Engine conversion of tricycle taxis

The Philippine experience in developing and using small scale transport methodologies

Tricycle – common transportation

12 in a Tricycle . . .

15 in a Tricycle!!!


TRADING
TZ 7404

895


VETERANS
BATODA
1193
774


745

2003
BACHAO SUR
FOR HIRE
4
K-1716
•LEA•REA•GIA•
POT
IS BOILING FOR

Tricycles in the Philippines

≈**evolved from Kalesa**

≈**1,300,000 registered tricycles** in the Philippines

≈wide variety of driving conditions

≈refurbished forever and ever

≈No AC.

Rational

- Dirty 2-stroke units are high emitters of CO, HC, and particulates (1 tricycle =>50 automobiles)
- A 2-stroke ban is an unrealistic & ineffective solution:
    - Carbureted 4-strokes offer limited GHG emissions reduction
- direct injection 2-stroke engines are cleaner than carbureted 4-stroke engines
- Carbureted 4-stroke replacement is very expensive and delivers zero economic payback to the driver
- Dirty 2-stroke units will merely be transferred elsewhere

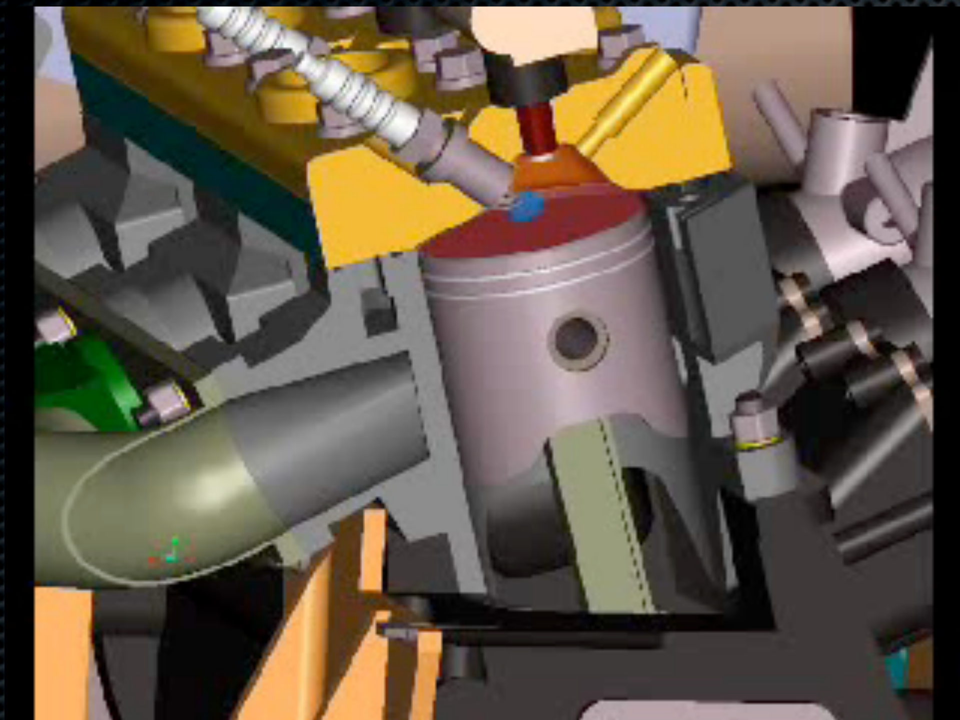
Human Impact of Dirty 2-Stroke Pollution

