









CHICKENS & EGGS: ***OPPORTUNITIES, CHALLENGES &*** ***STRATEGIES BUILDING THE NGV FUELLING*** ***INFRASTRUCTURE***

7-8 December 2011
Brussels



Thank you for coming

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ROLLER COASTER APPROACH to ALTERNATIVE FUEL POLICY MAKING

(also fed by the mass media)

- **1980s:** Electric batteries with the prospect of ‘free energy’ from solar & photovoltaics
- **Also 1980s (U.S.):** methanol
- **1990s into early 2000s:** fuel cell mania and the prospect of ‘cheap’ hydrogen from renewable electricity
- **Early 2000s:** maintaining a liquid fuel pathway with gasoline hybrids (10 years ago hybrids = 2^3 : two drive-trains, too complicated, too expensive)
- **2003+ until the ‘Sustainability’ wake-up call:** liquid biofuels (ethanol & biodiesel)
- **2008+** back to electric vehicles.
- **Meanwhile:** NGVs & LPGVs keep coming along...steady, improving, reliable (AND for biogas – a *renewable source*)

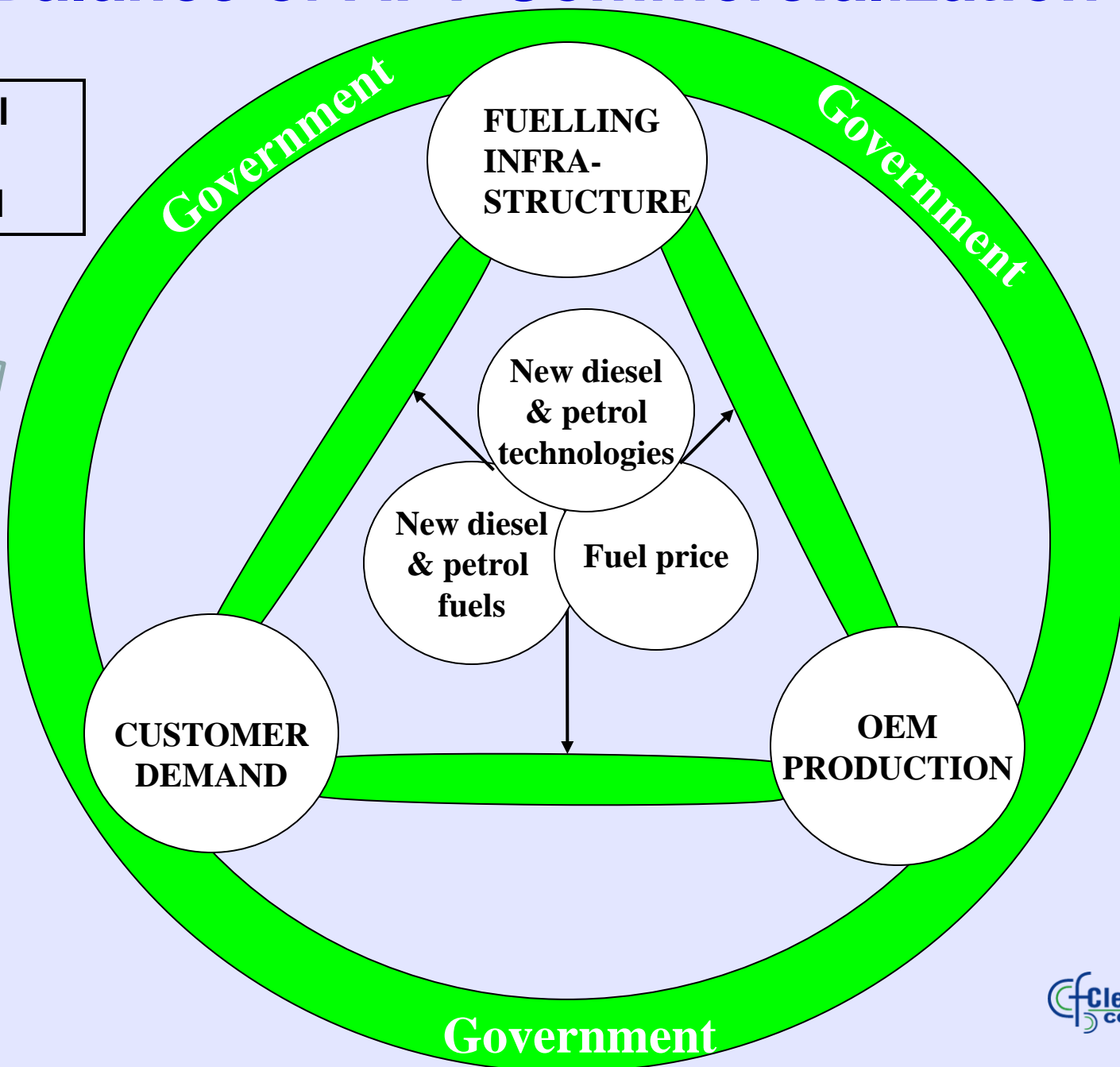
Shared Problems of **ALL** the Alternative Fuels

