# PYROI/AVE

## LESS CARBON. BETTER PRODUCTS.

2022 Sustainability Report

**April 2023** 



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### MESSAGE FROM THE CEO

Ten years ago, my business partner Jean-Philippe Laviolette and I were two young researchers with the ambition to tackle a problem that mattered to us – finding ways to extract resources from waste. Shortly after, we made an unexpected discovery that would change the course of our lives in a remarkable way: the use of microwaves in the manufacturing of low-carbon materials to replace traditional fossil fuels' combustion. When applied to plastic waste, microwaves can convert them back into their basic constituents in a high-value form that is identical to their virgin counterparts, these can then be reintegrated into new products. Since then, our path was paved.

By dint of perseverance, we now have a thriving business and a unique technology at commercial scale, the most efficient one for the recycling of polystyrene, a plastic that is traditionally difficult to recycle. In addition, we have set up an innovation centre that continues to develop our technology platform to other types of applications aimed at reducing CO<sub>2</sub> emissions in polluting sectors and we hold an enviable patent portfolio for each of these innovations.

This development comes at a time when the pressure to reduce plastic waste is growing around the world, creating the perfect momentum to offer our solution to manufacturers who wish to accelerate plastics circularity.

Aside from the commercial success set on the horizon, what we are most proud of is to have remained true to our DNA – our values of rigour and positive impact of our innovation, as well as the respect and collaboration that guides our interactions among our employees, with our partners and customers.

If PYROWAVE's model is disruptive, it is because it challenges old paradigms and proposes simple – but not simplistic! – solutions, while responding to the market's real needs.

It is extremely gratifying to see that our initial vision is finally taking off. Today, what I am proudest of is to see that these values now drive the 35 employees who are at the heart of PYROWAVE's success, and that we are contributing to developing the next generation of sustainability professionals.

Our first Sustainability report embeds our vision of commitment to continuous improvement, the same vision that motivates us to constantly innovate.



Jocelyn Doucet, P.Eng., PhD
Co-Founder and Chief Executive Officer



## PYROWAVE'S IDENTITY

#### 2.1 OUR HISTORY

Ten years ago, two recent doctorates in chemical engineering were asked by the plastic industry to find a solution to the end of life of plastics – without knowing this would soon become a worldwide hot topic. Thanks to their academic and professional backgrounds, they sought solutions that would have an impact on the planet. These environmental values always guided their research.

After being asked by the industry for a solution to PS recycling – traditionally hard-to-recycle plastics – the co-founders made the discovery, nearly accidentally, of a potential synergy between chemical and electrical engineering: applying microwaves to chemical processes. This was a considerable scientific breakthrough that led to publications and paved the way to innovation for low-carbon materials. Ten years later, this same technology is in its commercial phase with a major industrial partner while the plastics issue has only amplified and keeping resources in the manufacturing loop is increasingly crucial.

Since this original discovery, PYROWAVE has grown and acquired an office headquarters and a technological development centre. These two researchers stayed loyal to their original values which now drive the brand purpose: working for PYROWAVE means leveraging expertise and creativity to overcome challenges for generations to come. Every member of our team is motivated by the perspective of bringing disruptive solutions to the table and challenging the status quo by questioning old paradigms.

While environmental, social, and governance (ESG) factors are at the core of our brand DNA, this report will help us remain on course towards this mission as we expand. Structuring our activities with integrated sustainability and stakeholder dialogue enables us to maintain our continuous improvement curve during our growth.

Today, we are recycling polystyrene into valuable industry products. Tomorrow, our electrification platform will create more low-carbon materials to support the worldwide shift towards sustainability.



#### 2.2 OUR BRAND'S DNA

PYROWAVE is on a mission to accelerate the world's transition to a restorative low-carbon economy. We believe that, in the future, the backbone of progress will be electric. Our goal is to contribute to such change by equipping industry changemakers with our progressive and sustainable microwave technology. We define our business through six core values: Facts first, Creativity, Respect, Being impactful, Trust, and Result-oriented endeavour. All these elements contribute to our identity and serve us as an everyday reminder to inspire us, unify us, and present ourselves in front of external stakeholders.

WHY **BELIEF** The backbone of progress will be electric. **PURPOSE** Accelerate the world's transition to a restorative low-carbon economy. ROLE We equip industry changemakers with progressive and sustainable microwave technology. HOW **EQUITY** Mastery in microwaves Business model Circular approach Integrity and dependability and chemistry designed for efficiency to systems of a partner **VALUES** Facts first Creativity Respect Being impactful Trust Result-oriented endeavour WHAT

A PLATFORM FOR ADVANCED MICROWAVE TECHNOLOGY

- Facts first: we believe that intellectual honesty and the use of transparent processes are of vital importance for any business.
   We want to ensure the integrity of our actions at all times by always verifying facts, avoid basing our work on assumptions, and
- 2) Creativity: we strongly value curiosity and open-mindedness, and we perceive it as a catalyst for change. For this reason, we want to encourage our employees to have faith in their ideas, open new horizons, and not be afraid of suggesting solutions that require thinking outside of the box.

acknowledging the limits of our conclusions.

- 3) **Respect:** it is of uttermost importance for us to ensure the respect of facts, ideas, nature, people, clients, shareholders, the community, and of our company throughout the entirety of our operations.
- 4) Being impactful: as a growing business in the innovation sector, we want to ensure that our actions matter. We do so by focusing our work on important issues, by not being afraid of tackling big problems, and by facing them with ambition and entrepreneurial spirit.
- 5) **Trust:** we strongly value the trust that the public, our partners, our shareholders, our customers, and our colleagues place in us. We aim to honour this trust by maintaining a high level of integrity and avoid creating unrealistic expectations.
- 6) Result-oriented endeavour: whenever a challenge should arise, we want to face it with a problem-solving approach and focus on the implementation of all necessary efforts to encourage the achievement of the best possible results.

