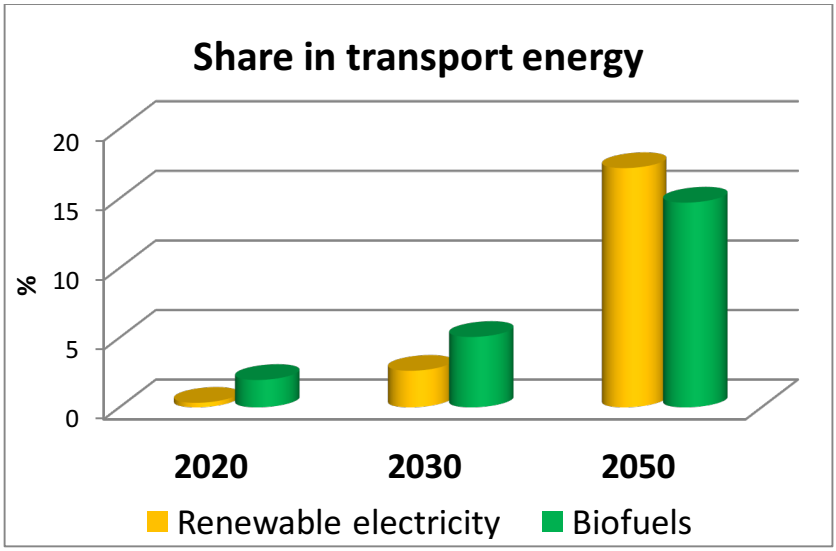
Talanoa Dialogue

*By the **Climate Ethanol Alliance***

II. Where do we want to go?

IPCC modelling

The IPCC Global Warming of 1.5 °C report (Table 4.SM.1) indicates the pace of the transitions that are deemed necessary in 2020, 2030 and 2050 at the sector level for 1.5°C-consistent pathways, and complements this with bottom-up studies from literature that give actionable policy targets. It is shown (as depicted below in the chart based on IPCC data) that the role of biofuels is expected to be more prominent than renewable electricity based e-mobility in the critical upcoming decades. Given the fact that ethanol is the most prominent biofuel, it deserves special attention.



Source: Based on IPCC SR1.5 (2018)

Proven technology

Ethanol technology is a proven and scalable climate solution. Decades of production have shown it to be safe and reliable. Its abatement cost is the lowest of alternative fuels, and its potential is substantial.

Ethanol offers a practical solution for transport emissions that delivers significant GHG savings. The use of different methodologies in different countries makes comparison difficult, however irrespective of the choice of models, ethanol is remarkably good. Under the EU methodology, today's ethanol has 80% lower lifecycle GHG emissions than petrol, while the saving under the US methodology is around 40%. These methodologies, however, are more alike than different and each shows solidly increasing GHG savings over the past decade, indeed a doubling in both cases and reflecting the same leaps forward in production technology and innovation. The uncertainty in ethanol is only over how much better than oil it is, not whether it is.

With continuous investment and innovation in the industry and its supply chain, ethanol's climate profile gets better by the year, and is on track to become carbon neutral in the foreseeable future, probably by 2030.

Scale

Ethanol plants have a good track record of producing the fuel at scale, and there is currently around 100 *billion* liters of ethanol produced in the world today. These ethanol plants are getting more efficient by the day.

There is vast potential in feedstock availability around the globe by closing the crop yield gap and hence increasing land productivity sustainably and also by utilising marginal and under-utilised or abandoned lands. Corn yields have improved across the globe, above trendline increases. According to the farmers who have reduced their carbon footprint by doing this, ethanol requirements have played a significant part in yield enhancement.

Cost

A wide range of mitigation technologies are available in transport, but very few offer competitive prices. Most technologies come with high carbon abatement costs and therefore their prospects are limited. Mature and inexpensive technologies are in short supply.

In contrast, ethanol has been shown to have a relatively low carbon abatement cost. It ranks among the cheapest transport decarbonisation technological options. Research finds that ethanol blending delivers substantial carbon saving inexpensively.

In every major ethanol market in the world (namely Brazil, Europe and the United States), a liter or gallon of ethanol is moderately to substantially less expensive than petrol. Remarkably, this makes ethanol one of the only renewables capable of replacing their counterparts at scale without immense subsidies (but, in each case, with enabling laws).

Sustainability

All technologies have some impact on the environment, there are no ideal solutions, and ethanol is no exception. There are two major criticisms of biofuels. The major criticism has come from the food v fuel debate. This has been shown to be a false dichotomy, with food and feed prices lower now than 10 years ago, while ethanol production has nearly tripled. The second, indirect land use change impact (ILUC), contrary to overblown early estimates is increasingly found to be low for ethanol, so low as to be entirely negligible. In other words, ethanol's impact on food security is minor (and is just as likely to be positive as negative), and its ILUC risk is so low as to be on the same order of practical concern as bird mortality from wind turbines.

Engine efficiency improvement

A little known phenomenon, that ethanol is an octane enhancer, makes the climate profile of ethanol even better. Research finds that the higher octane fuel that results when ethanol is blended into petrol brings significant engine efficiency improvements. High-octane, midlevel ethanol blends allow automakers to produce smaller, higher compression and therefore more efficient engines. As a consequence, for E20 (20% ethanol blend), ILUC impacts appear to be entirely offset by fuel economy improvements. Ethanol as an octane enhancer also replaces toxic substances previously used for this purpose.

Rural development dimension

In addition to climate benefits, ethanol contributes to rural development by creating and maintaining jobs in rural communities, advances farming by stimulating investments in sustainable technologies, improves urban air quality and provides valuable high protein animal

feed and an increasing range of innovative bio-based products. It also contributes to energy independence at a regional level.