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Decarbonisation: Opportunities and challenges for the road haulage sector

Brian Ó Gallachóir & Shane McDonagh

Presentation to Dept. of Transport Haulage Strategy Webinar June 16 2021

HOST INSTITUTION

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University College Cork, Ireland
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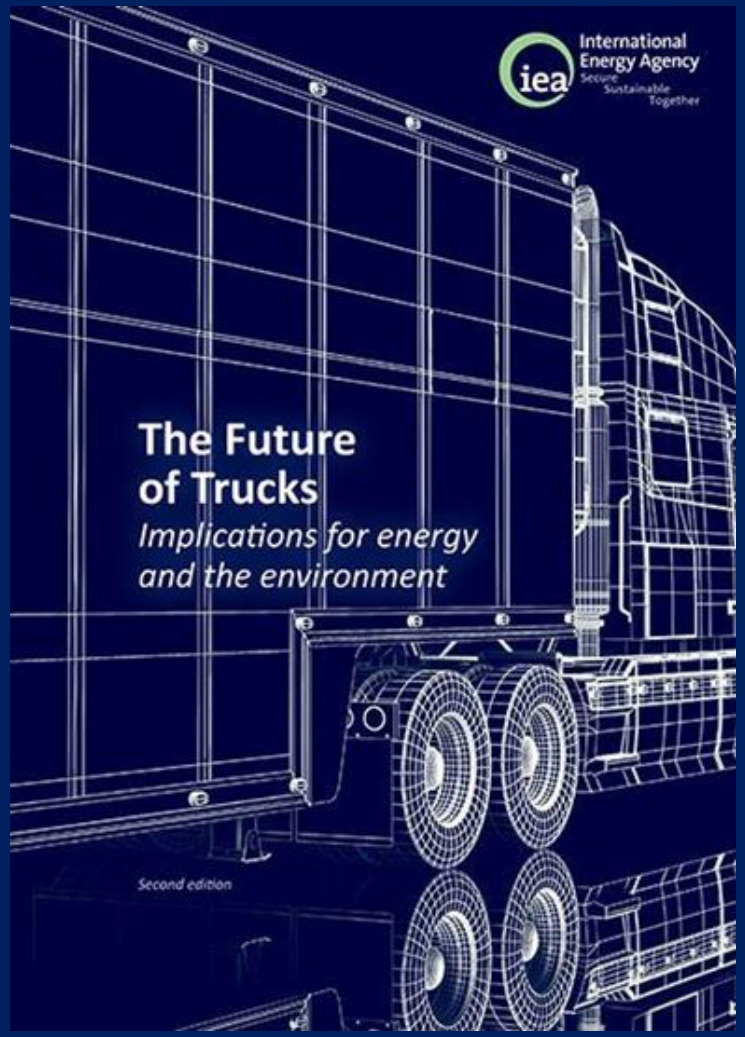
CAPACITY
CLIMATE ACTION PATHWAYS & ABSORPTIVE CAPACITY

Previous MaREI research on freight decarbonisation



Co-authored IEA publication on freight

Policy measures

1. Haasz T., Gómez Vilchez J.J., Kunze R., Deane P., Fraboulet D, Fahl U., Mulholland E. 2018 ***Perspectives on decarbonizing the transport sector in the EU-28.*** Energy Strategy Reviews
2. Clancy J.M., Curtis J. Ó Gallachóir B.P. 2018 ***Modelling national policy making to promote bioenergy in heat, transport and electricity to 2030 – Interactions, impacts and conflicts.*** Energy Policy
3. Hanley E.S., Deane, J.P., Ó Gallachóir B., 2018 ***The role of hydrogen in low carbon energy futures–A review of existing perspectives*** Renewable and Sustainable Energy Reviews
4. Mulholland E., Rogan F., Ó Gallachóir B. 2017 ***From Technology Pathways to Policy Roadmaps to Enabling Measures – a multi-model approach*** Energy

Technology

1. McDonagh Shane, Deane Paul, Rajendran Karthik, Murphy Jerry D 2019 ***Are electrofuels a sustainable transport fuel? Analysis of the effect of controls on carbon, curtailment, and cost of hydrogen?*** Applied Energy
2. Venturini G, Tattinia J, Mulholland E., Ó Gallachóir B.P. **2019** ***Improvements in the representation of behaviour in integrated energy and transport models*** International Journal of Sustainable Transportation
3. Mulholland E, Teter J, Cazzola P, McDonald Z, Ó Gallachoir B 2018 ***The Long Haul towards Decarbonising Road Freight – A Global Assessment to 2050.*** Applied Energy
4. Mulholland, E., Tattini, J., Ramea, K., Yang, C., Ó Gallachoir, B. P., 2018 ***The cost of electrifying transport – evidence from an empirical consumer choice model of Ireland and Denmark,*** Transportation Research Part D: Transport and Environment

