Clean Fuels CONSULTING

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LNG IS HOT
Issues & Strategies

Issues & Challenges in Today's Market

- Fuelling
- Buying Vehicles
- Gas Industry Support
- Liquefied Bio-Methane
  - Fuel quality
  - Cost
- Growth of Fuelling Stations
  - Cost
- Government Involvement?
  - RD&D Funding?
  - Tax policy
  - Brussels
  - Local
  - National
- Other?
- Sales Levels/Volumes
- Standards Development
  - CEN
  - ISO
  - Harmonize w/ other nations?
  - Industry support/ Manpower?
- Cost of the Fuel

Fuel Supply & Distribution

- Fuel Composition/ Quality (Conditioning[?])
- Metering
  - ISO/OIML?
- Fuel Temperature & Pressure
- Odorization
- Liquefied Biomethane
  - Pipeline Injection
  - Direct to Fuel Station
- Distribution Strategies
  - Small-Scale Liquefacton
  - Pipeline gas
  - L-CNG
  - Near Receiving Terminal
  - Over-the-road Trucking

Other?

Vehicle Availability & Marketing

- National & Local Dealer Support
- First Cost of the Vehicles
- Dual Fuel vs Dedicated
- Downstream Service Support
- Fleet Operations?
- Matching Vehicles to Customer Needs
- Competition w/ Diesel + SCR? → Emissions Performance
  - Tailpipe methane
  - Test cycles Steady-state/ Transient?
  - Boil-off

Future Pathways

- Over-the-Road Transport
  - HD Trucks
  - Buses
- Off Road Transport
  - Construction
  - Farm
- Railway Applications
- Port Facilities
- Marine Applications
  - Inland Waterway Transport
  - Ocean-going vessels ?
- Fuel Stations
  - Private vs Public
  - L-CNG?
  - The Role of Small-scale Liquefaction?