

October 2019

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The Role of Smart Mobility Solutions in Climate Action

All Ireland Smart Cities Forum Conference 2019

Oct 2019

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Smart Mobility Solutions in Climate Action

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Context

Why is transport important in achieving Climate Action targets?

- The transport sector is responsible for 23% (20% in Ireland) of global energy-related greenhouse gases emissions and urban travel is the single largest source of emissions in the transport sector.

Climate Action Plan 2019 measures to deliver targets

Modal Shift	<ul style="list-style-type: none"> Reducing car dependency Major public transport investment Smart and sustainable travel Compact growth and integrated land use / transport planning Park and ride Cycling Public transport fares
Convert public fleets	<ul style="list-style-type: none"> Low and zero emission vehicles and driving zones
Incentives and regulation	<ul style="list-style-type: none"> Subsidies and grants Taxation Regulation Annual review of taxes and incentives
Electric vehicles charging	<ul style="list-style-type: none"> Giving the confidence to switch Expand the charging network Development control regulations
Biofuels	<ul style="list-style-type: none"> Raising the volume of biofuels used in road transport
CNG	<ul style="list-style-type: none"> Strategy for heavy freight Public CNG fuelling stations
Emerging technologies	<ul style="list-style-type: none"> On-going investigation of other decarbonisation options such as hydrogen vehicles

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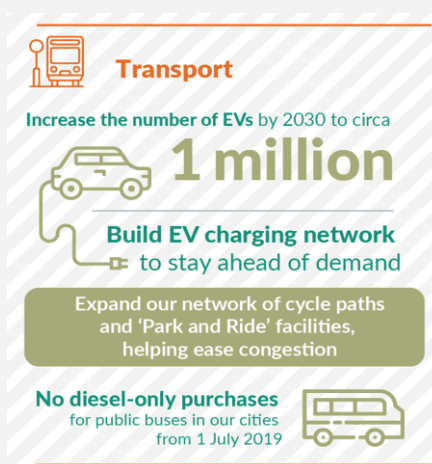
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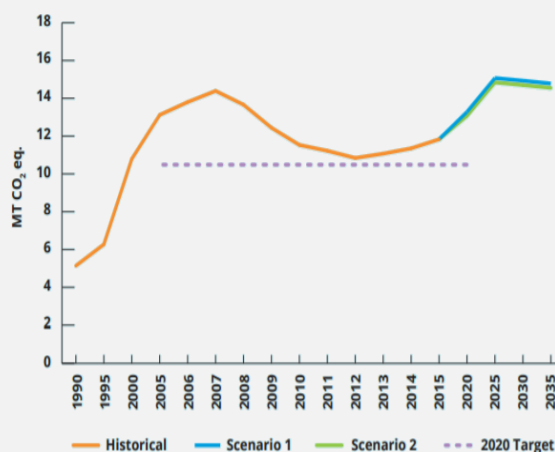
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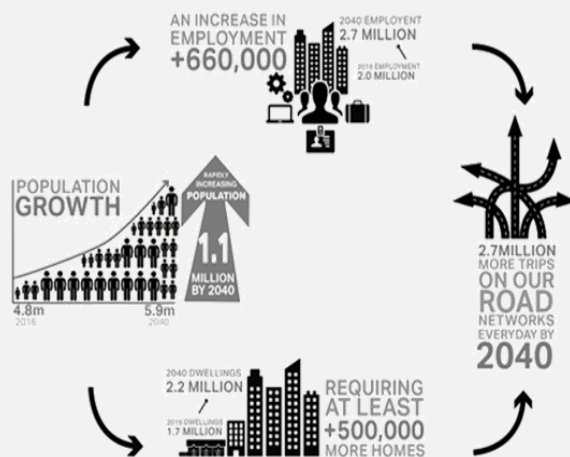
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Overview

What influence can transport have on achieving climate action?

- Need for Travel** – virtual working, travel impact knowledge building
- Policy** – cost of travel, removal of incentives (mileage), personal emission reduction targets
- Energy generation** – decarbonisation of energy generation, maximise use of renewable energy across the day (storage?)
- Time of travel** – Measures to encourage/allow avoidance of congested periods which increases emissions
- Mode of travel** – Investment in sustainable modes e.g. bus and rail, MaaS, last mile mobility solutions
- Delivery** – Smart Infrastructure e.g. advanced comms and predictive maintenance systems
- In travel improvements** – improved driver behaviours e.g. VSL, C-ITS, EV, CAV
- Vehicle/propulsion improvements** – Transition to LEV/EV and other renewable sources

Key considerations?

