

# ASX Quarterly Report For the Quarter Ended 30 September 2018

# **SALES DURING THE QUARTER**

	30 Sep 2018 \$000's	30 Sep 2017 \$000's	% Change
EdenCrete® Sales	403	121	+233%
OptiBlend® Sales	65	268	-76%
Total Sales	468	389	+20%

# **HIGHLIGHTS**

# EdenCrete®

#### GEORGIA

#### > GEORGIA DEPARTMENT OF TRANSPORTATION (GDOT)

- First Federal/State Funded Repair Project Commences US\$525,000 worth of EdenCrete® required.
  - Total value of this project is approx. US\$525,000.
  - Two tanker loads of EdenCrete® already delivered to Georgia. Project now 25% completed - likely finish in 2018.
  - EdenCrete® produced between 26% -107% higher compressive strength than the control mix tested after 11 hours, 24 hours and 72 hours curing.
- State Funded Repair Projects FY Ended 30 June 2018 four highway repair projects worth US\$133,000 completed in quarter
- State and Federal Repair Projects FY Ended 30 June 2019 GDOT State and Federal funded highway repair projects for the 2018-2019 financial year using EdenCrete® likely to be known over the next few months- potential for significant number of projects. Discussions with GDOT have commenced.

#### > METROPOLITAN ATLANTA RAPID TRANSIT AUTHORITY (MARTA)

- MARTA Whitepaper detailed excellent performance over 2 years from 2016 field trial – highly encouraging conclusions endorsing use of EdenCrete®
- Discussions scheduled with MARTA about specifications and possible future projects for EdenCrete®

#### > GEORGIA COMMERCIAL SALES AND TRIALS

- Warehouse Project completed EdenCrete® worth US\$22,500 supplied for a concrete slab for a major US tractor manufacturer.
- Further Warehouse Projects being discussed with same contractor
- Encouraging trials with Georgia ready-mix concrete company for possible infrastructure and coastal and marine applications.

#### > GEORGIA LAND ACQUISITION FOR PRODUCTION EXPANSION

- o **31ha (66.6acres) of strategic industrial land** acquired for US\$1.2million.
- Saves several million dollars in costs and 9-12 months of development time compared with the original, proposed undeveloped site.
- o **22 months lease of portion of the land signed** rent of US\$55,000 already paid.

#### COLORADO

- o Commercial trials of EdenCrete® ready mix concrete mix commence
- EdenCrete® Shotcrete Mix Application for CDOT approval submitted by a ready mix concrete supplier for use in CDOT's "Central 70" project
- Vail Resorts Phase 2 of snow-cat abrasion trial installed
- o Bureau of Reclamation- internal testing in preparation for 2019 Test Program
- Bulk Road tanker acquired to deliver EdenCrete®
- NORTH CAROLINA DOT EdenCrete® bridge trial work completed in August
- IDAHO DOT concrete road slab replacement trial of EdenCrete®
- KOREA
  - o Testing program underway with Korean precast manufacturer

#### AUSTRALIA AND NEW ZEALAND

Parchem appointed Australian and New Zealand EdenCrete<sup>®</sup> distributor

# EdenPlast®

- o Encouraging progress towards commercialisation master batch developed
- Second patent application being drafted

# OptiBlend®

 Sales worth A\$64,728 were finalised and orders worth A\$251,575 were received during the quarter, including order for four units from Bosch worth a total of A\$142,800

# Hydrogen

 Interest in Eden's various hydrogen technologies starting to re-emerge in India, Australia and Europe

# **DETAILS**

## **SALES**

**EdenCrete®** - during the quarter, sales (US\$403,000) increased significantly compared to the September quarter last year (US\$121,000), and included the first tanker load of EdenCrete® that was delivered for the Twiggs County Federal Highway Project.

**OptiBlend®**- Two units were sold in India and 1 unit sold in the US during the quarter for a total approx. value of A\$64,728. Orders were received for approx. A\$251,575 worth of OptiBlend® units, the majority of which are anticipated to be invoiced in the December quarter. These orders included one order from Bosch Limited in India for four dual fuel units having a total invoice sum of approx. A\$144,359.

