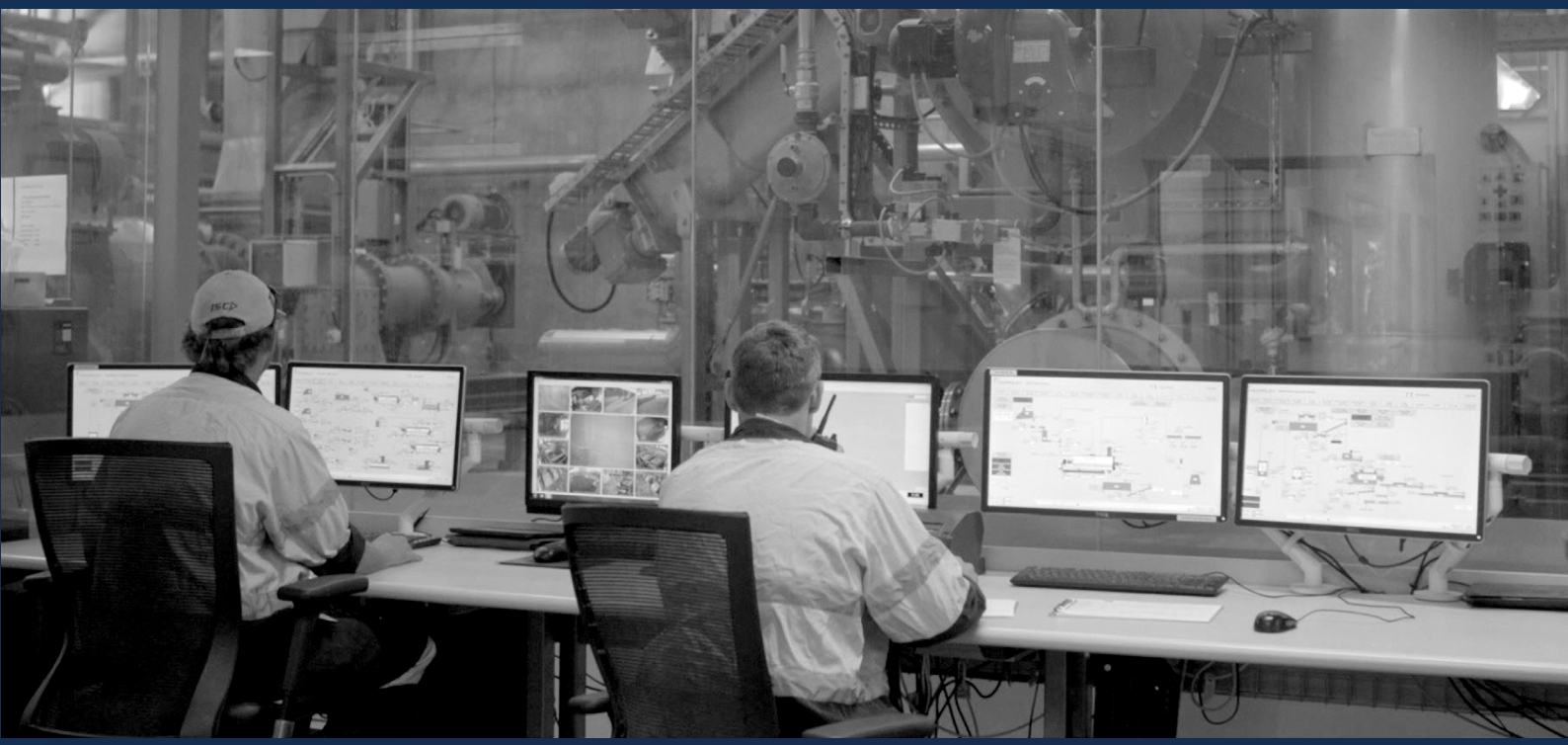
HAARSLEV™

Processing Technology



CORE ADVANCED PROCESS CONTROL

CONTROL YOUR PROCESS

STABLE, SUSTAINABLE SAVINGS

Large fluctuations and variations in industrial operations are a familiar, world-wide problem, not least because they give rise to excessive energy consumption, loss of output, production bottlenecks, and other irregularities.

