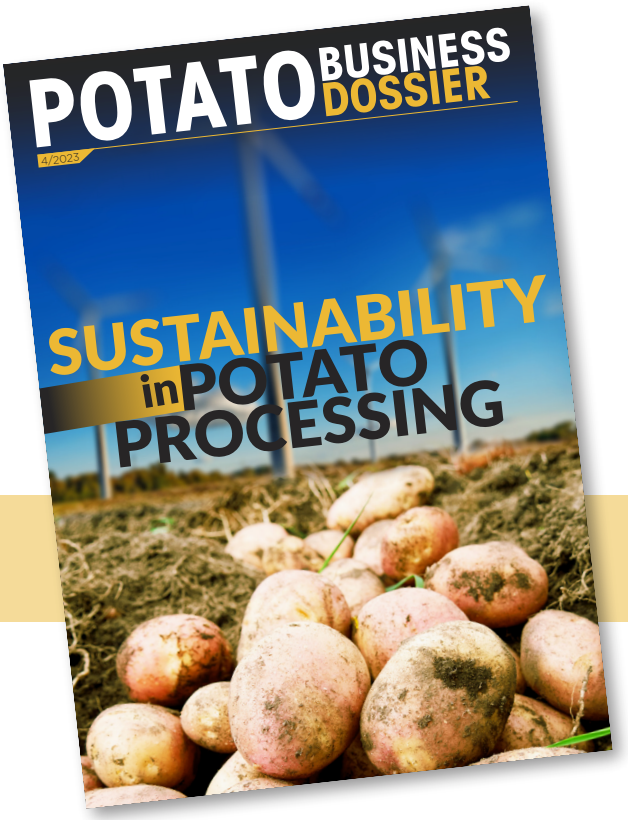
POTATO BUSINESS DOSSIER
4/2023

SUSTAINABILITY in POTATO PROCESSING



ISSUE 4-2023

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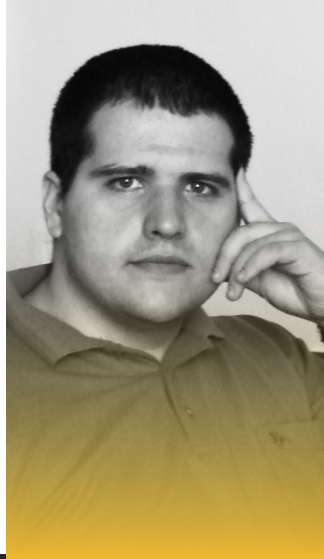
Highs and Lows on a Global Scale in the 2023 Potato Business Season



IONEL VĂDUVA
Online Editor

COMMENT

Ionel Văduva

2023 turned out to be a remarkable year for potato farmers in the U.S. Production increased by 8.9% annually, hitting its greatest points since 2018. This accomplishment was attributed to several variables, including larger planting areas, ideal weather, and higher soil moisture. The two states that produce the most potatoes, Idaho and Washington, had yearly yield increases of 5% and 6%, respectively. Retail sales are still strong despite declining prices, with processed and frozen potato goods seeing significant growth in sales.

In contrast, unfavorable weather patterns and an abundance of soil moisture affect European markets. Ireland is a major potato-producing location, but because of challenging growing and harvesting circumstances, yields are lower and waste is higher there. An unexpected possibility of a cold wave from the Arctic adds even more complexity, one that might potentially interfere with farmers' efforts throughout the continent. Monthly price increases of over 65% have been observed for processed potatoes in the Netherlands, while 20% of the crop is still unharvested.

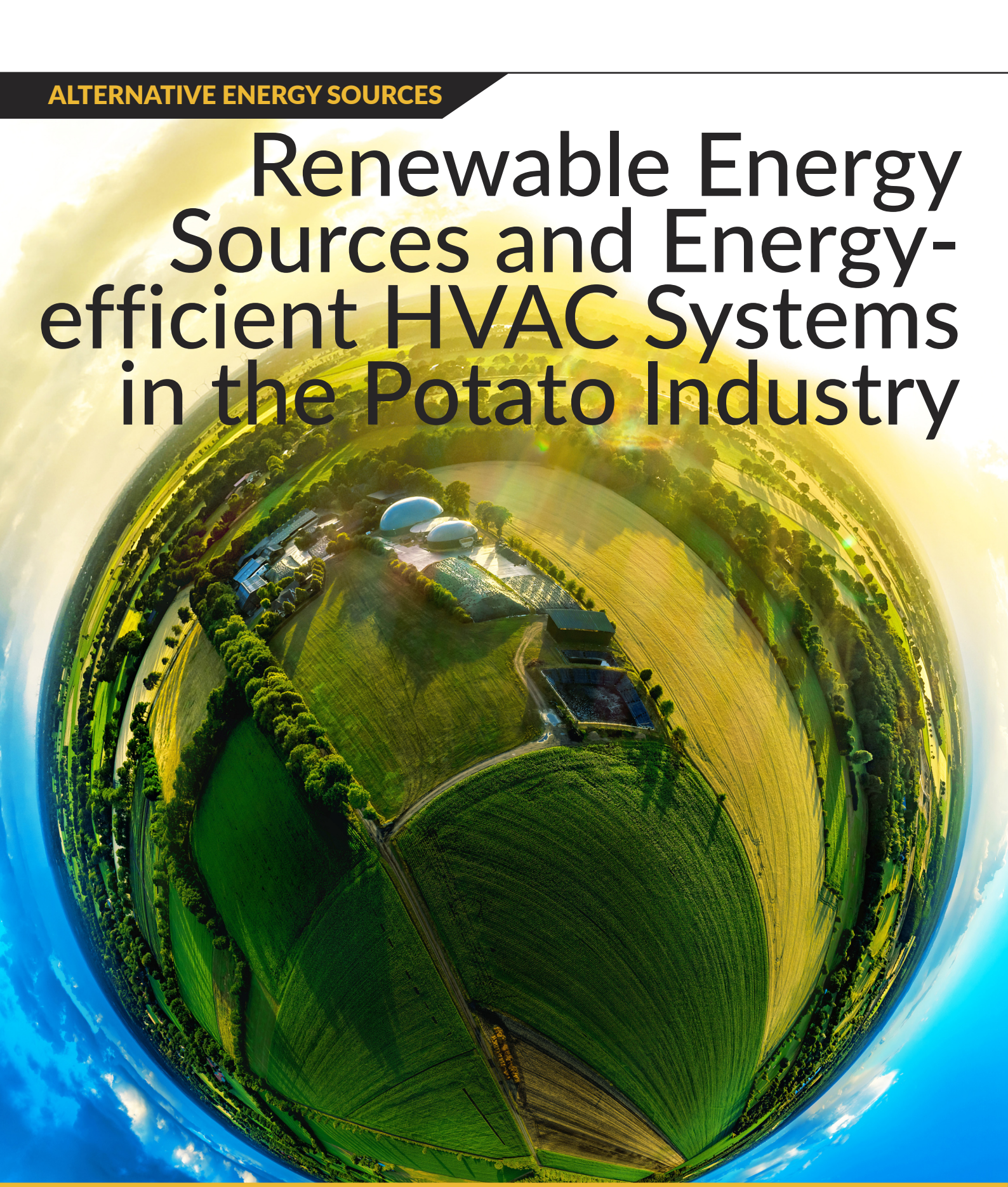
Leading producers of potatoes worldwide, Germany, France, and Belgium, are dealing with heavy rains and the possibility of an unforeseen cold snap. The possibility of giving up a substantial amount of the 3.5-4m tonnes that need to be harvested raises questions about the yield in these important European regions as a whole.

This situation is being exacerbated by political and climatic reasons in Bangladesh, the seventh-largest producer of potatoes in the world. A 109% year-over-year spike in prices was caused by hoarding and unlawful activity. Bangladesh is turning to emergency potato imports from India to fill the gap between supply and demand due to contradictory data on output forecasts and a decline in cultivated areas.

Action must be taken quickly as the potato landscape experiences both successes and setbacks on a global scale. Timely imports become essential to stabilizing prices and guaranteeing a consistent supply of this food product, even while Bangladesh has a challenging market situation, Europe struggles with bad weather, and the United States enjoys a robust potato season. ■

As the year comes to an end, the potato industry around the world is changing dramatically. This is a thorough summary of the present status of the potato market, including everything from climate issues in Europe to abundant harvests in the United States.

