ENERGY-EFFICIENT TECHNOLOGIES DRIVE PEAK PERFORMANCE IN PHARMACEUTICALS

In a highly competitive pharmaceuticals market, even minor revenue savings can help companies shore up their balance sheets and considerably improve business sustainability. Below are profiles of two technologies this company adopted that yielded large energy and resource savings.

AIR-COOLED CHILLERS WITH HEAT-RECOVERY CAPABILITY

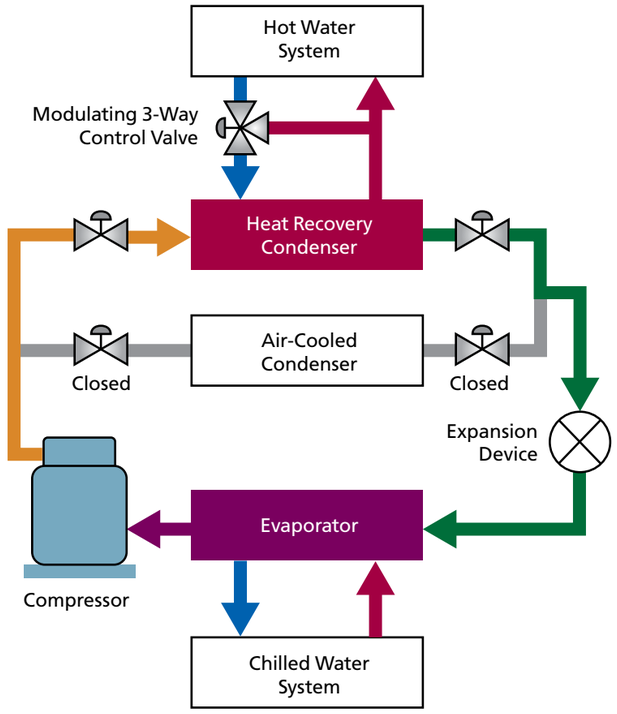
A typical heat-recovery chiller, used when a building has a heating or cooling load throughout the year, is a traditional screw-type chiller where condensed heat is absorbed by a water loop, which is then used for heating. Net heat recovery depends on the percentage of cooling load available and the ambient temperature.

At the client's facility in Vrsac, an air-cooled chiller that contains a waste heat recovery (WHR) module was installed. Without a WHR module, heat from the condenser is absorbed by the air, which is blown by large fans around condenser fins and transferred to the ambient environment. The chiller installed at the plant has a heat-recovery exchanger, which captures heat that would otherwise be lost.

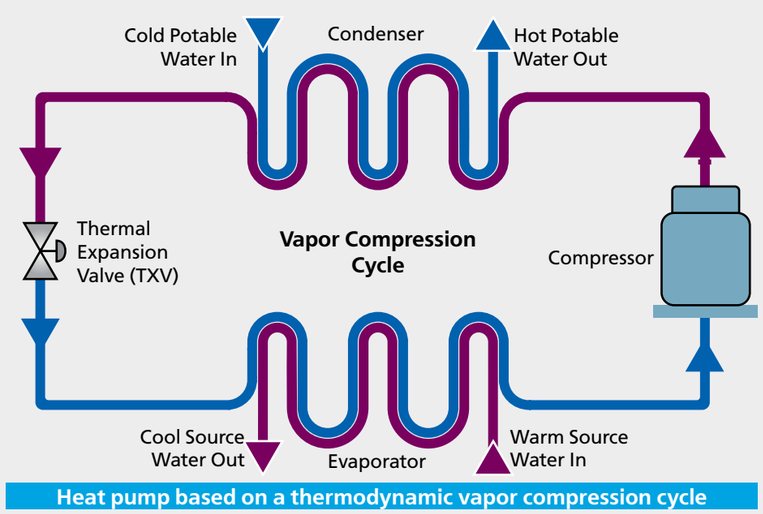
How waste heat is captured in a chiller with WHR capability

Inside the heat recovery condenser (HRC) is a heat-exchange module, where heat from the hot gas is absorbed by water that flows in an adjacent chamber. The gas and the water are not in direct contact, but flow in adjacent metal tubes that allow for the transfer of heat. The warmed water that flows from the HRC is then used for space heating or other purposes. The gas that flows from the HRC condenses into a liquid and flows to the Expansion Valve, and the cooling process continues.

