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# Aviation Carbon Tax Project Summary of Key Findings

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## Background

The Aviation Carbon Tax Project took place in the context of heightened global efforts to reduce greenhouse gas (GHG) emissions, and amidst an emerging view at the international level that further action was required to reduce emissions from Aviation. These views were reflected in the “Fit for 55” package of measures proposed by the European Commission in July 2021, which proposed measures to target GHG emissions from all sectors including aviation. These measures include the proposed taxation of kerosene and reform of the European Union Emissions Trading System (EU ETS).

As a small open economy without any road or rail-based access to the European mainland, Ireland is particularly vulnerable to any loss in connectivity or reduction in passenger demand as a result of the introduction of any aviation tax. In this context it was determined that it would be useful to estimate the potential impact of an Aviation Carbon Tax and/or other forms of aviation pricing measure on the economy as a whole and on individual sectors, including aviation and tourism, and to assess the impact for GHG emissions reduction

Because of the potential cross sectoral impacts of the introduction of any form of Aviation Carbon Tax the project involved a cross-departmental steering group who provided inputs at key project milestones, including representatives from:

- Department of Transport
- Department of Environment, Climate and Communications
- Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media
- Department of Enterprise, Trade and Employment
- Department of Public Expenditure and Reform

The project was part funded by the Irish Government Economic and Evaluation Service (IGEES) Research Fund with the balance of funding provided by the D/Transport Climate Change Unit.

The research was carried out by the Economic and Social Research Institute (ESRI) using their I3E Model. The I3E model reproduces the structure of the economy in its entirety. It was designed specifically to better understand the economic and environmental impacts of policies and to inform the policy-making process.

## Policy Context

International aviation emissions are currently dealt with through a framework approach led by the UN International Civil Aviation Organisation (ICAO). The ‘basket of measures’ framework includes aircraft technology improvements, operational improvements in air navigation and airport operations, the development of sustainable aviation fuels, and a market-based international carbon off setting scheme known as CORSIA. However, Article 24 (a) of the Chicago Convention on International Civil Aviation (and several associated resolutions of the Council of ICAO) led to a general exemption from taxation

for aviation fuel, while international aviation is also currently exempt from VAT in all EU Member States and domestic aviation is exempted in many EU states.

CO<sub>2</sub> emissions from aviation have been included in the EU emissions trading system (EU ETS) since 2012. Under the EU ETS, all airlines operating in Europe, are required to monitor, report and verify their emissions, and to surrender allowances against those emissions. They receive a certain number of free tradeable allowances and must purchase additional allowances to cover the balance of emissions from all of their flights in a year.

Many EU member states also tax air travel by applying taxes to air passengers at the national level. The rates generally depend on the distance travelled (long vs. short haul) and in some cases also on the class (economy vs. business) and vary considerably across the EU.

Though Ireland currently does not impose a passenger tax, the Irish Air Travel Tax (ATT) was applied between March 2009 and April 2014. The ATT introduced a tax of €2 per passenger on flights leaving from Dublin Airport to airports within 300km and €10 for airports over 300km away. The differential rate was considered by the EU to be an interference with the internal market and from 1 March 2011 a flat rate of €3 was introduced. The ATT was strongly opposed by airlines and the tourism industry and finally abolished.

### Modelled Scenarios

In order to investigate the impact of a range of taxation and aviation pricing measures, a number of scenarios were modelled. A brief overview of each scenario and its relevance to policy is set out in Table 1 below:

**Table 1 – Overview of Scenarios**

Scenario	Overview	Policy Relevance
Central	Includes a constant EU ETS price, Covid-19 impacts and policy pathway for domestic Carbon Tax to reach €100 a tonne by 2030	Central policy scenario against which results are compared.
Kerosene Exemption Abolished	Kerosene excise duty exemption is abolished and kerosene is taxed at the EU proposed minimum rate.	Proposed measure set out in the EU Fit for 55 package.
VAT 25	Value Added Tax (VAT) is gradually introduced reaching 13.5% in 2025.	Aviation is exempt from VAT in the EU. There is no proposal to change this currently. This scenario is illustrative of the impact of alternative aviation pricing methods.
VAT 30	VAT is gradually introduced reaching 13.5% in 2030.	Aviation is exempt from VAT in the EU. There is no proposal to change this

