

Clean Air Summit

Transport innovation

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Transport innovation & disruption: Implications for air quality

NSW Clean Air Summit

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IEA paths to reduce emissions: avoid, shift, improve

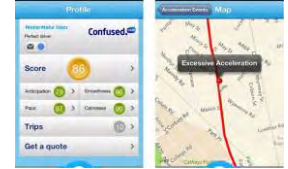


- Cars to public transport
- Cars to cycling, walking
- Rail freight
- Trucks to LCV
- **LCV to UDV (urban delivery vehicle)**

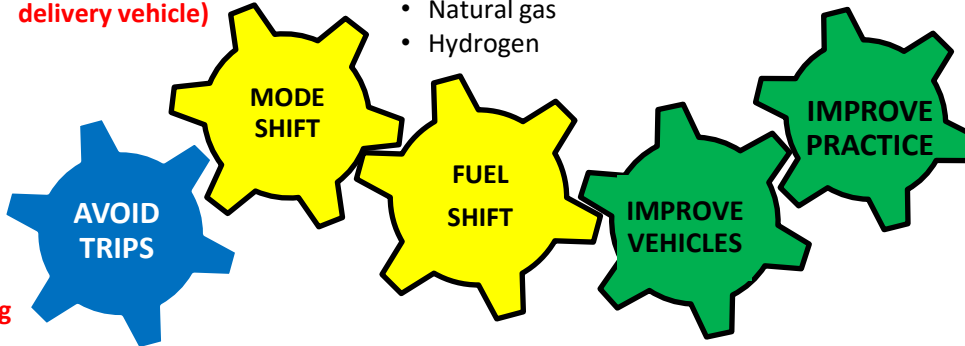


- Electrification – renewable
- **Electrification – grid**
- Biofuels
- Natural gas
- Hydrogen

- Eco-driving
- Reduce idling
- Load consolidation
- Better maintenance
- Trip planning / linking
- Night freight
- Telematics / remote monitoring



- Video conferencing
- Telecommuting
- Social media
- Streaming media
- 3D printing
- **Car sharing / ridesharing**
- Linking trips
- Digital freight matching
- High productivity vehicles



- Mode shift (rail, walking, cycling)
- **Hybrids (battery-electric)**
- **Hydraulic hybrids**
- **Microturbine hybrid**
- Tyres, aerodynamics
- Lubricants
- Light-weighting
- ITS-ICT
- Autonomous vehicles (AVs)

INNOVATION 1: HYBRID TRUCKS

- First generation hybrids: effective, evolutionary
 - Conventional IC engine, modest battery technology
 - 20% to 30% energy/emission saving
 - 14% to 20% cost premium
 - Only light trucks (in Australia), and only new
- Next generation hybrids: revolutionary
 - Micro-turbine: Flex-fuel, low emissions, high reliability
 - 40% to 60% fuel saving
 - NOx and PM up to 85% lower (NRDC 2013)
 - Applicable to new vehicles and RETROFIT(!)



Fuso.com.au



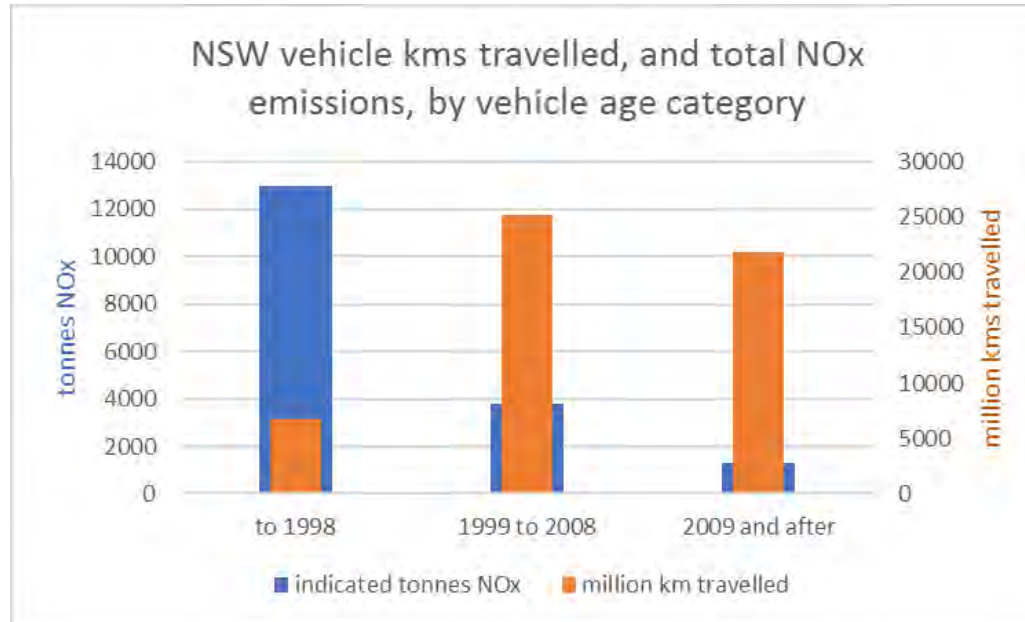
Nikolamotor.com



Wrightspeed.com

WHY WE NEED INNOVATIONS TO RETROFIT

- Large number of old vehicles, doing low km, but causing major emissions



INNOVATION 2: RIDESHARE ENABLERS



Adelaidenow.com.au

- Add a passenger: halve emissions of a single-occupant trip (g/p-km)
- ICT / apps / social media makes trip matching/sharing easy
- Innovations include:
 - Ride sharing
 - car pooling apps
 - digital “hitching”
 - Maas
- Regulations and infrastructure: enablers or barriers?

