

Achieving our GHG Targets **what Engineers can offer**

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Ireland's Non-ETS 2030 GHG Target Required Reduction from 2005 Levels

Base Reduction Requirement	- 30.0%
EU Proposed Flexibility Mechanisms for Ireland	
• Allowance Transfer From Reduced ETS Permit Sales	4.0%
• LULUCF Credits	5.6%
Nett Reduction Required with full use of credits	- 20.4%

Ireland's Non-ETS GHG Emissions 2015

Sector	Mt	%
Agriculture	19.8	46.0
Transport	11.8	27.4
Residential	6.0	14.0
Industrial & Commercial	3.25	7.6
F Gases & Waste	<u>2.1</u>	<u>5.0</u>
Total	43.0	100

Mission Impossible

Achieve a 20.4% Reduction in Non ETS Emissions by 2030

Assuming

- **Agricultural Emissions Remain a Sacred Cow**
- **Real GNP Growth averages 2.5 % p.a. to 2030**
- **Transport Emissions Inevitably Increase in line with Economic and Population Growth**

Irish Academy of Engineering Proposal

Non-ETS Emissions	2005	2030	Change
	mt	mt	vs 2005
Agriculture	20.1	17.9	- 11%
LULUCF Credits		(2.7)	
Agriculture Net		15.2	- 25%
Transport	13.1	13.4	+2%
Residential	7.3	3.0	-59%
Industrial & Commercial	5.7	3.0	- 47%
Waste	1.8	1.0	-26%
Allowance transfer from ETS		(1.9)	
Total	48.1	33.7	-30.0%

Increased Transport Emissions are Not an Inevitable Consequence of Economic Growth

UK Performance 1999-2013

GDP	+ 27%
Population	+ 9%
Registered Vehicles	+ 23%
Land Transport GHG Emissions	- 8%

Necessary Steps to Limit Transport Emission Growth to 2% by 2030

- Eliminate fuel tourism, by raising excise duties on petrol and particularly diesel to UK levels.

Emission Saving 1.75 mt p.a.

- Achieve 10 % BEV penetration of car fleet by 2030

Emission Saving 825kt p.a.

- Raise biofuel penetration to 10% of land transport energy requirements by 2030, thus reducing emissions by approx. 6%

Emission Saving 800kt p.a.

Further Reductions Require Major Changes to Spatial Planning and Transport Investment Patterns as

- Automotive emissions are not declining in line with manufacturers claims

SEAI report the following improvements since 2005

- 27% efficiency improvement of new petrol cars
- 29 % efficiency improvement of new diesel cars

IAE analysis indicates a 10% improvement in the efficiency of the petrol car fleet since 2000

- Electric vehicles will not solve problem, as currently believed by senior Irish civil servants

World Auto Production 2015

million vehicles

Country	Cars	Commercial Vehicles	Total
China	21.1	3.4	24.5
USA	4.2	7.9	12.1
Japan	7.8	1.4	9.3
Germany	5.7	0.3	6.0
Korea	4.1	0.4	4.6
Others	25.6	8.8	34.3
Total	68.5	22.2	90.8

Lithium Ion Battery

Annual Manufacturing Capacity

Excl. Panasonic Japan - Source FT

Country	2016		2020	
	GWh	%	GWh	%
China	17	59	105	61
Korea	11	38	23	14
US	1	4	38	22
Poland	0	-	5	3
Total	29		171	
BEV Car Equivalent		m		m
Assuming 100km Range		1.16		6.84

Automobile Industry Trends

Year	Auto Ownership	Financed by	Drive	Controls
2000	Driver	Owner	Petrol	Manual
2020	Leased	Auto Industry Finance	Hybrid	Cruise Control Lane Tracking Auto Breaking Auto Parking
2040	Shared Mobility	Auto Industry	Battery	Driverless

