






Executive Summary

Iarnród Éireann have encountered several barriers to the implementation of biofuels and have chosen to take the route of biofuel certificates.

- **The primary barrier relates to engine warranties from manufacturers. They have previously advised that biofuel usage invalidates warranty**
- Incompatibility of older engines with biofuel
- Expense of shorter service intervals and increased service consumables (oil, filters etc.). It should be noted that the Inter City Railcar engine requires expensive semi-synthetic oil for its operation.
- Fleet capacity is currently running at 100% - any additional maintenance requirements would place a severe strain on scheduled passenger services
- Expense of treating bulk storage tanks (NORA) in Inchicore (every 6 months)

As part of Ireland's EU and national commitments and wider climate change goals, a target of 33% energy efficiency improvement has been set for all Irish public bodies (as defined in SI 426 of 20141) by 2020.

As the largest consumer in the transport sector, Iarnród Éireann had been an exemplar performer within the group by reporting an energy efficient improvement of 33%.

Departmental group energy performance - Transport, Tourism & Sport [draft final]					
Public body	2018 energy consumption (primary) [GWh]	% of group's consumption		2018 energy performance result (value & 'dot' to be published by SEAI Q4 2019)	
PB-00204 Iarnród Éireann / Irish Rail	648.020	37%		33%	Selected for DVA (relatively minor discrepancy): Passenger km' does not account for freight activity (subsequently changed back to 'km travelled' activity metric)
PB-00037 Bus Éireann	334.158	19%		13%	Selected for DVA (DVA passed)
PB-00036 Dublin Bus	317.767	18%		14%	Selected for DVA (DVA failed): Effectively using 'passenger numbers' as activity metric; low correlation between passenger numbers and fuel consumption.
PB-00134 daa plc	139.462	8%		53%	
PB-00426 Transport Infrastructure Ireland	124.795	7%		25%	Selected for DVA (DVA passed)

88% of energy consumption is from diesel fuel and energy performance has improved in an era of increasing passenger km (22%). Iarnród Éireann have reduced CO₂ emissions by 46% from 2006 which is an annual carbon avoidance of 148,000 tonnes of CO₂.

This has been achieved by a combination of operational and engineering programs.

A number of fuel efficiency programs are currently in progress:

- **DMU Gearbox (Intercity Railcars)** – Replacement of fluid coupling with dual lock-up clutch. Trial Fit-out currently in progress
- **Hybrid Drive for Inter City Railcar fleet:** Hybrid pack will collect regenerative energy and store electric energy to permit electric-only running within urban areas and lead to reductions in Fuel and Emissions. Follows on from the Gearbox project – (c.2021)
- **Envirox Fuel Additive** (to reduce fuel consumption and keeps DP filters clean in diesel engines) – nationwide implementation commenced in 2019.
- **Loco Engine Repower** – feasibility study underway

Generally, these energy efficiency improvements require significant investments, both from company resources and State funding.

As an example, we are currently in receipt of €15M of funding from the Climate Action Fund (DCCaE) for the Intercity Railcar Hybrid project. Based on prototype testing, this project will deliver 25% energy efficiency across a current fleet fuel volume of 22 million litres in addition to reduced emissions from an engine upgrade. The project will be phased in over 8-10 years (contingent on Government funding) and will deliver a carbon avoidance of 18,000 tonnes per annum in addition to reduced volumes of NOx, particulate matter and noise emissions.

Another difficulty is the fact that biofuel has a reduced energy content per litre compared to EN 590 (B0) diesel. In the context of a car filling at a forecourt, the differential is insignificant. However, given the scale of our 2018 fuel throughput, 42 million litres and at a blending rate of say, 4.5% biodiesel, that's an extra 0.49% volume = 200, 000 litres that will be consumed.(source : [DBFO HA Carbon Calculation Spreadsheet](#) DEFRA). This volume amounts to an extra 536 tonnes of CO₂ released to atmosphere.

The capital cost for a typical ICR hybrid unit is approx. €360k.

Our anticipated liability for biofuel obligations in 2019 is €1M based on current market rates.

Money spent on biofuel credits is money diverted from hybrid retrofits (3 No.) and a delay in realising the energy and environmental benefits therein.

We anticipate our Envirox additive program should deliver energy efficiency (and reduced emissions) savings of 6% and we believe it would be counter-productive to be simultaneously introducing a biofuel which is adding to our overall fuel consumption.

In the context of the Biofuels Obligation scheme, we believe it more beneficial for the State to direct Iarnród Éireann activities and expenditure towards projects that deliver a real, measurable contribution to National Renewable energy targets rather than a compliance exercise in procuring biofuel certificates.

Therefore, we request a continuation of the derogation/exemption from the Biofuels Obligation scheme



Background:

EU Renewable Energy Targets

Under the EU Renewable Energy Directive, all Member States are obliged to achieve a minimum target of 10% renewable energy in the transport sector by 2020.

