

**CNG Vehicles, CNG Filling and
Conversion Centres:
Looking at Environmental Assessment
Point of View**

QSI Hashmi

and

Mohammed Solaiman Haider

Department of Environment

Environmental Benefits of NGVs

- Significantly reduced emissions of limited air pollutants (particles, nitrogen oxides, volatile organic compounds, carbon monoxide) compared with vehicles fuelled by petrol or diesel.**
- Overcompensate the advantage of the lower specific climate gas emissions of natural gas.**
- Environmental effects of natural gas, petrol and diesel therefore needs to include various categories of environmental impact such as human health, extraction of fossil resources and climate change.**

LCA

- **The systematic comparison of natural gas, diesel and petrol as fuels requires a complete Life Cycle Assessment to be conducted.**

According to ISO 14040 , a Life Cycle Assessment includes four phases.

- **First, the goals and the system boundaries of the study are stated.**
- **Second, an inventory of environmental interventions is compiled, which typically contains resource demands and emissions.**
- **Third, The impact of these interventions is subsequently quantified in terms of categories such as human health or climate change using suitable impact indicators.**
- **Finally, the results of both inventory analysis and impact assessment are interpreted.**

Environmental Impact of NGV

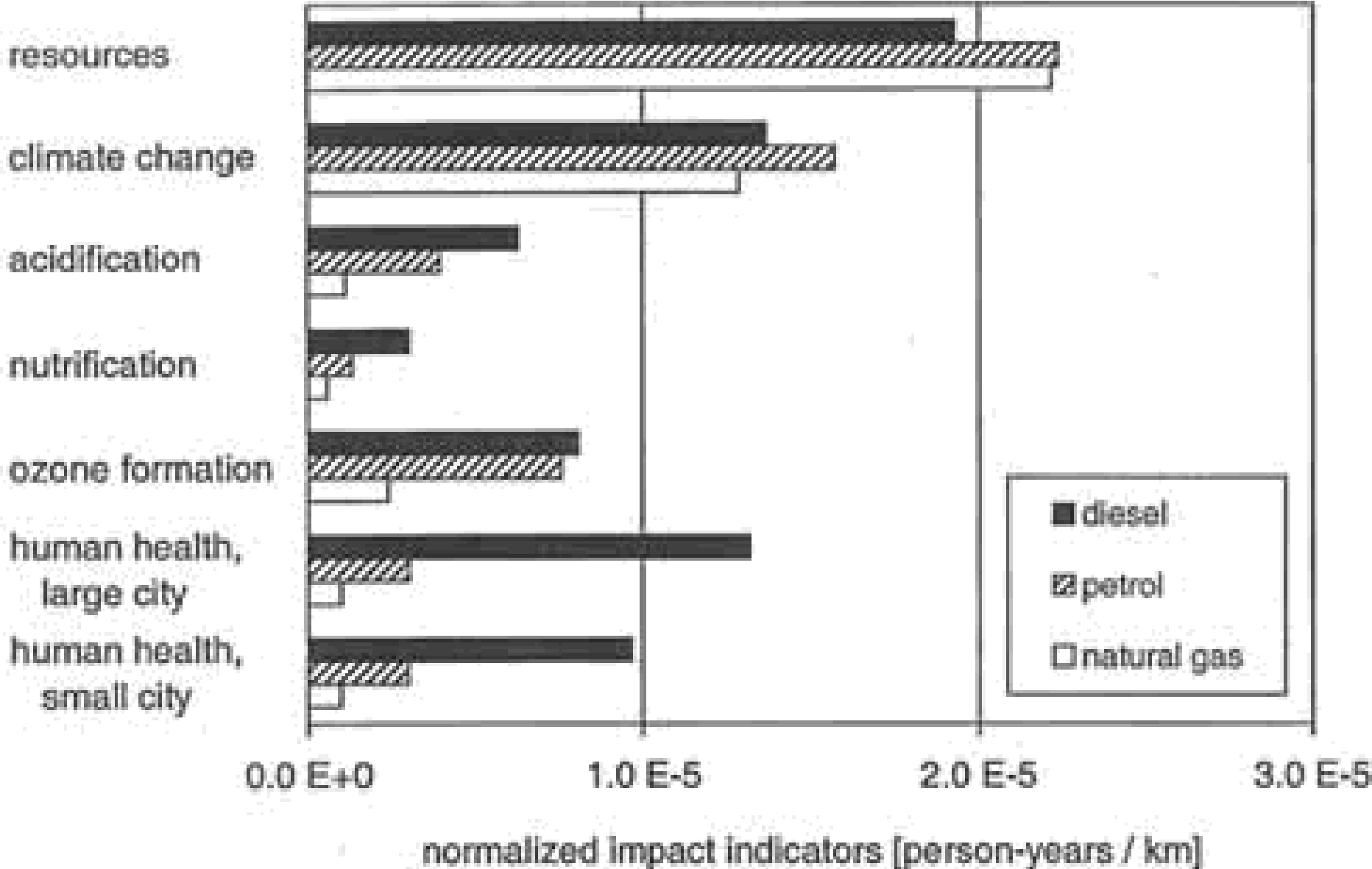
- Through one study in Germany, environmental impact of natural gas as a fuel was compared with diesel for city buses and with both diesel and petrol for passenger cars.**
- The study found that, Except for the climate gases, the emissions of all considered pollutants are significantly reduced for the natural gas vehicles compared to their diesel and petrol counterparts.**

