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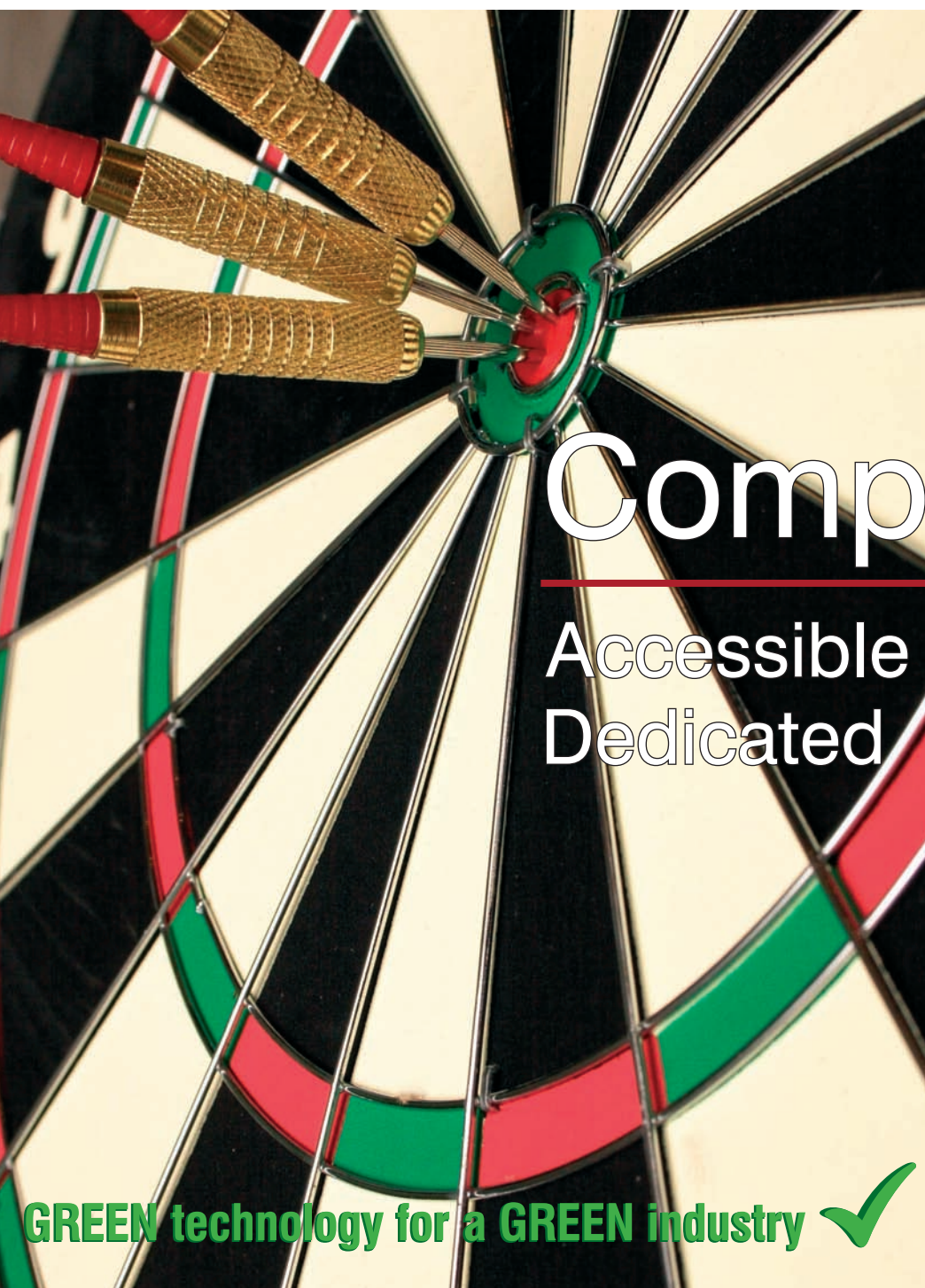
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GREEN technology for a GREEN industry ✓

TINE dairy implements Green Technology from DSS

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In 2010, DSS signed a contract with the Norwegian dairy group TINE for the supply of two virtually identical whey protein projects including several membrane filtration systems and related equipment. One of the systems has been

installed at TINE's brand new super dairy at Jæren near Stavanger, which was finalized at the beginning of 2012.