Renewable Energy Directive (REDII) that sets the rules for the use of biofuels in Europe for the period 2020 to 2030

Biofuel Obligation Scheme

One of the main measures that Ireland introduced in order to help meet this target was the Biofuels Obligation Scheme. This scheme was introduced in 2010 and is administered by the [National Oil Reserves Agency](#) (NORA). It sets out an obligation that suppliers of road transport fuels must include a certain percentage of environmentally sustainable biofuels across their general fuel mix.

Now, the rate is 8.695% which means that 8% of the motor fuels, typically diesel and petrol, placed on the Irish market are produced from renewable sources.

Progressive increases in the obligation rate have led to increased use of biofuels. The department for Communications, Climate Action and Environment issued a Policy Statement which sets out the following actions that the Minister for Communications, Climate Action and Environment intends to implement:

- **Continue the Biofuels Obligation Scheme until at least 2030 with progressive increases in the level of obligation and develop the scheme in line with EU energy policy.**
- **Increase the biofuel obligation to 10% by volume from 1 January 2019**
- **Increase the biofuel obligation to 11% by volume from 1st January 2020**

An order will be made in 2019 under Section 44D of the National Oil Reserves Agency Act 2007 to set the biofuel obligation rate to 11% by volume from 1 January 2020.

The obligation rates set out for 2019 and 2020 reflect the types of biofuels most likely to be available to the market. In order to further increase the penetration of biofuels, it will be necessary to exceed the planned obligation rate of 11%. This will require the current 'blend wall' limits to be overcome

We note from the RED II legislation that:

- There is a dedicated target and incentives for the use of advanced fuels such as **renewable electricity in transport** and advanced biofuels made from wastes and residues.
- Countries are no longer forced to use crop-based biofuels as a reaction to ILUC (indirect land-use changes) that cause some biofuels to have higher GHG emissions than the fossil fuel they replace, when taking into account the whole life-cycle emissions.



Iarnród Éireann has long-term goals and future plans that will directly increase our proportion of renewable electricity in transport:

- The **DART Expansion Programme** is a series of projects which would develop and expand the DART network in the Greater Dublin Area (electrification of the commuter lines to Drogheda, Hazelhatch, Maynooth and expansion of fleet and depot facilities). This will result in approximately 80% of journeys on the Iarnród Éireann network being powered by electricity, up from 43% currently.
- DART Expansion will require the procurement of new Rolling Stock which will be a mix of EMU and Battery-EMU. Up to 600 trains over 10 years



CIE Fuel Supply Chain



Irish Rail have responsibility for two bulk fuel storage facilities, one on Alexandra Road in Dublin Port and the other on the Inchicore Railway Works Site.

Each site has two bulk storage tanks.

Diesel is purchased directly from refinery and moved by ship to Dublin Port. CIE are part of the Common Oil Pipeline with fuel moved from ship to our bulk storage tanks through the pipeline.

All the fuel distributed to Irish Rail / Dublin Bus & Bus Éireann is then moved from our bulk storage tanks in Alexandra Road to destination point by our Logistics Transport Provider – we are currently in contract with Reynolds Logistics.

Overall fuel deliveries from Alexandra Road in 2018 were 94.27 million litres with Irish Rail receiving 45% of the product, Dublin Bus 28.5% & Bus Éireann 26.5%. All fuel for Irish Rail has a green dye added when loading to signify it as non-road use fuel which attracts a lower rate of duty. The Irish Rail fuel also has Envirox additive injected which lowers fuel costs by reducing fuel consumption.

IE are signed up to NORA, (National Oils Reserve Agency), agreement which dictates that we hold 55 days stock of our annual usage at any one time in the event of a National Emergency / Fuel Shortage. As part of the agreement we save 2 cent for each litre of fuel consumed.

Fuel is delivered to 8 Irish Rail depot locations, 7 Dublin Bus locations and 14 Bus Éireann locations country wide.

All fuel delivered to Dublin Bus & Bus Éireann is clear fuel with no dye or Envirox additive.

To date, rail transport has been exempted from the Biofuel Obligation Scheme

Based on current market prices, we estimate that the Iris Rail certificate liability is approx. €1M (see table below)

Irish Rail 2018 Total	42,000,000	litres
Blend rate	8%	
Biofuel element	3,360,000	litres
Biofuel Cert Rate	€ 0.30	
Total IE liability	€ 1,008,000	

- Should legislation change to include the rail fleet there would be some of the older rail fleet that would not be compatible with Biofuel. Even the most up to date trains would require much shorter service intervals and more filter replacements as a result of the use of biofuel. This would lead to increased cost for materials and labour but also decreased availability of trains due to the extra servicing requirements
- Most of our fuel stocks held as part of the agreement with NORA are held in Alexandra Road with very little turn-over of fuel. While this is acceptable for Ultra Low Sulphur Diesel, with fuel being tested twice yearly, it would not be acceptable to continue to store product with a high Biofuel content without cycling the product on a continuous basis

