

Innovation, Adversity and Resilience

Thank you. It is as always a privilege and a pleasure to be here.

The theme of this plenary session is innovation. Of course, innovation is one of the wellsprings of human progress, the creative force driving growth and solving problems. And of course, this industry, as much as many and more than most, has been born out of innovation, as much because of the unique context that underpins it – the forcing together, for the first time, of our world's two most potent and politicised supply chains – agriculture and energy, as because of the healthy dollop of excitement about the potential of biotech to deliver new feedstocks and new molecules, and reduce capital and operating costs, that has so allured investors, commentators and academics.

Innovation has been central to this industry's story so far, and will continue to be in the future. It is tempting to deliver a rousing, upbeat message about the power of human ingenuity, liberally splattered with fabulous examples from my own company, while expressing unquestioning confidence that innovation will solve the problems that the biofuels industry is facing. And yet, as I stand before you, I am minded to do something rather different.

We need to consider innovation in the biofuels sector from the perspective of where we are as an Industry.

It is arguable that the time to talk of game-changing inventions in biofuels is **largely behind us** - at least for this phase of our history. Too many would-be kings have been shown to be rather underdressed. The stage is pretty much set. The most promising routes, such as ligno-cellulosic fermentation, or butanol, have seen some remarkable improvements, and are, at last, on the cusp of commercial reality. Others have been forced to side-step into niche chemical applications, in the hope that these will be more forgiving market environments than fuels, others yet have fallen away, or are waiting the breakthrough necessary to become competitive.

And still we wait for the truly scalable, competitive, biodiesel option that is not dependent on vegetable oil, or the gaming of the unintended consequences of regulation.

In the meantime, biofuels as a whole has entered what one might call the **really hard yards** - the most difficult phase so far of its young life.

Margins are tight; high feedstock prices, overcapacity as the blend wall bites, depressed sugar and power prices; all part of an economic context which remains very challenging.

Regulation remains uncertain. In the USA the battle over RFS2 continues. In Europe we are, once again, in the throes of a fairly material rethink of biofuels policy. I guess many of us hope and expect some good to come of it, not least in providing a more robust support to advanced biofuels; One day, dare we even dream that we will see technologies compared on an even basis, with well – to-wheels analysis

applied to all pathways, including electric, and where biomass is not differentially subsidised if it is burnt to generate electrons, but is treated exactly the same as biomass that is to be fermented? But in the short-term, regulatory uncertainty can only mean more downside for investor confidence, already very fragile. I would be hard-pressed today to list five large-scale biofuels investments in Europe, be it in the conventional or advanced category.

Criticism is unabated. As Europe tries to extricate itself from the quagmire of legislating for indirect land use change, and we all hope for a good global harvest in 2013 to put paid to the latest claims of competition with food, new controversies, new attempts to discredit the sector are emerging all the time - the latest one the contention that 12 million hectares in Africa are being grabbed by multinationals and sovereign funds, allegedly for the sole purpose of producing biofuels for Europe. How a biofuels industry roughly the size of the US corn ethanol industry could possibly be built in Africa, without first the massive infrastructure investment that it would require over many years, is something I've not seen a good explanation for. Yet, the controversy rages on, threatening once more our sector's license to operate. The superficiality of the public debate around the fundamentally critical aspects of sustainability continues to depress.

Despite some great strides forward, promised technologies are all coming to fruition more slowly than expected. Development companies are solving problems today that they didn't even know existed a year

ago. New lessons are being learned, but they are being learned the hard way.

What then of innovation in this context? Adversity is a great prompt to inventiveness and resourcefulness. If we have grown out of the phase of hyping step change innovations, we are now seeing innovation in the smaller things; the incremental improvements that mean the difference between business survival and failure. When you have to gain the hard yards, be it on a rugby pitch or in a new industry, you concentrate on doing the simple things very well. For us, this means operating safely and reliably, understanding operational risk, learning how best to apply our process engineering skills, and integrating engineering with biology. Innovation still happens in the lab – but it doesn't just happen in the lab.

So the innovation of today takes a form much expanded from, and much more nuanced than, the “big ideas” stuff. The stuff that was compelling enough to turn the head of a silicon valley vc. Now it is about innovation borne of a thousand details, borne of being an operator at scale, of knowing your business and your factories, your fields and your customers inside out, and having to scrape for the last cent of margin, in the commodity world that a company like BP knows only too well.

As I touched on earlier, perhaps the area with richest scope for innovation in biofuels lies in the integration of the various components that are required if the next generation technologies are to scale up.

The integration of project finance structures originating in power markets into the very different risk and margin profiles of a fuels

operation, the integration of unconventional feedstocks with conversion, the integration of process engineering with biotechnology..

Should we mourn the passing of the age of transformational innovation? Surely not – for we are now seeing the early experiences of a mature industry. And another interesting aspect of the maturing of the industry is in the maturing of aspects of regulation. In Europe, loopholes are being closed. Gaming the system is becoming more difficult, and so the incentives that regulation intended to provide are re-emerging – to the benefit of committed investors. In the US, the conventional RIN markets are responding to the blend wall – exactly as could have been anticipated. The RIN markets are now starting to incentivise all members of the value chain to seek ways to resolve the blend wall. What had become a static, entrenched relationship is now starting to look much more fluid, as the incentives provided by the RIN markets provide a real prompt to innovation – not just on the supply side, but for the better demand side players as well.

So innovation remains important. But now it is innovation grounded in the response to real problems and real opportunities, and underpinned by the spirit of resilience and tenacity that players in this industry are showing as we navigate from adolescence to maturity.

Thank you!