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Current MaREI research project on freight decarbonisation

Mitigation measures to reduce CO_2 emissions from the existing Irish heavy goods vehicle fleet

seai SUSTAINABLE ENERGY AUTHORITY OF IRELAND

An Roinn Iompair
Department of Transport

1. **Establish a baseline**
   Profile HGV sector, contrast with other countries.
2. **Identify international best practice**
   Assess lessons learned and applicability to Ireland.
3. **Model measures in Ireland**
   Assess effectiveness and cost if implemented.
4. **Consult with industry**
   Gauge market environment, qualitative element.
5. **Identify key interventions**
   Convert learnings to policy measure recommendations

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Context – Freight sector and recent decarbonisation

1. **Ireland's freight sector is**
   a) key to a functioning economy, but also
   b) a large and growing source of emissions of both CO2 and NOx
2. **Newer vehicles are cleaner and more fuel efficient BUT …**
   a) … the Irish HGV market is dominated by used imports and
   b) … the impact of Brexit on this is uncertain
3. **There are significant barriers to investment in new technology**
   a) due to low margins, high competition, and a high share of small business.
4. **To date the biofuel obligation scheme has been responsible for the most significant reductions in CO_2 emissions in freight**

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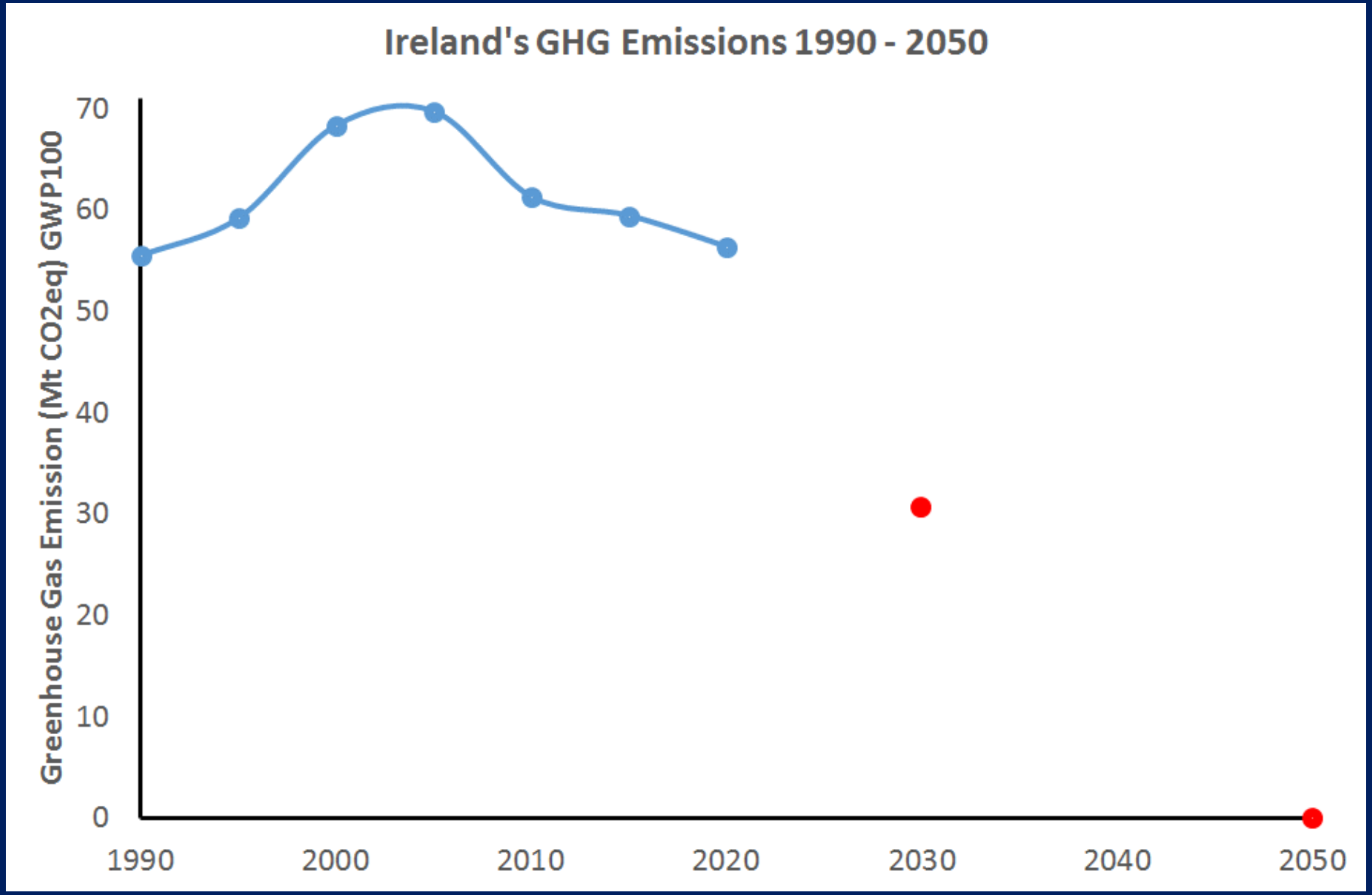
Context – Future political ambition