Renewable Energy Sources and Energy-efficient HVAC Systems in the Potato Industry



In an increasingly competitive market, potato storage owners and processors look for ways to cut operating costs without sacrificing the output levels, quality, and manufacturing efficiency of their value chain-delivered final goods. Today's energy price volatility has a detrimental impact on consistent earnings.

by Ionel Vaduva

Investments in energy efficiency, such as the acquisition of energy-efficient equipment and the adoption of plant-wide energy efficiency policies, can frequently address the difficulty of maintaining good product quality while concurrently lowering production costs.
Since increases in energy efficiency frequently result in lower emissions of greenhouse gases and other significant air pollutants, energy efficiency is a crucial part of a business's overall environmental strategy. In the current potato business environment, energy efficiency investments are therefore a wise course of action.
In many potato storages and processing facilities, HVAC (Heating, Ventilation, and Air Conditioning) systems utilize a large amount of electricity (10% to 25% of total electricity use). Furthermore, it is calculated that HVAC systems require about 5% of the natural gas used by the facility overall.
The greatest opportunities for energy efficiency exist at the design stage for HVAC systems in new industrial facilities. By sizing equipment properly and designing energy efficiency into a new facility, potato storage owners and processors can minimize the energy consumption and operational costs of HVAC systems from the outset. This practice often saves money in the long run, as it is generally cheaper to install energy-efficient HVAC equipment at building construction than it is to upgrade an existing building with an energy-efficient HVAC system later on, especially if those upgrades lead to production downtime.
An energy monitoring and control system supports the efficient operation of HVAC systems by monitoring, controlling, and tracking system energy consumption. Such systems continuously manage and optimize HVAC system energy consumption while also providing building engineers and energy managers with a valuable diagnostic tool for tracking energy consumption and identifying potential HVAC system problems.
As the world is becoming increasingly conscious of the need to reduce the carbon footprint and transition towards sustainable practices, the combination of renewable energy sources and energy-efficient HVAC systems has emerged as a powerful duo in the fight against climate change. These alternative energy sources as well as more energy-efficient technology are becoming more prominent in the HVAC industry.
For example, customers who install geothermal heat pumps can save up to 70% on heating costs and up to 50% on cooling costs.
Photovoltaic cells absorb the sun's rays and convert them into electricity through solar panels. The energy is captured in batteries or sold back to the grid (where allowed). This can supply power to a building's HVAC system.
Geothermal energy is heat that radiates from the rocks and fluids underneath the Earth's crust. By digging tunnels and creating wells in the ground, steam, and hot water can be used to drive turbines connected to electricity generators.
A geothermal system consists of an indoor handling unit and pipes that are buried in the ground. These pipes (Earth loops) connect from a pump to a re-injection well that provides steam. Since the temperature in the Earth's crust is constant, it provides free energy.
In winter, the fluid that circulates through the system's earth loop is carried indoors. The indoor unit then transforms this heat to a higher temperature and releases it into the building, acting as a heater.
In summer, the geothermal system absorbs heat from the building and transfers it through the earth loop/pump to the re-injection well.
It's important to note that geothermal systems do not need as frequent maintenance as most HVAC systems might. Once installed, the earth loop can last for generations. However, filter changes and coil cleaning can help improve system efficiency and longevity.

SLASHING THE GRID ELECTRICITY CONSUMPTION OF MCCAIN AUSTRALIA'S BALLARAT FACILITY

Not so long ago, McCain Foods Australia completed the first phase of its plans to install an 8.2MW behind-the-meter renewable energy system, cutting the ribbon on the first 4.5MW of a 7MW solar array to power its Ballarat processing facility in Victoria.
Plans for the solar project were unveiled by the Australian arm of the international food giant mid-way through 2020, as part of a hybrid system that would also include a 1.2MW waste-to-energy co-generation plant, a solar car park, and three electric vehicle chargers.
The renewable energy system, which is being

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designed and installed by Smart Commercial Solar, is expected to slash the grid electricity consumption of McCain Australia's Ballarat facility by just under 40%.

Significantly, the solar component of the project is the first in Australia to use Trina Solar's fully integrated module and tracking TrinaPro offering, under the company's now fully-owned Trina Tracker business.

The solar component of the McCain hybrid system is being financed through a partnership with Smart Commercial Solar under a power purchase agreement (PPA) funded by the renewable investment fund, Solar Bay.

A PEPSICO PROJECT TURNING POTATOES INTO POWER

PepsiCo's Sustainability team in Portugal is joining the growing ranks of teams tapping into the power of potato peels. Marisa Neves, the Environmental, Health, and Safety Engineer in PepsiCo's Carregado plant, is overseeing the installation of a biomethane digester.

The biodigester is a machine that converts potato peels along with other food waste from the plant into biogas - a renewable energy source formed as a byproduct of the peel's breakdown. The gas is then purified, to remove elements such as carbon dioxide and water, to become biomethane. It is this higher-quality gas that can be used to provide energy to cook Carregado's chips.

Biogas is increasingly essential as a sustainable energy source at PepsiCo, with more than 10 installations of the technology across the globe. But the biodigester is a new approach to creating energy with Carregado as just the second site at PepsiCo able to convert biogas to biomethane - an innovation that offers a way to replace the natural gas traditionally used to power the facility's ovens.

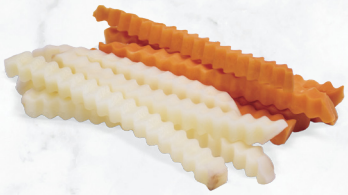
The biodigester is estimated to reduce 4,212 tonnes of emissions - the equivalent of providing electricity to 820 homes for a year. Neves explains the surrounding community will also benefit from the newly added power source. She's working on plans to collect organic waste from nearby factories and local businesses to fuel the biodigester.

"In my personal life I can do small actions, but PepsiCo allows me to be involved in big projects and do big things to help the environment," he said.

Cutting emissions with projects like Carregado's biomethane digestor supports the company's pep+ (PepsiCo Positive) transformation. As part of a set of Positive Value Chain goals, PepsiCo aims to reduce absolute emissions (Scopes 1, 2, and 3) across the company's value chain by more than 40% by 2030, including a 75% reduction in emissions from our direct operations. PepsiCo is also working to achieve net-zero emissions by 2040 - 10 years ahead of what's called for in the Paris Agreement.

In Carregado, they've gone beyond potato peels to source sustainable energy. About 6,000 solar panels have been installed to provide electricity. Neves also oversees sustainability projects that use their boilers to produce steam without the use of gas. In recognition of their work in reducing water, electricity, and gas usage, the plant received an internal PepsiCo Resource Conservation (ReCon) bronze award. ■







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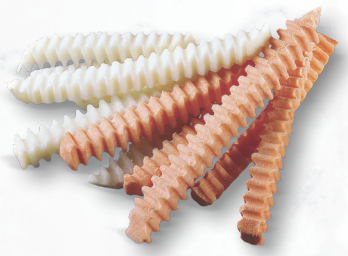


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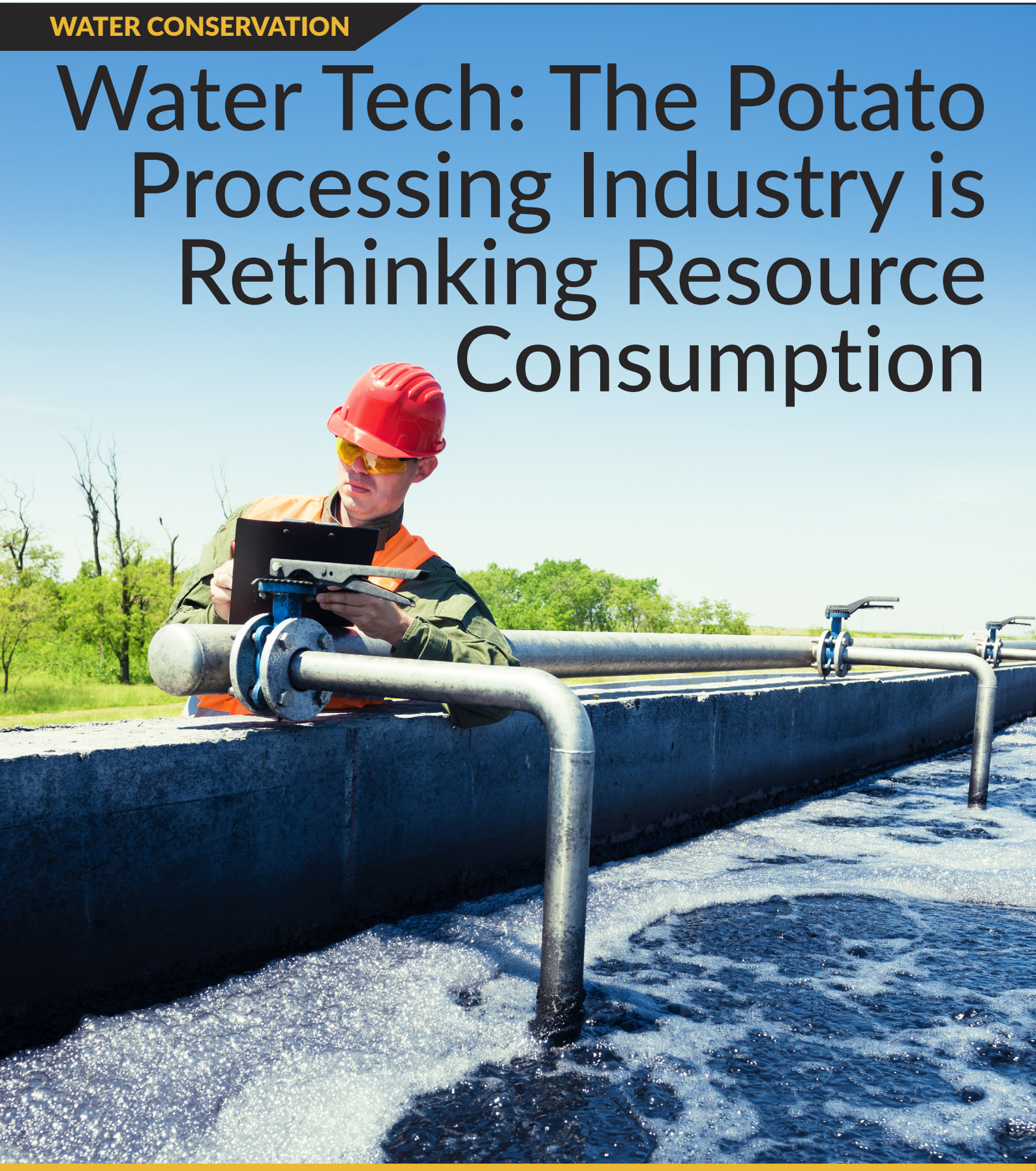
Water Tech: The Potato Processing Industry is Rethinking Resource Consumption



