



The common objective to fight climate change brought together 196 nations to the Paris Climate Conference (COP21) in early December 2015. In an exceptional exercise of international concerted action, leaders from all parts of the globe agreed to join efforts to fight climate change. Transport is one of the key topics of this newly founded climate change venture. It is the second most polluting sector, representing 23% of CO₂ emissions worldwide. Therefore, countries will have to adopt strategies to substantially cut transport emissions in order to fulfill their COP21 pledges. To accomplish this task, the promotion of cleaner fuels is essential. The Brazilian experience with sugarcane ethanol shows that countries can successfully fight climate change by using sustainable biofuels to move towards a low-carbon transport system.

CO₂ emissions from transport are growing at a faster pace than in other sectors, with an average annual growth rate of 2% from 1990 to 2012. According to the International Energy Agency (IEA), this increase is driven by road transport, which rose 68% since 1990 and accounted for three quarters of total transport emissions in 2013. However, it is more complex and more expensive to displace fossil fuels in transport than in the electricity sector, for instance. Future transport trends make the task even more challenging. Indeed, with car ownership expected to triple worldwide to over two billion by 2050, governments need to use a combination of different policy instruments to successfully reduce the carbon footprint of transport. This includes car efficiency, so that vehicles run more kilometres using less fuel, but also the promotion of cleaner fuels. Choosing one measure or the other will not provide the deep CO₂ emissions cut that the Paris agreement requires. It is the right mix of instruments that will make the difference and determine the level of effectiveness of this agreement.

The Brazilian experience

In Brazil, sugarcane ethanol will be the cornerstone of the transport decarbonisation strategy. The country is committed to reducing GHG emissions by 37% by 2025, based on 2005 levels, and has indicated it could go up to 43% by 2030. In the transport sector, CO₂ emission reductions will be achieved by increasing the share of sustainable biofuels in the Brazilian energy mix to approximately 18% by 2030, the majority being supplied by sugarcane-based first and second generation ethanol. This choice is a natural consequence of the country's positive experience with this biofuel. Thanks to sugarcane, Brazil has avoided emitting more than 300 million tonnes of CO₂ since 2003. To remove a similar amount of greenhouse gases from the atmosphere would require planting 2.1 billion native trees and maintaining them for 20 years.

Today, sugarcane ethanol constitutes one of the best alternatives to replace fossil fuels in transport. For each litre of petrol replaced with sugarcane ethanol, 90% of emissions are avoided, on average. This environmental benefit is further enhanced by the co-generation of bioelectricity from sugarcane residues – bagasse and straw – which provide clean and affordable electricity. These residues are burned in boilers installed in sugarcane mills, producing steam and making the mills self-sufficient electricity-wise. Surplus electricity is then sold to distribution companies. In 2014, sugarcane mills supplied about 19,000 GWh or 4% of Brazil's electricity demand. Experts estimate that sugarcane bioelectricity could reach 177,018 GWh by 2023 if all potential sources are fully developed. That would be enough energy to cover 23% of Brazil's electricity needs or, looked at another way, it could power Sweden and Portugal together.

The development of second generation ethanol will further contribute to the Brazilian fight against global warming. Besides generating bioelectricity, sugarcane leftovers are used to produce cellulosic ethanol. With two commercial plants, the country is at the forefront of green biotechnologies. The installed production capacity is more than 177,000 m³, and companies have ambitious plans to increase the number of production facilities. Although production costs are still relatively high, they will come down in the near future and advanced ethanol is expected to be competitive after 2020.

Global call

Like Brazil, other nations will also rely on biofuels as part of their transition towards a low-carbon economy. According to the Global Renewable Fuels Alliance, 36 countries specifically referred to the use of biofuels in their Intended Nationally Determined Contributions (INDC), as part of their action plan to mitigate climate change. Among them is India, the third highest CO₂ emitter in the world, according to IEA. India states that it has adopted a 20% blending target for biofuels, including biodiesel and ethanol, as part of its

strategy to establish a sustainable transport system. While the example set by India is encouraging, there is still an untapped potential to further reduce transport emissions with biofuels. More than 100 countries grow sugarcane in the world, but only a few use the plant to produce ethanol, like Brazil.

The Paris Climate Conference of 2015 set the framework of the global climate action plan for the next 15 years. Now, countries are confronted with the complex challenge of transforming their pledges into real contributions for the planet. The question now is not whether or not to decarbonise transport, but rather what are the best policy measures to make it happen. Considering the scope of this challenge, countries will have to combine different instruments, including the use of cleaner fuels, instead of picking one or the other solutions. The Brazilian experience with sugarcane ethanol shows that sustainable biofuels can provide a concrete contribution and should inspire other countries to explore the potential of sustainable biofuels in decarbonising transport.

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