

# Policy and Behaviour

## passenger transport

Belfast

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Better Accessible Transport To Encourage Robust Intermodal Enterprise



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European Union  
European Regional  
Development Fund



# challenges facing transport in Europe

## Health and Environment

- **greenhouse gas (GHG): 20% of all CO<sub>2</sub> equivalent GHG emissions** are from transport
- **nitrogen oxides (NOx): high street-level values** in many European cities

## Quality of Life and Productivity

- **traffic congestion: yearly loss of 2% GDP** (est.)
- **congestion: in specific parts of the city, as much as 30% of traffic** can be attributed to motorists searching for parking space
- **alternative use of urban space: 13.8 million parking spaces** in European cities with more than 20 000 inhabitants

## Safety

- **road fatalities: 28 136** (2012) in the EU with FR: 3653; IE: 162; PT: 720; ES: 1903; UK: 1802
- **road non-fatal injuries: 4.2 million** per year

## Economy and Trade Balance

- **dependence on foreign oil: imports represent €1000 million per day**
- **uncertainty** in near and long term oil prices



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# impact of transport

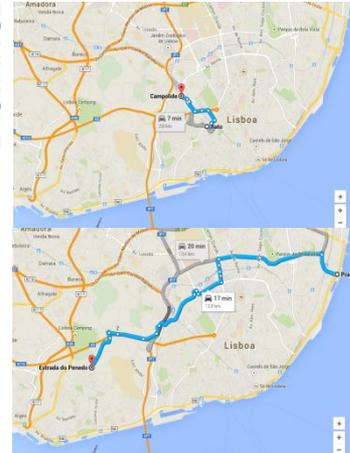
MOTORIZATION



ENERGY SOURCE



DISTANCE



TRANSPORT EFFICIENCY



traffic congestion



occupancy



powertrain

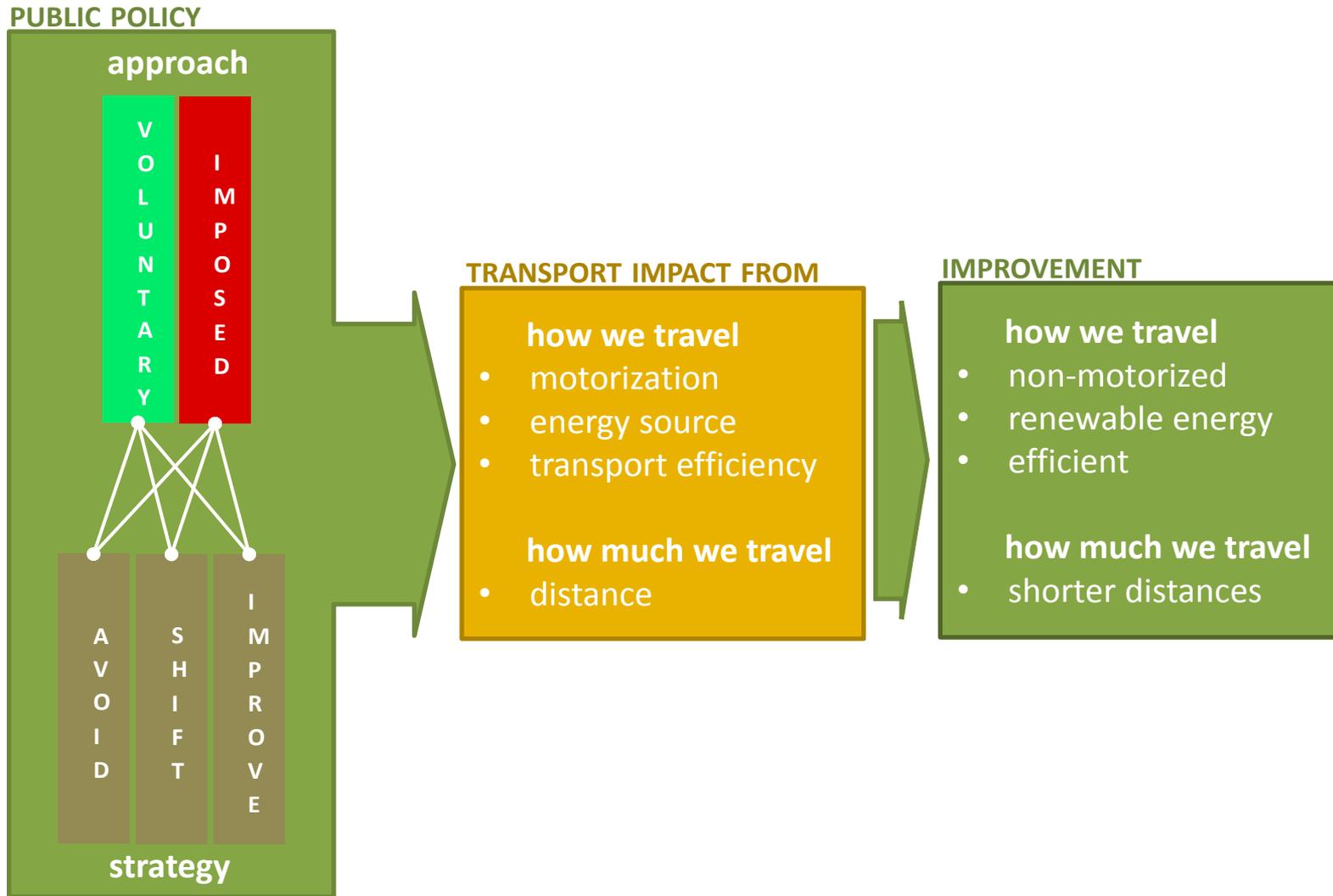


weight and  $c_d$



driving technique

# public policies



# public policy - approach

## VOLUNTARY CHANGE TO BEHAVIOUR

### Change comes from

- individual becomes aware that changes in behaviour are beneficial from a personal point-of-view
