

From: [REDACTED]
To: **airquality** <airquality@DCCAE.gov.ie>
Subject: FW: NAPCP consultation response
Date: 05.07.2019 16:29:46 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Please delete the earlier version sent, this is the final one.

Regards

[REDACTED]
Strategy, Innovation & Corporate Affairs Director
M: [REDACTED]

Toyota Ireland
Killeen Road
Dublin 12
www.toyota.ie



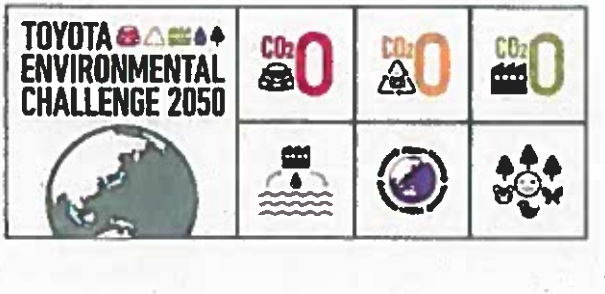
From: [REDACTED]
Sent: 05 July 2019 17:01
To: 'airquality@dccae.gov.ie' <airquality@dccae.gov.ie>
Subject: NAPCP consultation response

Regards

[REDACTED]
Strategy, Innovation & Corporate Affairs Director
M: [REDACTED]

Toyota Ireland
Killeen Road
Dublin 12
www.toyota.ie







Toyota Ireland, Killeen Rd, Bluebell, Dublin 12

Office: +353 1 419 0200

www.toyota.ie

National Air Pollution Control Programme (NAPCP)

Toyota Ireland's submission to public consultation

July 2019



Introduction

Toyota Ireland is the company responsible for the sales, marketing and distribution of the Toyota and Lexus automotive brands in Ireland. Toyota first entered the Irish market in 1972, and since then has grown to be the number one car brand in Ireland with over 390,000 vehicles on Irish roads – more than any other manufacturer. Toyota's national dealer network comprises 47 dealerships across the country, and these dealerships, together with its headquarters in Dublin, directly employ over 1,500 people.

Toyota is the largest manufacturer of hybrid vehicles, which have both an electric battery a petrol engine. While driving, the car automatically switches between the battery and petrol engine in order to optimise fuel efficiency and reduce air pollution and emissions without needing to be plugged in. Hybrid vehicles emit very significantly less NOx than a petrol or diesel engine, thereby improving air quality for all citizens.

In addition, Ireland was the first country in which Toyota launched its YUKO, car sharing service, debuting in Dublin in 2016 with an all-hybrid fleet. The long term aim is to promote usage as opposed to ownership of private cars and thereby to impact on both improving air quality and reducing traffic congestion.

Toyota Environmental Challenge 2050

In 2015 with the aim of contributing to global environmental sustainability, Toyota introduced and committed to an ambitious set of goals to be achieved over the following 35 years. The Toyota Environmental Challenge 2050 addresses key global environmental issues and aims to reduce the negative impact of manufacturing and driving vehicles.

Under its Challenge #1 (one of six challenges detailed), "New Vehicle Zero CO2 Challenge", Toyota has challenged itself to reduce vehicle CO2 emissions by 90% by 2050 when compared to 2010 levels. Toyota will promote the development of next-generation vehicles with low or zero CO₂ emissions – hybrid, plug-in hybrid, electric, and hydrogen fuel cell vehicles – and further accelerate their spread. Increasing the use of these eco-friendly vehicles will contribute to a more environmentally friendly society.

Mitigating climate change is absolutely key for the future sustainability of Ireland, and Toyota is taking the lead within the transport sector to help reduce polluting emissions and support government strategies to achieve its aims.

Executive summary

Toyota Ireland is committed to reducing harmful pollutants from the transport sector and welcomes the Government's move to take a more comprehensive approach to "greening" the environment by tackling the issue of NOx alongside other air pollutants. We feel it is our duty as a leader in the



transport sector to introduce innovative initiatives that will reduce pollutants and to play our part in assisting the Government in this important consultation process on the future of air quality in Ireland.

The current dominance of diesel vehicles in the Irish market has negatively impacted the quality of our air, particularly in urban centres (limited air quality information has been available to date but the expanded monitoring that is now being undertaken by the EPA is expected to rectify this situation). Working towards improving Ireland's air quality calls for a multi-modal solution and should also take into account the important roles that hybrids, plug-in hybrids and electric vehicles will all play in reducing harmful emissions from the transport sector.

In the response below, we outline the serious need to rollback diesel incentives, discuss the importance of hybrid cars for moving all of Ireland into low emission driving, and consider how a low emission zone might work in Ireland.

Hybrids are the best vehicle option for rural and long-distance drivers. In typical Irish commuting conditions they drive over 60% of the time in zero emissions mode and 40% of the distance according to a new study commissioned by Toyota from ConsultUCD.

In addition to this point typical tested NOx emissions from a hybrid electric car are 3-4 mG/Km as compared to the allowed limits for current new cars of 80 mG/Km for diesel and 60 m/Km for petrol vehicles, ie they are an order of magnitude less than the NOx emissions from internal combustion engine (ICE) vehicles.

Rural and long-distance drivers are still affected by the limited range of electric cars, long recharging times and limited charging infrastructure, but hybrid vehicles are available now and are extremely effective in very significantly reducing the emission of health damaging pollutants.

We propose a three measures to incentivise hybrid uptake:

- 1) Restructure VRT to incorporating a NOx element alongside the existing CO₂ element
- 2) Introduce a VAT reclaim for petrol in business use, to enable companies to choose hybrid for corporate fleets (it is estimated that the national company car population is approximately 95%)
- 3) Introduce a percentage BIK reduction for hybrid and plug in hybrid company cars

Rollback diesel incentives

Ireland is projected to become non-compliant on NOx emissions from 2030 and beyond – a major concern for air quality in our cities and human health around the country. Road transport is the main source of NOx emissions in Ireland at present, accounting for approximately 33% of the total national emissions of NOx in 2016.



Although data on air quality and the impact it has on people in Ireland is lacking, we know from international evidence that one in ten child asthma cases in the UK is linked to traffic pollution.¹ Further, a study by the International Council on Clean Transportation this year showed that on-road diesel vehicles were responsible for nearly half of the health impacts of air pollution from vehicles worldwide in 2015.²

Despite overwhelming international evidence linking diesel cars with harmful air pollution, diesel is still the predominant car of choice in Ireland. In fact, in 2019 to date, diesel sales still make up nearly half (48%) of all new car sales in Ireland³ compared to approx. 34% across Europe as a whole.⁴

The high number in Ireland is, in large part, due to the current vehicle taxation system (both VRT and ART) that was introduced in 2008. This, unintentionally, succeeded in encouraging diesel uptake.

Previous Governments have introduced and maintained several pro-diesel incentives such as favourable VRT bands, VAT reclaim on diesel fuel in business use, and lower excise duty on diesel fuel (as against petrol fuel). We believe it is Government's responsibility now to ensure that these are rolled back in a manner that enables people to switch to more environmentally friendly cars.

Incentivise hybrid

Hybrid vehicles have both an electric battery and small petrol engine, allowing them to automatically switch between the battery and petrol engine to minimise emissions and maximise fuel economy. They can drive on electric power alone and are self-charging, meaning they don't need to be plugged in.

Most importantly for the purposes of this consultation, hybrid vehicles have very low NOx emissions. Figure 1 shows that hybrids are significantly better than both diesel and petrol vehicles on NOx. Typical tested NOx emissions from a hybrid electric car are 3-4 mG/Km as compared to the allowed limits for current new cars of 80 mG/Km for diesel and 60 m/Km for petrol vehicles, ie they are an order of magnitude less than the NOx emissions from conventional internal combustion engine (ICE) vehicles.

¹ <https://www.bbc.com/news/health-47882038>

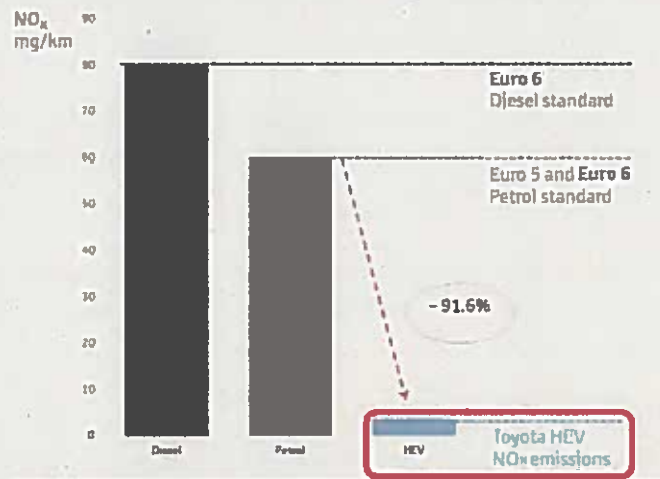
² <https://www.theicct.org/news/health-impacts-transport-sector-pr-20190227>

³ <https://stats.beepbeep.ie/>. As of 24 June 2019, diesel sales accounted for 47.57% of new car sales in Ireland in 2019.

⁴ <https://www.best-selling-cars.com/europe/2019-february-europe-new-car-sales-market-analysis/>

Figure 1: Hybrid NOx emissions compared to diesel and petrol Euro standards

HEV NOx - Ahead of Euro Standards



Hybrids are vital to the Irish transport landscape if the Government wants to ensure that rural and long-distance drivers have a clean, low emission transport option. A recent study commissioned by Toyota and published by ConsultUCD (independent UCD academics) showed that the average hybrid driver spends 62% of their driving time and 40% of their driving distance in zero emissions mode – meaning the combustion engine is stopped and the car is running solely on the electric battery.

The results of this study are significant. Even long-distance commuters, driving hybrid cars spent over half their commuting time with no combustion engine running. The study showing that they spend 57% of the time and 30% of the distance in zero emissions mode.

If Government really wants to move people away from diesel and petrol cars, they must make hybrid an option for those drivers who cannot feasibly switch to an electric car due to concerns around limited driving range, long recharging times and limited charging infrastructure. Note, these are the barriers that exist currently with consumers and Government is committed to challenging them. However, it will take time for BEV vehicles to become the norm.

Hybrids are available now to rural and long-distance drivers and are capable of delivering half of their driving in electric mode. Helping non-city drivers switch to low emissions vehicles means encouraging hybrid uptake.

There are a few simple ways to do this.

- 1) Restructure VRT to incorporating a NOx element alongside the existing CO₂ element
- 2) Introduce a VAT reclaim for petrol in business use
- 3) Introduce a percentage BIK reduction for hybrid and plug in hybrid company cars



Restructure VRT bands

Currently, vehicle registration tax (VRT) bands are based on the level of CO₂ emissions from a car, meaning cars with higher CO₂ emissions face higher VRT charges.

In 2020 a new, more realistic, system of measuring CO₂ emissions has been introduced. This system, called WLTP, will impact CO₂ emissions ratings and cause many models to move bands. It presents an optimum time to restructure VRT bands.

When the CO₂ bands are restructured for VRT, a NO_x element can be added to the VRT system. This would ensure that the VRT system incentivises the purchase of cars that are both CO₂ and NO_x friendly rather than diesel vehicles.

One way to do this would be to add a €10 charge (as an example) per mg/km of NO_x that a car emits according to its certificate of conformity, which is already used to determine the CO₂ emissions for the VRT bands.

VAT reclaim on petrol

Companies are currently eligible to claim the cost of VAT on the purchase of diesel fuel used in the course of their business. However, they cannot do the same for petrol fuel which acts as a significant disincentive against companies buying hybrid or plug-in hybrid cars. Approximately one in four new cars bought is a company car, and given that VAT input deductibility entitlement applies to diesel fuel only, they are predominantly diesel. This has resulted in the company car fleet in Ireland, estimated to number approximately 75,000 passenger cars, being 95% diesel. As we know, diesel is extremely harmful to human health and air quality. In effect, under the 2010 VAT Consolidation Act, Government are forcing companies to buy diesel cars when more air quality friendly alternatives are available.

Toyota Ireland is calling for petrol to be included in this VAT reclaim to allow companies to transition away from diesel and its known pollutants and into more sustainable forms of transport such as hybrid and plug-in hybrid. Toyota Ireland believes that companies will be attracted to hybrid and plug-in hybrids as a more fuel-efficient technology than petrol only. Also it is anticipated that the revised VRT system will make petrol engine passenger cars more expensive to buy. Financial controllers usually make the decisions on what cars a company purchases for its staff, and of course fuel efficiency and costs ultimately play a major role in such decisions. In short we do not foresee a flight from diesel into petrol ICE vehicles, rather, this move will facilitate the addition of both hybrid electric and plug in hybrid cars to company fleets.

Significantly, this move would be cost positive to the Exchequer. It would not affect the size of the company car fleet, but would simply result in a shift in the type of car purchased. The fact that there is higher excise on petrol fuel as compared to diesel fuel (a difference of 10.7c per litre), means that the exchequer is in a position to gain from this move towards better air quality.



BIK bands for company cars

Currently, electric vehicles qualify for 0% BIK while diesel vehicles qualify for a VAT reclaim on fuel. This leaves hybrid caught in the middle – at present it neither qualifies for a BIK relief nor a VAT reclaim.

Introducing a percentage BIK relief for hybrid electric and plug in hybrid company cars would ensure that corporate fleets transitioned to more environmentally friendly cars and would benefit air quality.

Consider low emission zones

Toyota would support the introduction of low emission zones and has already taken steps as a leader within the automobile industry to provide alternatives to private car ownership in urban areas. Our car sharing start up in Dublin, YUKO, uses only hybrid vehicles and reduces the need for private car ownership by providing a vehicle that can be shared amongst a community (it is estimated that every one additional car share car takes 10 cars off the road; Boston Consulting). YUKO is small but will expand in a measured way from next month (August 2019)

If a low emission zone were introduced, it would be possible for car sharing initiatives like YUKO to place vehicles at transport nodes into and out of the city. This would provide clean, low-emitting vehicle options within the identified zones for all drivers.

To ensure that the introduction of low emission zones does not disrupt the residential and commercial life within the zones, careful consideration must be given during the roll out phase to address concerns that may arise around private citizens' and business' needs. Toyota would suggest that the government give careful consideration to how a low emission zone would operate. Key questions include:

- Which vehicles would qualify to enter a low emission zone?
- Would higher polluting vehicles be banned from the low emission zone or would their entry require a levy to be paid?
- Would low emission zones be limited to certain small city centre areas or would they have wider application?
- How would the low emission zone be policed, e.g. a camera network?
- Would low emitting vehicles be issued with an identifier to determine their eligibility to enter the zone?
- How will low emission zones be consistent across local authority areas?

If low emission zones are only to be applied in a limited way, which is in small, tightly-defined, and restricted city centre areas, then it may be practical to only allow entry by low emission vehicles such as hybrid, plug-in hybrid and electric vehicles. Ensuring hybrid is included in any designation of low emission vehicles would be essential given the impracticality of electric vehicles for many Irish drivers,



especially rural and long-distance drivers. European cities that have already introduced LEZs have used a variety of approaches. All that we are aware of though, do allow Low Emission Vehicles, such as hybrid electric cars, to enter unhindered.

If considering a tightly-defined low emission zone, the Government could implement a vehicle categorisation system similar to the French Crit Air system, which identifies different levels of low emission vehicles.

However, if low emission zones are to be considered on a wider basis, then realistically, they could only exclude the worst polluting vehicles. This would suggest that diesel cars sold before one of the European emissions levels, e.g. pre-Euro 5, could be banned from the zones.

Conclusion

Toyota believes that in order to improve Ireland's air quality and successfully reduce future pollution, Government should take steps to encourage the further uptake of low emission vehicles. Toyota is firmly of the view that hybrid is a low emission vehicle and has the added benefit of addressing consumer reluctance in transitioning to fully electric vehicles at this point in time, given their real concerns around range anxiety, recharging time and limited charging infrastructure. Hybrid is vital to allow rural and long-distance drivers to transition to low emission vehicles.

By incorporating a NOx element to the VRT system, introducing a VAT reclaim on petrol, introducing a percentage BIK reduction for hybrid and plug in hybrid cars and by introducing low emission zones, the government has the tools to address air pollution and take positive actions to reduce it. It is Toyota's opinion that the key to reducing air pollution, especially within congested urban areas, lies in encouraging and incentivising the continued and increased uptake of low emission vehicles.

Toyota remains at the disposal of Government and policymakers to help achieve policy objectives and thereby move Ireland toward more sustainable forms of transport.



Energy Behaviour Of Toyota Prius Hybrid Vehicles In Sample Irish Commuting Conditions

Francesco Pilla¹, Giovanni Russo², Robert Shorten³
and David Timoney⁴

March 11, 2019

¹Professor Pilla is with the School of Architecture, Planning and Environmental Policy, University College Dublin.

²Professor Russo is with the School of Electrical and Electronic Engineering, University College Dublin, a member of the Lero Research Centre, and a member of the I-Form Research Centre.

³Professor Shorten is with the School of Electrical and Electronic Engineering, University College Dublin, a member of the Lero Research Centre, and a member of the I-Form Research Centre.

⁴Professor Timoney is with the School of Mechanical and Materials Engineering, University College Dublin.

Executive Summary

This document provides a summary of research that was conducted by ConsultUCD®. The objective of the research, which was commissioned and funded by Toyota Ireland, was to investigate the energy behaviour of the (new) Toyota Prius IV hybrid vehicle, under a set of conditions that may be considered representative of regular commuting patterns in Ireland.

The research consisted of recording and analysing commuting data from seven volunteers, all of whom are employees of University College Dublin. Each volunteer was supplied with a Toyota Prius IV hybrid vehicle for one calendar week during the period November 4th-19th 2018. The overall test data was built from an ensemble of 157 individual trips, which when aggregated together, cover 2018 km.

With the exception of GPS information, all measurements, including fuel consumption, were obtained directly from the standard Toyota sensors and on-board computer systems. Our main findings may be summarised as follows.

- 1 On average, the percentage driving in Zero Emission Mode (ZEV) mode (petrol engine stopped) was 62% of the overall travel time.
- 2 On average, the percentage driving in ZEV mode was 40.4% of the overall travel distance.
- 3 An average fuel consumption of 4.92 litres per 100 km was recorded for the overall trip distribution.
- 4 An average CO_2 emissions of 114.2 grammes per km was computed for the overall trip distribution.
- 5 The fuel consumption figure, and the computed CO_2 figure, are in remarkably close agreement with the newly introduced world-wide harmonised light vehicle test (WLTP) figures for the Toyota Prius IV vehicle that have been published by Toyota.

