil will configure it to collect the tagged data points from the turbines
- The on-site CPS server will then transfer that data over PI Cloud Connect to Camfil's PowerEye Analysis Server

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Even though PowerEye is an advanced, powerful analytical tool,

INSTALLATION REQUIRES ONLY THREE MAIN STEPS

camfil PowerEye
AIR MONITORING STATION