- individual becomes aware that changes in behaviour benefit society in general

### Main tools for achieving change

- more/improved/updated information to the public (e.g. demonstration of new solutions)
- incentives (e.g. financial or investment in infrastructure)

### Advantages

- may not require investment besides dissemination
- potential positive impact in other areas from change in mind set (e.g. at home; at work)

### Disadvantages

- adherence is voluntary (if unsuccessful, may have to be followed by mandatory measures)

# public policy - approach

## IMPOSED CHANGE

### Change comes from

- individual reacts to new restrictions/penalties/barriers

### Main tools for achieving change

- new/modified national, regional or local legislation/regulation that impose change

### Advantages



- less uncertainty in relation to leading to effective change

### Disadvantages



- change is imposed so it may not lead to change in mind set
- may require public investment to create alternative (e.g. strengthen bus or underground service)

# public policy - strategy

## Public policy alternatives

- Avoid policies
- Shift policies
- Improve policies

### Avoid

Address transport energy use and emissions by slowing travel growth via city planning or travel demand management (e.g. tele-working)

### Shift

From motorized individual transport to collective transport and/or more energy efficient travel modes (e.g. cycling)

### Improve

Through the introduction of efficient fuels and vehicles that reduce energy consumption and emissions (e.g. plug-in electric vehicles)



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# transport impact - policies - results