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Trends – Licensed Hauliers

No. of Vehicles	Hauliers	Share of Hauliers	Fleet size	Share of Fleet
0	29	0.8%	0	
1	1591	42.0%	1591	7.9%
2	558	14.7%	1116	5.5%
3 to 4	573	15.1%	1943	9.6%
5 to 6	304	8.0%	1647	8.2%
7 to 10	295	7.8%	2451	12.2%
11 to 20	277	7.3%	4028	20.0%
21 to 40	107	2.8%	3006	14.9%
40+	56	1.5%	4367	21.7%
Total	3790		20149	

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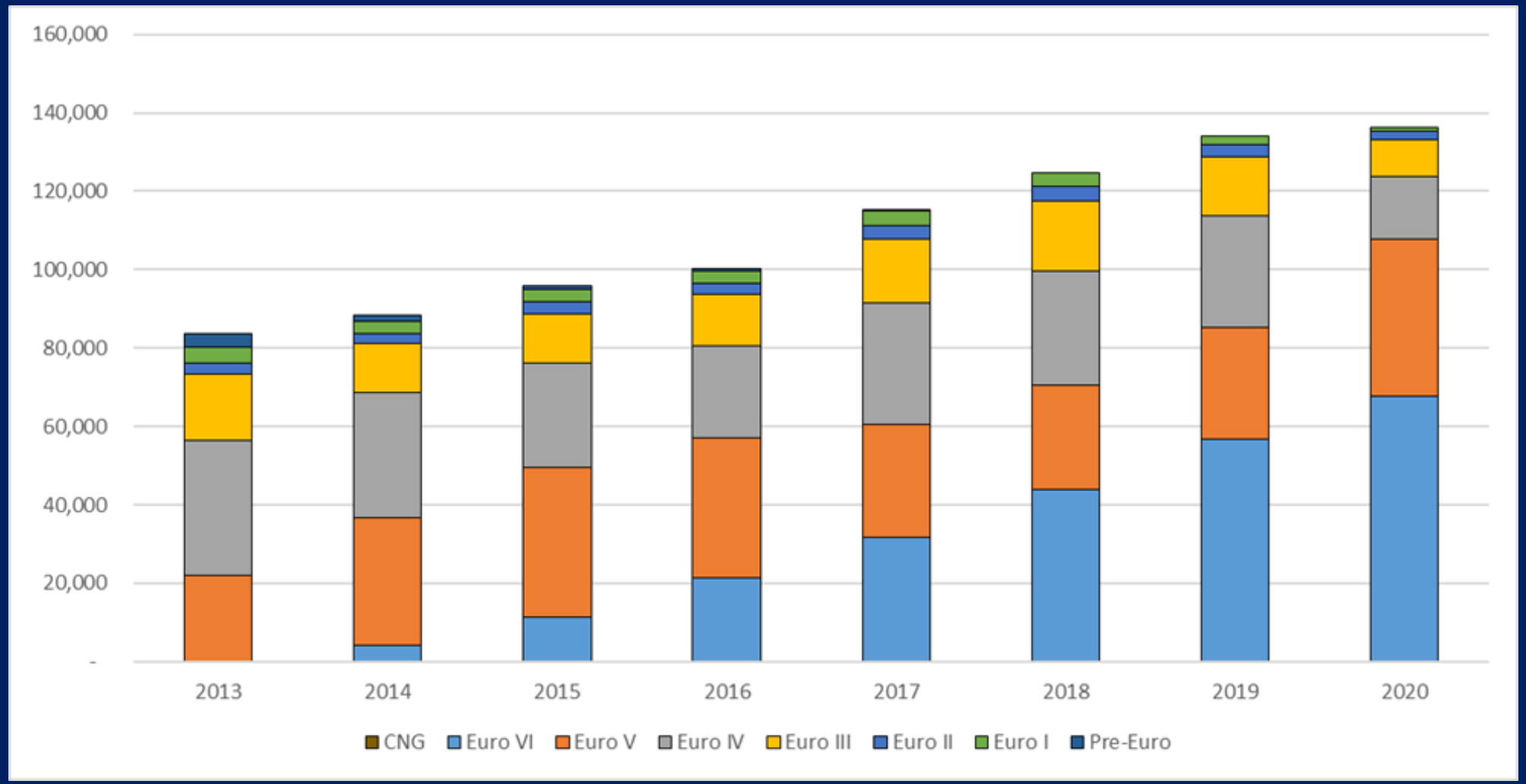
Methods – HGV by fuel type and Euro-class