		currently. This scenario is illustrative of the impact of alternative aviation pricing methods.
ETS 26	Free EU ETS allowances for aviation are abolished by 2026.	Proposed measure set out in the EU Fit for 55 package.
PT 5	A passenger tax of €5 is applied to all departures.	This represents the lowest level of passenger tax in the UK and EU and a similar rate to the Irish Air Travel Tax before its abolition in 2014.
PT 16	A passenger tax of €16 is applied to all departures.	This represents the average rate of passenger tax applied across the UK and EU.
PT UK	A passenger tax of €29 is applied to all departures.	The average level of passenger tax in the UK (which represents the highest in Europe), adjusted to the Irish profile of flights (shorter distances) for 2019.
EU Policy (KRSEX_ETS26)	A combination of the Kerosene Exemption Abolition and ETS 26 scenario discussed above.	Both of these measures are proposed in the EU Fit for 55 package and are likely to be implemented together. Therefore, this represents the most likely scenario to emerge over the medium term.

### Modelling Assumptions

While the analysis provides insights which will help to inform policy there are a number of modelling assumptions which should be considered when interpreting the results. These are:

The Central scenario assumes a constant EU ETS allowance price of €32 per tonne of CO<sub>2</sub>, in line with the EU Reference Scenario<sup>1</sup>. However, the ETS is a market-based mechanism, and the allowance price is determined by the supply and demand for allowances, therefore the future price is still highly uncertain. A higher price of €100 per tonne was also modelled for the Central, ETS 26 and EU Policy Scenarios to assess the impact of changes to the ETS allowance price on the costs to the Economy and Aviation Sector and emissions reduction potential.

The future impacts of the Covid-19 crisis are highly uncertain, particularly for the aviation sector. The International Air Transport Association (IATA) has published projections of the impacts on global aviation and the DAA has estimated impacts on Irish flights. These projections show similar trends with an initial sharp recovery followed by a steady increase in aviation activity reaching pre-Covid levels in

1. EU Reference Scenario is one of the European Commission's key analysis tools in the areas of energy, transport and climate action. It allows policy-makers to analyse the long-term economic, energy, climate and transport outlook based on the policy framework in place in 2020.

2025. Consistent with these estimates, this analysis assumes a sharp recovery with a steady increase reaching pre-Covid levels by 2025.

The Aviation sector faces additional measures to reduce emissions. ReFuelEU, also an EU 'Fit for 55' initiative will mandate the production, supply and the use of sustainable aviation fuels by suppliers, airports and airlines. The UN's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) will require airlines and other aircraft operators to offset any growth in CO<sub>2</sub> emissions above 2020 levels. While the cost of compliance with CORSIA is low presently, measures to increase its stringency could entail cost increases for the Sector and lead to further emissions reductions over the long term. The exact costs of CORSIA and ReFuelEU remains highly uncertain therefore they are outside the scope of this analysis.

In terms of calculating the impact on tourism, within the I3E model demand for goods in the economy is not linked to international arrivals. In order to investigate these potential tourism impacts, several additional scenarios were modelled. In these scenarios, the percentage reduction in tourist arrivals (this includes business travellers) due to a decrease in aviation demand was estimated. CSO estimates on the expenditure by overseas travellers in the accommodation and food sectors, which accounted for 66% of tourist expenditures, was then used to calculate the decreased spending due to decreased tourist arrivals<sup>2</sup>.

The methods applied in this analysis (the I3E model) only allows for an examination of the aviation sector as a whole and passengers as being homogeneous. Impacts are likely to vary across different market segments of the aviation industry and different passengers. Impacts may be different for different routes - this connectivity impact has not been examined. For example, recent literature suggests that low-cost airlines are more impacted by aviation taxation than other airlines; different passengers (long vs short haul and leisure vs business) are likely to react differently to price changes.

### **Modelling Results**

The ESRI's I3E model was used to investigate the impact of the scenarios outlined above. Scenarios were assessed in terms of their impact on key macroeconomic indicators such as GDP, their impact on individual sectors such as Tourism, their impact on the Aviation industry measured by the impact on its value-added (VA)<sup>3</sup>, and finally their emissions impact. It should be noted that the economy and aviation sector continue to grow under all scenarios, the level of growth is just lower than the Central Scenario which assumes a growth of 3.7% in GDP and 5.1% in Aviation VA annually over the period 2021-2030. The impacts below should be considered in this context. The results from the analysis are summarised in Table 2 below.

