



# **AGM Presentation**

## **4 November 2014**

**Greg Solomon**  
**Chairman**

## Corporate Details\*

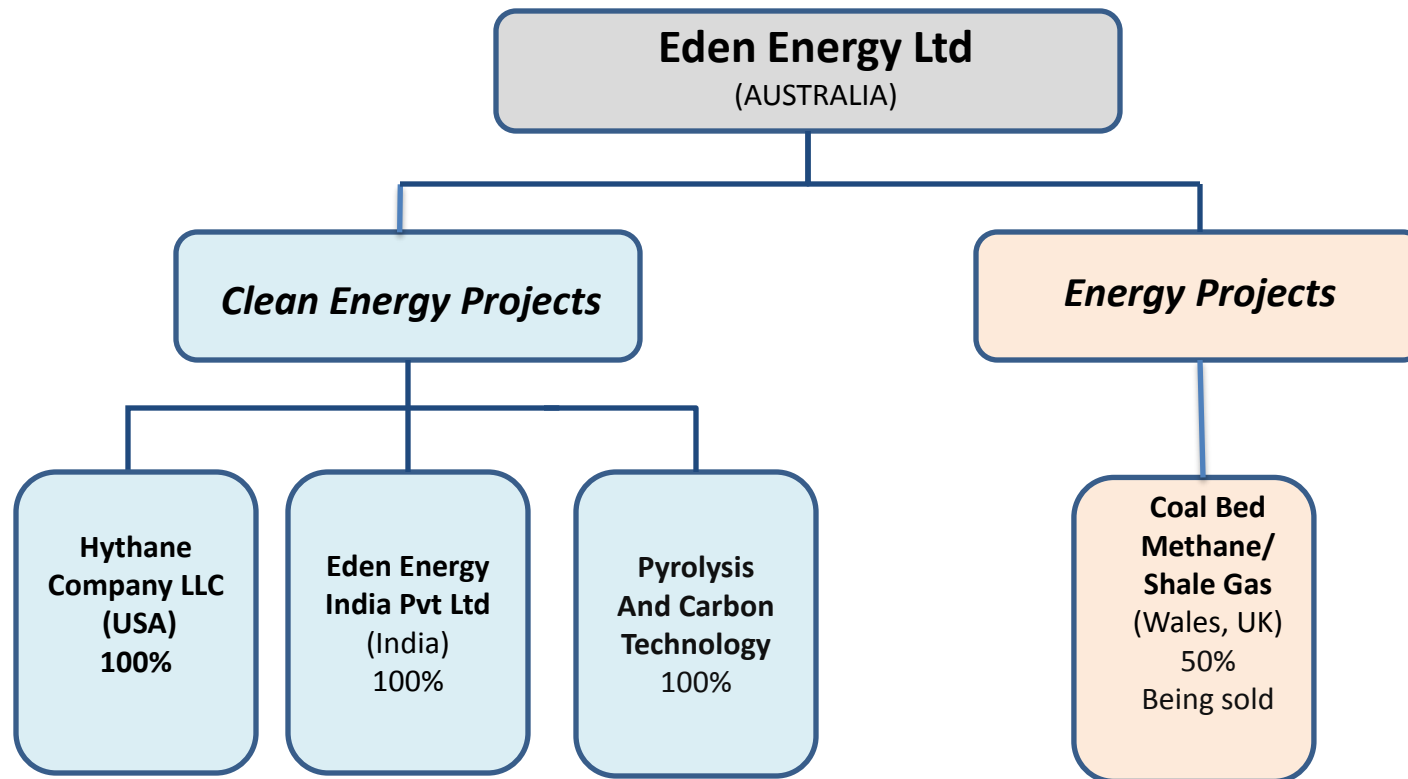
<b>ASX Code:</b>	<b>EDE</b>
<b>Total Shares:</b>	<b>759m</b>
<b>Share Price:</b>	<b>\$0.014 – historical high of \$0.84</b>
<b>Market Capitalisation</b>	<b>\$10.62m – historical high of &lt;\$80m</b>
<b>Cash and Receivables</b>	<b>\$660k</b>

