

NATIONAL ROADS AUTHORITY

NATIONAL ROAD NETWORK INDICATORS 2012

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INTRODUCTION

The National Road Authority's primary function is to secure the provision of a safe and efficient network of national roads.

For this purpose, it has overall responsibility not only for planning and supervision of construction and maintenance works on these roads, but also for ensuring the efficient use and safe operation of the national road network.

Efficient use of the national road network provides benefits to road passenger and road freight users in the form of shorter

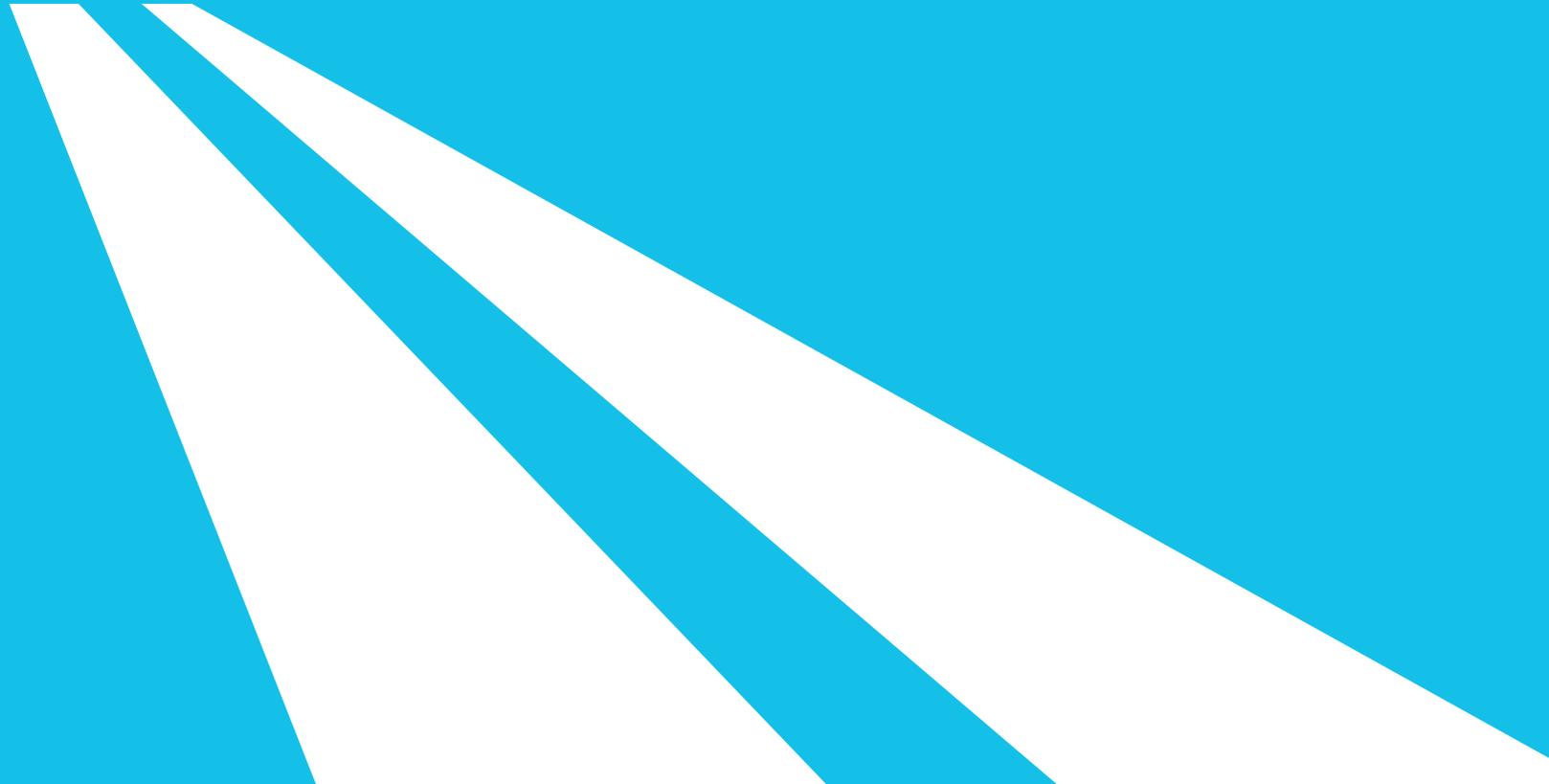
journey times, reduced congestion and reductions in the cost of operating vehicles. Society as a whole benefits from increased economic productivity, reduced energy consumption and a better environment.

If the national road network is operated to a high standard, then road users will enjoy short and predictable journey times and safe journeys.

The National Roads Authority considers it important to monitor the performance and use of the national road network and to share this information with the public at large.

This publication sets out some key road transport, economic, safety and environmental indicators of performance and usage of the National Roads Network.

ONE: ROAD NETWORK



A: LENGTH OF NATIONAL ROAD NETWORK

Length of national road network by road type 2012

There are in excess of 5,400 kilometres of national road network in Ireland

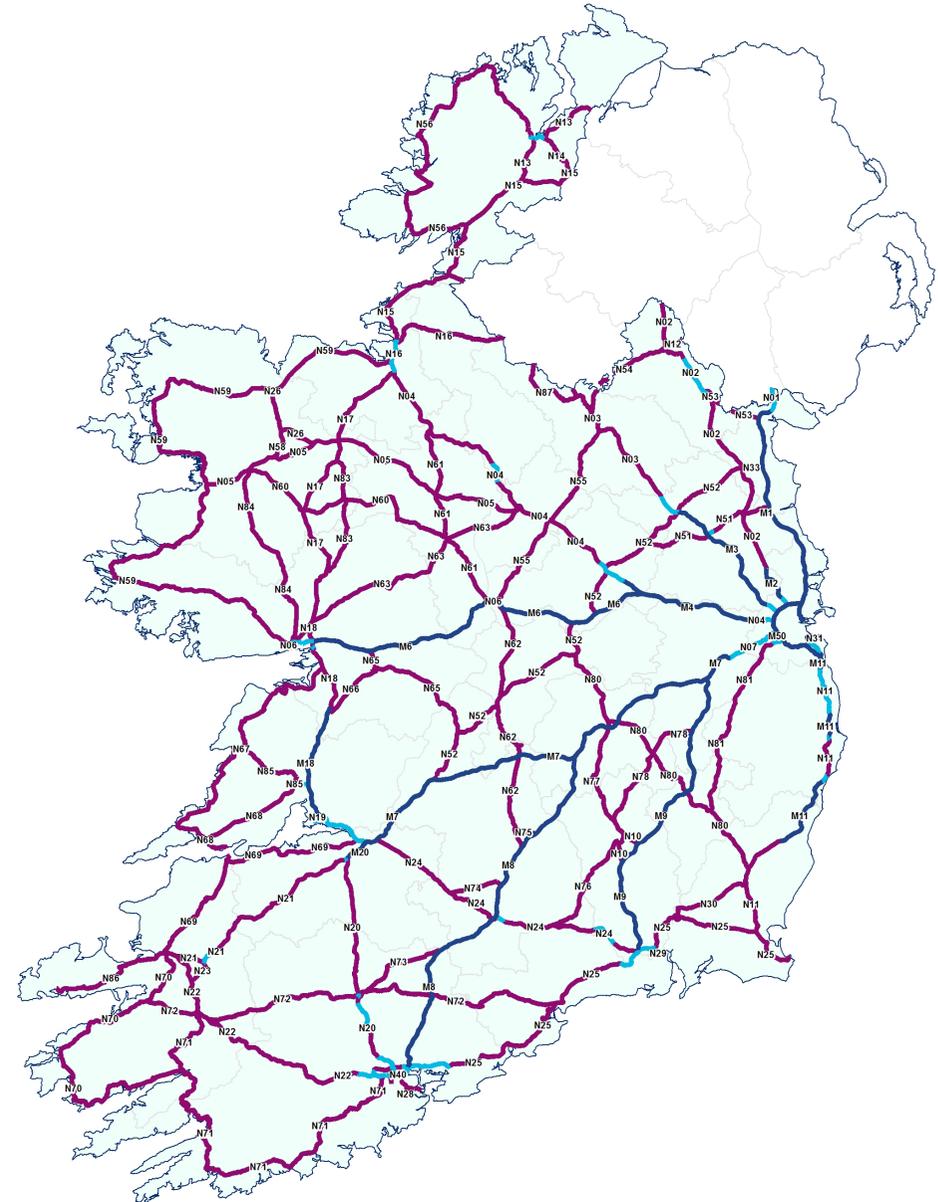
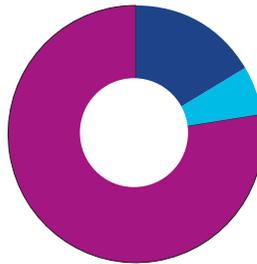
The national road network is comprised of 900 kilometres of motorway, 324 kilometres of dual carriageway, and 4,189 kilometres of single carriageway.

The national road network's classification status comprises 2,697 kilometres of National Primary and 2,716 kilometres of National Secondary roads.

The actual length of the national road network fluctuates year on year due to road reclassification, realignments to existing national roads, new roads opening and analysis and updating of data in the NRA Roads Database.

Road type:

motorway		900km
dual carriageway		324km
single carriageway		4,189km



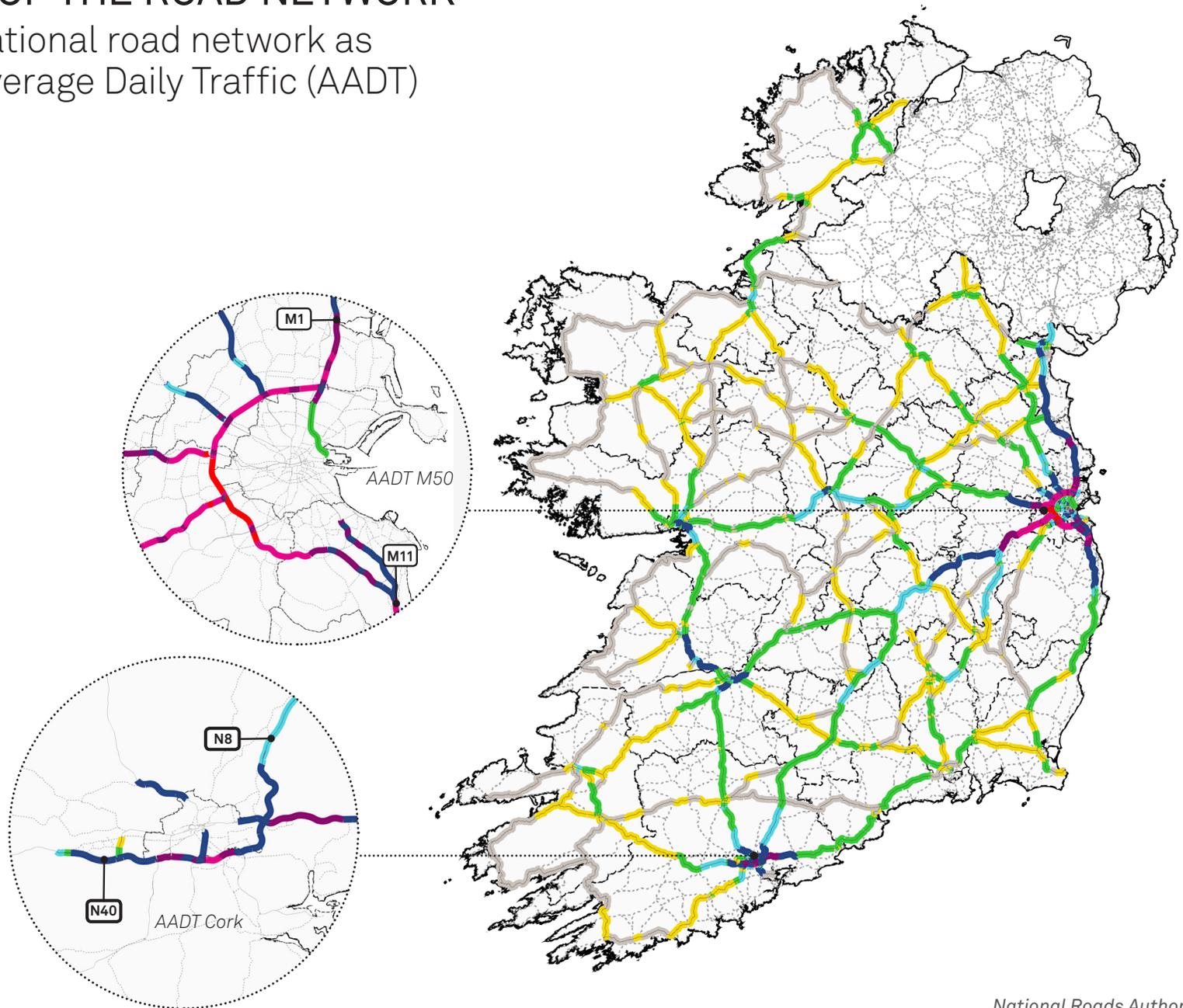
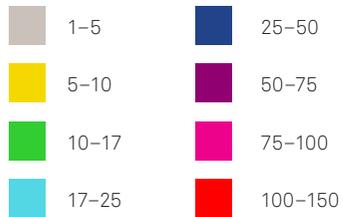
B: LEVEL OF USAGE OF THE ROAD NETWORK

Level of usage of the national road network as measured by Annual Average Daily Traffic (AADT)

Despite the impact of the economic downturn, the national roads network continues to be heavily used

On the M50 the annual average daily traffic flow (2-way AADT) in places is in excess of 124,000 vehicles per day.