This technology is particularly relevant for pharmaceutical plants, which need simultaneous heating and cooling to keep temperature and moisture levels in a building constant.



A workflow: An air-cooled chiller system with *waste* heat recovery



Heat pump based on a thermodynamic vapor compression cycle

HEAT PUMPS: THE TECHNOLOGY TO TAP GEOTHERMAL ENERGY

Hot water and hot rock found in the earth's crust are clean and sustainable sources of geothermal energy. Depending on the source, geothermal energy is tapped using direct or indirect approaches.

In the direct approach, a well is drilled directly into the geothermal reservoir. In the indirect approach, a heat pump is used, as with the company discussed in this case study.

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IFC ADVISORY SERVICES IN EUROPE AND CENTRAL ASIA
ECA RESOURCE EFFICIENCY PROGRAM

ENERGY EFFICIENCY CASE STUDY

This case study describes how a renowned pharmaceutical company, with manufacturing facilities across the Balkans, achieved peak performance by implementing resource-efficiency measures.

RESOURCE EFFICIENCY: A HIDDEN DRIVER OF SUCCESS IN PHARMACEUTICALS

Pharmaceutical companies are renowned for their high quality standards, technological sophistication, and lucrative patents-driven revenues. Yet they often overlook the benefits of investing in resource efficiency, which can boost margins, sharpen their competitive edge, and strengthen long-term business viability.

COMPANY

HEMOFARM, A TOP PHARMA BRAND WITH SEEMINGLY LITTLE ROOM FOR PERFORMANCE IMPROVEMENT

Founded in 1960 in Vrsac, Serbia, as a state-owned manufacturer of pharmaceutical and chemical products, this company operates in three Balkan countries and exports to a variety of foreign markets. Privatized and acquired by a German multinational in 2006, the company has steadily expanded its operations and grown into a major exporter, including to competitive markets such as the United States. Today it enjoys a 17.5% market share in Serbia.
The company is profitable, attracts skilled labor, and invests regularly in audits and international standards certifications. In a bid to sharpen its competitiveness and long-term sustainability, the enterprise engaged IFC to improve resource efficiency at its facilities. At first, the potential for improving its performance seemed minimal, with no obvious issues to address.

CHALLENGE

IMPROVING MARGINS BY STANDARDIZING EFFICIENCY ACROSS PLANTS

The company faced shrinking margins due to price pressures from strong competition in its market segment. Opportunities to reduce costs in its core production processes were tapped to the fullest, and the locational advantages it enjoyed were leveraged to the maximum.

To shore up margins, the company made resource efficiency a key business strategy. Its drive for enterprise-wide efficiency, however, was hindered by uneven performance across its production units. Resource prices, meanwhile, fluctuated constantly in each location, complicating decisions on potential interventions.

RESULT

FOCUSED INTERVENTIONS UNLOCKED LONG-TERM BENEFITS WITH QUICK PAYBACK

By investing around $246,000 in water and electricity measurement systems, waste heat recovery systems, and insulation of valves, the company was able to cut its energy use by 4.2% and water use by 10%. The investment achieved a payback of less than 11 months.

IMPACT

Savings Achieved Through Resource Efficiency Measures

Investment	Energy	Water	Savings
$246,000	**4,500 MWh/year**	**40,000 m³/year**	**$275,000/year**

How did a pharma major achieve best-practice in resource efficiency with a modest investment that had a payback of less than a year?