**[http://www.simon-kucher.com/
Internetdatabase/publication.nsf/](http://www.simon-kucher.com/Internetdatabase/publication.nsf/)**

Environmental Impact

- The larger differentiation between small and large cities for the diesel cars, compared to the diesel buses, results from a relatively higher contribution of primary diesel soot particles.**
- In terms of the amount of avoided health impact, the substitution of natural gas for diesel in large cities ranks first.**
- On the second rank follows the substitution of natural gas for diesel in small cities, which avoids a higher amount of health impact than the substitution of natural gas for petrol in large or in small cities.**

Normalized Impact Indicators for passenger cars fuelled by diesel, petrol and natural gas



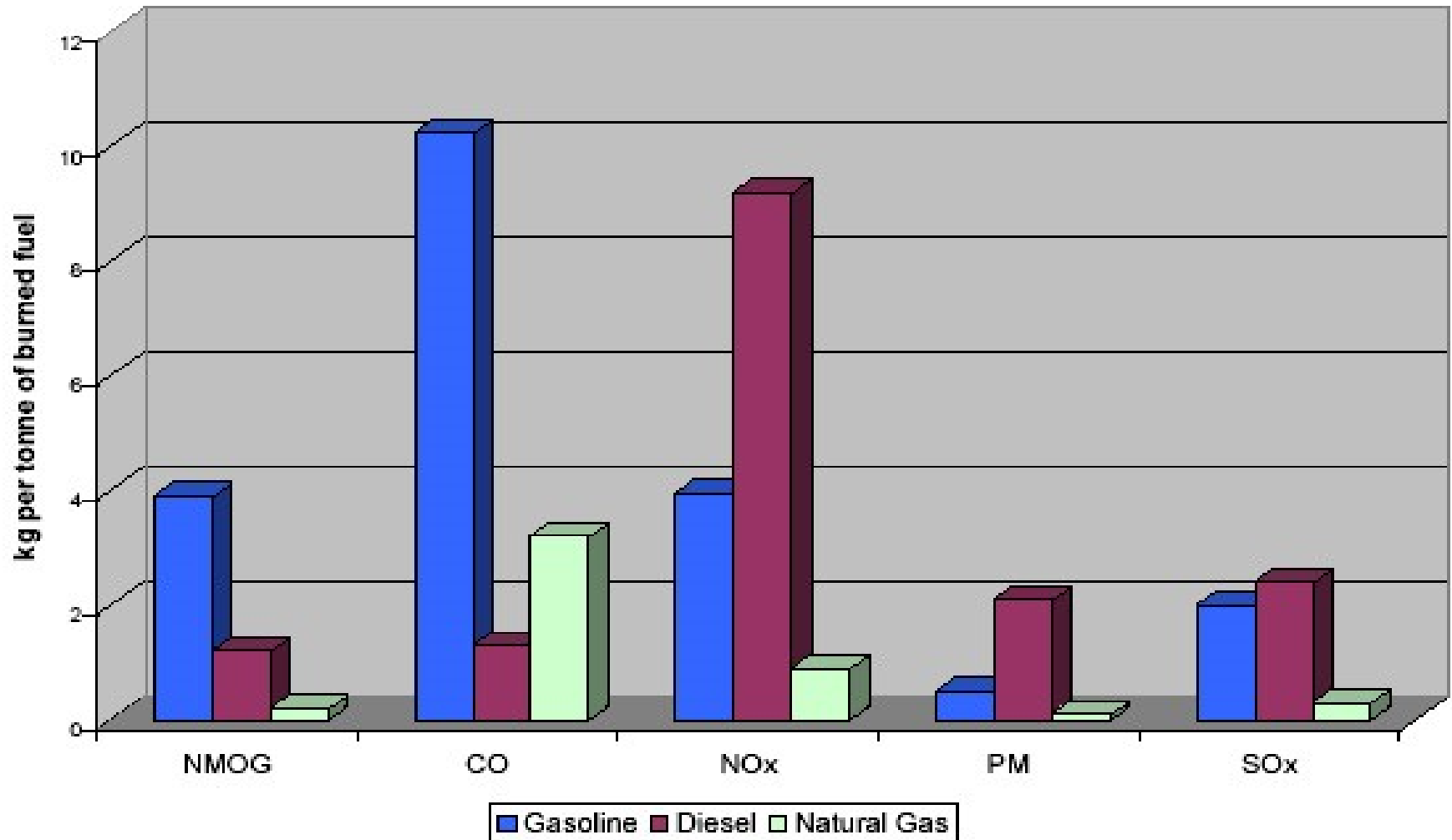
Environmental Impact

- **Impact on human health of passenger cars fueled by natural gas is about a factor 10 lower in small cities and about a factor 14 lower in large cities than for diesel cars.**
- **Relative to petrol, natural gas leads to a reduction of about a factor 3.**
- **The impact of the natural gas and petrol cars is independent of the size of the city due to the dominating contribution of secondary nitrate aerosols.**
- **The larger differentiation between small and large cities for the diesel cars, compared to the diesel buses, results from a relatively higher contribution of primary diesel soot particles.**

Environmental Impact

- In terms of the amount of avoided health impact, the substitution of natural gas for diesel in large cities ranks first.**
- On the second rank follows the substitution of natural gas for diesel in small cities, which avoids a higher amount of health impact than the substitution of natural gas for petrol in large or in small cities.**
- In the remaining impact categories, statements similar to those for the buses apply to the comparison of natural gas and diesel cars. Natural gas furthermore fares equal to or better than petrol in all impact categories.**

Emissions Comparison of Different Vehicles



Environmental Advantages

- One of the most important advantages of natural gas is that it's extremely clean burning when used in internal combustion engines.**
- According to the U.S. Department of Energy, exhaust emissions from NGVs are much lower than those of gasoline-powered vehicles.**
- For instance, carbon monoxide (CO) and nitrogen oxides (NO_x) are reduced by more than 90 and 60 percent, respectively, and carbon dioxide (CO₂), a greenhouse gas, is reduced by 30 to 40 percent.**
- When used in medium- and heavy-duty engines, CO and particulate matter (PM) reductions of over 90 percent, and NO_x reductions of over 50 percent, have been demonstrated compared to diesel engines.**
- More than 40 different manufacturers, including Ford, General Motors, Toyota and Volvo, TATA etc. companies currently produce NGVs.**

