Vehicle Fuel Efficiency Consultation
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**Energy Developments Limited - Submission to the Vehicle Fuel Efficiency Discussion Paper**

Energy Developments Limited (EDL) commissioned a 200Tpd LNG production facility near Karratha in WA in 2007 to displace diesel and provide LNG as a fuel source for the remote power stations of Broome, Derby, Fitzroy Crossing and Halls Creek in the West Kimberley region of WA. (see attached fact sheet). This plant also provides LNG for diesel substitution in EDL's delivery fleet which distributes LNG into the West Kimberley region. (1) EDL has agreements in place to commence supply of LNG to other road transport users from this plant in the near future. EDL believes that there is high potential for LNG to contribute substantially to a reduction in the environmental impact of the Australian road transport industry, however the LNG industry will need assistance to become established and we seek your help to attain favorable consideration from the Federal and State governments.

Currently LNG is used in around 170 commercially operating Heavy Duty Vehicles (HDV) in WA and Victoria and this number is increasing following the commissioning of Wesfarmers new plant in Kwinana W.A.

LNG is considered to offer significant growth potential due to its capacity to provide lower fuel cost and fuel price stability (pricing is not necessarily linked to international oil price fluctuations) and EDL believes that LNG can be placed domestically as an alternative fuel with significant; environmental advantages, supply security benefits, balance of payments improvements (a reduction of oil imports) when compared to diesel.

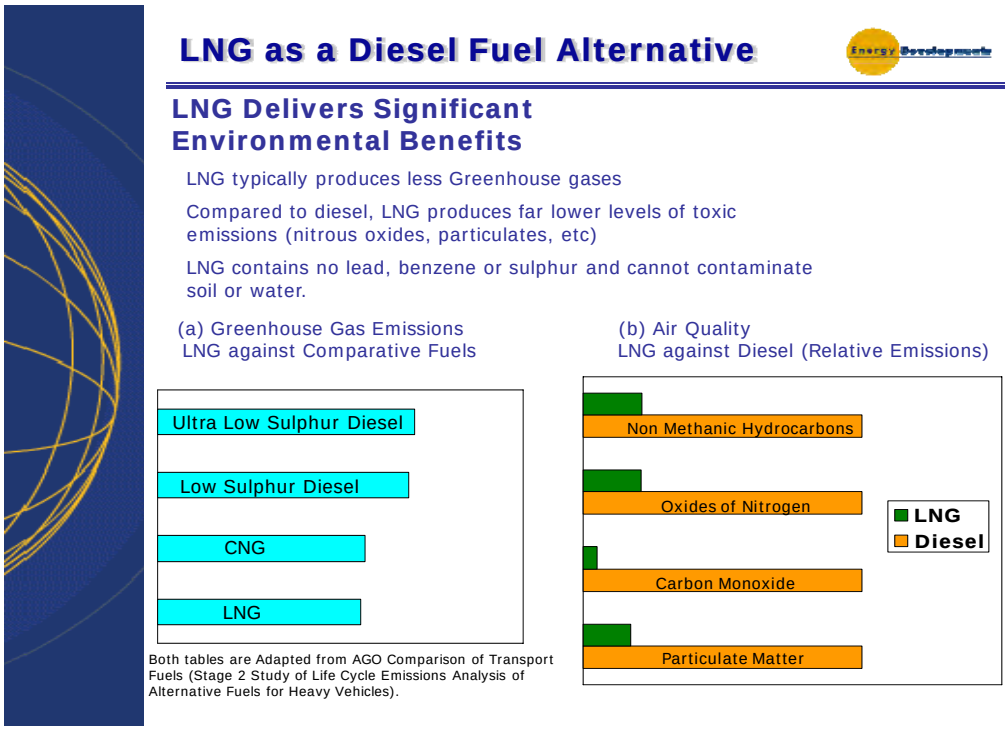
The Australian Greenhouse Office recognises that LNG is more environmentally friendly than diesel and produces less carbon dioxide, less sulphur and far lower particulate emissions than diesel. (2)

The first obstacle to the widespread use of LNG as heavy vehicle fuel at the present time is the very limited supply of LNG (particularly on the east coast) however there are a number of companies planning construction of LNG production plants in the next two years which will address this concern.