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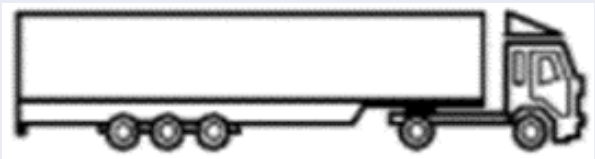
Trends – Freight HGV by Weight Class

			Share of the HGV fleet	
Unladen Weight (UW)	Typical configuration		**2013**	**2020**
2 to 5t	Large van		**68.4%**	**72.5%**
5 to 7.5t	Medium two-axle		**5.5%**	**3.6%**
7.5 to 10t	Heavy two-axle		**3.5%**	**3.1%**
10 to 12.5t	Large rigid		**11.5%**	**9.9%**
Over 12.5t	Tractor and trailer		**10.1%**	**11.6%**

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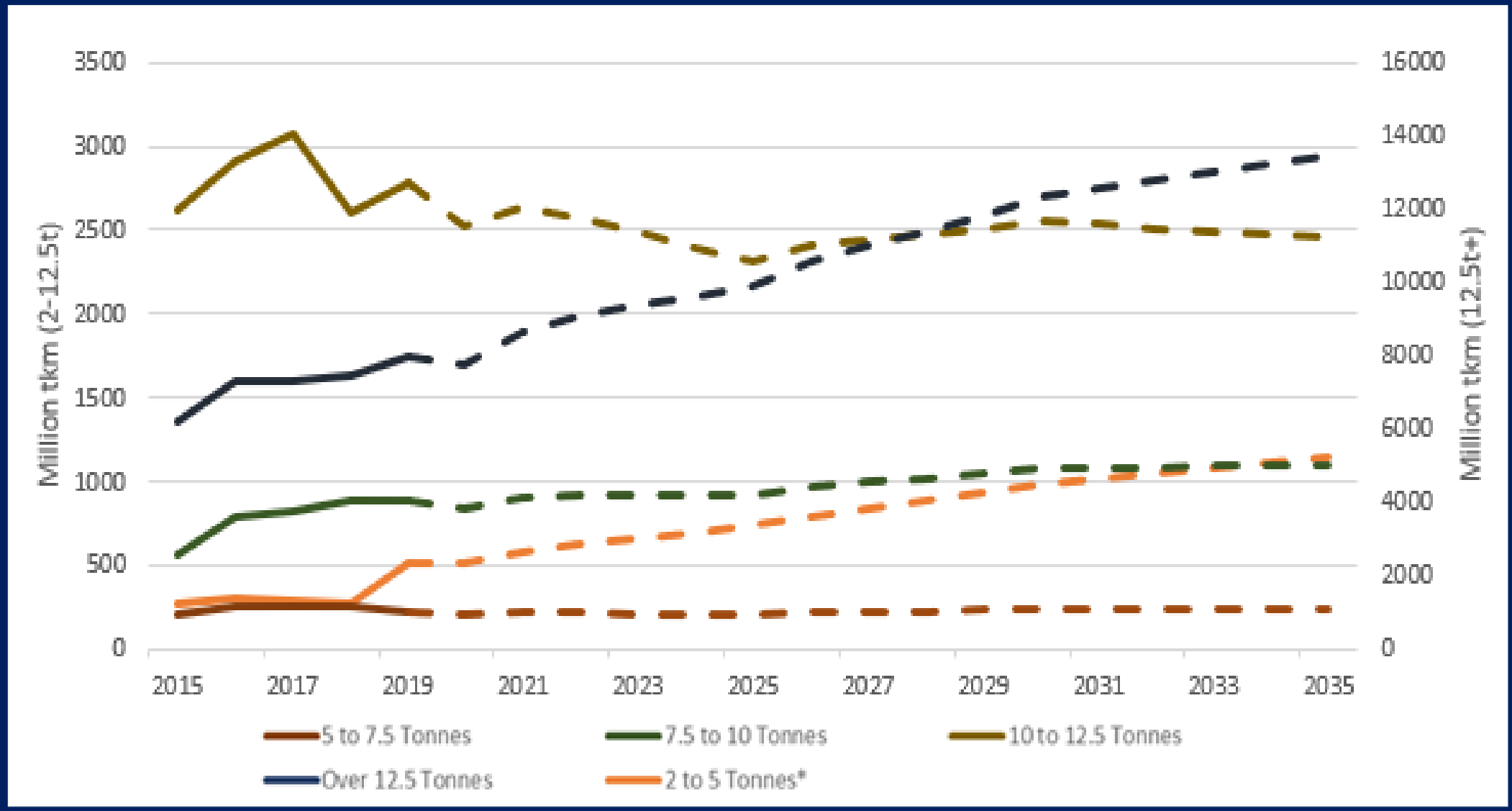
Projection – Projected tkm by vehicle weight class