The potato processing business, one that has grown dramatically over the last 20 years, is a water-hungry industry, requiring an average of 17 liters of water for each kilogram of processed output.

by Ionel Vaduva

With a global production of 376m tons annually, potatoes rank as the fourth most important non-cereal food crop. Consequently, this branch produces a significant amount of wastewater. Wastewater from potato processing is quite laden and hence challenging to treat using traditional techniques, particularly when little energy input is needed for environmental friendliness.

French fries, chips, hashbrowns, salads, and other potato treats are among the goods produced by the potato processing sector. Several processes in this chain include the use of water, such as washing, steam-peeling, chopping, boiling, and blanching. On average, 8 to 28 liters of water are used for every kilogram of processed potatoes. Furthermore, during processing, potato waste is produced, which could account for 15 - 40% of the original weight of the potato. It is estimated that the US potato industry alone generates about 1.3X109 kg of waste each year.

Usually, potato processing wastewater is highly loaded with organic compounds. Its Chemical Oxygen Demand (the measure of the capacity of water to consume oxygen during the decomposition of organic matter in the water or COD) depends on the type of applied process and may vary from 6,000 to 30,000 mg/L.

"Such wastewater can cause serious environmental problems, as it contains high concentrations of biodegradable compounds such as starch 19 - 25 g/L, protein 2.8 - 4 g/L, and glucose 0.3 g/L, as well as inorganic salts containing significant concentrations of minerals (e.g., N 0.1–751 mg/L, P 128–361 mg/L, K 1613–2222 mg/L) and a pH in a wide range of 3.9 - 7.5," 'Application of Microbial Fuel Cell Technology in Potato Processing Industry' report reveals.

ZERO-ENERGY INPUT POTATO PROCESSING WASTEWATER TREATMENT IS GAINING TRACTION

The treatments with zero energy input are gaining traction and are anticipated to supplement or, in the best-case scenario, replace conventional methods used in industry. This is due to the combination of increasingly stringent water management regulations, technologies with lower energy consumption, and closed loops for processing water in the potato business industry.

Fruit and vegetable processing plants' wastewater is mostly composed of carbohydrates, including starches, sugars, and pectin, along with vitamins and other cell wall constituents. Since around 75% of all organic stuff is soluble, it cannot be extracted by physical or mechanical methods. Thus, the best methods for treating wastewater are chemical and biological oxidations.

Primary treatment, secondary treatment, and advanced treatment are the three stages that typically make up an integrated waste treatment system. By using screening, flotation, and sedimentation, suspended and settleable materials are eliminated during the primary treatment process. The biological breakdown of the mostly dissolved organic matter that is still in the flow stream following primary process treatment is known as secondary treatment. Natural or mechanical techniques can be used to treat biological materials.

A Polish company manufacturing potato-based products needed help with its process wastewater stream. To resolve discharge problems they requested to concentrate and remove as much protein and potassium resulting from the centrifuge decanting line. Fortunately, thanks to a tubular reverse osmosis membrane system supplied by PCI Membranes, it has been demonstrated that it is possible to use a single treatment process to minimize protein residues in the permeate stream and eliminate the need to build a new biological wastewater plant or purchase expensive evaporators.

"For a feed flow of up to 60 m3/hr a capital expenditure cost of circa EUR4m would result from processing the potato wastewater with an evaporator (price indication provided by a renowned company that specializes in manufacturing evaporators), whilst a capital expenditure cost of about EUR1.6m would result from using a tubular reverse osmosis system when considering the design done at 70°C, with a feed flow of 70 m^3/hr. All samples collected and analyzed during the trial confirm the efficiency of using AFC99 reverse osmosis membranes in processing the potato wastewater stream. The retention rate of most of the components analyzed is above 99% on average; which indicates that the permeate is reasonably clean and with very low/no presence of contaminants. At the other end, the feed stream has been concentrated to a level where the retentate could potentially be used for other processes such as biogas production via anaerobic digestion or disposed of at a lower volume and cost," according to the company.

Cleaning and clean water flux recovery efficiency have been consistent and acceptable when processing wastewater on AFC99 membranes. On average a 60% clean water flux recovery has been achieved across all process runs. Both chemical cleaning (using Ultrasil 11, Ultrasil 75, or enzyme cleaning) and mechanical cleaning (foam ball) have proven efficient for membrane cleaning.

Both designs from this project have been completed with the use of a reverse osmosis polyamide thin film composite membrane

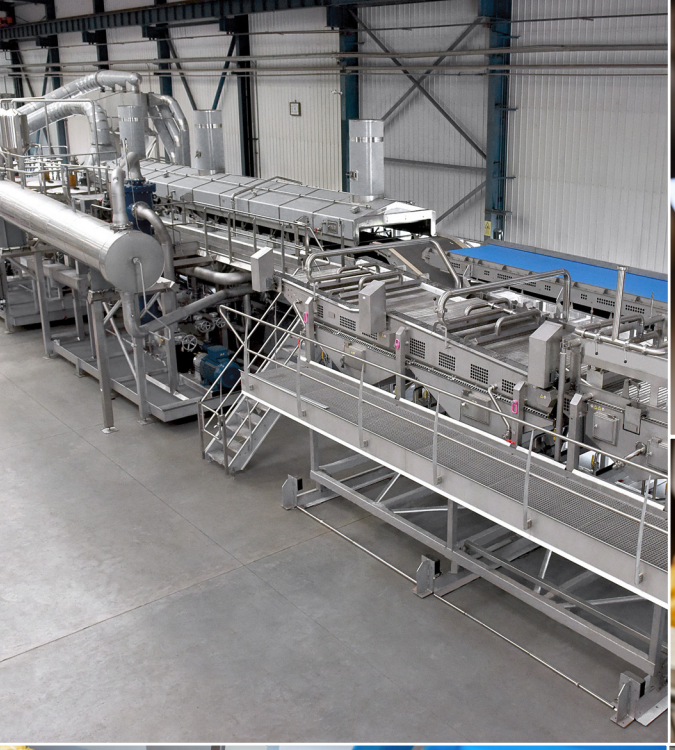
The treatments with zero energy input are gaining traction and are anticipated to supplement or, in the best-case scenario, replace conventional methods used in industry.

(AFC99) at 35 bar operating pressure and a design option at 50°C and 70°C respectively, the AFC99 membrane could be used for applications even up to a maximum operating pressure of 64 bar and 80°C process temperature; which makes it the only tubular reverse osmosis membrane that can be operated at these conditions.
Each B1 module comprises 18 perforated stainless-steel tubes in the form of a shell and tube, each tube is fitted with a membrane element. For a reverse osmosis application, the flow of the process fluid through each of the tubes is affected by specially designed end caps.

The potato processing business, one that has grown dramatically over the last **20** years, is a water-hungry industry, requiring an average of 17 liters of water for each kilogram of processed output.