	ISSUE	IMPACT	CAUSES	POLICIES	RESULTS
DISTANCE	work far from home	<ul style="list-style-type: none"> <li>emissions</li> <li>congestion</li> <li>productivity loss</li> </ul>	lack of an integrated approach to city planning	mixed use development	work, home, leisure in close proximity
TYPE OF TRAVEL	excessive use of private car	<ul style="list-style-type: none"> <li>emissions</li> <li>congestion</li> </ul>	<ul style="list-style-type: none"> <li>free parking</li> <li>no tolls</li> <li>no congestion fees</li> <li>poor quality PT</li> </ul>	<ul style="list-style-type: none"> <li>improve PT</li> <li>paid parking</li> <li>tolls or congestion fees</li> </ul>	less use of private car and more use of PT
ENERGY SOURCE	use of non-renewable energy sources	<ul style="list-style-type: none"> <li>emissions</li> <li>trade balance</li> <li>energy security</li> </ul>	<ul style="list-style-type: none"> <li>price of alternative powertrains</li> <li>no infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>create infrastructure</li> <li>incentives to alternative technologies</li> </ul>	more alternative powertrain vehicles
ENERGY EFFICIENCY	low efficiency of IC Engines	<ul style="list-style-type: none"> <li>emissions</li> <li>trade balance</li> <li>energy security</li> </ul>	<ul style="list-style-type: none"> <li>maturing ICE technology</li> <li>slack standards</li> </ul>	<ul style="list-style-type: none"> <li>incentives to low emission vehicles</li> <li>tighter standards</li> </ul>	<ul style="list-style-type: none"> <li>smaller/lighter vehicles</li> <li>hybrid technologies</li> </ul>
USERS PER VEHICLE	one person per car	<ul style="list-style-type: none"> <li>emissions</li> <li>congestion</li> </ul>	<ul style="list-style-type: none"> <li>free parking</li> <li>no tolls / congestion fees</li> <li>poor quality PT</li> </ul>	<ul style="list-style-type: none"> <li>improve PT</li> <li>paid parking</li> <li>support car-pooling</li> </ul>	<ul style="list-style-type: none"> <li>less use of private car</li> <li>more use of PT</li> <li>more car-poolers</li> </ul>

# main trends in transport

## Integrated mobility management systems

- Centralised mobility management systems that integrate public and private transport
- User/payer mobility

## Public transport and shared mobility

- Less focus on car ownership by younger generations

## Alternative powertrains

- Growth of alternatives to the internal combustion engine (ICE)
- Strong political support for alternative fuel/energy vehicles and respective supply infrastructure
- Growth in renewable energy capacity in all European countries

## Autonomous vehicles

- Initially lead by safety issues
- Only real solution to achieve (or aim for) zero road deaths in the EU

## Decentralised energy production for transport

- Electricity, hydrogen, biofuels



# integrated mobility management systems

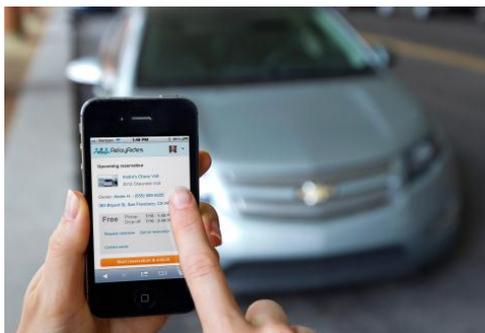


- Centralised mobility management systems that **integrate public and private transport**
- **ICT**: Key enabler of **seamless transition between modes** (real-time information from buses, trains, traffic, parking,...)
- **User/payer** mobility models that incentivise/penalise individuals based on collective wellbeing
- Systems partially **based on new and existing infrastructure**: Many mobility operators have management systems in place but integration is lacking
- **Web services** facilitate the development of communication tools between systems with different architectures
- Integrated Mobility Management Systems generate valuable data for **improved urban planning**

## Policy ideas:

- Push for **mandatory data sharing** by operators while safeguarding confidentiality of core business data
- Mobility management systems must be implemented and operated at the **Metropolitan Area level**
- Make sure do **avoid vendor and technology lock-in** through open systems architectures and protocols, and interoperability

