

SUSTAINABILITY REPORT 2021



TFC

BIOMASS BASED CHEMICALS

TransFurans Chemicals BV

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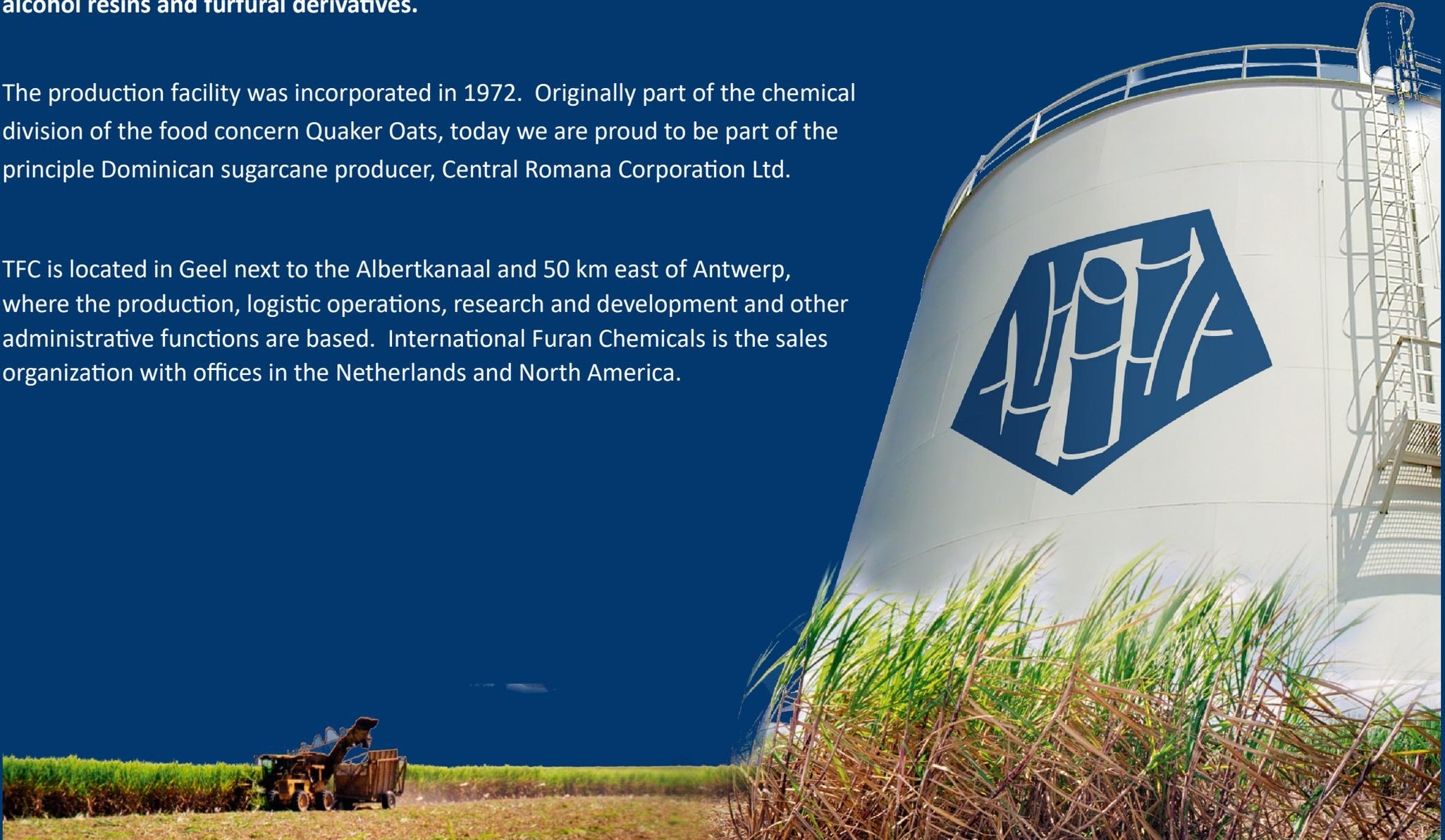


TFC at a Glance

TransFurans Chemicals is a prominent producer of furfuryl alcohol, polyfurfuryl alcohol resins and furfural derivatives.