The second barrier to widespread adoption of LNG is the high cost of purchase or conversion of LNG vehicles; in the initial development stage , low volume truck conversions are relatively expensive when compared with the benefits of scale as conversion numbers increase, which has been demonstrated by the more mature LPG conversions of light duty vehicles. Foundation LNG fleet operators would welcome incentives to assist with the justification of this capital cost, incentives could be linked to $CO^2e$ reductions. Some incentives for consideration should be;

1. Direct financial incentives for purchase or conversion of LNG vehicles.
2. Reductions in registration and stamp duty for LNG vehicles.
3. Assistance with training costs, operators of LNG fleets will incur additional costs to train their maintenance staff in the installation and repair of LNG equipment and NG engines.
4. Favourable excise treatment. EDL recognises that this issue is outside the scope of the discussion paper but believe it may be an essential incentive needed to promote low emission fleets.

The last barrier to widespread adoption of LNG as diesel fuel replacement is the very high cost of LNG refueling infrastructure compared to the number of vehicles converted, this limits current LNG usage to mainly “back to base” fleets. We believe that a subsidy scheme to assist with the cost of “public” refuellers on the major transport routes would speed the development of this crucial infrastructure and open the use of LNG to a much wider proportion of the national fleet.




Contrary to section 2.4 of the discussion paper we believe that Natural Gas engines are able to show significant $CO^2e$ reductions as demonstrated in the following tailpipe analysis information for the Westport Cummins engine, the Dual fuel Caterpillar Clean Air Power conversion and the Advanced Engine Components Isuzu conversion in Tables 1, 2 and 3. Additionally we believe that the potential to collect and utilise coal mine methane prior to mining has the potential to substantially reduce the escape of environmental methane into the atmosphere.

(1) West Kimberley Power Project Brochure attached.
(2) Comparison of Transport Fuels - Final Report (EV45A/2/F3C) to the Australian Greenhouse Office http://www.environment.gov.au/settlements/transport/comparison/index.html
(3) Tables 1,2 and 3 see addendum.

# Factsheet

March 2008

# West Kimberley Power Project

Energy Developments

leaders in clean energy

Australia's remote area electricity generation has taken a quantum leap into the future with international clean energy company, Energy Developments Limited, opening Western Australia's first LNG production plant for supply to the domestic market.

The project consists of five power stations – four fuelled by liquefied natural gas (LNG) – an LNG plant and associated transport infrastructure.

With an initial generating capacity of 61 megawatts (MW), potentially growing to 92 MW over 20 years, the project will produce electricity for approximately 27,000 people in the resource-rich, but isolated West Kimberley region of Western Australia.

The project is underpinned by a 20-year power purchase agreement signed in August 2005 by Energy Developments and Western Australian Government-owned regional power company Horizon Power.

Under the agreement, Energy Developments will generate clean and reliable power for the towns of Broome, Derby, Looma, Fitzroy Crossing and Halls Creek in the West Kimberley region.

Managing Director Greg Pritchard said that Energy Developments is very pleased to be providing power to the towns.

"We appreciate and acknowledge the support of Horizon Power and the local community through what has been a challenging process," Mr Pritchard said.

LNG provides significant growth potential for Energy Developments as global trends favour greenhouse gas abatement and the gap between the global prices of diesel/oil and natural gas widening as a result of the boom in crude oil prices. Energy Developments believes customers can switch to LNG as viable, alternative long-term energy source for power generation and transport.

The benefits of LNG for the WKPP include:

- a 25% reduction in greenhouse gas emissions;
- ultra-low noise generators to minimise the impact on residents;
- direct employment of at least 30 people;
- creation of many other service and support industry positions in the region; and
- the purchase of local services and materials.