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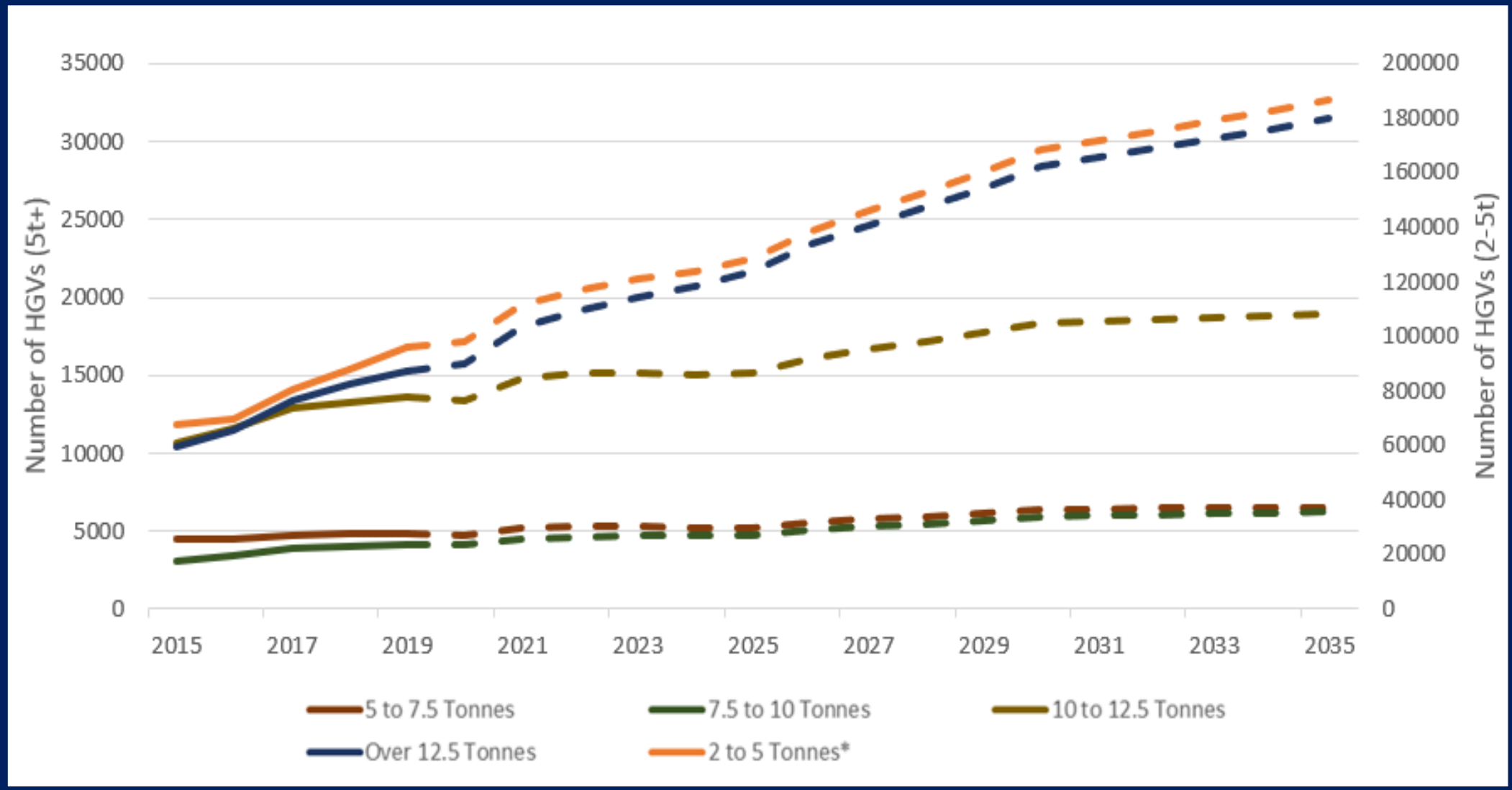
Projection – Projected vehicle stock by vehicle weight class