Start point of commute	Driver	Total Distance for each driver [km]	% ZEV Time for each driver	% ZEV Distance for each driver	Average Speed for Driver [km/h]	Average fuel/km [l/100km]	% Motorway Distance for Driver
Smithfield	Driver 1	119.7	76%	57.1%	11.0	5.438	0.0%
Wicklow	Driver 2	293.9	56.2%	40.6%	42.5	4.562	76.5%
Drogheda	Driver 3	644.2	56.6%	36.9%	33.3	4.830	48.4%
Dundrum	Driver 4	128.3	64%	49.5%	17.8	5.183	16.1%
Dundrum	Driver 5	115.6	66%	54.6%	20.3	5.317	13.6%
Blackrock	Driver 6	263.9	66.5%	48.0%	23.2	5.121	9.3%
Aughrim	Driver 7	452.6	56.5%	30.0%	39.3	4.914	29.0%
	ALL	2,018	62%	40.4%	27	4.92	28%

Table 1: Summary of trip distribution

A summary of the key data obtained for each driver is depicted in Table 1. Overall, the results indicate that in sample Irish commuting conditions, the Toyota Prius IV hybrid car may be in ZEV mode for a very significant portion of its travelling time and distance, suggesting meaningful air-quality related benefits for pedestrians and cyclist as compared to conventional combustion engine vehicles.

1. Introductory remarks

The objective of this work is to develop a better understanding of the zero emissions driving characteristics of Toyota Prius IV hybrid car in what could be considered typical Irish commuting conditions. Specifically, we wish to empirically measure the percentage distribution of the total energy delivered to the wheels between the electric drive system and the internal combustion engine. A particular interest in the fraction of time and distance during which the vehicle is in Zero Emissions (ZEV) mode.

The research, which was funded and commissioned by Toyota, was organised so that measured data was acquired in conditions that could be considered typical commuting patterns for Ireland. To do this, volunteer drivers from the pool of UCD employees were given access to a vehicle for one week. Thus, the measured trip distribution, consisted of regular commuting behaviour, and private incidental journeys, across a population of UCD employees. Note that this is a key methodological difference with a previous Toyota study in Rome⁵ in which one predetermined route was considered and the ZEV behaviour was measured for this route only. Our test attempts to replicate real, day-to-day driving.

- (i) Drivers were chosen with varying commute types (traffic conditions, length of commute, type of roads traversed). This resulted in a suite of measured data that may be considered indicative of everyday commuting behaviour, and incidental journeys.
- (ii) Prior to commencement of the study, all drivers were given a short briefing on how to optimise the performance of a hybrid car.
- (iii) No restrictions were placed on the volunteer drivers. For example, no set routes were prescribed or suggested, and there was no attempt to restrict driving behaviour in any manner. In particular, drivers were not asked to limit use of energy intensive features such as air conditioning, heating, and other in-vehicle services.
- (iv) Toyota Ireland supplied Toyota Prius IV models for testing. Specifically the vehicles supplied were Luxury Grade with 17" wheels and a full suite of premium features. This grade makes up over 90% of the Prius models sold in Ireland.
- (v) Fieldwork took place during November rather than during the warmer, and therefore more benign, summer months.

The study consisted of three phases: (A) test definition and set-up; (B) data gathering and processing; and (C), data analysis.

⁵Hybrid Analysis: True Test Drive, Toyota Prius IV, Technical Report, CARE—Centro di ricerca sull'Auto e la sua evoluzione Università degli Studi *Giuglielmo Marconi* Via Plinio, 42—00195 Roma, June 2016

During phase one, volunteers were selected, and the experimental infrastructure calibrated. Measurement data was obtained from the vehicle OBD2 data port of each vehicle, using an Android[®] Smartphone Application that connected to the OBD2 via Bluetooth. The Android[®] Application records GPS traces of each journey, and these were used to link the ZEV behaviour with the geographic location of the car. All data were recorded, together with the EV activation patterns, using the *Hybrid Assistant* Application⁶ which is available on the Google Play Store[®] for Android[®] devices.

Calibration of the test setup was performed in collaboration with Toyota Ireland, by comparing measurements obtained by the UCD team with measurements obtained by using the Toyota diagnostic system *Techstream*. We found that the measurements obtained using the two methodologies were in complete agreement for the parameters of interest, thereby confirming the fidelity of the measurement system. Thus, with the exception of GPS information, all measured parameters, including fuel consumption parameters, were obtained directly from the standard Toyota sensors and on-board computer systems.

During phase two, measurement data were acquired for each of the drivers that were selected to participate in the study.

In phase three, the data-sets from phase two were analysed, with relevant results and findings highlighted.

Note that all tests were performed between November 4th and November 19th, 2018.

2. Test Definition

The overall duration of the test was two weeks. In total, seven drivers participated in the test. During week 1, four drivers collected data during their daily routine. During week 2, three new drivers collected data during their daily routine.

Drivers were instructed to drive the vehicle provided by Toyota as they would normally drive for their daily activity. Thus, daily activities of each driver included:

- commuting from home to work location (UCD);
- routine scheduled activities (such as a school run);
- commuting from UCD to home;
- incidental daily and weekend journeys.

⁶<http://hybridassistant.blogspot.com/p/about.html>

Of the seven drivers: one was female and six were male; four of the drivers had not previously driven a hybrid car; and the overall age range was 30-65. Figure 1 depicts the test trip distribution (in terms of distances). Note that the this figure is similar to the Irish trip distributions in

C. King, W. Griggs, F. Wirth, K. Quinn and R. Shorten, Alleviating a form of electric vehicle range anxiety through on-demand vehicle access, International Journal of Control, vol. 88, no. 4, pp. 717-728, 2015,

suggesting that the journey pattern that emerged from our experiment is representative of Irish commuting behaviour (from the 2009 National Travel Survey, NTS). Overall, data for an aggregated trip distance of 2018 km were collected,

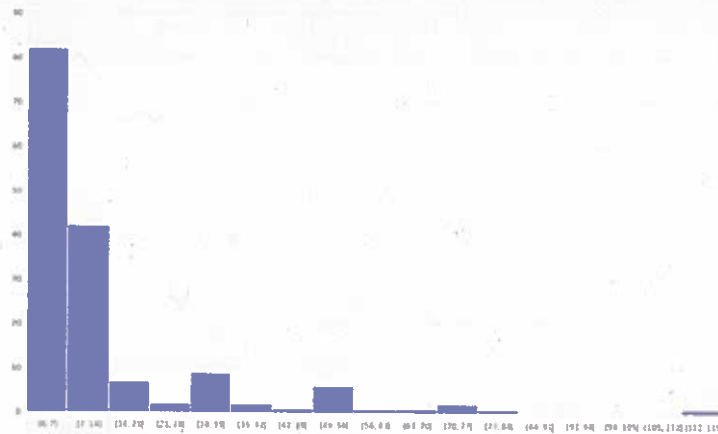


Figure 1: Test trip distribution. The horizontal axis depicts the range of journey length, and the vertical axis captures how many trips fell into this category.

with an average journey length of 12.85 km. Based on the measured data it could be surmised that:

- the trips of driver 4, driver 5, and driver 6 were mostly in urban/suburban areas;
- the trips of driver 2, driver 3 and driver 7 were mostly in non-urban areas;
- and the trips of driver 1 were mostly in urban areas.

3. Main findings

We now report our main findings.

ZEV mode analysis: For our trip distribution, the average time that Prius spent in ZEV mode was 62% of the total journey time. The average distance that the Prius spent in ZEV mode was 40.4% of the total journey distance (these values were obtained by averaging across all the trips). Figure 2 and Figure 3 provide more detailed information on the EV mode activation.

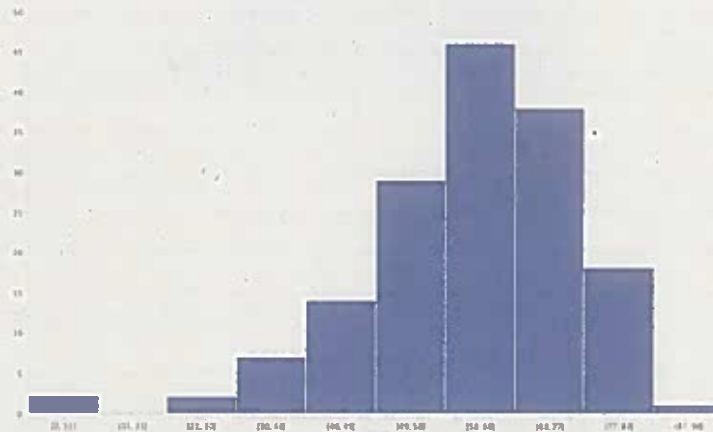


Figure 2: ZEV mode distribution. The horizontal axis depicts the range of time percentages spent in ZEV mode, and the vertical axis captures how many trips fell into this category.

We also estimated, from the available GPS traces, the percentage of motorway driving for each trip; see Figure 5 for the estimated distribution of motorway driving across the tests. The data presented in Figures 2-4 are summarised in Table 2.

Additionally, we were able to cross-reference ZEV mode information and GPS information, thus highlighting where the vehicle was in ZEV mode during each trip. In the Appendix, we give examples of representative journeys that illustrate the geographic locations where the ZEV mode was active.

Fuel usage analysis: Total carbon dioxide (CO_2) emissions were computed based on US EPA Emission Factors for Greenhouse Gas Inventories (9 March 2018). Details of the computation methodology can be found at:

www.epa.gov/sites/production/files/2018-03/documents/

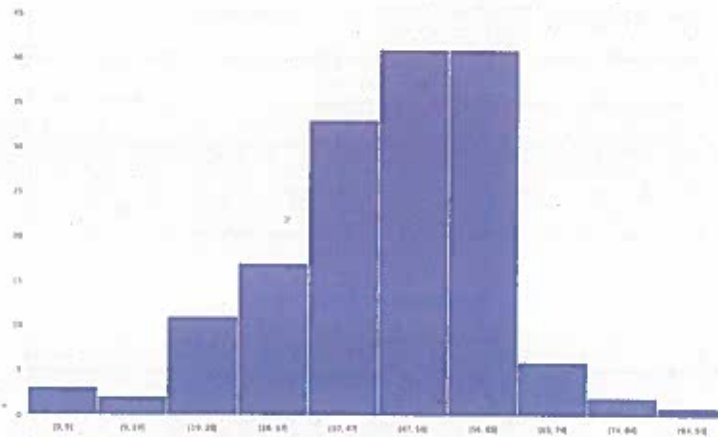


Figure 3: ZEV mode distribution. The horizontal axis depicts the range of distance percentages in km spent in ZEV mode, and the vertical axis captures how many trips fell into this category.

emission-factors_mar.2018.pdf. The average CO_2 emissions for all trips was calculated to be 114.2 g/km.

A total of 99.37 litres of fuel was consumed over 2018 km of the total test distance. The overall average speed was approximately 27 km/h. Consequently, the average fuel economy is 4.92 litres/100 km, and the calculated average CO_2 emissions is 114.2 grammes per km. It is worth noting that these are very close to the official figure for the vehicle obtained under the new world-wide harmonised light vehicle test (WLTP) emissions testing regime (given below).

Official Fuel Economy Figures (WLTP Test Procedure) Prius Luxury Saloon

EC Certificate of Conformity, 10/12/2017
 Vehicle Identification number JFDKB3FU503581203
 Vehicle Type XW5(EU,M)
 Variant ZVW50(H)
 Version ZVW50R-AHXEBW(1C)

Fuel (Combined): 4.8 litres/100 km
 CO_2 Emissions (Combined): 108 (g/km)

Comment : Note that this is one of the first real world verifications of the test figures published by Toyota. Note also that the published figures are close to

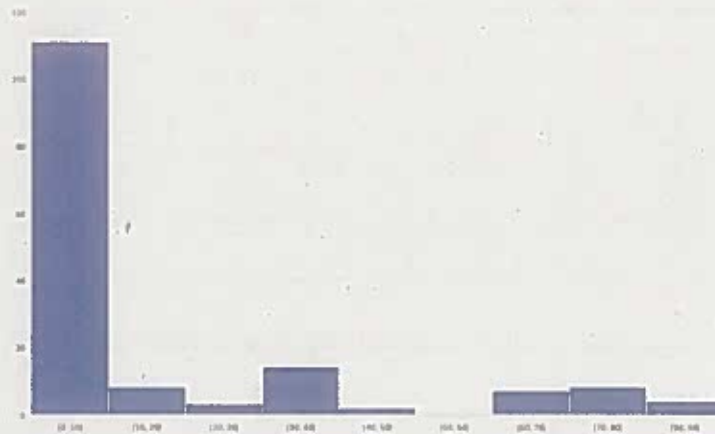


Figure 4: Estimated motorway. The horizontal axis depicts the range of distance percentages in km spent in motorway driving, and the vertical axis captures how many trips fell into this category.

the actual measured ones from our tests; fuel economy is within 2.5% of Toyota figure; and the CO_2 emissions figure is within 5.7% of Toyota figure.

Finally, we also estimated the fuel cost per travel. This estimate was obtained by considering an average price of € 1.38 per litre of petrol. These statistics are depicted in Figure 5.

4. Conclusions

This report summarises the main findings of a study to empirically evaluate the energy consumption behaviour of the Toyota Prius IV Hybrid (luxury model), in a set of commuting conditions that may be considered typical for Ireland.

The study was funded and commissioned by Toyota Ireland.

A key methodological difference with a previous Toyota study in Rome is that the present study is based on commuting behaviour of a population of seven UCD employees, rather than a single vehicle traversing a predetermined route.

The tests were performed between 4/11/2018 and 19/11/2018. The total aggregated distance was 2,018 km accumulated over 157 trips.

Overall, it was found that, on average, the car was in ZEV mode for 62% of the commuting time, and for 40.4% of the average commuting distance. These

Start point of commute	Driver	Total Distance for each driver [km]	% ZEV Time for each driver	% ZEV Distance for each driver	Average Speed for Driver [km/h]	Average fuel/km [l/100km]	% Motorway Distance for Driver
Smithfield	Driver 1	119.7	76%	57.1%	11.0	5.438	0.0%
Wicklow	Driver 2	293.9	56.2%	40.6%	42.5	4.562	76.5%
Drogheda	Driver 3	644.2	56.6%	36.9%	33.3	4.830	48.4%
Dundrum	Driver 4	128.3	64%	49.5%	17.8	5.183	16.1%
Dundrum	Driver 5	115.6	66%	54.6%	20.3	5.317	13.6%
Blackrock	Driver 6	263.9	66.5%	48.0%	23.2	5.121	9.3%
Aughrim	Driver 7	452.6	56.5%	30.0%	39.3	4.914	29.0%
	ALL	2,018	62%	40.4%	27	4.92	28%

Table 2: Averages in the last row are based on aggregated trip information

results suggest meaningful air-quality related benefits for pedestrians and cyclists encountered en-route by the Prius, when compared with conventional ICE vehicles.

An average fuel consumption of 4.92 litres per 100 km was recorded, and an average CO₂ emissions of 114.2 grammes per km was computed. The results, for the test population, are in remarkably close agreement with the newly introduced WLTP test, suggesting that for Toyota Prius IV Luxury model the test results may be a good guide to real world fuel economy and CO₂ emissions. These latter results represent one of the first verifications of the figures produced by Toyota under the new WLTP test procedure.



Figure 5: Trip cost. The horizontal axis depicts the range of trip cost in €, and the vertical axis captures how many trips fell into this category.

Appendix

A sample of typical routes traversed during the test are depicted in Figures 6-9 (all starting locations obfuscated). GPS points in a green colour denote activation of the ZEV mode (rpm from internal combustion engine zero).

Figures 10 and 11 depict the distributions of local ambient temperatures and humidities available from Met Eireann (Dublin Airport) during the vehicle testing period.

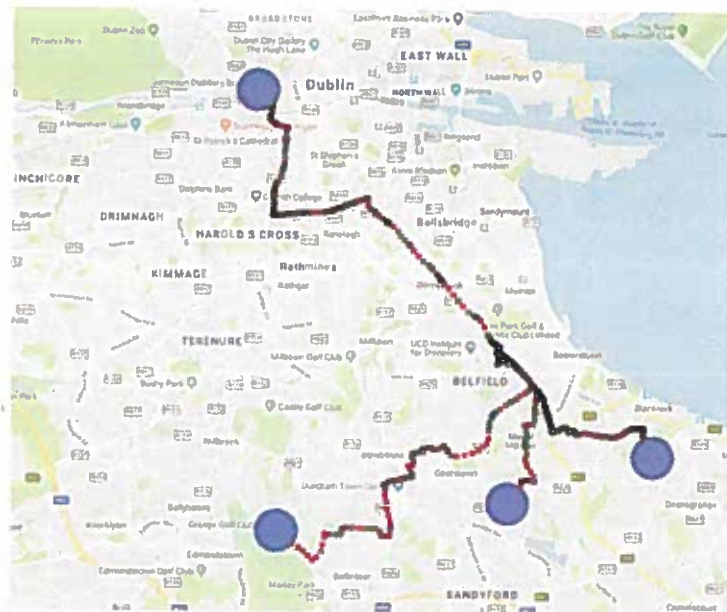


Figure 6: Sample urban journeys. GPS points in green denote activation of the ZEV mode (rpm from internal combustion engine zero). Traces are from four separate urban journeys (all different drivers).