# **EDENCRETE®**

The progress achieved during the Quarter is detailed below.

#### **GEORGIA INFRASTRUCTURE**

#### First GDOT Federally Funded Repair Project

The first order for the supply of EdenCrete® for a joint GDOT/ Federal Highway Administration project that included a number of additional performance requirements, for a repair project on the interstate Highway I-16 in Twiggs County, Georgia was received during the quarter. The first tanker load of EdenCrete® was then delivered to Georgia and work commenced before the end of the quarter. Subsequent to the end of the quarter a second truckload was delivered and Eden was advised that pour rates could possibly increase to 250 cubic yards per day with a 5-day work week.

The project that will require US\$525,000 of EdenCrete® is now approximately 25% completed and is targeted to be finished before the end of 2018.

Encouragingly, in all the test work that has been carried out to date (one test still remains outstanding after the concrete has cured for a longer period) the EdenCrete® enriched concrete has exceeded the minimum standards that were required and has significantly outperformed the same mix that was trialled without EdenCrete®. EdenCrete® delivered between 26% and 107% higher compressive strength than the control mix in the three tests, that were conducted after 11 hours, 24 hours and 72 hours respectively.

# GDOT - Repair Projects - Year Ending 30 June 2019

The GDOT highway repair projects for the 2018-2019 financial year that will include EdenCrete® are anticipated to become clearer over the next few months. A forecast list has been published of all proposed GDOT repair and maintenance projects for the period from August 2018 - June 2020, listing over 50 projects with a total estimated cost estimated at more than US\$170 million.

These projects include both Federal funded projects and State funded projects. It is not yet known how many projects will involve the use of EdenCrete®, but Eden remains hopeful that it

will be included in all State funded projects and at least some of the much larger Federal funded projects. Preliminary discussions with GDOT in relation to these matters have commenced.

The best available approximation of the possible value of EdenCrete® that may be required for any project, based upon the actual tendered prices for the Twiggs County Federal funded project that is presently underway, is that the cost of the EdenCrete® may amount to between 4-5% of total project cost.

# **Metropolitan Atlanta Rapid Transit Authority (Marta)**

During the quarter, the initial draft of the MARTA Whitepaper that evaluated the performance over 2 years of EdenCrete® in a field trial that commenced in May 2016, was revised. In October 2018, the final conclusions were signed off by the parties and the Whitepaper, including highly encouraging conclusions endorsing use of EdenCrete® was signed and released to the public (see announcement ASX: EDE 18 October 2018).

#### The conclusions from the MARTA Whitepaper were:

"The results of lab testing indicate the inclusion of EdenCrete® will provide a significant extension of service life to the concrete. MARTA's use of EdenCrete® is anticipated to extend the service life and reduce the frequency of maintenance projects to keep the parking areas in service. Progressive site visits over the course of 2 years in-service show the EdenCrete® sections outperforming the adjacent sections of standard concrete. The surface of the reference is abrading significantly more irregularly, and rapidly, than the surface of the slabs containing EdenCrete®.

Over time, the reduced maintenance schedule and longer service life before needing replacement will outweigh any upfront cost of EdenCrete®. Testing also indicates that dosages of EdenCrete® below 3 gal./yd.³ of concrete (used in the Brady evaluation) will perform successfully in a similar environment. Lower dosages of EdenCrete® around 1.0 to 1.5 gal./yd.³ are anticipated to perform successfully for MARTA, while providing a savings beyond that which was trialled at the Brady facility in 2016.

MARTA chose to undertake this evaluation based on the success GDOT has had with EdenCrete® to date. According to David Springstead, responsible for MARTA AGM Capital Programs & Development:

"With GDOT's specification of EdenCrete in mix design, MARTA will look to incorporate EdenCrete in both design criteria and specifications as a viable value-added option."

