



## **ASX Quarterly Report**

### **For the Period Ended 30 September 2013**

## **HIGHLIGHTS**

### **Optiblend™ Dual Fuel Project**

- During the quarter, orders were received in USA for a total of nineteen Optiblend™ systems, having an aggregate value of US\$498,000, continuing the increasing sales trend.
- During the quarter, orders for two Optiblend™ systems with a total value of approximately A\$60,000 were received in India, including a maiden order to supply an Optiblend™ system in Bangladesh.

### **UK Gas Assets**

- Eden executed a conditional reinstatement agreement with Shale Energy Plc (“Shale Energy”) for the sale of its entire UK coal seam methane and shale gas portfolio for £11.467million (approximately A\$19.3million) being an increased price compared to the previous conditional agreement signed in May 2013 and terminated in August 2013.
- Eden completed a share placement to Shale Energy raising approximately \$410,000.

### **Pyrolysis Project - Carbon Nanotubes/ Carbon Nanofibres/ Hydrogen**

- The previously announced collaboration project between Eden and the University of Queensland (“UQ”), which was awarded a \$255,000 grant by the Australian Research Council (“ARC”) to fund research into methods for production of super high strength, low weight carbon nanotube (“CNT”) reinforced polymer composites (for potential automotive and aerospace applications) has been delayed due to the principal researcher taking a position at an overseas university. A new principal researcher has been secured and approval for this change from the ARC is currently awaited.

### **Corporate**

- Eden completed a \$1.04m non-renounceable pro-rata rights offer to shareholders
- During the quarter Eden settled all its claims against Engenco Ltd (“Engenco”) (formerly named “Coote industrial Ltd”) and its subsidiary Drivetrain USA Inc and also the counterclaim by Engenco against Eden for the sum of \$800,000 (which has since been received from Engenco) arising out of the sale in 2008 of certain hydrogen assets of Eden in USA.

# DETAILS

## 1 OPTIBLEND™ DUAL FUEL SYSTEM (EDEN 100%)

### *US Optiblend™ Progress*

During the quarter, Hythane Company, Eden's wholly owned US subsidiary, received orders in the USA for a total of nineteen OptiBlend™ systems, having an aggregate value of US\$498,000. The nineteen OptiBlend™ systems sold in the US during the quarter represent more than 32% of all OptiBlend™ systems that Eden has now sold in USA since its first sale in November 2009, and confirm both the market acceptance and strong sales growth trend that is being experienced in the US for the OptiBlend™ systems.

All these nineteen orders for OptiBlend™ systems were for use in the shale gas exploration industry.

The US dual fuel market is continuing to grow and Hythane Company is actively expanding both the number and geographic coverage of its OptiBlend™ distributors in the US, which in due course is anticipated to result in increased future sales.

In addition to the expanding US market, Eden has now also sold OptiBlend™ systems into two South American countries and has quoted on possible sales into both Mexico and Canada.

### *Indian Optiblend™ Progress*

During the quarter, Eden Energy India received two new orders for Optiblend™ systems including the first order for a system in Bangladesh. These two orders were for an aggregate amount of approximately A\$60,000.

Over the past eighteen months, the market in India for the OptiBlend™ systems has slowed due to a number of factors including:

- delays in the rollout of the necessary natural gas pipeline distribution network;
- shortages of supply of natural gas; and
- the price of natural gas continuing to increase and the government partially reversing its earlier decision to progressively increase the price of diesel fuel.

However, should these problems be overcome and should shale gas exploration (which is apparently being supported by the government) commence, not only will this generate possible sales into the shale gas exploration industry in the short term, but the prospect of lower priced natural gas would produce a very large market in India for the OptiBlend™ dual fuel systems.

### *Optiblend™ Background*

Eden has developed an efficient dual fuel system that is capable of operating on diesel engines and displacing up to 70% of the diesel fuel with natural gas. If Hythane™ (hydrogen enriched natural gas) is used in place of natural gas, the displacement of diesel fuel could be as high as 80%. The use of the natural gas will greatly reduce greenhouse gas emissions and, in places where natural gas is cheaper than diesel, will also reduce fuel costs. It has significant market potential particularly in the diesel powered generator set ("genset") market.

As lower priced natural gas, which is much cleaner than diesel, becomes more widely available, a large market in both USA and India for the conversion of these diesel engines to operate on a dual-fuel system of both natural gas and diesel is anticipated. Depending upon the size of the engine and

the number of hours per day that it operates, payback times for the conversions are often less than 12 months, so the cost is minimal compared to the replacement cost of a natural gas generator.