In many contexts, if the operations of just one production unit become unstable and unpredictable, it can have significant consequences for the yield and the quality of the final product.

To help deal with this problem, Professor Preben Alstrøm developed and refined the technology behind CORE advanced self-learning controllers. Within a relatively short space of time, these advanced process controllers have spread across the globe.

CORE technology has provided significant savings, especially for rendering animal by-products, resulting in a strategic partnership with Haarslev Industries in 2016, and a full take-over in 2022.

CORE technology is about delivering stable, sustainable savings. We focus on optimizing energy efficiency, yield, product quality, and capacity, reducing the level of your investment and increasing your profit.

Improving the stability and control of core manufacturing and production processes is always pivotal for this.

CORE SOLUTIONS
YOUR PROCESS - OUR FOCUS

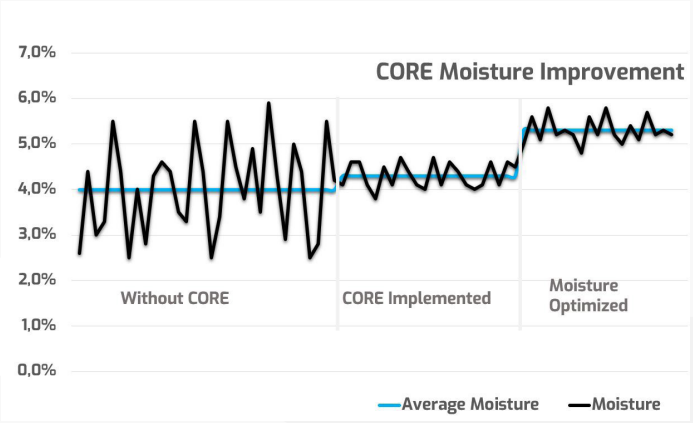
Production operations have to be continuously adjusted to make sure of achieving the best results.

Unlike standard process controllers, CORE patented software exploits critical information about how the process actually took place, and then automatically adapts to the registered variations. This results in leaner production, higher yields and end-products that feature more consistent quality.

CORE advanced process controllers work like a "cruise control" function, ironing out fluctuations and inconsistencies in your operations, and stabilizing the results you can achieve. This in turn provides significant savings and benefits within a short payback period – generally less than 12 months.

ADVANTAGES

- Lower energy consumption
- Greater output
- Higher yield
- Improved product consistency and quality



CORE PRODUCTS AND TECHNOLOGY

HOW ADVANCED PROCESS CONTROL CAN BENEFIT YOU

CONTROLLER	MACHINE	MAIN TARGET
CORE-DDRY	Cooker/Disc Dryer	Temperature/Moisture
CORE-PRS	Press	Amperage/Torque
CORE-HEAT	Preheater	Temperature
CORE-EVAP	Evaporator	Dry matter
CORE-DEC	Decanter	Torque

PATENTED CORE CONTROL TECHNOLOGY CONSISTS OF PROPRIETARY ADVANCED PROCESS CONTROLLERS, DETAILED PROCESS ANALYSIS AND THE CORE SPECIALIZED OPTIMIZATION CONCEPT

CORE controllers can be fitted to high-temperature and low-temperature production lines. Controllers are available for selected items of equipment as well as for complete production lines.

CORE builds a data-driven model for how each unit operates, based on process responses to adjustments. The advanced process controller uses this model to predict how the process will respond to changes, and to adjust the process to achieve any particular desired response.

The differences between the actual response and the response predicted are used to finetune the model. This ensures continuous adaptations of the amplification and response times to actual process conditions, as these vary. CORE controllers are able to significantly reduce such variations – usually by as much as 30–60%.