The implementation of EdenCrete® into projects or applications deemed appropriate by MARTA will provide savings by reducing the life cycle cost of the concrete and reducing the frequency of disruptive maintenance projects which affect both operations and the revenue stream.

Transit departments across the nation are encouraged to contact MARTA and Eden Innovations personnel listed below with any questions regarding the use of EdenCrete® and how it can improve concrete applications across the spectrum of use."

Discussions between Eden personnel and senior MARTA engineers concerning specifications and possible future projects for EdenCrete<sup>®</sup>, are currently being arranged, and are hoped will lead to EdenCrete<sup>®</sup> being used in suitable forthcoming MARTA projects.

#### Georgia Commercial EdenCrete® Sales

During the quarter EdenCrete® worth US\$22,500 was supplied for a large concrete slab that was required for a plant being built in Georgia for a U.S. tractor manufacturer. The contractor undertaking the project had previously done a number of similar projects in Georgia in which EdenCrete® had been used, and over a period of time had seen the significantly enhanced performance benefits that it delivered, and recommended to the owner of the new project that

EdenCrete® should be included. This occurred and the owner and the contractor were happy with the results.

In consequence, trials are now being discussed with same contractor for the use of EdenCrete® in a forthcoming project in the south east of the US that will involve the building a similar plant for an international tyre manufacturer that has a number of plants or warehouses in the U.S.

#### **Georgia Trials**

On-going trials that are achieving positive results are being undertaken by Eden in conjunction with a large Georgia based ready-mix concrete company that operates in a number of States, developing a number of suitable EdenCrete® concrete mixes that could become the company's standard mixes that could be suitable for a range of applications including roads, bridges, and coastal and marine applications.

Additionally, bridge and other trials are being planned or discussed with a number of contractors in Georgia and Eden is hopeful will lead to commercial projects in due course.

#### Strategic Land Acquisition in Augusta, Georgia for Future Production

Following completion of a detailed environmental assessment that indicated no serious environmental concerns, Eden has acquired for US\$1.2million, 31ha (66.6 acre) of developed industrial land, strategically located approximately 4 kms from the centre of Augusta, Georgia. Even after the cost of buying the land is considered, it is estimated this will save Eden several million dollars compared with the anticipated total cost of developing the alternative undeveloped land that was previously planned to be acquired.

The near level site which is almost all usable without significant site works, was used as a brick works for many years, and has an existing rail siding, an office building with over 20 rooms, a maintenance shed, large hard-stand areas and all utilities are already connected. It has been estimated it could save up to 9-12 months in development time compared with the original site.

Apart from the free land (worth approximately US\$2.75million) that was previously offered and which will now not be taken, Eden has been advised that the balance of approximately US\$22million out of the original US\$24.75 million incentive package (comprising mainly tax and local government rebates and incentives), offered by both the Georgia Department of Economic Development and the Augusta Economic Development Authority, will still be available.

A lease for a 22 month term to a major utility, over a portion of the land that will not be required during the next two years, has been signed at a monthly rent of US\$2,500, and the lessee has paid the full US\$55,000 rent up front and erected new gates and security fencing. The lessee proposes to store machinery and equipment on the site whilst it undertakes a regional infrastructure project.

#### **COLORADO**

#### Commercial trials of an EdenCrete® ready mix concrete mix commence

During the quarter, Eden completed the development with a Denver based ready mix company of a proprietary concrete mix that incorporates EdenCrete® in place of the welded wire mesh or macro fibres that have previously been used, targeting the building and replacement of concrete driveways. Driveways in Denver very frequently crack, even often in the first year, due to exposure to the many freeze - thaw events (when water freezes into ice and expands, then thaws and returns to water) that Denver experiences in a year. Denver has been reported in some years as experiencing more than 300 freeze - thaw events in a year. When concrete cures,

shrinkage cracks are often formed which then fill with moisture and expand and contract with each freeze-thaw event, propagating the cracks and leading to a breaking up of the concrete.