**Cash flow - increasing from US Optiblend sale**

**Conditional contract to sell UK Gas Assets**

**\* As at 4 November 2014**

# Corporate Structure





- **OptiBlend® Dual Fuel** – USA/ India/ Bangladesh/ S.America
  - **Total sales to date** >125 units (≈\$4.6million)
  - **Sales increasing in US - Oct 2013-Sept 2014** - 57 units sold – (\$2,472,500) approx)
- **Pyrolysis Project - Carbon and Hydrogen Produced no CO<sup>2</sup>**
  - Multi Walled Carbon Nanotubes (MWCNT)
  - Carbon Nanofibres (CNF)
- **Hythane®**- India and US
  - plan to use hydrogen from pyrolysis project

## UK

**Coal Bed Methane JV-50% ( $\approx 1200\text{km}^2$ )**

**Shale Gas JV-50% ( $\approx 1200\text{km}^2$ )**

**Conditional contract to sell for cash and shares**

# OptiBlend Dual Fuel System



- **Displaces up to 70% of diesel with natural gas** in diesel engines
- **Large US market**- shale oil/ gas exploration and back-up power
- **Indian market** – hundreds of thousands of gensets / locomotives
- **Huge cost savings**
  - Payback period less than 12 months for larger gensets
- **Total sales to date >125 units (≈\$4.6million)**
- **Sales increasing in US - Oct 2013-Sept 2014** - 57 units sold – (\$2,472,500 approx)
- **Cummins Inc selected OptiBlend** for its drilling rig power modules
- **Hythane Company cashflow positive in Sept 2014**

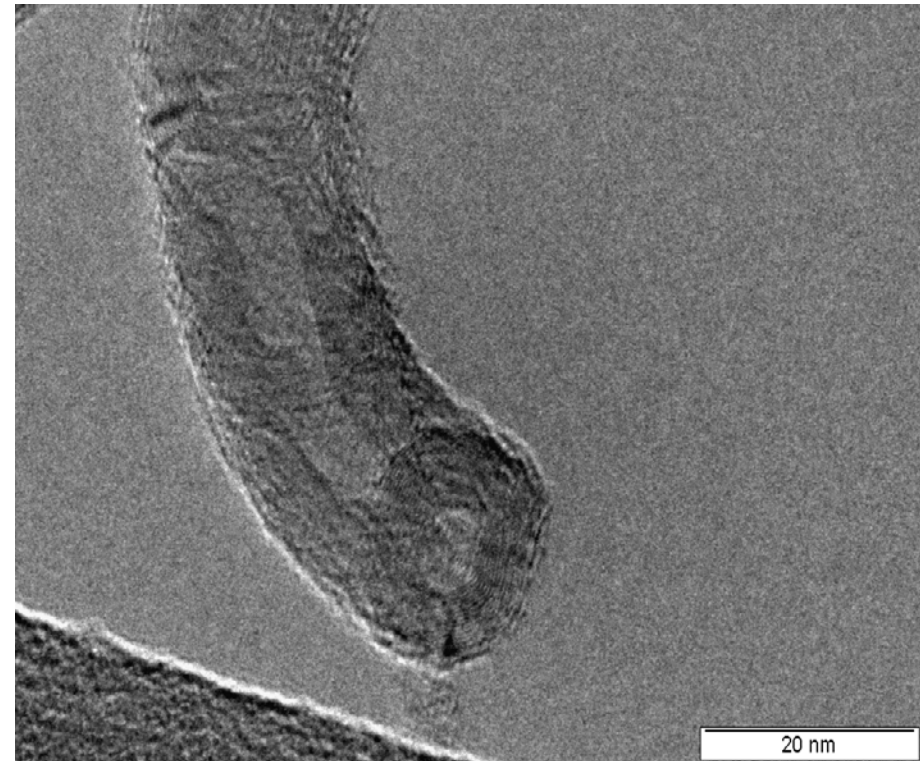
# Carbon Nanotube Project



## UQ/ Eden Developed Pyrolysis Production of CNT from Natural Gas (Eden 100%)



- Produces only CNT + H<sub>2</sub> - no CO<sub>2</sub>
- Multi-walled carbon nanotubes:
  - tensile strength -200-300 times steel
  - approx 17% the weight of steel
  - high conductivity (electrical/thermal)
  - bulk uses - concrete/plastics/polymers
- Patents in 8 countries