- **Vehicles have less range due to fuel storage issues**
 - Gaseous fuels in pressurized (or cryogenic) tanks
 - Hybrids & electrics with batteries
 - Biofuels less energy per petrol volume/equivalent
- **Fuelling infrastructure chicken & egg**

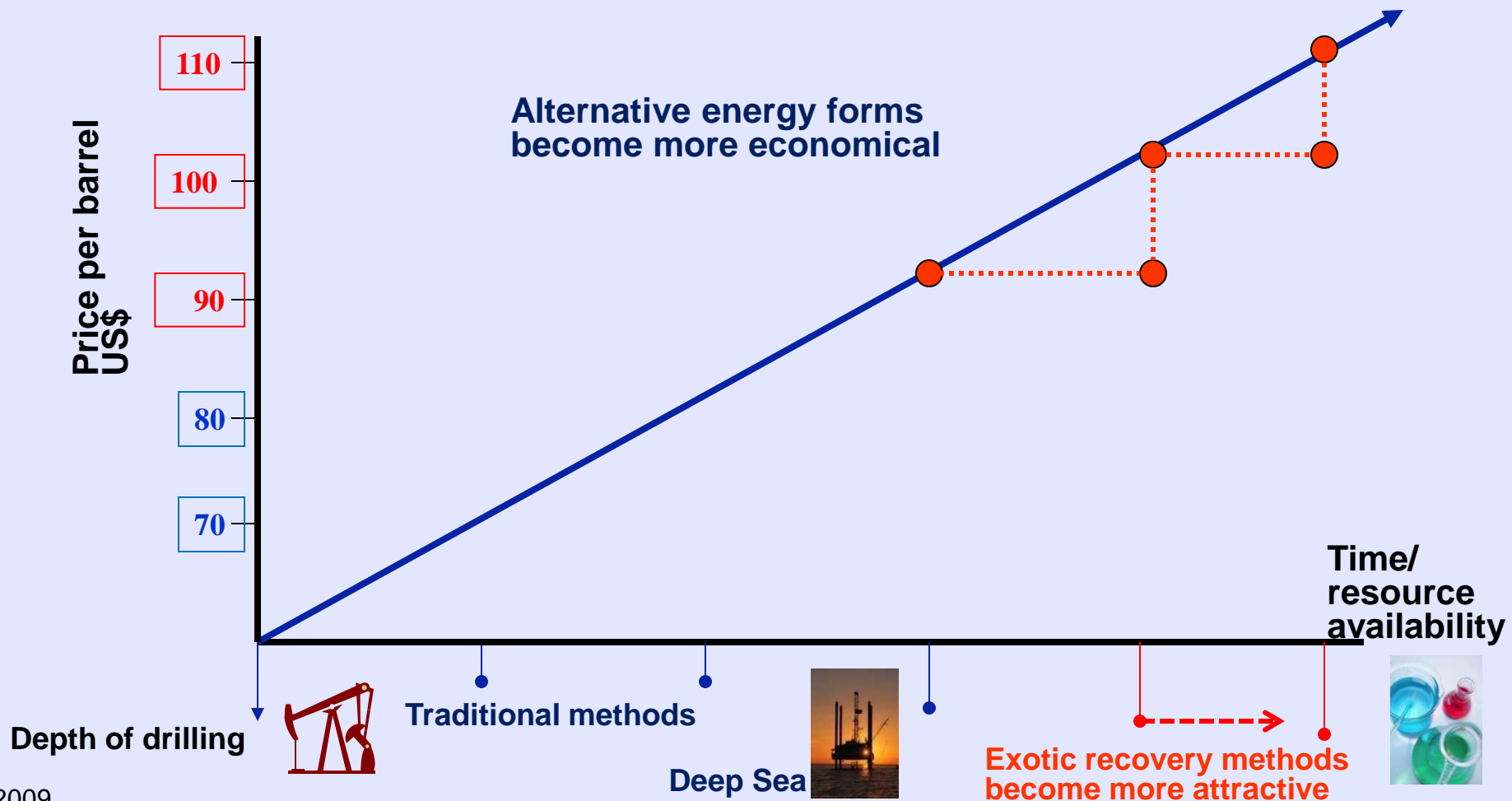


Balance of AFV Commercialization

- Municipal
- National
- Regional



Oil economics and the use of alternative energy



NATURAL GAS VEHICLES

*Potential Into the Future**

- Only alternative fuel with potential for significant market share above 5% by 2020 in terms of economics and mature market scenario
- Broad market acceptance possible with tax & excise duty incentives
- Mature technology available but product diversity & services need improvement
- Main driving force for the large-scale introduction of natural gas as a motor fuel is concern for the security of supply

NGV CHALLENGES

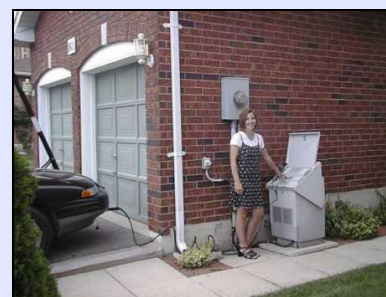
- Vehicle range is 30% of petrol (gaseous fuels have less energy than liquids) or 60% of diesel with LNG
- Compressor stations are expensive & the infrastructure needs to be developed



Fleet Fuelling



Public fuelling



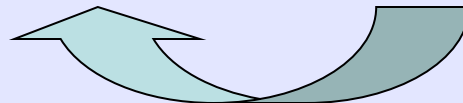
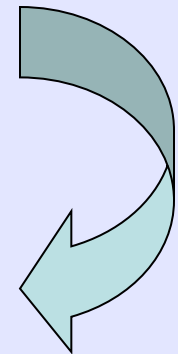