CASES OF UASB/EGSB REACTORS OPERATING IN GERMAN POTATO PROCESSING FACTORIES

In another case study, a Biothane Upflow Anaerobic Sludge Blanket (UASB) reactor and a Biobed Expended Granular Sludge Bed (EGSB) reactor were installed at two different potato processing facilities in the Netherlands. The first example is Smiths Food, which produces potato chips. They chose the Biothane UASB anaerobic treatment process for bulk COD removal from their wastewater and aerobic final treatment to meet the discharge limits. Coarse solids are removed in a parabolic screen (mesh size 1mm). After this screen, the water enters a preclarifier designed at a surface load of 1m/hour for the removal of suspended solids and residual fat, oil, and grease. The settled solids are dewatered in a decanter and the water flows by gravity into a buffer tank of 400m3. From the buffer tank, the water is pumped to a conditioning tank for pH and temperature correction. Conversion of COD takes place in the Biothane UASB reactor. The total anaerobic plant has a COD removal efficiency of approximately 80%. The remaining COD and Kjeldahl nitrogen are removed in the aerobic post-treatment. The final COD concentration is less than 100 mg/L and the Kj-N concentration is less than 10 m/L. The final effluent is discharged to the municipal sewer.
The second example is Peka Kroef, which produces potato and vegetable-based half-products for the salad industry in Europe. Owing to the specific characteristics of the resulting wastewater (low temperature, COD load fluctuations, COD composition fluctuations, high suspended solids concentration) an alternative for the conventional UASB, the EGSB technology, was tested. Extensive laboratory research showed good results with this type of anaerobic treatment at temperatures of 20-25°C.
The wastewater from the potato and the vegetable processing plants follow similar but separate treatment lines. Coarse solids are removed in parabolic screens and most of the suspended solids are in a preclarifier. The settled solids are dewatered in a decanter and the overflow is fed into a buffer tank of 1000m3. The anaerobic plant consists of two identical streets, giving Peka Kroef a high degree of operational flexibility. From the buffer tank, the water is pumped to the conditioning tanks where the pH of the wastewater is controlled. Wastewater is then pumped to the Biobed EGSB reactors where the COD conversion takes place. The conditioning tanks and the anaerobic reactors operate under 100 mbar pressure and are made from FRP. It is possible to operate without a gasholder or a compressor. In addition, the EGSB reactor guarantees operating under a 'zero odor emission' and supports the aerobic post-treatment to increase nitrogen and phosphorus removal for final discharge to the sewer. The initial results of this Biobed reactor in the potato processing industry are very promising. ■



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Opportunities for Efficiency Improvement Through Recovered Thermal Energy

The rising cost of fossil fuels and power, along with the strict goals set by the Climate Change Act for reducing greenhouse gas emissions, have made energy efficiency in the potato processing industry a more pressing concern.

by Ionel Vaduva

Overall, the food and beverage processing industry accounts for 25% of the estimated 11.4 TWh of recoverable heat that is wasted annually, making the utilization of waste heat sources essential to increasing industrial energy efficiency.

Heat exchange between a neighboring or same process source and sink is typically the most cost-effective solution for waste heat recovery, and a variety of highly developed heat exchangers are readily available for purchase. Several innovative technologies have surfaced recently to facilitate the recovery of lower-temperature heat streams. Examples of these include compact heat exchangers with low approach temperatures and low-temperature organic Rankine cycles (fundamental operating cycles where an operating fluid is continuously evaporated and condensed), with unique working fluids.

INNOVATIVE TECHNOLOGIES TO FACILITATE THE HEAT RECOVERY

In steam systems, heat recovery from flue gas is frequently the best option. In an economizer, boiler feed water can be heated using flue gas heat. Large boilers typically use this measure, but additional heat recovery is frequently possible. The requirement to maintain the economizer wall temperature above the dew point of any acids present in the flue gas - such as sulfuric acid in fossil fuels containing sulfur - represents the limiting factor for flue gas heat recovery.

According to a research paper titled "Opportunities for low-grade heat recovery in the UK food processing industry", an industrial air compressor can generate up to 90% of its electrical energy as heat. A heat recovery unit can often recover between 50 and 90% of this available thermal energy, which can then be used for heat pump applications, boiler make-up water preheating, water heating, process heating, make-up air heating, and space heating. For every 100 cfm of compressor capacity, it is predicted that recovered heat of about 50,000 Btu/hour is accessible. Repayment terms are usually shorter than a year.

A heat exchanger, for example, can be used to recover heat from the hot water blanchers' discharge water. Similarly, heat recovery from the hot condensate that exits the steam blancher may be feasible if the condensate is not recycled internally. In situations where fouling is under control, heat can be recovered via a heat exchanger and applied to boiler feed water or equipment cleaning water beforehand.

Using a dryer's exhaust air to warm the incoming air stream during a retrofit application is a low-tech method of heat recovery that can save energy. The area that can be made available for more ductwork close to the dryer will determine how well this measure works. A recuperation system, or heat exchanger, can be used to use exhaust air to indirectly heat the inlet air stream or the exhaust air can be directly fed into the entrance air stream.

"In the former approach, the saturation of the exhaust air might limit the effectiveness of heat recovery (highly saturated exhaust air may raise the humidity of incoming air and reduce its drying capacity). If there isn't sufficient room for additional ductwork around the dryer, heat can be recovered from exhaust gases using 'run-around coils,' which contain a heating medium such as water to transfer heat to the inlet air stream via a heat exchanger," School of Chemical Engineering and Advanced Materials experts wrote in their paper.

When items are purposefully cooled with forced air after drying, it may be possible to recycle the warm air that results, either into the dryer itself or by passing it via a heat exchanger to warm the air stream entering the dryer. On the other hand, the cost of the heat recovery system and cooling fan may be more for non-cooling products than the energy savings from the recovered heat.

Through the use of a heat exchange system, heat can be indirectly recovered from the fat-laden exhaust gases of fryers and used to pre-heat water and air for use in other facility activities. However, to eliminate lipids and lessen heat exchange system fouling, conditioning of the exhaust gas is necessary.

Direct combustion can also be used to recover more heat from the fat-laden exhaust gases of a fryer. There are two-stage commercial fryer gas combustion systems that are capable of recovering useful heat. Using economizers to pre-heat the facility and process water, heat is collected from exhaust gases leaving the fryer in the first stage. Exhaust gases are burned in a little furnace powered by natural gas in the second stage. After leaving the furnace at a temperature of between 700° and 800°C, exhaust gases pass through a second heat exchanger, which warms fryer oil.

Adsorption cooling systems can generate chilled water for process cooling and facility air conditioning by using waste heat rather than power. The majority of contemporary pasteurizers employ internal heat regeneration, however, heat pumps or heat exchangers can also be utilized to recover heat from rejected water and use it to pre-heat water or air for other facility purposes. Instead of being released into the sky, leftover steam from steam-based peelers should ideally be used for heat recovery. Condensing heat exchange systems can be utilized to recover heat from the discharge steam and utilize it to heat process or facility water.

Several innovative technologies have surfaced recently to facilitate the recovery of lower-temperature heat streams. Examples of these include compact heat exchangers with low approach temperatures and low-temperature organic Rankine cycles with unique working fluids.

Overall, the food and beverage processing industry accounts for **25%** of the estimated 11.4 TWh of recoverable heat that is wasted annually, making the utilization of waste heat sources essential to increasing industrial energy efficiency.

A type of active heat recovery device called a heat pump raises low-temperature waste heat to a higher, more usable temperature for use in other process heating applications. Where conventional (i.e., passive) heat recovery techniques are impractical, waste heat can be recovered through the use of heat pumps. Heat pumps are an active heat recovery technique that needs energy input to transform waste heat from low temperatures into process heat at high temperatures. All things considered, using a heat pump to convert low-temperature waste heat into useful process heat still generally use less energy than supplying that process heat using more conventional energy sources (such as burning fuel or electricity).

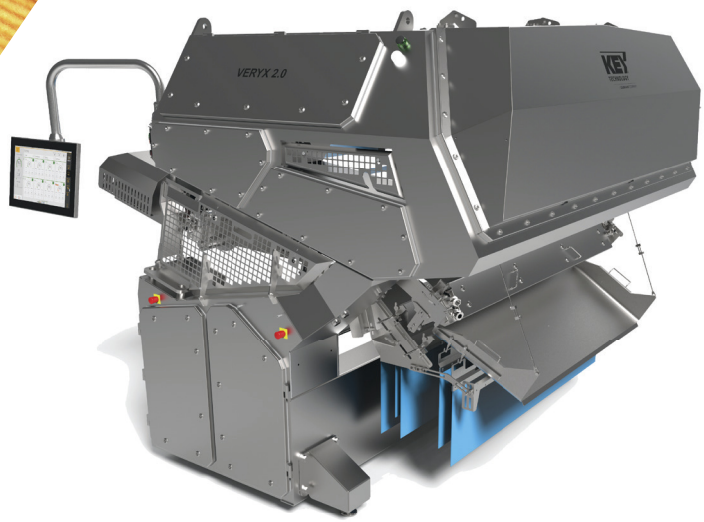
SCHNE-FROST: INSTALLATION OF A HEAT RECOVERY SYSTEM TO PRODUCE HOT WATER

Schne-frost, a German manufacturer of frozen french fries and potato specialties, requires high process temperatures to be able to produce its potato and vegetable products. These temperatures are generated by steam, which is produced in steam boilers or thermal post-combustion plants. As part of its sustainability strategy, Schne-frost is constantly rethinking and optimizing its processes for more efficient use of energy. Heat recovery is important in this context. To use residual heat in an optimized process, rejected heat from the thermal post-combustion plants is used to warm up process water.
A heat recovery system has also been implemented with two hot water tanks, each with a 120 m^3 storage capacity. The high-temperature exhaust air from the thermal post-combustion plants heats the water via heat exchangers and it is then stored in insulated storage tanks. The water is heated to about 65°C to 75°C and used in the production processes, for the heating of the ambient logistic store and cleaning purposes. The company plans to install another two 120 m^3 storage tanks which will enable it to store 480 m^3 of hot water. The goal is to reduce gas consumption by 3%, representing a CO_2 reduction of 350 tonnes.

