

Moving to E10 in Ireland

Climate progress in today's car fleet and millions of euros in avoided fines for not meeting EU targets

10% Ethanol

Petrol containing up to 10% ethanol is called E10. Ethanol is the chemical name for alcohol and it is made from the starch and sugar in plants such as beet and grains. It is added to petrol in order to reduce climate harming greenhouse gas emissions, reduce a region's dependence on oil imports, bolster the farm economy, bolster protein feed availability and reduce the level of particulates emissions in vehicle exhausts. Compared to oil ethanol fuel results in overall average¹ 70% less greenhouse gas emissions.

For these reasons it is widely used across the world. Ireland already has 5% ethanol in its petrol having introduced it in 2005. Ireland has used E10 in times of oil shortage in the past, right up to the 1970s. In Europe as a whole the average blend level is currently 5%, with some fleets using 85% or higher, particularly in Sweden and in France, where E10 is the main petrol type sold. In the USA all petrol has 10% or more ethanol in it. Belgium, Finland and Germany are also big users of E10 while Luxembourg, the Netherlands and Romania will boost usage levels in the coming year.

Ireland has recently been considering transitioning to E10. With the 2020 deadline for reaching EU renewable energy targets fast approaching, 2018 is the year Ireland should make the move to E10. This transition will go as smoothly as the 2005 introduction of E5 in Ireland, which occurred without incident.

Role of Government

Ireland has committed to a number of EU actions for addressing climate change. Among them is the transition from fossil fuel to renewable energy. In order to boost the use of renewable energy in transport the government puts a general obligation on fuel suppliers in Ireland to use a certain percentage of biofuels, leaving suppliers free to decide the precise type and mix of biofuels to use.

The current biofuels obligation is 8%, rising to 10% next year and 11% or 12% by 2020, and suppliers are typically meeting it by using up to % ethanol in petrol and up to 7% biodiesel in diesel. That target of 8% is achieved on paper because some forms of biodiesel can be counted twice under the terms of the EU Renewable Energy Directive. The directive allows each litre of biodiesel made from used cooking oil or animal fats to be double-counted, even though in reality that "2nd litre" is just normal diesel. Double counting makes reaching EU targets easier on paper, but it can be misleading as it overstates climate progress in real terms. Ethanol energy is counted once and hence progress is all real.

The target for renewable energy as a whole in transport, electric vehicles included, is 10% by 2020, rising to 14% by 2030. Ireland is set to fall short of this considerably and to continue to fall short for several years. E10 would contribute 7% renewables to the petrol sector, with the effect of contributing an impressive 1.4% renewables in transport overall. E10 would give suppliers more flexibility in how they meet the government's obligation and it would give the government the option of increasing the obligation.

In terms of climate action E10 is the equivalent of taking more than 50,000 cars off Irish roads and cutting fossil carbon emissions by 150 ktCO₂.

¹ <https://epure.org/news-and-media/press-releases/european-ethanol-sets-new-high-level-for-greenhouse-gas-savings/>

Save €25 Million in Fines for Missed EU Targets

Ireland is ranked second last² in Europe for climate action and will miss its target for renewable energy in 2020 by several percentage points. This will potentially result in compliancy costs, or “fines”, of up to €700 million³.

Going from E5 to E10 petrol would have the effect of reducing this by up to €25 million. This is because ethanol is an effective source of renewable energy with the transition from E5 to E10 resulting in an additional 0.37 terawatt hours of renewable energy being used annually in the system.

Impact on Cost of Petrol

Wholesale costs of ethanol and of petrol vary widely as does the spread between them. Typically, ethanol is a little more expensive than petrol but there are periods when this is reversed.

Oil refineries are integrated systems with numerous streams of input raw materials and output products. Ethanol is a high octane fuel meaning it improves the performance of petrol overall. This allows fuel blenders use lower grade and lower cost base petrol when formulating a blend to meet fuel standards.

As the transition to E5 from E10 involves substituting just one twentieth of a litre of petrol with ethanol the impact of the cost difference between petrol and ethanol is limited and generally in the order of plus or minus one cent per litre. However, since ethanol is very high in octane, less expensive petrol can be used to blend with it, meaning that E10 should not be more expensive than conventional petrol. Fuel distributors in the USA maximise ethanol use when conditions allow, which in recent years has been almost all the time.

Over longer periods the factors at play even themselves out with no significant price impact either way.

Fuel and Vehicle Standards

E10 is the European standard for petrol is fully supported in Europe’s vehicle.

Older Cars

E10 is the most common form of petrol sold in a number of regions of the world which together account for 500 million petrol cars, including the USA, France, Brazil and Belgium. About 5% of cars in today’s fleets are without a manufacturer’s warranty for E10 fuel due to their having been sold before it became mandatory to include E10 in the warranty. All experience over decades of use in transport fleets across the globe shows that unwarranted cars run on E10 trouble free.

² <https://www.irishtimes.com/news/environment/ireland-second-worst-in-eu-on-climate-change-action-1.3533954>

³ <https://www.rte.ie/eile/brainstorm/2017/1124/922516-missing-climate-and-energy-targets-will-cost-ireland-millions/>

All of the USA's 190 million petrol cars, new and vintage alike, run on E10 while E10 has been a regular feature in the world's fuel supply systems in times of war or fuel crisis ever since cars were first invented. The US EPA, Coordinated Research Council, Society of Automotive Engineers and Army have all examined E10 use and found it free of compatibility barriers. In 1979, Chrysler, AMC, and GM announced that use of 10% ethanol would have "no effect" on vehicle warranties. Ford followed with similar tentative support. A review of litigation cases to date shows that no cases have ever arisen in America in which warranty claims were denied because E10 was used.