TEM image of Eden's MWCNT

# Eden's CNT Commercial Production Capacity

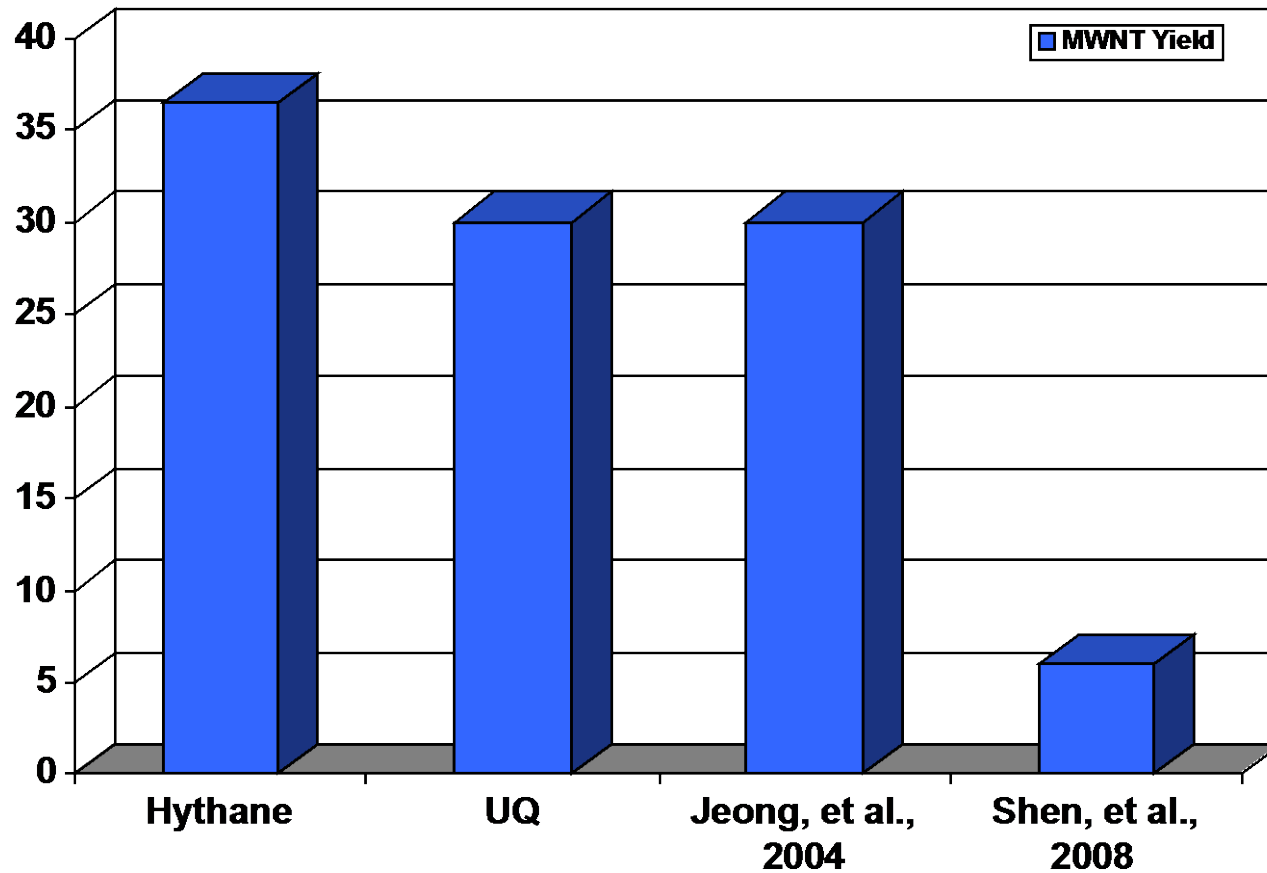


- **Eden's Commercial Scale Reactors in Denver, USA**
- **Capable of producing <40 tonnes of CNT/ year**
- **Low cost catalyst production**
- **High quality / low cost CNT**



## Eden MWNT Catalyst Yield

(Shown in grams carbon per grams catalyst)

