

CO-DEVELOPMENT OF INDUSTRIAL-QUALITY POST-CONSUMER RECYCLED PLASTIC: the example of Groupe SEB and Veolia

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The introduction of quality recycled plastics from closed loop post-consumer waste is an important issue for manufacturers in their efforts to roll out circular economy strategies. But the lack of pre-existing recycling capabilities means that tackling it requires a co-development approach that presents unexpected difficulties and potential. The project discussed in this interview centers on a pioneering partnership between Groupe SEB and Veolia to develop post-consumer recycled polypropylene for use in electrical and electronic appliances. The project proved highly beneficial for both partners. For Groupe SEB, it was a way of highlighting the potential for incorporating post-consumer recycled plastics, which now encompass various product families, types of plastics and geographical regions. For Veolia, it was the first stage in the development of a recycling process that is now applied worldwide across a range of different sectors.



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With a degree in mechanics and production from T121 Caen, Jacques Tanquerel is Plastics Procurement Category Leader at Groupe SEB. He co-ran a pilot project looking into using recycled plastics as part of the sustainability and procurement strategy.

Ingrid Tams is a materials engineer who studied at INSA in Lyon. From 2012 to 2015, she jointly ran the first project to introduce closed loop recycled plastic into household appliances. Since then, her activities have broadened to cover all aspects of eco-design.

François Guéneron studied engineering at ISPA and has worked in the recycling industry for the past 10 years, joining Veolia in 2016.

Françoise Weber is an engineer with an MBA from Darden University in Virginia, USA. She is currently Head of Extended Producer Responsibility Schemes at Veolia.

Can you tell us about the initial issues surrounding this co-development project?

Ingrid Tams and Jacques Tanquerel (Groupe SEB): We've been looking at product recyclability since 2000 as part of our eco-design efforts. In 2010 senior management at Groupe SEB asked us to switch focus onto recycled plastic, which emits up to three times less CO₂ than virgin plastic. In concrete terms, as early as 2011 laundry care marketing teams were telling us they saw real advantages in incorporating recycled plastic into our products. We initially decided to work on recycled polypropylene since it is the most commonly found material in our products. In 2012, the project to develop use of recycled materials was identified as one of the four key issues facing Groupe SEB in its sustainability approach. This approach was part of a long-term strategic vision that we strongly felt was fully aligned with client and consumer demand, but that also had the potential to reduce supply costs by using recycled materials.

For the first three years, we didn't know if we'd succeed. There were new skills that both sides needed to acquire

Françoise Weber and François Guéron (Veolia): Working at our waste electrical and electronic equipment (WEEE) processing site at Angers, we set up a plastics waste sorting unit to eliminate brominated flame retardants. As soon as we succeeded in obtaining decent quality resin, we wanted to produce a plastic mixture and develop high-added-value applications in a closed loop. At the time, Veolia was keen to expand its plastics recycling activity but we needed to scale up. We knew how to sort, but we didn't have the capacity to produce recycled plastic from post-consumer plastics.

Why did you choose to work together?

IT and JT (Groupe SEB): Precisely because Groupe SEB has the manufacturing know-how needed to co-develop and then use this recycled plastic. We are founding members of an eco-body called Ecosystem, and at the time it was running a tender for recycling plastics from WEEE. Veolia offered advanced skills in sorting plastics using infrared sorting techniques. We did sound out other recyclers, but our discussions with Veolia were the most productive. They were actively engaged and listened closely to us, but were also prepared to sign up for a process that would inevitably be long and difficult. And we knew that working with Veolia meant we would be able to use post-consumer plastic from WEEE. This aligned with our determination to use material recycled from our own products, in a closed loop. With over 360 million of our products sold each year around the world, it's a responsibility we have to assume.

FW and FG (Veolia): We have a longstanding relationship with Groupe SEB via Ecosystem, which is our primary partner in France for WEEE collection and processing.

SEB had a proactive attitude to the issue and Ecosystem pointed them in our direction. From the start of the project we already knew a lot about the process of sorting plastics to separate out brominated flame retardants using our infrared sorting technology and we could sort resin by type (polypropylene, ABS, etc.). Veolia is well known as a serious player and that worked in our favor. But we were missing the final stages of the value chain we needed to meet their requirements. At the time, we didn't have all the stages in the plastics recycling value chain in place. So we reached out to a French specialist in compounding recycled materials. Today, Veolia has in-house recycling capacity thanks to its acquisition of four recycling plants in France. We teamed up with PMG, which specializes in preparing recycled plastics.

What commitments did the two parties make to each other?

IT and JT (Groupe SEB): We undertook to develop recycled material for our laundry care products, where the constraints were pretty reasonable. We wanted a black material that met our exact specifications and was available in the volumes we required. For the first three years, we didn't know if we'd succeed. There were new skills that both sides needed to acquire.