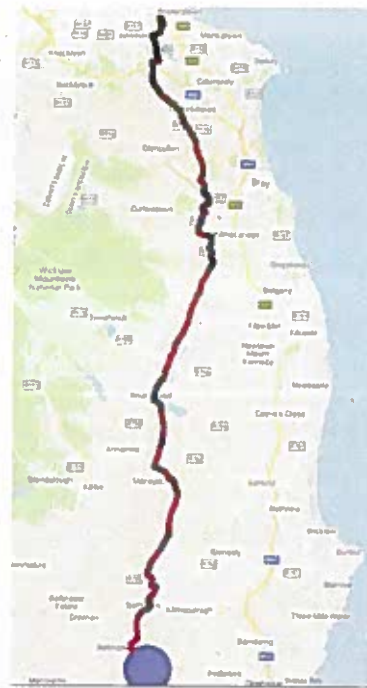


Figure 8. Sample non-urban journey. GPS points in green denote activation of the ZEV mode (rpm from internal combustion engine zero)



Figure 9. Sample non-urban journey. GPS points in green denote activation of the ZEV mode (rpm from internal combustion engine zero)

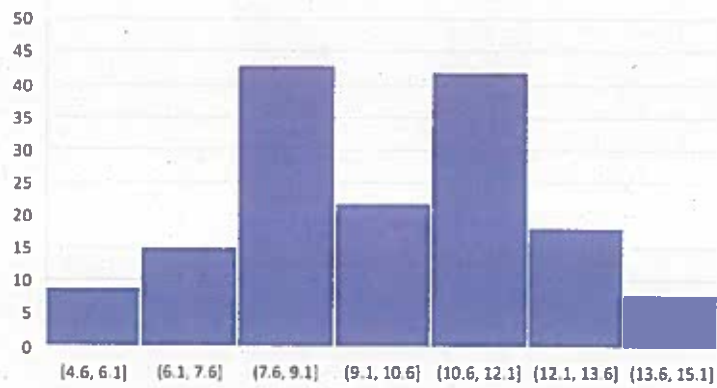


Figure 10: Distribution of ambient temperature during testing period. The horizontal axis denote the range of temperatures and the y axis captures how many trips fell in that category.

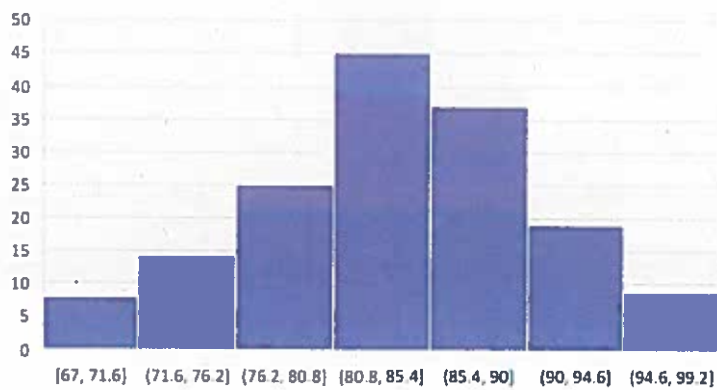


Figure 11. Distribution of background humidity during testing period. The horizontal axis denotes percentage ranges and the y axis captures how many trips fell in that category.

From: [REDACTED]
To: **airquality** <airquality@DCCAIE.gov.ie>
Subject: NAPCP
Date: 10.06.2019 14:43:02 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

I write below, as requested, my thoughts on the NAPCP document circulated in mid-April 2019.

1. I was surprised to see that the whole plan was due to be submitted by 1 April 2019.....and this consultation ends in mid-July 2019!
2. I have little to add to my thoughts submitted to you in response to your Cleaning our Air document in March 2017. I attach it again.
3. That consultation has still not been published to my knowledge despite many scientists contributing. That means that well over 2 years have been wasted in the non-development of a CAS by yourselves.
4. The Cleaning our Air document was well-written, clear and structured so that commentary to advise you was easy to make. Even though the advice itself raised many difficult concerns for Ireland.
5. In contrast this NAPCP document is repetitive, rambling and incoherent. I do not know what you want commentary on..
6. The logical progression would have been to publish your CA strategy a year or so back in 2018. (And other strategies you refer to). And consult on the important directive now.
7. Why should experts contribute to your most recent paper gathering exercises when the previous consultation results sit on a shelf or in a bin at DCCAIE?
8. All I would say is the mess that the CAS is evidently in here is partly due to the topic being spread over 4 government departments and local authorities (yes they have a role to play despite what your document alludes to).
9. It is odd though that the Department of Health does not appear to be involved at all. A crazy omission in my belief.
10. At least the NAPCP document made me laugh out loud at one point on the hand wringing discussion on the banning of smoky coal given the wholesale retreat made recently by DCCAIE on the subject in the face of commercial pressures.
11. The first responsibility of government is to protect its citizens. Perhaps DCCAIE should remember that.

Yours
[REDACTED]

Cleaning Our Air: A National Clean Air Strategy for Ireland

*Commentary: Professor ██████████ Centre for Research into Atmospheric Chemistry,
UCC*

Preamble

This document is excellent: comprehensive, clear and at points of critical importance for Ireland. I hope it gets the recognition as a game-changer that it deserves. I have commented on the document in response to the ordering of most of the consultation questions, although I discuss University Research issues and likely contributions throughout my submission.

Vision and an Air Monitoring Network for Ireland

1. The first element of my vision is for Ireland to pass a Clean Air Act to replace the outdated Air Pollution Act (1987). This instrument should put our health front and centre rather than be aimed exclusively at providing a tool for statutory compliance. WHO guidelines should be adopted in the Irish guidelines and the mission of the EPA be changed to reflect the new focus. That mission should include a much enhanced research support function. (In UK NERC exists in addition to the Environment Agency). Blue skies research has to return as part of the remit for the new body, for reasons I will discuss later.
2. The second is that Clean Air policy should be rooted in the unbreakable connection between Air Quality/Health and Climate Change. The ultimate policy (unlike the current three sustainable research pillars of the EPA) should not separate the two terms in any headline title. The link is self-evident in atmospheric Black Carbon particles.
3. The third element is that "Big Picture" matters such as the introduction of an International Law of the Air (like for the Seas) should be fully supported by the Irish Government and fully connected to "Small Picture" matters like the carrying of personal air monitors in a citizen science network.
4. The fourth element is to recognise that it is not correct to separate indoor air pollution from its outdoor counterpart. These two aspects have to be considered together alongside their synergies. Radon is monitored indoors by EPA, why not other chemicals?
5. The final element is that education of the public and politicians and journalists and sometimes policymakers regarding the underpinning science of air pollution is required. (Figure 1 is a great example of educating). It requires schools' programmes, local Tidy Towns Awareness Schemes, TV /Radio interviews, media articles and political/economic briefings for sure. It also needs a big focus project sited in a custom built building somewhere as an interactive centre for Air Quality and Climate Change. I suggest it be built in Cork!

The document gives an excellent overview of the inadequacies of the current air monitoring network co-ordinated by the EPA. It also describes a welcome plan that has been recently published for the future by the EPA. The new system will require many more real-time measurement/real-time reporting stations: I would estimate about 15-20 that are dispersed all over the country in a way not just determined by populations. I think the people of Kerry will think they are being ignored yet again with the EPA map proposal of air stations! These

activities will require a much expanded EPA. Even then the EPA cannot do it alone! Local Authorities must play their part. But they will not unless they are told to do so by Government. They are enthusiastic but will not commit resources unless made to, in general. (Wexford is an honourable exception). That responsibility must be clearly stated in the new Clean Air Act or the proposed EPA programme of monitoring will fail.

How can we know where we are as a nation regards pollution and health when the air monitoring network we currently run is worse than that provided in Tasmania or Iran? In this respect many more epidemiological studies need to be performed related to both chemical and biological particulates in the air.

Industrial air emissions will always prove a problem to those living in the vicinity. Smells are probably the most invasive but the trouble the EPA got itself into over the recent ENVA licence (in Portlaoise) shows the problems that are faced by them with their current mission. There are many and obvious health concerns in the locality of that factory. The EPA performed appropriate monitoring protocols and still the complaints came in. If the mission of EPA had been to put public health as its priority then much more specialised monitoring would have been performed. However this is a point that even researchers at the forefront have difficulty in helping with because techniques to detect and characterize Volatile Organic Compounds (VOCs) exist but are very expensive to deploy. In cases like this though the EPA and researchers need to co-operate on-site to help alleviate the concerns of the public. Mechanisms must be put in place to do this. Problems will also develop if companies begin to give up on fossil fuels and move to "Alternative Fuels" (AF) that may involve tyre, solvent and sludge burning. The public will not stand for this development unless there is continual air monitoring in the local area. Dioxins and other VOC and "dusts" and Ultra Fine Particles will be the main issues in my opinion.

The whole issue of VOCs (an enormous group of air pollutants from both anthropogenic and natural sources) needs to be addressed. The WHO guidelines do not mention levels at which oxygenated VOCs should be considered a problem. That should not stop the new Irish Strategy from devising detection protocols for compounds such as formaldehyde.

The Residential Sector

I believe it should be made illegal in any new Clean Air Act to burn solid fuel (coal, less-smoke coal, wood, peat and turf) if the residence has access to natural gas. Fuel poverty arguments and libertarianism are irrelevant in this discussion. Killing people is illegal.

The public should be educated about the toxic dangers of burning smoky coal in their homes in conjunction with learning the sometimes worse dangers of burning wood and peat! They should also be made more aware that even burning "clean" natural gas has a price to pay with climate change. (The Clean Air Dialogue is particular disappointing in this way; it makes me think that this current process is likely worthless with politico-speak ruling the day. What part did practising scientific stakeholders play in this "dialogue"?)

Solar energy sources must be promoted. Much more research in this area (and storage) is required in Ireland. It cannot carry on riding the coat tails of the huge investments being made

by other nations in this regard. New businesses of this type will save Ireland's economy in the future. Not act as a drain that "a small nation cannot afford".

Transport

How many countries have now realised that subsidizing diesel vehicles because of their smaller contribution to global warming than petrol-powered was stupid? All of them....and worse they all knew from atmospheric chemists that the localised emissions from the diesel combustion process were harmful and carcinogenic.

This is where it gets tricky for governments to remove the subsidies. Because they did know of the dangers and the excess mortality caused by PM and NO₂. In my view that is complicity. Nonetheless there should be an immediate surcharge put on to diesel at the forecourt and road tax. Yes an increase well above petrol price! In addition the government could apply a levy to insurance companies for every diesel vehicle that they insure. Trucking companies will have to buy electric. Such vehicles can be bought now. Buses too. The money from the taxes and levy can be put into diesel scrappage schemes. It can also be used to increase dramatically the number of fast, electric charging locations.

I can hear the objections from the rural community now. And yes they will need financial help and a better public transport set-up, help with purchasing electric cars and far better communications. But would they rather be under 6ft of water?

I repeat: Solar energy sources must be promoted. Much more research in this area (and storage) is required in Ireland. It cannot carry on riding the coat tails of the huge investments being made by other nations in this regard. New businesses of this type will save Ireland's economy in the future. Not act as a drain that "a small nation cannot afford".

(I have written many articles in my blog at crac.ucc.ie on the topics above. Please read them for a more complete scientific case regarding my position).

I (and John Wenger) wrote an EPA research proposal called ELIPSE in 2006 (and TacCo three years later). It demonstrated, as outlined in the document here, that the number of small particles emitted from Shipping in Cork Harbour were of potential concern. It also put into context how Domestic Solid Fuel burning in Cork (even in Summer) was an air quality problem. More work needs to be done on this topic. But I bring it up here because the project was written not in response to an EPA targeted call. It was a much more blue skies call. Many outside the research community did not even know then that there was a problem with shipping emissions. The EPA would never have targeted it. And that is why there must be a different way of funding Air Research in Ireland on a long term and sustainable basis. Sponsor people with good track records who have delivered. Do not rely on in-house discussions. Then results that can help form a basis for future strategies can be made with confidence.

Agriculture and other Biological Emissions

This is Ireland's biggest problem regarding climate change/air pollution in my opinion. The changes to practice required for farmers (like husbandry, fertilizer use, feedstocks) will require an extensive and targeted education programme. The Leaving Certificate in Agriculture has only just begun to mention climate change! What do related degree programmes contain even on the problems of ammonia release that subsequently interacts with airborne sulfur

compounds to make PM_{2.5} containing ammonium sulfate. This PM source has been modelled to indicate it is the biggest particulate killer in the world.

Food waste is an increasing problem for Ireland. Much is turned into compost. That process releases harmful bioaerosols like *Aspergillus fumigatus*. New methods of real-time detection must be devised in light of recent research work in Ireland. EPA projects BioCheA and OLBAS gave proof of principles for future approaches, including occupational monitoring for workers, and visitors to green waste management sites and piggeries and silage plants but the work needs to be built on, meaning financed. Furthermore the interaction between fungal spores and pollen with some chemical ingredients of air pollution must be studied. Blue skies yes. But so was BioCheA. Again it was not a targeted EPA project call. I was just interested in the topic and thought CRAC could contribute. And it did.

I have long brought to the attention that Ireland needs its own pollen/spore network based on its own measurements so that we can belong to the European Allergen Network (Currently Bosnia and Serbia are our other companions in this exclusion). Furthermore the European Commission is currently progressing a Standards and Certification (CEN) protocol for biological particles that Ireland will have to obey.

EPA has sponsored attempts to perform pollen and fungal spore monitoring in a research context that needs to continue. But stakeholders like UCC/DIT/Asthma Society/EPA/Met Éireann need to get together to put a proper national network together. That needs ring-fenced finance even to set up a pilot scheme. It will not be cheap.

Research

I have mentioned a number of issues throughout the text but the main challenge for Ireland is how to most effectively fund that research. There are always resources. It is the prioritisation that matters. For many reasons over the last two years, Air Science research has become important globally and so Ireland now needs to step up.

In this regard the current structure of the EPA is not fit for purpose in my view. My statement is nothing to do with the quality of the personnel who have worked hard over the last 10 fallow years for Environmental research in Ireland (by comparison with the prior 5 years from 2002-2007). It is to do with national priorities. My solution would be to expand its responsibilities massively and to give the EPA a new title: the EPRA (where the R stands for research). Then it would be able to use ring-fenced resources to run the type of programmes that NERC does in the UK. From centres (sometimes distributed) to targeted programmes to EU participations to Blue Skies. My own experience at UCC has shown that the stop-start approach to funding in Air Chemistry in Ireland is destructive. We have trained many people; lost most of them to other countries or professions; lost morale, all because we could offer no medium or long term strategy to the researchers working with us. The government needs to provide resources to chosen University/EPRA/NGO/Industry centres and let the talent talk for itself.


13th March 2017

From: [REDACTED]
To: **airquality** <airquality@DCCAE.gov.ie>
CC: [REDACTED]
Subject: Public Consultation on the National Air Pollution Control Programme
Date: 28.06.2019 15:01:09 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Please find submissions from Cavan County Council below on the public consultation for the National Air Pollution Control Programme,
Regards

[REDACTED]
Senior Executive Scientist
Cavan County Council

Page 14 of the NAPCP outlines the LA responsibilities relevant to the NAPCP across the Built Environment, Agriculture and Industry sectors as follows –

- implementation role,
- enforcement role
- reporting and monitoring role

However, sufficient staffing resources to date have **not** been made available to local authorities to adhere to their responsibilities across these sectors.

The following areas have been designated as Air Enforcement Priorities for Local Authorities in order to protect public health and to improve and maintain air quality, **with no provision of local authority resources for same:**

- Solid fuels: Compliance of fuel merchants, retailers and householders
- Air and Noise Control (complaints)
- Air and Noise Control (planning): assessment and conditioning of planning permissions in relation to air/noise regulation
- Ambient Air Monitoring Programme (extension of AAMP)

Page 47 of the NAPCP outlines the following supporting measure - *Deliver effective enforcement of illegal use, marketing, sale and distribution of bituminous fuel, including by resourcing a regional approach.* – It is acknowledged that such a regional approach is in place for both waste (WERLA) and water (LAWPro), however, ultimately the enforcement is driven by the local authority staff at the front line on the ground.

Finally, provision is made in the supporting measures on page 47 of the NAPCP for transition of the public bus fleet to lower emitting alternatives but this should also be undertaken for the transport fleet within local authorities at a national level.

The contents of this e-mail (including attachments) are private and confidential and may also be subject to legal privilege. It is intended only for the use of the addressee. If you are not the addressee, or the person responsible for delivering it to the addressee, you may not copy or deliver this e-mail or any attachments to anyone else or make any use of its contents; you should not read any part of this e-mail or any attachments. Unauthorised disclosure or communication or other use of the contents of this e-mail or any part thereof may be prohibited by law and may constitute a criminal offence. The General Data Protection Regulation (GDPR) came into effect on 25th May 2018. GDPR and the Data Protection Acts give you greater rights over your personal data and requires organisations to take additional steps to ensure that your personal data is protected and processed fairly. Our Privacy Policy explains how Cavan County Council collects, shares, uses and protects your personal data. We respect your personal data and take great care to ensure security and confidentiality is maintained at all times. You may view our Privacy Policy at www.cavancoco.ie which also explains how you can exercise your rights under GDPR.

From: [REDACTED]
To: [airquality <airquality@DCCAE.gov.ie>](mailto:airquality@DCCAE.gov.ie)
Date: 7/5/2019 11:11:34 AM
Subject: BnM Response to: Public Consultation on the National Air Pollution Control Programme

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To Whom it May Concern,

Please find attached Bord na Móna's response to the above consultation.

We would be pleased of course to discuss any aspect of our response should you so wish and would be grateful if you might please acknowledge that you have received this submission.

Kind regards,

[REDACTED]
*Bord na Móna Powergen,
Main Street,
Newbridge,
Co. Kildare,
W12 XR59
Ireland.*

Tel [REDACTED]
Mobile [REDACTED]
Email [REDACTED]
www.bordnamona.ie , www.loughbooranparklands.com , www.heartland.ie

Bord Na Mona plc
Registered Office: Main Street, Newbridge, Co. Kildare, W12 XR59
Registered No: 297717

Disclaimer: The information contained in this email and in any attachments is confidential and is designated solely for the attention and use of the intended recipient(s). This information may be subject to legal professional privilege. If you are not an intended recipient of this email, you must not use, disclose, copy, distribute or retain this message or any part of it. If you have received this email in error, please notify us immediately and delete all copies of this email from your computer system(s).

Notice: You are requested to carry out your own virus check before opening any attachment. Bord na Mona plc accepts no liability for any loss or damage which may be caused by software viruses.

Bord na Móna's Response to the Public Consultation on the National Air Pollution Control Programme (NAPCP)

1. Introduction

Bord na Móna welcomes the publication of this first iteration of the National Air Pollution Control Programme (NAPCP).

While we recognise that 'NAPCP reporting' incorporates elements from a number of connected National strategies and plans¹, many of which we have already responded to; in this response we comment on what is set out in aspects of the paper, as well as to the European Commission's 'Conclusions on the Clean Air Dialogue with Ireland'².