## 2 UK GAS PROJECT

During the quarter Eden executed a conditional agreement with UK unlisted public company Shale Energy PLC (“Shale Energy”) to reinstate, on revised and improved terms, an earlier agreement (which was terminated in August 2013 due to failure of a condition to be satisfied) to sell its entire UK coal seam methane and shale gas portfolio to Shale Energy at a price of up to £11.467million (approx.A\$19.3million based on the prevailing exchange rate on 16 September 2013).

Shale Energy has also taken a placement of 37,349,416 shares in Eden for the AUD equivalent of £244,000 (A\$410,843) at an issue price of 1.1 cents per share.

### *The Key Terms of the Reinstated Sale Agreement*

1. The total consideration of up to £11.467million (approximately A\$19.3million) payable by Shale Energy will be satisfied as follows:
  - 1.1. A non-refundable deposit of £56,000 (approx. A\$94,300) has been paid to Eden. This deposit will not be refundable even if the new agreement fails to Complete.
  - 1.2. At Completion of the sale, Shale Energy will:
    - (i) pay a further cash payment of £1.1million (approx. A\$1.879m), and
    - (ii) issue to Eden such number of fully paid ordinary shares in Shale Energy having an approximate value of £7,061,000 as will represent 29.85472% of the total issued capital of Shale Energy (after the acquisition of Eden’s UK gas assets and the completion of a capital raising of £7million), and
  - 1.3. Eden is also entitled to receive a further £3.25m worth of ordinary shares in Shale Energy in two equal tranches of £1,625,000 to be issued on achievement of the following milestones:
    - (i) firstly, when the independently verified best estimate of recoverable gas (2C) in Eden’s UK Licence Interests reaches 1.5 trillion cubic feet (TCF); and
    - (ii) secondly when the independently verified best estimate of recoverable gas (2C) in Eden’s UK Licence Interests reaches 2 trillion cubic feet (TCF).

On each occasion these payments shall so far as possible be satisfied by the issuance to Eden of additional shares in Shale Energy at the moving average market share price of the Shale Energy shares over the previous 30 days.

If Shale Energy shares are not listed on AIM, the price will be determined by Shale Energy’s auditors.

If either such issue would result in Eden’s shareholding exceeding 29.9% of the then total issued capital of Shale Energy, the number of shares to be issued on such occasion shall be restricted to maintain Eden’s shareholding at 29.9% and the balance of the consideration shall be paid in cash. These additional shares shall on each occasion be subject to a lock in period of 3 months or such other period as AIM may require.
2. Shale Energy shall pay any value added tax (VAT) payable on the transaction.
3. The new agreement is subject to a number of Conditions Precedent (most of which were included in the original agreement and were satisfied at that time) including:
  - 3.1 the completion by Shale Energy of the £7m capital raising; and
  - 3.2 Eden shareholder approval being obtained, if required by the ASX. Shareholder approval for the original agreement was obtained.
4. Subject to satisfaction of the Conditions Precedent, Completion shall take place:
  - 14 days after the Purchase Agreement is executed by all parties; or

- 30 days after satisfaction of all of the conditions precedent, whichever is the later, with the latest date for Completion being 22 November 2013.
- 5. The remainder of the terms of the reinstated agreement shall be the same as in the original agreement as announced to ASX by Eden on 29 May 2013.
- 6. The purchasing entity will be Shale Acquisition Ltd (“Shale Acquisition”), a wholly owned subsidiary of Shale Energy.
- 7. Shale Energy also agreed to subscribe the sum of £244,000 for the issue of new ordinary shares in Eden (for additional working capital) to be issued at A\$0.011 (1.1 cents) per share. The actual amount in Australian dollars received by Eden in Australian dollars was A\$410,843.58, which resulted in Shale Energy being issued with 37,349,416 shares in Eden. These shares will be subject to a voluntary 12 months escrow period to be implemented in accordance with the ASX listing rules.