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#### 2.3 OUR BUSINESS OPPORTUNITY

According to the OECD, only 9% of the plastic waste generated is recycled¹. During the past years, the growing awareness of plastics' mismanagement has led to an increasing societal pressure to act. In addition, industries have realized that end-of-life products can become a valuable resource to reduce our dependency on finite fossil feedstocks.

Governments have started enacting regulatory measures to shift from the linearity of plastics' economies. Such measures encompass the inclusion of recycled content in products or packaging, the improvement of collection and sorting infrastructures, and the establishment of recycling targets. In addition, leading brand owners have committed to transition their material supply to more sustainable resources, most of which are expected to come from recycling. The consequence of these actions has been a remarkable growth in the demand for recycled polymers.



With a production of 25 million tonnes per year, polystyrene is one of the most widely used polymers. The main building block of this material is styrene. Other than for the manufacturing of polystyrene in its basic form (PS) and in its variants (EPS, HIPS²), styrene is also used in the making of engineering plastics such ABS, SAN, and SBR. Lightness, malleability, and durability, make plastics produced out of this monomer suitable for countless varieties of applications across the packaging, electrical and electronics, automotive, and construction industries.

Despite the wide use of styrenics, their recycling rates remain low. Challenges are historically found across the value-chain within the design, collection, sorting, and valorization of these polymers. Styrenics are often used in foams, films, trays, automotive parts, or small electrical components, and contain additives that mechanical recycling cannot remove. Polystyrene is also a brittle material which degrades rapidly during mechanical recycling, making it unfeasible to obtain high yields and a virgin quality output. Mechanical recycling technologies are hence unsuited for most PS waste and often oblige recyclers to downcycle the material. This barrier generates a considerable interest in innovative recycling methods that can unlock considerable volumes of waste and pull them back in the supply chain.

Societal pressures to limit the production of virgin plastics, paired with the technical limits of mechanical recycling, have thus converged to offer tremendous opportunities for actors like us who are developing chemical recycling solutions for styrenics. Our technology has the capacity to process impure plastic waste streams and generate virgin quality styrene monomers that are necessary for the production of new goods and packaging. In this sense, our innovative process allows for an upcycling of PS waste, a result that today's mechanical recycling technologies cannot attain. By offering this type of complementary solution, we allow our clients to generate value by tapping into the PS waste reserves that today are destined for downcycling, incineration, or landfilling. The large-scale development of our technology will therefore allow to boost material circularity and actively contribute to the transition towards a low-carbon economy.

#### 2.4 OUR BUSINESS MODEL AND UNIQUE TECHNOLOGY

#### Our compelling business model

Within less than 10 years, we have been strengthening our business model through the creation of an extensive network of stakeholders. The ensemble of these following assets constitutes the input that enables us to generate value:



#### **OUR TECHNOLOGY**

Our low-carbon chemical recycling technology can recycle polystyrene waste while relying on a completely electrified process. This characteristic clearly distinguishes us from our competitors.



### OUR INTELLECTUAL PROPERTY (IP)

We have protected our recycling process through the use of patents to prevent the risk of it being illicitly sold or exploited by third parties.



#### OUR EMPLOYEES

Our skilled team members are in charge of running daily operations. Their work is essential to ensure that all internal activities are carried out in an attentive and efficient manner, and that our business keeps thriving in the long-term. Our R&D team generates innovation and IP.



### SHAREHOLDERS

The investments we receive allow us to keep developing and continue improving our business and our technology.



#### **OUR NETWORK**

We establish our presence within the chemical recycling sector through the collaboration with several partners, universities, institutions, suppliers, and non-profit organizations. Each of these business relationships constitutes a treasured pillar for our company.

## PYROM/AVE



#### **OUR EMPLOYEES**

We set up internal activities aimed at increasing employees' satisfaction and at ensuring their safety in the work environment. We additionally provide training and development programs for our staff members, and we focus on creating a diverse and inclusive workplace.

40% of our workforce have non-Canadian origins.



#### **OUR NETWORK**

We actively contribute to the advancement of the chemical recycling sector through the generation of economic growth, and through the work we conduct with institutions and NGOs to foster the acceptance of these innovative technologies.



#### **OUR COMPANY**

Clients purchasing our technology and deciding to install it at their facilities are the main generators of our revenue streams. Our income derives from the sale of equipment, licences, and process books to operate our technology. These earnings are then reinvested to cover costs, fund business development activities, and benefit our shareholders.



#### **OUR COMMUNITIES**

we generate value for the community we operate in by organizing and participating in social and environmental preservation actions.

- 1. https://www.oecd.org/environment/plastic-pollution-is-growing-relentlessly-as-waste-management-and-recycling-fall-short.ht
- EPS: Expanded Polystyrene, HIPS: High Impact Polystyrene
- 3. ABS: Acrylonitrile Butadiene Styrene, SAN: Styrene-Acrylonitrile, SBR: Styrene-Butadiene Rubber