2. Observations

It is recognised that the NACP must report on both air quality and air pollution emissions of NO_x, SO_x, NMVOC, NH₃ and PM_{2.5}, and that the paper takes a structured perspective³, covering:

- a) A very comprehensive view of National Air Quality Priorities
- b) Responsibilities attributed to national, regional and local authorities
- c) Progress made by Current Policies and Measures
- d) Policy Options under Consideration, and essentially concluding with
- e) Measures and Policies Selected for Adoption by Sector

In section 3 of this response, we attempt to identify the issues relating to this consultation, noting that the primary concerns relate to NH₃, NMVOC and NO_x. (Ammonia, Non-Methane Volatile Organic Compounds, and Nitrogen Oxides, respectively) as these are the pollutants whose forecasted reductions will fall short of 2030 targets.

In section 4. we set out our general comment on i) measures ii) the most suitable instruments and iii) actions to implement the selected measures.

In section 5., we present a summary.

While we support many of the proposals we note that there is perhaps an under-representation of actions relating to Transport, as well as to other sources of Pollutants, such as uncontrolled Agricultural burning. Measuring background levels of pollutants, their origin, and the effectiveness, or otherwise, of proposed instruments towards targeting reductions is at the root of air quality policy. It is well-recognised that there is need for further work on emission factors and on source apportionment.

We highlight that enablers must be in place to ensure that desired policy objectives are implementable. Policy relating to Transport Fuels and Residential Solid Fuel will need to fully bear in mind traded, untraded, grey markets and cross border flows with Brexit.

¹ such as the Clean Air Strategy and the National Energy and Climate Plan

² 13th March 2017

³ In accordance with Article ³10(1) of Directive (EU) 2016/2284

3. Ireland's Air Quality – and the pinch points⁴

Ireland's Air Quality

To add perspective, and notwithstanding the need for continuous improvement and the potential beneficial health impact of improved air quality in Ireland, we note that Section 3.3⁵ highlights that in 2017 no exceedances of the EU legislative limits were observed.

The National Planning Framework⁶ identifies that 'In particular Ireland generally have good air quality'.

The European Commission's 'Conclusions on the Clean Air Dialogue with Ireland' of 2017, reflects that:

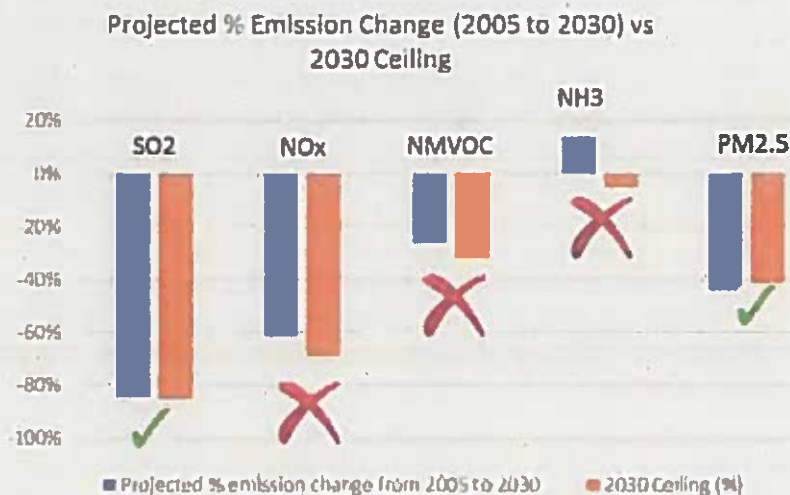
'Ireland has made significant progress in reducing air pollution and improving air quality, to the benefit of public health and welfare, the environment and its ecosystems, as well as reducing health and other costs to society resulting from air pollution.'

The Pinch points:

The points of difficulty relating to this consultation emerge from taking the EC paper, coupled with the draft NAPCP Report:

Extracting from Table 3⁷ of the draft NAPCP Report – one can clearly see that the NEC issue is forecast to arise in relation to NH₃, NMVOC and NO_x, while the level of SO₂ and PM_{2.5} remain within acceptable limits.

Pollutants	Projected % emission change 2030 Ceiling		Good/Bad
	from 2005 to 2030	(%)	
SO ₂	-84%	-85%	✓
NO _x	-61%	-69%	✗
NMVOC	-26%	-32%	✗
NH ₃	14%	-5%	✗
PM _{2.5}	-44%	-41%	✓



⁴ Relating to this Consultation

⁵ Progress in relation to improving air quality

⁶ Ireland 2040 Our Plan Issues and Choices; Section 5.1.1

⁷ Table 3: Projected emission reductions (WM) scenario

The data in the report suggest that priority action is needed for the following pollutants Ammonia (NH₃), NO_x, and NMVOC, all of which are forecast to exceed 2030 ceiling.

We note the sources of these 'pinch point' emissions:-

- for Ammonia (NH₃), largely from Agriculture;
- for NO_x, largely relating to road transport, becoming an issue with further tightening of the ceiling for NO_x from 2030;
- and for NMVOC, from a variety of sources

4. Recommendations

i) Commentary Scope

In consideration of i) the selection of measures ii) the most suitable instruments and iii) actions to implement the selected measures we comment generally on the need to target reductions of Ammonia, of NO_x emissions and of NMVOC emissions primarily, given that these represent the pinch points. We also comment on SO₂ and PM_{2.5}.

ii) Agriculture – further work

The Agriculture Ammonia abatement options within the NECP look to be comprehensive.

Regarding other Agricultural emissions, apart from the Ammonia issue, we note from the EC's paper⁽⁸⁾ the uncertainty of the unmeasured impact from uncontrolled Agricultural burning. The EC's paper comments that:

'The scale of the issue is relatively unclear due to a lack of national data sets and a detailed inventory of burning activities.'

This area needs some attention, in terms of research (and enforcement if necessary) to determine the scale of these emissions.

iii) Transport

We note and support the other NECP measures shown in the consultation. Bord na Móna is fully supportive of further deployment of Electric Vehicles in tackling transport emissions and are aligned with the associated measures listed in the Paper. We support the proposals around roadside exhaust emission monitoring studies and believe there is a lot more which needs to be learned towards formulating effective policy.

Bord na Móna welcomes the Category 1 – Actionable Measures, relating to Transport. The implementation of the Alternative Fuels Infrastructure Directive provides a unique opportunity to achieve an impactful solution, especially with the undertaking that no new non-zero emission vehicles are to be sold in Ireland post 2030.

iv) Electric Heat – the transition

Regarding the Heat Pump opportunity – there needs to be recognition that this will take time. Only homes with a Building Energy Rating (BER) of C or better will be in any way suitable as hosts for heat pumps. A recent estimate is that circa 88% of the housing stock has a BER less than or equal to C, with 53% less than or equal to D and that the scale of resources required is €35Bn to €50Bn.

v) Air Quality Improvement & Policy design

That said, Bord na Móna fully recognises the benefits which will accrue from the increase in the use of electric vehicles as well as the transitional displacement of residential fossil fuels through heat pumps. We note, and agree with the expression that Ireland is not expecting exceedences of EU ambient air pollution limits going forward, and indeed are acutely conscious that Ireland not only has one of the lowest average PM_{2.5} levels in the EU, but has also achieved the fourth best improvement in the EU over the period 2011 to 2016, relative to its Average Exposure Index target.

We recognise that policy requires a key ingredient – Quality. It is well recognised that further work is required on emission factors, as well as to source apportionment of pollutants, to avoid under-achieving the forecasted reduction, and being mindful of potential unintended consequences. Likewise on indoor air pollution.

In relation to PM_{2.5} Bord na Móna recognises the very high background levels – and believes that there is a body of work to learn more about these. We support the proposal to consider new research on emerging Air Quality issues such as agricultural burning, shipping emissions, ultra-fine particles, non-road mobile machinery.

vi) Policy requires a key ingredient - Enforcement

Our general, and considered, comment however is that while all measures look sensible, for them to be practical and of use to the general public the ones relating to Transport fuel and Residential solid fuel in particular need to be underpinned by effective enforcement of 'existing' regulation as well as 'proposed' regulation.

viii) Enforcement requires Effective Policy design

The effectiveness and usefulness of policy design is totally dependent on how and whether it can be implemented. Effective policy implementation for solid fuel needs to evolve from the current 'head in the sand approach' in relation to- the untraded and grey market volumes of biomass (wood) and of Sod Turf which are being burned in residential homes across the country. Similarly, the law in respect to cross border North/South solid fuel needs to be enforced particularly in the context of a) increasing Carbon Tax price differentials incentivising illicit trade and b) the Brexit impact. We note similar concerns in relation to Transport fuels, and do acknowledge recent initiatives in this area of law enforcement.

It is important that Policy is properly informed so we welcome the proposal to Commission detailed research study on solid fuel use in the residential sector to improve national (i) fuel statistics and (ii) and air pollution emission inventories from all sources, extending well beyond just solid fuel related. Likewise, there is a need for robust and relevant information on levels of indoor air pollution. Improved, peer reviewed data on Emission factors and Source apportionment is required for both outdoor and indoor air pollution.

v) The Flexibilities Mechanism

Regarding the flexibilities mechanism; recognising that the new NEC Directive allows Member States some flexibilities in achieving compliance for air pollution, Bord na Móna is firmly of the view that Pollutant swaps or Offsets should not consider SO₂ and PM_{2.5}, as there is not a large surplus in either parameter.

Noting that the pinch points relate to NH₃, NMVOC and NO_x, we comment on some of the proposed Category 2 and Category 3 proposals.

ix) Category 2 & Category 3 Proposals re Solid Fuel

Bord na Móna supports the majority of the measures relating to solid fuel set out in Category 2 – Supporting Measures, as well as those in Category 3 Policy Exploration, Development, and Better Governance bearing in mind that the effectiveness of low Smoke Zones has been compromised historically by the frequent inability to enforce regulations in the past. SWIFT 7, which was designed as an instrument to robustly underpin the carbon tax on residential solid fuel has, delivered far short of expectations. Any distributional policy initiatives in this area, such as the potential restriction on residential wood moisture, must be fully conscious of the need for strong enforcement of current laws– which could only be effective for industry (the ‘honest broker’) and for the population at large if there is rigorous enforcement.

Bord na Móna is acutely aware of the need for, and supports, energy efficiency first, as a pre-requisite to the introduction of heat-pumps, as part of transition away from fossil fuels. Given the scale of the journey, this will take some time yet. The deeper the retrofit, the greater the effectiveness of the heat-pump. During this transition period there is now a good opportunity to engage with the Stove Manufacturing Industry to potentially expedite the uptake of the Eco Design Regulation. Some of the proposals around a product standard for emissions from biomass appliances were unclear insofar as to whether the proposal was in relation to fuels or appliances, especially in the context of the EcoDesign introduction.

As with all policy initiatives, it is important that no cohort of society is left behind and we would urge policy makers to be aware of potential impacts during this transition on the Energy Poor in our community.

5. Summary

The primary issues featuring in this consultation relate to NH₃, NMVOC and NO_x which according to the data presented in the consultation are largely attributable to pollution from the Agriculture and Transport sectors.

We welcome the initiatives around Ammonia abatement – a key Agricultural deliverable – as well as the recognition of the need to quantify the level of Agricultural emissions from uncontrolled burning.

Bord na Móna is strongly in favour of the EV roll-out. Now is a key time to ‘get right’ the implementation of the Alternative Fuels Directive, with the plan for no new non-zero emission vehicles to be sold in Ireland post 2030 – and with the roll-out of the transport electricity re-charging infrastructure.

While recognising and supporting the Heat Pump opportunity, and the environmental benefit in displacing of residential fossil fuels through heat pumps, we understand that because of the ‘energy efficiency first’ imperative, and the associated €35Bn to €50Bn cost estimates^a up to 2030 and beyond, it will take time to realise - there is need for transition.

Bord na Móna supports the majority of the proposals, specifically in relation to Energy Efficiency, Retrofits and Stoves while reminding policy makers that they must be mindful of the Energy Poor in our community.

^a According to various estimates

From: [REDACTED]
To: [airquality <airquality@DCCAE.gov.ie>](mailto:airquality@DCCAE.gov.ie)
Date: 7/5/2019 9:39:08 AM
Subject: Ervia's response to the National Air Pollution Control Programme Consultation

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Sir/Madam,

Please find attached Ervia's response to the National Air Pollution Control Programme Consultation.

If you have any queries, please feel free to contact me.

Kind Regards,

[REDACTED]
Business Analyst – Commercial & Regulation

ervia

Colvill House, 24-26 Talbot St, Dublin 1
T 0353 21 4539456 | [REDACTED] | www.ervia.ie



The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential, commercially sensitive and/or privileged material. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited and may be unlawful. Ervia accepts no liability for actions or effects based on the prohibited usage of this information. Ervia is neither liable for the proper and complete transmission of the information contained in this communication nor for any delay in its receipt. If you received this in error, please contact the sender and delete the material from any computer.

E-mail may be susceptible to data corruption, interception and unauthorized amendment. Ervia accepts no responsibility for changes to or interception of this e-mail after it was sent or for any damage to the recipient's systems or data caused by this message or its attachments. Please also note that messages to or from Ervia may be monitored to ensure compliance with Ervia's policies and standards and to protect our business. Ervia (formerly Bord Gáis Éireann) is a body corporate established under the Gas Act 1976.

Thank you for your attention.

Is don té nó an t-eintéas chuig a seoltar an fhaisnéis atá an fhaisnéis seo beartaithe agus d'fhéadfadh ábhar faoi rún, atá logair ó thaobh tráchtála agus/nó faoi phríbléid a bheith mar chuid de. Tá cosc ar dhuine ar bith nó ar eintéas ar bith seachas an té chuig a raibh sí beartaithe, an fhaisnéis seo a athbhreithnú, a athsheoladh, a scalpeadh nó aon úsáid eile a bhaint aisti, nó gníomh a ghlacadh bunaithe uirthi agus d'fhéadfadh sin a bheith in aghaidh an dlí. Ní ghlacfaidh Ervia aon fhreagracht maidir le gníomhartha nó iarmhairtí a bheadh bunaithe ar úsáid thoirimisce na faisnéise seo. Ní bheidh Ervia freagrach maidir le seachadadh cuir ná lomlán na faisnéise atá sa chumarsáid seo ná maidir le haon mhoill a bhainfeadh lena fáil. Má fuair tú an teachtaireacht seo trí dhearmad, déan teagmháil le do thoil leis an té a sheol í agus scríos an t-ábhar de gach ríomhaire.

D'fhéadfadh truailliú sonraí, idircheapadh agus leasú neamhúdaraíthe tarlú do ríomhphost. Ní ghlacfaidh Ervia aon fhreagracht maidir le hathruithe nó idirghabháil a dhéantar ar an ríomhphost ó bheidh sé seolta nó maidir le haon damáiste a dhéanfaidh an teachtaireacht seo nó na ceangaltáin leis do chórais nó do shonraí an té a fhaigheann é. Tabhair ar aird le do thoil go bhféadfadh monatóireacht a bheith á déanamh ar theachtalreachtaí chuig Ervia nó uaidh chun a chinntiú go bhfuiltear ag comhlíonadh caighdeán agus beartaí Ervia agus chun ár ngnó a chosaint. Is comhlacht corparáideach é Ervia (Bord Gáis Éireann roimhe seo) a bunaíodh faoin Acht Gáis 1976.

Go raibh maith agat as d'aird a thabhairt.

There may be merit in examining the use of the 'flexibilities' however, the data suggests that there is not sufficient headroom for Pollutant swaps from SO₂ and/or PM_{2.5}.

We remain concerned about the background levels of certain pollutants, and believe that there is much work to do regarding emission factors as well as source apportionment. Incorrect source apportionment will lead to policy instruments and resources being misdirected and underachieving the forecasted reduction. Likewise we believe that there is much work required in relation to indoor air pollution.

We have cautioned, specifically in relation to residential solid fuel that the ability to enforce is a pre-requisite to any policy introduction, referring to traded, untraded, grey market fuels, from within and outside of the jurisdiction. Bord na Móna would be pleased to help the Department in whatever way it can in this regard, based on its' experience to date.

ervia

**Ervia's response to the
National Air Pollution Control
Programme Consultation**



05/07/2019

Ervia

Introduction to Ervia

Ervia is a commercial semi-state company with responsibility for the delivery of gas and water infrastructure and services in Ireland, through Gas Networks Ireland and Irish Water. It also provides dark fibre broadband infrastructure through its business Aurora Telecom.

Gas Networks Ireland develops, operates and maintains the natural gas transmission and distribution networks in Ireland, consisting of 14,172km of gas pipelines. Gas Networks Ireland provides gas transportation services to all gas suppliers and shippers.

Irish Water is the national water utility responsible for providing safe, clean and affordable water and wastewater services to 1.7 million customers in the Republic of Ireland. Irish Water is responsible for the operation of all public water and wastewater services.

These national gas and water utilities underpin the social and economic development of Ireland and will play strategic roles in the transition of Ireland to a low carbon, climate resistant and sustainable economy by 2050.

Introduction

The World Health Organisation (WHO) estimates show that more than 400,000 premature deaths are attributable to poor air quality in Europe annually. In Ireland, the annual number of premature deaths attributable to air pollution is estimated at 1,510 people and is mainly due to cardiovascular disease. The WHO has described air pollution as the 'single biggest environmental health risk'.

The Environmental Protection Agency (EPA) Ireland, have also stated:

1. Levels for both PM₁₀ and PM_{2.5} are above the WHO air quality guidelines.
2. Emissions from traffic are the main source of nitrogen oxides (NO_x) in Ireland. It will be important to remain vigilant to increasing NO₂ levels, particularly from transport in urban centres, in light of the economic recovery.

It is also noted in the consultation document that residential fuel use will become an important sector, when trying to reduce emissions of SO_x.

Ervia have outlined some suggestions below to help reduce these emissions and improve air quality in Ireland:

- Support homes and businesses to switch from burning oil and coal to gas, the cleanest fossil fuel and which can be decarbonised to reduce harmful pollutants,
- No supports be given to biomass burning for heat in urban areas,
- Support the development of a biomethane industry in Ireland which will help decarbonise heat, transport and agriculture, while improving air quality,
- Support the roll out of Compressed Natural Gas in transport to replace diesel in heavy goods vehicles;
- Carry out an assessment on the impacts of large scale biomass burning for power generation in terms of air quality.

Residential emissions affecting air quality

It is noted in the consultation document that 'Combustion from the residential sector is the largest source of emissions, with 48% in 2016'. It is also noted that there has been a reduction due to fuel switching from more polluting fuels (in terms of PM_{2.5}) such as coal and peat to less polluting fuels, such as natural gas.