## AT A GLANCE

Project name:
West Kimberley Power Project

Builder, owner, operator:
Energy Developments Limited

Location:
Pilbara and Kimberley regions of Western Australia

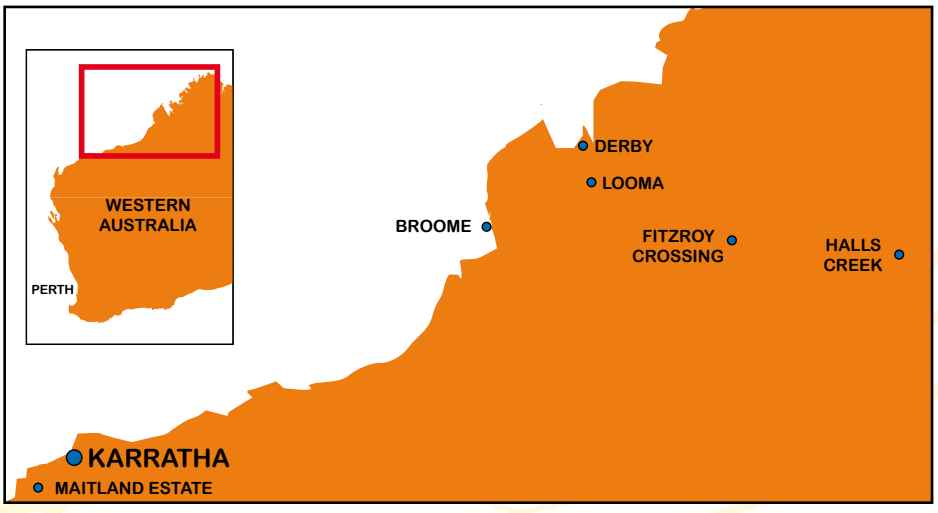
Components: Broome, Derby, Looma, Fitzroy Crossing and Halls Creek power stations, an LNG plant, a 3.2km pipeline, a 12km pipeline and an LNG road transport fleet.

Generating capacity:

61 MW initially, rising to 92 MW over 20 years.

Primary fuel: Liquefied Natural Gas (LNG)

Customer: Horizon Power



# West Kimberley Power Project

## continued...

LNG Triple Road Train

Four of the power stations are fuelled by LNG from a plant at Karratha in the Pilbara region of Western Australia, using gas from the John Brookes field in the North West Shelf. A new efficient diesel-fired power station was built at Looma and has been operating since June 2007.

The growth potential of LNG encouraged the Company in 2006 to expand the initial capacity of the LNG plant from 160 tonnes per day to 200 tonnes per day.

The gas will be transported along a 3.2 km pipeline from the Dampier-Bunbury pipeline to the LNG plant.

LNG from the Karratha plant is carried by triple road trains, which will use LNG for up to 80% of the trucks own fuel requirements, and travel up to 1500km to the power stations and store LNG in tanks with a capacity of more than five million litres.

The WKPP is the first LNG-based investment for Energy Developments, a provider of renewable and low greenhouse gas emission energy with more than 65 projects in Australia, the United States and Europe.

The company operates in four main areas:

- landfill gas power generation;
- coal mine methane power generation;
- remote area power generation; and
- LNG and CNG energy solutions.

LNG/CNG power generation and energy transport solutions are newer capabilities for the Company, which was established in Australia in 1988 and listed on the Australian Securities Exchange in 1993.

Broome Power Station

Broome Fuel Storage Facility

**About Energy Developments Ltd (ASX code: ENE)**

ENE is an ASX-listed, Queensland-based, international provider of renewable energy and low greenhouse gas emission energy. The Company currently owns and operates a diversified international portfolio of power stations in Australia, the United States and Europe with a total capacity of over 540MW from a range of fuel sources including landfill gas (LFG), coal mine methane (CMM) and compressed natural gas (CNG).

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## *Table 2: Summary of Clean Air Power Results*