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Decarbonisation – Key measures modelled 2021-2030

1. **Eco-Driver Training**
   a) drivers accessing training and tools to change their driving style
   b) can deliver an average 10% fuel saving
   c) accelerated rollout could achieve an additional 1.2 Mt cumulative CO_2 reduction
2. **Increased biofuel obligation**
   a) We can use biediesel, HVO, or biomethane (requiring CNG vehicles)
   b) Increasing biofuel obligation to 20% can reduce emissions by 3.5 Mt
3. **Fleet turnover incentives**
   a) accelerate transition to EURO VI – impacts NOx more than CO_2

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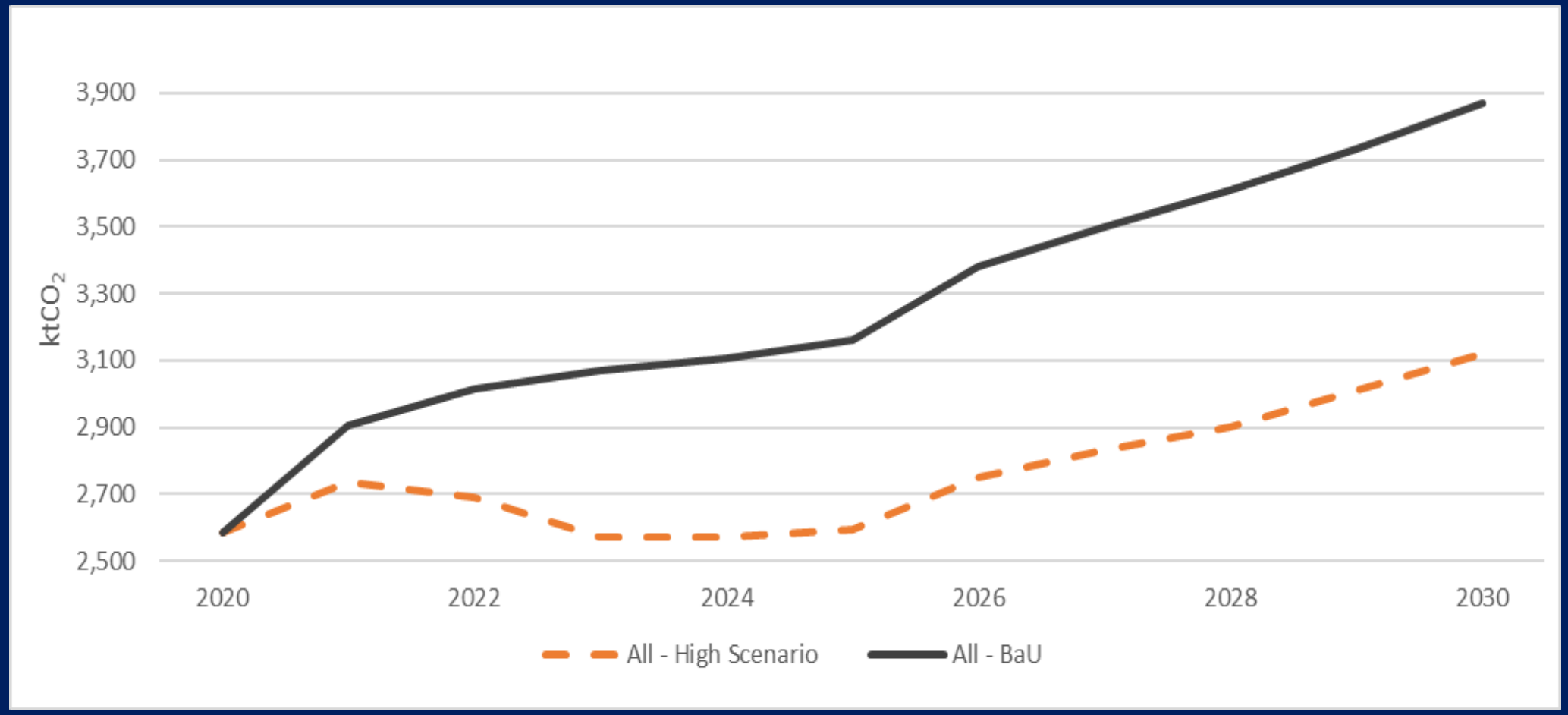
Decarbonisation – Key measures modelled – GHG emissions ($ktCO_2$)