While it is promising that emissions are falling in this sector, Ervia is concerned about the level of emissions from the increasingly popular biomass stoves being installed, especially in urban areas.

Looking to the United Kingdom for lessons learned on their approach to air quality, a 2018 consultation¹ highlighted the following:

- 'Since 2005, we have seen an increase in the emissions from the domestic sector. We believe this is largely due to an increase in the popularity of open fires and wood-burning stoves.
- A recent report by King's College London measuring local concentrations, found that wood burning accounts for up to 31% of the urban derived PM_{2.5} in London.
- As well as the overall impact of domestic burning on air quality for everyone, we are concerned about the health impact this can have on individuals who use solid fuel and their families.'

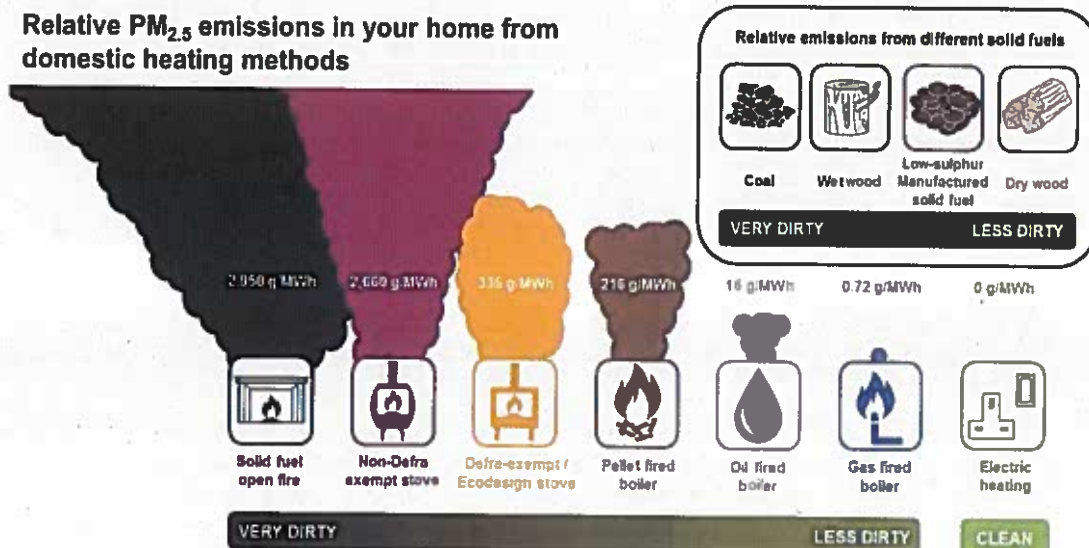
The Committee on Climate Change UK recommended the UK take the following actions to help improve air quality²:

- 'Our advice to Government is to not support any biomass for heat in urban areas because of the air quality impacts, including PM_{2.5} (fine particulate matter with a diameter below 2.5 microns)'
- ✓ Ervia recommends that Ireland follow the UK recommendations and not actively support the burning of biomass in urban areas due to air quality issues.

¹ Consultation on cleaner domestic burning of solid fuels and wood

² Biomass in a low-carbon economy CCC UK

It is clear to see from the graphic below (sourced from the same UK consultation) the benefits, in terms of air emissions, that natural gas (and soon renewable gases) offer to Ireland.



Smoke plumes are not to scale. Emission factors show emissions in the home – emissions during production of fuel or electricity are not included here. Emission factors taken from EMEP2016 Guidebook (1A4 small combustion tables). The following definitions were used. Solid fuel open fire: wood burned in an open fire, Non-Defra approved stove: wood in a conventional stove, Defra approved / Ecodesign stove: wood in an advanced / ecolabelled stove, Pellet fired boiler: wood in pellet stoves and boilers, Oil fired boiler: fuel oil in a medium (>50kW < 1MW) boiler, Gas fired boiler: natural gas in a small (<50 kW) boiler

It is positive to see in the Government’s Climate Action Plan (published in June 2019) ambition to decarbonise domestic heating and improve air quality by installing 400,000 domestic heat pumps (in existing homes) by 2030, however this would leave c. 1.5m homes not using electric heating. Currently c. 700,000 homes use natural gas which is not only the best fossil fuel in terms of air quality it also has the lowest CO₂ emissions per kWh. Moving homes from oil, peat and coal to the gas network not only reduces residential CO₂ emissions it would also enhance Ireland’s air quality. There is an immediate opportunity to transition 300,000 homes from burning oil to using the gas network to heat their homes. This is outlined in a 2018 KPMG study ‘Decarbonising Domestic Heat in Ireland’³. These homes could be further decarbonised via increasing levels of biomethane in the grid from 2019 onwards.

- ✓ Ervia recommends that to improve air quality in Ireland and to reduce CO₂ emissions in the residential sector homes close to the gas network are incentivised to connect to the network.
- ✓ Ervia recommends that Government support the creation of a biomethane industry in Ireland that will help decarbonise homes with a gas boiler and improve air quality in Ireland. Supporting a biomethane industry in Ireland could also reduce NH₃

³ [Decarbonising Domestic Heating in Ireland 2018 - KPMG](#)

emissions in the agricultural sector which has seen levels of air pollution rise since 2011.

Transport emissions affecting air quality

Diesel transport was originally thought to be 'cleaner' than petrol, in terms of CO₂ pollution, but little consideration was given to the adverse impact it would have on our air quality in Ireland. Transport is another sector in which the gas network can help improve Ireland's air quality, switching from diesel to Compressed Natural Gas (CNG) would reduce harmful air emissions from diesel trucks and buses in Ireland.

"The International Agency for Research on Cancer (IARC) is part of the World Health Organization (WHO). Its major goal is to identify causes of cancer. IARC classifies diesel engine exhaust as "carcinogenic to humans," based on sufficient evidence that it is linked to an increased risk of lung cancer. IARC also notes that there is "some evidence of a positive association" between diesel exhaust and bladder cancer".

CNG is a mature and proven technology which delivers improved air quality with **99% less particulate matter, 70% less Nitrogen Oxide, and 80% less Sulphur Dioxide relative to diesel**, it also offers a c.16% reduction in CO₂ emissions when compared to the latest diesel vehicles. When the production of renewable gas is increased on the gas network, and this gas is utilised by CNG vehicles as bio-CNG, carbon neutral transport can be achieved.

The rollout of a network of CNG refuelling facilities has commenced with 14 fast fill CNG stations being installed across the Core TEN-T road network via a project called the Causeway Study⁴ that is supported by the European Commission through the CEF Transport Fund⁵ and the Commission for Regulation of Utilities (CRU). In December 2018 a new public CNG station opened in Dublin Port. This project helps support the 'National Policy Framework: Alternative Fuels Infrastructure for Transport in Ireland (2017 to 2030)', which sets out a target network of 70 CNG refuelling stations by 2025. This document also forecasts Alternative Fuelled Vehicles for 2025 and 2030 i.e. 4,050 CNG commercial vehicles and 1,000 CNG buses in Ireland by 2025, growing to 6,050 CNG commercial vehicles and 1,500 CNG buses by 2030.

- ✓ Ervia recommends that to improve air quality in Irish cities public transport fleets transition from diesel to CNG.
- ✓ Ervia recommends that financial incentives for diesel should be removed and further supports given to cleaner alternatives like CNG. This could include reducing tolls for CNG trucks/buses.

⁴ [Causeway Study](#)

⁵ [CEF Transport Fund](#)

Power Generation emissions affecting air quality

The energy sector is one of the largest contributors to greenhouse gas emissions through CO₂ and to a lesser extent N₂O emissions which pose a significant threat to the global environment.

Emissions to air from combustion installations have the potential to cause significant impacts on local air quality. There are a range of emissions and emission sources ranging from dust from solid fuel and ash storage and handling to NO_x, SO_x CO, hydrocarbons, particulates and heavy metals from combustion plant. All these emissions have the potential to adversely affect air quality.

Natural gas fired power generation is considerably cleaner than coal, peat, oil and biomass in terms of air quality and CO₂ emissions. With dates already confirmed for the closure of coal and peat power generation in Ireland, Ervia feel these could be brought forward which would improve air quality and the impact on the environment.

One alternative to coal and peat burning in Ireland is to support biomass burning for power generation. This poses significant risks to air quality and also to the wider environment as highlighted by the 30+ civil groups in the USA who have opposed the ESB's plans to burn biomass in Ireland as it could pose a serious threat to Southern USA forests⁶.

A recommendation from the Committee on Climate Change UK states '**Do not provide further policy support (beyond current commitments) to large-scale biomass power plants that are not deployed with CCS technology**'. This is due to the limited availability of biomass and the better alternative uses than the relatively costly and inefficient burning of it for power generation.

- ✓ Ervia recommends that to help improve Ireland's air emissions the use of biomass in electricity generation is not supported.
- ✓ Ervia recommends that to improve air quality in Ireland the cessation of peat and coal burning for power generation be brought forward.

Production of Biomethane can reduce harmful air emissions in the Agriculture Sector

The use of fresh slurry in renewable gas production can reduce emissions from manure storage on farms, particularly potent methane emissions. The replacement of open slurry storage with anaerobic digestion can potentially deliver 17% methane emissions saving. Slurry biogas systems are therefore very favourable as they can be carbon negative. The digestate produced as a by-product of the anaerobic digestion process can also be used as a bio-fertiliser, reducing emissions from energy intensive chemical fertiliser production.

⁶ [Green News – March 2019](#)

- ✓ Ervia would recommend the development of an anaerobic digestion industry to produce renewable gas for injection into the gas network which will also reduce agricultural methane emissions.

ervia

Aurora
TELECOM



Gas
Networks
Ireland

UISCE
DUBLIN LONDON
WATER

From: [REDACTED]
To: airquality <airquality@DCCAIE.gov.ie>
Subject: Gas Networks Ireland Consultation Response DCCAIE Public Consultation on the National Air Pollution Control Programme
Date: 05.07.2019 16:05:48 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it concerns,

Please find attached Gas Networks Ireland's response to the Department of Communications, Climate Action and Environment consultation on The National Air Pollution Control Programme. Gas Networks Ireland would welcome the opportunity to discuss this response with you in more detail.

If you have any questions or require any clarification with regard to the attached consultation response please let us know.

Kind regards,

[REDACTED]

[REDACTED]
Policy and Governance, Commercial Department

Gas Networks Ireland
P O Box 51, Gasworks Road, Cork, Ireland

T [REDACTED]
E [REDACTED]

Progress is natural, which is why we're
moving Ireland towards a cleaner energy future.



gasnetworks.ie | Find us on [Twitter](#)

Tá an fhaisnéis á seachadadh dírithe ar an duine nó ar an eintiteas chuig a bhfuil sí seolta amháin agus féadfar ábhar faoi rún, faoi phribhléid nó ábhar atá fogair ó thaobh tráchtála de a bheith mar chuid de. Tá eon atá seachadadh nó scaipeadh den fhaisnéis, eon atá bhréifneú ar nó eon úsáid eile a bhaint as, nó eon ghníomh a dhéanann ag brath ar an bhfaisnéis seo ag daoine nó ag eintitis nach dóibh siúd an fhaisnéis seo, toirimisce agus féadfar é a bheith neamhdhleathach. Níl Líonraí Gáis Éireann faoi dhéanann maidir le seachadadh lomán agus caert na faisnéise sa chumarsáid seo nó maidir le haon mhóil a bhaineann léi. Ní ghlacann Líonraí Gáis Éireann le haon dhéanann faoi ghníomh nó faoi iarmhairt bunaithe ar úsáid thoirimisce na faisnéise seo. Níl Líonraí Gáis Éireann faoi dhéanann maidir le seachadadh caert agus lomán na faisnéise sa chumarsáid seo nó maidir le haon mhóil a bhaineann léi. Má fuair tú an teachtaireacht seo in earráid, más é do thóil é, déan teagmháil leis an seoltóir agus scríos an t-ábhar ó gach eon ríomhaire. Féadfar ríomhphost a bheith soghabhálach i leith truaillithe, idircheaptha agus i leith leasaithe neamhdharaíthe. Ní ghlacann Líonraí Gáis Éireann le haon fhreagracht as aithníthe nó as idircheapadh a rinneadh ar an ríomhphost seo i ndiaidh é a sheoladh nó as eon dochar do chórais na bhfaighteoirí déanta ag an teachtaireacht seo nó ag a ceangaitán. Más é do thóil é, tabhair faoi deara chomh maith go bhféadfar monatóireacht a dhéanamh ar theachtairachtal chuig nó ó Líonraí Gáis Éireann chun comhlíonadh le polasaithe agus le caighdeáin Líonraí Gáis Éireann a chinntiú agus chun ár ngnó a chosaint. Líonraí Gáis Éireann cuideachta ghníomhaíochta ainmnithe, faoi theorainn scairearna, atá corpraithe in Éirinn leis an uimhir chláráithe 555744 agus a tá hoifig chláráithe ag Bóthar na nOibreacha Gáis, Corcaigh, T12 RX96.

Go raibh maith agat as d'aird a thabhairt

The information transmitted is intended only for the person or entity to which it is addressed and may contain confidential, commercially sensitive and/or privileged material. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited and may be unlawful. Gas Networks Ireland accepts no liability for actions or effects based on the prohibited usage of this information. Gas Networks Ireland is neither liable for the proper and complete transmission of the information contained in this communication nor for any delay in its receipt. If you received this in error, please contact the sender and delete the material from any computer.

E-Mail may be susceptible to data corruption, interception and unauthorized amendment. Gas Networks Ireland accepts no responsibility for changes to or interception of this e-mail after it was sent or for any damage to the recipients systems or data caused by this message or its attachments. Please also note that messages to or from Gas Networks Ireland may be monitored to ensure compliance with Gas Networks Ireland's policies and standards and to protect our business. Gas Networks Ireland a designated activity company, limited by shares, incorporated in Ireland with registered number 555744 and having its registered office at Gasworks Road, Cork, T12 RX96.

Thank you for your attention.

Department of Communications, Climate Action & Environment Public Consultation on the National Air Pollution Control Programme

Gas Networks Ireland Response



Contents

Contents	2
1 Introduction	3
2 Views on Consultation	3
3 Conclusion	4

1 Introduction

Gas Networks Ireland (GNI) owns, operates, builds and maintains the gas network in Ireland and ensures the safe and reliable delivery of gas to its customers. The company is responsible for transporting natural gas through 14,172km of pipeline networks. The gas network supplies energy to 700,000 customers, including businesses, domestic users and power stations. GNI believes that gas and the gas network are integral to Ireland's energy system and future.

GNI welcomes the opportunity to respond to the consultation on the National Air Pollution Control Programme.

2 Views on Consultation

GNI is concerned about air quality and commends the fact that checks are being made nationally using the more stringent World Health Organisation (WHO) guidelines in addition to the more lenient EU legislative levels. Section 3.3 of the consultation document details that no exceedances of the EU legislative limits for air pollutants were observed in 2017 but when assessed against the WHO guideline levels, four pollutants of concern are revealed. The consultation document lists two of these as:

- *"PM₁₀ and PM_{2.5} levels mainly linked to residential solid fuel use and transport emissions from diesel engines as well as from tyre and brake abrasion.*
- *NO₂ levels in urban centres associated with transport emissions."*

This consultation and the majority of the related documents place a heavy focus on electrification of vehicles to address transport emissions. While electrification of domestic vehicles may be a practical solution, electrification of heavy good vehicles (HGVs) and buses is currently not a viable alternative to diesel. Compressed Natural Gas (CNG¹) has the potential to address these transport emissions with 99% less PM, 70% less NO₂, and 80% less SO₂ relative to diesel.

GNI suggests that CNG, which is listed in the 'National Policy Framework: Alternative Fuels Infrastructure for Transport in Ireland (2017 to 2030)², be included in the consultation document as a way to address the emissions from HGVs and buses.

The rollout of a network of CNG refuelling facilities has commenced with 14 fast fill CNG stations being installed across the Core TEN-T road network via a project called the Causeway Study³ that is supported by the European Commission through the CEF Transport Fund⁴ and the Commission for Regulation of Utilities (CRU). In December 2018 a new public CNG station opened in Dublin Port. This project helps support the 'National Policy Framework: Alternative Fuels Infrastructure for Transport in Ireland (2017 to 2030)', which sets out a target network of 70 CNG refuelling stations by 2025. This document also forecasts Alternative Fuelled Vehicles for 2025 and 2030 i.e. 4,050 CNG commercial vehicles and 1,000 CNG buses in Ireland by 2025, growing to 6,050 CNG commercial vehicles and 1,500 CNG buses by 2030.

¹ Compressed Natural Gas (CNG) is a fuel used in the transport sector which reduces transport emissions.

² National Policy Framework: Alternative Fuels Infrastructure for Transport in Ireland (2017-2030)

³ Causeway Study <https://www.gasnetworks.ie/business/natural-gas-in-transport/the-causeway-project/>

⁴ CEF Transport Fund <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-transport>

GNI welcomes the EPA upgrade and expansion of the Ambient Air Quality Network as discussed in section 3.3 of the consultation document.

Section 4.1 of the consultation document lists a number of exceedances of PM levels in 2017 against WHO guideline levels. The document explains these breaches as follows:

"The main sources for much of the ambient air pollution are urban transport and residential solid fuel use."

With respect to residential solid fuel use GNI recognises the significant threat posed by particulate matter from the burning of such fuels and believes that caution should be exercised when considering solid biomass. Biomass is mentioned in the Government's Climate Action Plan⁵, however, GNI suggests that more severe emissions requirements are considered for biomass to reflect the threat to human health⁶.

GNI supports the closure of Moneypoint power station as included in the Government's Climate Action Plan. Where there are opportunities to transition coal/peat fired power generation plants to combined cycle gas turbine (CCGT) or open cycle gas turbine (OCGT) plants, these should be considered to reduce the substantial impact coal/peat plants have on the environment.

Anaerobic digestion (AD) plants, used to produce renewable gas⁷, have air quality benefits. A by-product of AD is the production of bio-fertiliser. This bio-fertiliser displaces chemical fertiliser which is produced by burning fossil fuels causing air pollution. GNI suggests that AD be included as an option to reduce air pollution. GNI is currently working to develop renewable gas injection points on the gas network to support AD plants. Current active projects in this area include the GRAZE⁸ Gas project which aims to develop a renewable gas injection point in the Mitchelstown area and associated logistics. GNI is targeting 20% renewable gas on the gas network by 2030.