In 2012 the national German motoring organisation ADAC carried out research to uncover incidents involving E10 and declared it had found none. Ireland introduced E5 in 2005 when virtually all cars were without warranty for it and the transition occurred without incident.

Yes, some motor companies still maintain the cautious positions they published in the 2010 ACEA document on older cars and E10. But given that all American makes, BMW, Honda, Volvo and most models of all the other makers were declared to be E10 safe at the time, and given that there are no known cases of E10 issues having arisen since, ever and given that there is no specific issue that has been described and demonstrated in test or laboratory conditions, then it can be concluded beyond all doubt that E10 is free of issues in all petrol engines. Climate progress should not be held up by a conservative motor industry briefing from eight years ago.

The Finnish government gives this advice to drivers who mistakenly fill their vehicles with E10: Carry on, it's ok. Bulgaria, with its older fleet than Ireland's, is on E10 in all its petrol and everybody is fine.

The only consequence of E10 will be more climate friendly and air friendly motoring for Irish citizens.

Cleaner Air

Ethanol is a high octane fuel which enhances regular petrol by enabling it burn leaner and cleaner, thereby helping reduce the level of unburnt particulate matter in the exhaust gases. E10 can cut particulate emissions by over 20% compared to regular petrol while a E20 (20% ethanol) can bring a reduction of up to 61%, according to a study by the Technical University of Vienna⁴.

Food, Land Use and Sustainability

Though made from crops, demand for ethanol as a fuel has no adverse impact on food commodity supplies or land use. World statistics on crop output, prices and ethanol demand over the last two decades indicate that there is no correlation.

Ethanol is derived from the starch and sugar in grain, beet and cane crops. There is an abundance of starch and sugar globally. After the ethanol is made the more sought-after protein, oils and fiber from the crops is returned to the farm in the form of feed for livestock.

Ireland's tillage crop output has declined by a fifth in recent years due to low prices. All over Europe farmland is being taken out of crop production with total tillage area shrinking one or two percent annually. Despite

⁴ <https://www.epure.org/news-and-media/news/particulate-emissions-from-petrol-cars-can-be-cut-by-up-to-61-through-greater-fuel-ethanol-use-tu-wien/>

this, Europe's tillage crop output is actually rising, due to improved farming practices. Europe can not only comfortably and sustainably supply all the ethanol it needs now or will ever conceivably need, its farmers benefit greatly from the demand which gives them a much needed market for their produce.

Domestically produced biofuels in Europe generate six billion euro in farm incomes, shoring up markets for all farmers, Ireland's included. The protein, oil and fiber co-products add up to twenty million tons of GMO-free animal feed, greatly reducing dependency on GMO-based soy imports from the Americas. Europe's biofuels processing facilities support hundreds of thousands of biorefinery jobs in rural areas. Should Ireland return to sugar beet farming then ethanol will be an essential part of the sector, providing an important additional market for the crop.

Ethanol contributes to stabilizing and developing rural economies.

Conventional European ethanol is supplied, from farm to tank, under the most stringent life cycle and environmental requirements in the world, with traceability and certified greenhouse gas savings data accompanying every single tanker load. In 2017 the Climate Ethanol Alliance⁵ was an official partner of the UNFCCC at COP23 in Bonn and will be again this year at 2018. It is a peace of mind option for renewable energy.

Supply Chain

The switch to E10 will be smoothly handled by the existing petrol supply chain which is highly flexible, competitive and efficient when it comes to optimizing refinery processes, storage, trading and distribution.

The UK supplies about 60% of Ireland's petrol, 10% comes from places like Norway, France and Belgium, while the rest is refined domestically at Whitegate in County Cork.

Ireland accounts for just 5% of UK petrol exports. The bulk of UK exports goes to the USA and Belgium where E10 is already standard and to the Netherlands which switches to E10 in the coming year. Security of supply for E10 is assured. The UK also exports to a diverse range of markets such as the Middle East, Asia and Africa requiring multiple different blends which use no ethanol at all. Ireland's Whitegate is also an exporter capable of satisfying multiple blend requirements. In 2017 it exported half a million tons of petrol, or close to the total amount used domestically.

Hence the UK, Ireland and EU supply system is efficient, flexible and adapted to supplying multiple different blends in parallel. In competitive global markets E10 is a given.

E10 can also be made simply by adding 10% ethanol to E5 blendstock, subject to confirmation by the source refinery that doing so will not bring the resulting blend outside standard specifications, or subject to testing.

As a fuel standard E10 affords high levels of flexibility to petroleum suppliers as it allows multiple ethanol levels of anything between 0% and 10% at any time across the distribution system. Fuel suppliers can optimize their blends according to prevailing supply chain conditions and according to their preferences for how they fulfil the national biofuel blending obligation.

⁵ Initiated by EERL

Conclusion

Conditions are right for Ireland to move from E5 to E10 ethanol blend petrol. It will improve air quality, improve conditions for farmers across the Union and drive down GMO feed imports with only positive implications for energy sustainability, competitiveness, security of supply and cost.

But mostly it will enable the current fleet of cars contribute to climate action for many years to come while reducing the risk of Ireland having to pay millions in EU compliancy costs.

This briefing is for discussion among Ireland's climate, energy, research, agriculture, petroleum and motor industry stakeholders in order to foster progress on renewable energy uptake in transport and an early decision on the transition to E10. Ethanol Europe Renewables Ltd is an Irish company with ethanol production capacity in Hungary. The company has no commercial interest in the Irish market due to the distant location of the production site. Comments to James Cogan, jcogan@eerl.com, tel. 085 8044110, 6 Fitzwilliam Place, Dublin 2.