Since the end of the quarter the first four driveways using the new EdenCrete® mix have been laid (see Figure 1) using only EdenCrete® to combat shrinkage cracking. The performance of the EdenCrete® concrete will be evaluated for possible use in future projects early in November 2018, by when any shrinkage cracking should be evident. To date, no cracking due to drying shrinkage has been observed. The contractors were also happy with how the mix finished, particularly as it did not require the addition of macro fibres.



Figure 1. Two driveways laid with EdenCrete® concrete

#### **Successful EdenCrete® Shotcrete Trials**

Following successful trials of an EdenCrete® shotcrete mix with a Colorado based ready-mix company that has been awarded part of the work in the CDOT Central 70 project, the ready-mix company has submitted the EdenCrete® mix design to CDOT and FHWA regulators for approval for use in the Central 70 project. Central 70 is an infrastructure project being undertaken in Denver involving the reconstruction of 10 miles of the I-70 Interstate Highway, including the sinking of part of the highway and the establishment of a park over the top.

The EdenCrete® shotcrete mix is also intended to be tested in the future for a range of other shotcrete applications including its suitability for tunnels, concrete swimming pools, mining industry applications, slope stability applications, and retaining walls.

#### Vail Resorts

Phase two of the snowcat abrasion trial was completed in September 2018. This trial placed approximately 80 yards<sup>3</sup> of a modified EdenCrete<sup>®</sup> mix in the Vail Ski Resort maintenance yard. The trial is testing abrasion resistance against tracked vehicles and titanium track spikes. The Town of Vail has indicated that if the trials are successful it intends to use EdenCrete<sup>®</sup> on a

section of US Highway 6 where snowcats are used for mountain access as well as for other similar future applications. The results of the trial will be assessed over the next ski season.

## **Bureau of Reclamation 2019 Pozzolanic Concrete Trial**

Eden is continuing to develop mixes that could be suitable for testing as part of the Bureau of Reclamation's (BOR) planned research project in 2019 to evaluate admixtures designed to improve strength in concrete containing raw natural pozzolans.

Eden will test a range of natural pozzolans and is reviewing possible mix design and parameters suitable for reinforced structural mass concrete, which could be used for structures such as dams, and could be relevant to many of the projects that the BOR is likely to be involved in. Natural pozzolans, the main material used in the very long lasting concrete structures that the Romans built, react differently from Portland cement, but with suitable mix designs produce very strong and durable concrete.

#### **BOR Background**

BOR manages water, power plants and canals in the western 17 States in the U.S. and has constructed more than 600 dams and reservoirs including Hoover Dam on the Colorado River and Grand Coulee on the Columbia River. It is the largest wholesaler of water in the U.S. bringing water to more than 31 million people. It provides one out of five Western farmers (140,000) with irrigation water for 10 million acres of farmland that produce 60% of the vegetables and 25% of the fruits and nuts in the U.S. BOR is also the second largest producer of hydroelectric power in the United States. Its 53 power plants annually provide more than 40 billion kilowatt hours generating nearly a billion dollars in power revenues and produce enough electricity to serve 3.5 million homes.

#### Bulk Road tanker acquired to deliver EdenCrete®

During the quarter, Eden acquired a second-hand road tanker (but not including the prime mover) (see Figure 2) to enable it to deliver bulk loads of EdenCrete® without encountering any problems with possible contamination or availability of a suitable tanker when it is required. It has now been used to deliver the first two loads to Georgia for use in the current Twiggs County Federal funded slab replacement project.



Figure 2- Road tanker with first bulk EdenCrete® delivery to Georgia

#### **TEXAS**

Sales of EdenCrete® in Texas have been impacted by two events during the quarter. Firstly, Texas has received a great deal of rain this year and this has slowed concrete production and consumption generally.

Secondly, the precast contractor in Texas using EdenCrete® has experienced technical issues with the low-cementitious content summer mix (using a total of 700lbs cementitious material) and this resulted in the suspension of the day to day usage of EdenCrete®. During the quarter alternative 750 lbs. of cementitious material mixes were developed to overcome this issue, and performed satisfactorily, but to date have not been used. As the weather cools, and it is necessary to further increase the cementitious content, it is hoped that the use of EdenCrete® in the colder weather concrete mix, that has performed well over the past 15 months, will resume.