The production facility was incorporated in 1972. Originally part of the chemical division of the food concern Quaker Oats, today we are proud to be part of the principle Dominican sugarcane producer, Central Romana Corporation Ltd.

TFC is located in Geel next to the Albertkanaal and 50 km east of Antwerp, where the production, logistic operations, research and development and other administrative functions are based. International Furan Chemicals is the sales organization with offices in the Netherlands and North America.



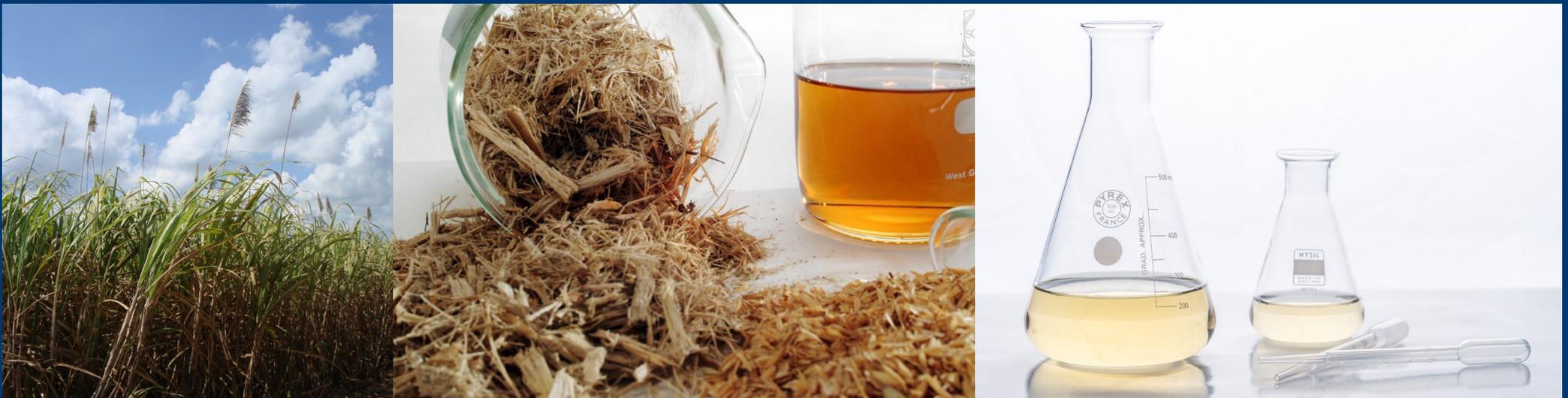
TFC at a Glance



Vertically integrated: We turn agricultural crop waste into bio-based chemicals and polymers.

Sugarcane is where it all starts. It is one of the most energy-efficient and intrinsically sustainable crops on the planet. Sugarcane is a C_4 carbon fixation plant, which means it is equipped with a turbocharged method of photosynthesis.

The plant provides the food products (sugar, molasses) Central Romana Corporation makes, and supplies the water for their processes. The waste from the sugar mill is the plant fiber, i.e. (hemi)cellulose and lignin from which they produce furfural, TFC's raw material. After furfural extraction, the remaining residue is used for the production of the renewable energy (electricity and steam) which powers their operations. At TFC's facility furfural is converted into furfuryl alcohol (FA) by means of a catalytic hydrogenation and is further processed in polyfurfuryl resins and derivatives.



The Future is Green

For 50 years, TFC is a pioneer in chemicals from biomass.

Furfural is the base chemical of today's furan chemistry. It can be produced from virtually any agricultural waste material by acid catalysed digestion of hemicelluloses. This process can be considered as one of the oldest forms of chemical biorefining. Furfuryl alcohol is the main derivative of furfural and is produced by catalytic hydrogenation.