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2. Expenditure by tourists outside of the accommodation and food services sectors were not included in the analysis.
  3. Value added is the difference between the input cost of total production and the revenues received from sales for the aviation industry.

Table 2 - Cumulative % impact 2021-2030

Scenario	GDP Impact	Aviation VA Impact	Emissions Impact
Kerosene Exemption Abolished	-0.04	-0.5	-0.8
VAT 30	-0.20	-4.4	-1.7
Passenger Tax 16	-0.1	-2.5	-0.8
ETS 26	-0.05	-2.6	-1.1
	-0.54 (High ETS Price)**	-13.41 (High ETS Price)**	-14.27 (High ETS Price)**
EU Policy (KRSEX_ETS 26)	-0.09	-3.1	-1.9
	-0.57 (High ETS Price)**	-13.68 (High ETS Price)**	-14.80 (High ETS Price)**

\*All Results above assume ETS Allowance Price of €32 per tonne in 2030 unless otherwise stated.

\*\* Results assume ETS Allowance Price of €100 per tonne in 2030.

All of the scenarios, assuming the EU Reference Scenario ETS allowance price, show an increase in the price of aviation and result in a decrease in demand, the scale of the impact is relatively low ranging from a reduction of 0.04%-0.09% in GDP and 0.5%-3.1% in Aviation VA over the period to 2030. This is in line with the findings of previous research which suggests that very large price increases are required in order for individuals to change their decision to travel, particularly on island nations such as Ireland where road and rail-based alternatives are not available.

The scenario which has the largest impact in terms of emission reduction over the period to 2030 is the EU Policy Scenario (KRSEX\_ETS 26), which leads to a reduction of 1.9% or 824 Tonnes of CO<sub>2</sub>. This is followed by the VAT Scenarios, and the UK Passenger Tax Scenario with the lower passenger taxes and the ETS 26 or Kerosene Excise Exemption removal scenario applied in isolation shown to lead to lower emission reductions.

The most effective scenarios, i.e. the ones that lead to the greatest emission reductions at the lowest cost to the Economy (measured by GDP) or the Aviation Sector (measured by VA) is the ETS 26 scenario, the Kerosene Excise Exemption removal scenario and the EU Policy Scenario (KRSEX\_ETS 26), which combines the two measures. VAT and passenger taxation measures are shown to be more costly to the Economy as a whole and the Aviation sector. This is in line with the findings of previous research, which suggests that taxing CO<sub>2</sub> directly, through taxes which target the carbon content of fuel are more efficient than measures that target it indirectly, through taxing flights or passengers.

The analysis found that spillover effects in most other economic sectors would be limited across all scenarios. However, some sectors that more directly interact with aviation, such as the petroleum sector, warehousing, machine repair and installation, and travel and tourism do show some limited impacts.

In assessing the impacts on the travel and Tourism sector, this analysis estimated the decreased spending by tourists resulting from a decrease in arrivals. The results, assuming the EU Reference Scenario ETS allowance price, show that Tourism is the most impacted sector after Aviation. Although, these impacts are still relatively limited across all scenarios, for example the EU Policy Scenario (KRSEX\_ETS 26) led to a cumulative reduction in VA for the Tourism sector of 0.90% over the period to 2030.

However, the results suggest that the ETS allowance price will play an important role in determining the cost and efficiency of taxation measures. When a higher ETS price scenario of €100 per tonne of CO<sub>2</sub> by 2030 was modelled for the ETS 26 and EU Policy Scenarios the higher price led to a significant increase in the costs to the Economy and Aviation sector and also to the level of emissions reduction. For example, in the EU Policy Scenario modelled at the higher allowance price, the cost to GDP and VA in the Aviation Sector were -0.6% and -13.7% respectively while the reduction in emissions was -14.8% over the period to 2030.

### **Policy Implications**

The results of this analysis contribute to the understanding of the impact of aviation carbon tax and pricing measures in the context of the debate, at EU Council level, of the Fit for 55 package of measures.