



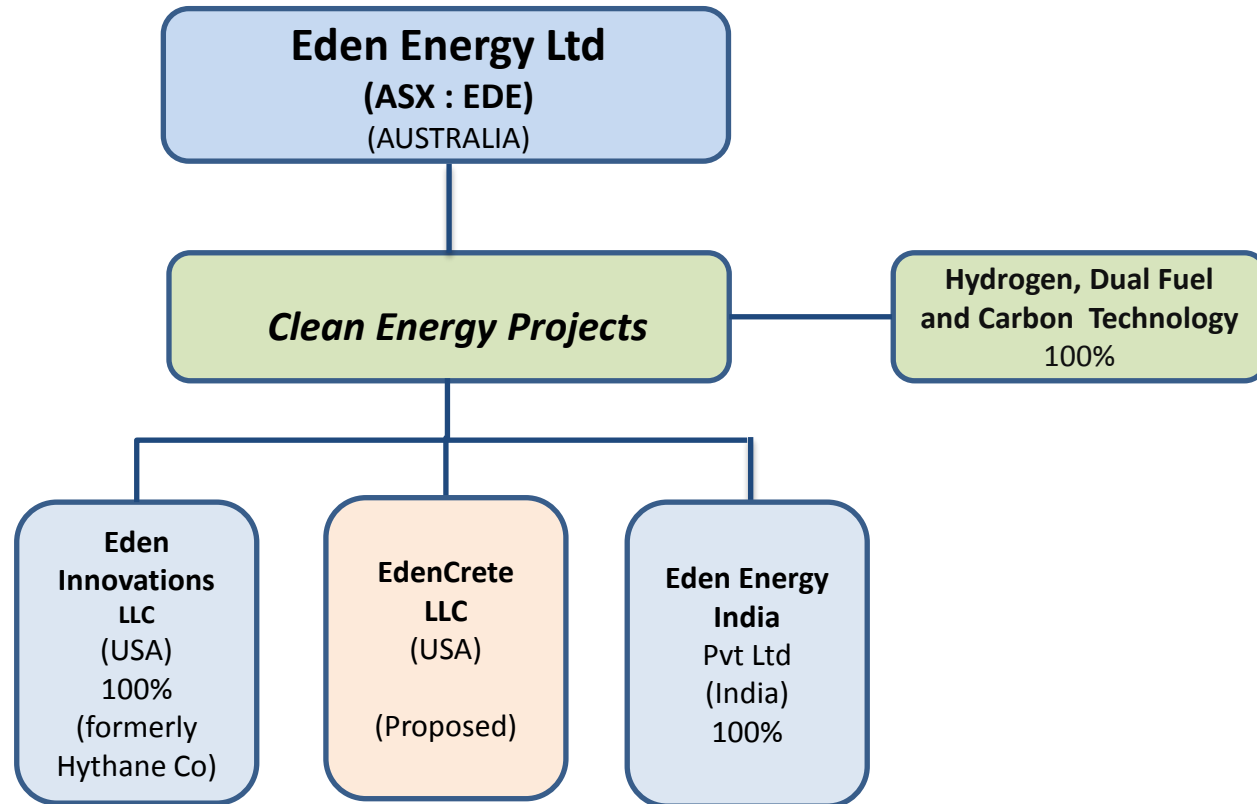
Revolutionising Concrete

Carbon Nanotube Enriched Concrete

Greg Solomon
Chairman
May 2015



Proposed Corporate Structure



EdenCrete LLC is proposed to be the US production and marketing company

Carbon Nanotube Project



Eden Developed Pyrolysis Process-CNT/CNF from Natural Gas (Eden 100%)

