Clean Air Summit

Transport innovation

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Transport innovation & disruption: Implications for air quality

NSW Clean Air Summit

27 June 2017

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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(!!)
WHY WE NEED INNOVATIONS TO RETROFIT

- Large number of old vehicles, doing low km, but causing major emissions
INNOVATION 2: RIDESHARE ENABLERS

- 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
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

➔ 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)
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
References


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