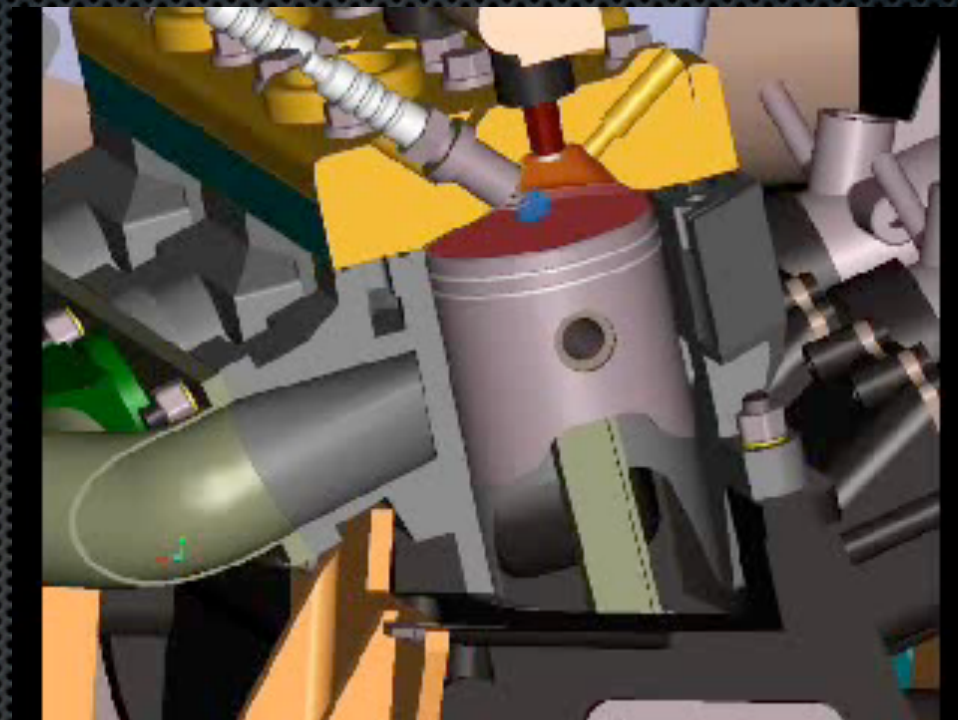
- Residents of many Asian cities must wear masks or breathe through rags
- Commercial taxi drivers often suffer the highest rates of respiratory illness; a World Bank study shows drivers are too sick to drive 7 days each month
- School children are among the most frequent passengers and are particularly vulnerable & disproportionately affected
- Many Asian cities are heavily dependent on commercial dirty 2-stroke vehicle transportation
- In the Philippines, dirty 2-stroke taxi's provide the primary income for ≈ 1.3 million working class families and make up 30% of the transportation sector

Huge environmental & health issue

Human Impact of Pollution - Philippines

Carburetion vs. Direct Injection





Carbureted
2-Stroke

Direct Injected
2-Stroke

Methodology Development

Clarification of the Applicability of AMS III.C – Version 10 (Nov 2007) “low-greenhouse gas emitting vehicle”

SSC_WG Reply: “AMS III.C deals with project situations involving the replacement of complete vehicles and not components thereof . . . “

“In addition, the retrofitting of existing vehicles with more efficient component does not fit into type III projects as it clearly belongs to type II projects…..”

Initial issues in meth development

- Developed based on clients practices + IPCC + AMS III.C
- Applicability conditions
- Constant level of service
- Energy use per unit of service not energy per unit time.
- Baseline
- Combustion efficiency vs. Energy efficiency (EB 32 paragraph 28)

Next meth draft

- Based on comments of initial draft + AMS III.S
- Level of service deemed constant by sampling both baseline vehicles and project vehicles for the duration of the crediting period.
- Monitoring of actual fuel consumption of a sample of vehicles. (data from ECU)

Approved AMS III.AA

- Using instead a constant route
- Final applicability conditions
- Simplified monitoring parameters – distance, efficiency, number of project vehicles

Project Issues & Challenges

- Communicating local conditions
- User Perception
- Market penetration
- R&D costs
- Funding
- Economies of scale vs. Market conditions
- Model specific retrofit kits
- Country/community specific practices (TODAs)

CDM related issues and challenges

- Lack of data – data must be generated and verifiable to determine an appropriate baseline.
- Vehicle lifetime - forever? How to prove and validate lifetime of vehicles used for a very long time. How to prove conservativeness of data?
- Baseline fuel efficiency (how to measure efficiency under a wide variety of driving conditions, weather conditions and practices) -
- CDM Specific research and surveys (lifetime, efficiency, distance)

Conclusions / Recommendations

- Specific conditions for project implementation
- Project developers and CDM consultants need to think differently for small scale transport projects. (timing, data gathering etc)
- Additions to transaction costs due to project specific data gathering and research.
- Need for country specific baseline data to be easily accessible.
- Necessity of PoA for small transport projects