In partnership with

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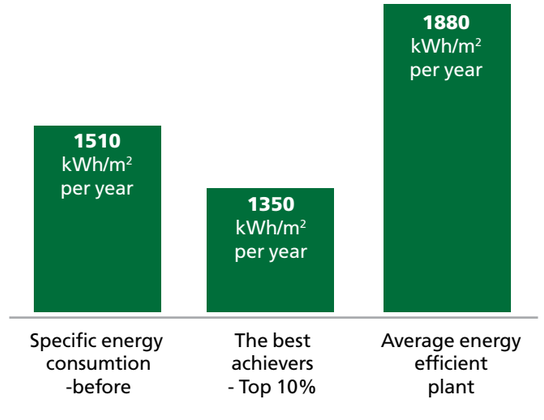
A STEP-BY-STEP APPROACH TOWARDS BEST PRACTICE IN RESOURCE EFFICIENCY

This case study concerns a sophisticated pharmaceutical enterprise, Hemofarm, with a history of embracing technological innovation. The company is compliant with EU's Good Manufacturing Practice requirements and is a certified ISO 9001:2015 company.

COLLECTING AND BENCHMARKING DATA

Hemofarm had started collecting historic data on energy, heat and water consumption, which helped achieve significant improvements gradually. Structuring, and analyzing this data was part of IFC's advisory engagement. Additional data, when required, was collected through surveys, interviews, and site visits. The next step was to benchmark Hemofarm resource efficiency against international standards. Analysis of the company's plant in Vrsac revealed that energy consumption per production unit was already 23.4% less than the industry average. Even so, IFC discovered that implementing sectoral best practices had the potential to save a further 11%, which could place the facility amongst the top 10% in the pharmaceutical sector. In fact, the plants in Sabac and Podgorica were already amongst the best performers in terms of energy consumption: Sabac consumed 47% less than energy-efficient plants of the same type, while the plant in Podgorica was one of the sector's best performers in the analogue category.



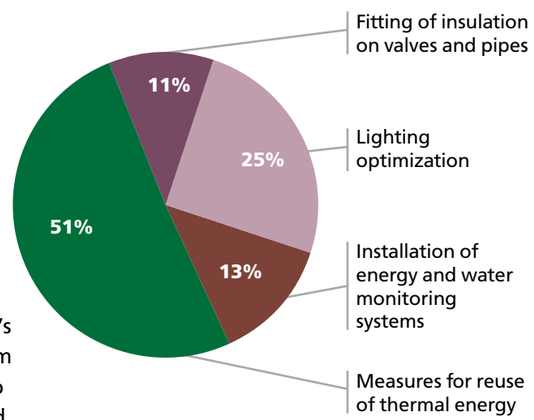
Energy benchmarking of the plant in Vrsac

"Our company considers energy-efficiency a key driver of sustainable and profitable growth. Accordingly, the engineering team diligently works towards this, achieving tangible results consistently. Cooperation with IFC helps us develop and extend our energy-savings program with new ideas and valuable advice."

Dejan Ivanovic,
Operations Cluster Head (South Eastern Europe), Hemofarm AD

IDENTIFYING AND IMPLEMENTING RESOURCE EFFICIENCY MEASURES

Following additional analyses and site visits, Hemofarm engineers and the IFC team identified and quantified key resource efficiency measures that the company could take to reduce energy and water consumption in the most cost-effective way. They also evaluated the potential for renewable and alternative energy sources. These findings guided enterprise-wide investments in resource efficiency measures. Hemofarm had already developed high-awareness of the importance of piping insulation. Insulating the valves which operate at high temperatures improved efficiency further. The company's investments relating to this had a payback period of less than a year. IFC findings also supported Hemofarm's plans to complete a resource monitoring and management system and replace classic lighting with LED lighting. These measures also required only low investments but yielded impressive savings, and a payback of less than a year. Other measures, such as heat-recovery systems in chillers, required moderate investments with paybacks exceeding a year.



Capital expense allocations for resource efficiency measures

EXPANDING AND STREAMLINING RESOURCE EFFICIENCY ACROSS MULTIPLE PLANTS

IFC's advisory was initiated at the company's plant in Vrsac, Serbia. The first diagnostics were promising, showing potential to sharpen the company's competitive edge and enhance its long-term sustainability. This led the client to extend the resource-efficiency program to its other plants.