CORE ADVANCED PROCESS CONTROLLERS ARE

- Delivered on standard PLC platforms
- Installed without disturbing production
- Swiftly implemented and commissioned

YOU WILL BENEFIT FROM

- Easy-to-use interface and clear communication
- Much more stable operations
- Payback in less than 12 months

CORE PROJECTS
THE OPTIMIZATION PROCESS

1

ANALYSIS, INTERFACE, CONFIGURATION AND SETTING OPERATING PARAMETERS

CORE reviews the existing process control systems, the signals available and the PLC network installed – all in detail.
The specific advanced controller modules required are then configured, the operating parameters are set, and the entire configuration is downloaded onto a separate PLC. This is sent to the plant for installation, together with signal interface, diagrams for installation and communication.
The necessary communication units are also provided.

2

IMPLEMENTATION

When the PLC and controllers have been installed and communication established, input–output tests are carried out in order to ensure correct signal transfer.
Control signals are implemented in accordance with all relevant safety and process limitations.

3

TEST, TUNING AND OPERATING PROCEDURES

When the CORE controllers have been correctly implemented, a CORE engineer will be on site to commission these units. This CORE engineer adjusts the controllers one by one, while keeping production running.
A simple switch ensures that the CORE controller can be switched on and off at any time. After initial adjustments, a user manual/control description is provided and presented, and the operating procedures are made clear.

Further adjustments may be needed, so the production process is monitored over a specified period, with both on-site and off-site finetuning of the controllers. In this phase, it is essential to closely monitor the results from the performance indicators in order to optimize the control goals.

4

FINAL TESTS AND ACHIEVED PERFORMANCE DOCUMENTATION, AND PRESENTATION OF RESULTS

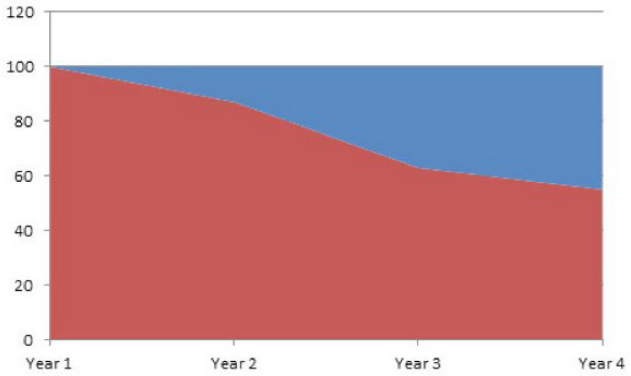
When the controllers have been finetuned and are running well, final tests are carried out and CORE presents a report covering the results achieved.

SERVICE POTENTIAL
KEEP PROCESSES OPTIMIZED

CORE advanced process controllers are used to achieve better product quality, lower energy and maintenance costs, and higher capacity and yield.

However, all production processes develop and change over time. Major machinery maintenance may be needed, new types of raw materials or new types of products may be introduced, or new operating procedures may be used. Parallel with such changes, it may be necessary to adjust the controllers in order to maintain results at the same level as when they were installed.

Market changes and customer requirements can be difficult to predict, and competitiveness depends on the ability to quickly adapt the production to the changes. CORE offers customers a service that keeps the process control optimized, regardless of increasing demands and new challenges.



The savings and benefits you can achieve by implementing CORE controllers may be affected by changes in machinery, operating procedures, etc. With a CORE service agreement, you keep your processes optimized at all times.

CORE PROVIDES SERVICE AGREEMENTS FOR ALL CORE ADVANCED CONTROLLERS

THESE SERVICES INCLUDE:

PROCESS MONITORING

CORE monitors the processes controlled by the CORE controllers, and reacts if significant changes in process variations are observed.

THOROUGH PROCESS CONTROL REVIEW

CORE reviews the process control and the available signals in detail in order to identify possible changes in use, possible changes in performance, and possible adjustments needed to keep results at the best level.

QUARTERLY EXAMINATIONS OF ACHIEVED PERFORMANCE

Four times a year, CORE provides a full examination report that covers the changes observed, the influences they have on key performance indicators for your processes, and the actions that may be needed for re-optimizing these processes.