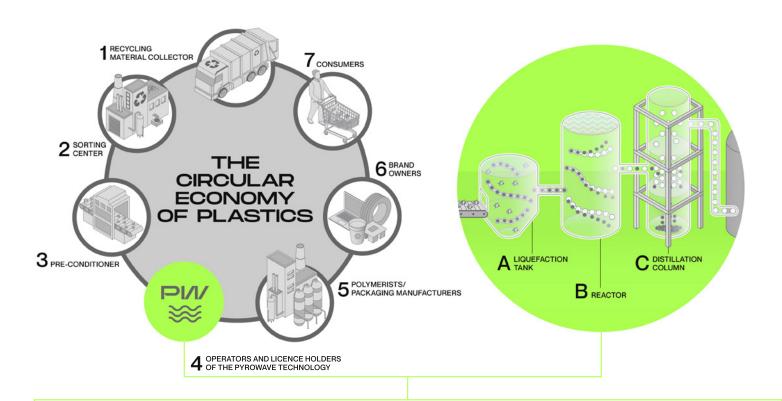
2 PYROWAVE'S IDENTITY

#### A Unique Recycling Process

Since the founding of PYROWAVE in 2014, we have developed three different generations of our technology at our pilot plant. The chemical recycling process that derived from this research enables us to recycle polystyrene while overcoming the limits of mechanical recycling, and while reducing the carbon emissions of virgin styrene production. Nonetheless, our R&D department is constantly at work to continuously improve the efficiency of our recycling solutions and to attempt to further reduce its environmental impact.

In order to maximize yields, waste is first processed to achieve optimal PS purity and to minimize the presence of impurities. After the necessary sorting and pretreatment steps, PS waste is fed into the process. First,

plastics enter a liquefaction tank in which they are melted to remove solid contaminants such as labels and metals. The liquid plastic is then injected into the main microwave reactor, where it is heated at very high temperatures (approximately 350°C). The heat utilized in this phase, which is generated through a fully electrical process, causes polystyrene chains to break and allows styrene monomers to evaporate. By doing so, styrene is separated from remaining contaminants such as dyes or additives. After these steps, plastic vapours are cooled down to produce a styrene monomer-rich oil, which is further purified within a distillation column to reach a virgin-like output purity of 99.8%. The styrene monomers produced can then be sold to polymerists and packaging manufacturers, who can use it to integrate recycled plastics into their products.



- A The plastic waste prepared up stream is melted and liquefied to remove solid contaminants such as labels.
- **B** In the reactor, the microwaves action heats the liquid to a very high temperature. The polystyrene chains are then broken and the styrene monomer is released.
- **C** The liquid monomer is then purified ina distillation column to reach 99.8% purity, identical to the virgin product.

#### 2.5 OUR STRONG AND RECOGNIZED STRUCTURE

#### Recognitions and Awards

We take pride in knowing that our knowhow of the chemical recycling sector and our commitment to sustainable innovation have been recognized through several national and international awards.

Our ambition to develop a disruptive and sustainable technology was first recognized in 2017, only a couple of years after our company was founded. That year, we won first place in the international industrial chemistry competition.

In 2018, we were awarded the Innovation Engineering Prize by the Quebec Order of Engineers. This title recognizes merit from both the perspective of the efforts invested in the project and the results obtained.

Soon later, we were selected by the **Solar Impulse Foundation's World Alliance for Efficient Solutions** as one of the 1000 most promising businesses of the year 2019. This label is traditionally awarded to companies that meet rigorous standards of sustainability and cost effectiveness, which we believe successfully reflects PYROWAVE's pioneering and groundbreaking spirit.

As part of our commitment to develop an environmentally friendly technology, we received the **Novae Award in 2020**, which is attributed by a Canadian media organization that is committed to innovation, sustainability, and social impact.

In 2021, we were named among the 12 winners of the **BloombergNEF** (New Energy Finance) Pioneers Award, a prize that we received for being acknowledged as a fast-growing company with a strong commitment towards decarbonization.



Finally, merely two years following the announcement of our European plant in partnership with MICHELIN, we received the **Rayonnement à l'extérieur du Québec Award**, an achievement that recognized our ten years of hard work to develop PYROWAVE's technology and our ambition to expand on an international level.









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## PYROWAVE'S SUSTAINABILITY APPROACH AND COMMITMENTS

#### 3.1 OUR ACTIVITY IS SUSTAINABILITY

As a technology provider for low carbon materials, sustainability is at the core of our operations. Since the company was founded in 2014, we have been engaging in its development in line with environmental, social, and governmental sustainability principles. This process has led us to the creation of a business model that actively contributes to multiple of the United Nations' Sustainable Development Goals (SDGs), here is how:

We provide a recycling solution that reduces the amount of plastic waste that is dispersed into the environment (both water and soil) and that limits the emissions associated with the extraction of fossil fuels for the production of virgin quality plastics. Through these actions, we contribute to the following targets:



#### **SDG 3:** GOOD HEALTH AND WELLBEING

**3.9** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination.



#### **SDG 13: CLIMATE ACTION**

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.



### LIFE BELOW WATER

- **14.1** By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution.
- 14.3 Minimize and address the impacts of ocean acidification. including through enhanced scientific cooperation at all levels.



#### **SDG** 15: LIFE ON LAND

**15.5** Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species.





to always ensure the safety of our

premises and all along our value chain.

Through these actions, we contribute

abuse and forced labour at our

to the following targets:

We have built an

innovative recycling

solution that helps

prevent the issues

mismanagement of

plastic waste and the

use of fossil fuels. Our

business contributes to

sustainable development

by creating employment

through the deployment

generation and promotes

and economic value

of a technology

that reduces waste

a more efficient use

of natural resources.

we contribute to the

following targets:

Through these actions,

created by the

**5.2** Eliminate all forms of violence these minorities, we have put in place against all women and girls in the strict policies that do not tolerate any public and private spheres, form of violence nor discrimination on including trafficking and sexual the workplace. We additionally want and other types of exploitation. employees, and we wish to prevent

5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life.

**SDG** 5:

against all women and girls

everywhere.

**GENDER EQUALITY** 



#### **SDG 8: DECENT WORK** AND ECONOMIC GROWTH

- 8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.
- 8.8 Protect labour rights and promote safe and secure working environments for all workers. including migrant workers, in particular women migrants, and those in precarious employment.