AADT (thousands per day)



Source: NRA National Transport Model, 2010

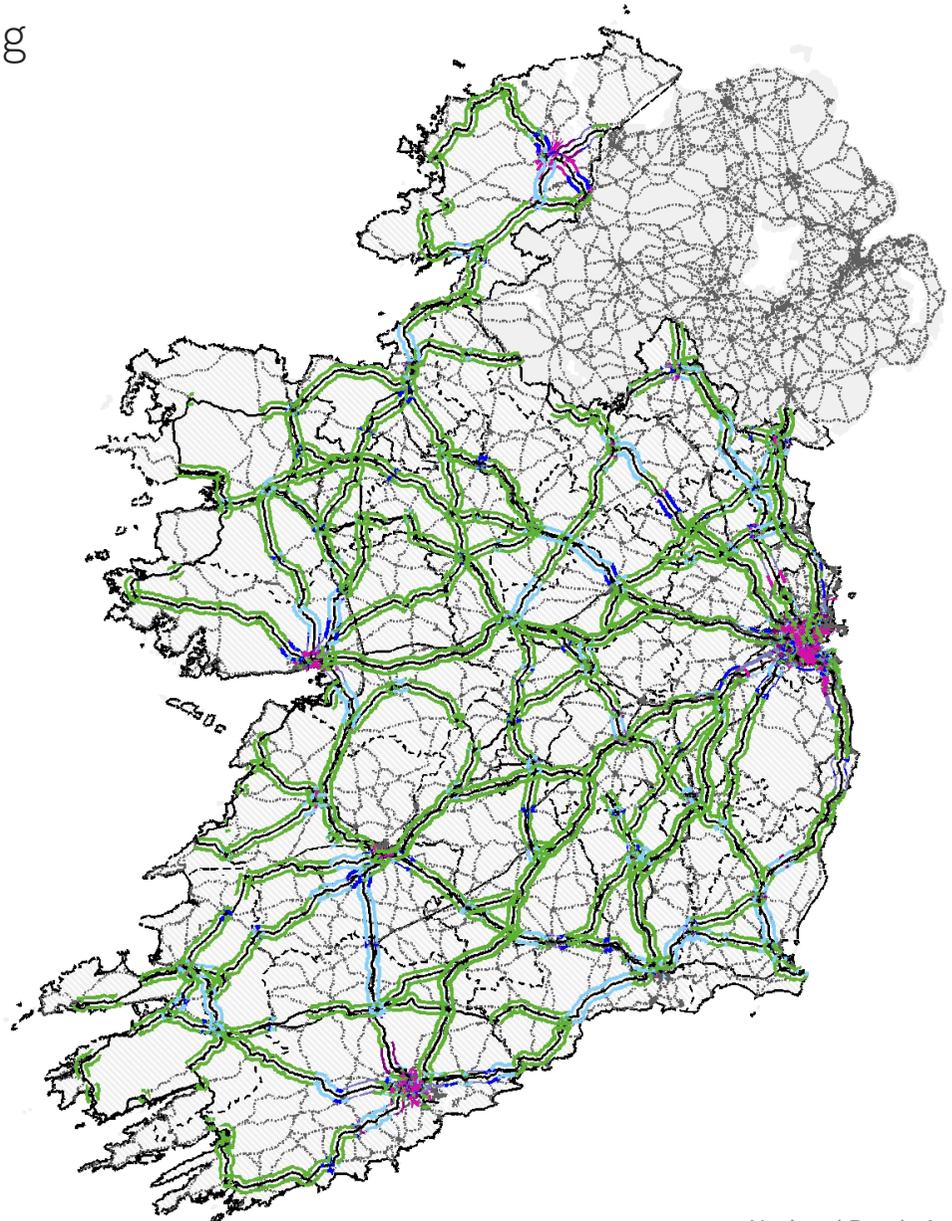
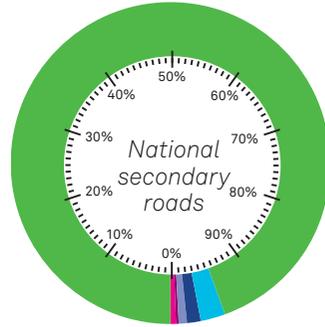
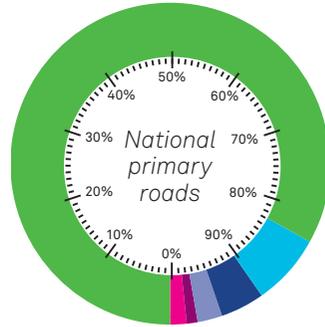
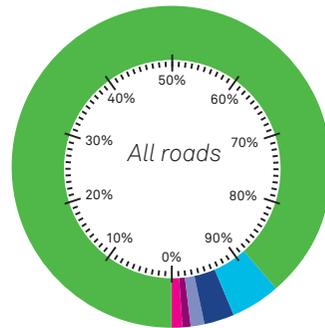
C1: LEVEL OF SERVICE: MORNING RUSH-HOUR, NATIONAL ROADS

Proportion of the national road network operating under each level of service condition

The level of service (LOS) provided by roads may be assessed using recognised international standards. LOS is a quality measure describing operational conditions within a traffic stream. Following the substantial investment in national roads over the last decade, most route sections are operating to the highest standard of service. However, for certain roads such as the M50, further interventions such as demand management are required to ensure that higher levels of service are achieved.

For further information see:
Transport Research and Information Note: A Study of Lane Capacity, 2012
online at <http://nra.ie/Publications/TransportResearchandInformationNotes/>

- Free flow
- Reasonably free flow
- Stable flow
- Approaching unstable flow
- Unstable flow
- Forced or breakdown flow



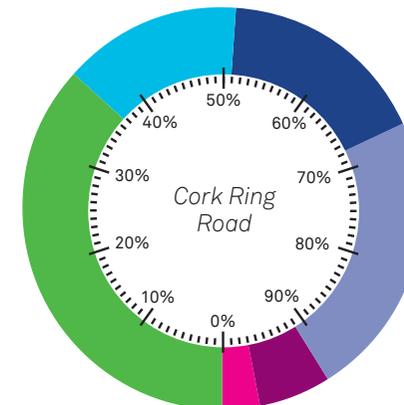
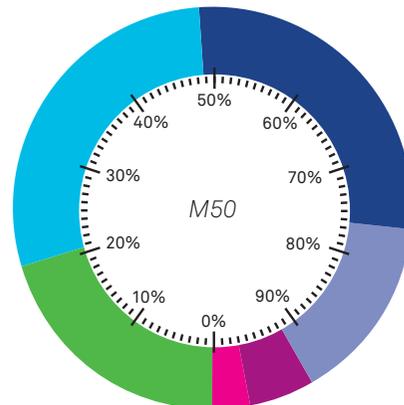
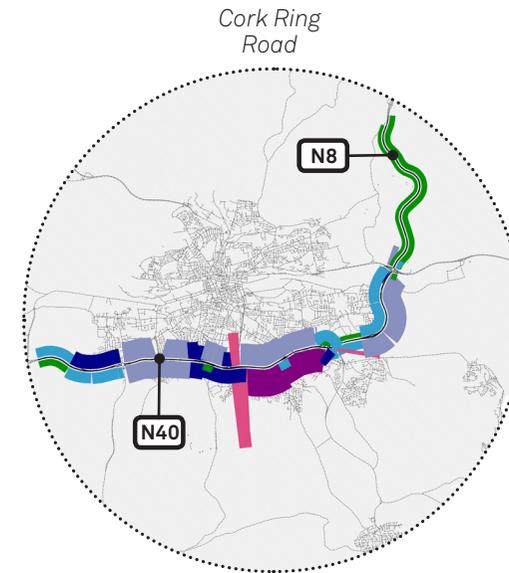
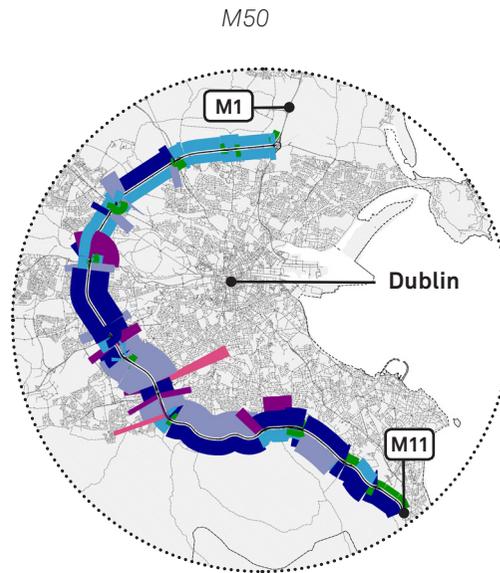
Source: NRA National Transport Model, 2010

C2: LEVEL OF SERVICE MORNING RUSH-HOUR, NATIONAL ROADS, ETC

Proportion of the M50 and Cork Ring Road operating under each level of service condition

The level of service on the M50 in Dublin and Cork Ring Road is presented opposite:

- Free flow
- Reasonably free flow
- Stable flow
- Approaching unstable flow
- Unstable flow
- Forced or breakdown flow