CORE CUSTOMER CARE
SUPPORT AND SERVICES

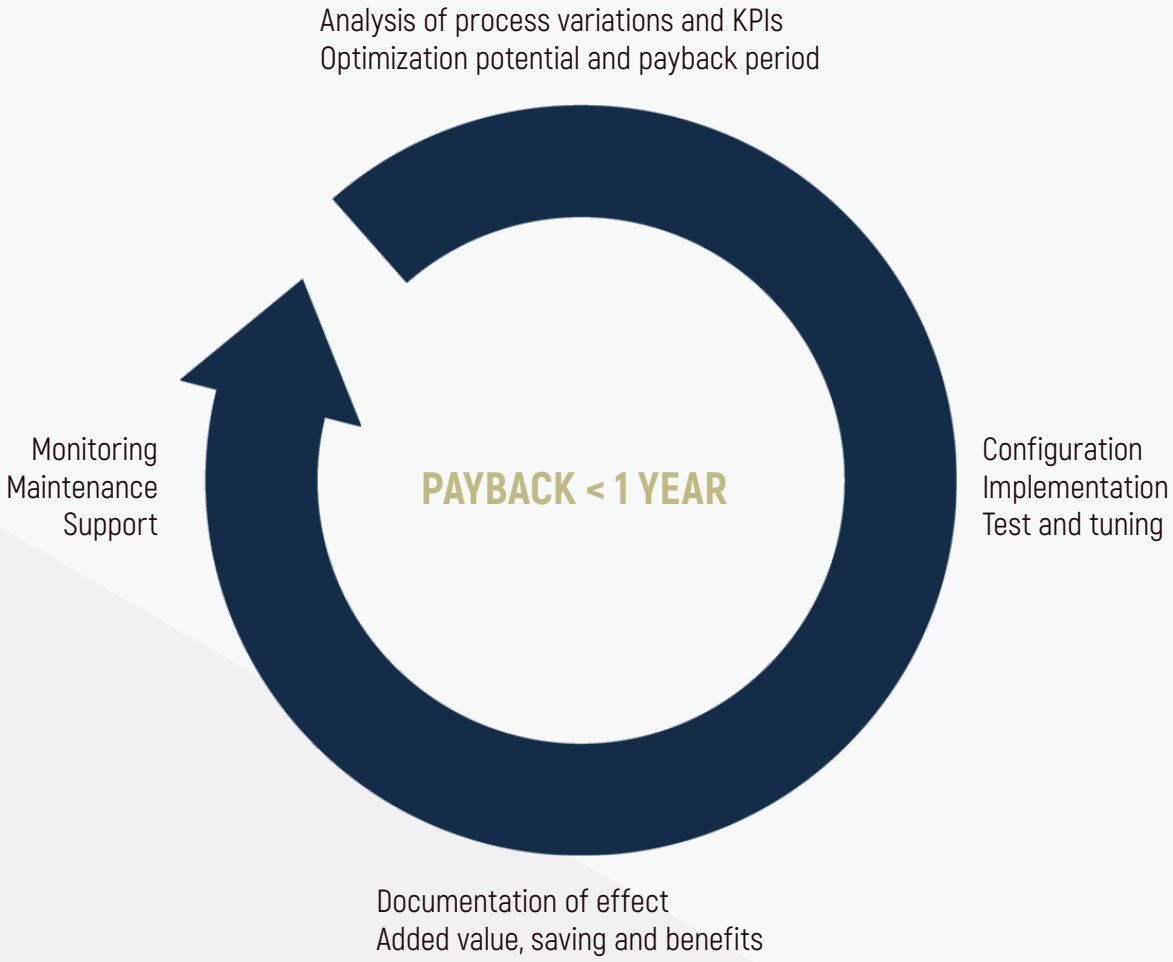
SERVICE AGREEMENTS

- Process monitoring
- Thorough review of process control
- New opportunities for process optimization
- Maintaining optimal performance

CORE service agreements provide your company with the support necessary to keep improving the performance of your processes so you can achieve the required savings and benefits.

