

EFFICIENT TECHNICAL SOLUTIONS IN SUGAR PRODUCTION SAVES RESOURCES

The section below examines the key technical solutions implemented by T-Sugar. Energy efficiency improvements like these are relevant for most sugar plants in Ukraine:

Location: Zbarazh sugar plant, with a processing capacity of 3,000 tons of sugar beets per day.

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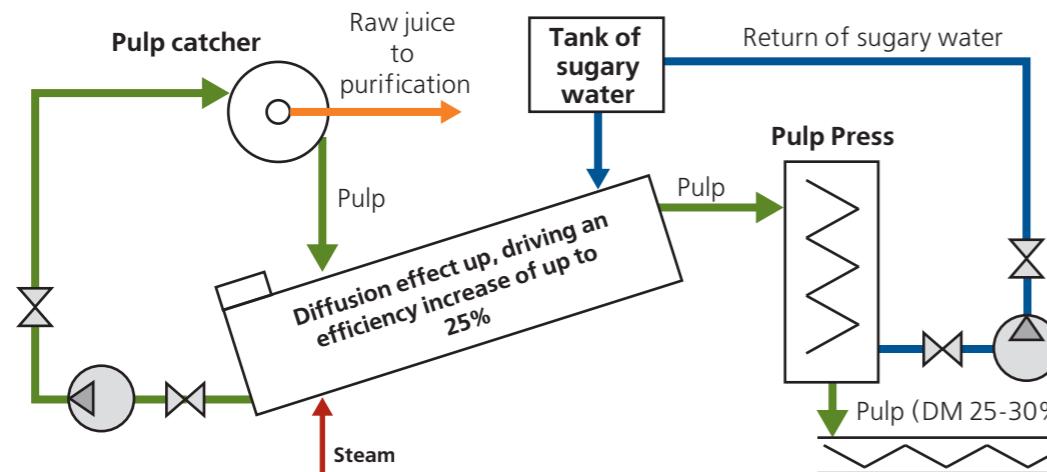
Improvements in beet pulp pressing

Problem: Significant amounts of hot water are lost via beet pulp at the pulp diffusion stage. Also, large amounts of energy are required to heat fresh water before the extraction stage. Then additional energy is needed for the beet pulp dewatering.

Solution: Installing a new press for beet pulp reduces energy consumption at the diffusion and at the beet pulp drying processes.

Results:

- Water consumption decreased by 30% (190,000 m³/year)
- Gas consumption receded by 16% (1,324,640 m³/year)
- CO₂ emissions were likewise reduced by 2,500 tons/year



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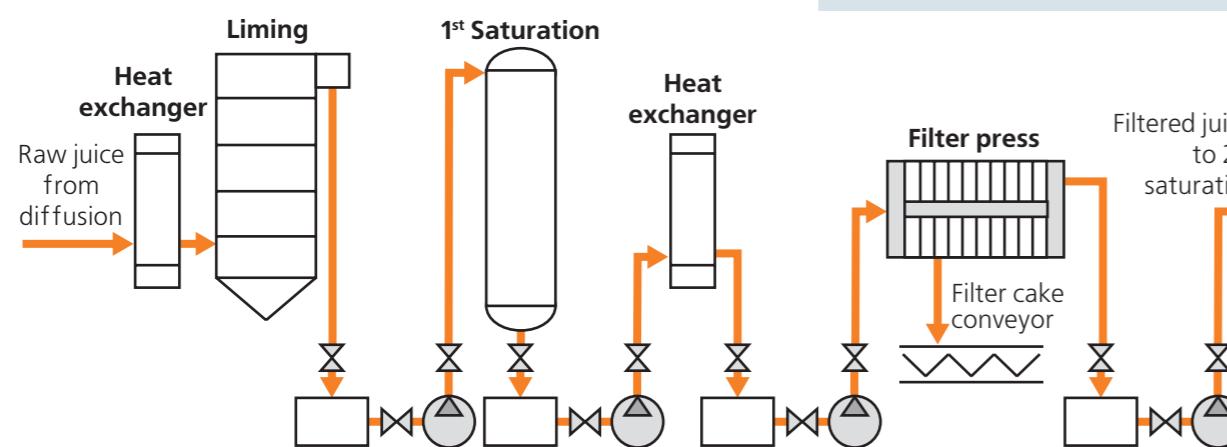
Improvements in sugar separation and purification

Problem: Sugar losses with filter cake waste. Additional water is required for filters cleaning. This generates sugar juice dilution and additional energy loss at the evaporation stage.

Solution: Adding new, high-efficiency press filters to decrease the amount of moisture that needs to be evaporated from the beet juice and to improve sugar yield.