Source: NRA National Transport Model, 2010

D: ROADS USAGE OVER THE DAY

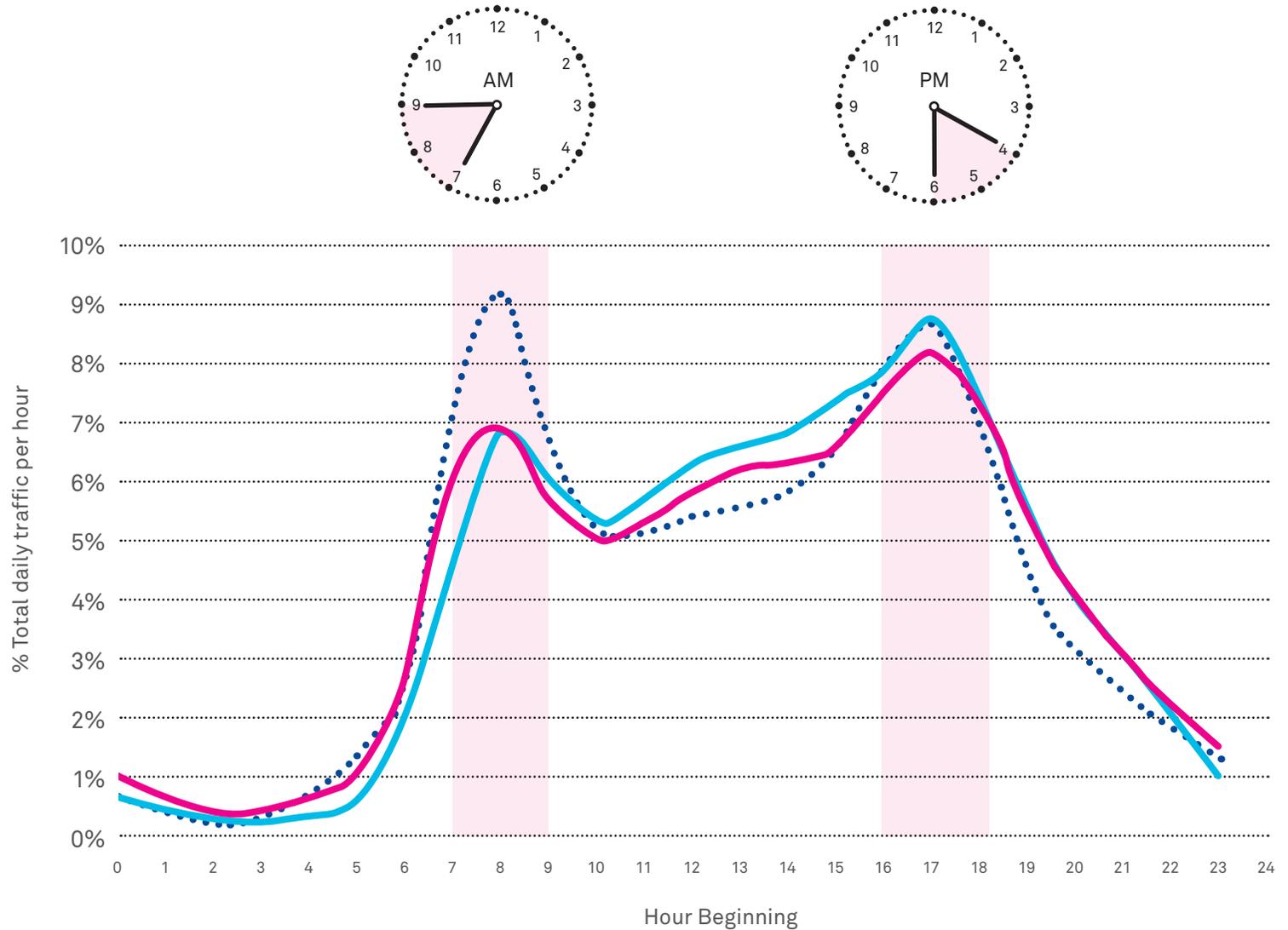
Profile of the usage of the road network by time of day

The majority of roads are more heavily trafficked in the morning and evening peaks

In the morning peak traffic builds to peak around the hour beginning at 8am. In the evening, the peak is usually reached in the hour beginning at 5pm. Peak traffic hours have a level of traffic some 30% to 50% above off-peak levels.

The M50 is the most trafficked road in the country with daily weekday traffic of nearly 130,000. The peaks on the M50 are more prolonged than other roads with significant traffic flows being maintained during off-peak periods.

- M50 motorway
- national primary
- national secondary
- peak period



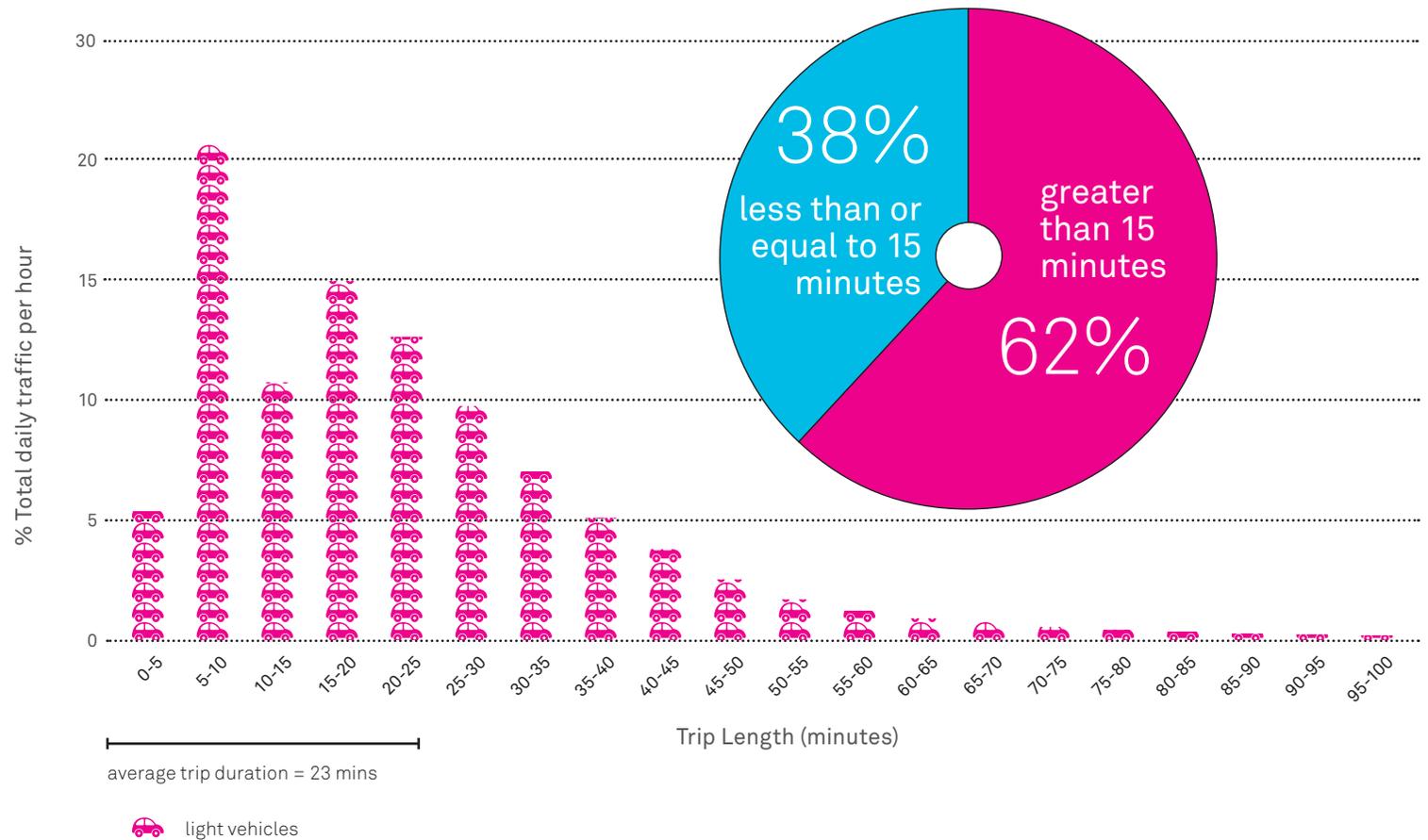
Source: NRA National Transport Model, 2010

E: TRIP DURATION

NATIONAL ROADS AND REGIONAL ROADS - AM PEAK

Profile of the trips made on the national and regional road network by their duration

Across the road network, a large portion of trips that people make are of short duration. In total, 38% of trips are of 15 minutes duration or less



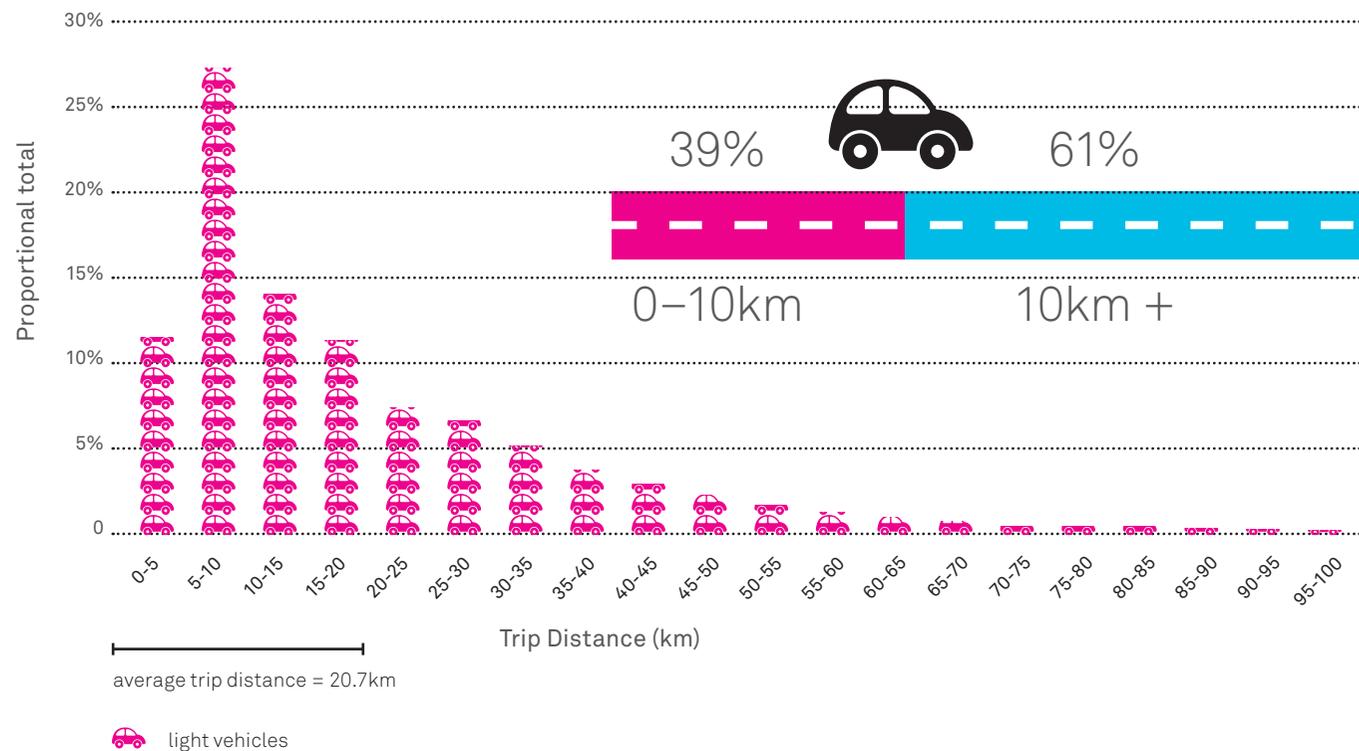
Source: NRA National Transport Model, 2010

F: TRIP DISTANCE

NATIONAL AND REGIONAL ROADS - AM PEAK

Profile of the trips made on the national and regional road network by their distance

Across the road network, a large portion of trips that people make are short distance. In total, 39% of trips on the national and regional roads network are 10 kilometres or less

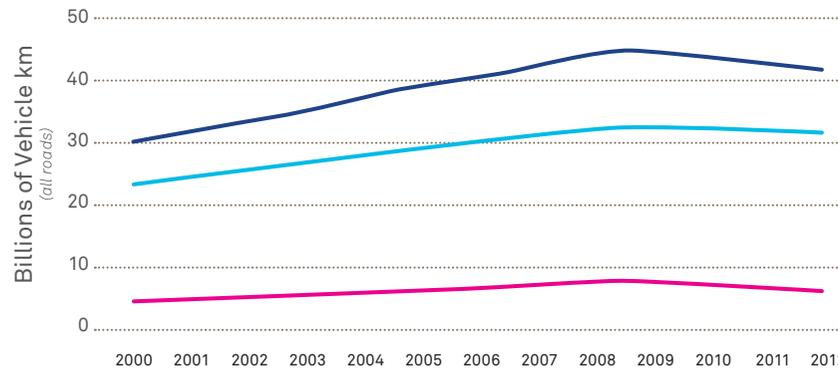


G: VEHICLE KILOMETRE TRENDS

Trends in the vehicle kilometres travelled on the road network in Ireland

After the impact of the economic recession, traffic volumes on the national road network have started to increase again

Long term trends on all roads
Source: Central Statistics Office (CSO)



In total there has been a 33% increase in traffic volumes (as measured by vehicle kilometres travelled) in the country over the 11 year period 2000 - 2012. Traffic volumes peaked in 2008, reaching 44.4 billion vehicle-kilometres. Since 2008, traffic volumes have fallen annually, totalling 40.7 billion vehicle-kilometres in 2012. While the overall movement in traffic volumes has been similar for private cars and goods vehicles over the 2000 – 2012 period, the proportional decrease in traffic volumes since 2008 has been much more pronounced for goods vehicles (-22.5%) relative to private cars (-4.7%).

- all vehicles
- private cars
- goods vehicles

More recent experience on national roads
Source: NRA Traffic Counters

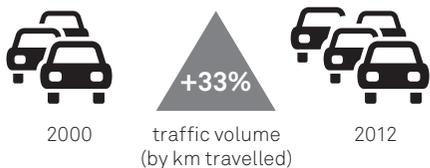


all vehicles: +4.8%

goods vehicles: -4%

However, an analysis of recent trends on national roads only shows that traffic volumes have started to increase again.