INLINE VENTURI SCRUBBERS CAN FUNCTION AS HEAT RECOVERY EQUIPMENT

JOA Air Solutions' Energy Recovery Scrubber effectively cleans a client's exhaust streams, which lowers unwanted emissions into the environment. Additionally, the scrubbing process extracts heat from the same exhaust stream, which can be reused in a potato processing facility.
During the scrubbing process, the scrubbing liquid not only captures pollutants or vapors but also absorbs heat. Hence the Inline Venturi Scrubbers can also function as heat recovery equipment, especially if the exhaust stream has a relatively high temperature. Lowering the temperature of the exhaust stream during the scrubbing process would also enhance the absorption of vapor into the scrubbing liquid.
The heat captured by the scrubbing liquid can be recovered using a heat exchanger. That heat can then be reused by other consumers within or outside of the plant, enabling a more economical plant operation.
"Our Energy Recovery Scrubbers are often employed to economize heating utilities in offices, factories, and other process equipment, especially where hot water is in demand. The recovered heat can be processed further, depending on specific needs. [...] With an intelligent automation system, the Energy Recovery Scrubber adapts to the factory operating conditions while requiring minimum interaction from operators," JOA Air Solutions experts concluded. ■

Optimize Yield, Quality & Productivity



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HOW PROPER LUBRICATION CAN MAKE THE DIFFERENCE IN YOUR PRODUCTION PLANT

Rolling bearings are machine components that are subjected to heavy loads. Accordingly, they cannot function reliably without appropriate lubrication. In fact, up to 80 percent of premature bearing failures are related to lubrication issues caused by aged, contaminated or unsuitable lubricants or simply by insufficient lubrication. The related costs are immense if you consider production losses and consequential damages on the machines. Therefore, the correct lubricant selection as well as modern lubrication methods not only have a crucial impact on the life of a bearing but also on the correct functioning of the machine or system it is integrated into.

HOW TO CHOOSE THE RIGHT LUBRICANT BY ITS PURPOSE

The most important task of a lubricant is to reduce friction and wear in the bearing through the formation of a lubricant film that separates the surfaces – ideally with no metal-to-metal contact occurring between the rolling element and raceway surfaces. This separating lubricating film does, however, require certain minimum speeds in the bearing, which are not always achievable under changing operating conditions.

If elevated temperatures occur in a machine or system, oil lubrication can act as a coolant. In many cases, this can have a critical impact on how a machine functions. Oil lubrication also has the ability to remove any contamination from the system by means of filtration. With grease lubrication, which is the primary focus here, the lubricant cannot provide any cooling function, the grease must be capable of tolerating the resulting temperatures over longer operating periods. Therefore, temperature suitability is a key selection criterion for greases! Despite not providing any cooling benefits, grease does have its advantages in that it frequently has a long service life and a generally good relubrication capacity. And it provides additional protection against the ingress of contaminants from outside.

In most cases, the demands placed upon the different lubricants are adapted according to the specific requirements of the equipment that is to be lubricated.

WHY SHOULD YOU CONSIDER CHANGING YOUR LUBRICANT?

Proper lubrication is essential in maintaining your production equipment. Choosing the most suitable grease for your different applications extends the life of your machines, thus reduces your maintenance costs and increases the performance of your entire production line. All this, in turn, makes a valuable contribution towards a more energy-efficient and sustainable production in your plant. So changing your lubricant - even if the new lubricant is potentially more expensive - can be worthwhile in many aspects.

AUTOMATIC LUBRICATORS, ESPECIALLY SMART AUTOMATIC LUBRICATORS, CAN HELP YOU IMPLEMENT A KEY COMPONENT OF A COMPREHENSIVE AND SUSTAINABLE LUBRICATION STRATEGY IN YOUR PLANT.

Lubricate when needed, where needed, and with the right amount. This may sound like a perfect scenario, but when done manually, it is in fact very labor-intensive and the consequences if done incorrectly are costly. The difference in energy consumption between an optimally lubricated machine and an over-lubricated machine, for example, can be several percentage points. In addition, maintenance personnel are sometimes not sure when to relubricate and how much, which increases the risk of lubrication issues. Safety requirements may make access to lubrication points difficult. And to top things off, maintenance budgets are in general under pressure.

With increasing digitalization efforts in industrial maintenance, potato processing plants are starting to look for digital integrated systems where lubrication can be controlled remotely, and the user gets feedback on the lubrication process. These systems have multiple benefits such as lowering the cost of the lubrication activity and decreasing grease waste by delivering a controlled quantity of lubricant to the various lubrication points. A smart lubricator solution proactively notifies of impending malfunctions and allows prevention before damage actually occurs, thus reducing unplanned downtime and eliminating spontaneous firefighting measures. This means fewer inspection rounds which in turn means more occupational safety and more time for other important tasks. The payback of such lubrication systems, without considering the production losses, is in general less than two years.

BUT STILL - HOW DO YOU DETERMINE HOW MUCH GREASE AN AUTOMATIC LUBRICATOR SHOULD SUPPLY IN WHICH BEARING?

Use Schaeffler´s free **Grease App**! The intuitive tool lets you quickly determine the lubricant quantity for initial lubrication and relubrication of your bearings. It also tells you the most suitable type of Schaeffler Arcanol grease to use for your individual application, the grease service life, and the relubrication interval. The tool can be used on any mobile device, such as smartphones, tablets, laptops or computers. This means that the information is available everywhere - even in the workshop environment where the lubrication is carried out.

AN EXAMPLE FROM PRACTICE

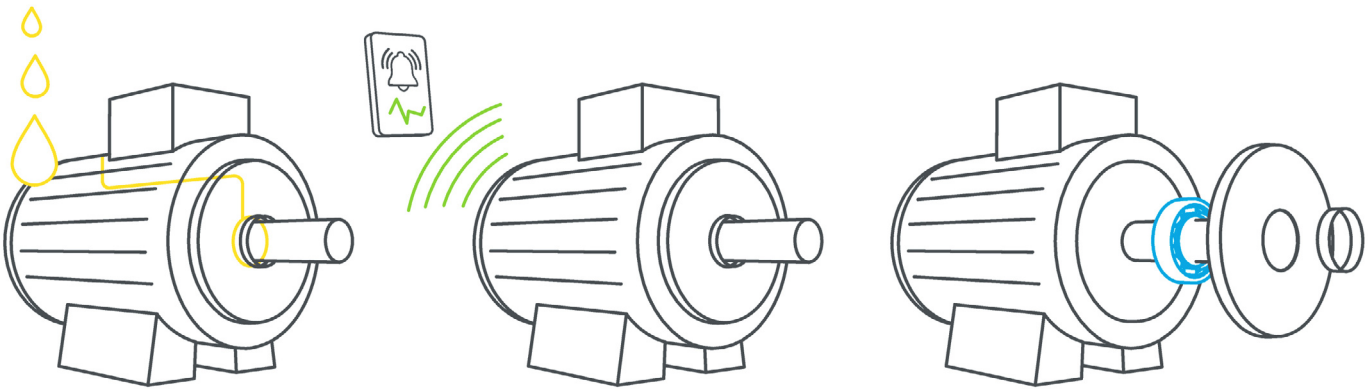
The e-motors of a production line at a well-known European meat processor´s plant were continuously leaking grease – apparently a case of over-lubrication. But all OEM recommendations had been followed so the customer was confused as to which amount of lubrication would be appropriate for this particular application: the recommendation of the motor manufacturer was to supply the amount of 0.255cm³/day, while the lubricator OEM suggested a daily dose of 0.26cm³. Schaeffler´s recommendation differed a lot from both: according to calculations made in the Schaeffler Grease App, the minimal amount of merely 0.034cm³/day of their Arcanol Multitop grease would be sufficient to ideally supply the customer´s application, which equals a grease reduction of 87%!

Automatic lubricators available on the market today are not yet able to provide such extremely minimal amounts of grease to a lubrication point. Still, there are solutions that come very close. Schaeffler recommended the use of their automatic lubricator CONCEPT1 or their smart automatic lubricator OPTIME C1. Both are able to provide the respective e-motors with a better calculated amount of grease and thus avoid overgreasing in the future.

Using the OPTIME C1, for instance, you can reduce lubricant waste in your plant by up to 60% and the scrap rate caused by unplanned downtime. The smart automatic lubricator also offers energy savings of up to 3% by reducing friction caused by improper lubrication. It comes with refillable cartridges, which offers additional savings. In the long run, the optimal lubrication offered by this smart lubrication system also improves the overall lifetime of your bearings and machines.

When considering that, statistically speaking, three out of four lubrication points worldwide are still relubricated by hand, a move towards automatic or even smart lubrication is a simple but effective step towards simplifying industrial maintenance. Moreover, up to 80% of unplanned bearing failures can be avoided simply by using such lubrication practices. Which is why the OPTIME C1 does not only simplify machine lubrication for many Schaeffler customers worldwide – Schaeffler uses it in their own plants to prevent unnecessary production stops during maintenance.