- ◆ 100% of the carbon in furfuryl alcohol is bio-based.
- ◆ A high material efficiency factor of 1.0080 tons furfuryl alcohol per ton furfural input is reached. Side streams are used as a biofuel for energy production in our steam boiler or are recovered by distillation (e.g. 2-methylfuran).
- ◆ The production of furfuryl alcohol requires hydrogen. When taking into account hydrogen made from gas, the bio content of FA is approximately 98%. To reduce CO₂ emissions from grey hydrogen production, so-called blue hydrogen, with CO₂ capture in its production is a first step. Green hydrogen is the ultimate solution.



Applications

TransFurans Chemicals is a prominent producer of furfuryl alcohol, polyfurfuryl alcohol resins and furfural derivatives.

Our products are used in

- Industrial resin applications in foundry, refractory and anti-corrosion industry
- Wood modification and building products
- Polymers for composites in transport and construction
- Raw materials and solvents for production of active pharmaceutical intermediates
- Raw materials to produce ingredients for cosmetics (moisturizers, lotions and creams)

Foundry and renewable energy: Furfuryl alcohol (FA) plays a vital role in the production of furan foundry sand binders which are extensively used to produce high quality sand cores and moulds for big metal casting. Furan foundry binder is a generic term for binders containing FA. Large metal castings play a crucial role in the energy transition (hubs for wind turbines, compressors for green hydrogen ...) to tackle climate change. About 1 ton of FA based binder is used per MW of installed wind power.



Core Purpose & Values

We turn agricultural (crop) waste into bio-based chemicals and polymers for the production of sustainable end-use materials with a high bio-content and a low carbon footprint.

We strive to maintain and strengthen our leading global position in the Furfural, Furfuryl Alcohol and derived chemical markets, by collaborating with our valued partners and implementing innovative technologies resulting in sustainable solutions used across multiple industries.

Our core values help us work as one team and reflect our future ambitions.

We are **RELIABLE**.

Our actions match our words. We deliver on time and in full.

We are **RESPECTFUL**.

Respect for our people, planet and profits are always at the core of our behaviours. We foster honest feedback, open dialogues, mutual respect and loyal relationships.



We are **INNOVATIVE**.

We leverage market insights, customer inputs and our extensive expertise to maintain and grow our competitive advantage through innovation.

We **CARE** about a sustainable future.

We are good stewards of our company, and the environment to the benefit of global society, ensuring prosperity today and for future generations.

Sustainability Development Goals

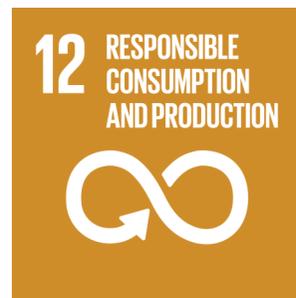
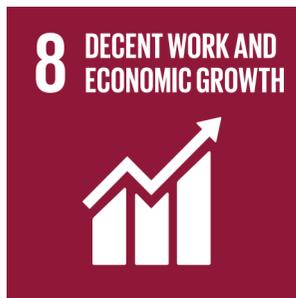
Our shareholder, Central Romana Corporation Ltd (CRC) is the largest private employer in the Dominican Republic. CRC currently employs more than 25,000 people.

CRC operates in accordance with the ProTerra Standard for Social Responsibility and Environmental Sustainability. Use of GMOs or destruction of high conservation value area in agricultural production is not allowed.



Since 2005, our shareholder, Central Romana Corporation is an active contributor to the United Nations Global Compact (UNGC). In 2015, the Sustainable Development Goals (SDGs) were adopted by the United Nations and are a call for action to improve the lives of people while protecting the planet.

TransFurans Chemicals also takes action on SDG's, and thus contributes to solutions for specific global challenges. CO₂ is taken up by sugarcane and the carbon is locked in during the lifetime of the products. By turning agricultural waste into biobased chemicals and polymers that allow customers to produce sustainable materials, we are actively doing our part and make a difference in the global reduction of CO₂ emissions.