#### **SDG 8: DECENT WORK** AND ECONOMIC GROWTH

**8.4** Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead.



#### **SDG 12:** RESPONSIBLE CONSUMPTION

- **12.2** By 2030, achieve the sustainable management and efficient use of natural resources.
- **12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse.



#### **SDG 9:** INDUSTRY **INNOVATION** AND INFRASTRUCTURE

- 9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries.
- **9.4** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities.

3 PYROWAVE'S SUSTAINABILITY APPROACH AND COMMITMENTS 3 PYROWAVE'S SUSTAINABILITY APPROACH AND COMMITMENTS

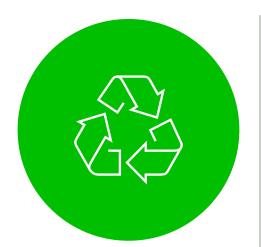
#### 3.2 OUR ANALYSIS OF KEY ESG CHALLENGES

We are aware of the fact that many of the risks and opportunities affecting our business largely depend on the context we operate in. To identify the ESG challenges that are most likely to affect us and our stakeholders, we have worked on the development of our first ESG Materiality matrix. To ensure the respect of confidentiality policies and the impartiality of the results, an independent third party was hired to run the following activities:

- 1) Benchmarking to understand which ESG topics might have been most relevant for our business. This exercise was done by reviewing the sustainability reports of similar companies (mainly other chemical recycling developers and companies operating in the chemical sector) and by reviewing industry standards such as the SASB Chemical Standards. The screening process led to the identification of 18 ESG subjects.
- 2) Submission of an online survey to a group of PYROWAVE's internal stakeholders in which they were asked to rate the ESG topics identified in the previous phase. Responses had to be provided based on the Importance and the Priority<sup>4</sup> that, in their opinion, each of those subjects holds for our business.
- Organization of a series of individual interviews with our internal stakeholders. This step was conducted to consolidate the information collected in the questionnaire and gather complementary qualitative data.
- 4) Analysis of the data collected. Quantitative results were presented in the form of the ESG Materiality matrix presented below.



4. Importance: importance that each internal stakeholder attributes to ESG issues in PYROWAVE's existing business strategy. Priority: priority that each internal stakeholder assigns to ESG issues to identify those that should be addressed to improve PYROWAVE's ESG performance. As shown in the ESG Materiality matrix, 11 subjects stood out for being most relevant to our business model and for our future strategy. These topics have been further analyzed and discussed in sections 3.3, 3.4, and 3.5 of the present report:



### **ENVIRONMENTAL TOPICS**

- · CIRCULAR ECONOMY
- · WASTE
- ENERGY
- CLIMATE CHANGE MITIGATION



### SOCIAL/SOCIETAL **TOPICS**

- TALENTS' ACQUISITION AND DEVELOPMENT
- HEALTH AND SAFETY

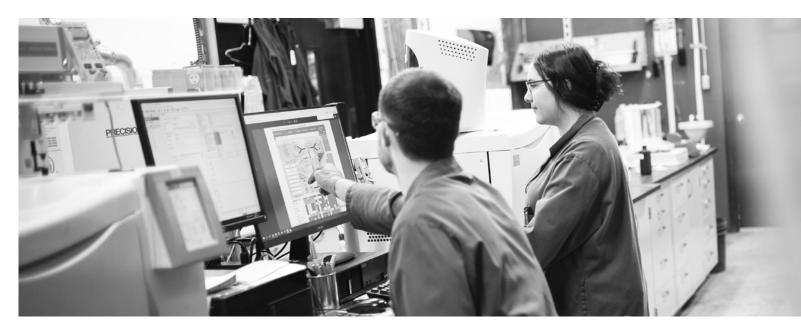
DIVERSITY AND INCLUSION

- **BUSINESS ETHICS** GOVERNANCE
  - - MANAGEMENT OF REGULATORY RISKS

**TOPICS** 

**GOVERNANCE** 

MANAGEMENT OF CYBER-SECURITY



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## /33 OUR ENVIRONMENTAL FOOTPRINT







#### **CASE STUDY:** LEED CERTIFICATION AND WELL HEALTH & SAFETY OF PYROWAVE'S OFFICE

We have decided to locate PYROWAVE's head office in a Leadership in Energy and Environmental Design<sup>5</sup> (LEED) building certified by the Canada Green Building Council.

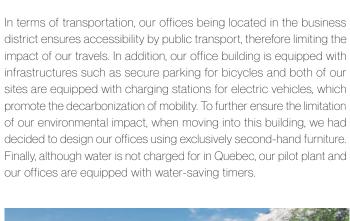
The LEED Certification is a global standard for sustainable construction. which guarantees that a building project has been designed to achieve high performance in carbon emissions' reduction, resource conservation, and lowered operating costs through a focus on sustainable practices. This certification operates based on a scoring system that rewards the adoption of sustainable building strategies. The building in which our offices are located is LEED Gold certified, which is one of the best ranking categories. This performance was assessed based six areas of human and environmental health:.

- Location and transportation
- Green site
- Water conservation

commitment to the well-being of the people working in our building. To receive this certification, we were required to meet at least 15 of the following 20 criteria across the following action areas: Cleaning and sanitation

procedures

- Emergency preparedness programs Stakeholder engagement
- Health service resource
- Air and water quality management
- and communication



Energy efficiency

Materials selection

Indoor environmental quality





From a health and safety perspective, the COVID-19 pandemic

highlighted the critical role of sanitation within indoor environments.