CORE keeps an eye on your processes, checking all possible control issues that may arise due to changes in machinery, flows and transport systems, sensors and meters, energy resources, operating personnel and production plans. Any issues are reported and the necessary remedial action is identified.

CORE commits to providing the responses you require to all your questions and queries about control technologies.



CORE FACTS

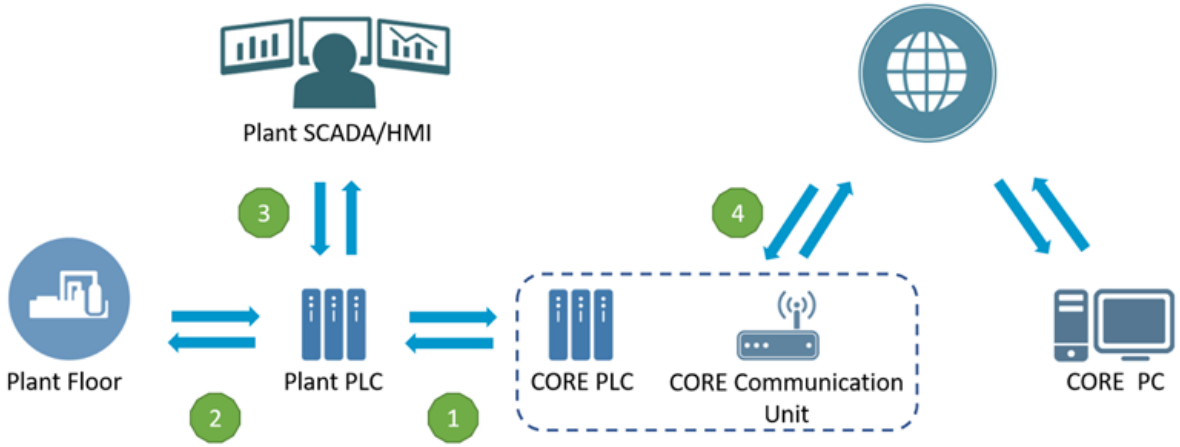
ADDITIONAL INFORMATION

More than 400 CORE controllers have been installed in Europe, North America, South America and in Australia.

AN AVERAGE CORE PROJECT

- Saves 4 million kWh in energy
- Reduces CO2 emission by 800 ton every year
- Improves throughput and capacity by 5%
- Improves yield by 0.5%
- Decreases variations in temperature by 50%
- Has a payback period of 10 months
- Brings benefits and savings corresponding to 2 EUR per ton raw material

Haarslev delivers a separate CORE PLC and a communication unit for remote access to the CORE PLC.
An overview of the installation is shown below.



1 Communication between the CORE PLC to the plant PLC(s) is typically via Ethernet.
2 Signals to/from the machines on the plant floor, including additional measurements if needed and control signals.
3 Additional signals to/from the SCADA/HMI system, including setpoints and on/off buttons for the CORE controllers.
4 Connection from the CORE communication unit to the internet, enabling Haarslev to communicate with the CORE PLC.

TESTIMONIALS

Jeff Gay, President, Protein Products, MS, USA: *"We are encouraged by the results we are seeing due to the CORE system. I got nothing but positive feedback from our operators, they all love it. The system has made the operation easier with better results."*

Dan Price, Division Manager, 3D Corporate Solutions, AR, USA: *"The capabilities of the CORE technology far exceeded the expectations we had. It allowed us to bring the moisture in the product up nearly one percent."*

Barney Williams, Technical Director, Advanced Proteins, UK: *"Every year, the CORE controllers at Advanced Proteins save us more than 6000 MWh in energy and the environment from 1500 tons of CO2!"*

CORE
A HAARSLEV SOLUTION

TAKING CARE
OF TOMORROW

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GLOBAL EXPERIENCE - LOCAL PRESENCE

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