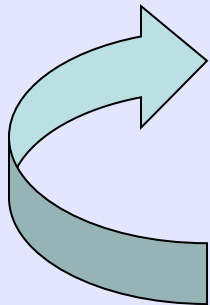
Home fuelling appliances



THE *RENEWABLE* ADVANTAGE

BIOGAS-to-BIOMETHANE

The Environmentally 'Closed Loop'



Synergies with & a relationship to hydrogen?

- Except for the fuel cell itself, fuel storage systems, compression, and cryogenic equipment are same/similar NGVs & H2FCVs
- CH4 & H2 blending (?)
- NGVs = H2FCVs =



What we want to accomplish at *Chickens & Eggs?*

- The goal is to leave the workshop with a firm idea of the key issues facing the gas industry, governments, and entrepreneurs as to what strategies and next steps are required to expand the fuelling infrastructure to become one of the long-term, sustainable alternatives to petroleum-based fuels.
- Workshop...is for 'work' and 'networking'..... and not texting, emailing or talking on the phone during presentations.....please?
- Please complete your questionnaires!

The Program

- Session 1: Set the stage
 - Government approach
 - Fuel industries, vehicles
 - Standards
- Session 2: Learn from success
- Session 3: Alternative, innovative approaches
- Session 4: Cost reduction & best practices
- Session 5: Pathways to sustainability: strategies & next steps





CHICKENS & EGGS:

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