### ***The UK Gas Project Sale Assets***

The sale assets comprise Eden’s 50% joint venture interests in 17 Petroleum and Development Licences (PEDLs) in England and South Wales and its 100% interest in one further PEDL in South Wales (“Eden’s UK Licence Interests”)

As announced by Eden to the ASX on 30 May 2011, independent experts (RPS in relation to shale gas and RISC in relation to coal seam methane) had reported that these licences have the potential to contain significant quantities of hydrocarbons. More specifically, that announcement reported that:

- **RPS in relation to the shale gas had reported:**
  - unrisks P90 Resource Volumes of Shale Gas in the Numurian Measures on 7 Petroleum Exploration and Development Licences (PEDLs) in South Wales in which Eden holds a 50% interest (covering a prospective area of 806 square kilometres) of:
    - Volume of Gas Initially in Place (GIIP) – 34.198 TCF (Eden’s share -17.099 TCF)
    - Recoverable Volume – 12.799 TCF of gas (Eden’s share – 6.349 TCF); and
- **RISC in relation to coal seam methane had reported that:**
  - the estimated Gross Contingent Resources of Coal Bed Methane contained in the 10 PEDLs in South Wales (covering a prospective area of 247 square kilometres) in which Eden holds an interest are:
    - a 1C to 3C range of 687-1,363 BCF with a 2C estimate of 980 BCF , and
    - that the estimated Gross unrisks Prospective Resource of Coal Bed Methane contained in the 17 PEDLs in South Wales, Kent and Bristol Somerset (covering a prospective area of 1068 square kilometres) in which Eden holds an interest are:

a low to high estimate of 1,903-4,990 BCF with a best estimate of 3,088 BCF.

## **3 NANO-CARBON, HYDROGEN and HYTHANE™**

### **Pyrolysis Project (Eden 100%)**

#### ***Market progress***

During the quarter, although small scale sales of carbon nanotubes (CNTs) are periodically occurring, Eden and its US subsidiary continued its efforts to develop suitable large scale commercial markets for its nano-carbon products. Eden continued to focus on developing a number

of collaborations with groups and universities with the requisite skills to assist in developing commercial applications of the CNTs.

### ***CNT Enriched Polymers and Plastics Project in Australia***

The previously announced collaboration project between Eden and the chemical engineering department of the University of Queensland (“UQ”), which was awarded a \$255,000 grant by the Australian Research Council (“ARC”) to fund research into development of a methods for production of super high strength, low weight carbon nanotube (“CNT”) reinforced polymer composites for potential automotive and aerospace applications has been delayed due to the principal researcher taking a position at an overseas university. A new principal researcher has been secured and approval for this change from the Australian Research Council is currently awaited.

This collaboration project follows preliminary encouraging results from the addition of carbon nanotubes into polypropylene.

### ***CNT Enriched Concrete and Cement Projects in Australia and USA***

#### **Australia**

Eden had negotiated an agreement with Monash University for the joint development of a process to combine carbon nanotubes / carbon nanofibres with cement and concrete to produce a high strength concrete suitable for high rise building applications. This agreement was conditional on receiving financial assistance from the Australian Federal Government.

This follows preliminary encouraging work by the university using Eden’s carbon nanotubes that has achieved increases in compressive strength of up to 30% with the addition of small quantities of carbon nanotubes. Early indications are that the process should only add a relatively small additional amount to the cost of producing concrete

Although Eden was earlier invited to submit an application for an Australian Federal Government Clean Technology Innovation Grant for financial assistance for this project, following the change of the Australian Federal Government in September 2013, this Clean Technology Innovation Grant Programme has been terminated, and Eden now intends to apply with Monash for an Australian Research council Grant to fund a portion of the costs of this research project. If this application is successful and the project proceeds, it is anticipated it will take 30-36 months to complete.

#### **USA**

Eden continued its work with a US group testing a product developed by Eden to create harder, high strength carbon-enriched concrete for applications such as pavements and bridge decking, which are often damaged by scraping by snow ploughs during the winter period. Encouraging preliminary tests by Eden have indicated increases of up to 21% in compressive strength in cement paste, but to date these results have not been duplicated in concrete.

However, as Monash University has independently developed a different process, using carbon nanotubes produced and supplied by Eden, that have resulted in an increase in compressive strength of cement paste of up to 30% when the carbon nanotubes were added, Eden is currently negotiating an exclusive licence agreement for the right to use this technology, which if it proves successful, Eden will seek to commercially trial in the US in the next few months.

Eden anticipates that if successful, the collaborations with these groups in both Australia and USA could lead to the development and marketing of suitable commercial products for its nanocarbon. If successful results are obtained, and early commercial trials support these outcomes, Eden may achieve its objectives of developing a commercial product for limited applications within the next 12

months, and to complete the development for wider scale applications within the next 2-3 years, opening up a potentially very large global market for its nano-carbon products over the next few years.