In this context, we wanted to ensure that our offices also met high hygiene

standards. This goal was achieved through the attainment of the WELL

Health-Safety certification<sup>6</sup>. This recognition acknowledges our

#### **Transitioning Towards a Low-Carbon Economy**

Our business model directly contributes to the transition towards a low-carbon economy by giving new life to plastic materials that would otherwise be landfilled, incinerated, or leaked into the environment. To quantify the environmental impact of our recycling solution, we have conducted a life cycle analysis (LCA) based on a scenario of an industrial project in France. This study has proven that our process emits 82% fewer greenhouse gases (GHG) than the production of styrene from virgin fossil-fuel sources. Moreover, the information collected showed that our process consumes 94% less water compared to the production of styrene from fossil fuels. These results were obtained by comparing the impact of producing 1 kg of virgin styrene monomers, versus the production of 1 kg of recycled styrene monomers.

A further analysis of the data showed that environmental gains are mainly due to a significantly lower energy consumption (about -73%), which is related to the technology's high yields and to the use of low-carbon electricity. Our patented technology is equipped with a unique fully electrical process, and does not require the use of a cracker. The fact that our process runs entirely on electricity means that the environmental impact associated with our module's consumption is directly related to the type of energy mix that feeds the technology. For example, in Canada, our electricity is sourced from the supplier Hydro Quebec, whose sources is almost 100% hydroelectric. As a consequence, our consumption needs are almost fully met using renewable resources. Given the strong growth of renewable power in most global regions, this will provide increased opportunities to implement our low-carbon solution all around the world. On top of generating environmental benefits, this feature increases the financial resilience of our system by making it less exposed to the fluctuating prices of fossil fuels.

Moreover, most of the electricity required by our technology is used to power the microwaves that break down plastic's polymer chains. Knowing that this step is the most energy intensive one of the entire processes, we regularly invest in the optimization of its energetic consumption. Our progress is measured through the monitoring of the reduction of the kWh necessary to produce a given quantity of styrene monomers. Since our technology was created, significant improvements were made, such as tailored heating strategies.

#### **Enabling Circularity**

PYROWAVE's entire business model revolves around the concept of circularity. Our pyrolysis microwave technology can transform hard-to-recycle PS waste into virgin-quality styrene monomers. This process has been purposefully optimized for the recycling of post-consumer and post-industrial polystyrene from packaging and construction waste. After recycling, the obtained styrene monomers can be reemployed for high value applications in the packaging, transportation, automotive and construction sectors, allowing for a real upcycling of the material. Thorough testing has already proven that the recycled styrene produced by our equipment is virgin like, that it is compliant with the European REACH standard7, and that it is suitable for food-grade applications.

We have developed a Health and safety program to rigorously assure that our operations at the pilot plant comply with local regulations on recycling and waste disposal. Our depolymerization technology does not use solvents in its process, except for a small amount that is used in R&D projects and as a cleaning agent. Upon saturation, we ensure that the solvents used receive proper treatment by systematically transferring them to a specialized firm.



5. https://www.usgbc.org/leed

6 https://v2.wellcertified.com/en/health-safety/overview

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In the attempt to keep reducing the amount of waste we produce, we are constantly improving our technology to achieve the highest possible yields and minimize the production of co-products. In 2021, most of our co-products were styrene oligomers and were sent to a specialized firm for landfilling. In order to minimize the production of oligomers, we invested \$1,000,000 in a filtration system which will also increase the yields of our pilot operations.

At the plant, we are mindful to reduce any residual material and emissions in compliance with environmental regulations such as LQE8. For example, for solid residual material, most of the by-products are captured using a continuous filtration system embedded within our modules. Depending on their nature, these conglomerates are then suitable to be revalorized across other industries.

For process gas emissions, we recover them and sell them for energy recovery. In June 2022, an audit was conducted by external experts and concluded that emissions were well below provincial standards, as outlined in the LQE. We plan to work on heat recovery methods to save energy in heating our new facility.

## SUSTAINABLE TRAVELS

We ask our employees to minimize travelling whenever possible. Should this be necessary, our Employee's Handbook clearly states that public transports should be preferred. To incentivize our employees to select environmentally friendly transportation means, every year we reimburse part of our staff's public transport expenses. Moreover, we have installed electric charging stations at our pilot plant, which can be used for free by all employees owning an electric/hybrid vehicle. Among other actions, we wish to strictly prevent air transport to favor train travel. This concept will apply to all business trips within a 600 kilometres radius from our offices in North America, and whenever possible in Europe given the extent of rail networks in that region.

At PYROWAVE, we additionally strive to actively contribute to environmental sustainability through the preservation of biodiversity. Though we already provide a solution for polystyrene waste to be recycled, we are also working on mobilizing the value chain to improve the eco-design of PS products and reduce the quantity of materials that are improperly sorted or dispersed in nature. Since 2020, PYROWAVE has been a proud member of the plastics' division of the Chemical Industry Association of Canada (CIAC)9. Within this framework, we have participated in Operation Clean Sweep, which implements control measures to prevent and contain the dumping of granules and plastic waste. For our pilot plant, we have made the decision to move into pre-existing facilities to minimize impacts.

Furthermore, we strive to select equipment that is durable and that will last over time. For this reason, we have chosen a type of machinery which parts are easily repairable and simple to disassemble. Our modules are also made of steel and aluminum, which are both recyclable materials, and which main parts can be refurbished. In the future, we would like to purchase equipment made from recycled materials, proven that it meets the standards of the occupational health and safety (OHS) management system.

#### OUR ENVIRONMENTAL COMMITMENTS

#### CLIMATE CHANGE **MITIGATION**

To ensure transparency and mitigate our environmental impact, update our LCAs regularly and calculate the carbon footprint of our activities, then communicate on it every two years.