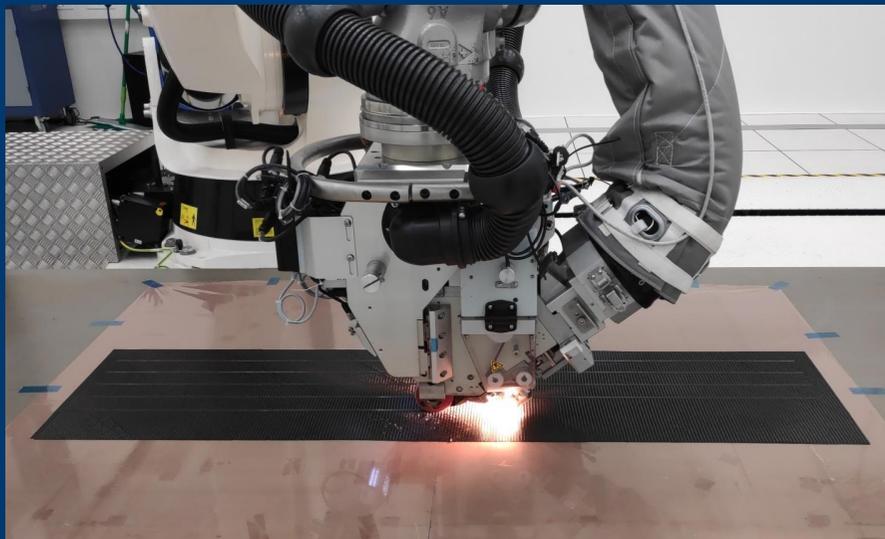
Innovation to a Sustainable Future

The heart of our company: turning agricultural waste into bio-based chemicals for the production of sustainable low carbon products.

The mainstay of the R&D work in 2021 focused on the use of bio based furfural derivatives in sustainable solutions for new and existing markets. With global collaborative efforts, innovative technologies have emerged during the drive for the electrification of vehicles. Not the least of which is the requirement for light weight materials to further enhance the efficiency of vehicles. Other developments are durable modified softwood as an alternative for tropical hardwoods, and a variety of other applications in which biobased chemicals are used as a viable alternative to petrochemicals.

Lightweight products: Fibre reinforced composites provide light weight materials and dramatically improve fuel economy of commercial aircraft. TFC developed biobased polyfurfuryl alcohol (PFA) thermoset matrix resins as replacement for oil based fire retardant epoxy resins. In 2021 our work was integrated in the SuCoHS project where advanced fibre placement manufacturing technology with PFA prepreg was utilized for the demonstration manufacturing of a composite aircraft interior shell. This was a successful project showcasing PFA products meeting the stringent aeronautical specification.

[SuCoHS, sustainable & cost efficient high-performance composite structures demanding temperature and fire resistance \(sucohs-project.eu\)](https://www.sucohs-project.eu)



Innovation to a Sustainable Future

Heavy industry: In our traditional markets, foundry, refractory and anti corrosive have been integrated in our research efforts to provide healthier and more sustainable chemical technology by avoiding the use of solvents and reducing petrochemical ingredients in favour of renewable polymer products.

Wood modification: Furfurylation of fast growing plantation pine wood provides a visual appealing, sustainable alternative to scarce tropical hardwood often used for decking and cladding. To improve its physical characteristics, the untreated wood is protected by locked-in furfuryl alcohol polymers in the wood cell walls. TFC is a key investor in the continued development of this technology.

Bio-solvents: Throughout 2021 TFC has developed lab scale processes for the production of hydrogenated derivatives of furfural. These chemicals will come on the market as bio-sourced replacements of petrochemical solvents for the production of Active Pharmaceutical Intermediates. TFC partnered in a new EU project New Wave to investigate the use of hydroxymethyl furfural for this purpose.

[NewWave Project – Sustainable Biobased products for the construction industry \(newwave-horizon.eu\)](https://www.newwave-horizon.eu)

PFA resins systems: PFA or polyfurfuryl alcohol resin systems are biobased alternatives and technical equivalents to a multitude of petrochemical plastics. Fire resistant materials were developed for automotive, construction and building applications. Furfurylated wood is a sustainable and long-lasting alternative to tropical hardwood.