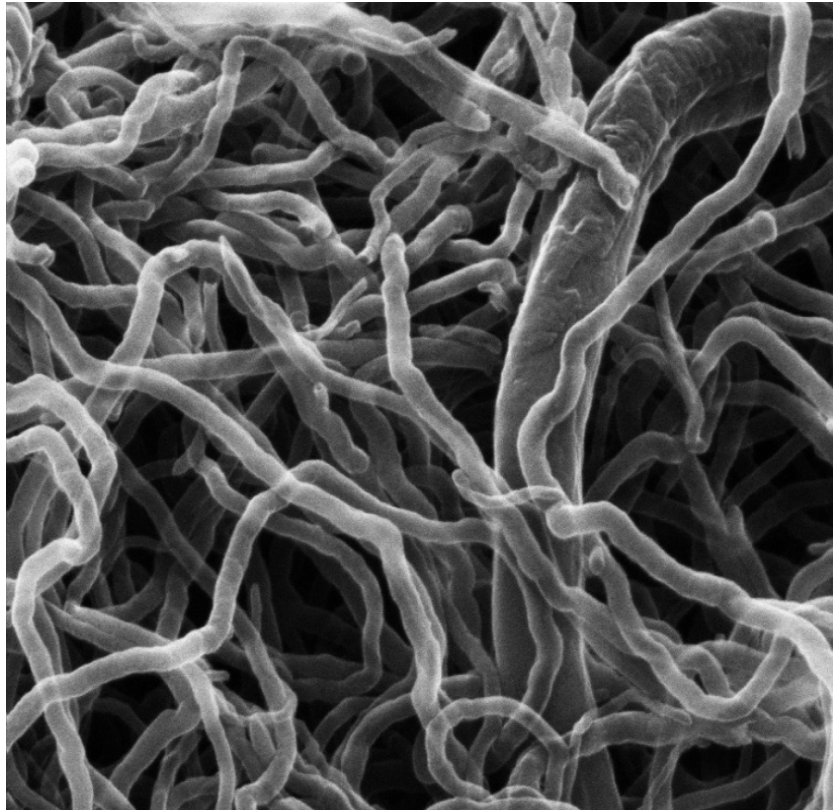


# Primary Market – CNT in Concrete



- **CNT Concrete - 0.5 % CNT : 99.5% cement /tonne concrete**
  - **< 30% increase in compressive strength of cement**
  - **< 14% increase in tensile strength of cement**
- **Product - CNT enriched liquid admixture-** added during batching
- **Benefits - stronger, tougher concrete**
  - **less concrete / steel re-enforcing needed**
  - **reduced building costs/ greater design flexibility**
- **Global Application - road and bridges, high rise buildings**