# public transport and shared mobility

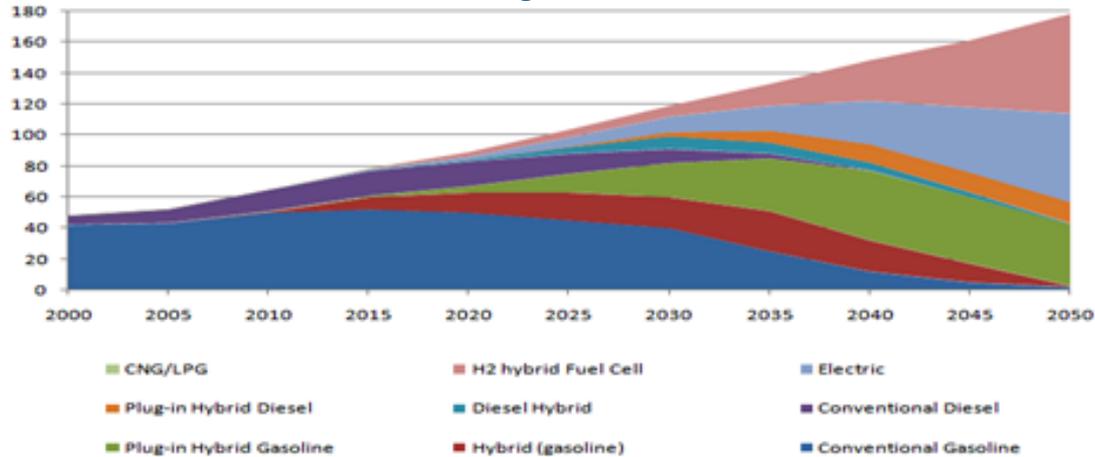


- **Less focus on car ownership** by younger generations
- Growing **disincentive to buy** car in large metropolitan areas (expensive to commute to work)
- **Social networks support sharing** initiatives (car pooling)
- **ICT allow for easier access and control** while enabling sharing
- **Real-time information from commuters** (on public and private transport) will be used to dynamically manage resources (car lanes become bus lanes, traffic lights divert traffic, temporary increment in the number of buses, dynamic tolls,...)
- **Alternative fuels in public transport:** Lower investment costs per vehicle (common infrastructure for entire fleet)
- **Integrated ticketing** irrespective of the transport operator or mode

## Policy ideas:

- **Special conditions** for **car pooling** and **car sharing** (e.g. free parking)
- **Push for integrated ticketing** within the metropolitan area (back office financial settlement between operators)
- **Channel taxes from ICE vehicles** to the creation and operation of **Metropolitan Area Mobility Management Systems**
- Get involved in **standardization** of new solutions

# alternative powertrains



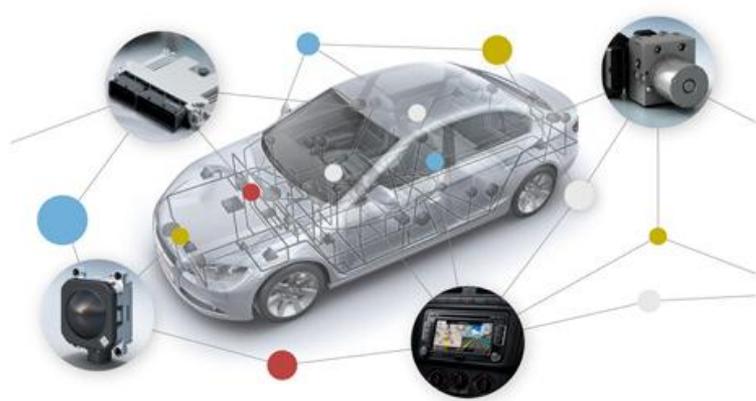
Source: International Energy Agency

- **One fits all coming to an end:** growing sales of electric and hybrid vehicles
- **New era** where different utilisation patterns require **different powertrain** solutions
- **Growing taxation** on (CO<sub>2</sub>) emissions paid by car manufactures and owners
- Continued pressure to reduce emissions: Fleet average targets for all new cars is 130 CO<sub>2</sub> g/km for 2015 and **95g/km by 2021** compared with 2007 fleet average of 158.7g/km
- Average CO<sub>2</sub> emissions of manufacturer's fleet exceeding limit value in any year: **payment of excess emissions premium for each car: €5** for the 1<sup>st</sup> g/km of exceedance, **€15** for the 2<sup>nd</sup>, **€25** for the 3<sup>rd</sup>, and **€95** for each subsequent g/km. From 2019, the cost will be **€95** from the first gram exceedance onwards
- **Incentives for low emission vehicles (<50g/km):** Each low-emitting car will be counted as 1.5 in 2015

## Policy ideas:

- **Public procurement** of alternative energy vehicles (create critical mass in manufacturing to bring down costs)
- **Restrictions** on use of ICE vehicles if air quality, congestion, safety, parking or noise have significant negative impact