Employment Growth is in Cities but Housing Growth is Outside Cities in Ireland

City

Housing Constraint

Dublin

**Height
Parking Provision/Apartment**

**Cork &
Limerick, until recently**

City Boundary

Galway

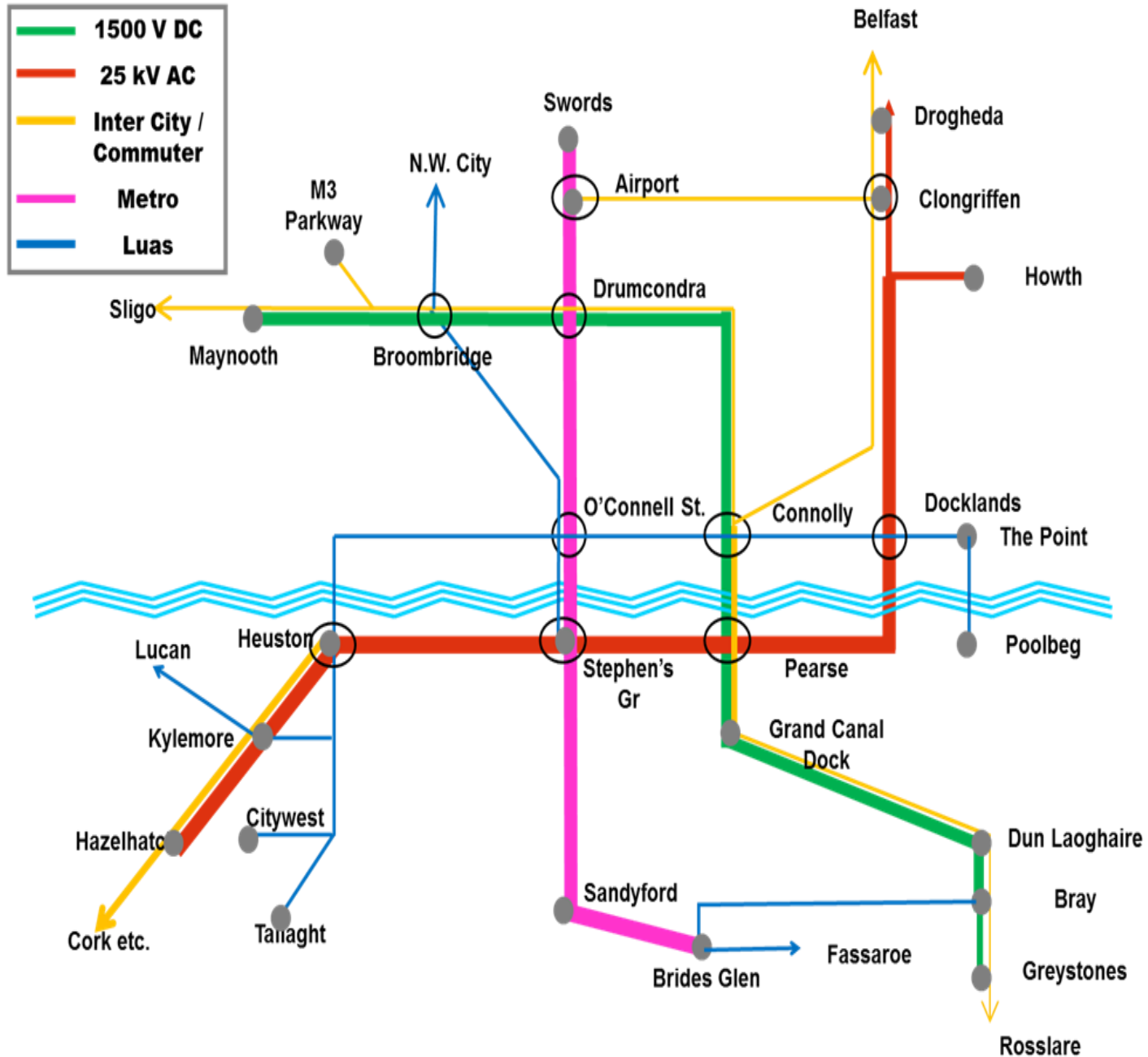
Sewage Treatment Capacity

Advanced Cities like London Paris Copenhagen and Vienna are Substantially Reducing Car Traffic

Change in mode of entry to city centre area 0700-1000

	London 1998-2012	Dublin 2006-2015
National Rail	+ 17%	- 12%
Underground/Luas	+8%	+ 39%
Bus	+ 63%	- 4%
Private Car	- 54%	-15%
Motor Cycle	+ 7%	-42%
Pedal Cycle	+ 260%	+ 127%
Taxi	- 25%	+ 100%
Total	+ 10%	- 6%

Dublin Integrated Rail Network 2035



Proposed Road Developments, Munster



Proposed Road Developments, Cork