- The package of solutions may differ in urban and rural areas (37% of population live in rural areas)
- Incentivise the right behaviours and attitudes – how do you build on the early adopters
- Value carbon in real terms
- Government need to protect investment in capital infrastructure such as Luas, Rail, Bus etc whilst encouraging the delivery of, and maximising the use of, other complementary modes

Continued investment in public transport and active modes will have a significant impact on emissions especially as the bus fleet transitions to renewable energy.

What are the emerging mobility solutions?

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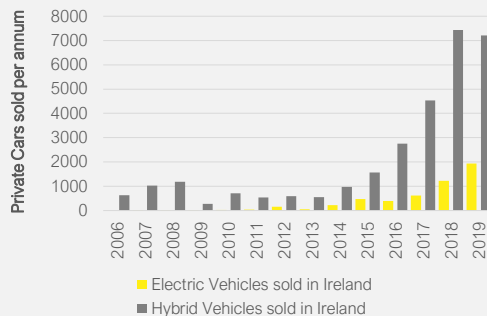
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Electric Vehicles

Market Overview

- **Market Share** – In 2019 BEV's will represent some 1% of all new cars sold whilst BEV/LEV will represent nearly 7%. Annual sales in BEV's have increased by 400% since 2015.
- **Range** – Batteries capacities increased from 20kWh in 2011 to 120kWh currently (range ~500km)
- **Policy Driven** – Targets becoming more optimistic.
 - / European Union include 15% EV sales by 2025 and 30% by 2030.
 - / Ireland's target is 1million EVs and 100% EV sales by 2030 .
- **Charging technology** has also developed significantly over the last decade with some 1,100 public charging points now available across the island of Ireland
- **Cost** – Coming down due to economies of scale, competition between the circa 25 EV model types available in Ireland and advancements in EV technology. Supported by SEAI grants of up to €5,000.
- **Policies** – Local authorities driving initiatives to encourage use of EV's and ensure developments encourage their use



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- **Policies** – Local authorities driving initiatives to encourage use of EV's and ensure developments encourage their use

Key Considerations

- **Congestion** – EV's have a significant role to play in reducing emissions but will not resolve congestion issues
- **Energy Generation** – The projected growth in the population will put increased pressure on energy generation which will need to continue expansion of renewable energy generation to keep up with demand and increase % share.
- **Source of Energy** – In 2017 only 29% of energy was generated by renewable sources with the remainder from Gas, Coal and Peat which leads to significant emissions.
- **Smart Energy** – Could EV's be used as storage of renewable energy (generated at night) and put back onto grid? Circular economy for individual developments etc.

Impact: Potential to significantly reduce transport emissions especially as energy generation becomes more sustainable

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Connected Vehicles / C-ITS

What is C-ITS/Connected Vehicles?

- Data harnessing
- Connecting vehicles to everything – V2X, V2V, V2B, V2I
- Delivering standardised, harmonised and trusted Services
 - Leading to ‘user’ benefits of safety, efficiency and environmental



“C-ITS will change the way that we plan, build and deliver infrastructure to deliver greater benefits to more road users and operators”

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Why invest in this area?

- Safety**
 - 25,000 lost lives
 - 135,000 seriously injured
 - 3% reduction in four years
 - EU safety strategy
- Environment**
 - 23% greenhouse gases – transport
 - 35% reduction by 2030



- Efficiency**
 - Congestion costs 1% of GDP
 - 40% growth in passenger transport
 - 58% growth in freight
- Digitalisation**
 - Automation – vehicles; processes; infrastructure

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Connected Vehicles / C-ITS



C-ITS Services Phasing

DAY 1	DAY 1.5	DAY 2
<ul style="list-style-type: none"> – Hazardous Notifications <ul style="list-style-type: none"> – Slow/stationary vehicle – Traffic Conditions – Person/Animal in road – Weather conditions – Road Surface Condition – Obstacles in road – In Vehicle Signage – Probe Vehicle Data – Signalised Intersections <ul style="list-style-type: none"> – Green light optimisation – Traffic signal priority – Emergency vehicle – Roads Works Warnings 	<ul style="list-style-type: none"> – Off-street parking – Fuelling/charging stations – Loading zone management – Zone access control – Vulnerable road user protection – Cooperative collision – + more... 	<ul style="list-style-type: none"> – Vehicle platooning – Driving assistance – Dynamic mapping – Multi-Modal travel integration – Transaction based services
Priority and biggest impact	Developing services	Future services

Impact: Potential to significantly improve driver behaviour and reduce congestion. Will lead to more efficient use of transport networks.