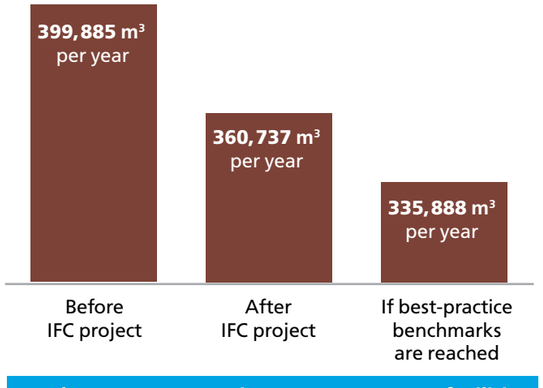
FOCUSED INTERVENTIONS WITH SHORT PAYBACK KEEP OPERATING COSTS IN CHECK

Resource efficiency is often thought to require substantial investments, with paybacks spread over years. By proposing interventions that yielded quick results and offered rapid payback, IFC was able to demonstrate the strategic business value of focusing on resource efficiency.

Improvement in monitoring measures cut water usage by 10%

Water is a key resource that pharmaceutical companies use, both for human consumption and industrial production. IFC's diagnostics revealed that water use at the client's facilities compared favorably with its industry peers. Notably, the plant in Banja Luka, Bosnia and Herzegovina, was amongst the best, globally, in terms of water consumption. However, there was room for improvement.

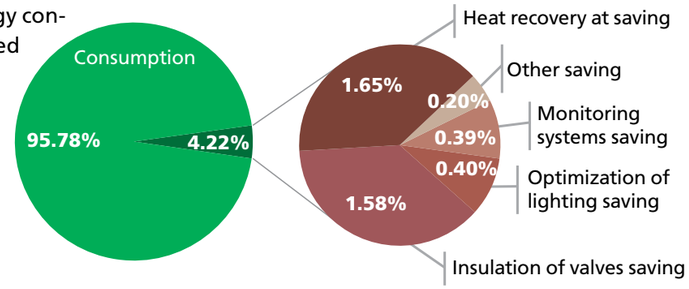
It was estimated that the company could save 3.5% of water, annually, across its facilities. In the end, however, the company has been able to save nearly three times that amount—namely, about 10.1% or 40,000 m³ of water across its five plants. This alone has unlocked savings of more than $45,000 per year across the company's facilities.



Total water consumption across company facilities

HEAT RECOVERY SYSTEMS AND INSULATION MEASURES BOOST ENERGY SAVINGS

According to benchmarked results for energy consumption, the client's main facility performed considerably better than its industry peers, ranking within the top 20% of surveyed pharmaceutical companies. Yet here too, there was significant room for improvement. By adopting simple measures such as insulating valves in steam pipes, and progressively installing LED lights, the company saved gas and electricity. Coupled with heat-recovery systems, these measures bring the company into position to annually cut gas consumption by as much as 10.6% and electricity by 6%, saving a total of 11-17% on energy across its facilities. Other investments, such as a reversible open-loop heat pump, could further reduce energy consumption and lead to additional cost savings.



Energy consumption and savings across all Hemofarm facilities

ADDITIONAL OPPORTUNITIES FOR SAVINGS WITH ALTERNATIVE ENERGY SOURCES

IFC evaluated the possibility of using alternative energy at one of the company's units. The diagnostic found that nearly 10% of water consumed at the unit was sourced from a well on-site, a potential source of thermal energy. By installing a reversible open-loop ground source heat pump (water-to-water), which pumps water at a constant temperature of 12-15°C, the company can extract thermal energy for the plant's heating and cooling needs. This has the potential to further reduce the load on its boilers.

The IFC team identified a technically feasible project involving a larger-capacity heat pump (500 kW) at the plant in Vrsac. This would require an investment of $415,000 and generate annual savings of $75,000, providing a simple payback of 5.5 years.