India and Brazil’s role in the bioeconomy

On 26 and 27 February, New Delhi will host the International Conference on Sustainable Biofuels 2018 (ICSB 2018), an event aimed at debating strategies for the large-scale, worldwide adoption of clean fuels as an alternative to carbon-intensive sources such as petrol or diesel. The conference is co-organized by the BioFuture Platform (BP) and Mission Innovation (MI), two coalitions of countries devoted to the advancement of renewable energy.

While the BP focuses on scaling up the deployment of low-emission fuels such as ethanol and biodiesel, MI promotes the development of innovative technology in various modalities of renewable energy sources. At the intersection of both efforts, ICSB 2018 will house important debates around state-of-the-art research and development in the biofuels domain, including second- generation ethanol (E2G), bio-hydrogen and algae-based biodiesel. Under discussion is not whether biofuels should be part of our future; it is how it will be adopted in our economy and daily lives.

On this subject, Brazil and India (members of BP and MI) have a lot to say. Both countries are large emerging economies that have to pursue the goal of inclusive growth under environment-friendly development standards—a novel challenge developed countries never had to face. Precisely because of this, the two countries have been at the forefront of technological development in the biofuels sector by providing economically viable, low-carbon solutions with positive social impact.

The Brazilian biofuel programme started in the context of the 1973 oil crisis. At that time, the government decided to launch the “Proálcool” (Pro-alcohol) scheme in order to foster an indigenous ethanol-based transport industry that would reduce the country’s dependence on hydrocarbons. Based both on Brazil’s long-established sugarcane sector and a prospering automotive industry, the government put together an attractive package of incentives that gave rise to a new business. From a yearly production of 600 million litres of ethanol in 1975, the Brazilian market evolved rapidly and reached the milestone of 12.6 billion litres in 1986. By 1991, almost 60% of the Brazilian car fleet was ethanol-powered.

Despite a temporary downturn in the 1990s, the ethanol sector regained momentum years later, spurred by the technological novelty of the flex engine, which allows for the same vehicle to be powered by petrol or ethanol or any mix of the two. The first flex vehicle was sold in Brazil in 2003. In 2016, 88% of all new cars were fitted with dual-fuel engines. Another push came from the regulation on mandatory blending. As of today, stations throughout the country are mandated to sell petrol with a blend of 27% of anhydrous ethanol. And a new policy, RenovaBio, is about to be enacted: through “decarbonization credits”, oil marketing companies will be encouraged to sell more ethanol while naturally holding back the sales of petrol.

To meet this increasing demand, Brazil is set to increase its yearly production of 27 billion litres of ethanol (2016), which makes it the second largest producer in the world. Additional volumes are most likely to come from second-generation ethanol, which recently started to be commercially produced. Following an ascending growth curve, E2G production has the potential to improve the efficiency of sugarcane plantation acreage from 40% up to 250%.

The Brazilian ethanol programme has done a lot for our planet and it is poised to do even more. In an article published last year in *Nature Climate Change* magazine, an international group of scientists has concluded that Brazilian ethanol would have the potential to substitute up to 13.7% of petroleum consumed worldwide and reduce up to 5.6% of CO2 emissions by 2045.

India too has been developing a strong biofuel sector. Since the National Policy on Biofuels, 2009, the country has been relentlessly working on its ethanol blending programme. A decisive boost was given in December 2014, when the government decided to pursue the E2G track by taking advantage of the yearly surplus of biomass available (e.g. wood chips, cotton stalk, rice straw).

In 2016, India inaugurated its first demonstration bio-refinery in Uttarakhand and that December, the foundation stone of the country's soon to be inaugural commercial plant was laid in Punjab. In the research and development domain, centres led by the department of biotechnology have been making ground-breaking research in the field of algae-based biodiesel, cellulolytic enzymes and alcohol-producing bacteria. As the Indian government prepares a new comprehensive biofuel policy, recent announcements of bold investment schemes for bio-refineries and additional research funds indicate a bright future for the country's biofuel sector.

Following ICSB 2018, Indian and Brazilian governmental delegates will meet in a bilateral workshop with the purpose of exchanging success stories and challenges experienced in the context of their respective biofuel programmes. There is a lot the two countries can learn from each other. And there is a lot they can do together in order to further the adoption of biofuels globally. In a context in which the world cannot refrain from clean energy sources, the Indo-Brazilian partnership in biofuels comes in handy to show that low-carbon fuels are one of the most economic and socially optimal alternatives in the decades ahead.

Var Da Silva Nunes and Pedro Ivo Ferraz Da Silva are, respectively, ambassador of Brazil to India and head of the energy, environment and science and technology section at the embassy of Brazil in New Delhi.

END