



## Biofuels the best option for the Finnish economy

Increasing the use of biofuels manufactured in Finland is the most favourable way to reduce emissions of carbon dioxide (CO<sub>2</sub>) from traffic from the perspective of the national economy, since this also benefits domestic investment and employment. At current cost levels cars driven by fuel cells or electricity are clearly more expensive options that will not generate the same positive impacts for the economy as locally produced biofuels.

VTT Technical Research Centre of Finland and the VATT Institute for Economic Research have jointly assessed possible measures and related costs with regard to the goal of reducing CO<sub>2</sub> emissions from road traffic in Finland by as much as 40% by 2030, compared to emission levels in the base year of 2005.

– In practice it would be impossible to achieve reductions on this scale with any single technology, except for the uptake of progressive biofuels compatible with existing vehicles and distribution systems, says research professor **Nils-Olof Nylund** of VTT.

Increasing the numbers of electric cars, gas-driven or fuel cell vehicles sufficiently rapidly would be impractical, due to the slow rate of fleet renewal and the limited availability and high costs of such vehicles and the necessary infrastructure.

The project involved the creation of scenarios in which emission reductions would be achieved using different technologies. The base scenario features a fleet mainly consisting of petrol-driven and diesel vehicles, but also incorporating a scenario assuming that Finland

meets an existing biofuel expansion target designed to reduce fossil CO<sub>2</sub> emissions from transport by 21% of 2005-levels by 2030. In ten other scenarios involving the uptake of various technologies, calculations focused on the various ways emissions could be reduced by 40% through the greater use of alternative vehicles or fuels, with the outcomes then compared to the base scenario.

### Curbing emissions cost-effectively

A scenario where the target would mainly be achieved by expanding the use of biofuels produced in Finland proved to be the most favourable solution from the perspective of the national economy, with no need to renew the national vehicle fleet on a massive scale. In this scenario biofuel use would increase by about 600,000 tonnes annually, with some of the increase consisting of biogas. It was estimated that as many as 50,000 gas-fuelled cars could be on Finland's roads by 2030. The spread of electric cars is also expected to accelerate from 2020 onwards, with the fleet of rechargeable cars growing to 100,000–200,000.



The most cost-effective way to reduce emissions by far is thus to invest in increases in the domestic production and use of progressive drop-in biofuels. Measures encouraging the increased use of public transport, bicycles and new mobility services are also excellent ways to achieve further emission reductions. One concern is that the current weak state of the economy could deter the necessary investments.

*Drop-in biofuels are biofuels that can be used as such in existing vehicles, with no need to adapt them or fit new equipment.*

– If firms calculate that a proposed investment is viable, and financing can be found, then such an investment is usually made, says senior researcher **Saara Tamminen** of VATT Institute for Economic Research. – Public subsidies may also contribute where needed. Investment rates are sensitive to economic cycles, however. During recessions they decline, whereas when the economy grows more investments are made.

## Electric cars a costly option

If the projected Finnish biofuel production plants using new technologies are not realised, imports of sustainable biofuels may increase, or emissions will have to be reduced through other means.

– Using more gas-driven cars, electric cars or flex-fuel cars able to run on fuels with high ethanol content could also help to reduce emissions, but especially when it comes to electric cars this would be much more costly than shifting to drop-in biofuels, points out Tamminen. – At the moment electric cars cost a lot more than diesel or petrol-driven cars on average.

VTT's calculations indicate that it would be impossible to reach the 40% emission reduction target solely through the uptake of new fuels that require new kinds of motor. Other new forms of mobility would have to be promoted in addition to such new technologies.

Figures produced by the Finnish Transport Safety Agency show that only about 500 electric cars are in use in Finland today, accounting for just 0.02% of the total fleet of about 2.67 million cars in 2015. Their wider use will only become viable when electric cars become considerably less expensive. This is only expected to happen after 2020.

The EU climate and energy framework for 2030 does not include any obligations regarding the share of renewable energy in transport. However, emission reduction targets set as part of national burden-sharing for sectors outside emissions trading are much tougher than those set for 2020, so CO<sub>2</sub> emissions from traffic will also clearly have to be cut. By 2030 a wide range of emission-reducing technologies and measures will have to be taken into use in the transport sector, each with their own associated costs and impacts on the national economy.