#### **CIRCULAR ECONOMY**

Reduce the amount of waste we produce by increasing the efficiency of the styrene process at our pilot plant. By 2025, we will reduce by 30% the total amount of residual materials produced per ton of polystyrene waste treated.



/3.4 OUR SOCIAL FOOTPRINT





#### **CASE STUDY:**

#### SOCIAL CLUB ACTIVITY - RIVERBANK CLEANING

As part of the Social Club's activities, our employees volunteered to clean up the Saint-Charles River in Salaberry-de-Valleyfield, located near our pilot plant. Joining their efforts with those of the Haut-Saint-Laurent ZIP Committee, 17 of PYROWAVE's employees and family members collected nearly 2 tons of waste on the 17th of September 2022. In line with our enterprise's core values, we aim to continue our voluntary commitments in the upcoming years. By providing continuity to our Social Club's activities, we want to keep strengthening bonds among our employees and fostering team building.



#### Endorsing Health and Safety in the Workplace

Aware of the risks that workers are exposed to when operating heavy machinery or when dealing with chemical substances, we are committed to implementing all necessary measures to protect the safety of our staff members. In accordance with the provincial health and safety standards<sup>10</sup>, we monitor the welfare of employees working in the pilot plant each year by carrying out regular health checks and maintaining a detailed tracking system of all injuries taking place at our facilities. Accidents that may occur are reviewed by an internal Health and Safety Committee<sup>11</sup>, which meets once every two months to report on existing risks and to implement necessary corrective measures. This commission has, among other things, established an occupational health and safety policy which aims to protect the health, the safety, and the physical integrity of all employees. The existing policy sets out the general safety rules in force and the related safe working plan like equipement lockout procedures and hot work procedures. It also sets out the procedures to be followed in the event of an accident, including the accident reporting procedure and the accident investigation procedure. Thanks to the prevention work done by members, no "serious" accidents were reported at our facilities within the last three years.

Though the Committee is responsible for spotting potentially dangerous situations and for developing appropriate preventive actions, we remain aware of the fact that employees are the ones who are most likely to spot potentially unsafe working conditions. For this reason, we maintain an open dialogue with staff members by strongly encouraging

them to share their recommendations, suggestions, and criticisms on safety issues with their direct supervisors and/or the employee representative at the Health and Safety Committee. Furthermore, we recognize that employees' engagement is key to ensure a prompt reaction shall an accident occur on the workplace. This year, 2 employees received this first aid training, which represents 6 employees, 3 in our office and 3 in the pilot plant.

While we try our best to guarantee a prompt reaction in case of emergency, we believe that prevention is the real key to safeguarding employees' health and safety. To this end, we have created a Health and Safety welcome procedure that all employees must follow when joining the company. Prior to beginning their work at the pilot plant, all staff members are required to follow training and receive a certification on how to handle potential risks like fire and spill training. Additionally, every employee working at the Technology Development Centre must have completed SIMDUT training<sup>12</sup>, which aims to protect the health and safety of workers by promoting access to information about hazardous products used in the workplace.

https://eur-lex.europa.eu/Lext.triServ/Lext.triServ.do?uri=0.11 -2007-136-0003-0280-fr-PDF https://www.environnement.gouv.gc.ca/lge/autorisations/index.

9. Chemistry Industry Association of Canada (canadianchemistry.ca)

<sup>11.</sup> This action is aligned with the Quebec Act to Modernize the occupational health and safety regime (Bill 59).

<sup>12.</sup> This action is in accordance with the Workplace Hazardous Materials Information System (WHMIS - https://www.ccohs.ca/oshanswers/chemicals/whmis.ghs/general.html)





#### Corporate Values and Team Spirit

By joining PYROWAVE, partners and team members embrace a culture of innovation that is built on strong principles of creativity, respect, impact, trust, and strive for success. In April 2022, an internal survey showed that 100% employees are satisfied with the idea of working for the company, the main reasons being that people enjoy their work, feel like they are having a positive impact on the planet, and believe their values are aligned with those of the company they work for.

At PYROWAVE, we believe that our employees are our strongest asset. For this reason, we highly value the importance of creating a positive working environment which they can thrive in. Each year, we allocate budget to an internal Social Club, which is run by employees and that is responsible for the organization of several social events. Internal surveys are regularly conducted to measure employees' satisfaction with the events taking place and to collect their suggestions for new types of activities that could be organized in the future. This process led, for example, to the creation of a football team within the company for the 2023 season. Overall, activities vary over time and may include lunches, social, and cultural experiences.



Other than social inclusion, we believe that the wellbeing of our staff members also depends on ensuring the existence of an ethical work-life balance. Whenever feasible, we grant our employees the opportunity to have flexible working hours and to work remotely. On top of improving our staff members' quality of life, we believe that this progressive model is a better fit within a context of globally changing working habits.

#### **Acquiring New Talents and Supporting Professional Growth**

The ability to attract and retain qualified talents is a prerequisite for PYROWAVE to grow and to keep fostering a culture of continuous innovation.

In Quebec, recruiting talent with a specific skill set can be difficult due to the limited supply of labour in the region. To address this challenge, we have partnered with academic institutions such as École Polytechnique. where we are conducting experimental tests and developing models that will be tested in an industrial environment using our technology. This collaboration was made possible with \$173,000 in funding that we received from the Natural Sciences and Engineering Research Council of Canada. In parallel, we work with external recruitment firms which can help us reach out to a greater pool of candidates.

Our strategy for talents' attraction and retention is further strengthened by the multitude of benefits that the company has to offer. Indeed, we offer all our employees' access to an extensive insurance package covering essential care, medication insurance as well as extended health benefits.