# autonomous vehicles

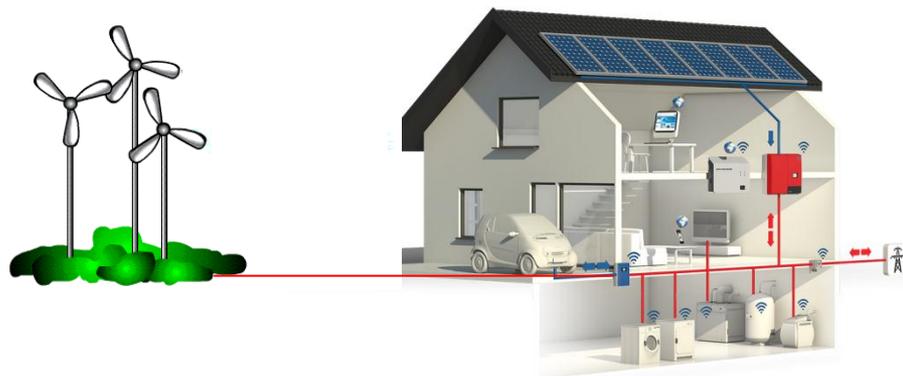


- **Full active safety features** or **autonomous vehicles** are the only real solution for **zero road deaths**
- Initially lead by **mandatory safety issues** and corresponding technology (e.g. e-call mandatory from 2015 for new cars)
- With time, lane assist, automatic braking, automatic traffic sign detection, vehicle-to-vehicle communication, etc., will **become mandatory**
- Automated routing based on vehicle-to-vehicle and vehicle-to-infrastructure communications, GPS/Galileo, radars, digital maps, sensors, image and signal processing, actuators, etc...
- May lead to substantial improvements in fuel economy by optimizing driving

## Policy ideas:

- Cities can start by developing some of the ICT infrastructure required for implementing **integrated mobility management systems** (sensors, actuator and communications networks)
- Get involved in the **standardization** of new solutions

# decentralised energy production for transport



- Decentralised production of electricity, hydrogen or biofuels **attenuates need for large investments in the grid**
- EVs can be used to **balance load on electric grid** (vehicle-to-grid or vehicle-to-home during peak hours)
- Differentiation between **peak and off peak energy prices** can stimulate the production of alternative energy by small, local producers
- Energy for transport can become **available even in the remote places**
- Intelligent ICT systems can be put into place, hereby **automatically managing energy in the vehicle and home**
- Main possibilities include electricity from **photovoltaic** systems, **hydrogen** from water and electricity and 1<sup>st</sup> generation **biofuels**)

## Policy ideas:

- Local authorities can create **small alternative energy production plants** for own fleet and public use (demonstration)
- Work with power and grid companies to **implement peak and off-peak electricity prices**
- Work with power and grid companies to **implement 100% renewable energy “premium” service**
- Get involved in the **standardization** of new solutions

# main conclusions and recommendations

- Continuing growth in transport but **imposing limits on mobility is not an option**
- Incremental improvements in the fuel efficiency of ICE vehicles are not enough because of growth in use of private car. The result is added focus on **alternative technologies**, namely on **hybrid vehicles**
- Various powertrain solutions will coexist (ICE will lose share to **gasoline plug-in hybrids, hydrogen fuel cell hybrids, plug-in diesel hybrids** and **pure electric**)
- **ICT** systems play key role in **intermodality** by giving real time info that can reduce waiting between modes
- **Metropolitan area mobility management systems** must be **open to the public** (supplying and receiving information) and **companies** that want to build services on top of the data
- **Outreach to key stakeholders** in order gain support (avoid blocking of initiatives)
- **Public information** campaigns to explain measures
- Small **demonstration/test projects** to gauge public response to policy changes before expanding initiatives

**Radical changes are required and the focus must be on changing the way people travel:**

- **Shift from accommodation to regulation:** from building road infrastructure, for accommodating more cars, to regulation
- **Shift from revenue collection** (e.g. from parking) to reducing impact on the **environment and quality of life**
- **PT: improve service** and simultaneously **impose limitations on the use of private car** (e.g. start by driver only cars)
- **Awareness: Driver behaviour** can account for **5 -10%** improvements in fuel economy



# THANK YOU

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