Total traffic volumes on national roads were 2 percent higher in Quarter 1 2012, relative to the same period in 2010. There was a mixed experience for different categories of road user. National car traffic volumes were approximately 4.8 percentage points higher in Quarter 1 2012, relative to the same period in 2010. However national HGV traffic volumes were 4 percentage points below the same period in 2010.



TWO: ECONOMIC



A: ROAD VEHICLE FLEET IN IRELAND BY FUEL TYPE

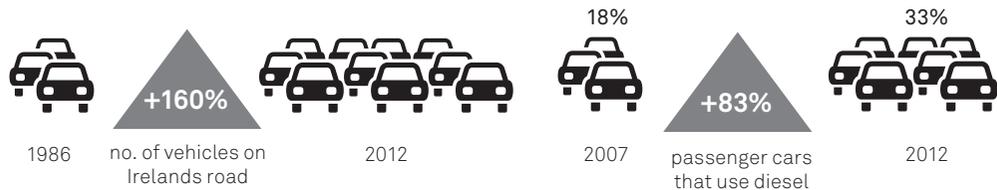
Changes in the distribution of the vehicle fleet in Ireland by type of fuel

Roads users are switching to diesel vehicles

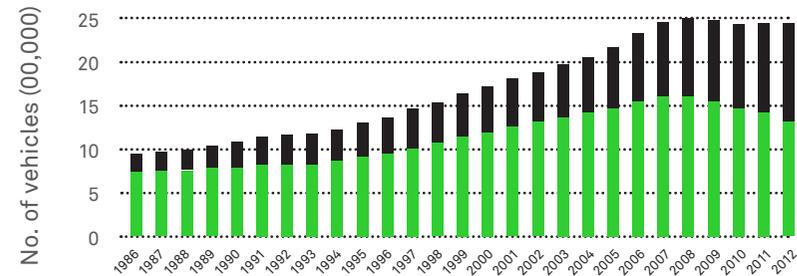
■ diesel
■ petrol

In 2012 there were 2.39 million vehicles in Ireland. This represents a 160% increase over the number of vehicles in the country in 1986. The vehicle fleet peaked in size in 2008, where there were 2.49 million vehicles in the country.

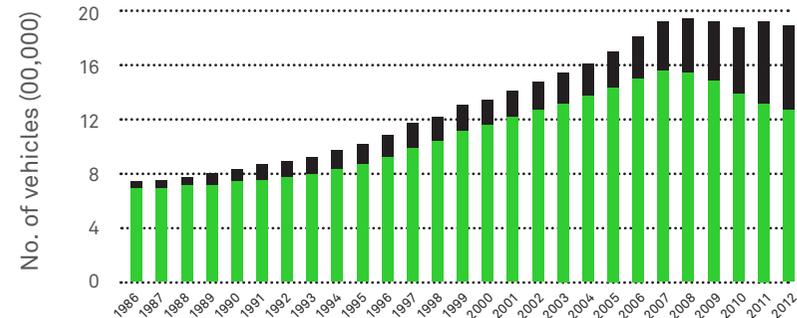
In response to changes in the motor vehicle taxation system, there has been a significant change in the fuel-type split of the vehicle fleet since 2007. The change has been particularly pronounced in the passenger car fleet. In 2007, 18% of the passenger car fleet were diesel vehicles; the equivalent proportion in 2012 was 33%.



Distribution of Total Vehicle Fleet by Fuel Type



Distribution of Passenger Car Fleet by Fuel Type

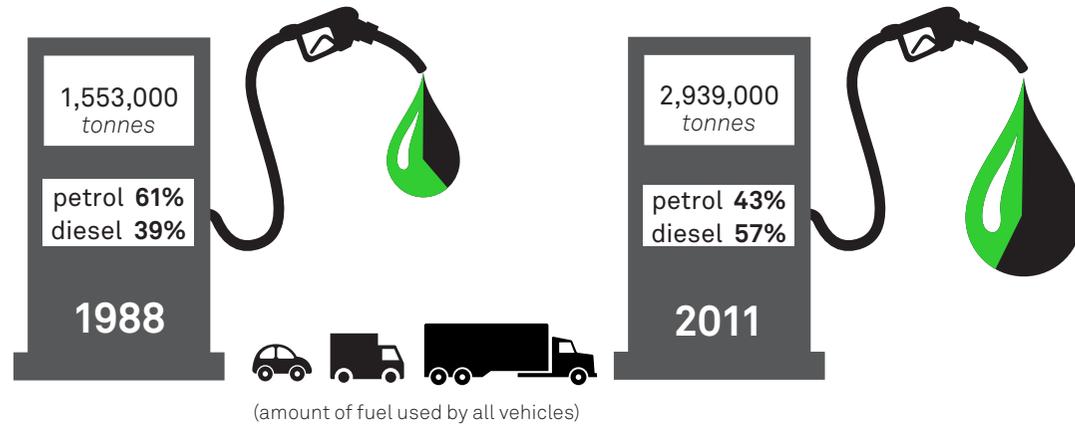


B: FUEL CONSUMPTION IN IRELAND BY FUEL TYPE

Profile of the vehicle fuel consumption in Ireland by type of fuel

Diesel is accounting for a growing proportion of road transport fuel consumed by all vehicles

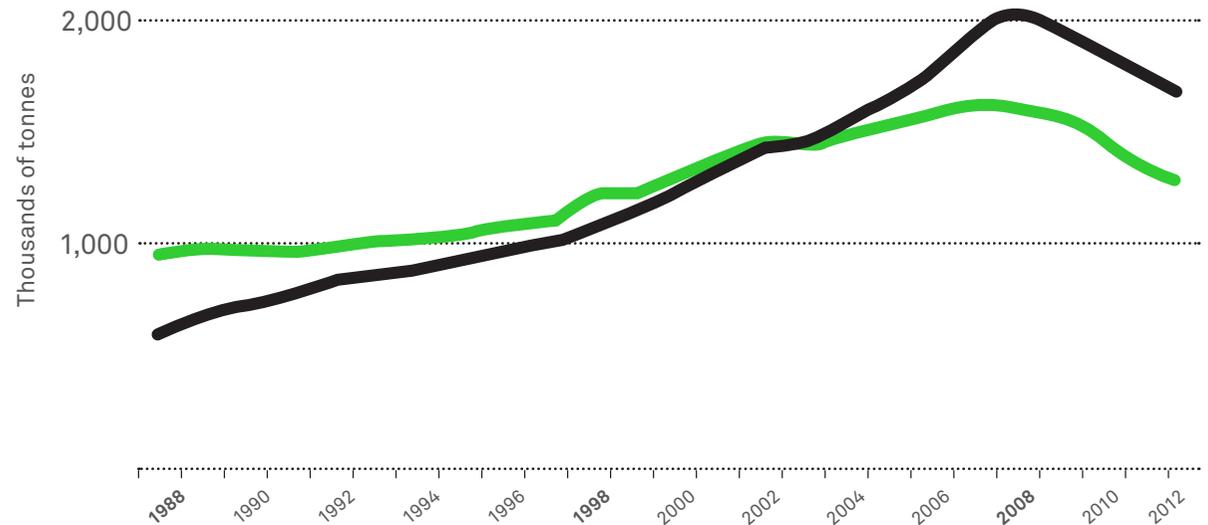
█ petrol
█ diesel



Based on the latest data available from NRA research in 2013, fuel consumption in road transport has increased by 70% over the two decades to 2011, to 2.94 million tonnes. Peaking in 2007, national fuel consumption has declined by 20% from that peak. This reflects both the increased fuel efficiency associated with the vehicle fleet as well as a decline in traffic volumes.

Since 2007, petrol consumption has fallen more than diesel consumption in percentage terms. This in part reflects an ongoing switch by car users from the petrol to the diesel car, as well as a move to smaller petrol vehicles. In 2011, 57% of the road fuel consumed in Ireland was diesel and 43% was petrol.

Trends in fuel consumption



Source: *The Impact of Fuel Prices on Fuel Consumption and Traffic in Ireland*, NRA (November 2013)

C: ELASTICITY OF VEHICLE KILOMETRES TRAVELLED TO CHANGES IN FUEL PRICES

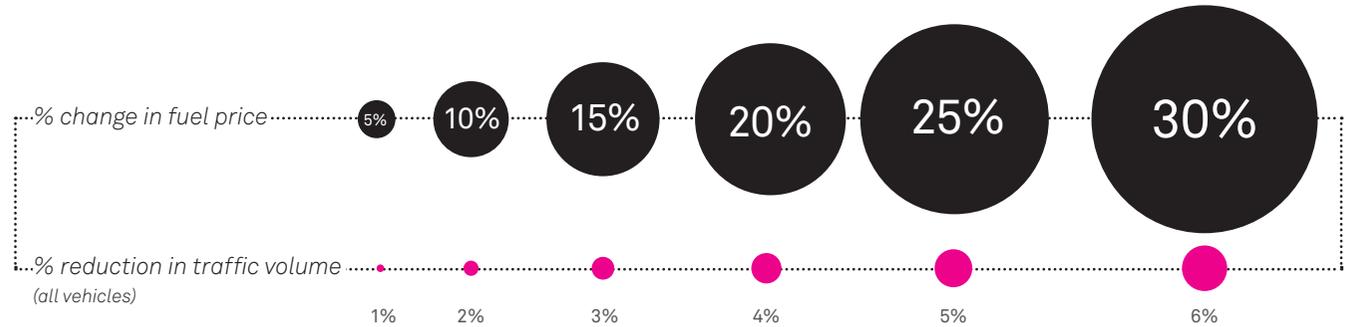
How responsive are Irish drivers to changes in fuel prices?

Petrol prices in Ireland doubled in the period 2004–2011 and diesel prices increased by two thirds

Research shows that when fuel prices increase by more than the general rate of inflation, road traffic volumes reduce. A 10% increase in fuel prices over and above general inflation rates reduces road travel by some 2%, but encourages a greater increase in fuel efficiency.

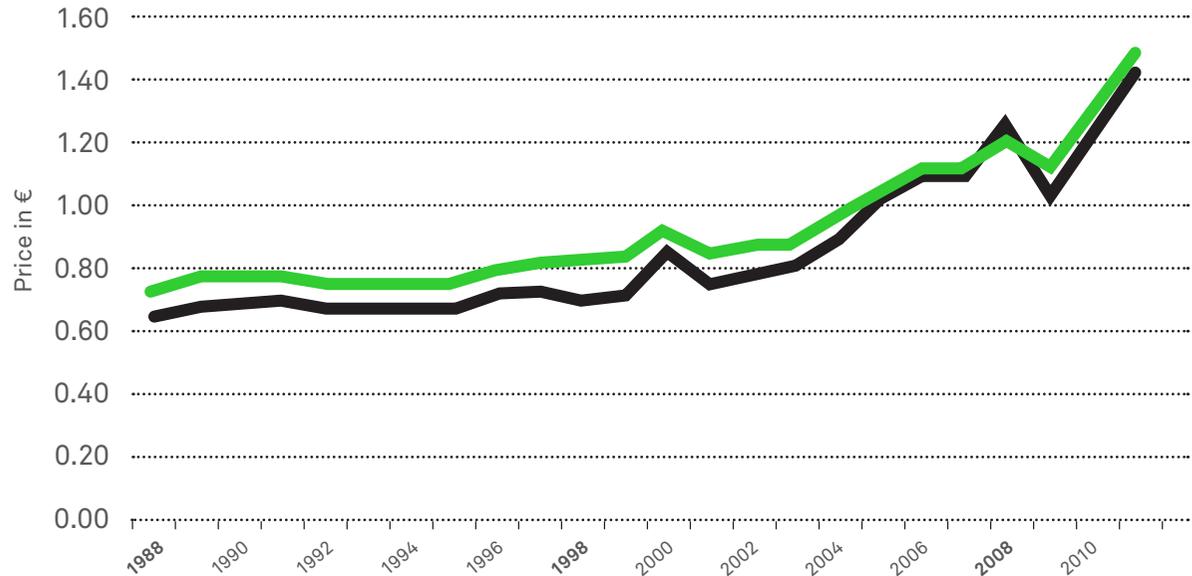
For further information see: *Transport Research and Information Note: The Impact of Fuel Prices on Fuel Consumption and Traffic in Ireland, 2013* online at <http://nra.ie/Publications/TransportResearchandInformationNotes/>