At the end of 2022, we had 35 employees, 94% of whom were on permanent contracts, with a turnover rate of approximately 6.7%. Although Quebec's Bill 90 stipulates that one percent of the wage bill must be spent on training, we have decided to go beyond this target. All of our employees are offered training that is relevant to their career development, and during the reporting period 46% of our staff members received at least one training session. In addition, all of the pilot plant employees receive health and safety training, and cybersecurity training is mandatory for all employees.

#### Advocating for Diversity, Equality, and Non-discrimination

The establishment of a diverse and inclusive professional environment is a key enabler for progress and innovation in PYROWAVE corporate culture. The variety of backgrounds in our organization plays an integral part in upholding three of our core values:

Creativity: Diverse backgrounds bring diverse point of views to the table. Thanks to our team's diverse backgrounds, we are able to foster paradigms shifts that are needed for a sustainable tomorrow.

Respect: Understanding different cultures and perspectives promotes respect between employees and towards stakeholders. This being said, Pyrowave has a strict zero-tolerance policy towards discrimination and harrassment based on gender, ethnicity, race, age, or religion.

**Trust:** By encouraging the expression of a variety of perspectives through our value of creativity, this fosters open dialogue and transparency in our organization. By acknowledging our different strengths and weaknesses, we are able to trust each other and ask for help when we need it.

We strongly value and seek for creating diversity and we strive for it both in terms of nationality and gender equality. In 2022, 40% of our employees had non-Canadian origins and accounted for a total of 9 nationalities. Nearly 75% of our employees were under 48 years of age.

Although female employees are minorities in the chemical industry, we continually strive to improve the gender diversity of our team. During the fiscal year 2022, women accounted for 26% of our total workforce. Additionally, 29% of our management positions were held by women, who also represented 14% of Board of Directors. Gender diversity is not our only priority, we also want to be able to welcome people with disabilities among our team members. The entrance to our head offices are equipped with ramps, lifts, and indoor parking spaces tailored for people with reduced mobility.





As an employer, we take seriously our role of protecting the dignity, physical and psychological integrity of all our staff members. That is why we have established a firm zero-tolerance policy towards any form of discrimination or harassment in the workplace. These principles are presented within the Employees' Handbook, which specifically encourages staff members to report any form of discriminatory act to management and which clarifies that all misconducts in this regard will result in serious sanctions against the perpetrator.

#### **OUR SOCIAL COMMITMENTS**

TALENTS' ACQUISITION AND DIVERSITY / INCLUSION

To attract young talents and incentivise gender diversity, implement an Interest For Science Program 2025 through collaboration with local universities (e.g. program, plant tours, welcome PhD students, teaching), once our new pilot plant is in operation.

TALENTS' RETENTION To foster employees' development, conduct semestrial evaluations and set up an Individual Career Action Plan by end 2023 (including training plans).

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### 3.5 OUR GOVERNANCE FOOTPRINT





#### Supporting the Work of Regulatory Institutions

We believe that the transition to a circular value chain for plastics can only be achieved if all industry's stakeholders are fully mobilized. As a member of this sector, we want to make sure that our company is contributing to accelerating that shift. For this reason, we continuously engage in dialogue and respond to growing expectations from stakeholders. To this effect, this fiscal year we have organized approximately 30 meetings with various representatives of trade associations of the recycling, packaging, and industrial sectors in Europe and in Canada as well as NGOs, research institutions and government representatives.

In 2022, we became an active member of Chemical Recycling Europe (CRE)<sup>13</sup>, an association representing the chemical recycling industry at the European level. Through this collaboration, we aim to share our expertise on recycling policy and contribute to the recognition of chemical recycling. Indeed, we want to increase EU institutions' support towards the adoption of chemical recycling technologies.

We also met with NGOs on 4 occasions to discuss critical aspects of chemical recycling this year. Considering their expectations, we have supported efforts to provide transparency on the integration of recycled content in new products as well as prioritizing its traceability in the Chain of Custody for recycled content standards. In this regard, we actively contribute to discussions with different stakeholders by providing reliable data on the performance of our patented technology. Communicating on our life cycle assessment (LCA) results is a good example of how we want to demonstrate the transparency of our process while presenting our technology in an accessible way. Indeed, we believe that making chemical recycling issues more understandable to a wide audience opens dialogue and develops a common vision of plastics circularity.

At the same time, we support **Canadian institutions** in developing regulations in line with those in place in the European Union. We are in fact convinced that legislations on waste and chemical recycling are necessary to foster the economic viability of recycling solutions and to accelerate the shift to lowcarbon plastics. For this reason, we regularly share our expertise in committees involved in the development of norms and standards for the emerging chemical recycling industry. We have additionally taken part in standards' working groups and we have been involved with the Bureau of normalization du Québec.

#### **Ensuring Protection of Our Technology**

Aware that cyber-attacks represent a potential threat to any company, we have been investing in the **safeguard of our data** and in the implementation of measures meant to prevent security breaches. At the same time, we have ensured the protection of our intellectual property by filing over 36 patents<sup>14</sup> for the technology that we have developed. While we are proud to announce that no incidents have so far occurred at our facilities. we wish to continuously strengthen our security systems and keep defending ourselves against potential attacks.

Measures that are already in place include tools to securely exchange confidential documents and work remotely, procedures to flag and report phishing, and monthly scanning of employees' computers. We additionally require all staff members to attend specialized cybersecurity training at least three times a year so that they can help us spot and prevent IT risks. .

We firmly believe that ethics are the basis on which all business relationships should be built. For the time being, we only work with a limited number of suppliers based across Canada, Germany, Austria, Italy, Japan, France, and the United States. Yet, as our business grows, we might enter in agreements with more international suppliers. In that case, we will want to keep guaranteeing that all our operations will remain ethical.

