The footballer tackling climate change

2008, Crystal Palace midfielder athieu Flamini co-founded F Biochemicals, the first company mass-produce levulinic acid. Here, tells Rohan Banerjee about his nbitious vision for renewable energy

Mathieu Flamini might have grown up in Corsica, but the Crystal Palace midfielder shows no signs of a Napoleon complex. He's softly spoken and remarkably down to earth, which is fitting really given the topic of our conversation.

In 2008, along with his friend and business partner Pasquale Granata, Flamini founded GF Biochemicals (GFB), the first company in the world to mass-produce levulinic acid, a naturally occurring chemical which has been identified by the US Department of Energy as one of 12 bio-based molecules that could help create a "greener" planet.

The oil substitute market may be worth an estimated £20bn but Flamini is quick to point out that it isn't only money that motivates him. "Many of my happiest early memories were spent in Corsica, an island of outstanding natural beauty and I have always been very close to nature. I've always been interested in how I can help the environment and for me, climate change is the biggest problem we are facing today."

Still, the 32-year-old, in the twilight of one career, can't hide his excitement at the dawn of another. Flamini, who earned cult-hero status at Arsenal across two spells with the north London club, laid the foundations for GFB during a five-year stint with AC Milan sandwiched between them. Shortly after signing for the Rossoneri, he was introduced to Granata through a common acquaintance. "At the time he was already interested in the problem of climate change and we shared this passion and wanted to do something. After meeting with scientists and researchers, together we developed this biotechnology, first with the Polytechnic University of Milan and later the University of Pisa."

So, what exactly is levulinic acid and why is it so exciting? Flamini explains: "Levulinic acid replicates all the uses of oil but can be made directly from organic material. We're using that product to substitute for oil in a range of everyday products including detergents, cleaning products, make-up and even furniture." And how will this impact the average person? "The primary benefit is that they will be able to continue to consume such products and reduce their carbon footprint while doing so without the heavy costs associated with many renewable products that are on the market today."

The key challenges that GFB has had to overcome, Flamini says, relate to keeping production low-cost and continuous. "After we had mastered the process for producing this form of levulinic acid, we took out over 250 patents to protect the technology. The next step was to make sure that we could continue to produce it on an industrial scale."

The forecast for GFB's output is currently 10,000 metric tonnes by 2017, which is roughly 70,000 barrels. For perspective, Saudi Arabia produces in excess of 10 million barrels of oil per day, but Flamini insists this comparison is moot. "Admittedly our output is

GF Biochemicals produces levulinic acid at a commercial scale at its main plant in Caserta, Italy

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relatively small compared to the global oil market, but let me clarify that we are not aiming to go against the oil companies; we want to work closely with them in partnership to help them be compliant with new regulations."

At the Paris Climate Change Conference COP21 in December 2015, world leaders agreed to binding rules to reduce greenhouse gas emissions, sending a clear signal that businesses must invest in the low-carbon transition. "As the percentage of biofuels needed to be in oil to meet environmental standards increases, as per the agreement in Paris, companies will need the technology to be able to do that. We've exhausted palm oil and ethanol and also found that they weren't actually that good for the environment. Levulinic acid uses an economical, more efficient and easily obtainable raw material in biomass, and this can boost lubricity."

Is GFB's role, then, to facilitate rather than to antagonise? "Of course. Another example is in plastics, where we have new regulations which say that the plastic in contact with food cannot come from fossil fuels any more. It has to be a bio-plastic, so for companies producing stuff in contact with food, they need to have that technology available to them to keep up with the changing market."

Previously, the price of many renewable energy strategies has been the source of resistance for firms. Flamini says GFB has worked hard to square this circle. "I think in the past people were nervous to invest in green chemistry because they were worried that it would cost too much. The advantage we have, and we refer to this as blue chemistry, is that the price remains the same for both the producers and the end-users, while delivering a better performance."

GFB's long-term vision, as Flamini outlines, is that levulinic acid will prove to be an important building block for a decarbonised world, helping to replace fossil-based chemicals and reducing the carbon footprint of consumer products. This year GFB won the Bio-Based Product Innovation of the Year award at the World Bio Market Awards, dedicated to recognise and celebrate the companies and individuals who are driving the bio-economy.

Last year, the company was presented with the John Sime award for Most Innovative New Technology by the European Forum for Industrial Biotechnology and the Bio-economy; and the Frenchman believes he and his colleagues really are on the precipice of something special.

At present, GFB directly employs 50 people and 400 people indirectly. It has a production plant in Caserta, about a 30-minute drive from Naples, as well as offices in Milan and Geleen in the Netherlands. Flamini accepts it will take years for the company to match the largesse of the major oil firms, but is nonetheless proud with what GFB has achieved in such a short space of time. "I think we've gone well beyond the 'start-up' phase now. We've gone as far as to actually prove the concept – it can be done – and in less than eight years, we're already talking about commercial applications."

And indeed GFB continues to snowball. In February, the company bought out Minnesota-based firm Segetis, the leading producer of derivatives based on levulinic acid, with the aim of developing its bio-plastic technology, cleaning products, solvents and many other applications. Flamini and his team have already earmarked China and Brazil as potential new markets and any idea that enthusiasm for this project might wane is soon rubbished when he tells me he's already planning for "70 years from now."

But what of the immediate future for Flamini? He joined Palace on a free transfer from Arsenal in September, agreeing a contract until the end of the season and maintains that football his priority. "It is my passion and I think I still have a good few years left in me yet. Perhaps when I do finish playing then I can be more involved in the day to day operations of the business but I am certainly still focused on continuing my career on the pitch for as long as I can." Better watch those bookings then.