Schaeffler´s range of Arcanol lubricants, paired with smart automatic lubricators and the Grease App can help your processes flow easily. They are part of the Schaeffler Lifetime Solutions portfolio, which offers a comprehensive range of products, services and solutions for industrial maintenance. It is designed to support maintenance professionals over the entire life cycle of a machine. ■



Solutions, Expert Services and Trainings

We pioneer motion

We keep your machines rolling – You keep your customers smiling

Around-the-clock machine availability with industrial maintenance solutions
Your production process is precisely timed. The availability of your machines must be guaranteed 24/7 to avoid waste of food, time and resources.
With our comprehensive solutions for condition monitoring, lubrication and mounting, unplanned downtime on conveyor belts, frying systems, peeling machines and other critical equipment in a potato processing plant becomes a thing of the past. At the same time they help you reduce CO2 emissions and ensure greater safety for your employees. Our solutions are called Lifetime Solutions – because we support maintenance experts like you over the entire life cycle of your machines.

medias.schaeffler.de/en/lifetime-solutions

SCHAEFFLER

SPUDS GO GREEN: ECO-FRIENDLY WAYS TO CUT CARBON EMISSIONS IN POTATO PROCESSING

The focus of decarbonization in the potato processing sector is on resource efficiency, fuel substitution, and CO2 emission reduction solutions. Typically, the sector considers sustainability throughout the entire supply chain, from farmer to customer. Key decarbonization strategies for the potato processing sector in this regard include material efficiency, energy efficiency, and fuel substitution.

by Ionel Văduva

Reducing product waste in the process, particularly in the peeling, sorting, and blanching phases, would minimize material requirements, as well as energy and CO_2 emissions (both onsite and upstream) to fulfill product demand. Valorization (upcycling) of leftover waste streams could further lower the sector's energy requirements and CO_2 emissions.
Peeling, blanching, and frying are major production steps where innovative energy-saving methods are being developed. Implementing them, coupled with good practices, has the potential to minimize energy use.
The deployment of low-carbon or carbon-neutral energy sources in place of natural gas would eliminate the sector's direct CO_2 emissions. To give heat and steam to the process, these can include biogas, green gas, hydrogen, or carbon-free power.

REDUCING MATERIAL LOSSES

In addition to reducing material losses, efficient peelers can benefit from increased energy efficiency. TOMRA installed an efficient steam peeler at a potato processing factory in Switzerland, cutting energy consumption by up to 25% while also reducing peel loss, water usage, and maintenance expenses.
Pulsed Electric Field (PEF) technology can replace traditional steam preheating of potatoes, reducing water usage by 90% compared to steam preheating, improving potato characteristics (for example, creating a smoother cutting surface), and reducing energy consumption for preheating by up to 85%. Lamb Weston Meijer utilized PEF technology to replace its traditional preheating process on one of its lines at its Kruiningen facility, primarily to reduce water usage. It was successful in reducing freshwater use by 8% and energy use by 5%.
The traditional method for lowering enzymatic activity in potatoes is to blanch them in hot water. It uses a lot of energy and water, and the blanched potatoes must be dried afterward (either with air or with water). This process's wastewater also necessitates extensive treatment to remove nutrients leached from the potatoes as well as any chemicals (typically used to preserve color and deactivate enzymes). The process can be carried out in batches or constantly on a moving belt, often in a drum blancher. Its advantages include simplicity and inexpensive capital expenditures. Beyond French fries and potato chips, blanching is employed in a range of fruit and vegetable processing industries, and new technologies are being developed to offer similar goods more effectively.
Aviko has been developing a closed-loop blanching technique with water and energy benefits with financing from the European Union (EU). Despite the leaching of some potato particles into the water, the technique would allow the same water to be reused, lowering both water and energy usage. The process entails turning sugars in the water back into other organic molecules so that the water becomes saturated with those compounds and no more potato particles leach out. According to the firm, this procedure saves around 94 MJ per tonne of potatoes due to reduced natural gas use to heat water and a 20 to 25% reduction in primary energy consumption for blanching. The method was first shown at the Aviko facility in Steenderen and has since been adopted.

FROZEN POTATO PRODUCTS COULD SIGNIFICANTLY SAVE ELECTRICITY

The use of energy-efficient refrigeration and freezing in the production of frozen French fries and other frozen potato products can result in significant electricity savings. While power consumption for cooling does not always result in direct, on-site CO2 emissions, efficient electricity use can help to decarbonize the energy system as a whole. Because of the features of the products, air blast freezing (also known as mechanical freezing) is typically used in potato processing rather than cryogenic freezing. Within this category, however, a variety of technical options are available; the selection of compressors, condensers, and defrost equipment can have a significant impact on efficiency.
Following the Montreal Protocol and EU laws aiming at phasing out ozone-depleting compounds such as CFCs and HCFCs as refrigerants, new refrigerants, including ammonia, have also been used in recent years. HFCs, which were added to the list of refrigerants to phase out under the Kigali Amendment to the Montreal Protocol in 2019, would help to avoid emissions of these fluorinated gases (also known as F-gases, a group of powerful greenhouse gases).
In addition to choosing the most energy-efficient equipment, adjusting the operational parameters of these systems is a critical component of energy efficiency. For example, when air speed in the freezer increases, freezing time lowers, but extra power is required to run the fans, and those fans emit residual heat. Finding the appropriate airspeed and freezing time in terms of energy usage can result in large energy savings, although this is highly reliant on site-specific restrictions (such as floor space) and product parameters (such as form and size).

Key decarbonization strategies for the potato processing sector in this regard include material efficiency, energy efficiency, and fuel substitution.

Pulsed Electric Field (PEF) technology can replace traditional steam preheating of potatoes, reducing water usage by **90%** compared to steam preheating, improving potato characteristics (for example, creating a smoother cutting surface), and reducing energy consumption for preheating by up to 85%.

GEA Group's equipment can drastically reduce energy requirements (up to 30%) by optimizing the air temperature management system and refrigerant circulation, as well as employing ammonia as a refrigerant. GEA also suggests integrated heat pumps, which can return excess heat from the freezer to other stages of the process, resulting in lower steam and natural gas use.

SUBSTITUTING TRADITIONAL NATURAL GAS BOILERS

In the potato processing sector, electrifying heat demand could result in significant direct CO2 emissions savings. The indirect CO2 emissions from the sector would be determined by the fuel sources utilized to generate power for the grid (or in dedicated off-site utilities). A shift to low-carbon and renewable energy sources in the power sector would allow the potato processing industry to eliminate both indirect and direct CO_2 emissions.

One of the key electrification options is to use heat pumps, which transfer heat from a lower-temperature source to a higher-temperature sink. As part of the Horizon2020 project "Hot chips", Tocircle Power Systems tested the integration of evaporative compression technology (ECT) which utilizes waste heat from the fryer, with a 1.5 MW high-temperature heat pump, together producing steam at 180°C with a COP of 4. The scaled-up 5 MW version was tested in the frying section of an Aviko French fry production line in Belgium, aiming to bring the technology from its current TRL level of 6 to TRL 9. This technology could also have applications for potato chips and other frying processes in the food manufacturing sector, as well as other industrial processes operating at temperatures above 100°C.

Mechanical vapor recompression could enable potato processing facilities to generate high-pressure steam to replace traditional natural gas boilers or natural gas CHP, particularly for process steps at temperatures below 100°C, such as preheating and blanching, by recompressing low-pressure steam exhaust from industrial processes. This would compete with other methods of utilizing extra heat, such as heat recovery from frying oil vapors via combustion. Steam recompression is a commercially accessible technology that can normally be deployed affordably on facilities with a minimum capacity of one tonne of steam per hour.

Currently, steam boilers powered by natural gas are used to supply steam to the potato processing industry. Electric boilers could meet the potato processing industry's steam needs while lowering natural gas consumption and thereby direct CO_2 emissions. Electric boilers, which are commercially accessible today, can deliver high-temperature, high-pressure steam with the same quality as a normal gas boiler. ■

elea

THE BEST PEF SNACKS, THE BEST PEF SYSTEMS, THE BEST PEF SOLUTIONS, THE ELEA PEF ADVANTAGE

PEF treatment provides many opportunities to get greater value from your snacks, but it takes more than just a system to get the best from PEF. At Elea, our specialist PEF Engineers and Food and Bio Technologists are focused on getting the best value from your product, before and after the installation of your PEF system.

- We offer PEF efficacy testing, replicating your production process in our PEF pilot hall or where appropriate on your site.
- Elea PEF systems are designed and manufactured by us in Germany, each customisable to your specific requirements.
- We ensure smooth, swift and successful commissioning of our systems. We are also able to provide fully comprehensive operational training.
- Our Support Engineers, options for remote maintenance and on-site spare parts, keep you up, running and efficient.
- Identify seasonal variations and effects and optimise your PEF treatment with our Cut Control and PEF Control.
- Our PEF pioneering R&D team can help you discover and develop new exciting PEF product opportunities. To date, Elea holds over 30 PEF patents.