█ petrol
█ diesel



Fuel price in Ireland, 1986–2011*

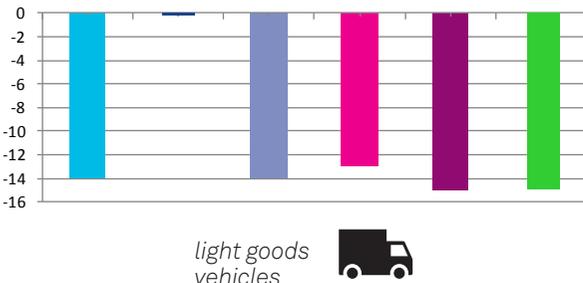
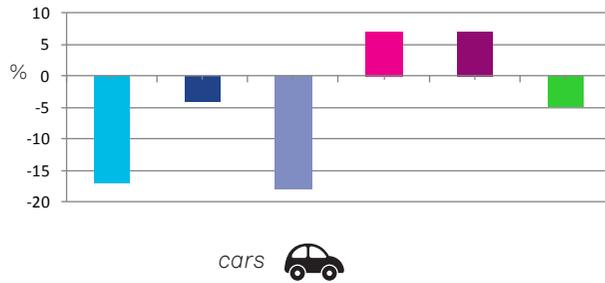
*Data from CSO Statistical Yearbook 2012, Chapter 16 – Prices, Table 16.3



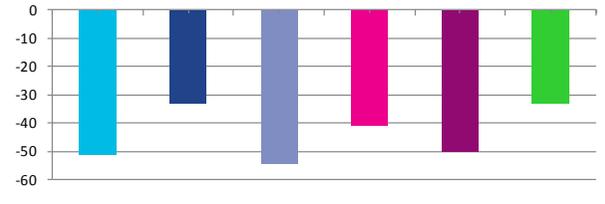
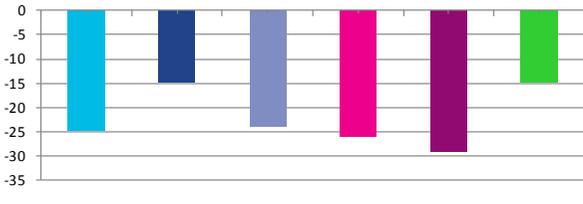
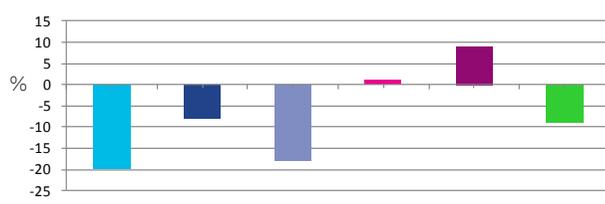
D: EMISSIONS FROM THE ROAD VEHICLE FLEET

Changes in the level of emissions from the road vehicle fleet over the 2008 – 2011 period*

Changes in Emissions / Fuel Consumption per Vehicle km (due to changes in more efficient vehicle fleet)



Overall Changes in Emissions from Vehicle Fleet (due to changes in more efficient vehicle fleet and changes in vehicle km travelled)



There have been significant changes in the vehicle fleet between 2008 and 2011. Newer, more fuel efficient vehicles have entered the vehicle fleet and a shift has taken place towards the purchase of diesel fuelled passenger cars. Over the 2008 – 2011 period the changes related to fleet technologies and the fuel type of the fleet are estimated to have reduced CO₂ emissions per vehicle kilometre travelled by 4% for passenger cars.

In addition to changes in the vehicle fleet, there has been a dramatic reduction in the vehicle kilometres travelled

by goods vehicles over the 2008 - 2011 period. The reduction for the private car fleet was more modest. The combination of changing fleet technologies and changing vehicle kilometres travelled totals has combined to effect reductions in fuel consumption and the emissions of many pollutants including the greenhouse gas CO₂. Notable exceptions are NOx and particulate matter emissions for private cars whose levels have increased owing to the increased use of diesel in the car fleet.

*Sources: CSO Primary Data and TRL Emission Rates

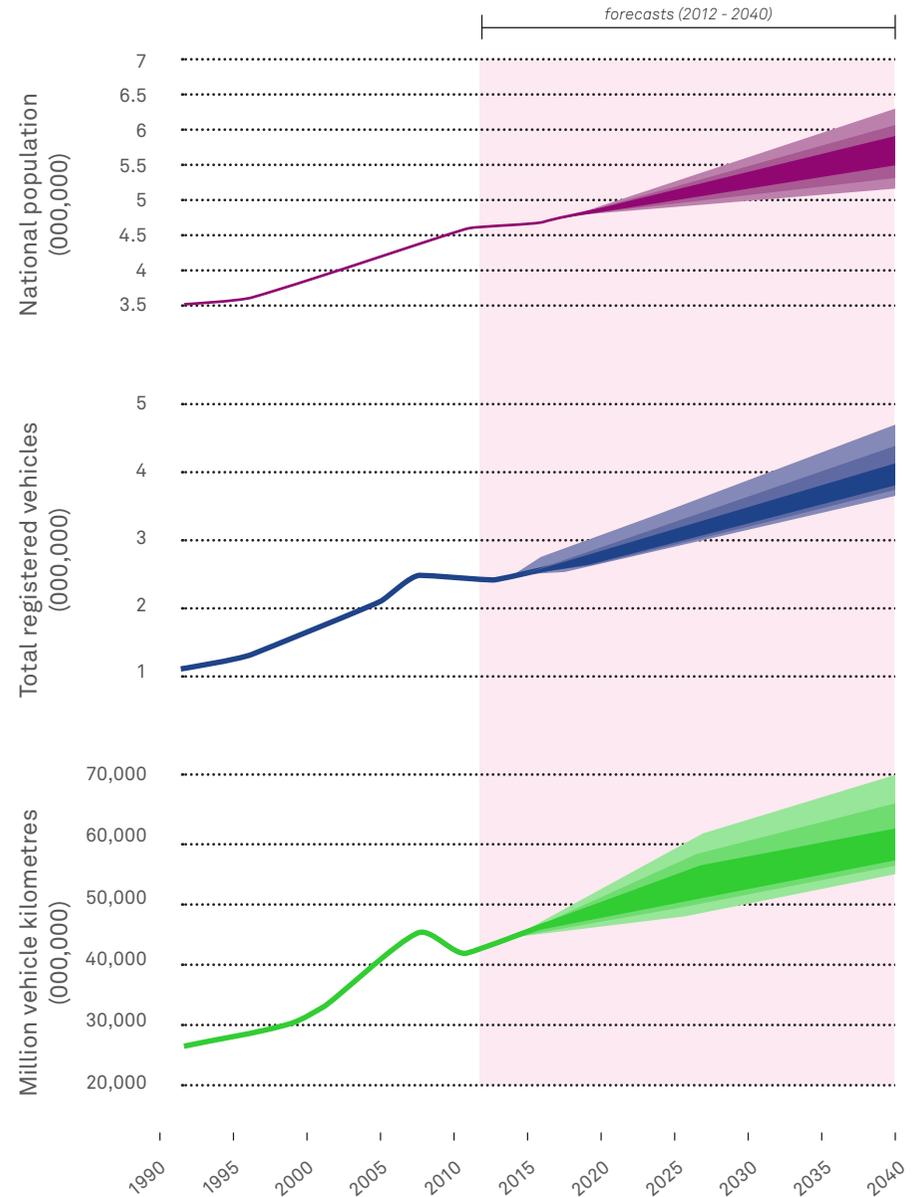
E: POPULATION, CAR OWNERSHIP AND VEHICLE KILOMETRES FORECASTS

Overview of recent experience and forecasts for the future

The country experienced significant increases in its level of population, number of registered vehicles and vehicle kilometres travelled over the period 1990 to 2008.

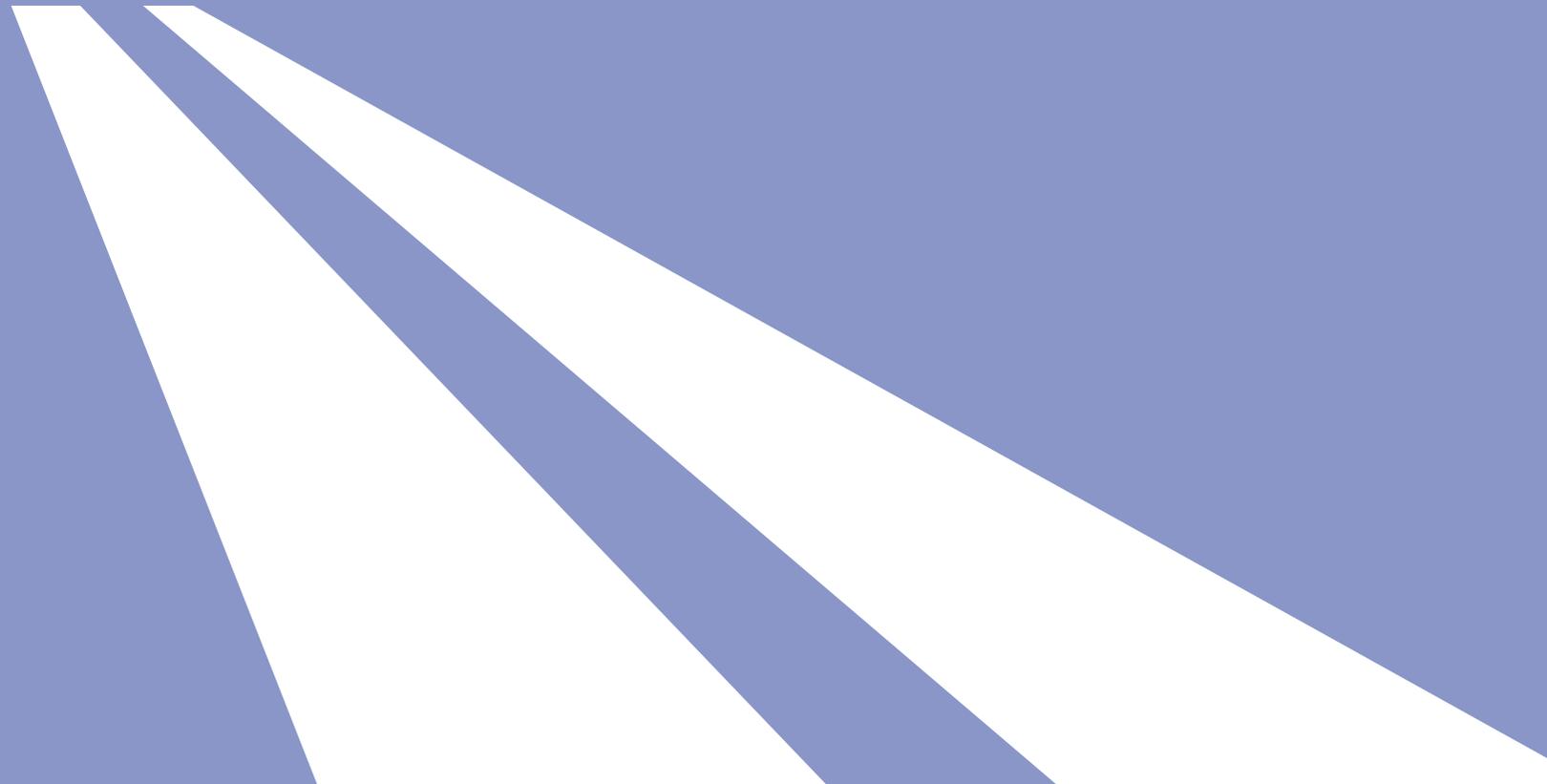
Since 2008 there has been a reduction in the level of car ownership and vehicle kilometres travelled in the country, although these have started to rise again since 2010. The Central Statistics Office (CSO) has produced population forecasts to 2046 on the basis of a number of scenarios with respect to fertility and migration levels. According to the CSO forecasts, the population of the country is forecast to reach between 5.16 and 6.36 million persons in 2041 (these are based on the CSO's F1 fertility growth scenario).

The NRA's National Transport Model was used to produce forecasts of the vehicle numbers and vehicle kilometres travelled in the country to 2040. In that year, it is forecast that there will be between 3.7 and 4.8 million vehicles registered in the country. The number of vehicle kilometres travelled is forecast to reach between 53.7 and 69.1 billion in that year.