TINE's impact on the external environment is primarily related to its transport activity, effluent discharge, and to en-

ergy consumption in the production process. The overall goal of the TINE Group is to reduce emissions of greenhouse gases by 30% from the 2007 emissions level by 2020.

Throughout the planning of the new TINE Jæren super dairy the word "Sustainability" was made an integral part of every aspect of the design. This concept was also conveyed as an important criterion to all the various suppliers to the project.

Green thinking

It goes without saying that aspects like hygienic design, reliability, operator and maintenance safety were crucial factors. However, as an overall criterion, DSS employees were urged to think green and come forward with ideas matching the general TINE policy of Sustainability.

Many ideas were put on the table, and the TINE Jæren management maintained focus on sustainability and acknowledged these ideas even though most of them involved additional investment. The return on investment will come later in terms of on-going cost savings on energy and other resources as well as an improved green image for the TINE Group.

For DSS this challenge was a perfect match to our own Green Profile strategy. This strategy implies first of all an internal project to raise awareness among all employees to think the Green Profile into every aspect of our daily work: for instance



DSS focus is on “Green Thinking”, no area is too small to become a potential improvement with regards to a reduction in utility consumption

“print only if necessary”, “limit lighting and ventilation to what is necessary to maintain a good working environment” etc. The overall aim with this Green Profile awareness campaign was to push the same thinking into development of new products and solutions aiming at reduced consumption of energy and other resources.

Clear targets

Without a clear target and plan this type of initiatives often comes to nothing but empty words, and therefore DSS management set a clear target – “a 25% reduction of the environmental footprint compared to industry standards 5 years ago.”

The TINE Jæren project was a welcomed opportunity to put the TINE strategy of sustainability as well as our own Green Profile strategy to the ultimate test. As part of the contract, all relevant utility consumption figures were clearly stated as Key Performance Indicators and checked as part of the Performance Acceptance Trials.

Excellent results

As the overall scope of DSS delivery covered UF, NF and RO plants, the project provided a great opportunity to implement our “green” solutions in different areas of a whey processing line. In the engineering

phase, our focus was to ensure that the process designs were able to meet the above targets.

As mentioned, some of the TINE Jæren project Key Performance Indicators were related to power consumption both during production and CIP, and to water, both in terms of capacity and consumption.

In order to minimize power consumption, all motors were delivered with frequency converters, and during the design phase all pumps were designed to perform at maximum efficiency during operation.

During commissioning, process parameters were optimized, so each production and CIP set-point was specifically chosen in order to minimize power and water consumption. Different parameters were assessed, such as temperature, pressure, and

flow in order to maximize the overall plant efficiency.

In reality, we have achieved results, which are 35%-50% better than the targeted contract values, see table below.

Some of the initiatives implemented in the project were caused by the awareness and focus on “Green Thinking” at DSS, and no area is too small to become a potential improvement with regards to a reduction in utility consumption. As an example, the plant uses polished water instead of well water to pump shaft seals.

To sum things up, DSS has been able to achieve the targets but will continuously maintain focused on areas in the filtrations processes where improvements can be achieved and contribute positively to our customers’ increased attention on sustainability.

The Jaeren project: Facts & figures

| | Contract goals, Key Performance Indicators, indexed | Achieved and documented, indexed | Performance achieved, compared to contract* |
|---------|---|----------------------------------|---|
| Power | 100 | 65 | +35% |
| Cooling | 100 | 65 | +35% |
| Water | 100 | 50 | +50% |

* The better-than-contract performance achieved has been possible due to careful plant optimization during commissioning.