3 Conclusion

GNI supports measures to improve national air quality and recommends the following points are given consideration:

- The use of CNG in transport to improve air quality.
- Consideration of more stringent biomass emissions levels.
- Moneypoint replaced with CCGT/OCGTs.
- The potential of bio-fertiliser from AD to displace chemical fertiliser.

GNI would welcome the opportunity to discuss this response in more detail and can provide further information on any of the topics discussed, if required.

⁵ Irish Government - Climate Action Plan, June 2018

⁶ Irish Times - 'Green' home heating fuels causing 'extreme levels of air pollution'

⁷ Renewable Gas: <https://www.gasnetworks.ie/corporate/company/our-commitment/environment/renewable-gas/>

⁸ GRAZE Gas Project: <https://www.gasnetworks.ie/corporate/news/active-news-articles/major-step-forward-to-bring-renewable-gas-on-to-gas-network/>

From: [REDACTED]
To: **airquality** <airquality@DCCAIE.gov.ie>
Subject: Air Quality Division - AOC - 8 July 2019
Date: 08.07.2019 15:36:02 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

To whom it may concern,

We apologise for missing the Friday deadline but please see attached the ICMSA response to the National Air Pollution Control Programme,

Kind regards,

[REDACTED]
PhD - Dairy Science
Policy Officer
ICMSA

Reference: 05072019



Air Quality Division,
DCCAÉ,
Newtown Road,
Wexford,
Y35 AP90

THE FAMILY FARM ORGANISATION

John Feely House,
Dublin Road, Limerick,
Ireland, V94 KX38.

Tel: +353 (0)61 314677
Email: info@icmsa.ie
Web: www.icmsa.ie

Topic: Draft National Air Pollution Control Programme

To whom it may concern,

ICMSA is a farm organisation that represents the dairy and beef sectors of Ireland. Thus, with regards to this plan we have focused upon the sections that are relevant to agriculture section and would like to make the following points:

Under Table 5.

The land spreading measures and the Bandspreader or trailing shoe measure should be treated as the one measure "low emission spreading" and then broken down by sector. It is very difficult to breakdown ammonia mitigation by trailing shoe and trailing hose given that its uptake will be very dependent on what's available and practical to use at local level.

The feeding strategies option should suggest that all feed should be labelled with its PDI values which is a more accurate measure of the protein in the feed which is available to the ruminant. This would allow farmers to make better decisions when purchasing feed.

Farmers must be incentivised to take up measures that benefit the climate. When setting policy, the low profitability of the sector cannot be ignored and we must support farmers to make the change towards systems with lower emissions.

We hope that you look favourably on these suggestions and should you have any queries please do not hesitate to contact us at our head office on (061) 314677.

Your sincerely,

A large, dark, rectangular redaction mark covering the signature area.A smaller, dark, rectangular redaction mark covering the name of the signatory.

President.

From: [REDACTED]
To: **airquality** <airquality@DCCAIE.gov.ie>
CC: [REDACTED]
Subject: SSE response - National Air Pollution Control Programme consultation
Date: 05.07.2019 14:12:24 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon,

Please find attached our response the consultation on Ireland's National Air Pollution Control Programme.

If you have any questions or would like to discuss our response, please do get in touch.

Kind regards,

[REDACTED]

[REDACTED] Corporate Affairs

E: [REDACTED] | T: [REDACTED] | M: [REDACTED]

Red Oak South | South County Business Park | Leopardstown | Dublin 18 | Ireland



Think green Do you really need to print this email?



The information in this E-Mail is confidential and may be legally privileged. It may not represent the views of the SSE Group. It is intended solely for the addressees. Access to this E-Mail by anyone else is unauthorised. If you are not the intended recipient, any disclosure, copying, distribution or any action taken or omitted to be taken in reliance on it, is prohibited and may be unlawful. Any unauthorised recipient should advise the sender immediately of the error in transmission. Unless specifically stated otherwise, this email (or any attachments to it) is not an offer capable of acceptance or acceptance of an offer and it does not form part of a binding contractual agreement.

SSE Generation Limited is part of the SSE Group. The Registered Office of SSE Generation Limited is No.1 Forbury Place, 43 Forbury Road, Reading, Berkshire, RG1 3JH

Registered in England & Wales No. 02310571

www.sse.com



DEPARTMENT OF COMMUNICATIONS, CLIMATE ACTION AND ENVIRONMENT

SSE RESPONSE TO

Public Consultation on National Air Control Pollution Programme

JULY 2019

INTRODUCTION

SSE is Ireland's second largest energy utility and the country's leading developer and investor in clean energy infrastructure. From small beginnings we've grown to become Ireland's second largest energy provider, supplying green electricity and natural gas to over 800,000 homes and businesses on the island. Through our retail arm, SSE Airtricity, we're proud to provide 100% green energy¹. Since 2008, SSE has invested over €2.5 billion in growing our energy business here – creating jobs in Ireland, sustaining employment, driving competition and greening our economy. Our 29 onshore wind farms have a combined generation capacity of 740MW, making us the largest generator and provider of renewable energy in the integrated all-island Single Electricity Market.

SSE's thermal generation includes one of Ireland's cleanest power stations - the 464MW Great Island CCGT unit in Co. Wexford which can generate enough energy to power over half a million Irish homes. We also own and operate another three power stations which are regulated by the Environmental Protection Agency (EPA) under the Industrial Emissions Directive (IED).

The Paris Agreement on climate change requires a transformational shift in our economy and society towards climate resilient and sustainable development. As the largest generator and provider of renewable energy in the all-island Single Electricity Market, SSE will be at the forefront of ensuring society realises the ambition of the Paris Climate Agreement to bring net greenhouse gas emissions down to zero.

We welcome the Government's "Climate Action Plan" which seeks to address the threats posed by climate change and put Ireland on a path to decarbonisation. We welcome the 70% renewable electricity target in the Plan and the ambition to decarbonise heat and transport. These developments will also go towards improving air quality, health outcomes and the quality of life of citizens.

¹ 100% green energy based on Fuel Mix Disclosure and CO2 Emissions for 2016, published by the Commission for Regulation of Utilities (CRU), October 2017. Largest provider of 100% green energy claim based on Retail Market Reports published by the CRU for the periods Q1-Q4 2016.

RESPONSE

SSE welcomes the opportunity to respond to this public consultation on Ireland's National Air Pollution Control Programme (NAPCP). Reducing emissions and associated improvements in air quality are of critical importance to Ireland's plans to address climate change. We welcome the strong focus on measures that can reduce emissions in the non-ETS sector, which is responsible for the majority of emissions in Ireland. In Ireland, sectors covered by the ETS have been more successful in reducing emissions than those that are not. We are forecast to miss our non-ETS emissions 2020 target by a large margin². While ETS emissions have increased in Ireland in recent years due to the economic recovery, Ireland's ETS sector is on track to reduce GHG emissions by more than 20% by 2020, compared to 2005 levels. Emissions reductions from the energy industry in Ireland have played a key role with a decrease of 6.9% in 2017 due to a fall in fossil fuel consumption and an increase in electricity generated from wind³.

We also welcome the measures identified to drive the decarbonisation of heat and transport such as private financing to boost the uptake of energy efficiency improvements, heat pump deployment and the expansion of Electric Vehicle charging infrastructure.

Our response to this consultation focuses on two issues: proposals in relation to a regional approach to the enforcement of air legislation and real-time air quality data reporting.

Regional approach to the enforcement of air legislation

Category 3: Policy exploration, Development and Better Governance

- 1. Develop a regional approach to support enforcement of air legislation taking consideration of the lessons from the regional approaches adopted for waste, water and climate legislation.*

² SEAI report: National Energy Projections to 2030: https://www.seai.ie/__uuid/53c5db52-b9d9-456e-aca502a5544b6bc7/National-Energy-Projections-to-2030.pdf

³ EPA report: Ireland's Provisional Greenhouse Gas Emissions: http://www.epa.ie/pubs/reports/air/airemissions/ghgemissions2017/Report_GHG%2019902017%20November%202018_Website.pdf

The EPA's approach to enforcement is underpinned by the principles of proportionality, consistency, transparency, risk and the concept of the polluter pays. In line with the requirements of the Industrial Emissions Directive, the EPA categorises each licensed facility in terms of the risk to the environment. Factors for the risk categorisation of each site include the complexity of the activity, the type, nature and quantity of emissions, the sensitivity of the receiving environment and its location. The highest ranked facilities receive the most planned visits from the EPA each year. The EPA also employs a system for the identification of licensed sites which are considered a national enforcement priority. National Priority Sites are subject to additional scrutiny and attention from the EPA. The Industrial Emissions Directive (IED) also contains specific provisions in relation to air quality for large combustion plants.

We believe that the EPA's current approach to enforcement of the IED is appropriate. SSE would caution against additional approaches to enforcement that could potentially cut across or duplicate Irish businesses obligations at a national or EU level.

Air quality data reporting

Category 3: Policy Exploration, Development, and Better Governance

5. Review and implement the provision of publicly available Real-time Air Quality Data from prioritised IED sites.

As mentioned above, we believe the current approach to air quality enforcement is appropriate and proportionate. Large Combustion Plants already comply with strict rules in relation to air pollutant reductions and air quality monitoring in compliance with EU legislation. Licensees are required to submit information to the EPA in line with the obligations set out in their licences. This includes the publication of annual air emissions data through Annual Environmental Reports. In addition to this, EPA licenced sites are governed by their environmental licence which stipulates the ELV (emission limit value) for each applicable pollutant. Each licensee is also required to report incidents at their installation to the EPA under the terms of their licence. An incident is typically defined as an Emission Limit Value breach, breakdown of key abatement plant or any indication that environmental pollution has or may have taken place. EPA licenced sites are also subject to inspections and testing where applicable.

Publicly available real-time air quality data would be technically challenging to produce, costly and of only limited value. A number of variables may impact on emissions at any particular time. For example, emission values will be higher during start up and shut down. Emission values also vary according to the type of fuel used, measurement value, confidence interval and calibration factor.

Reporting in real-time wouldn't allow sufficient time to validate the emissions data and presents the risk of non-validated emissions being reported. Section 4 of the 2012 Large Combustion Plant Regulations details the methodology to be employed when preparing validated results to determine compliance against environmental licence ELVs. These are subsequently reported to the EPA. For example, licences include the following requirements for plants:

- No validated monthly average value shall exceed the relevant licence ELV.
- No validated daily average shall exceed 110% of the relevant licence ELV
- 95% of all the validated hourly average values shall not exceed 200% of the relevant licence.

Releasing data on a real-time basis wouldn't allow sufficient time for the methodology for validating results referenced above to be followed. For example, emissions values can be numerically above the ELV yet still be in compliance with the LCP Regulations. There is a risk such data could be misinterpreted by members of the public and cause undue concern. Valid emission data taken over a period of time is of superior value and we believe this is where the focus of monitoring and enforcement should be.

CONCLUSION

SSE is available to discuss any aspect of this submission further, should that be helpful to the Department.

From: [REDACTED]
To: **airquality** <airquality@DCCAIE.gov.ie>
CC: [REDACTED]
Subject: Teagasc Response to Consultation on NAPCP
Date: 09.07.2019 14:32:10 (+0000)

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon, please see attached [REDACTED] Director's Office

Attention:

This e-mail is privileged and confidential. If you are not the intended recipient please delete the message and notify the sender. Any views or opinions presented are solely those of the author. This email was scanned by Teagasc and has been certified virus free with the pattern file currently in use. This however cannot guarantee that it does not contain malicious content.

Tabhair aire:

Tá an r-phost seo faoi phribhléid agus faoi rún. Mura tusa an duine a bhí beartaithe leis an teachtaireacht seo a fháil, scrios é le do thoil agus cuir an seoltóir ar an eolas. Is leis an údar amháin aon dearcaí nó tuairimí a léirítear. Scanadh an r-phost seo le Teagasc agus deimhníodh go raibh sé saor ó víoras leis an bpatrúnchomhad atá in úsáid faoi láthair. Ní féidir a ráthú leis seo áfach nach bhfuil ábhar mailiseach ann.

A Response to the National Air Pollution Control Programme

Teagasc submission to the
Department of Communications, Climate Action and Environment

Prepared by the Teagasc Gaseous Emissions Working Group

Krol, D.J., Lanigan, G.J., Buckley, C., Donnellan, T., Forrestal, P., Hanrahan, K., Humphreys J.,
Murphy, NiFhlatharta, N., P., Richards, K.G., O'Brien, D., O'Dwyer T., O'Mara, F., Shalloo, L.,
Wall D., Waters, S., Spink, J. (chair)

Editors: Krol, D.J., and Spink, J.

July 2019

Teagasc

Agriculture and Food Development Authority

Oak Park, Carlow



Contents

Introduction	3
The Policy Context	3
Irish Ammonia Emissions	3
Ammonia Abatement Potential	6
Relationship between Ammonia Abatement Options and National Air Pollution Control Programme	8
The Role of Knowledge Transfer	9
Future Research	11
References	13
Abbreviations	15

Introduction

Teagasc is pleased to avail of the opportunity to make a submission to the Department of Communications, Climate Action and Environment (DCCAE) on the National Air Pollution Control Programme (NAPCP) and in particular on the potential for ammonia (NH₃) abatement within the agriculture sector. The objective of this analysis is to assess the scope of the ammonia mitigation set out within the NAPCP in order to meet Ireland's ammonia emissions reduction targets.

This submission builds on the previously submitted response to the National Clean Air Strategy during public consultation in 2017. The previous submission synthesised the ammonia mitigation potential of agriculture as reported in 'An Analysis of the Cost of the Abatement of Ammonia emissions in Irish Agriculture to 2030' (Lanigan et al. 2015). This current submission draws on that analysis and assesses the roadmap to compliance set out in this first iteration of the NAPCP.

The Policy Context

European Legislation: Under the current (revised Gothenburg Protocol) National Emissions Ceilings Directive (NECD) Ireland is obliged to reduce its ammonia emissions by 0.5% on 2005 levels by 2020. Further to a NECD review in 2012, a new target of a 1% reduction in ammonia emissions relative to 2005 levels from 2020 to 2030 was imposed on Ireland. Under the amended NECD of the EU Clean Air Package (Dec 2013), a post-2030 a 10% ammonia reduction target was proposed for Ireland. This was later revised down by EU Directive 2016/2284 to a 5% reduction in ammonia to 107.5 kT NH₃.

Food Wise 2025 (FW 2025) is the national plan for development in the agriculture and food sector. Food Wise 2025 envisages further increase in dairy production as well as significant expansion of the arable, pig, poultry and forestry sectors. Specific targets within the FW 2025 strategy included a) 85% increase in exports to €19 billion, b) 70% increase in value added to €13 billion, c) 65% increase in primary production to €10 billion and d) creation of 23,000 additional jobs all along the supply chain from producer level to high end value added product development. However, the strategy also stated that this expansion must be carried out whilst maintaining environmental sustainability. The FW 2025 strategy has adopted as a guiding principle that "environmental protection and economic competitiveness will be considered as equal and complementary, one will not be achieved at the expense of the other."

Irish Ammonia Emissions

Agriculture contributes virtually all (98%) of Ireland's national ammonia emissions (Hyde et al., 2003; Duffy et al., 2018). Historical Irish emissions are shown in Figure 1. Agricultural ammonia emissions reached a peak of 123.5 kT NH₃ in 1998 but subsequently declined to 104.4 kT NH₃ in 2011, due to a decline in the ruminant livestock population and reduced use of nitrogen (N) fertiliser. However, since 2011, ammonia emissions have been steadily increasing to 116.7kT NH₃ in 2016. These increased emissions over this period are primarily due to increased dairy cow numbers and urea fertiliser usage. In 2016, dairy and non-dairy bovines comprised 76.9% of agricultural ammonia with emissions arising principally from animal housing (31%) and storage (14%) and the landspreading of manures (30%). Manure emissions from pig and poultry systems comprised the bulk of the remaining emissions, followed by fertiliser-based emissions. Fertiliser emissions declined over the period 1990 to 2013, due to a combination of reduced fertiliser use and a lower proportion of urea

within total fertiliser use. However since 2014, urea usage has increased as a result of higher price differentials between urea and calcium ammonium nitrate (CAN) consequently leading to a 2.8% increase in ammonia emissions.

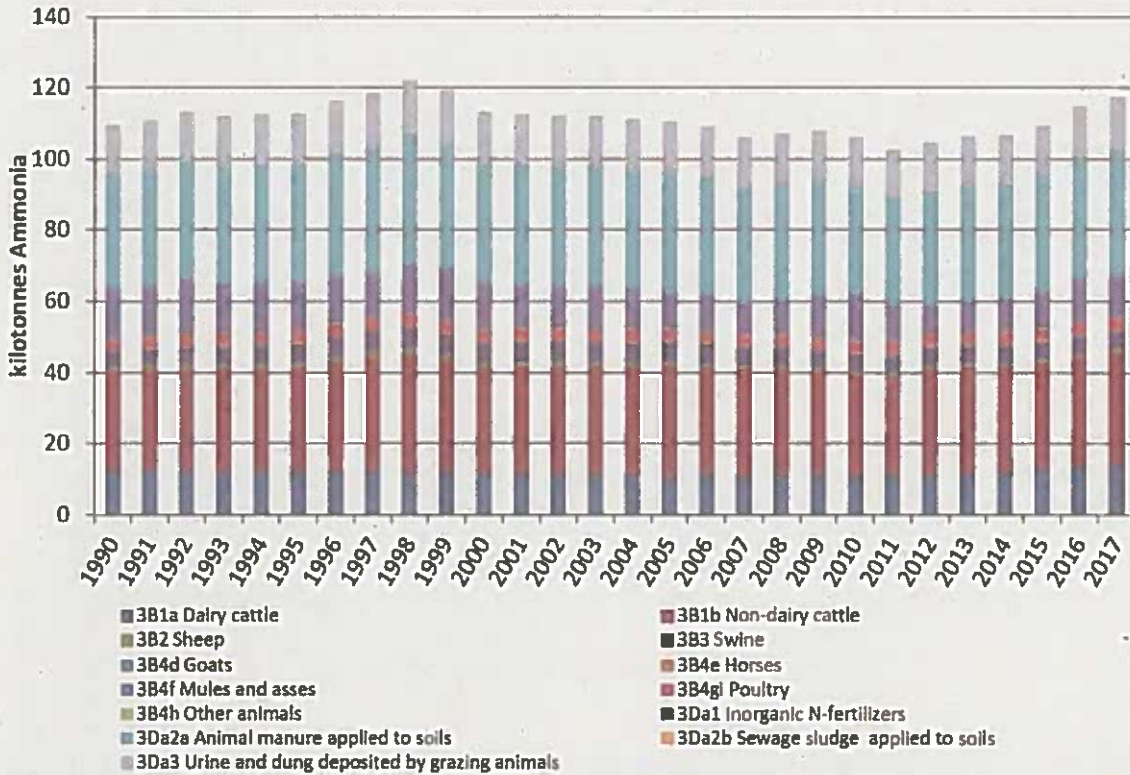


Figure 1: The composition of Irish national agricultural ammonia emissions: The contribution of various farm activities (data courtesy of EPA).

