

# **ASX Quarterly Report**

## For the Quarter Ended 31 December 2018

# SALES DURING THE QUARTER & UNFILLED ORDERS

|            | Sales*<br>31 Dec 2018<br>A\$000's | Sales*<br>31 Dec 2017<br>A\$000's | Sales<br>% Change | Unfilled<br>Orders<br>(Approx)<br>31 Dec 2018<br>A\$000's |
|------------|-----------------------------------|-----------------------------------|-------------------|---|
| EdenCrete® | 604                               | 315                               | +92%              | 205   |
| OptiBlend® | 411                               | 154                               | +167%             | -   |
| Total      | 1,015                             | 469                               | +116%             | 205   |

<sup>\*</sup> Invoiced during the quarter.

## **HIGHLIGHTS**

## **EdenCrete®**

### **USA**

#### Georgia

- First Federal funded GDOT highway repair project using EdenCrete® scope extended approx. US\$660,000 worth of EdenCrete® in total now required
- Next Federal funded GDOT repair project intended to include specifications suitable for use of EdenCrete®
- First three GDOT State funded repair projects for 2018-2019 advertised for tender requiring approx. US\$185,000 worth of EdenCrete® in total

#### Colorado

• Increasing commercial and residential sales emerging for use in concrete slabs, driveways, walls, and shotcrete and grout; repeat orders from six Colorado customers

#### **US Trials**

• **Numerous trial programmes** are underway or planned over the next few months in various States with potentially large commercial customers for a range of applications

### **AUSTRALIA AND NEW ZEALAND**

Parchem Distributorship – Testing/training starting - product rollout in late Q1/Q2 2019

#### **KOREA**

• Testing program continuing with Korean precast manufacturer

## **EUROPE**

• Interest received from a large international company and discussions are continuing

# **OptiBlend®**

• Sales worth A\$410,892 were invoiced during the quarter, including sales in India for five units to Bosch worth a total of A\$169,000

# **EdenPlast**<sup>TM</sup>

- The ARC funded research project with University of Queensland continued focusing on moving the production of master batches of CNT enriched plastics towards commercialisation.
- A second patent application was lodged.

# Hydrogen

 Recent interest in Eden's hydrogen technologies continues to grow, with Eden now in discussion with two international companies.

## **DETAILS**

## **EDENCRETE®**

During the quarter, total EdenCrete® sales (A\$604,000) increased significantly as compared to the September quarter last year (A\$315,000), increasing 92% year on year, and additionally orders were on hand at the end of the quarter for approximately a further A\$205,000.

Details of the geographic progress are detailed below.

#### USA

#### GEORGIA INFRASTRUCTURE

### First Federally Funded GDOT Repair Project- Interstate Highway I-16 Twiggs County

Following an increase during the quarter in the scope of this project, (which originally was limited to carrying out major repairs along a particularly troublesome 10miles long section of the I-16 which were estimated to require approximately US\$525,000 worth of EdenCrete®), the expanded project is now estimated to require in total approximately US\$660,000 worth of EdenCrete®.

During the quarter, three further tanker loads (one load was delivered during the September quarter) of EdenCrete® were delivered to Georgia. A fifth tanker load was sent at the start of January 2019, resulting in an aggregate 25,355 US gallons (95,979 litres) of EdenCrete® that have now been delivered for this project. It is anticipated that a further partial tanker load will be required to complete the project, which is likely to occur in late January/early February 2019.

This project is the first joint Georgia Department of Transportation (GDOT) / Federal Highway Administration (FHWA) project in which EdenCrete® has been used. The tender specifications for this project included a number of additional performance requirements for the concrete, all of which EdenCrete® had previously met. Recently completed testing of the EdenCrete®

enriched concrete used on this current project has again confirmed that the addition of EdenCrete® resulted in the concrete exceeding these additional performance requirements.

Whilst EdenCrete® was not named in the tender specifications for this Federal project (although it is named in the standard specifications for State funded highway repair projects in Georgia), the addition of EdenCrete® is considered likely to be the most, or one of the most, cost effective method for the contractors to meet all of these additional performance requirements.