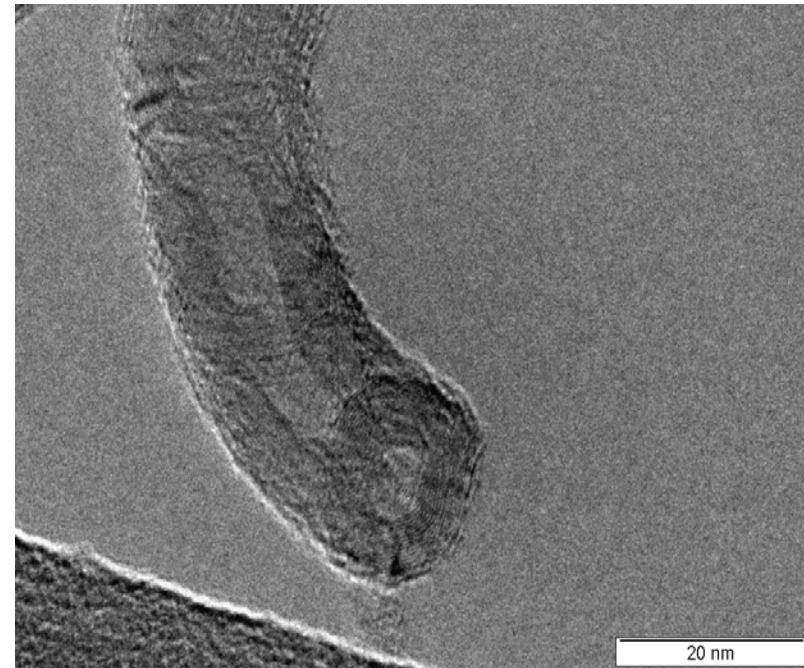


Produces only CNT + H₂ - no CO₂

- **Multi-walled carbon nanotubes:**

- Tensile strength - 200-300x steel
- Approx. 17% the weight of steel
- High electrical/thermal conductivity
- Bulk uses –
concrete/plastics/polymers

- **Patents in 8 countries**



TEM image of Eden's MWCNT

Eden's CNT/CNF Production Capacity



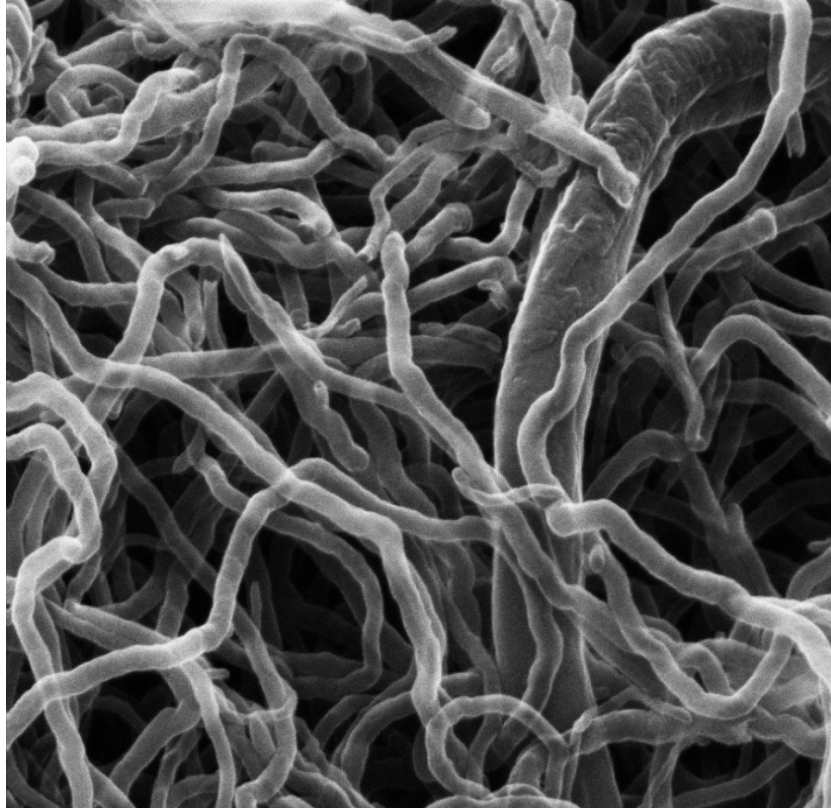
- **Eden's Pilot Commercial Scale Reactors, Denver**
- **Scalable, modular reactors**
- **Efficient catalyst production**
- **High quality/low cost CNT/CNF**

CNT in Concrete



- **Significant global research conducted over past 5-8 years**
- **Eden Innovations (formerly Hythane Company) (Denver)**
 - Testing and developing for 4 years
- **Monash University (Melbourne) - Collaboration**
 - Ongoing collaboration since 2011
- **Civil Contractors Federation Environment Award** — Australia 2014
- **International Concrete Companies' Interest**
 - Independent US and Australian trials completed