Irish agriculture is dominated by pastoral bovine livestock production, with approximately 90% of the utilised agricultural area (UAA) comprised of permanent grassland. The pastoral nature of farming systems to a large extent also defines feasible ammonia abatement practices. Typically livestock in Ireland are fed a grass based diet (grazed grass and grass silage) and spend about 60% of their time on pasture, with up to 75% of time spent on pasture in some dairy systems (Shalloo et al., 2011). As a result N excreted on pasture accounts for 61% of total N excretion, compared to other European countries such as 8% in Denmark, 10.6% in Germany and 13.6% in the Netherlands.

This has resulted in comparatively low Irish national emissions both in absolute terms and in terms of applied agricultural N lost as ammonia (8.8%), comparing favourably with other large EU agricultural producers (Figure 2). This arises due to the fact that the ammonia emission factor associated with grazing is 6% of applied total ammoniacal N (TAN) compared to housing and the storage of livestock slurries where N losses range from 5 to 28% of the initial TAN (Misselbrook et al., 2016). Indeed, grazing has been classified as a cost-effective Category 1 abatement technique in the Guidance Document for Preventing and Abating Ammonia Emissions from Agricultural Sources (Bittman et al. 2014). In order to further illustrate this point, if Ireland were to have grazing levels similar to Denmark (8%) or Germany (13%), ammonia emissions would be between 27 – 30 kT NH₃

higher than current levels. However, this high proportion of grazing results not only in the low existing ammonia emissions, but is a challenging task to achieve further ammonia abatement.

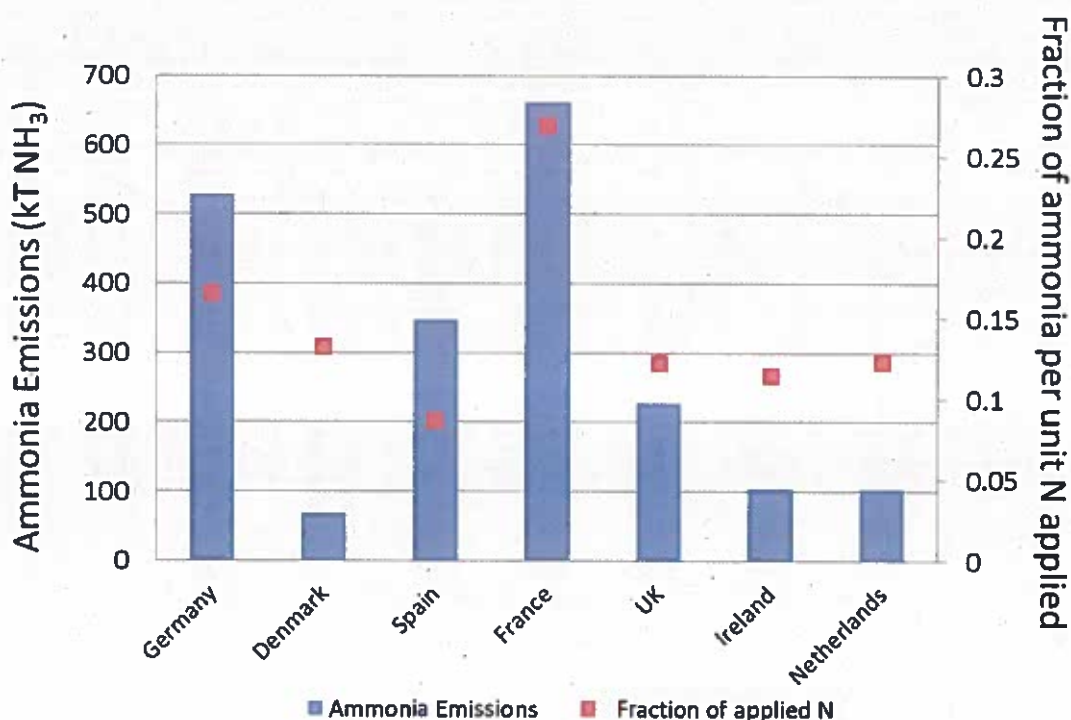


Figure 2: Ammonia emissions and the fraction of N lost as ammonia for Ireland and several EU countries.

The Impact of FW 2025 on Ammonia Emissions was assessed using the FAPRI-Ireland model (Donnellan & Hanrahan, 2006; Binfield et al., 2009; Donnellan et al. 2018). The increase in agricultural production under the FW 2025 is projected to result in total ammonia emissions of 113.8 kT by 2030 (Donnellan et al. 2018). This represents an 8.9 kT NH₃ increase relative to 1990 and a 6.6 kT NH₃ increase relative to 2005. This increase is principally due to a 16.8 kT NH₃ increase in dairy emissions and 0.7 kT NH₃ increase in pig-sourced emissions by 2030 relative to 2005. In contrast, non-dairy bovine and sheep emissions are projected to decrease by 11.5 and 0.9 kT NH₃ respectively by 2030.

However, the overall increase in emissions under FW 2025 is less than proportionate to the increases in agricultural production in these sectors. This is due to the fact that some measures, such as increased animal efficiency, nutrient efficiency and extension of the grazing season are already taken into account in the national inventory. Although N fertiliser application is projected to increase, by 2030 it is still 3.8 kT N lower than 1990 levels and marginally lower than 2005 with a lower projected proportion being comprised of urea, resulting in lower than expected impact on ammonia emissions.

Ammonia Abatement Potential

The cumulative maximum ammonia abatement potential was calculated to be 11.6 -13.0 kT NH₃ by 2030 (Lanigan et al. 2015, Figure 3). This maximum abatement assumed a 50% adoption of low emission slurry spreading methods (LESS), specifically trailing shoe, and represents a 5.1% reduction relative to 2005. The variation in the numbers reflect a) whether or not there is some continued use of splashplate application under an altered timing management system (ATMS) and b) whether low-emission-slurry-spreading (LESS), e.g. trailing hose or trailing shoe, applies to the remainder of available slurry.

It should be noted that these reductions represent the maximum biophysical abatement potential and achieving these levels of reductions (for example replacing urea with protected urea (urease-stabilised urea)) could prove extremely challenging in the context of a) incentivising farmer uptake and b) verifying the emissions reduction inside the farm gate (e.g. verifying the early spreading of slurry) or the practicality of using the trailing shoe or trailing hose across 50% of the slurry applications. Indeed, significant policy measures would have to be implemented to achieve these levels of uptake. The total costs associated with these reductions are €24.9 million and €35.6 million per annum (for trailing hose and trailing shoe application respectively) by 2030. These costs neither include pricing in labour costs (the farmer's time) to implement the measures, nor the cost of education and advisory services. These costs also assume that the majority of LESS is carried out by contractors to reduce the cost of the measure compared to each individual farmer having the technology on their farm.

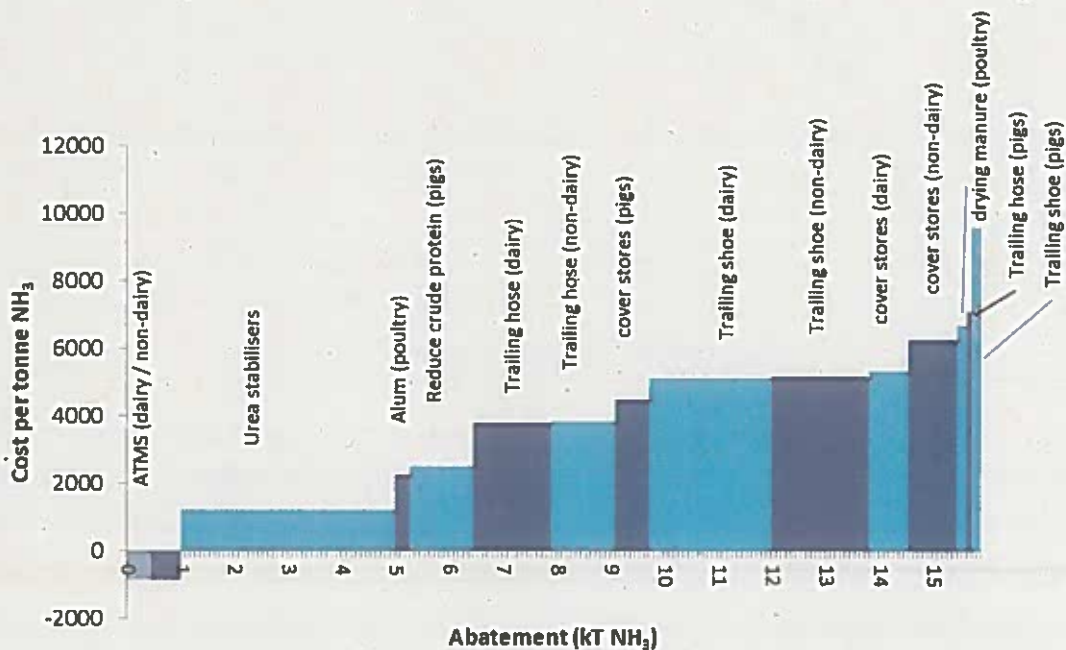


Figure 3: Histogram of the marginal cost and mitigation potential of a range of ammonia abatement measures (note: maximum abatement potential ranges between 11.6 and 13.0 kT NH₃ as the landspreading methods are not additive).

The cumulative abatement and costs are shown in Figure 4. Two abatement scenarios are shown: the dashed line with closed symbols is based on 50% of pig and bovine slurry applied by trailing hose

and the dotted line with open symbols is based on 50% of pig and bovine slurry applied by trailing shoe (all other measures remain unchanged in both abatement scenarios). A maximum abatement potential of 11.6 and 13.0 kT NH₃ is possible under the trailing hose and trailing shoe projections respectively, at a total cost of €24.9 million (trailing hose) and €35.6 million per annum (trailing shoe). When measures are applied in sequence along the entire manure management system, N that is abated cascades down into the subsequent N pool. So, for example, if N is abated during storage, this results in higher available N pools for volatilisation upon landspreading. It should be pointed out that these figures represent maximum potential and do not account for differential uptake rates. Linear uptake of measures between 2021 and 2030 would result in significantly reduced levels of annual abatement. A new iteration of this MACC analysis will be published towards the end of 2019 and will address issues such as new measures and differential adoption rates of individual measures.

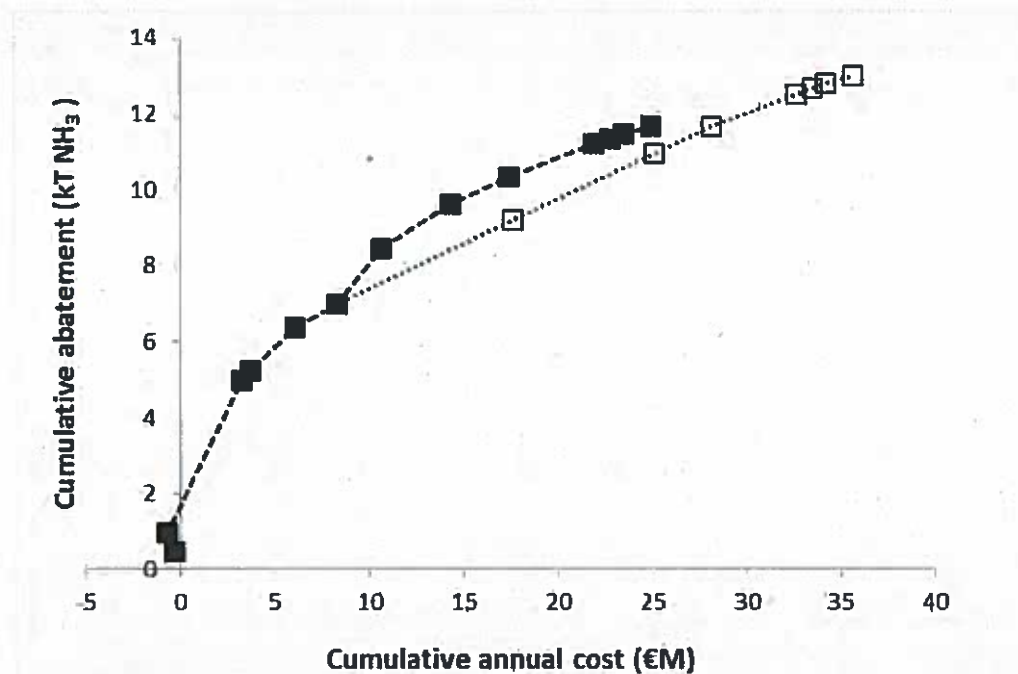


Figure 4: Cumulative costs and abatement for the Food Wise 2025 S1 Scenario. The dotted line with open symbols indicates abatement with trailing shoe included, whilst the dashed line with closed symbols includes trailing hose as a landspreading abatement option.

The most cost-effective measures (apart from ATMS) are: 1. use of protected urea, 2. use of trailing hose for bovine slurries, 3. reducing poultry manure pH with Alum and 4. reduction of crude protein in pig diets. These four measures account for 60% of the mitigation for less than 40% of the total cost. There are some *caveats* to the quantification of this mitigation value. First, 100% replacement of urea with protected urea (urea + NBPT) is assumed. While these products are on the recommended fertiliser lists (EC, 2003), there is some reluctance to their widespread use as, whilst there is no evidence, doubts have been raised about the detection of these compounds in vegetation or animal products. There is a current DAFM funded research project investigating the

residue risk associated with switching from urea to protected urea which will report in late 2021. It should also be noted that there is a possibility of protected urea displacing calcium ammonium nitrate (CAN) to reduce greenhouse gas emissions. Indeed, Teagasc and AFBI research has demonstrated that there are substantial benefits in terms of reducing nitrous oxide (N₂O) emissions when stabilised urea replaced CAN (Harty et al 2016). If this occurred, there could be an increase in ammonia emissions as the emission factor for stabilised urea is higher than that of CAN. Similarly, a campaign to reduce urea use could result in more farmers using CAN. Other things being equal, a shift to CAN would increase agricultural GHG emissions, as N₂O loss from CAN is 70% higher than for urea.

Reductions in pig crude protein content (4%) reduction should be achievable and also have co-benefits in terms of reducing N₂O and leached N emissions. The abatement value of covering pig stores is highly uncertain as data on the total configuration of outdoor storage are scarce. Alum amendment of poultry litter may also have added benefits for reducing landspreading emissions if the pH effect persists until the litter is applied to land.

It should be noted that three of the four measures with the highest ammonia abatement potential were also amongst the most expensive: 1. trailing shoe (dairy and non-dairy), 2. covering of external bovine slurry stores and 3. trailing hose. Trailing shoe is more effective at reducing emissions than trailing hose. Both LESS methods subsequently improve nitrogen fertiliser replacement value (NFRV) of slurry, however this increase in the manure NFRV is not enough to offset the increased costs of land spreading using LESS, the costs of which were calculated for contractor spread manure. The use of trailing shoe could be made more cost-efficient by targeting spreading using this technique to summer months only, however, the uptake of this measure may be challenging to verify on farm. An analysis has previously shown that late May to August is the most high risk period for ammonia emissions in Ireland (Lalor & Lanigan 2010). Targeting abatement to this period rather than using LESS at all times would reduce abatement from 3.3 kT NH₃ to 1.8 kT NH₃, whilst reducing costs from €8.7 million to €4 million due to reduced contractor fees.

Relationship between Ammonia Abatement Options and National Air Pollution Control Programme

Teagasc regards the National Air Pollution Control Programme as a positive step towards a cleaner air environment. It is clearly recognised that ammonia emissions (and wider reactive nitrogen emissions) must be reduced in order to a) protect vulnerable habitats and waterways, b) reduce aerosol formation and c) improve air quality for animals in large pig and poultry units. It is very encouraging that most of the ammonia abatement measures outlined in 'An Analysis of the Cost of the Abatement of Ammonia Emissions in Irish Agriculture to 2030' published in 2015 have been incorporated into this first iteration of the NAPCP. We broadly agree with the pathway to abating agricultural ammonia emissions as outlined in the draft plan. However, we would like to take this opportunity to point to the lack of inclusion of Altered Timing of Manure Spreading (ATMS) as a recognised method of abating ammonia losses in the draft NAPCP. Studies have shown that the emission factor associated with slurry spreading is lower in spring (26%) than it is in summer (48%) (Lanigan and Lalor 2010, Duffy *et al* 2018). Based on the data available through the Teagasc National Farm Survey (NFS), it is estimated that approximately 50% of manure produced by Irish agriculture is currently spread in spring. There is potential to shift 66% of slurry to spring and thus reduce

emissions on a cost-negative basis. Currently it is a requirement for farms receiving a Nitrates Derogation that “50% of slurry produced on the holding shall be applied by 15th June. Low emission slurry spreading equipment shall be used for any slurry applications after 15 June” ([S.I. No. 65 of 2018](#)). Based on the 2015 ammonia MACC analysis, it is projected that further adoption of the ATMS will lead to a 1.05 kT NH₃ reduction in the total ammonia emissions.

The use of LESS methods (trailing hose and trailing shoe) for application of slurry is the next most effective technology. These low emission spreading techniques reduce ammonia by a) reducing the surface area of slurry directly coupled to atmospheric conditions and b) in the case of trailing shoe, places the slurry beneath the grass/crop canopy and in direct contact with soil. These techniques can reduce ammonia from between 30%-60%. On average, the trailing hose has slightly lower ammonia reduction potential compared to trailing shoe but is still a very effective ammonia emission mitigation technology. However, the cost of these measures are extremely sensitive to the amount of slurry spread. If spread by contractors, where each machine will typically spread between 5000-10000 m³ slurry, the costs are below €4,000 per tonne NH₃. However, if each farmer has to buy a machine, each machine is likely to spread between 500-1000 m³ slurry and the costs increase 10-fold.