Source: Central Statistics Office and 2010 National Transport Model

THREE: ROAD CONDITION



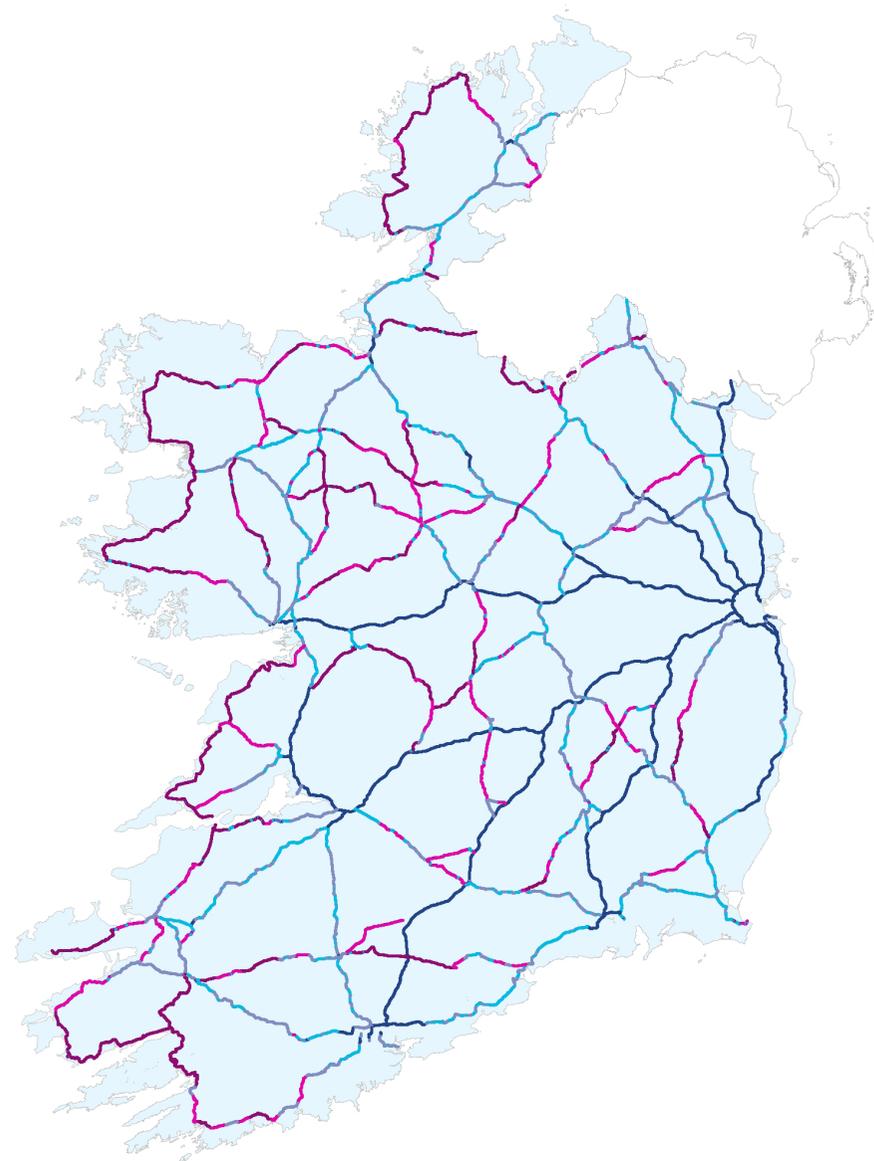
A: PAVEMENT MAINTENANCE

Overview of the status of the road pavement across the national road network by subnetwork type

The national road network consists of over 5,400 kilometres of road pavements. The pavements are predominately made of layers of flexible materials designed to support traffic volumes/loads over their design lifespan of between 0 and 40 years. Owing to the diversity that exists

across network pavements a series of 5 Subnetwork types has been defined, to assist in the ongoing management of the network. These Subnetworks are defined in terms of their characteristics, e.g type of pavement construction, pavement age, and traffic volumes carried.

Subnetwork	Classification	Length Km
0	Motorways + dual carriageways	1147
1	Engineered pavement	990
2	Legacy pavement – high traffic	1129
3	Legacy pavement – low traffic)	884
4	Legacy pavement – very low traffic	1170



B: CURRENT STATUS OF THE ROAD PAVEMENT CONDITION

Overview of the condition of the road pavement across the national road network by some key indicators

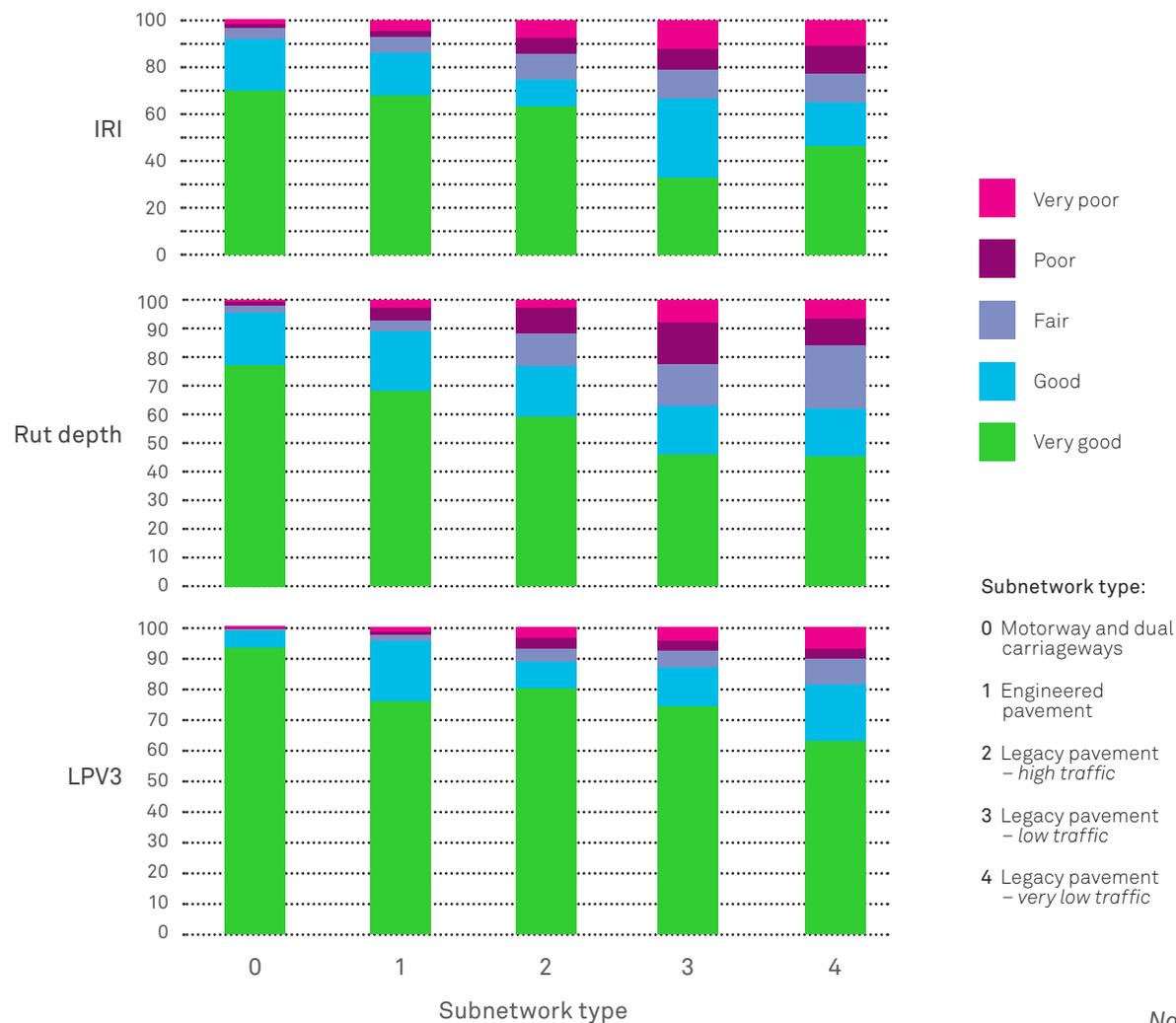
The NRA collects data on the pavement condition across the entire pavement network annually, using high speed machine survey vehicles. This data is used to select sites for treatment under the Pavement and Minor Improvements programme.

As part of the annual survey of road pavement condition, data on a number of key indicator parameters are collected, including:

- **IRI (International Roughness Index)** which measures the response of vehicle to the pavement surface conditions
- **Rut Depth** which measures the level of rutting/deformation on the pavement caused by heavy traffic
- **LPV3 (Longitudinal Profile Variance)** which measures the level of bumps, potholes, sags etc in the pavement

In 2012, it was identified in relation to roads belonging to motorway/dual carriageway that:

- 70% of the network had very good IRI;
- 72% of the network had very good Rut Depth
- 93% had very good LPV3 levels



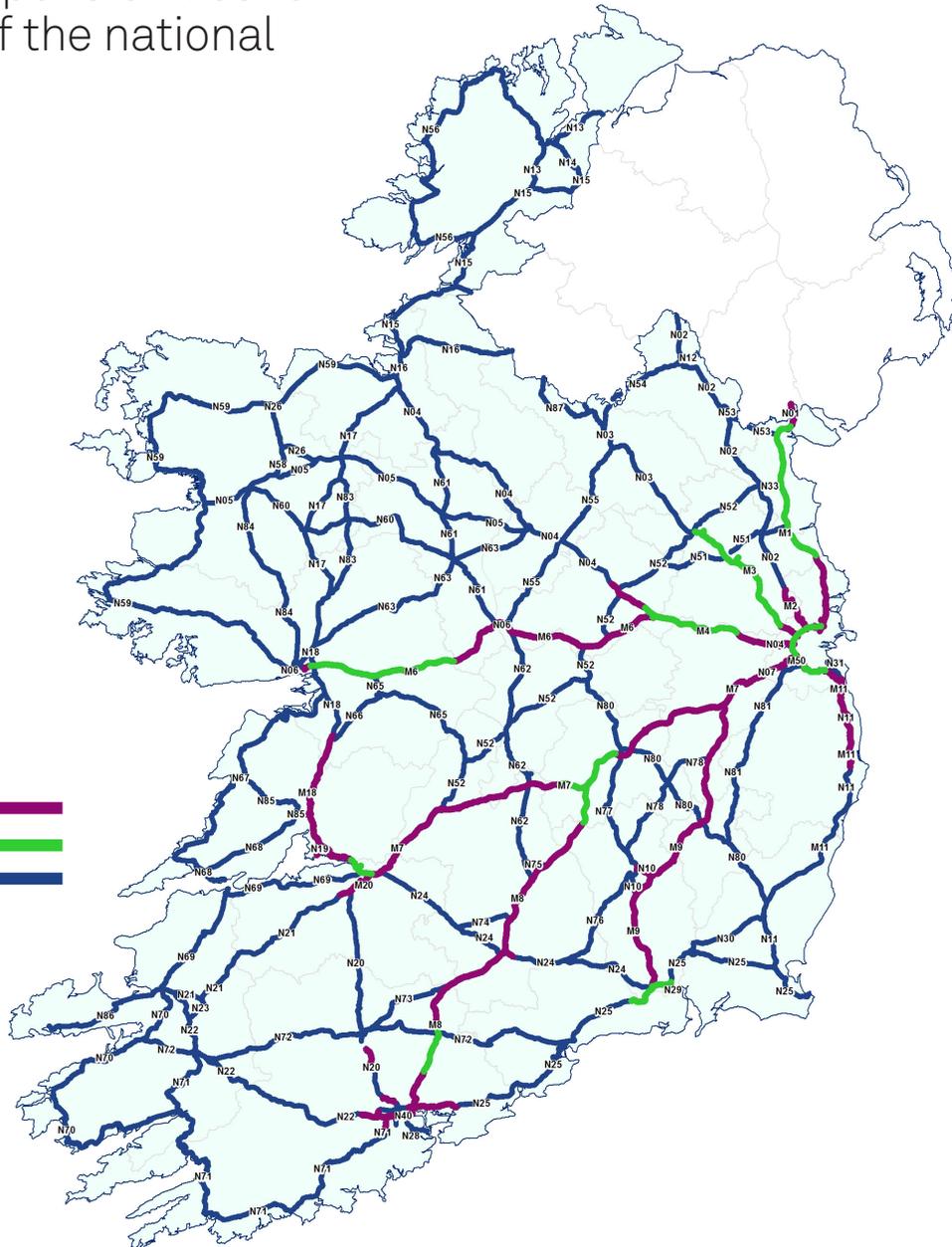
C: NETWORK MANAGEMENT

Overview of the responsibilities for the management of the national road network

The management of the national road network is assigned to a number of bodies with the majority share of national primary and national secondary roads being managed by local authorities. Motorways are managed under the Motorway Maintenance and Renewal Contracts (MMaRCs) or by PPP Concession companies in the case of the tolled motorways. The NRA manages the maintenance of 2,296 bridges, which includes all bridges on national roads other than on PPP roads.