To manage this issue with the low cementitious mix, seven different samples of cementitious material that represent both north and south Texas production were sent to the Eden's Denver laboratory for evaluation. Further, additional material is still waiting to be sent to Denver for further evaluation as soon as weather permits the gathering the necessary samples of cement and fly ash from the batch plant.

#### **IDAHO DOT TRIAL**

At the request of the Idaho Department of Transport (IDOT), a full depth, concrete slab replacement trial on a roadway in Idaho was undertaken in July 2018 in which a number of slabs were poured using EdenCrete®. At present there is no definite timeline for evaluation by IDOT to define success. IDOT will test that compressive strengths are met. Evaluation will include visual observation of EdenCrete® slabs over a period of time relative to the performance of surrounding slabs placed without EdenCrete®, to assess long-term durability. Eden will also conduct abrasion, split-tensile, and permeability testing.

#### NORTH CAROLINA DOT BRIDGE TRIAL

The work for the bridge trial with the North Carolina Department of Transportation (NCDOT) of EdenCrete® was completed during the quarter.

EdenCrete® was added to half of the items of the bridge that are being repaired including a barrier rail, a bent end and an approach slab, with the other half being made with the reference concrete.

NCDOT will review the test data as it is received and is interested in obtaining more data on long-term durability.

North Carolina is a potentially very large market for EdenCrete<sup>®</sup>. In 2015, in a report on the state of repair of the roads and bridges across all States of the U.S., the Federal Highway Administration reported that of the 18,168 bridges in North Carolina, 5,534 (or 30.5%) were structurally deficient or functionally obsolete<sup>1</sup>.

1. DOT Fact Sheets Highlights Grim State of U.S. Roads and Bridges – 9 July 2015

#### **NEW YORK**

## **EdenCrete®Pz Progress- Successful Truck Trials**

Following encouraging EdenCrete®Pz truck trials of a common commercial pozzolanic mix that has been extensively trialled in Eden's New York laboratory, discussions are continuing, but so far it has not led to commercial sales. Another trial with a different ready mix supplier is

currently being scheduled and is hoped to occur during November 2018. The New York concrete market is very large and uses a significant amount of pozzolanic concrete.

Eden's laboratory trials in New York with this commercial pozzolanic mix that have been going on for more than a year, over the past 6-9 months in particular, frequently produce increases in compressive strength of up to 15%-20%, normally using only a modest dosage of EdenCrete®Pz.

#### **KOREA**

As announced (ASX: EDE 9 July 2918), in July 2018, following successful trials in Colorado using three versions of Korean cement, Eden signed a binding Memorandum of Agreement ("Agreement") with KC Industry Co., Ltd. ("KC") (www.kccond.co.kr), a leading Korean precast concrete manufacturer, to jointly develop EdenCrete® enriched concrete, mortar and grout mix designs for use by KC in the Republic of Korea ("Korea") and elsewhere, to improve their technical performance.

KC, listed on KONEX (Korea Exchange), is a Korean precast concrete group that uses technology and innovation to deliver world-leading products for all sectors of the Korean precast concrete market. It has a research, testing and development capability and has developed a number of patented products, upon which it has built its position as a leader in the Korean precast concrete market with a strong emphasis on infrastructure including bridges, subways, and tunnels.

It services the whole South Korean market, operating its own large pre-cast plant, as well as having five other plants that manufacture for it on a contract basis (using KC's designs and under its quality control) that are spread across Korea. Additionally, KC owns two mobile precast manufacturing plants, with which it has undertaken projects in the Philippines and Vietnam.

In addition to use in pre-cast concrete products, KC intends to also use EdenCrete® in a range of markets including concrete highway pavement construction, repairs and road barriers.