Book a 30 minute PEF Talk with one of our experts elea-technology.com

Reduce costs • Increase yields • Improve quality • New product opportunity

PEF INDUCED PRODUCT AND PROCESS IMPROVEMENTS IN POTATO AND VEGETABLE CHIPS INDUSTRY

Pulsed electric field (PEF) processing is now considered a standard process technology for use in the potato and vegetable processing industry. Applying high voltage pulses opens the cell membrane of roots and tubers as well as other fruits and vegetables and allows for quicker and easier water release from the cells.

This effect termed electroporation reduces the turgor pressure and leads to a number of process, quality and sustainability benefits including enhanced yield (cutting, slicing and conversion), improved product organoleptic (taste, texture and appearance) improved nutritional credentials through reduced oil uptake. With more than 250 Elea PEF systems used in food industry, Elea is the market leader in this field.

PRODUCT BENEFITS FOR FRENCH FRIES

Potato tubers soften after a PEF treatment, as the internal cell pressure (turgor) is lost. Like after preheating, the texture softening improves cutting and results in less feathering and breakage. In comparison to preheating, PEF energy and water consumption are reduced by up to 90 %. Typical energy input for a PEF processing of potato tubers is 0.3 to 1.5 kJ/kg, corresponding to a temperature increase of 0.01 to 0.4°C. Process intensity is adapted during the season, being highest with fresh from the field crop or harder tuber varieties and lower at the end of the season. Average product length is increased, and the starch loss into cutting and blanching water streams is reduced. That causes a yield improvement of up to 1.5 % for a French fries processing line. Due to reduced tissue breakage, the oil uptake during frying is reduced by approximately 10 %. As the electric field effect is instant and volumetric, there is no holding time requirement and no start up or shut down time need. Today approx. 150 Elea PEF systems are in use in French Fries industry with processing capacities of up to 100 t/h on single lines or treatment of other raw material such as sweet potato or cassava.

Potato and vegetable chips processing is dependent on high quality raw material and optimized processing. Slicing quality and consistency are key factors, as performance of subsequent processing steps and product quality depend on them. During slicing of potatoes as well as other vegetables, PEF reduces tissue breakage and the number of fines and broken particles. A smother cut surface will reduce starch loss and the amount of free starch on product surface. This is beneficial for product yield and texture, as well as to reduce product stickiness and doubles during frying. Keeping starch in the slices contributes to improved texture and crunch. With reduced starch loss and improved cutting up to 2 % yield increase can be achieved. Due to faster release of water frying temperature and / or time can be reduced. On continuous frying lines – dependent on line setup - up to 10 % frying time reduction is possible, which in combination with a reduced final frying temperature results in less heat load and increased product quality. For batch frying up to 15 % capacity increase can be achieved due to facilitated moisture removal. Most potato chips lines do not include a blanching step, but where applied, PEF can help to revert undesired effects of blanching on product texture. Less slice surface damage will result in less oil uptake, approximately 10 % for typical product and frying conditions. For raw materials such as carrots, parsnip, sweet potato or cassava similar benefits are observed. PEF will improve product cutting and allow faster water removal and reduced oil uptake. Reducing frying time and temperature will allow lighter product color and more natural product appearance. At present approx. 65 Elea PEF systems are in use in snacks industry, ranging from 1 to 12 t/h treatment capacity for single lines or up to 28 t/h where multiple slicing and frying lines are combined.

PROCESS CONTROL AND OPTIMIZATION

With higher PEF energy input, pore size increases and besides water also sugar or starch are released. The more the better is not the right approach here, as that may cause undesired solids and yield losses. For process monitoring and optimization Elea has developed two tools, PEF Control and Cut Control. PEF Control is based on impedance measurement to detect the number of open cells in a tissue and to predict mass transport improvement e.g. in extraction, infusion or drying processes. Cut Control measures compressing and cutting force for tubers and hence allows selection of suitable processing parameters dependent on raw material variety, season and desired cut. Together with our clients as well as line integrators we have run in person or remote supported installation and line optimization projects. Making use of our own video support app the process is handled from first trials in pilot scale through proof of principle testing at place to system installation, startup and commissioning. Remote diagnosis and support are available for customer service as well as product development. When integrating a PEF system into turnkey projects or for retrofit, our team of experts is available to maximize overall line performance by optimization of process equipment and settings on all stages of the production line.

Reduce energy

11.206.000 kWh per year without PEF

300,00 with PEF

-10,906,000 kWh per year

Reduce water

30,000 m^3 per year without PEF

6,000 with PEF

-24,000 m^3 per year

Reduce oil

5,244 t per year without PEF

4,876 with PEF

-368 t per year

Yield increase

92,000 t per year without PEF

92,957 with PEF

+957 t per year

SUSTAINABILITY IMPLICATIONS

With an energy requirement of approx. 1 kWh per ton of raw material, PEF is the most efficient cell disruption technique. PEF water usage ranges from 30 to 50 l per ton of product, dependent on infeed water and product conductivity. To minimize water use, soil or free starch should be removed prior to entering the treatment bath. After treatment, the process water can be reused in other process stages. Several PEF users have run and published sustainability analyses after PEF implementation. For a typical 26t/h line water savings in a range of 24.000 m3 and energy savings of 10 million kWh per year have been reported. Those savings in combination with a yield increase of approx. 950 t and an oil uptake reduced by 368 t per year help to save money, resources, and the environment. Based on 250 Elea PEF systems in potato industry we have estimated total CO2 emission savings of close to 3 million tons so far. ■

UPCYCLING: THE TREASURE BEHIND THE 'WASTE'

Because organic waste goes through numerous stages during its life cycle - with the majority ending up in landfills - the disposal of large "waste" amounts has a significant negative impact on the environment and reusable resources. But "waste" ought to be regarded as a resource if it can be turned into cash.

by Ionel Văduva

Upcycling food waste is thought to be a better option than traditional garbage disposal methods since it may be put to other useful purposes. Conventional methods of waste disposal, such as incineration and landfill use, may result in an uncontrolled release of greenhouse gases.

Anaerobic digestion, composting, and animal feed are a few more waste treatment techniques that could be included in a broad definition of upcycling. However a more restricted approach is required in this context. In particular, creativity and technology are used to develop fresh, effective ways to turn leftover food into creative items that may be used as sustainable resources. Products like potato peel, for example, could be used as composting materials (soil fertilizers), packaging materials, commodity chemicals for other industries, and sources of biofuel or bioenergy. According to the waste hierarchy, landfilling is the last resort when all attempts at waste minimization have been made and valorization and other waste management strategies are not feasible.

It is estimated that the trash and by-products produced by the potato business account for 12–20% of the overall volume of production. Upcycling can occur during manufacturing, but consumers who care about the financial and environmental costs of food waste at home can also undertake the task by employing nutrient-dense potatoes in a variety of ways.

"Since potato prices are up and overall inflation has increased food prices by double digits, upcycling potato peels makes sense. Using the whole potato while enjoying new ways to consume it, reinforces the potato's value. Saving money while spending time around the table with friends and family is especially important at this time of year and during these economic conditions," Kathleen Triou, president and CEO of Fresh Solutions Network, said.