Routes managed by:

- MMaRC
- PPP
- Local Authority



Key facts:

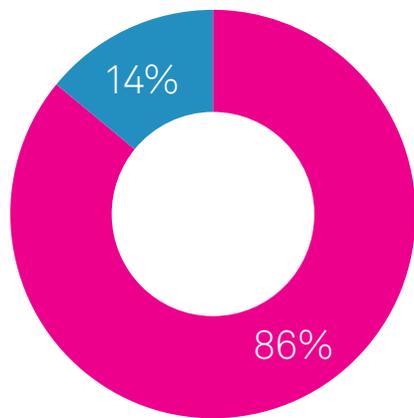
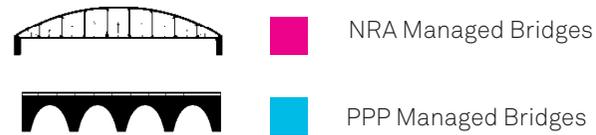
 255 demountable snow ploughs	 1,878 emergency calls received in 2012	 68 nights in 2012 where the temperature reached below zero
Our winter service fleet consists of:		
 303 salt spreaders	 1,390 SOS phones in the country	 84 weather stations in operation on the National Road Network
 59,000 tonnes of salt were used on National Road Network in 2012		

D: NATIONAL BRIDGE STRUCTURES

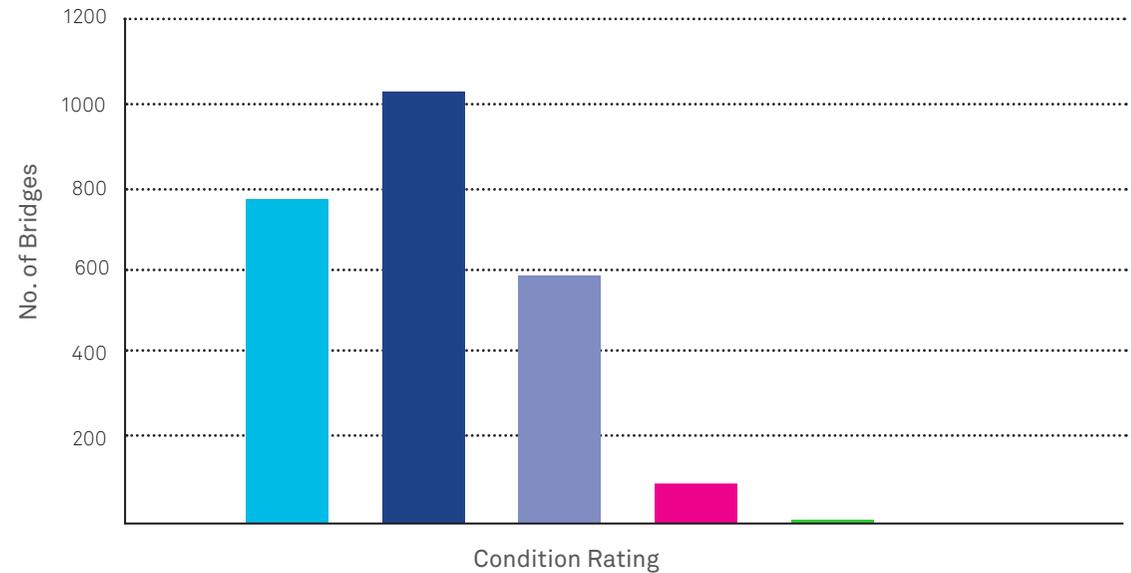
Overview of the quantum and condition of bridge structures on the National Road Network

Bridges are key elements of the national road system and maintenance and rehabilitation of bridges is a key part of the NRA asset management strategy.

The national road network includes approximately 3,000 bridge structures of which 421 are on roads provided by public private partnerships. The NRA was responsible for the maintenance and repair of 2,575 bridge structures in 2012.



Bridges are inspected on a regular cycle. Bridge components which are allocated a Condition Rating (CR) of 0 or 1 do not require repair work, whereas those assigned a rating of 2 or higher are scheduled for future repair.



FOUR: SAFETY



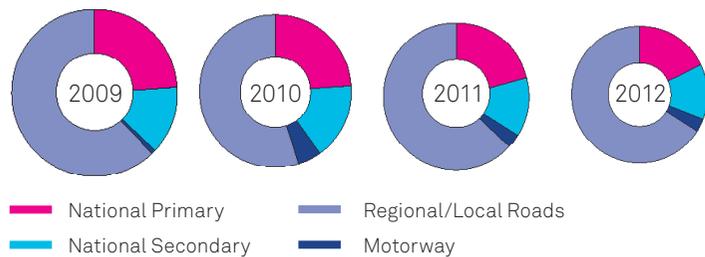
A: FATAL COLLISIONS NATIONALLY

Trends in fatal collisions nationally by road type and collision type*

Total fatal collisions on national roads:



Distribution of fatal collisions by road type (national & non-national):



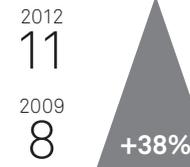
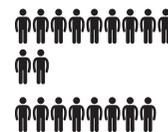
The number of fatal collisions on the National Road Network in Ireland has declined significantly over recent years. Trends in the distribution of fatal collisions, by the road type on which they occur, shows an increasing proportion of fatal collisions are occurring on non-national roads.

*based on Road Safety Authority / An Garda Siochana data

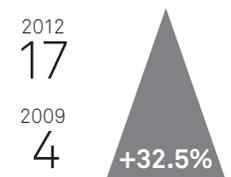
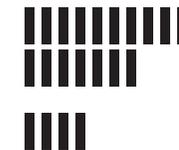
Whilst the number of fatal collisions involving single vehicles and head on collisions on the national road network have declined in recent years, the number of pedestrian related fatal collisions has increased. The proportion of rear-end and angle related fatal collisions has also increased.

Recent trends in total fatal collisions on national roads:

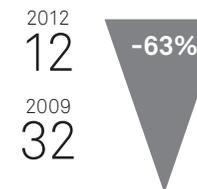
Pedestrians:



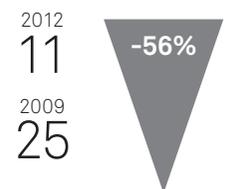
All Other:



Single vehicle only:



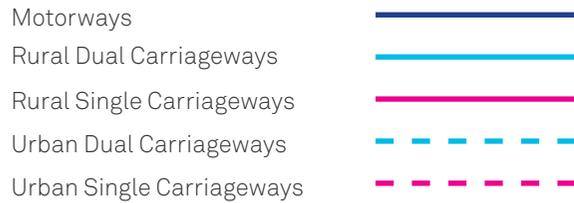
Head on:



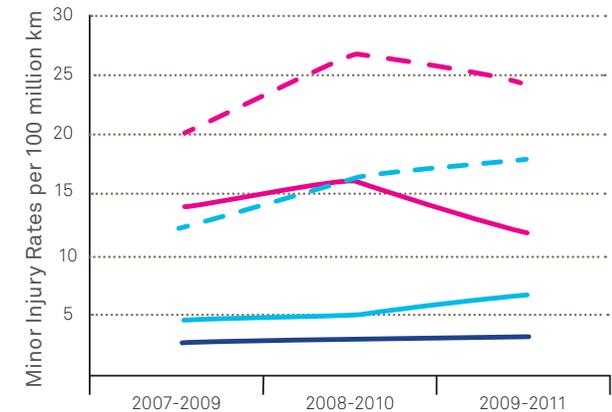
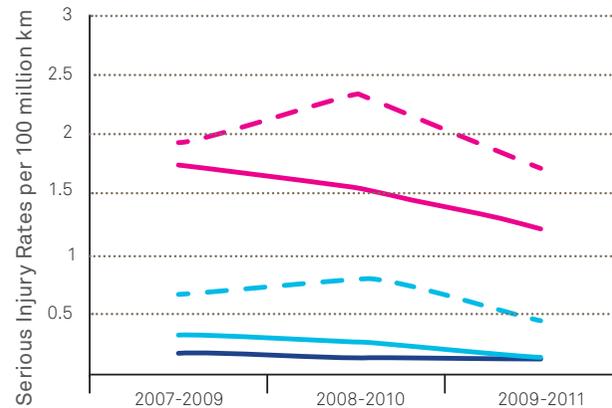
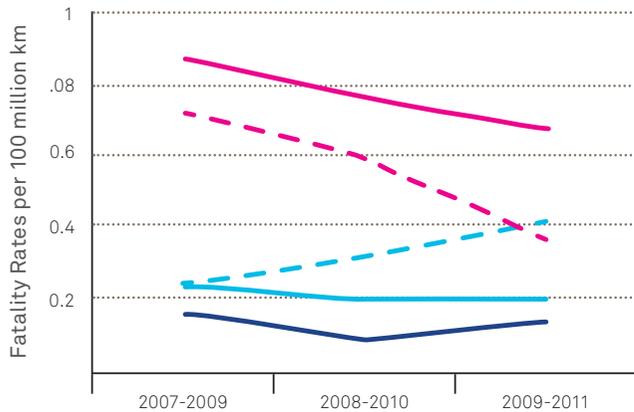
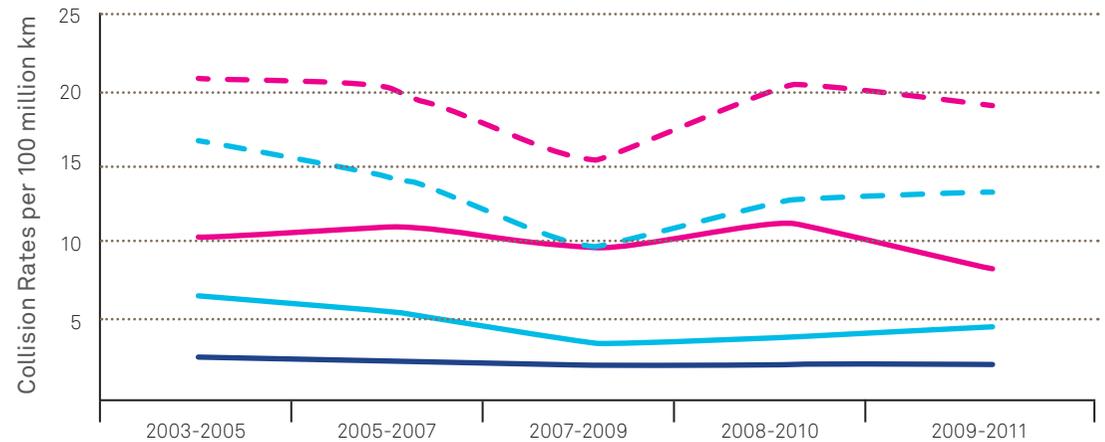
B: NATIONAL ROAD COLLISION RATES

Collision rates measure the exposure to risk associated with the number of vehicles travelling on the road