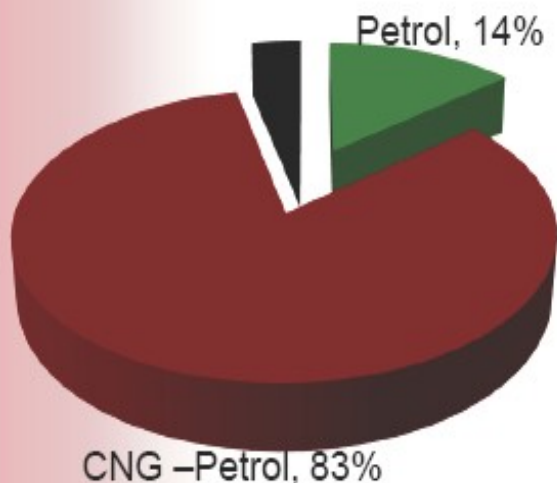
Status of CNG Vehicles and Stations

- Total Number of CNG Driven Vehicles in Bangladesh as reported by Rupantarita Prakritik Gas Co. Ltd (RPGCL) up to November 2010 is 2,00,333 (Jeep /Car /Mi-bus /Three-Wheelers=1,57,449; Auto-Rickshaw=25,773;=Taxicab =12,000; Bus=5,111).**
- Number of Established CNG Filling Stations in Bangladesh up to November 2010 is 584.**
- Number of CNG Conversion Workshops in Bangladesh up to November 2010 is 177**
- CNG Filling Stations and conversion centers, treated as Green Category Projects, are obtaining environmental clearance under environment conservation act 1995.**

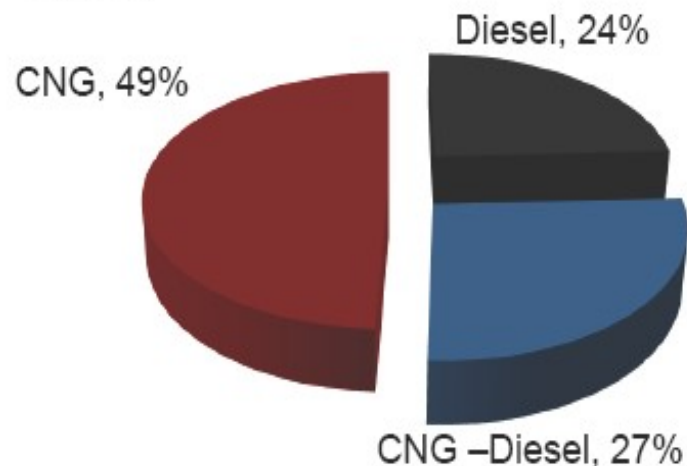


Current Conversion Status

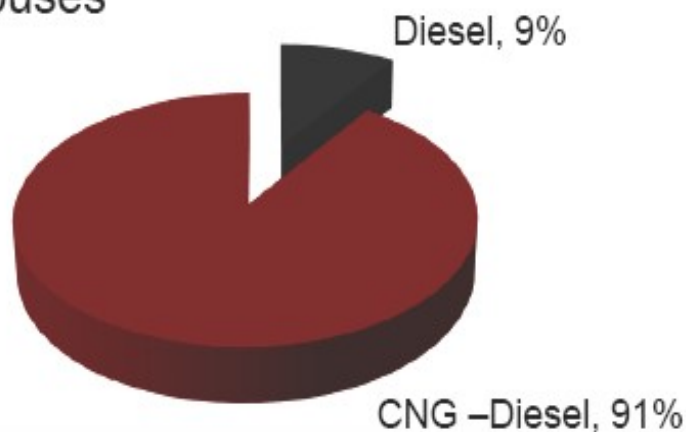
Cars



Buses



Minibuses



Data from primary spot survey

CNG Filling Station and Conversion Centre under ECA 1995

- **Legal Obligation: to Obtain environmental clearance as Project/Industry**
- **Falling under Amber B category of Industries/Projects under ECR 1997**
- **Boosting up: Environmental Clearance Processed treating as Green category Projects.**

Issues Considered in Processing Env Clearance

- **Location of the Project**
- **Explosion Risk (Certificate from Explosive Dept. to be produced)**
- **Noise and Vibration**
- **Oil and Grease**
- **Traffic Jam**



Thank You!