Results:

- Sugar production increased by 0.08% relative to beet weight (145 tons of sugar/year)
- Water consumption reduced by 2% (10,500 m³/year)
- Gas consumption reduced by 12% (993,480 m³/year)
- CO₂ emissions reduced by 1,900 tons/year



2014

CLIENT CASE STUDY

SWEET TASTE OF A RESOURCE EFFICIENCY SUCCESS

Sugar processor's bottom line boosted by better energy efficiency

T-Sugar Holding is an industry-leading sugar processor in Ukraine. Its six processing plants, located in the western part of the country, used 1.4 million tons of sugar beets to produce 161,000 tons of sugar in 2012

FACT

Processing sugar from beets consumes large quantities of natural gas and water. Raw sugar juice is extracted from the beets with hot water, and then evaporated and purified.

Resource efficiency has become an important competitive advantage in the Ukrainian sugar market.

PROBLEM

HIGH GAS COSTS BITE INTO PROFITS

Energy inputs, namely gas consumption, are a major part of production costs. Since 2004, Gas prices have changed dramatically, rising as much as eight times. Long-term pricing is also unpredictable. This exposes sugar processors to greater risks. Additionally, high resource intensity elevates environmental risks through increased carbon emissions and ground water pollution.



SOLUTION

Being committed to excellence across the farming value chain, T-Sugar established a strategic partnership with IFC to identify resource efficiency gaps in its sugar production division, and to design solutions to address them.

The company chose two processing plants for in-depth resource efficiency assessments. The plants, located in Khorostkiv and Zbarazh, were representative of the total of six in operation.

Then an extensive study paved the way for the company to develop and launch its resource efficiency program.

The work was undertaken in two stages. The first was to compare the company's operations with global best practices; the second was to identify specific measures to drive improved operational efficiency.

How did the company manage to save \$3 mln annually?

In partnership with

TWO STAGE APPROACH BRINGS FOCUS AND IMMEDIATE SAVINGS

Stage 1 Benchmarking study

In the first stage, the team measured the resources consumed at the two selected sites and compared the results with European sugar processors' best practice standards. The focal points were:

- to determine operational areas with the greatest potential for improvement;
- to analyze how other organizations achieve high performance levels;
- to design a replicable program using this information to improve performance while limiting the environmental impact.

Potential cost savings at the European gas consumption levels:

	Khorostkiv plant	Zbarazh plant
Savings per ton of sugar produced	\$63	\$68
Annual savings based on the 2012 production volume	\$2.2 million	\$1.35 million

Potential savings totaled \$3.55 million annually, or approximately 10% of the annual revenue

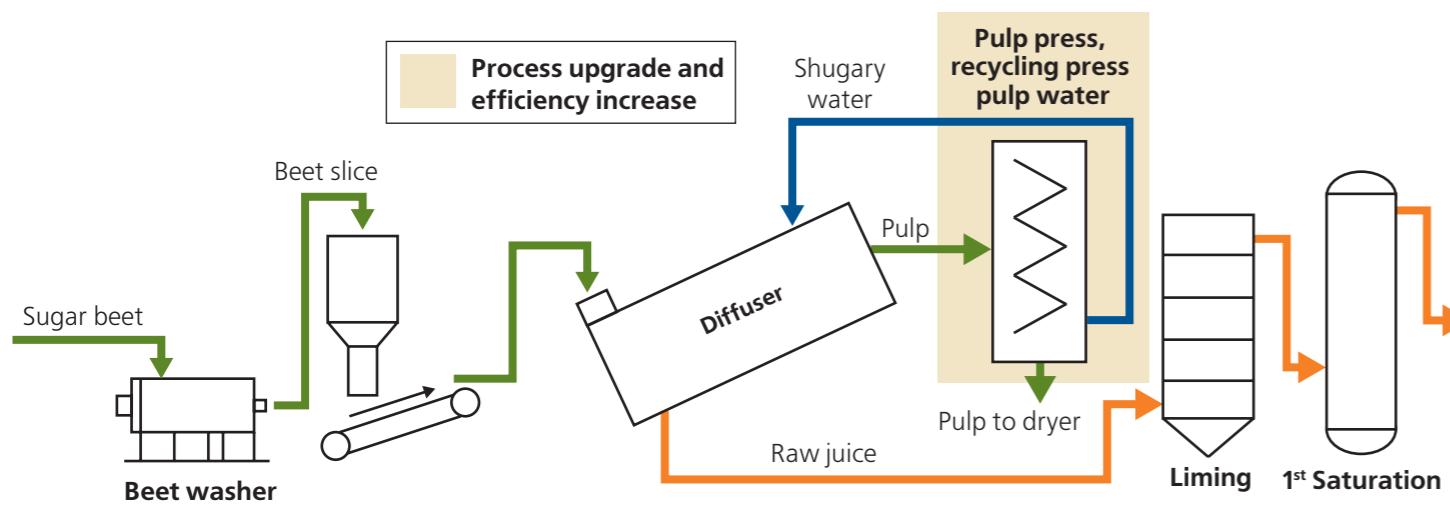
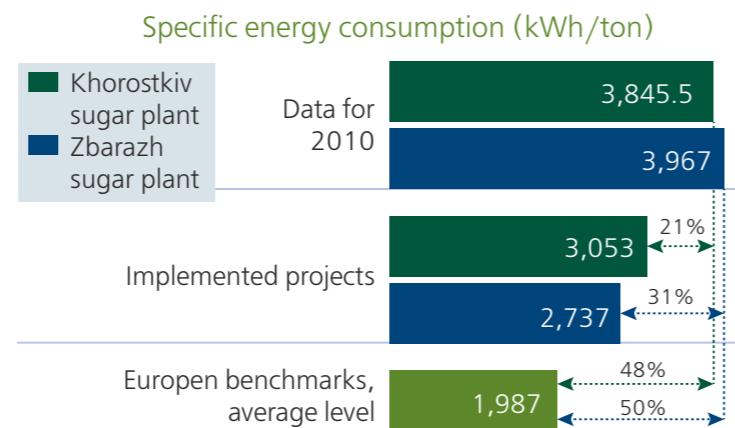
Stage 2 Identifying efficiency improvements and replicable technical options