CNT in Fresh Cement Paste



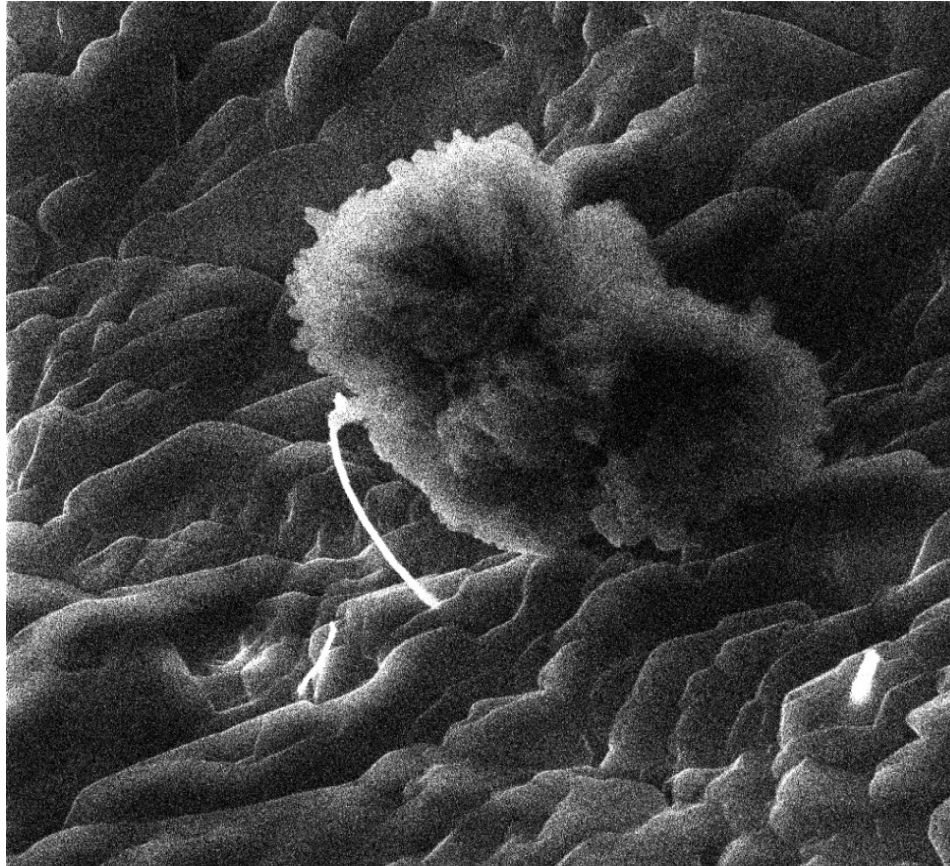
 CARL ZEISS SMT	Field Of View	200.00 nm	Dwell Time	Date: 2/16/2012
	1.50 um		3.0 us	Time: 3:10 PM
	Working Dist	Acceleration V	Mag (4x5 Polaroid)	Blanker Current
	11.9 mm	29.8 kV	76,200.00 X	0.5 pA

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 cement**
- **Other larger-scale fibres provide only nano-scale fibre reinforcement.**

Monash University Helium Ion Microscope Image

CNT in Fractured Hardened Cement Paste



CNT bonded in hardened cement paste after fracturing

Ends of CNTs are well-bonded within cement gel and provide anchorage

 ZEISS	CARL ZEISS SMT	Field Of View 3.50 μm	500.00 nm	Dwell Time 10.0 μs	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

Benefits – denser, stronger, tougher cement

- **Reduced building costs**
- **Reduced maintenance costs**
- **Less concrete / less steel** re-enforcing required
- **Greater strength-** compressive and flexural/tensile
- **Reduced corrosion-** denser, less permeable cement
- **Liquid surfactant** added during batching process

US and Australian Trials successfully completed

- **28/56 Day Results from US and Australian Trials**
 - **< 39% increase in compressive strength of concrete**
 - **< 48% increase in tensile strength of concrete**
 - **< 55% decrease in permeability of concrete**

CNT in Concrete- Applications



- **Global Applications**

- **Increased Abrasion Resistance**

- road and bridge surfaces, pavements , floors

- **Increased Compressive and Tensile Strength**

- high rise buildings, bridges , retaining walls

- **Lower Permeability**

- dams, spillways , sewer /water pipelines

- roads, runways etc subject to heavy snowfall and salt

- coastal and marine applications

Concrete Market



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

US Marketing Plans



- **First stage 1,000 tonne CNT production plant**
 - Sufficient for < 1% of US concrete market
 - Initial planning and discussions underway
 - Primary Target Market- Infrastructure Projects
- **Future planned expansion- 10,000 tonnes pa**

Immediate Action Plan



- **US EPA Approval for full scale production and sales**
 - Application prepared, pre-approval permits sale of < 100 tonnes of CNT
- **Colorado Dept of Transport Approval- Target 12 months**
 - Require 4-5 commercial projects for pre-approval list- target 1-2 months- several requires commercial projects
- **Design and cost scaled-up plant-** Process underway
- **Select location for US plant and secure site** —Process underway
- **Secure suitable funding-** Discussions underway in US

First US Commercial Project



May 2015



ASX Code: EDE

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