Compressed Natural Gas and School Buses

Senate Energy Policy Issues Committee

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FISCAL RESEARCH DIVISION
A Staff Agency of the North Carolina General Assembly

Agenda

- Price Differences
  - Buses
  - Fuel
  - Maintenance
- Fueling Issues
  - Types of fueling stations
  - Costs of fueling stations
- Emissions Differences
- Criteria to Consider for Implementation

Price Differences between Traditional Diesel and CNG Buses

Price Differences – Buses

- Type C versus Type D buses:

Type C

Type D

Price Differences – Buses

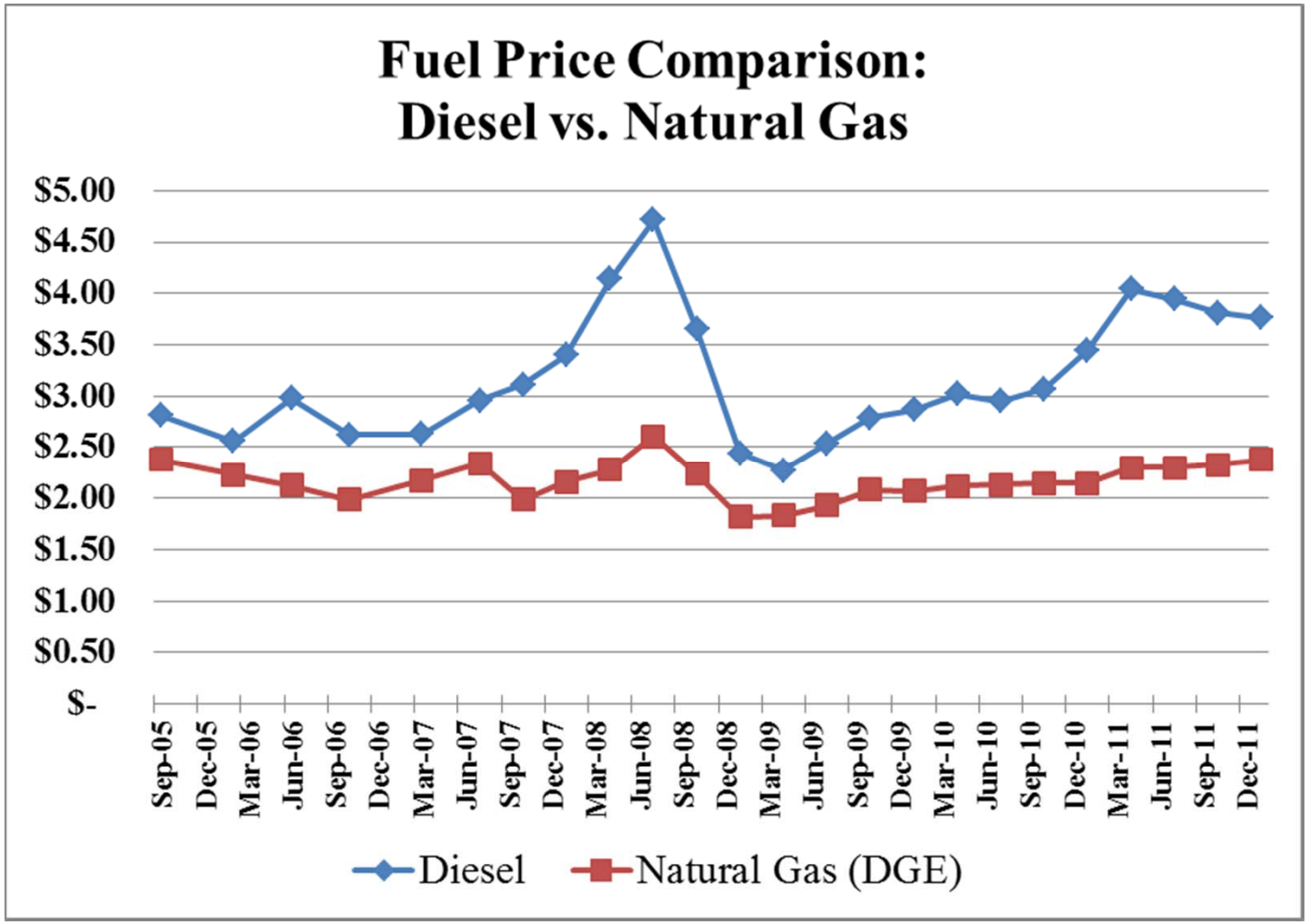
- Currently, CNG buses cost $50k to $55k more than a traditional diesel bus (≈ 65% differential)

- Two components to price difference:
  - Type C versus Type D: $20k
  - Diesel Type D versus CNG Type D: $30k to $35k
  - Total difference: $50k to $55k

Price Differences – Buses

- Emergence of Type C CNG might reduce cost differential slightly
  - Blue Bird: currently is not planning on offering a Type C CNG school bus
  - Thomas Built: do not know when they might have a Type C CNG school bus
  - International: over a year away, estimated price differential $40k to $55k

Price Differences – Fuel



Source: US Dept. of Energy "Clean Cities Alternative Fuel Price Report," January 2012.

Price Differences – Maintenance

- 1996 Charlotte pilot program
  - 8 buses
  - Maintenance costs nearly double that of diesel buses
    - Parts specific to the CNG engine are more expensive to replace
    - Mechanics must be trained on both CNG and diesel engine types
- Anecdotal evidence from districts with CNG buses indicates lower maintenance differential

Fueling Issues

Types of CNG Fueling Stations

- Two types of CNG fueling stations

Fast-Fill

Slow-Fill

CNG Fueling Station Costs

- Installation prices vary based on size of fleet
  - Approximately $1 million to $2.5 million
  - Per-vehicle costs potentially decrease if shared with transit or refuse vehicles

- Station maintenance
  - Approximately 5% to 8% of upfront costs

CNG Fueling Station Costs

- Potential for public-private partnerships
  - Certain vendors might support station costs with a commitment to purchase fuel

- NCSU Solar Center Clean Fuel Advanced Technology Project
  - Potential to cover 80% of a project's costs
  - Overall availability $1.5 - $2.0 million

Emissions Differences

Emissions Differences

- CNG and diesel buses have similar emissions
  - Cohen (2005) indicates
    - Diesel engines slightly better with regards to particulate matter and carbon dioxide
    - Diesel engines slightly worse with regards to oxides of nitrogen and sulfur dioxide

- Need to also consider emissions from extraction
  - More data needed at this time

Criteria to Consider for Implementation

Criteria to Consider

- If the GA is interested in purchasing CNG school buses, it could consider LEAs with:
  - Ability to use existing CNG fueling stations
  - Public-private partnerships for CNG fueling
  - Ability to share fueling station with transit or refuse vehicles
  - Centralized bus parking
  - Greatest replacement bus needs
  - Location in non-attainment county