FW and FG (Veolia): It was a long learning curve for us. We had to acquire new skills: setting up a quality control process, applying REACH classifications, and building a process for characterizing the material. We also had to guarantee the stability of the material supplied. In the beginning this was not a commercial project. The management team gave us the freedom to explore. We really wanted to successfully develop a commercial activity in a closed loop in collaboration with Ecosystem, and to show that we could embed a project of this type into our long-term operational processes.

What were project's key stages?

IT and JT (Groupe SEB): It began with a visit to the WEEE sorting site at Angers to assess Veolia's ability to develop a product that would meet our requirements. We then set up a project team at Groupe SEB comprising experts from various departments: marketing, environment, procurement, the plastics design office, site procurement and materials innovation. The second stage was to develop the first samples that matched the specifications and carry out testing to look at mechanical and thermal resistance and regulatory compliance (RoHS and REACH). We hit various unexpected problems during the project. Tests using presses, for example, showed up problems with offensive odors that troubled the operators. It took

a year to sort it out. The solution included investing in smoke extraction systems for the presses. Once that obstacle was dealt with, the third stage was very much like a conventional development process: prototyping, mold tests, laboratory tests, quality tests, etc. Only then did we settle on prices and shipment frequencies. Overall the project took three years, from initial discussions to characterizing the final material. Production was officially launched in July 2015 and the first products to include recycled material were on the market in September the same year.

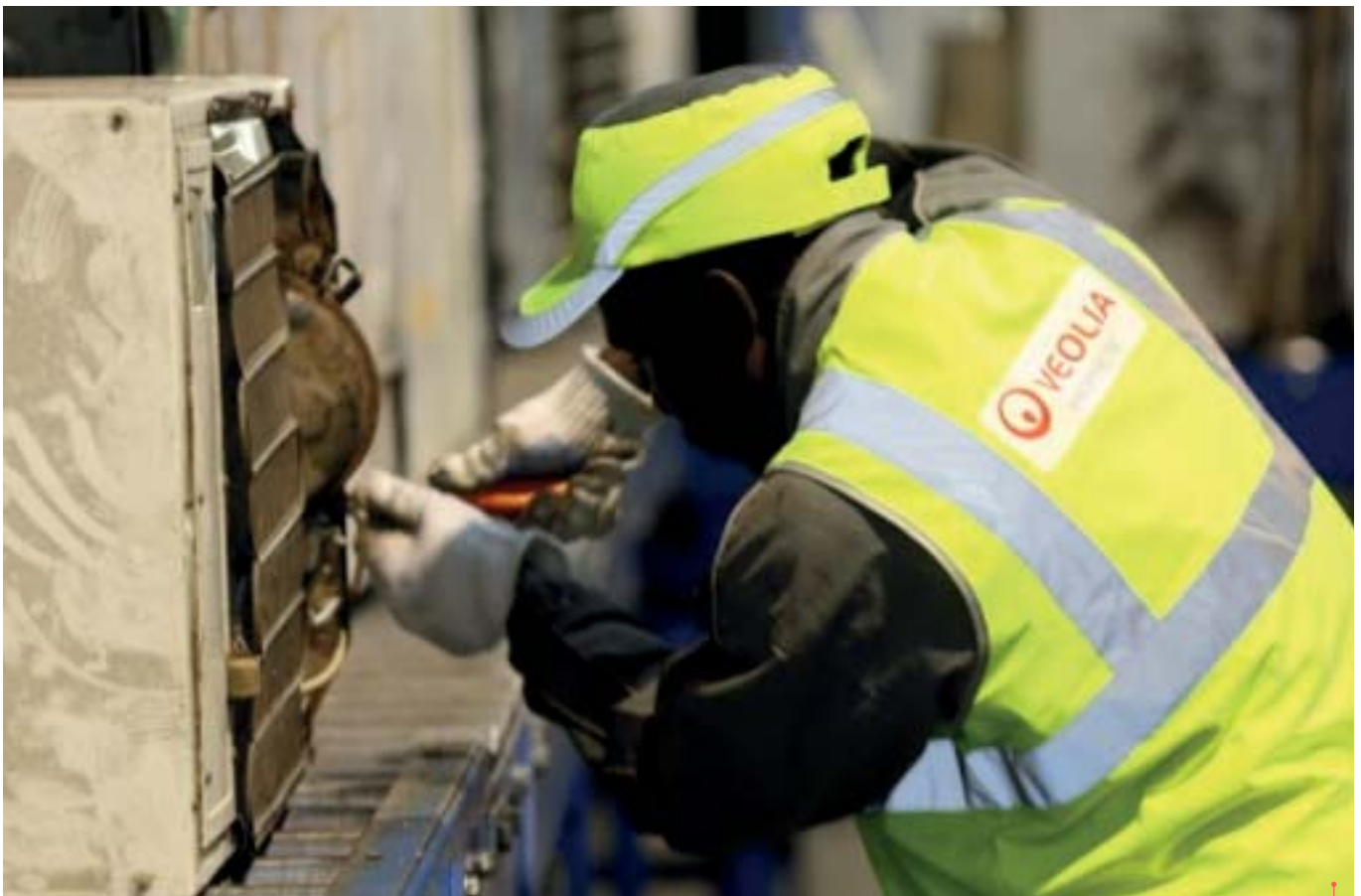
FW and FG (Veolia): At one point we thought the project would fail, particularly because of problems centering on the recycled material's smell. ADEME (France's environment and energy management agency) helped Groupe SEB with the design of an odor extraction system for the extrusion phase. Once feasibility was established, we opted to acquire the compounder so that we would have end-to-end in-house recycling capabilities. Our goal was to ensure the project would be a success. We were able to move a lot faster after that. For us, the project was a crucial component in developing a comprehensive