Eden and KC entered into the Agreement to collectively undertake the necessary testing and development (the "Testing and Development") to integrate EdenCrete® into KC's existing precast concrete products as well as to develop other cement based products, including mortars and grouts, that incorporate EdenCrete® for KC to use and market into the wider Korean market.

KC shipped Korean cement, fly ash, and blast furnace slag to Eden's Colorado laboratory and testing was successfully conducted. This was followed by one of Eden's concrete experts flying to Korea to assist KC undertake trials. These trials have produced positive results in the limited testing (compressive and tensile strength) that KC is able to test at its plant.

Many of the precast products produced by KC (architectural columns, beams, slabs, rooftop sculptures, prefabricated culverts, rain & sewage boxes, tunnel segments for railway, roads and power spheres, rainwater storage tanks, and soundproof wall foundations) are installed either outdoors or underground, and are exposed to the extremes of the Korean climate in both winter and summer, as well as frequently being impacted by heavy traffic, the application of chemicals or other harsh conditions.

In order to fully evaluate the potential of EdenCrete® to enhance both the overall durability and other performance characteristics of Korean concrete, KC has engaged a team from Hanyang

University to carry out a wider range of tests using EdenCrete® in various concrete mixes made with Portland cement, blast furnace slag and/or fly ash.

The proposed testing program includes:

- Shrinkage crack resistance
- Freeze- Thaw resistance
- Scaling at freezing temperatures
- Resistance to Chloride ion penetration
- Abrasion resistance,
- Drying shrinkage and
- Enhanced resistance to fire.

It is expected this testing may take up to three months to complete. If the results are positive, it is anticipated that KC will commence using of EdenCrete® in its own operations as well as also seek to be appointed as the distributor of the EdenCrete® range of products in Korea.

#### AUSTRALIA AND NEW ZEALAND EXCLUSIVE DISTRIBUTOR APPOINTED

During the quarter Parchem Construction Supplies Pty Ltd ("Parchem") was appointed as the exclusive Australian and New Zealand distributor of the EdenCrete® range of products.

Parchem has been servicing the Australian construction industry for over 50 years. It is a long-established marketer of a wide range of products that it either manufactures or distributes on behalf of other manufacturers.

These products are sold for use in many facets of the concrete industry in both Australia and New Zealand, supplying contractors operating throughout many markets including infrastructure, buildings, power and mining.

Parchem has a wide geographical footprint with locations across Australia. It covers a broad spectrum of concrete applications. It is currently represented by an extensive Account Management team, focused on supporting customers on-site and providing solutions across its serviced industries. A National Specifications Team provides expertise to Architects, Engineers and Specifiers at multiple stages of projects.

This experienced national sales and marketing network, supported by high level of in-house technical capacity, provides an ideal platform upon which Parchem can promote the EdenCrete® range over the next 3 years in Australia and New Zealand. Teams from both Parchem and Eden have been assembled and the process of moving to towards Parchem starting marketing, which is targeted to occur during the first quarter of 2019, is now underway.

Parchem's infrastructure focus is on bridges, tunnels, maritime, rail, airports, and roads.

Infrastructure Australia has responsibility to strategically audit Australia's nationally significant infrastructure, and develop 15 year rolling infrastructure plans that specify national and state level priorities. Following the release in February 2016 of its Australian Infrastructure Plan\*, a large number of significant new infrastructure projects are now either underway or are being planned across Australia.

These projects represent key market targets for Eden, access to which may in part be assisted by the considerable progress that EdenCrete® has already made, and is continuing to make, in penetrating the huge infrastructure market in the United States of America through the delivery of more durable, longer lasting, stronger, tougher, less permeable concrete.

<sup>\*</sup>http://infrastructureaustralia.gov.au/policy publications/publications/files/Australian\_Infrastructure\_Plan.pdf

#### JOINT RESEARCH PROJECTS

# **High strength CNT enriched concrete**

The three-year research project with Deakin University ("Deakin"), partly funded by an Australian Research Council ("ARC") Linkage Grant, into ultra-high strength carbon nanotube enriched concrete requiring little or even no reinforcing steel, continued during the quarter with ongoing trial work with EdenCrete® enriched concrete.