Furfurylated wood is a sustainable and long-lasting alternative for tropical hardwood



Energy

As a biomass based energy-intensive company, TFC is committed to energy efficiency and global climate protection. TFC has taken steps to reduce its environmental footprint by improving energy efficiency and using renewable resources.

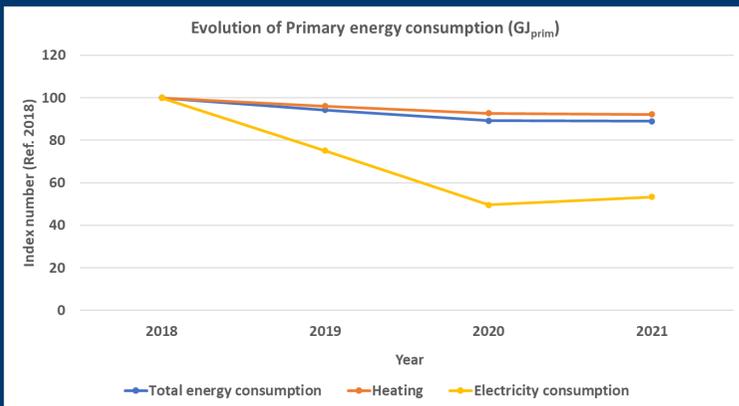
Our renewable chemistry is vertically integrated in sugarcane processing, where renewable energy is being utilized for the production of sugar, molasses and furfural. More than 85% of the total energy consumption (4320 TJp) is being produced from bagasse.

At TFC, the total energy consumed in 2021 was 38.227 MWh (138 TJp).

Since electricity is a significant part in the total energy use, in 2019, a 3.5 MW wind turbine was commissioned at our premises and in 2021 has generated 6731 MWh of wind power. More than 40% of this green electricity was directly injected to the plant, accounting for more than 60% of our electricity needs.

Our thermal processes require steam, which is generated by high efficiency combustion of natural gas. Side streams from our processes are used as a biofuel and efficiently co-combusted in the steam boiler, which reduces our natural gas consumption by 6%.

In 2021 the energy consumption of the total plant was decreased with 11% compared to the reference year 2018.



ENERGY USE	2021
Total energy used	38.227 MWh
Total electricity	5.129 MWh
Renewable electricity	2.985 MWh
Electricity from the grid	2.144 MWh



GHG Emissions

Our operations generate GHG emissions in the following ways.

Scope 1: We need thermal heat for our processes by combustion of natural gas. Side streams from our processes are valorised as bio-fuels in our steam boiler.

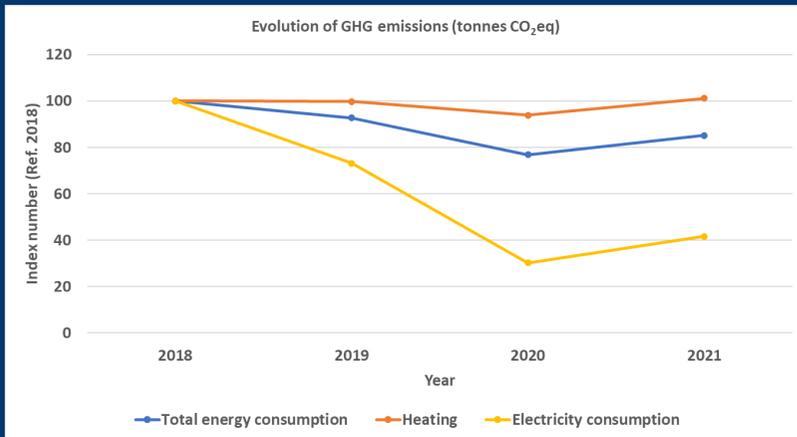
Scope 2: We require electricity to power our manufacturing facilities.

The greenhouse gas emissions at TransFurans Chemicals are mainly CO₂-emissions due to combustion of natural gas.