The best available cost/benefit analysis of what EdenCrete® could deliver to future projects, based upon the actual tendered prices for the current Twiggs County Federal funded project, is that the addition of the EdenCrete® may increase the total project cost by between 4-5%.

For this modest increase in costs, based upon the observed performance of EdenCrete® in highway and pavement field trials in Georgia over the past three and a half years, a very significant increase (and perhaps even a doubling) in the service life of the concrete is anticipated, resulting in a very compelling economic case for EdenCrete® to be added to the concrete.

## **Next Federal /GDOT Funded Highway Repair Project- Cobb/Fulton Counties**

The next Federal/ GDOT funded highway repair project in Georgia, which will be the first for 2019, will involve the replacement of a substantial amount of pavement along a 7.14 miles long section of a State Road 407 (SR 407) in Cobb/ Fulton Counties. Currently it is estimated that it will require approximately 9,800 cubic yards of concrete.

Eden has been informed by the GDOT Office for Materials and Testing that this new project is likely to be put out to tender towards the end of the first quarter of 2019 and that for the purpose of delivering a longer service life of the concrete, it is intended to include in the specifications the same, or similar, additional performance specifications for the concrete, to those that were included in the invitation to bid for the I-16 Twiggs County project, and in which EdenCrete® is currently being used to satisfy similar specifications,

Whilst there is no certainty that EdenCrete® will necessarily be used in this new project, based on its performance in the current Twiggs County project, Eden has high hopes that this will eventuate and also that these additional performance specifications will continue to be included in future Federal/ GDOT funded highway repair projects in Georgia.

## **GDOT - Repair Projects - Year Ending 30 June 2019**

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The first three GDOT State funded repair projects for July 2018- June 2019 have been advertised for tender. All of these projects require the concrete to incorporate EdenCrete® as provided in S504 of the GDOT specifications for its 24 hour full depth highway concrete repair mix (as announced ASX:EDE 27 January 2017).

These three projects will use, in aggregate, approximately US\$185,000 worth of EdenCrete®. Details of further GDOT State funded repair projects that will be put out to tender are expected progressively over the coming six months.

## Metropolitan Atlanta Rapid Transit Authority (MARTA)

During the quarter, a MARTA Whitepaper prepared jointly by engineers from both MARTA and Eden that evaluated the performance over 2 years of EdenCrete® in a field trial that commenced in May 2016 at MARTA's Brady Mobility Centre, was prepared and signed off by the parties in October 2018.

The Whitepaper included very positive conclusions endorsing use of EdenCrete® and was released to the public after signing (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 future MARTA projects.

### Georgia Commercial EdenCrete® Sales

During the September 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 who had previously done several similar projects in Georgia using EdenCrete® and had repeatedly seen significantly enhanced performance benefits, recommended that EdenCrete® be included in the new project. This occurred and the owner and the contractor were happy with the results. In consequence, trials are now being undertaken with same contractor for the proposed use of EdenCrete® in a forthcoming project in the south east of the US building a similar plant for an international tyre manufacturer that has a number of plants or warehouses in the U.S.

#### COLORADO

#### **COLORADO COMMERCIAL SALES AND TRIALS**

During the quarter, an increasing number of commercial sales of EdenCrete® occurred in Colorado for use in a range of commercial and residential applications including:

- twelve concrete driveways (first reported in Eden's September Quarterly Activities Report – see ASX:EDE 29 October 2018);
- three other slab-on-grade applications;
- three concrete walls (to help reduce cracking);
- o shotcrete applications (see Eden announcement- ASX:EDE 15 November 2018 and details below in relation to usage on the CDOT Central 70 project on the I-70 Interstate Highway in Denver involving the reconstruction of 10 miles, including sinking part of the highway), and for which applications EdenCrete® is now being regularly used by four different shotcrete suppliers, including for soil retention and construction of concrete swimming pools; and
- concrete grout for use with riprap (loose stone used to form a foundation for a breakwater or other structures).

To date, repeat commercial orders have been received from six customers in Colorado, and both the number of repeat customers and the value of the sales are targeted to grow significantly over the next year. Whilst most orders for residential applications, and some of the orders for the commercial applications, are presently relatively small, the growing number of repeat customers in Colorado using EdenCrete® on a regular basis, and the increasing aggregate volume of sales, are very encouraging.