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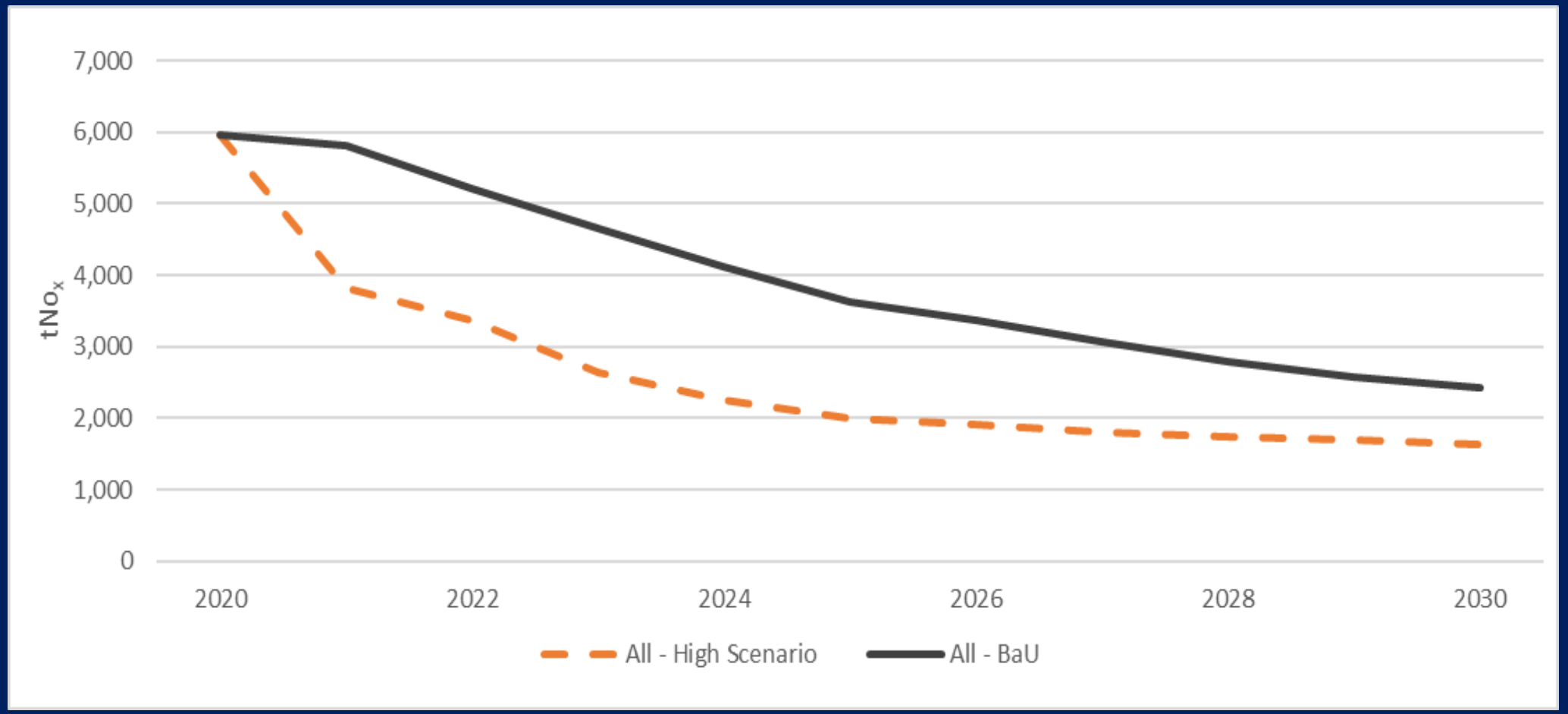
Decarbonisation – Key measures modelled – Air Pollution (tNOx)