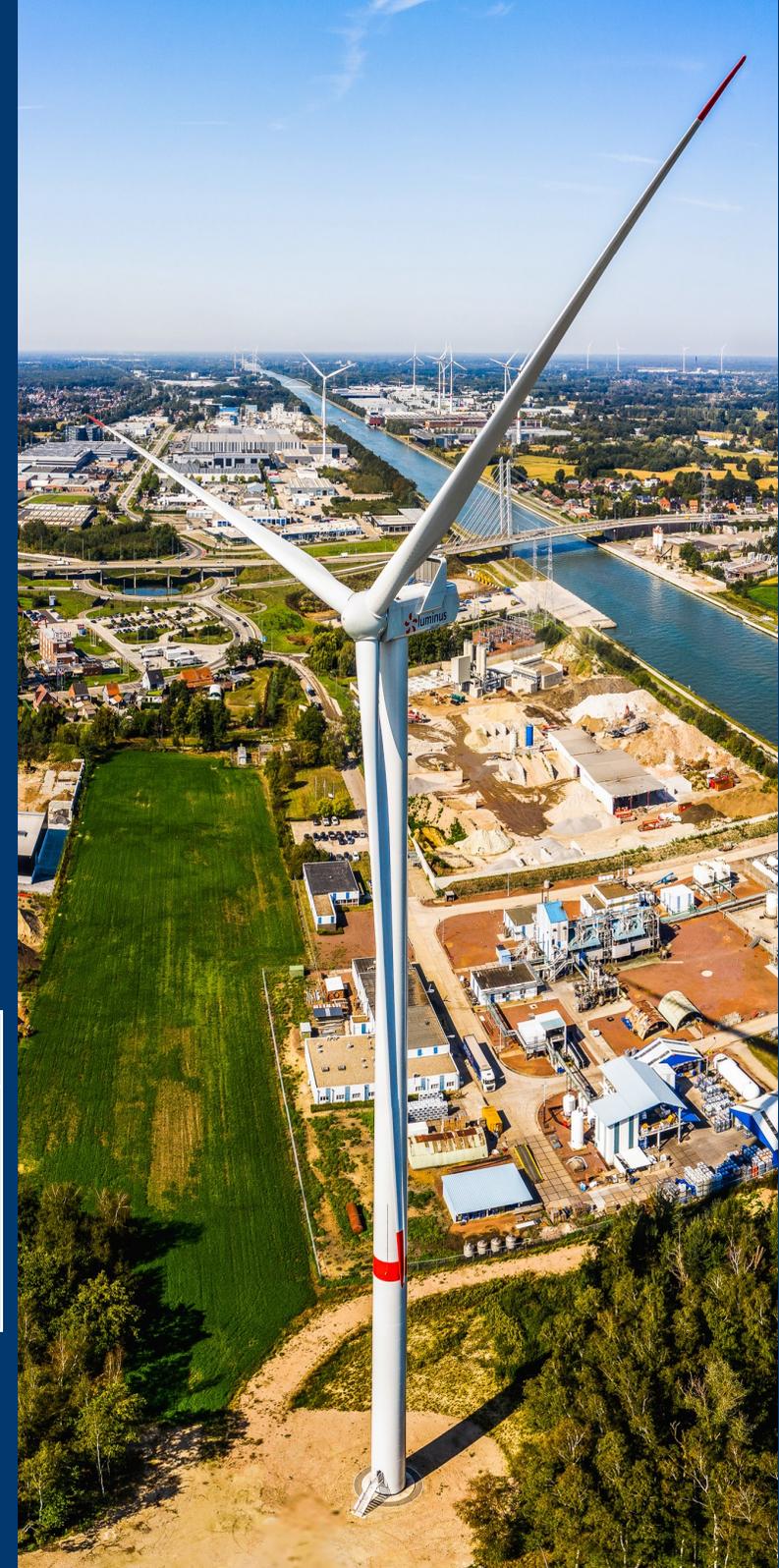
We are further working on our roadmap to decarbonization.

In 2021 60% of our electricity consumption comes from wind power (direct injection). The electricity from the grid comes from nuclear power, solar or natural-gas fired power stations.

By operational excellence and process improvements we continue to increase our efficiency and lower GHG emissions.