# CNT in Fresh Cement Paste



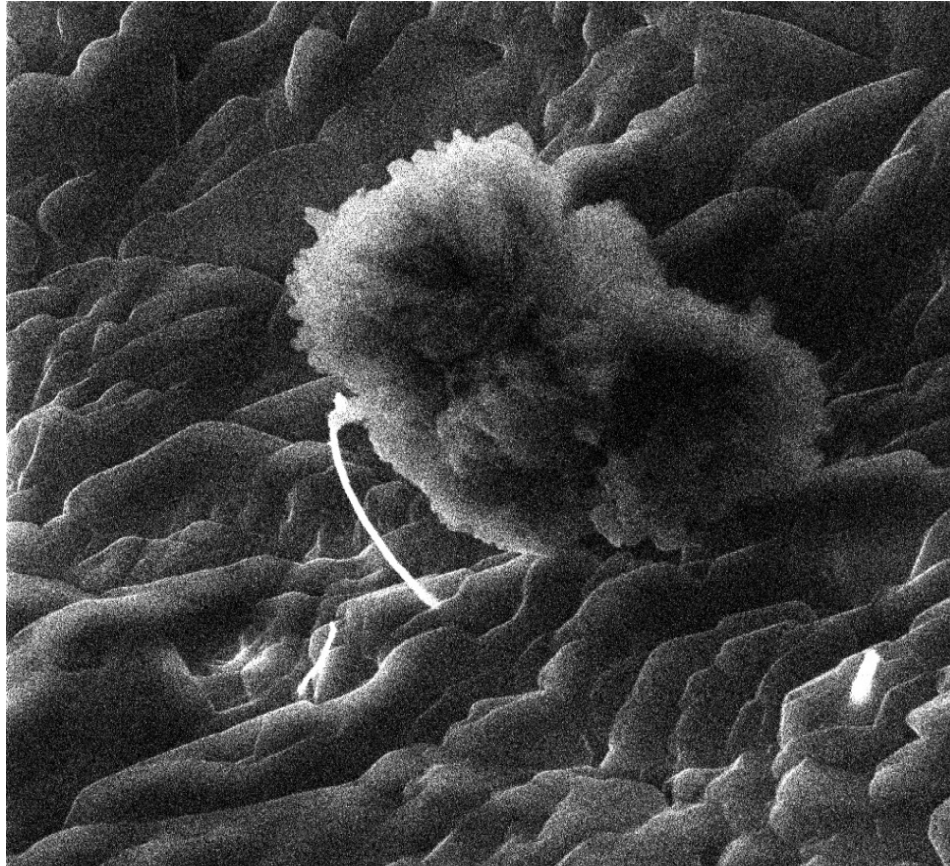
ZEISS CARL ZEISS SMT	Field Of View 1.50 $\mu\text{m}$	200.00 nm	Dwell Time 3.0 $\mu\text{s}$	Date: 2/16/2012 Time: 3:10 PM
	Working Dist 11.9 mm	Acceleration V 29.8 kV	Mag (4x5 Polaroid) 76,200.00 X	Blanker Current 0.5 pA

Monash University Helium Ion Microscope Image

**Build-up of dense, hydrated cement on surface of CNT** (top right)

- **CNT provide:**
  - nucleation points for cement hydration
  - nano-scale fibre re-enforcement.
- **CNT facilitate denser, stronger and potentially more durable concrete.**
- **Other larger-scale fibres provide only nano-scale fibre reinforcement.**

# CNT in Fractured Hardened Cement Paste



**CNT bonded in hardened cement paste after fracturing**

Note: ends of CNTs are well-bonded within cement gel and provide anchorage

ZEISS CARL ZEISS SMT	Field Of View 3.50 um	500.00 nm	Dwell Time 10.0 us	Date: 2/20/2012 Time: 3:57 PM
	Working Dist 11.1 mm	Acceleration V 29.8 kV	Mag (4x5 Polaroid) 32,161.91 X	Blanker Current 0.4 pA

**Monash University Helium Ion Microscope Image**

# Primary Market - CNT in Concrete



- **Global concrete/ cement market- US\$450 billion/year**
  - **Approx. 1 tonne of concrete** produced annually for every person on Earth
  - **Cement production creates 5% of annual global GHG emissions**
  - **CNT concrete could reduce cement requirements by >15-30%**
- **USA - initial target market**
  - **700 million tonnes/year** of concrete
  - **89,000kms of concrete paved roads and 340,000 concrete bridges**
  - **US\$40 billion annual infrastructure maintenance cost**

# Future Large Scale CNT Production



- **1,000 tonnes p.a. CNT capacity reactor- \$50million capital cost**
  - **sufficient for > 1.7 million tonnes concrete** -7% of Australian market
- **10,000 tonnes p.a. CNT capacity -Natural Gas Fired Power Stations**
  - **500MW station** uses >100,000 tpa of natural gas (NG)
  - **10,000 tonnes CNT:** needs 5% of total NG; enough for 70% of Aust. concrete
  - **H2 by-product -3,333 tonnes-** used in power production
- **10,000 tonnes p.a. CNT capacity -Fertiliser Plants**
  - **CH4 used to produce H2** for ammonia production- CO2 by product
  - **10,000 tonnes CNT produces 3,333 tonnes H2**
- **CO2 reduction < 36,000 tpa** in both cases



# Challenges and Marketing Plans



## Challenges

- **Extension of shelf life of admixture** development underway
- **OH&S concerns resolved**
  - CNT in low concentrations (< 0.5%) in liquid admixture
  - CNT used in low concentrations and is firmly bonded with cement

