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Connected Car a solution for
environment ?



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- Freedom of moving is fundamental
- No human activity possible without moving
- To progress human needs to move and meet other people
- But mobility still creates problems
 - The phenomena is not new : 45 years BJC circulation was forbidden in Roma during daylight “Lex Julia municipalis”

- Vehicles with thermal engines reject in atmosphere CO², CO, Nox...
- The major part of power comes from fossil energy : Petroleum
- The petroleum stock is not infinite
- The poisoning polluting components can be reduced (CO², Nox ...)
- The CO² is a normal result of Hydrocarbon combustion

Total CO² production 2003

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- o Europe 15 = 3347 Million tons
 - o USA = 5841 Million tons
 - o Japan = 1259 Million tons
 - o Canada = 586 Million tons
 - o China = 4300 Million tons
 - o India = 1100 Million tons
- As CO² is undoubtedly responsible of earth temperature increase ; we must reduce CO² emissions as soon as possible

- If nothing change the major part of usage will be for road transportation
- From 2007 to 2030 Petroleum needs will increase twofold
- If all countries have the same proportion of equipments than EU and USA ... car park would increase 2.6 times
 - That is to say the 6.3 Md people needs will increase from 1800 Mtep to 4700 Mtep
 - The difficulty with forecast is because it concerns future!!!

- o A lot of regulations has fostered car industry to make progress for 30 years
- o Between 1993 (Euro 3) and 2005 (Euro 4), reduction versus type of poisoning components : 5 to 10 times
- o Between 1995 and 2005, CO² decrease from:
 - 190g/km to 160 for gas engine
 - 175 to 150 for Diesel
- o Target < 130g/km circa 2015 in EU

How consumption reduction is made

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- o Improve combustion and efficiency
 - Electronic injection and firing
 - Catalytic exhaust
- o Better usage of power
 - Smart drive of air conditioning
 - Starter Generator with stop and start
- o New technology for engine
 - Electronic valves
 - Hybrid vehicles
- o Electric car
 - o All that in respect of Carnot law !!!

- No utilization of private cars or trucks
 - Forget it : part of the world is waiting to have high way of life
- Use of public transportation
 - An example : in France TGV 1 billion of travels in 20 years, same as on motorways in one year
 - Need strong public investments
- Development of new technologies
 - Hydrogen engine
 - Long life- low cost Battery

- What can do ITS and Telematics?
 - Probably not a massive economy of fuel
 - But reaching chemical/physical limits, we need to use each possibility :
 - New technology for engine
 - Bio fuel
 - Better management of power usage in the car
 - Better and more economical use of car
 - Imagine new transport systems
- ITS and Telematics can help

o Telematics

- Data transmission between two distant points
 - Car to infrastructure and vice versa, Car to Car
 - Define communication channel, radio satellite Telephone, IR, DSRC,
 - Define, sometimes, packaging of Data
- Not involved by data contains or services

o ITS Intelligent transportation systems and services

- Union of information & communications technologies and vehicles which move people and goods

- Adopt a new driving style - Eco-driving
- Efficient use of road infrastructure
- Foster Multimodal transport
 - These three points that change the behavior of drivers can bring 10% to 50% of fuel economy

- o Driver's behavior modification
 - Avoid nervous driving style -20%
 - Beginning of travel (5km) Slow -50%
 - Good adaptation on gear box ratio. -30%
 - Engine in good health -5%
 - No Climatisation (-20% in town) -5%
 - Good tyre pressure -3%

- o Drivers must be educated
 - Comparison of his performance with a theoretical model
 - Data monitoring (speed, geolocalisation, RPM gearbox, Temperature...)
 - Data collected and sent to central Comparison with best behavior Taking into account road weather conditions speed ...
 - Result sent back to driver with advices
 - The driver is in the loop and learns how to be an Eco-driver

ECO-Driving (3)

Some experiments

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- The Dutch national ecodriving program
- Le programme éco-flotte Canada
- Easy Rider Finland
- Quality Alliance Eco-drive Swiss
- GERICO France
- ECO-DRIVING Europe Consortium
Austria, Belgium, Czech, France, Finland, Greece, Netherlands, Poland, UK
- Impacts on last 4 past years: -15% for car and -35% for truck

- If it is impossible to forbid use of Cars, Trucks and Bus ...the best way to make economy is to have a fluid traffic
- The less Cars, Trucks and Buses are on the road, the less they burn fuel
- To obtain fluidity:
 - Navigation system
 - Traffic information
 - Trip management on line
 - Dynamic traffic management

- o Increase fluidity
 - Remove bottleneck
 - Automatic data collect
 - Reduction of road closures
 - Diagnostic and testing
- o An example
 - Navigation system reduce delay -18% and km -16%

- Road charging to fight congestion:
 - For instance, in an urban area, congestion pricing together with transit services can have real societal benefits:
 - **Stockholm:** Downtown cordon pricing has reduced traffic in the downtown area by 25%, creating free flow highway conditions virtually every day for 7 months. It has also increased transit ridership by 5% and reduced vehicle emissions by 14%. (after the trial in 2006)
 - **London:** Downtown cordon pricing has increased vehicle speed by 37%, reduced delays by 30% (as of May 2007)

- In a same trip usage of Car public transportation car sharing , truck on the train ...
- To obtain adoption multimodal travel must be easy to choose
-must be so efficient than private system
- ITS play a big role of communication to inform real-time the traveler of all possibilities : parking, waiting time to train or bus, reservation , ticketing

- All functions shown must be interoperable
- Need standards on:
 - Communication
 - Telecom architecture
 - Data packaging and collect
- Please look at ISO TC204 and CEN TC278
 - Calm architecture
 - Probe data
 - Nomadic devices use
 -

- 20 to 50 % of energy can be saved
 - Infrastructure must be built or adapted
- Education of people must be done
 - ITS and telematics can transport the service
- Standardization of process can be adopted by all



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