GHG EMISSIONS	2021
Scope 1 GHG emissions	5.732 tCO ₂
Scope 2 GHG emissions	857 tCO ₂
GHG emissions intensity (Scope 1 & 2)	0.17 tCO ₂ /t product

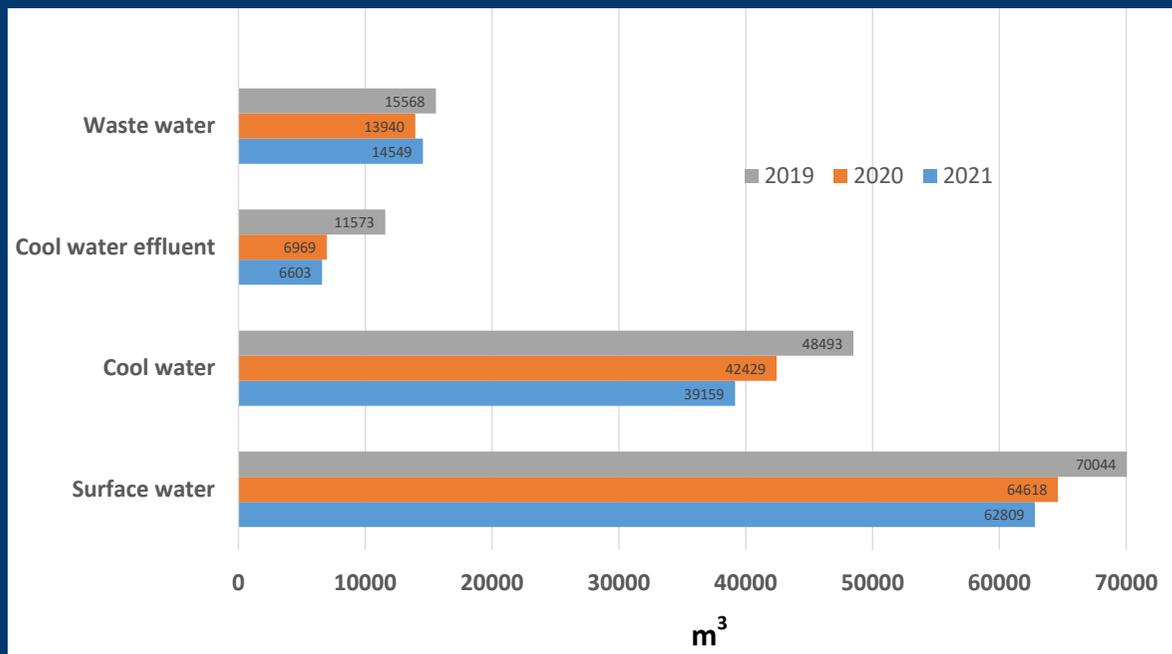


Water, Waste and Air

Surface water is mainly used for cooling and steam generation. The figure below gives an overview of our water consumption of the past 3 years. The main reason for the improvement is the installation of a new water treatment system during 2020.

Hazardous waste is mainly of contaminated water and metal catalyst from TFC's production processes. The metal catalyst is recycled and copper is recovered. Contaminants in waste water are removed by activated coal before release to the local sewer system. Waste water is continuously monitored (TOC, pH, N1, flow) and finally treated through a municipal waste water treatment plant.

Measures are in place to prevent emissions of pollutants and air quality is regularly monitored.



Prevention

Our health, safety and environmental policies are based on the HSE requirements TFC describes in their integrated QHSE Management System. This management system is certified according to the internationally recognized ISO 9001 and ISO 14001 standard and is regularly assessed for effectiveness and efficiency and, if necessary, adjusted. Established rules, procedures, processes, and work instructions must be readily accessible and unambiguous so that all employees can use it as a daily work tool to fulfil their assigned tasks.

Working in a Seveso chemical plant poses obvious risks. Therefore Health, Safety and Environment is a top priority within our daily operations. All our employees get a safety training. In 2021, TFC had no accidents resulting in absence of employees.



Social

TFC culture

With our leading global position, the shared success of TFC as an employer depends on the commitment and skills of each of our 42 employees, and their ability to thrive and live our values of reliability, respect, innovation and sustainability. At TFC, we recognize the importance of creating an environment that supports our people's wellbeing and that ensures they get home safely after work every day.