A paper detailing some of the improvements in performance that have been observed in these trials that is to be published, was presented at a concrete industry conference in Melbourne, and was well received.

# **EdenPlast® / CNT Enriched Polymers and Plastics**

The three-year research project between Eden and the University of Queensland ("UQ") for the development on a new method for producing carbon nanotube ("CNT") enriched thermoplastic composites, and which is partly funded by an Australian Research Council ("ARC") Linkage Grant, continued during the quarter, focussing on bringing this project to commercialisation as soon as possible.

A highlight of the work was that a master-batch of CNT- enriched plastic, containing a high concentration of CNT, was successfully prepared using a novel technique, bringing this project far closer to being ready for commercialisation. Following the lodgement of an earlier patent application, a second patent application in relation to this novel technique is soon to be lodged by Eden.

These two patent applications related to this project could deliver to Eden a significant intellectual property base in this potentially very important and large global market.

# **OptiBlend®**

During the quarter Eden recorded the following Optiblend® sales and orders:

# Optiblend® Sales and Orders for the Quarter

	SALES (A\$)	ORDERS (A\$)
USA	35,468	107,216
INDIA	29,260	144,359*
TOTAL	64,728	251,575

<sup>\*</sup>The Indian sales were all from one order, received from Bosch Ltd, for four dual fuel units.

#### **HYDROGEN**

After a number of years when little external interest has been shown in the range of hydrogen technologies that Eden successfully developed, over the past year interest in these technologies has started to re-emerge.

Whilst focusing heavily on hydrogen related activities between 2004 and 2012, Eden built, and still retains, a strong hydrogen technology base (comprising significant know how, techniques,

designs and eight relevant patents), including Eden's patented pyrolysis process for production of hydrogen and carbon nanotubes/carbon nanofibres from natural gas (without producing carbon dioxide as a by-product), and a patented blender for blending hydrogen and natural gas to create a highly efficient, low emission blend called Hythane® which Eden promoted for a number of years, particularly in India.

During this period, Eden built a hydrogen electrolyser and an operating Hythane® station for Indian Oil near the New Delhi airport (and which was still operating until recently), and developed Hythane® bus engines with Ashok Leyland, the largest Indian bus manufacturer.

Eden was also at that time working on joint ventures with various Indian natural gas suppliers to establish a number of Hythane® bus trials in various parts of India, but interest in hydrogen as a fuel started to wane after 2008, when US policy moved away from hydrogen as a vehicle fuel to electric vehicles. As a result none of these early developments in India progressed beyond the planning stage.

Over the past year however, there has been a growing increase around the world in the level of interest in hydrogen as a fuel, that has resulted in increased interest in Eden's hydrogen technologies, particularly over the past quarter.

In India, due to the extreme air pollution in Delhi, the Indian Supreme Court recently mandated that the 10,000 strong, natural gas fuelled bus fleet in Delhi, be converted to run on a hydrogen based fuel, which in the short term will be focused on converting these buses to operate on Hythane®. This has resulted in a number of enquiries being received by Eden for possible collaboration.

In Australia, the Federal Government has recently allocated funds for research into the production of "clean hydrogen", opening an area of possible interest for Eden for its now commercialised, pyrolysis process that produces, with a very low Greenhouse Gas footprint, both relatively low cost hydrogen and high value carbon nanotubes or carbon nanofibres.

Similarly, interest from Europe has also started to emerge, resulting in enquiries in respect to a number of Eden's hydrogen technologies.

Whilst all the enquiries and developments to date are both early stage and very preliminary, and may well not result in any material outcome, collectively they could perhaps herald an emerging opportunity for Eden to re-focus some attention on its significant body of hydrogen technologies.

# CORPORATE

During the quarter 137,812,232 EDEO options were exercised raising over \$4.13m.

**Gregory H Solomon** 

Executive Chairman

For information, please contact Greg Solomon (+61 8 9282 5889) or visit www.edeninnovations.com