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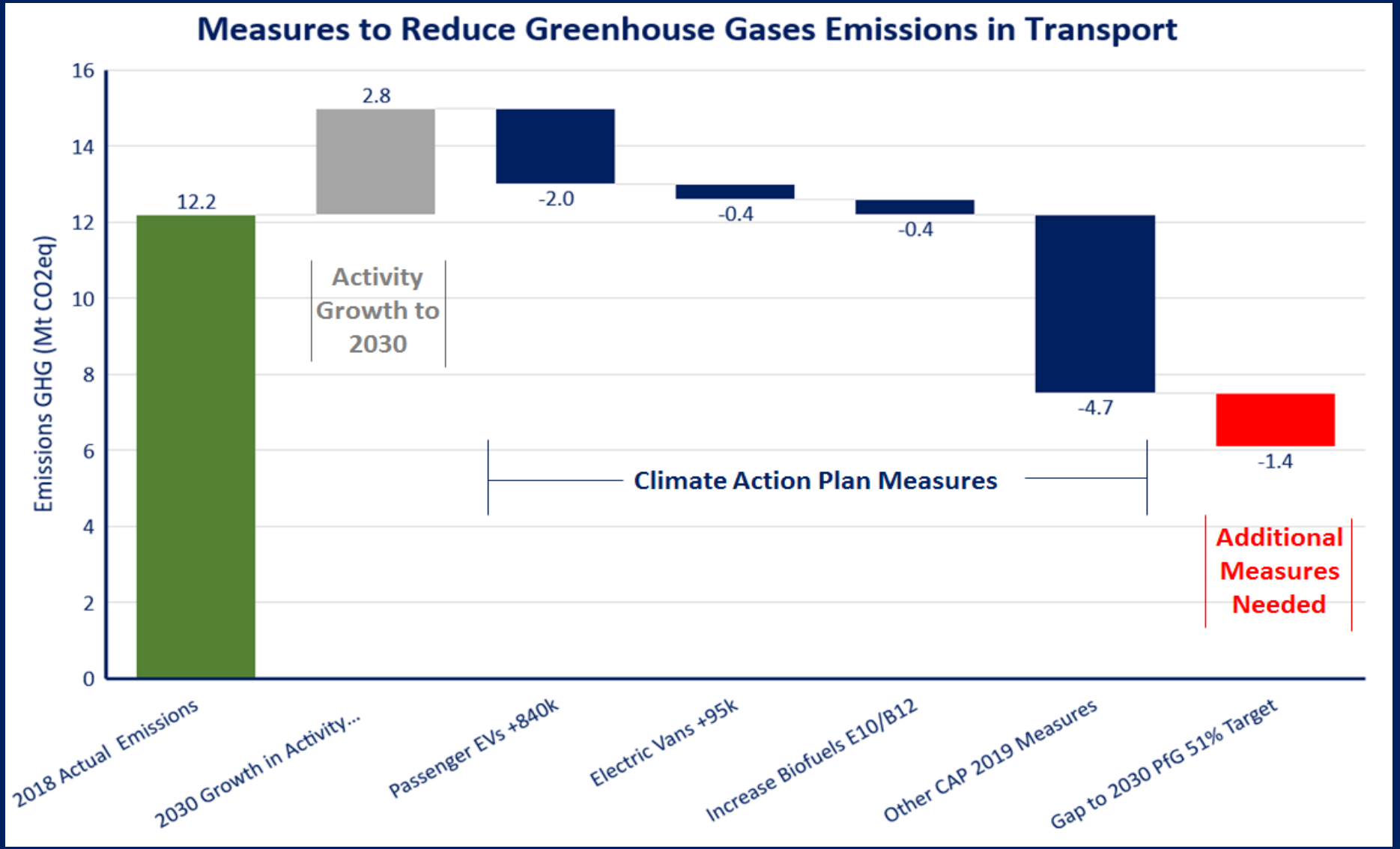
Can we achieve 51% GHG emissions reduction by 2030 in transport?



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MaREI submission to Joint Committee on Environment and Climate Action on reducing GHG emissions in Transport – see Appendix 3 of Oireachtas Committee Report

Additional Measures beyond Climate Action Plan 2019

Measure	Description	Emissions Avoided in 2030 (Mt)
Hydrotreated Vegetable Oil (HVO)	Blend HVO with diesel displacing 20% of diesel in road transport by 2030	**1.3**
Increase active modes of transport	Cycling and walking increase by 2030 to replace car journeys for up to 10% of short trips	0.2-0.6
Targeted measures for trucks	Incentivised driver training for heavy goods vehicles, reform of diesel rebate scheme and changing allowable max weights and truck lengths	**0.2-0.5**
Changes to public transport	Electric or hybrid trains, Dublin Bus Connects and extension of LUAS to Finglas by 2030	0.2-0.3
Working from home	Up to half of workers living more than 25 km work from home by 2030	0.1-0.3
Reduce speed limits	Reduce speed limit on motorway from 120 to 100 km/h	0.1-0.2

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