



# PYROWAVE

With the Pyrowave technology,  
we go further.

Interview between Virginie Bussi eres, Vice-President Communications,  
Marketing and Government relations at Pyrowave and Professor  
Jamal Chaouki, in the midst of his recent recognition of being part  
of the “ 50 scientists from Polytechnique Montr al among the top 2%  
most cited in their field of research ”

Discover the vision on future low carbon chemical processes of Mr. Jamal Chaouki, P.Eng., M.Sc. A., Ph.D., Full Professor in the Department of Chemical Engineering at Polytechnique Montréal and one of Pyrowave's co-founders. Dr. Chaouki is a world-renowned researcher, chiefly for his work and discoveries in the development and optimization of high-temperature and high-pressure processes, and is one of the 50 scientists who have made it into the top 2% most cited in their field of research.



**V.B.: You have already mentioned in an article “that with the Pyrowave technology, we go further: from waste, we generate raw materials. This heralds the beginning of a new industrial revolution, as we will soon be forced to extract raw materials from products at the end of their lifecycle.” Can you tell us more about this FOURTH Industrial Revolution that you foresee?**

**J.C. :** There have been four industrial revolutions since the 18<sup>th</sup> century: the emergence of steam and hydropower for mechanized production, electricity for mass production, electronics and computers for automation, and the 4<sup>th</sup> revolution, contrary to popular belief, is not limited to Artificial Intelligence (AI) and the Internet revolution (Industry 4.0, connected objects...): it concerns renewable energies, the use of garbage as raw materials and the reduction of greenhouse gases. It is the first time in the history of mankind that we can generate clean low-cost electricity. In Quebec, for example, we are already talking about generating electricity from wind power at \$0.04 per kWh. For example, the electrification of chemical processes is part of the energy transition to reduce the carbon footprint of various industries worldwide. As the economy moves away from traditional

fossil fuels, the generated renewable energy is primarily electrical. Therefore, there is a need for the chemical industry, which is traditionally a large consumer of fossil fuels, to adapt its processes to the use of green electricity. For the Province of Quebec, hydroelectricity could open up new opportunities: green chemistry and the application of a circular economy.

**V.B.: How do you think Pyrowave can make a real contribution to this Fourth Industrial Revolution?**

**J.C.:** Pyrowave is a pioneering company. The founders are primarily interested in having a real environmental impact, in saving, albeit on a small scale, our planet. But every small step counts. Its technology is unique in the world. And it has a threefold innovative pathway: it efficiently recycles plastics by closing the consumption loop, it uses renewable electricity in the form of microwaves in its process, and it significantly minimizes greenhouse gases.

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*Jamal Chaouki, P.Eng., M.Sc. A., Ph.D.*





**V.B.:** How did you become interested in the potential for electricity to be applied more broadly to industrial processes?

**J.C. :** When greenhouse gas emissions are already present, there is currently no effective and efficient technology to separate, store or react CO<sub>2</sub>, for example. Current technologies are far too energy-intensive and have catastrophic environmental impacts. Therefore, by the time CO<sub>2</sub> is formed, it is already too late. As a consequence, action must be taken BEFORE it is formed. The vast majority of emitted CO<sub>2</sub> comes from the production of energy from fossil fuels. How can this energy be replaced?



I was first interested in the use of electricity in processes when I tried to answer this fundamental question. It then accelerated with the real potential of generating clean low-cost electricity. For the young (and even the not-so-young!), we are living in very exciting times, open to green innovations: how can we reduce greenhouse gas emissions at source by using electricity? We knew that process engineering needed the basic sciences (math, physics, chemistry and biology), and it is now urgent to understand the whole field of electrical engineering and to associate it with the development of new processes. It is a new interface where everything remains to be discovered.

**V.B.:** What are the values that motivate you?

**J.C. :** In a nutshell, human values. Because of my personal background, I have a deep esteem for human beings. I have seen poverty. I have seen environmental desolation. I have seen enough. Now, it is high time to act to enable the poor to live decently, in a healthy environment and an equitable economy, while respecting mother nature and being sensitive to others.

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