## Colorado- EdenCrete® used in first shotcrete application for CDOT

As referred to above, following approval by the Colorado Department of Transportation ("CDOT") for EdenCrete® to be used in a shotcrete concrete mix, during the quarter EdenCrete® was used for the first time on the CDOT Central 70 project in Denver (see Figure 1).



Figure 1. EdenCrete® shotcrete concrete mix being applied

This project involves the reconstruction of 10 miles of the I-70 Interstate Highway, including sinking part of the highway and the establishment of a park above it (see Eden's 30 September 2018 Quarterly Activities Report - ASX:EDE 29 October 2018).

The EdenCrete® shotcrete mix was used to stabilize a buttress wall under an I-70 bridge (see Figure 2), and performed very well. The project is estimated to require 6,000-10,000 cu/yards of shotcrete. EdenCrete® is currently being added at 0.5 gallons/ cu. yard of concrete.



Figure 2. EdenCrete® shotcrete mix being supplied to the CDOT Project

This project is very important for several reasons. It is:

- the first contract for the use of EdenCrete® in a shotcrete application;
- the first time EdenCrete® has been approved by any Department of Transportation for a shotcrete application; and
- the largest contract, to date, for EdenCrete® on a CDOT project.

It also represents a further major milestone for EdenCrete® as it continues to expand its sales footprint into the huge U.S. infrastructure and commercial concrete markets.

Additionally, this project has great relevance for the potential use of EdenCrete® in shotcrete applications both in the USA and other parts of the world, where many significant tunnel projects being planned or being constructed. This includes in South Korea and Australia (New South Wales, Victoria and Queensland), in all of which EdenCrete® is intended to be marketed.

### **Colorado Independent Case Study**

An independent case study by members of the Department of Civil Engineering, University of Denver, Colorado, was published on some of the benefits delivered by EdenCrete® enriched concrete used in field trials being conducted by the Denver Public Works (see Figure 3) to evaluate the performance of EdenCrete® when concrete is exposed to heavy dosages of de-icing salts and road chemicals (see Eden's ASX Announcement ASX: EDE 20 February 2017).

The case study is available at: <a href="http://edeninnovations.com/newsandmedia/#corporate-news">http://edeninnovations.com/newsandmedia/#corporate-news</a>



Figure 3. EdenCrete® Trial Slabs in first trials.

The study provides a strong, independent assessment of the significant benefits delivered by EdenCrete® in this field trial. It analysed the comparative performance of a standard concrete mix, and two other similar mixes but with EdenCrete® added at 2 gallons/ cubic yard of concrete and at 3 gallons/ cubic yard of concrete respectively. It measured and compared changes in the three mixes in respect to compressive strength at 7 days and 28 days, as well as slump that was measured at the time of conducting the tests.

In all the tests, the EdenCrete® enriched concrete outperformed the standard concrete mix. Of relevance is that the initial Denver field trials were followed up by further field trials by the Denver Public Works in September 2017 (and which are ongoing) to further evaluate the performance of EdenCrete® enriched concrete when exposed to de-icing salts and road chemicals (see Figure 4) (see Eden's ASX Announcement – ASX: EDE 18 September 2017).



Figure 4 – One of Two New Trial Sections of Concrete Pavement in second trials

The results in the published independent case study on the Denver field trials of EdenCrete® represent further very encouraging progress and are likely to be of considerable interest to other U.S. infrastructure agencies that are required to use de-icing salts and road chemicals on roads, walkways and other exposed concrete areas that are subject to snow and ice.

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

During the September 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.

Early in the December quarter, four test driveways using the new EdenCrete® mix were laid and after being reviewed following two months use, the mix is now being used on a regular commercial basis in new and replacement driveways.

To date, twelve driveways using the new EdenCrete® mix have been laid using only EdenCrete® to combat shrinkage cracking, and this is expected to develop into a significant market, that will also have great relevance in many other States which also experience similar freeze — thaw events on a regular basis.