### **Background**

Eden remains optimistic that it will develop suitable markets for the nano-carbon products that it can produce in an efficient, commercially competitive production process. Eden currently has established production capabilities at its subsidiary in Colorado that enable it to produce up to 40 tonnes of nano-carbon per year from a feedstock of natural gas (methane).

Additionally, the only other major by-product from Eden's pyrolysis process is hydrogen, the real cost of which will be dependent upon the value of the carbon produced. The quantity of hydrogen produced will be 33.33% (by weight) of the quantity of carbon produced.

This hydrogen can be used either to help fuel the pyrolysis reactor or captured and fed into the various hydrogen/Hythane™ applications that Eden has been developing, to try and accelerate the commercial rollout of these hydrogen applications based on the relatively low cost hydrogen. The current cost of hydrogen is one of the major limiting factors holding back a broader rollout of hydrogen and Hythane™. Encouragingly, the hydrogen produced using the Eden pyrolysis process will generate only a relatively very small amount of greenhouse gas as a by-product compared with most other currently available methods of hydrogen production, and in consequence it is projected that the hydrogen is likely to be both commercially competitive and environmentally preferable.

### **Hythane™**

#### **Indian Hythane™ Projects**

##### ***Delhi and Gujarat Hythane™ Bus Demonstration Projects***

During the quarter, no progress on either of these two projects was achieved. A previously announced possible new Hythane™ bus project in Gujarat involving the use of biogas as the source of the methane did not eventuate.

If commercial hydrogen production, using Eden's new pyrolysis process is available and the nano-carbon can be sold, it would greatly increase the chances of developing a large Hythane™ market in India as the cost of the hydrogen can be underpinned by the value of the carbon that is produced.

Despite no significant progress having been made on any of these Indian Hythane™ projects during the past two years, there remain signs of an increased level of interest both from ongoing Hythane engine development programmes and also activities by the Indian Government affirming its intention to proceed with its hydrogen projects. Eden remains hopeful that these projects will ultimately proceed particularly if Eden can utilise low cost hydrogen produced as a by-product from its pyrolysis project to produce carbon nanotubes and nanofibres, and Eden will continue to follow up on these projects as they emerge.

## **4 CORPORATE AND FINANCIAL MATTERS**

### ***Settlement of Claims against Engenco Ltd***

During the quarter Eden settled all its claims against Engenco Ltd ('Engenco') (formerly named "Coote industrial Ltd") and its subsidiary Drivetrain USA Inc and also the counterclaim by Engenco against Eden arising out of the sale in 2008 of certain hydrogen assets of Eden in USA.

Under the terms of the settlement Engenco paid to Eden \$800,000 in full satisfaction of all claims by Eden, and Engenco has in turn abandoned all counterclaims against Eden.

The claims by Eden which were settled, were for payment to Eden of the balance of the purchase price (\$680,000) still owing from the sale of the shares in Hyradix and Eden Cryogenics in 2008, plus interest and also for the obligation to supply a hydrogen reformer.

### ***Non-renounceable Pro-Rata Rights Issue Completed***

During the quarter Eden completed a non-renounceable pro-rata rights offer to Eden's shareholders of one (1) fully paid ordinary Eden share for every six (6) fully paid ordinary shares held, at a price of \$0.01 (one cent) per share, which raised a total of A\$1.04 million. .

### ***La Jolla Cove Investors LLC (LJCI)***

In June 2012, in consequence of conduct alleged by Eden to be repudiation by LJCI, Eden terminated the Funding Agreement pursuant to which LJCI was advancing money to Eden. Subsequently, LJCI also purported to terminate the Funding Agreement, such that it is common ground that the Funding Agreement had been terminated. As a result of the termination, no further draw-downs under the Funding Agreement have been or will be made, and similarly Eden believed that LJCI cannot convert any more money that may be owed to it by Eden to shares under the terms of the Funding Agreement.

Having obtained legal advice, Eden denied any obligations to repay the unconverted balance of the funds advanced to Eden by LJCI before the facility was terminated (US\$536,039) due to the repudiation by LJCI of the Funding Agreement. LJCI in turn instituted proceedings to recover what it claims it is entitled to (including alleged loss of profits) and Eden is defending this claim.

Negotiations between the parties in relation to settlement of this litigation are at an advanced stage, and details will be announced upon completion of these negotiations.

As at the date of this report, LJCI holds no shares in Eden, having sold all the shares that were previously issued to it under the facility.



**Gregory H Solomon**

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