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Case Study – C-ITS Pilot

- EU Connecting Europe
- €10.2million funding to TII supported by AECOM-ROD
- V2V, V2I, V2X



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Last Mile Mobility Solutions

Concept

Personal Travel

- Urban mobility sharing solutions such as car sharing, bike sharing, scooters, shared taxi etc
- Private solutions such as bikes, eBikes, scooters
- Effective where barrier to mode shift to sustainable public transport is 'last mile' accessibility

Freight Travel

- Last mile freight where smaller sustainably propelled freight vehicles (potentially crowd sourced..) are used for entering urban areas

“
The last mile is always the least efficient part, comprising up to 28% of the total cost to move goods.
”



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Impact: Potential to have a significant impact in urban areas and increase usage of high capacity public transport. Needs active mode infrastructure.

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Mobility as a Service (MaaS)

Concept

- Digitalisation has affected transport with the app becoming key to how people move around, challenging fixed transit systems and timetables.
- MaaS brings together all mobility options, public and private, into one place; leveraging the latest digital innovations to provide an integrated point-to-point service to users via an app and payment channel.
- Well delivered MaaS can promote more sustainable decision making allowing users to compare based on costs, emissions, flexibility etc.

“
It currently costs €616 to own a car per month yet cars are only in use for 4% of their lifetime.
”

“
How do we incentivise people to choose the option that is best for them and meets a cities sustainability targets?
”

Case Study – mymobilityhub



- An **integrated, multi-disciplinary mobility solution** which uses behavioural change technology and computer science to disrupt existing unsustainable travel behaviours to bring about a fundamental change in mobility behaviour.
- App based personalised travel planning tool to track personal usage, enforce enterprise policies, make efficient use of sustainable transport assets (eCars/eBikes) and monitor emission based performance against Climate Action targets.
- The system encourages staff in making sustainable travel choices that are in line with Council policy and extract maximum value from existing resources e.g. eBikes/eCars.
- Enterprises are provided with a means to track performance against emission focused climate targets and to manage and optimise usage of transport assets
- **In operation in DLRCC since Spring 2019..**



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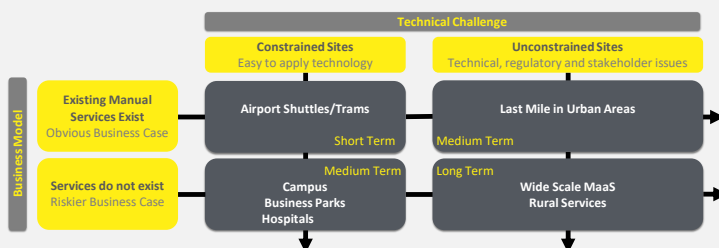
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Connected Autonomous Vehicles

Market Overview

- Numerous prototypes in operation. Some new models offer some elements of autonomy such as automated parking, distance sensors, braking sensors etc.
- Ongoing work in relation to security, sensors, regulation etc.



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Impact: Potential to change the way we think and behave about travel. Our networks will be more efficiently used and safer.

Smart Mobility Solutions in Climate Action
Connected Autonomous Vehicles

Case Study – CAPRI Autonomous Vehicles Trial

- CAPRI – AECOM is leading a consortium of experienced partners from industry, academia, public sector authorities and local government, working together to deliver a complete pod on demand mobility service.
- In the near future pods are expected to move people around airports, hospitals, business parks, shopping centres and other contained environments. The team is combining expertise and using practical trials to write the blueprint for a viable autonomous MaaS. <https://caprimobility.com/>
- **Objectives** - Trial how pods should interface with the infrastructure and people around them, develop a framework for safety and security testing and to determine a viable business model for a service that meets user needs and delivers value for money



“Capri will build user, regulatory and market confidence in autonomous pods as a practical, safe and affordable way to travel”



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Thanks

Questions?

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