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

As referred to in the Eden's September 2018 Quarterly Activities Report, 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 designs 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.

### **TEXAS**

As reported in the Eden's September 2018 Quarter Activities Report, sales of EdenCrete® in Texas were impacted by two events. Firstly, Texas 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 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 had not been used. This remains the case today.

Eden is however still undertaking a test program with the precast contractor to develop improved mix designs, and remains hopeful that it will be successful and that the contractor will again start using EdenCrete® in its precast beams.

#### **NEW YORK**

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

New truck trials were commenced during the quarter with two New York based ready mix suppliers, testing the benefits that EdenCrete®Pz can deliver in two new commercial pozzolanic concrete mixes, and the results will be available during the first quarter of 2019.

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

The New York concrete market is very large and uses a significant amount of pozzolanic concrete.

#### **KOREA**

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As announced (ASX: EDE 9 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"), 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 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, and 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 in Korea.

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 and 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 range of tests that may take up to three months, using EdenCrete® in various concrete mixes made with Portland cement, blast furnace slag and/or fly ash.

If the results are positive, it is anticipated that KC will commence using of EdenCrete® in its own operations and seek to be appointed as the distributor of the EdenCrete® range in Korea.

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.

#### AUSTRALIA AND NEW ZEALAND EXCLUSIVE DISTRIBUTOR

During the quarter Eden continued working with Parchem Construction Supplies Pty Ltd ("Parchem"), with EdenCrete® testing and training to commence in early 2019, and with the commercial rollout by Parchem of the EdenCrete® products in both Australia and New Zealand scheduled to commence late the first quarter of 2019.

Significant interest is already being shown from a range of potential customers in Australia and New Zealand, and it is hoped that this initial positive response will translate into rapidly increasing sales of EdenCrete® in these new markets.

## Background

In September 2018 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.

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

# **OptiBlend®**

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During the quarter Eden recorded the following Optiblend® sales, including sales in India to Bosch for 5 units worth A\$161,000:

# Optiblend® Invoiced Sales for the Quarter

|       | SALES (A\$) |
|-------|-------------|
| USA   | 194,825     |
| INDIA | 216,066     |
| TOTAL | 410,891     |

These sales for the quarter represent a year on year increase of 167% compared to the corresponding quarter in 2017, primarily driven by an increasing demand in India for the OptiBlend® dual fuel systems for back-up power supplies supplied by large diesel powered generator sets, with the increase in sales resulting from a combination of both attractive economics as well as from a national effort to reduce air pollution.

#### 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. This project will end during the current quarter.

# **EdenPlast**<sup>™</sup> / **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, still focussing on bringing this project to commercialisation as soon as possible.

A highlight of the work was that a concentrated 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. Further, the master batch then diluted with more plastic, bringing the mix to commercial concentration, and its

performance characteristics were then tested, confirming that the process resulted in a potentially commercially viable end-product.

Following the lodgement of an earlier patent application, a second patent application in relation to this novel technique was lodged by Eden during the quarter.

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.

### **HYDROGEN**

As reported in Eden's September 2018 Quarterly Activities Report, 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 reemerge.

This interest has continued and Eden is now in discussion with two international companies that have each shown interest in Eden's hydrogen technologies.

Whilst both of these discussions are still early stage and may well not result in any commercial outcome, they are continuing and may perhaps offer an opportunity for Eden to re-focus some attention on its significant body of hydrogen technologies.

## Hydrogen Background

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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 couple of years however, around the world there has been a growing increase in the level of interest in hydrogen as a fuel, in large part being driven by concern about climate change, which has resulted in increased interest in Eden's hydrogen technologies.

Additionally, in India, extreme air pollution in Delhi and other cities is causing great concern, which has resulted in the Indian Supreme Court having mandated that the 10,000 strong, natural gas fuelled bus fleet in Delhi, be converted to run on a hydrogen based fuel, that in the short term is focusing on converting these buses to operate on Hythane®. This in turn has resulted in enquiries being received in relation to Eden's various hydrogen capabilities.

Similarly, in Australia, the Federal Government in 2018 allocated funds for research into the production of "clean hydrogen", opening a further 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.

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