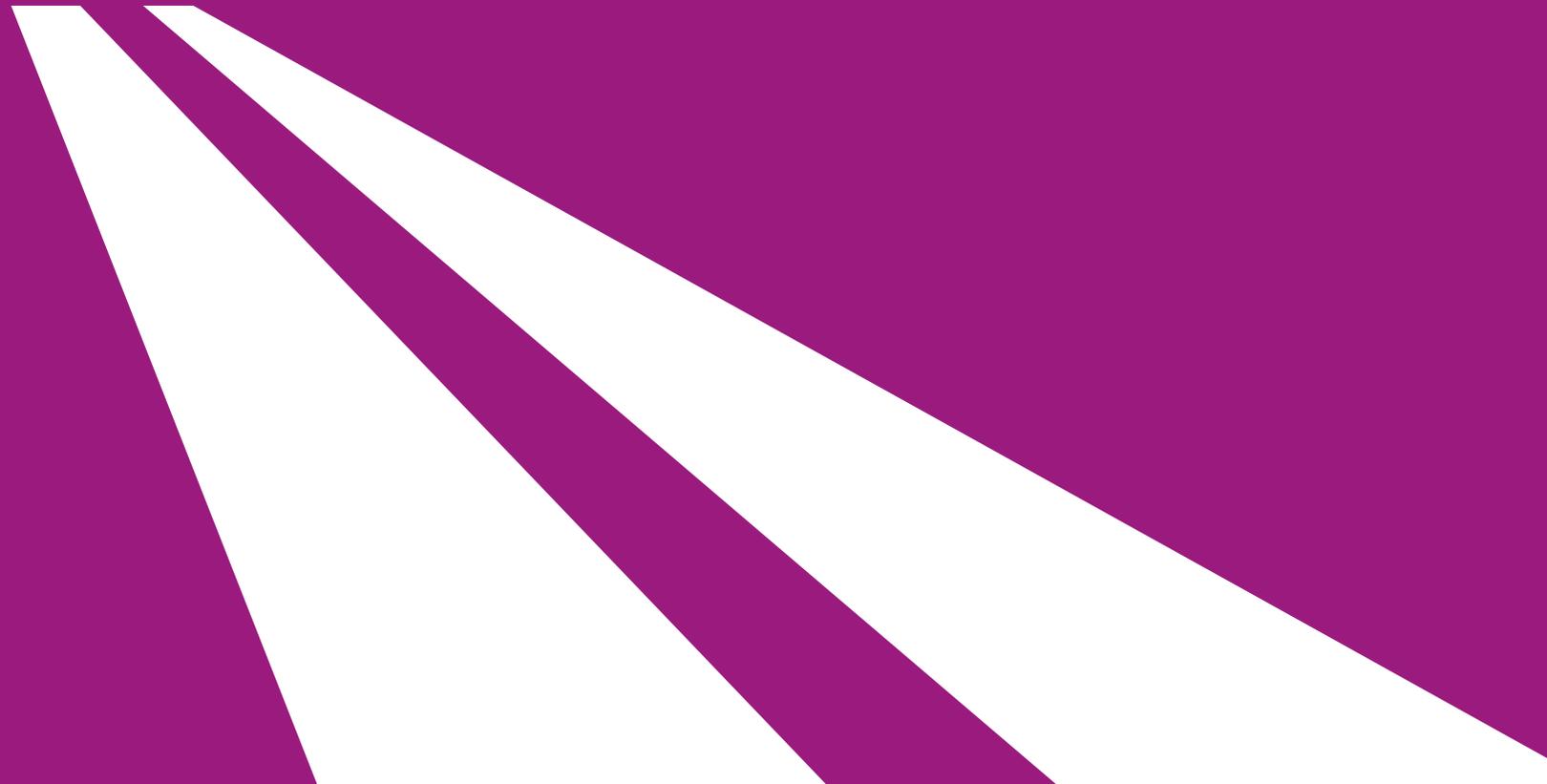
A collision rate is the ratio between the frequency of collisions and the vehicle kilometres of travel over a section of road. The NRA produce an assessment of the average collision rate of each road type on the national road network on a three year cycle.



Trends of collision rates indicate that the national road network has become safer over the period 2003-2011 with reduced collision rates on all road types. The recent rate of decline in fatalities and serious injury collisions on the network has been significant, particularly on rural roads.

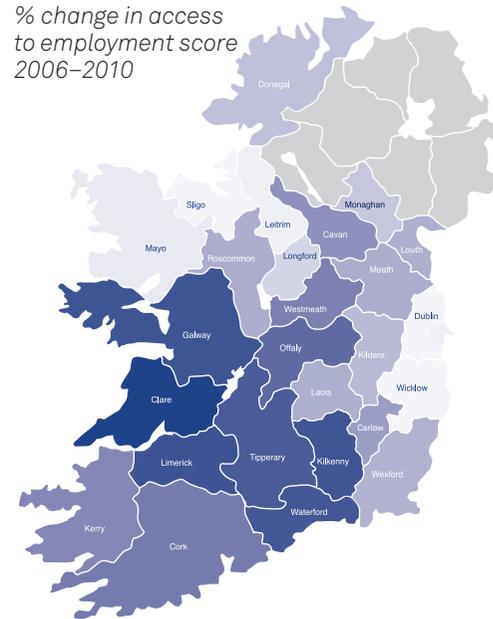
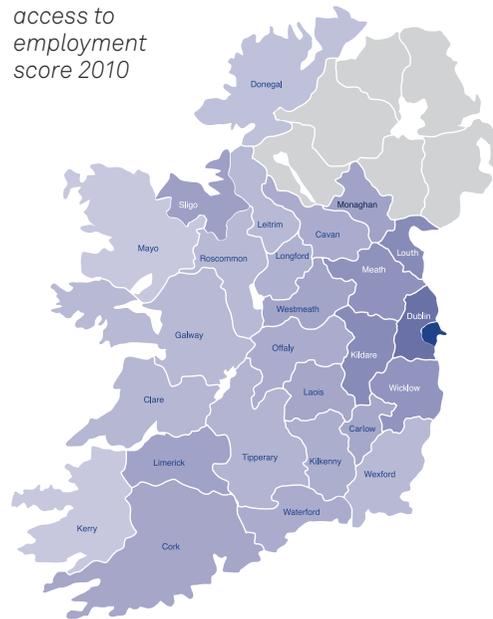
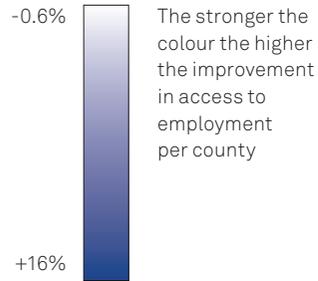


FIVE: ACCESSIBILITY + ENVIRONMENT



A: IMPACT OF ROAD INVESTMENT ON EMPLOYMENT ACCESSIBILITY

A key benefit of a quality road system is improved accessibility to jobs



Note: *The quantified benefits relate to agglomeration wider economic impacts only; they exclude the conventional benefits arising from journey time savings and safer journeys.*

Peripheral areas tend to suffer from poor accessibility to jobs if transport links are inadequate. In 2010 the most accessible areas in the country were Dublin and Kildare followed by Louth, Wicklow and Meath. The investment in the road system over the period 2006–2010 led to an increase in job accessibility of 6.9% nationally. However, the counties of Galway, Clare, Limerick, Tipperary, Kilkenny and

Waterford have particularly benefited from improvements in accessibility of 14% or more, reflecting the impact of the investment in the major inter-urban routes. It is estimated that road improvements over the period 2006–2010 are contributing an annual benefit in GDP terms of €525m. In present value terms, over a period of 30 years, this is an aggregate benefit of some €9.5bn.

For further information see: *Transport Research and Information Note: Impact of Improvements in the Road Network on the Accessibility & Economic Potential of Counties, Urban Areas, Gateways & Hubs, 2012*

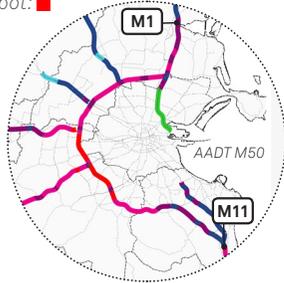
SIX: DISSEMINATION



A: KEY TREND SUMMARY

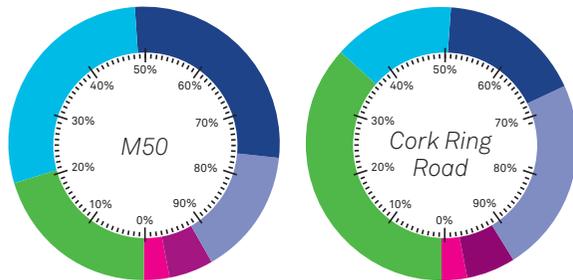
TRAVEL HOTSPOTS:

M50 Dublin area:
130,000+ vehicles per day
Hotspot: ■

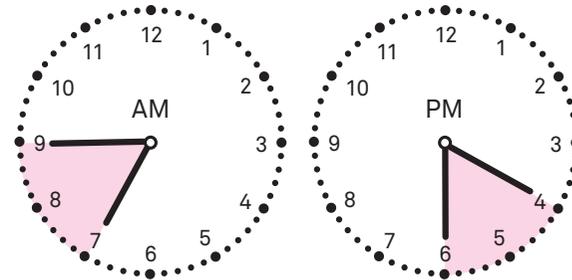


LEVEL OF SERVICE:

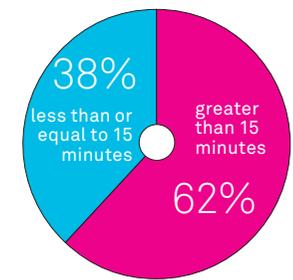
Morning rush hour: Free flow to → forced or breakdown flow



ROADS USAGE OVER THE DAY:



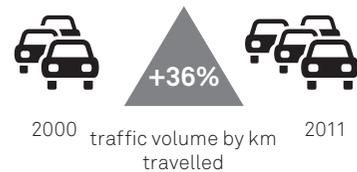
TRIP DURATION:



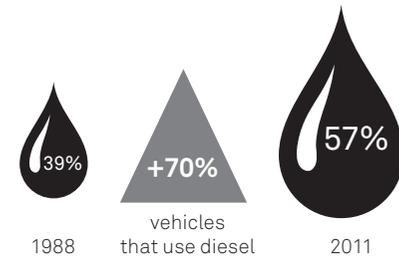
TRIP DISTANCE:



TRAFFIC VOLUMES:

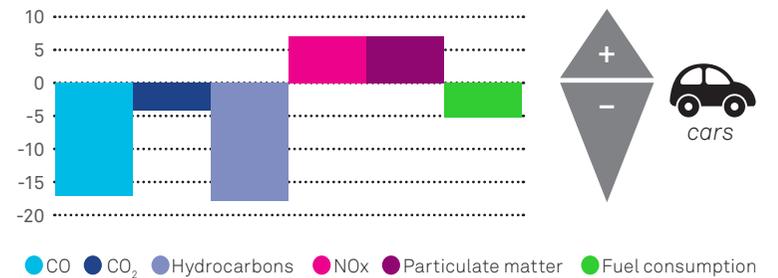


DIESEL USAGE:



EMISSION TRENDS IN MORE EFFICIENT CARS:

Changes in Emissions / Fuel Consumption per Vehicle km



SINGLE VEHICLE FATALITIES:

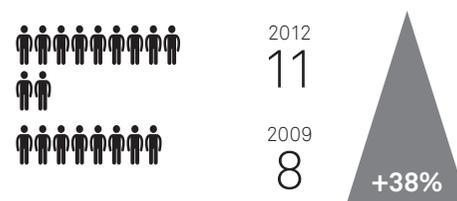
Breakdown of fatal collisions on national roads, by collision type:



HEAD-ON FATALITIES:



PEDESTRIAN ROAD FATALITIES:



FATAL COLLISIONS:

Total fatal collisions on national roads:



B: NATIONAL ROADS AUTHORITY: NEWS + UPDATES

This section sets out recent NRA news and provides information on services provided by the NRA

National Transport Model

Documentation regarding the National Transport Model can be located on the NRA website at <http://nra.ie/policy-publications/project-appraisal-guideli/in Unit 20.3>

Traffic Monitoring Units

The NRA have recently installed over 270 traffic monitoring units around the country which will be used to monitor traffic patterns and will be used to plan future interventions. See website: <http://www.nratraffic.ie/>

Transport Research and Information Notes

The NRA has published a number of Research Papers on topics related to the National Roads Network. The papers cover topics such as Lane Capacity, Electric Vehicles, Emissions amongst others and are available online at <http://nra.ie/policy-publications/transport-research-and-in/>

Motorway Service Helpline

A Motorway Service Helpline has been set-up to assist roads users in difficulty on a Motorway. All calls are directed through the Motorway Traffic Control Centre (MTCC) and the number is:



0818-715-100 or;
operator@nraits.ie

Further information and live traffic updates are available on www.nratraffic.ie

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