Having measured the potential benefits of these improvements, the team analyzed the efficiency of the present technical processes at the Khorostkiv and Zbarazh sugar plants, identifying bottlenecks and inefficient production units. The basic process flow of sugar production (shown below) identifies the key findings of this audit.

Results

These two studies showed that gas consumption per ton of sugar produced in Ukraine was twice that of European producers.

The benchmarking analysis provided concrete evidence that T-Sugar could realize significant cost savings through more efficient resources consumption, as shown in the diagram on the right.



SUMMARIZING THE RECOMMENDED MEASURES

Zbarazh sugar plant:

- Installing a new press for beet pulp reduces the energy required for the diffusion process and beet pulp drying. Combined with recycling press pulp water, this reduces water and gas consumption by up to 30% and 16%, respectively.
- Adding new, high-efficiency press filters to decrease the amount of moisture that needs to be evaporated from the beet juice, reducing natural gas consumption by a further 12%.
- Replacing sugar separation centrifuges enhances plant productivity by eliminating uneven loading capacity and improving the sugar crystallization process, leading to a 3% drop in gas consumption.

Khorostkiv sugar plant:

- Installing new vacuum pans, sugar centrifuges and overhauling the drying department will reduce gas consumption by an additional 20%.
- Overhauling the waste water treatment plant to shrink waste water treatment costs by up to 20%.

MONEY FOR THE TAKING

Resource efficiency improvements resulted in reduction of gas and water consumption.

- Zbarazh plant: resource efficiency improved by 31%, saving \$1.3 million annually;
- Khorostkiv plant: resource efficiency improved by 21%, saving \$1.25 million annually.

With the program fully implemented, further improvements and cost savings are possible.

PROOF OF THE CONCEPT THROUGH SUCCESSFUL REPLICATION

Given the success of the analysis, T-Sugar scaled up the program to include two other plants. In total, the team identified 12 projects for process and equipment upgrades, projecting potential annual savings of \$3 million – along with much better environmental performance of the client.

Making these improvements at all four plants would cost a total of \$12.5 million; but after only four years, resource efficiency savings would overtake these costs.

REAL RESULTS, REAL SAVINGS

IFC's investment department has supported T-Sugar through the Cleaner Production Lending Facility, an IFC financial instrument that finances resource efficiency projects. Utilizing this initiative, the company received a \$5 million cleaner production loan, which covered 40% of \$12.5 million in the costs cited above.

Once fully implemented, these projects are expected to deliver annual savings of:

- 340,000 m³ of water;
- 6.5 million m³ of gas;
- 12,300 tons of greenhouse gas – the equivalent of taking 2,460 cars off the road.

"With competent advice and financial support from IFC, we got a new experience and unlocked a number of opportunities for further efficiency improvements. As we learned, implementation of such projects is a key enabler for our future market success."

Volodymyr Nevistiuk, General Director, T-Sugar Holding