### Witnessed tests

| Configuration | | Diesel | Diesel | | UC152072 | UC152072 | | SC150001 | SC150001 | |
|---|---|---|---|---|---|---|---|---|---|---|
| Test cycle | | 2escdie | 2escdie | Average | 2esc72 | 2esc72 | Average | 3ESCcert | 3ESCcert | Average |
| Test number | | 1780 | 1781 | Diesel | 1783 | 1784 | UC152072 | 1788 | 1789 | SC150001 |
| Date | | 11/10/07 | 11/10/07 | | 11/10/07 | 11/10/07 | | 12/10/07 | 12/10/2007 | |
| Gas substitution | | 0% | 0% | 0% | 54% | 53% | 53% | 54% | 54% | 54% |
| BSCH4 | | 0.01 | 0.01 | 0.01 | 4.42 | 4.43 | 4.42 | 5.59 | 5.66 | 5.63 |
| BSHC | | 0 | 0 | 0 | 5.19 | 5.18 | 5.18 | 6.42 | 6.53 | 6.48 |
| BSCO | | 0.68 | 0.7 | 0.69 | 3.31 | 3.31 | 3.31 | 3.34 | 3.37 | 3.36 |
| BSNOx | | 6.48 | 6.48 | 6.48 | 3.89 | 3.88 | 3.88 | 4.28 | 4.23 | 4.26 |
| BSCO2 | | 721.14 | 718.35 | 719.75 | 582.96 | 583.36 | 583.16 | 569.05 | 567.53 | 568.29 |
| BSPM | | 0.027 | 0.024 | 0.026 | 0.052 | 0.061 | 0.057 | 0.038 | 0.038 | 0.038 |
| Fuel Flow | | 218.62 | 217.63 | 218.12 | 211.78 | 215.2 | 213.49 | 213.6 | 213.85 | 213.73 |
| GHG (CO2 equivalent) | | 781.68 | 778.86 | 780.27 | 711.97 | 712.39 | 712.18 | 726.24 | 725.76 | 726 |
| reduction from ave diesel | -0.18% | 0.18% | 0.00% | 8.75% | 8.70% | 8.73% | 6.92% | 6.99% | 6.95% | |
| ref | | | | | | | | | | |
| GHG w/o Nox | 721.41 | 718.6 | 720.01 | 675.83 | 676.32 | 676.08 | 686.41 | 686.43 | 686.42 | |
| reduction from ave diesel | -0.20% | 0.20% | 0.00% | 6.13% | 6.07% | 6.10% | 4.67% | 4.66% | 4.66% | |

All data shown as g/kWhr

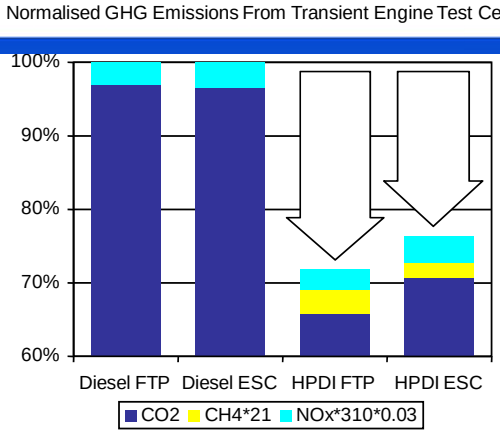
(3)

## Addendum.

***Table 1.***

# Australian HPDI Emissions Results

- Australian HPDI engine certified to ADR 80/02 (December 2007)
- 24% GHG reduction on ESC test and 28% reduction on FTP
- PM at 50% of base diesel engine




Diesel Baseline
FTP - ISX Data Used for Certification Submission
ESC - Certification Data + WPT Diesel Baseline (CO2)

| | $CO_2$ g/bhp-hr | $CH_4$ g/bhp-hr | NOx+NMHC g/bhp-hr | CO g/bhp-hr | PM g/bhp-hr |
|---|---|---|---|---|---|
| **ADR 80/02 Limit** | **N/A** | **N/A** | **2.5** | **15.5** | **0.10** |
| **FTP Composite** | **413** | **1.0** | **2.1** | **3.0** | **0.04** |
| **ESC 13-Mode** | **368** | **0.5** | **2.1** | **2.2** | **0.04** |

## *Table 3: Isuzu Sitec 255 Engine*

**Composite Emissions data during 13-mode ESC test (as an indicator of 13-mode ETC test as used in Euro procedures)**

| | | CO (g/kWh) | nmHC (g/kWh) | NOx (g/kWh) | CH4 (g/kWh) | PM (g/kWh) |
|---|---|---|---|---|---|---|
| **ADR 80/01** | **Euro 3** | **2.10** | **0.66** | **5.00** | **1.6** | **0.02** |
| AEC 2007 (actual) | | 0 | 0.14 | 4.03 | 0.56 | - |
| | | | | | | |
| **ADR 80/02** | **Euro 4** | **1.5** | **0.46** | **3.50** | **1.1** | **0.02** |
| AEC 2008/9 (estimate) | | 0 | 0.14 | <2 | 0.56 | - |
| | | | | | | |
| | **Euro 5** | **1.5** | **0.46** | **2.0** | **1.1** | **0.02** |

**Weighted carbon dioxide equivalent (CO2-e) emissions during 13-mode ESC (to Euro 3 norms, only).**

| SYSTEM | CO2-e (g/kWh) |
|---|---|
| | - |
| AEC | 645 |
| | |
| | - |
| Diesel | 750 |
| | |
| | - |