TURNING POTATO PEELS INTO PLASTIC SHEETS AND NYLON FIBERS

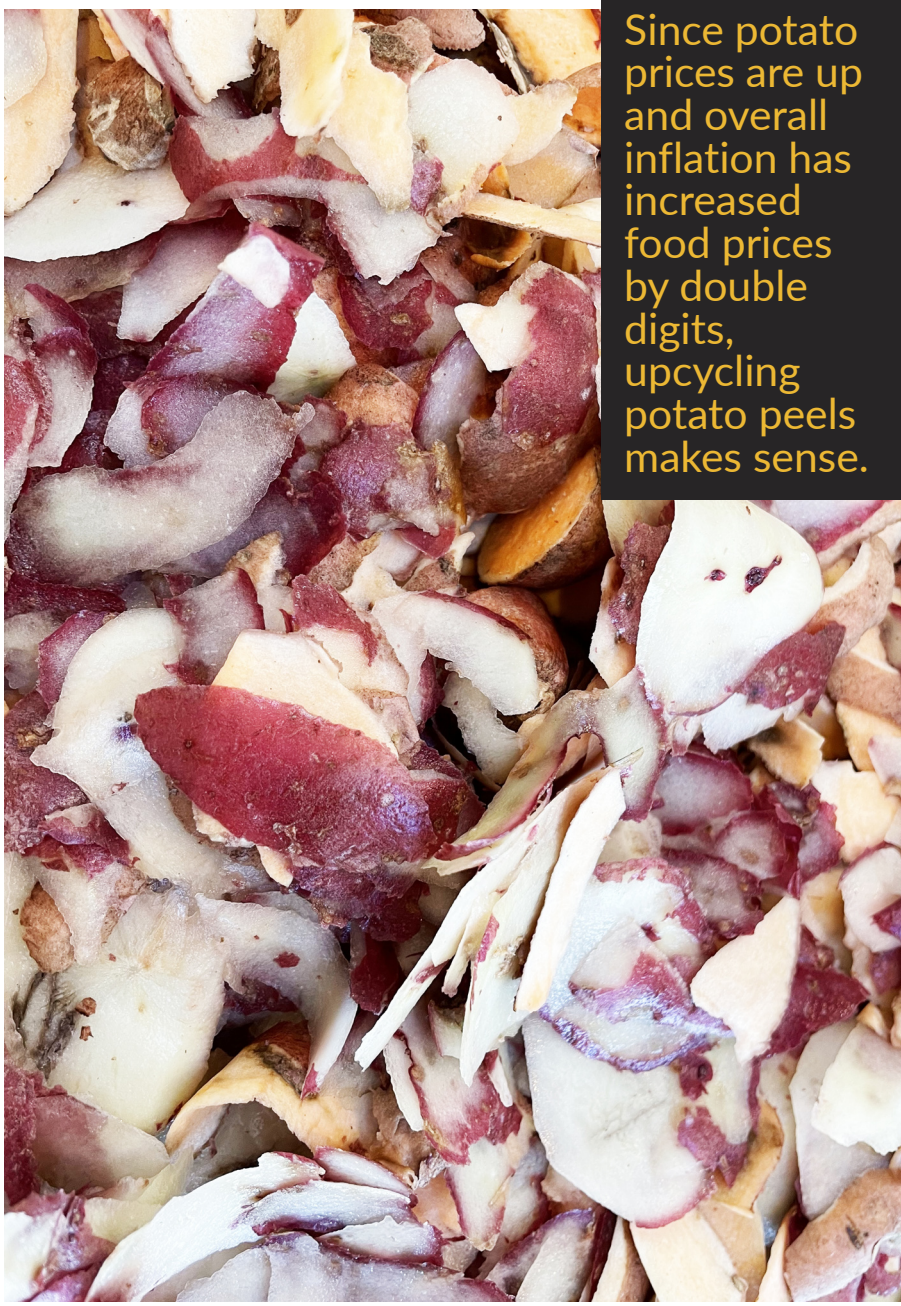
The new wasteCANcreate program from Ontario Genomics brings together Canadian researchers and industry partners from the energy, agriculture and food, plastic films, and performance textiles sectors to develop real-world solutions to the waste problem that is threatening the climate, wildlife habitats, and critical natural resources like fresh water. Precision fermentation converts food waste into useable goods such as biodegradable polymers by using naturally occurring or designed microorganisms. This novel upcycling technology also minimizes greenhouse gas emissions, eliminates the need for petroleum-based plastics, and boosts the province's economy through employment creation.

"This is a win-win situation. Taking food waste and turning it into things like biodegradable plastic cuts down on garbage going into landfills both now and for generations to come," Ontario Genomics President and CEO, Dr. Bettina Hamelin, said.

WasteCANcreate received a USD2.3m kickstart from Agriculture and Agri-Food Canada's Agricultural Clean Technology initiative, Ontario Genomics, and other industry partners.

Ontario Genomics is a non-profit organization supported by the Ontario government and Genome Canada. Since 2000, OG has fostered innovation throughout the province by funding genomic technologies in the health, agriculture, food, and environmental sectors.

Since potato prices are up and overall inflation has increased food prices by double digits, upcycling potato peels makes sense.



WasteCAN create received a **2.3** million USD kickstart from Agriculture and Agri-Food Canada's Agricultural Clean Technology initiative, Ontario Genomics, and other industry partners.

INNOVATIVE BIODEGRADABLE PACKAGING MATERIAL MADE FROM POTATOES

Addressing the need for new biobased packaging materials, Tomorrow Machine developed GoneShells, an innovative biodegradable bottle made from potatoes.

"Most packaging solutions today are made to last for years or decades. Meanwhile, the food inside goes bad after days or weeks. Inspired by how nature protects its content, GoneShells develops materials with the ability to break down under different conditions and work in symbiosis with what's inside. Similar to a fruit peel. Made in a material so pure you can eat it. The innovative biodegradable packaging material is made from potato," according to the company.

A translucent, flexible package having a distinct perception from typical packaging materials. New opportunities arise as a result of the possibility of making them edible. Not simply from a sustainability standpoint, but also in terms of whole new methods to design food packaging.

According to the developers, the speed and variety of degrading options are what distinguish GoneShells from other available solutions.

"With a bottle that can be home composted, eaten, or dissolved under the water tap in the kitchen sink, the objectives are to create less strain on recycling systems and reduce problems associated with packaging materials ending up in nature. With a bottle designed to be torn apart after it has been used, the idea is that one can speed up the decomposition process. When you break the packaging and then put it in contact with water, a natural reaction starts to break down the bottle immediately – and that's how we created a bottle with the ability to disappear by itself," the producers say.

New biobased packaging materials are needed, and GoneShells aims to fill that need. The product developers have discussed using the ingredients for their juices and smoothies with Eckes-Granini and Brämhults. With the help of BioInnovation, a partnership between Vinnova, Formas, and the Swedish Energy Agency, development, and prototype design are carried out. ■

POTATO PROCESSING
INTERNATIONAL

2024 Feature Planning

1 JANUARY/FEBRUARY
Ad closing 16.01/Publishing 30.01

Key Exhibitors Road Map and Event Agenda
Processes
- Sorting and Grading, Pre-cleaning, Washing, De-stoning
- Energy and Water Saving

Expert View
- Cutting / Slicing / Dicing
- Drying - Innovation in Belt and Drum Dryers

Spotlight
- Raw Product Handling

Markets
- Eastern Europe

Products
- Freshly Packed Potatoes

Ingredients
- Salt

Storage Special
- Potato Monitoring & Quality Assurance
- Sprout Suppressants in Storage

Trade shows: Fruit Logistica 07-09 Feb 2024

2 MARCH/APRIL
Ad closing 20.02/Publishing 05.03

Key Exhibitors Road Map and Event Agenda
Processes
- Cutting Accuracy and Equipment Reliability
- Process Monitoring

Expert View
- PEF Applications and Advantages
- Sustainability in Production

Spotlight
- Smart Production/IoT/Industry 4.0

Markets
- Western Europe

Products
- Extruded Potato Products

Ingredients
- Better for you/Clean Label

Storage Special
- Automated Climate Control
- Sensors and Data Gathering

Trade shows: Anuga FoodTec 19-22 March 2024

3 MAY/JUNE
Ad closing 22.05/Publishing 05.06

Key Exhibitors Road Map and Event Agenda
Processes
- Blanching, Frying
- PEF Systems

Expert View
- Automation - Ensuring a Reliable and Flexible Production Flow
- Optical Sorting - Increasing Yelds, Reducing Waste

Spotlight
- Food Safety

Markets
- North America

Products
- Chips and Potato-based Snacks

Ingredients
- Frying Oils

Storage Special
- Power Saving and Sustainability
- Disease Management

Trade shows: SnackEx 19-20 Jun 2024

4 JULY/AUGUST
Ad closing 17.07/Publishing 28.07

Processes
- Conveying Systems and Belts
- Seasoning & Coating

Expert View
- Drying Technology Advancements
- IQF Freezing for French Fries

Spotlight
- Supply Chain Management & Logistics

Markets
- South America

Products
- Flakes & Mashed Potatoes

Ingredients
- Seasonings for Chips and Fries

Storage Special
- Storage Challenges and Cost-saving Solutions
- Potato Monitoring & Quality Assurance

Trade shows: World Potato Congress, Adelaide 23-26 June 2024

5 SEPTEMBER/OCTOBER
Ad closing 04.09/Publishing 15.09

Key Exhibitors Road Map and Event Agenda
Processes
- Efficient Freezing Technology
- Starch and By-products Processing

Expert View
- Remote Maintenance and Customer Service
- Complete Lines for Processing
- Conveying And Product Transport

Spotlight
- The Road to Sustainability

Markets
- APAC/ANZAC

Products
- French Fries in Retail and Foodservice

Ingredients
- Batters/Coatings

Storage Special
- Storage Design and Construction
- Handling Potatoes to & from Storage

Trade shows: Interpom 24-26 Nov 2024

6 NOVEMBER/DECEMBER
Ad closing 07.11/Publishing 18.11

KEY SUPPLIERS GUIDE
Processes
- Oil Filtration Systems & De-fattening
- Turnkey Projects
- Waste Management / Upscaling

Expert View
- Batch vs. Continuous Frying
- Cutting vs. Hydrocutting
- Pulsed Electric Field (PEF) Processing

Spotlight
- Increasing Production Capacity/Future-proofing Processing Operation

Markets
- Global Market Predictions for 2025

Products
- Potato Seasoning and Flavor Trends

Ingredients
- Stabilizers/Functional additives

Storage Special
- Store Preparation and Hygiene
- Bulk vs. Boxed Storage

Trade shows: Gulfood Manufacturing, Dubai 5 - 7 November 2024

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