The Role of Knowledge Transfer

Knowledge Transfer (KT) plays a critical role in the adoption rates of the ammonia abatement measures by the Irish agriculture. Teagasc has a number of research programmes designed to develop a more detailed understanding of the individual farmer decision making process. This has included the development of a typology of farmers based on their attitudes, where such attitudes are an important factor in the decision to adopt ammonia abatement practices. Other research is informing the direction of support services, not only towards those farmers that are more likely to adopt new ammonia abatement practices, but also to understanding where current agri-KT actions are less effective.

However, research in of itself will not lead to emissions reductions without strong linkage to KT. There are twin roles of research and KT: whereas research into new ammonia abatement options aims to further reduce the nitrogen-intensity of farms, KT efforts focus on narrowing the spread in nitrogen-intensities between the most efficient producers and the main body of producers. This highlights the urgent requirement for both research and knowledge transfer efforts to encourage practice change and the adoption of abatement measures by Irish farmers. For example, Irish dairy farmers with agricultural education or who participate in farmer discussion groups are more likely to adopt the ammonia abatement practice of extended grazing.

Therefore, emissions reductions can only be realised if the desired mitigation actions are supported by a comprehensive KT programme. This finding concurs with one of the main recommendations of the Environmental Analysis of the FW 2025 Strategy (Farrelly *et al.*, 2015), commissioned by DAFM. In response to this KT challenge, Teagasc are developing a number of initiatives in collaboration with several partners to aid in the uptake of new abatement measures. These initiatives include:

- **Climate Change Demonstration Farms (CCDemoFarms) Programme:** Teagasc is proposing a knowledge transfer programme to tackle the greenhouse gas and ammonia issues with support from government, farmers and industry. The intention is that the Programme will run for an initial period of 5 years. The Objectives of the Programme are centred around a)

Building awareness of the issues and the solutions that farmers can adopt to mitigate GHG and ammonia emissions; b) Achieving widespread adoption of the main measures in the Teagasc GHG and Ammonia MACCs; and c) Going beyond the MACCs to develop and validate new technologies to deliver additional mitigation.

- Expansion of the Agricultural Catchments Programme, to include ammonia to evaluate measure adoption and measure efficacy. The programme would also quantify the potential pollutant trading where reducing ammonia emissions could lead to an increase in greenhouse gas or nitrate leaching losses. The catchment areas are used as focus areas to demonstrate mitigation actions. On the Nitrates Derogation Farms, measures around water quality will have impact on nitrogen use, Nitrogen Use Efficiency (NUE) and associated losses. Derogation Farms already utilize ammonia abatement measures such as the use of protected urea, LESS techniques for manure management, inclusion of clover in grassland swards and improving soil fertility and NUE.
- The Teagasc-Farmers journal BETTER beef farms programme, has at its core, increases in efficiencies. Now in Phase 3, previous phases have led to increased gross margins by 52% for farmers who joined the programme in 2012, with technical efficiencies delivering 83% of this improvement. Other farmers in every region of the country have had the opportunity to see these improvements implemented on these farms. Key strategies for Phase 3 include increased fertility of the beef herd, improved animal health, increased soil fertility and incorporation of clover into 20% of swards, all measures which are projected to decrease GHG emissions, improve water quality and reduce ammonia emissions. Teagasc see the BETTER farm programme as a key demonstration tool with which to improve uptake of measures.
- Nutrient Management Planning is required in order to fulfil the terms of the Nitrates Directive. Teagasc has developed an online system for developing nutrient management plans for environment and regulatory purposes called NMP online. This tool allows farmers to optimise nutrient requirements on a paddock by paddock basis. It requires farmers to soil test their fields and the tool then provides maps of the N, P, K and lime requirements in order to optimise output. The data underlying the tool has been obtained from Teagasc research and is synthesised in the Major and Micro-Nutrient Advice for Productive Agricultural Crops 'Green Book' (Wall and Plunkett 2016). Optimal liming reduces the requirement for mineral fertiliser and higher pasture primary production will increase soil C sequestration, which will in turn increase nutrient availability. NMP online, used in conjunction with pasture growth monitoring will, thus optimise Net Primary Productivity and hence sequestration. Optimal nutrient management will decrease ammonia emissions as optimising N fertiliser replacement value by definition requires lower ammonia loss and reduces nitrate leaching and runoff.
- Farmer KT discussion group programme, funded significantly by DAFM, focuses on improvement of environmental sustainability as well as profitability, breeding and animal health. This is achieved through peer-to-peer learning and invited expertise in environmental areas. Participating farmers are required to complete a Farm Improvement Plan taking into account learnings from the programme. The objective of the Plan is to implement improvements directly on farms increasing efficiency and optimising environmental management.

- **Joint KT programmes:** similarly to the Teagasc KT discussion group programme, Teagasc is involved in a number of joint industry initiatives, including, tailored programmes with virtually all of Ireland's dairy co-ops; the Green Acres beef programme involving a number of agri-business companies; and the Glanbia Open Source Sustainability Farm at Teagasc Kildalton. The focus of these programmes is on disseminating environmental sustainability knowledge to farmers at open days and visits to demonstration farms.
- **Grass 10** is a multi-year campaign (2017-2020) to increase grass utilisation on Irish livestock farms, with the objective of achieving 10t grass DM/ha/year utilised; and 10 grazings/paddock/year. The campaign, supported by DAFM and industry partners, covers a range of topics regarding managing of grassland resources, including soil fertility, which will have positive impact on reducing ammonia emissions through optimising N fertiliser management.
- **Open Days:** these events disseminate latest research findings and advise on the best practice options available to farmers. Open Days strongly feature environmental sustainability, with topics covering gaseous emissions, water quality and biodiversity. Through talks, discussion with farmers and demonstration of technologies such as LESS and incorporating protected urea in the fertiliser programmes, the events lead to improved management practices on farms and create greater awareness of the environmental issues facing the industry and available solutions.

Future Research

It is important to point out that neither the 2015 Teagasc ammonia MACC analysis, nor the draft NAPCP provide an exhaustive analysis of all ammonia abatement strategies. Any MACC provides a snapshot in time and by its very nature MACCs evolve as more technologies come on-stream while others change in terms of cost as they are adopted more widely. Teagasc is currently in the process of updating the cost-benefit analysis of abatement of agricultural ammonia emissions and this work is expected to be completed in the last quarter of 2019 or in the first quarter of 2020.

This new MACC analysis will incorporate a) new technologies that will become available and that are feasible for adoption and b) changes in emission factors incorporated in the national ammonia inventory as a result of the proposals by the Task Force on Emissions Inventories and Projections (TFEIP). In particular, recent changes to the methodology regarding calculating national ammonia inventory include a) changes to the ammonia emission factors (% ammonia N per kg total ammoniacal nitrogen applied) of all fertilisers, b) changes in the emission factors of housing and storage of manures and c) the proportion of covered/uncovered stores in the bovine and pig sub-sectors. There's considerable research currently being undertaken in Teagasc on the assessment of housing and storage strategies for ammonia abatement. Also the capacity for the sector to use slurry injection technology, as well as national research on its abatement potential is urgently required. Many studies have shown that ammonia emissions reduction of 90% is achievable through the use of injection technology, although injection can increase N₂O and/or nitrate losses. Internationally, acidification of slurry has been shown to reduce emissions by approximately 70% (Petersen *et al*, 2012), this also needs research to generate Irish specific emission factors and assess potential impacts on soil quality. Reducing crude protein in pig diet has been proven to be effective in

reducing ammonia emissions due to lower animal nitrogen excretion rate. Reductions in the protein content of bovine diets would be more problematic in the context of pasture-based production systems due to the fact that feeding is less controlled. However, there should be opportunity to reduce the protein content of supplemental concentrates, particularly in the dairy sector, taking into account that well managed grass has CP content over 18%. The abatement potential of such dietary changes in the bovine herd needs further research.

There is an urgent need for the annual quantification of activity data on manure management and farm facilities to be incorporated in to the EPA's national inventory. Currently the EPA uses the 2003 Teagasc Farm Facilities Survey for their agricultural activity data for the national ammonia inventory (Hyde *et al* 2008). The survey is required to quantify adoption rates and for improved National inventory reporting and verification.

There is also an urgent need for a nationally representative ammonia monitoring programme to measure current atmospheric ammonia levels and identify areas and habitats that are being impacted by ammonia deposition.

References

- Binfield, J., Donnellan, T., Hanrahan, K., Westhoff, P., 2009. "Issues in examining the impact of WTO reform on the Beef and Dairy Sectors in the European Union." International Association of Agricultural Economists, 2009 Conference, August 16- 22, 2009, Beijing, China.
- Bittman, S., Dedina, M., Howard C.M., Oenema, O., Sutton, M.A., (eds), 2014, Options for Ammonia Mitigation: Guidance from the UNECE Task Force on Reactive Nitrogen, Centre for Ecology and Hydrology, Edinburgh, UK
- Donnellan, T., Hanrahan, K., 2006. "The impact of potential WTO trade reform on greenhouse gas and ammonia emissions from agriculture: A case study of Ireland." In: Swinnen, J and E. Kaditi (eds.) Trade Agreements and Multifunctionality. Centre for European Policy Studies, Brussels, Belgium.
- Donnellan, T., Hanrahan, K., Lanigan, G.J., 2018. Future Scenarios for Irish Agriculture: Implications for Greenhouse Gas and Ammonia Emissions <https://www.teagasc.ie/media/website/publications/2018/GHGscenarios2030final.pdf>
- Duffy, P., Hyde, B., Ryan, A.M., Murphy, J., Quirke, B, Fahey, D., 2018. Air Pollutant Emissions In Ireland 1990–2017 Reported To The Secretariat Of The UnEce Convention On Long-Range Transboundary Air Pollution. EPA, Johnstown Castle, Wexford
- Farrelly et al., 2015 FOOD WISE 2025 Strategic Environmental Assessment Environmental Report <https://www.agriculture.gov.ie/media/migration/foodindustrydevelopmenttrademarkets/agri-foodandtheeconomy/foodwise2025/finalenvironmentalanalysis/FoodWise2025SEAEnvironmentalReport091215.pdf>
- Harty, M.A., Forrestal, P.J., Watson, C.J., McGeough, K.L., Carolan, R., Elliot, C., Krol, D., Laughlin, R.J., Richards, K.G. and Lanigan, G.J., 2016. Reducing nitrous oxide emissions by changing N fertiliser use from calcium ammonium nitrate (CAN) to urea based formulations. Science of the Total Environment 563–564: 576–586
- Hyde, B., Carton, O.T. and Murphy, W.E., 2008. Farm Facilities Survey – Ireland 2003. Report prepared for the Department of Agriculture by Teagasc, Johnstown Castle, Wexford, Ireland. 150 p.
- Lalor, S.T.J. and Lanigan, G.J., 2010. The potential of application timing management to reduce ammonia emissions following cattle slurry application. In: C.S.C. Cordovil and L. Ferreira (Editors), 14th International RAMIRAN Conference. Treatment and use of organic residues in agriculture: Challenges and opportunities towards sustainable management. ISA Press, Lisboa, Portugal
- Lanigan, G.J., Donnellan, T., Hanrahan, K., Burchill, W., Forrestal, P., McCutcheon, G., Crosson, P., Murphy, P., Schulte, R., Richards, K., Browne, P. 2015 An Analysis of the Cost of the Abatement of Ammonia Emissions in Irish Agriculture to 2030. Teagasc submission to the Department of Agriculture, Food and the Marine <https://www.teagasc.ie/media/website/publications/2015/An-Analysis-of-the-Cost-of-the-Abatement-of-Ammonia-Emissions-in-Irish-Agriculture-to-2030.pdf>
- Misselbrook, T.H., Gilhespy, S.L., Cardenas, L.M., Williams, J. and Dragostis, U., 2016. Inventory of Ammonia Emissions from UK Agriculture 2015. Rothamsted Research, North Wyke, 36 pp (unpublished). Ammonia Emissions from UK Agriculture 2015. Rothamsted Research, North Wyke, 36 pp (unpublished).

Petersen, S., Andersen, A.J, Eriksen, J., 2012. Effects of Cattle Slurry Acidification on Ammonia and Methane Evolution during Storage. *Journal of Environmental Quality*, 41 (1), 88-94.

Shalloo, L., Creighton, P., O'Donovan, M., 2011. The economics of reseeded on a dairy farm. *Irish Journal of Agricultural and Food Research*, 50, 113–122.

Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers (Text with EEA relevance) ELI: <http://data.europa.eu/eli/reg/2003/2003/2016-01-01>

S.I. No. 65 of 2018 European Union (Good Agricultural Practice for Protection of Waters) (Amendment) Regulations 2018, THE STATIONERY OFFICE, GOVERNMENT PUBLICATIONS, ST. STEPHEN'S GREEN, DUBLIN 2Hyde, B., Carton, O., and Murphy, W., 2008. Teagasc Farm Facilities Survey – Ireland 2003. Report produced for the Department of Agriculture, Fisheries and Food.

Abbreviations

ATMS	Altered Timing Management System, or altered timing of slurry application
CP	Crude Protein
DAFM	Department of Agriculture, Food and the Marine
DCCAIE	Department of Communications, Climate Action and environment
FW 2025	Food Wise 2025 – a strategy document for sustainable growth in Irish agriculture developed by food industry stakeholders in 2015
kT	Kiloton (1,000,000 kg)
MACC	Marginal Abatement Cost Curve
NAPCP	National Air Pollution Control Programme
NECD	National Emissions Ceilings Directive
NFS	National Farm Survey
NMP Online	Nutrient Management Plan Online
NH ₃	ammonia
LESS	low emission slurry spreading methods such as trailing shoe and trailing hose
TFEIP	Task Force on Emissions Inventories and Projection
Trailing shoe	One of LESS techniques, where slurry is landspread in bands with the use of tanker equipped with a number of hoses with 'shoe' attachments ensuring opening grass sward and deposition of slurry directly onto the soil surface
Trailing hose	One of LESS techniques, where slurry is landspread in bands onto grass surface with the use of tanker equipped with a number of hoses

From: Andrew Caldicott <Andrew.Caldicott@DCCAIE.gov.ie>
To: Paul Mcdonald <Paul.Mcdonald@DCCAIE.gov.ie>; Emmet Fahy <Emmet.Fahy@DCCAIE.gov.ie>; Colm Lambert <Colm.Lambert@DCCAIE.gov.ie>
CC: Micheal Young <Micheal.Young@DCCAIE.gov.ie>; Marc Kierans <Marc.Kierans@DCCAIE.gov.ie>
Subject: FW: NAPCP consultation
Date: 18.07.2019 09:34:35 (+0100)

Folks

For info

Regards

Andrew

From: [REDACTED]
Sent: 17 July 2019 17:40
To: Andrew Caldicott
Subject: NAPCP consultation

CAUTION: This email originated from outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Andrew,

Following up on our recent conversations, I attach the EPA submission on the NAPCP consultation. A hardcopy issued today by post.

Kind regards,

[REDACTED]
[REDACTED]
Manager - Ambient Air Quality

Environmental Protection Agency
McCumiskey House, Richview
Clonskeagh Road, Dublin 14
Ireland

Phone: [REDACTED]
Fax: 0199 1268 g
Email: [REDACTED]
Web: www.airquality.epa.ie

Twitter: <http://twitter.com/EPAAirQuality>

YouTube: <http://www.youtube.com/user/epaireland>



Please consider the environment before printing this email. Smaoinigh ar an dtimpeallacht sula bpriontáilteann tu an e-phost seo.



Draft National Air Pollution Control Programme Consultation,
Air Quality Division,
Department of Communications,
Climate Action & Environment,
Newtown Road,
Wexford,
Y35 AP90

17th July 2019

Re: Draft National Air Pollution Control Programme (NAPCP) Consultation

Dear Sir/ Madam,

The Environmental Protection Agency (EPA) acknowledges and welcomes the opportunity to comment on the Department of Communications, Climate Action and Environment's draft National Air Pollution Control Programme (NAPCP), produced in accordance with Article 10(1) of the National Emissions Ceilings Directive [2016/2284/EU] (NECD). The Directive provides for regulation of annual emissions of atmospheric pollutants.

Across Europe air pollution presents one of the biggest environmental threats to public health and ecosystems. It is clear from the EPA's most recent report *Urban Environmental Indicators – Nitrogen Dioxide levels in Dublin* and research into the environmental and public health effects of air pollution that the current levels of air pollution in Ireland are negatively impacting on the health and the quality of life of the citizens of Ireland. However, data produced by the EPA on the key sources of these pollutants also indicates that there are clear opportunities to take action to reduce the levels of pollutants in the atmosphere, in order to provide a cleaner and healthier environment supporting a sustainable society and economy. In terms of defining future objectives for reductions in air pollution in Ireland, the EPA would be supportive of moving beyond statutory compliance with EU standards and moving towards WHO guideline values which offer greater protection to public and environmental health.

The EPA notes that the development of the NAPCP has occurred in parallel with several other national policy frameworks in Ireland to which EPA input has been provided and that correspondence with specific comments on the NAPCP programme was issued on 18th February regarding the *Draft SEA Screening for National Air Pollution Control Programme*. Relevant parallel frameworks which are incorporated into the NAPCP and which have had detailed submissions are as outlined below:

- National Clean Air Strategy Consultation – A submission was sent on 25th May 2017. The EPA looks forward to the publication of the finalised strategy
- Draft National Energy and Climate Plan (NECP) – A submission was sent on 22nd February 2019, and the EPA looks forward to the final plan to be submitted in December 2019
- 2019 Nitrates Derogation Review – A submission was sent on 21st May 2019, wherein the EPA highlighted the need for action to mitigate Ammonia emissions

The national implementing legislation, the European Union (National Emission Ceilings) Regulations 2018 (S.I. No. 232/2018) outlines that the emission reduction policies and measures contained in the NAPCP shall be updated within 18 months of the submission of the latest national emission inventory or national emission projections if, according to the submitted data, the obligations set out in Regulation 4 of the implementing legislation are not complied with or if there is a risk of non-compliance and that in either case the Plan shall be updated at least every four years. The EPA looks forward to the consultation on further updated versions of the NAPCP.

Yours Sincerely,

[Redacted Signature]

Senior Scientific Officer
Office of Radiation Protection
and Environmental Monitoring

[Redacted Signature]

Senior Scientific Officer
Office of Environmental Sustainability