Composed of experienced international profiles, our Board of Directors meets 6 times a year. Its members include 1 founder, 3 directors representing our financial partners (Sofinnova, MICHELIN and one independent investor), and 3 independent executives who represent half of the members and help us implement a pluralist governance. The board meetings also include 2 executives as observers from Ecofuel and Fond de Solidarité FTQ. These independent directors represent a real added value to our governance thanks to their international experience and their expertise in the industrialization and export of technologies. Prior to each Board meeting, the representatives of the management team reiterate their engagement to a series of undertakings, including the adherence of the general principles of the United Nations Global Compact, and compliance with local environmental and labour laws. Within the board, there are 2 committees, each governed by a charter and who meet twice a year:



AUDIT AND RISKS COMMITTEE

REVIEWS OF FINANCIAL STATEMENTS

**CYBERSECURITY** 

RISKS

COMPENSATION

COMMITTEE

ANNUAL REVIEW OF EXECUTIVE COMPENSATION

**EMPLOYEE** STOCK OPTION PLAN (ESOP) **MANAGEMENT** 

13. PYROWAVE becomes a member of Chemical Recycling Europe - News - Blog - PYROWAVE

14. Number valid for August 31, 2022. At the time of writing, 40 patents had been filed.



In parallel, our management team meets once a week to review PYROWAVE's business strategy and to make key operational decisions. At PYROWAVE, we support internal management and good governance through a range of internal resources. Ancillary tools we have developed include: a **Code of Ethics integrated in our employee handbook**, a formal organizational chart outlining the management and reporting structures, written job descriptions for all employees outlining responsibilities and decision-making authorities. Aware that internal communication is key in the governance process, we also wish to implement supporting tools on this manner. To do so, we hold a CEO-led, company-wide strategy which meets every year in January to share the progress of all departments. Additionally, 4 internal seminars were organized, giving employees the possibility to share information on their projects with other staff members.

### CASE STUDY: PRESENTATION OF ONE OF OUR BOARD MEMBERS

#### Marie Pierre Donati

Engineering and Impact Investment Director at the Fonds de solidarité FTQ Board Observer

"ONE OF THE MISSIONS OF THE FONDS DE SOLIDARITÉ FTQ IS TO PROMOTE THE DECARBONIZATION OF INDUSTRIES. PYROWAVE HAS A GREAT EXPERTISE IN CLEAN TECHNOLOGIES."



#### OUR GOVERNANCE COMMITMENTS By end of 2023, set up a Sustainability ESG Committee with a board member, GOVERNANCE which will be in charge of reporting and monitoring ESG commitments. By end of 2023, strengthen our stakeholders' engagement strategy through: An active and transparent dialogue with external STAKEHOLDERS' stakeholders. The reporting of **ENGAGEMENT** stakeholders' engagement activities in the sustainability report. From 2023, organize biannual ESG roadshows following the publication of our sustainability report

## 4 ANNEX: KPI table for the Fiscal Year 2022

|                                       | MATERIAL ISSUES   | INDICATORS AND RESULTS  |
|---------------------------------------|---|---|
| ENVIRONMENTAL<br>INDICATORS<br>FY2022 | Transitioning towards a low-carbon economy <sup>15</sup>    | <ul> <li>Reduction of GHG emissions compared to the production of virgin styrene: -82%</li> <li>Reduction of water consumption compared to the production of virgin styrene: -94%</li> <li>Reduction of energy consumption compared to the production of virgin styrene: -73%</li> <li>Quebec energy mix: almost 100% hydroelectric</li> </ul>  |
|                                       | Endorsing health and safety on the workplace                | <ul> <li>Number of severe workplace injuries within the last three years: 0</li> <li>Number of employees trained on first aid: 6 (2 of which trained during FY2022).</li> </ul>   |
| SOCIAL<br>INDICATORS<br>FY2022        | Acquiring new talents<br>and supporting professional growth | <ul> <li>Partnerships with local universities: École Polytechnique</li> <li>Number of employees at the end of FY2022: 35 (6 of which recruited during FY2022).</li> <li>Rate of permanent employment: 94%</li> <li>Turnover rate: 6.7%</li> <li>Number of employees who received at least one training session: 46%</li> </ul>  |
|                                       | Advocating for diversity, equality, and non-discrimination  | <ul> <li>Diversity of nationalities in the workforce: 40%</li> <li>Nationalities represented in the workforce: 9</li> <li>Rate of women in the labour force: 26%</li> <li>Rate of women in management positions: 29%</li> <li>Rate of women in the board of directors: 14%</li> </ul>   |
|                                       | Supporting the work of regulatory institutions              | Number of meetings organized with external stakeholders (associations, industrial sector): approximately 30     Number of meetings organized with NGOs: 4   |
| COVEDNAMOE                            | Ensuring the cyber-protection of our data                   | <ul> <li>Number of Cybersecurity incidents: 0</li> <li>Number of patents filed: 36 (9 of which filled in FY2022)</li> <li>Recurrence of cyber security training for all employees: at least 3 times a year</li> </ul>   |
| GOVERNANCE<br>INDICATORS<br>FY2022    | Building strong governance to ensure prosperity             | <ul> <li>Number of board meetings per year: 6</li> <li>Percentage of independent directors on the Board of Directors: 43%</li> <li>Recurrence of management team meetings: Once a week</li> <li>Frequency of meetings to share with all employees the company's strategy and the progress of all departments: once a year</li> <li>Number of internal seminars organised to allow employees to share information on their projects with other staff members: 4</li> </ul> |

<sup>15.</sup> The KPIs indicated in this section were calculated through a Life-cycle analysis (LCA).

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