INNOVATION 3: ELECTRIC CARS/TRUCKS

(if powered by renewable energy)

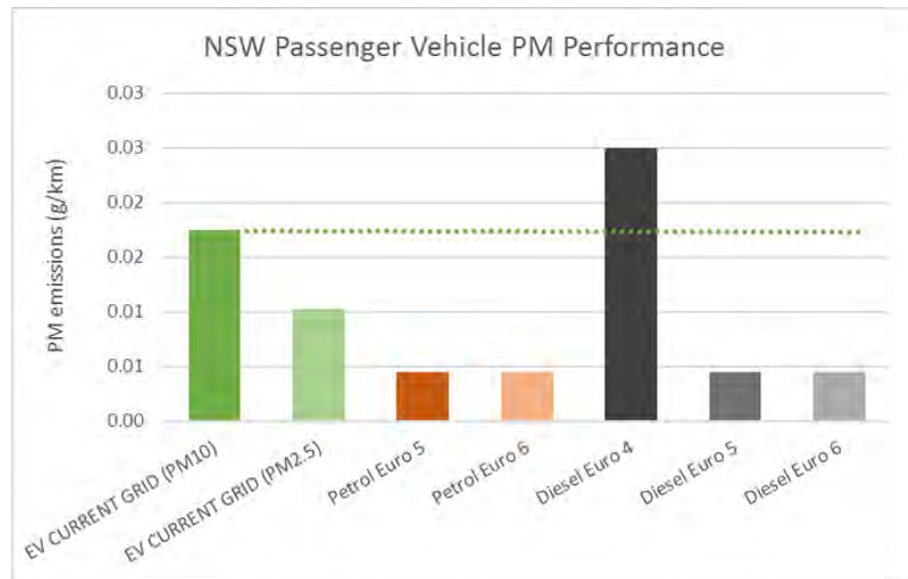
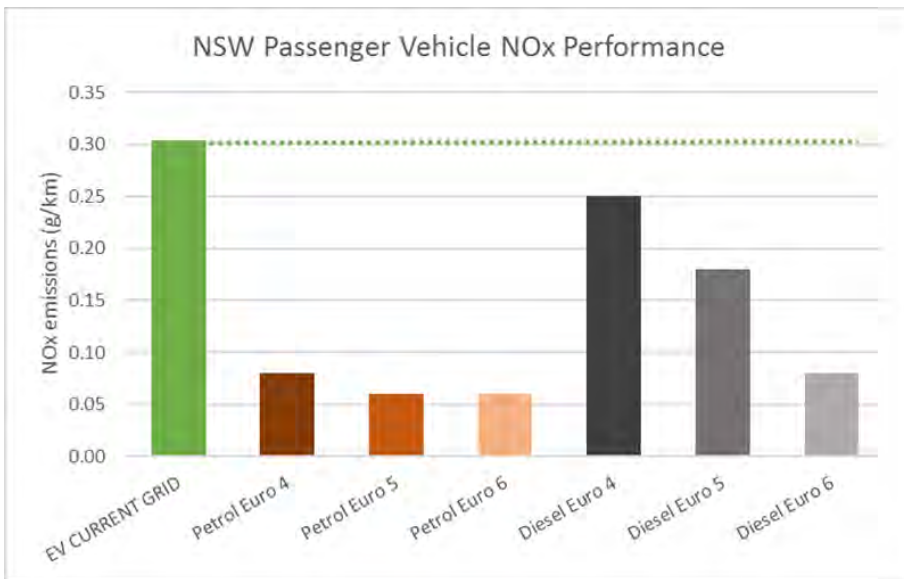
- Technology available today
- Energy source is ubiquitous
- Cost parity with conventional (ICE) cars ~ 2020
- Potential for near-zero emissions... ONLY if powered by renewable energy
- But grid charging could increase emissions



Tollgroup.com



COMPARING EMISSIONS FROM EV ENERGY SOURCES



➔ In NSW, fleet incentives should be linked to renewable energy



INNOVATION 4: DISTRICT TRANSPORT (ELECTRIC)

Electrified personal transport

- Neighbourhood scale transport – fit for purpose
- Small energy requirement
- Address many barriers to cycling
 - Hill-climbing
 - Long distances
 - Weather (esp. heat)
 - End of trip facilities



EVworld.com



Newsweek.com

➔ *Transform cycling into an option for otherwise non-cyclists*

DISTRICT TRANSPORT (ELECTRIC)

URBAN FREIGHT

- High efficiency, right-sized – effectively a mode shift
- Small energy requirement means electricity source less critical
- Reduce congestion and parking demand
- Regulatory barriers?
(ADRs, footpath laws, licensing)



Urbanarrow.com



NZpost



SUMMARY

- Transport sector is facing major disruption
- Conventional fuel efficiency measures can reduce emissions
- New technology and business models can also reduce emissions...
- ... But may also increase activity and/or emissions
- No silver bullet (match innovation to regions/location/situation)
- How the technology/innovation is applied is crucial
- Rules of thumb and intuition can lead to unintended consequences





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