## Marketing Plans

- **Global manufacturers planned for CNT admixture** production /marketing
- **Global concrete company interest-** initial Australian trials planned in 2015
- **US Trials to commence in 2014** -initial target roads/ bridges
- **Planned US commercial rollout in 2016**

## Hythane<sup>®</sup> - the transitional fuel

$H_2 + CH_4 \rightarrow$   
Hythane      *Significantly lower pollution / Higher efficiency*

- **Premium blend of Natural Gas**

- 5-7%  $H_2$  (by energy); 20%  $H_2$  (by volume)

- Ultra-low emissions – 50%  $NO_x$  /CO - approx 15 tonnes/year  $CO_2$  savings per bus
- High efficiency - 10-15% increase in efficiency with suitable engines
- Low engine cost - only software changes to suitable engines
- Anticipated Hythane<sup>®</sup> sale price  $\approx$  10% more than natural gas
- Tested over 15 years – adopted in Indian Hydrogen Roadmap



## Hythane<sup>®</sup> in India

- Extreme air pollution – Govt push to reduce pollution
- 2006 Indian hydrogen roadmap - proposes HCNG as transitional fuel
- Cost of natural gas – historically cheaper (per GGE) than diesel
- Increasing supply of natural gas
- National rollout of pipelines and Gas distribution networks
- 2009 First Public Hythane<sup>®</sup> station – Delhi - built by Eden
- 2014- Change in Indian Federal Government- emerging support for Hythane<sup>®</sup>
- Target- to promote Hythane<sup>®</sup> when low cost hydrogen available from pyrolysis

# Hythane<sup>®</sup>



## First Indian Hythane<sup>®</sup> Station Delhi January 2009



# UK Gas Asset Overview



- **Conditional contract to sell for cash and shares**
- **Large UK landholding** – 50% interest in 13 licences
- 1,200km<sup>2</sup> approx— South Wales, Bristol and Kent
- **Shale Gas Resource** (Source: RPS Dallas independent expert report)
  - GIIP P50 = 49.8 tcf (Gross) : Eden 24.9 tcf (Net)
  - Prospective Recoverable Resource P50 = 18.3 tcf (Gross) : Eden 9.2 tcf (net)
- **CBM Resource** (Source: RISC independent expert report)
  - Prospective Resource P50 = 3.1 tcf (Gross) : Eden 1.4 tcf (net)
  - Contingent Resource South Wales 2C = 980 bcf (Gross) : **Adamo 332 bcf (net)**

Tcf (net Eden)	GIIP (P50)	2C	3C	Prospective Resource (P50)
CBM	3.2	0.3	0.5	1.4
Shale Gas	24.9			9.2



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## Disclaimer – Forward-looking Statements and Projections

Whilst reasonable care has been taken in compiling the forward projections in this presentation, they necessarily are based on many assumptions and factors that are beyond the control of the company and accordingly there is no representation or warranty given that these projections will be achieved. There are many uncertain market and exploration risk factors on all the projects, particularly related to new markets and products such as carbon nanotubes and fibres and energy projects including the coal bed methane, shale gas, natural gas and geothermal projects, all of which are at very early stages of development. On the technology projects, the risks are varied, including risk that patent applications will not be granted, or another party may claim priority or that other methods of producing better and cheaper alternative products will be developed and that projected prices will not be achievable. In the Indian market, there are many risks which are beyond the control of the company and which could significantly impact on both the prices that are achieved, the sales turnover and the production and operating costs. These risks include delays in the availability of the Natural Gas in India, increases in the price of Natural Gas, reduction in the price of alternate fuels such as diesel, changes in Indian Government or Indian Supreme Court policies and rulings, market competition, shortages and cost increases in raw materials and labour, political or economic instability, problems with reliability of equipment produced and sold, warranty claims, currency fluctuations, restrictions on foreign investment, disputes with potential joint venturers, market resistance to the products or services offered, lack of available capital or finance, restrictions on international travel and similar factors beyond the control of the company. For these reasons, all potential investors and others must satisfy themselves on the reliability of these forward looking projections before acting upon any information provided to them in relation to forward looking projections, and neither the company nor any of its officers make any representations, warranties or commitments that these or any other forward projections will necessarily be achieved.