AUSTRALIAN FUEL PROGRAM

WHAT IS GEM?

GEM TRIAL PROGRAM

WHY METHANOL?
1. Coogee Chemicals

- Founded in 1971

- Head Office
  - Perth, Western Australia

- The business now includes:
  - Chlorine & caustic production
  - Chemical tank terminals
  - Petroleum fuel import terminal
  - Dangerous Goods transport fleet
  - Sodium cyanide manufacture
  - Methanol manufacture

- Directly employ over 400 people across Australia & SE Asia
2. Methanol Plant Snapshot

OPERATOR
Coogee Chemicals Pty Ltd

FEEDSTOCK
Natural Gas (with variable nitrogen content)

LOCATION
North Laverton, Victoria (20 km west of Melbourne)

TECHNOLOGY
JM (formerly ICI Synetix) GHR Technology
17th October 1994 (built by BHPB & Mitsubishi)

LCM Demonstration Research & Development MFPSO
3. Why Methanol Fuel Blending?

- Australian oil refineries are in decline with near term closure expected
- Refined fuels are increasingly imported
- Current disconnect between energy value of gas and oil
- Australia is a gas-rich country
- Methanol is a proven GTL technology
- Methanol is easier to integrate into the gasoline distribution system than gas
- Methanol fuels have excise tax free tax status for at least 10 years
- A significant amount of work has been done globally on ethanol/gasoline blends in recent years – methanol is also an alcohol

Methanol fuel can extend the alcohol fuel supply and help meet the need for diversity in the transportation fuel mix.
PURPOSE & APPROACH

- Have methanol included in the Australian Fuel Standard & Fuel Quality Regulations

- Demonstrate & introduce methanol as a fuel into Australia (GEM-8, GEM-15, GEM-56)

- Confirm fuels compatibility with existing fleet and determine benefit to consumer

- Obtain stakeholder input to get the approach right
  - **Federal & State Governments**
  - **OEMs:** Ford & Toyota
  - **Fuel Majors & Distributors:** Caltex (Chevron), Shell and United Petroleum.
  - **Ethanol Manufacturers:** Wilmar & Manildra
  - **Engine & Car Test Centres:** Melbourne University & Ford’s ACART test centre, Orbital (WA)

- Develop a coordinated global approach on methanol fuels for transportation use
5. **Timeline**

- **Nov 2011** Australian Road Show
- **Jan 2012** MI Global Fuel Blending Alliance
  - Methanol Institute ([www.methanol.org](http://www.methanol.org))
- **Aug 2012** Technical program commenced
  - Life cycle assessment ([www.csiro.au](http://www.csiro.au))
  - Materials compatibility, RVP etc.
- **Apr 2013** Australian Road Show
- **Nov 2013** Technical program continued
  - RVP and other regulatory tests
  - Replicate work done for ethanol fuels
- **2014** - *Commercial rollout of GEM fuel*

6. Stakeholder Feedback on Methanol

- Federal Government was ‘agnostic’ to fuel choice – environmental credentials to be met
- Need OEM support for new methanol fuel standard
- Fuel majors and distributors identified the commercial opportunity
- Methanol toxicity, customer perception & forecourt pump congestion a concern
- Benefit to ‘extend’ alcohol fuel mix – a ‘drop in’ blend of gasoline, ethanol & methanol.

FUEL MAJORS
“…what is the compelling reason for a consumer to not put 100% gasoline in their vehicle?”
7. **Performance**

**HIGH METHANOL BLEND**
- GEM56 & E85 performance similar
  - Fuel economy
  - Octane (RON)

**LOW METHANOL BLEND**
- GEM15 & E10 fuel economy similar
- GEM15 has higher octane than E10 (98 versus 95 for E10)

GEM fuel offers higher performance at lower cost to the consumer

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**Fuel Economy (L/100km)**

**Research Octone Number (RON)**

ULP = 91 octane gasoline
PULP = 98 octane gasoline
8. Emissions

OVERALL EMISSIONS
• GEM56 is lower than E85 (E85 has higher embedded emissions)
• GEM56 similar to PULP98 (PULP98 has higher tailpipe emissions)

NOx EMISSIONS
• GEM56 & E85 has reduced NOx
• GEM15 has lower NOx than E10 or ULP91 or PULP98.

 ULP = 91 octane gasoline
 PULP = 98 octane gasoline
1. Lubricant compatibility
2. Fuel system adaptability
3. Exhaust temperature / Catalyst ageing
10. Outcomes & Next Steps

TECHNICALLY PROVEN ‘DROP IN’ FUEL
• GEM15 or lower blends are suited to E10 compatible cars
• GEM56 fuel is compatible with E85 FFVs

DIRECT CONSUMER BENEFIT
• GEM fuel offers higher performance at lower $/mile to ULP91 or ULP98
• Reduction in overall emissions including NOx and particulate matter

CONSTRAINTS
• State-based RVP limits for smog prevention (GEM15 or lower)
• Federal government oxygen limit of 3.7% (GEM56, GEM8 or lower)
• OEM engagement (for any new fuel)

COMMERCIAL ROLLOUT OF GEM FUEL
• GEM56 – similar performance but lower cost fuel to E85 (or PULP98)
• GEM8 – similar performance but lower cost fuel to E10 (or ULP91)
• Satisfy all Federal & State regulatory requirements and are Market Ready

Methanol sits alongside other proven alternative fuels.
GEM fuel offers fuel diversity, price competition & consumer choice