People at TFC

Due to our global exposure, we have the privilege of operating in a diverse and international environment, across a wide range of sectors. Our employees, customers, partners and other stakeholders have been given empathy and care alike, such that we were able to navigate through the challenges and changes brought by in these uncertain times like the global pandemic.

Diversity, Equality & Inclusion

Our vision is to have a working environment where you can be yourself. TFC therefore aims to be a high-performing team of employees who feel they are part of the company and where every person can use their unique experiences and backgrounds regardless of gender, ethnicity, sexual orientation or any other characteristic. It's TFC's responsibility to create this inclusive environment and respect the dignity and diversity of all people.

Regarding gender equality, we currently have 6 women working at TFC or 14,3 % of the workforce.

Employee health and well-being

As we believe that good health and well-being help to enhance our employee's working experience, protect their safety and inspire an innovative and engaged work culture, we must support our employees there-in. TFC therefore provides a wide range of insurances such as a long-term illness or accident insurance, healthcare and hospitalisation insurance and an invalidity insurance. The medical insurances are also valid and applicable for the partner and children of the employee which only emphasizes the importance of the employee and its family.

Taking into account the importance of the company goals, we strive to act as one team at TFC. The collective bonus is a good example in that respect as it encourages our employees to work together to achieve common goals.

Regarding the global pandemic, covid measures were firm within the company to ensure that we maintained a covid safe and secure working environment.

Talent and professional development

Managers must understand what their individual team members need in order to create the best conditions for learning and personal growth. In this respect TFC acts in a way that we believe achieves our strategic goals with consideration of equal opportunity, development and advancement for all staff from Management through operational and administrative staff.

All our employees are encouraged to develop professionally by following updates and courses, and management trainings are also in place. In 2021 the covid pandemic had a significant impact on our training hours. Training still took place however at a reduced level as many trainings were postponed to a later date.

TFC also facilitates internships such that students have their first working experience. This way they can challenge their theoretical knowledge and put it into practice. Our employees guide these students in their work and we see that young people are clearly engaged to work in a green company that turns agricultural waste into biomass based chemicals and polymers.

Governance

Corporate governance is defined as the processes and control features that have been established to protect the interests of TFC's shareholders and other stakeholders such as employees, suppliers, and customers. TFC's code of conduct provides an important guideline to ensure that company operations are ethical, compliant and appropriately manage risks like conflicts of interest, bribery, or any other corruption,

Through our values of reliability, sustainability, respect and innovation, we aim to maintain and strengthen our global leadership position and we are committed to doing business ethically and with zero tolerance for corruption. Regarding corruption, we didn't have any confirmed case of corruption.

Any knowledge of facts related to violation of ethical principles must be reported immediately in order to protect our people, customers, any other stakeholder and our business. TFC will take every reasonable measures to ensure that we all operate in accordance with ethical and compliance laws and standards.



Sustainability Objectives 2022

- ◆ > 97% of our raw materials will remain bio-based and by preference made from agricultural waste streams
- ◆ Actualize carbon footprint / Life Cycle Analysis of furfuryl alcohol and PFA resins and set CO₂ reduction targets
- ◆ Study future options for blue and green hydrogen
- ◆ Identify the ESG topics that are most material to TFC's business operations and that will impact the success of our business
- ◆ Collaborate with customers to bring products to market that capture CO₂ during their lifetime or increase the biocontent.
- ◆ Workplace mobility plan: offer an (electric) company bike to stimulate commuting from home to work , electrify the fleet of company cars and instal EV charging stations
- ◆ Safety comes first: strive for zero accidents
- ◆ Review our Code of Conduct
- ◆ Execute the measures of the Energy plan 2019-2022 and develop strategies to further increase the use of renewable energy.
- ◆ Assess Corporate Social Responsibility practices
- ◆ Communicate TFC's sustainability goals and progress







Central Romana Corporation, Ltd.

<http://centralromana.com.do/>



<https://www.transfurans.be>



<https://www.furan.com/>