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recycling capacity, from sorting to grading, washing, grinding, formulating and extruding resin polymers and manufacturing compounds.

What have you learned from this co-development project?

IT and JT (Groupe SEB): There were three key takeaways for us: above all it showed us that it is possible to recycle material from our products to make new ones. It was tricky at the beginning, and some experts didn't think we would manage it. Then there was the fact that projects of this type require patience. It takes six to 18 months to develop a new product, but this project took three years. Lastly, there are the spin-offs from new learning about the latest developments in recycled materials. It now takes us much less time to run the pre-qualification phase, although still longer than when using a virgin material as adjustments are inevitably required. Recycled materials take three or four months longer.



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FW and FG (Veolia): We were able to show our clients and management that we had the skills to run a closed loop post-consumer recycling process for industrial quality applications. The project also gave us an insight into the difficulties of co-development with clients that manufacture technically demanding products.

What are the outcomes you have noticed?

IT and JT (Groupe SEB): The savings achievable from using recycled materials depend on the price of oil, as the price of virgin material is indexed to it. If oil is expensive, recycled material is attractive. This is less true when the price of oil is low. But the most important point is the impact the project had inside the company as well as among our clients and with the general public. We are starting to see consumer surveys that indicate the public is very receptive to recycled plastic. There is also strong impetus from policymakers – which we saw in France, for example, with the draft climate law – encouraging manufacturers to make voluntary commitments in this field. Within the company, recycled plastic is now seen as being a major plus in terms of customer value. The senior management team are very committed to it. They have set a target of 50% recycled materials for our products and packaging. The increasing importance of recycled materials is reflected in the ever-growing number of requests we're receiving from our brand management teams and manufacturing division, asking us to develop new materials and new colors.

FW and FG (Veolia): Our plastics recycling business has grown very quickly, extending way beyond the market for electronic and electrical equipment, which is small from our standpoint. We currently sell 60,000 metric tons of recycled plastic a year (post-consumer, post-industrial and post-use). We hope to bring this up to 100,000 metric tons a year in France. Worldwide, we currently operate 32 plants for a capacity of 500,000 metric tons. Creating a fully structured sector requires the investment of very large sums. Our plastic recycling subsidiary currently employs 1,000 people worldwide and generates €500 million in earnings.

The difficulty facing us now lies in finding an economic balance when oil prices are low. There are fixed costs involved in developing and producing recycled materials. Not only is material qualification testing required, but production molds designed for virgin material also have to be modified. Demand needs to be kick-started to drive these costs down. Mentalities are clearly changing. But action on several fronts is needed if recycling is to be viable over the long term, such as eco-modulation with a bonus for recycled materials, eco-design, and consumer acceptance.

Within the company, recycled plastic is now seen as being a major plus in terms of customer value



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What are the latest developments and the outlook for recycled plastic?

IT and JT (Groupe SEB): We've extended the process to other, more sophisticated, product families (vacuum cleaners, coffee machines, etc.), which has led us to alter the material to meet impact resistance standards for vacuum cleaners, for example. We are also working on the development of new materials (ABS, ABS-PC) with other suppliers, aside from Veolia. One of the current issues we face in trying to take things to the next stage is how to change the product designs. Recycled material is a dark color, either black or grey. But a lot of our products are white. At the moment, our design teams are working on this to make sure that consumers will accept black as a color. Working closely with all our specialties, we are innovating to help consumers transition to more responsible and sustainable consumption habits. To boost the quantity of recycled plastic we use, we are working on co-development projects with local partners (in Brazil and Vietnam) in other parts of the world, as well as on the development of food-grade recycled colored plastics. We are looking into new techniques for removing color from plastics as well as examining chemical recycling processes. There's still a lot to do!

FW and FG (Veolia): We're working to develop additional materials (PET, ABS, polystyrene, polyethylene, etc.) in addition to polypropylene, and looking into different outlets, particularly packaging and vehicle manufacturing. Other post-consumer flows will emerge with the expansion of EPR recycling schemes, such as for garden furniture and in the construction industry. One of our aims for the future is also to be able to work on other continents, because the ability to supply local products is the crux of the circular economy. We are currently working with the vehicle manufacturing industry.