



LWP TO INVEST IN GROUND BREAKING ALUMINIUM-GRAPHENE-OXYGEN BATTERY TECHNOLOGY

- **LWP investing in technology with three Australian patents lodged – significance of the patents is a description of the chemical synthesis process to manufacture the highest quality Graphene on a commercial scale, and the production of superior battery technology**
- **\$1.6 million cash investment and issue of 30m LWP shares to obtain 50% of patent pending Aluminum-Graphene Synthesis and battery technology**
- **Investment adds second ground-breaking energy technology to LWP’s portfolio**
- **Significant International R&D investment globally in Graphene battery technology which has demonstrated vastly superior energy density compared to lithium-ion batteries**
- **LWP will drive the marketing and licensing and commercialisation of the technology**
- **50/50 JV structured with inventor to create market-facing brand GraphenEra Pty Ltd**
- **LWP remains fully committed to the continued commercialisation of its ceramic proppant technology with negotiations ongoing with a range of potential commercial partners**

ASX ANNOUNCEMENT

14 June 2016

Energy technology company LWP Technologies Limited (ASX:LWP) (“LWP” “the Company”) is pleased to announce a significant transaction that will see the Company invest in a patent pending Aluminum-Graphene Synthesis and battery technology which has shown to have vastly superior energy density over lithium-ion batteries.

This investment represents a major value-adding step for LWP and is consistent with the Company’s strategy of investing in technologies in the energy sector.

BACKGROUND - ALUMINIUM-GRAPHENE-OXYGEN BATTERY TECHNOLOGY TRANSACTION

After significant due diligence, LWP will enter into a Joint Venture (JV) to commercialise a revolutionary battery technology. Under the terms of the JV agreement, LWP will acquire 50% ownership of patent pending Aluminum-Graphene Synthesis and battery technology for an investment of \$1.6 million in cash and the issue of 30 million LWP shares to the Australian-based scientist and inventor of the technology. Funds invested will be spent on developing battery prototypes for the first of three patents that have been lodged, with an initial focus on the revolutionary battery technology. The JV partners intend to license the technology to battery manufacturers and other industry participants.

Electric Vehicle (EV) manufacturers and battery suppliers are currently investing millions of dollars into battery Research & Development (R&D) aimed at obtaining greater driving range and lowering the charging times of lithium-ion batteries. However, improvements in lithium-ion technology appear to be proving incremental rather than exponential.

Lithium-ion Batteries have an estimated current market of US\$30+ Billion per annum, which is forecast to grow quickly as the electric vehicle market increases, and as the increase in distance travelled per charge and speeds of electric vehicles improve. Market participants, however, agree that Lithium-ion batteries will continue to have limitations as lithium is regarded as unstable and prone to fire risks.

Millions of dollars have been invested into Graphene technology with R&D occurring at a number of renowned universities around the world, as it became apparent that Graphene has the capacity for far greater energy density than that produced by Lithium-ion batteries, without the hazardous side effects that has prevented Lithium-ion batteries from being used in certain applications.

Some universities engaged in Graphene R&D include: Stanford University; Manchester University; Rice University; University of Cambridge; University of Notre Dame; Beihang University; Tsinghua University; Kansas State University; Beijing Institute of Technology; Tohoku University, Japan; University of Cordoba; Yonsei University, South Korea; Dresden University of Technology; Sydney University of Technology; Monash University; North Carolina State University; California NanoSystems at UCLA; Sapienza University, Rome; Hong Kong Polytechnic University; Korean Sungkyunkwan University; University of Wollongong; Brown University, Rhode Island, USA; Western Reserve University, Ohio; China University of Science & Technology; Fudan University, Shanghai, and Kumamoto University, Japan.

The Russian born Australian Scientist who invented this disruptive battery technology has completed internal laboratory testing of the Al-Graphene-Oxygen battery which has demonstrated the capacity to deliver significant benefits over Lithium-ion Batteries as detailed in the below table:

Comparison of Al-Graphene Battery with Tesla 85 kWh Lithium-Ion Battery			
Property	Lithium-Ion Battery	Al-Graphene Battery	Benefit
Power	85 kWh	100 kWh	15% more power
Energy Density	265 Wh/kg	2,000 Wh/kg	7.5x stored energy
Range	426 km	3,500 km	8x range
Recharge time	4.5 hours	15 minutes	not much longer than refueling with petrol
Weight	544 Kg	387 kg	30% lighter
Dimensions (cm)	10.16 x 284.48 x 177.8 for 16 modules	7 x 200 x 100 for 8 modules	54% smaller
Estimated cost	A\$22,200	A\$11,450	50% less
Durability	8 years (est.)	15 years (est.)	Lasts almost 100% longer
Accumulated battery loss	5% initially, then 1% per 3,000 km	1% initially, then 1% per 3,000 km	Retains peak efficiency longer
Estimated Manufacturing cost	~A\$200/kWh	A\$20/kWh	Reduced Manufacturing Cost

The extraordinary potential of Graphene has been recognised ever since its discovery by two Russian-émigré, Nobel Prize winning scientists at Manchester University in 2004. However, to date, success at producing highest quality Graphene on a commercial scale has been limited.

The significance of the Australian patents lodged is that the patents describe the chemical synthesis process to manufacture the highest quality graphene on a commercial scale. The first application of the technology the JV partners intend to independently validate, then commercialize, using synthesis graphene is the Aluminium-Graphene-Oxygen battery, however a number of other technologies and applications are in the pipeline.

TRANSACTION SUMMARY

The 50/50 JV partners, LWP and VVV Technologies Pty Ltd have formed GraphenEra Pty Ltd (GraphenEra) and the inventor has contractually agreed to transfer exclusive ownership of the patents and all technology rights to GraphenEra. GraphenEra intends to commercialize the Graphene Synthesis patents for battery technology by providing technology licenses to multiple manufacturers.

R&D has already been completed, and three Australian Patent applications lodged. The primary thrust of the patents are:

Patent Application #1

Invention: The invention relates to the sphere of electrical energy storage and notably to metal-air electrochemical cells.

Application: Aluminium – Graphene – Oxygen Battery.

Patent Application #2

Invention: The invention belongs to the field of metallurgy and notably to productive metal-based conductive composite with improved mechanical and chemical properties. Particularly, the invention relates to a method for producing Graphene-Aluminium composite material.

Application: Aluminium – Graphene Composite.

Patent Application #3

Invention: The invention relates to the sphere of electrical energy storage and notably to metal-ion electrochemical cells.

Application: Aluminium – Graphene – Ion Ultra Fast Rechargeable Battery.

LWP has agreed to invest \$1.6 million in cash and 30 million LWP shares for a 50% interest in GraphenEra to exploit patent #1.

The Patent #1 development program estimates a 6 to 12 month timeframe:

- Construct first prototype battery.
- Prototype battery testing by independent experts during numerous charge/discharge cycles.
- Build up to 5 batteries for evaluation by potential technology licensees.

LWP will drive the marketing and licensing/commercialisation of the technology. Upon positive results, the JV partners intend to license the graphene synthesis/manufacturing process and battery technology then commence the proto-typing and commercialisation of patents #2 and #3.

About the Scientist and Inventor

- Russian born, Australian inventor, Victor Volkov B.Sc. Engineering, MAI – State University of Aerospace Technology. B.Sc. (Economics) MAI. Post Grad cybernetic. Plekhanov Institute, Moscow.
- Nano Technology / Software analyst, specialising in the application of leading-edge physical methods in the process of metal-based conductive composite with improved mechanical and chemical properties. In particular relating to a method for producing graphene-aluminium composite material, with more than 12 years engaged in nano-technology research.
- Holds 7 provisional patents relating to synthetic ligature aluminium alloys with titanium and zirconium, titanium diboride synthesis, synthesis graphene, synthesis of lead-zinc-coating, and a method of producing lead battery electrodes.
- Victor's international scientific group has 2 priority references: (1) A method of synthesis of lead-graphene composites, and (2) Synthesis of aluminium-, magnesium-, aluminum-graphene composite.

COMMENTARY

Scientist and inventor Victor Volkov said: "I am thrilled to be working with LWP Technologies to commercialise my life's work in nano-technology, culminating in the Al-Graphene-Oxygen Battery technology and Graphene Synthesis technology. I look forward to creating the revolutionary prototype batteries together with LWP who have a proven track record in developing energy-related technologies from laboratory to commercial scale."

LWP Chairman Siegfried Konig added: "LWP has acted quickly to secure this very unique and valuable technology. We have secured a foothold in a patent pending innovation that could potentially change energy markets and the way the world commutes. We are witnessing the early stages of this disruption through greater take up of lithium-ion powered batteries and we believe that Al-Graphene-Oxygen Battery technology is superior. We expect that this investment will unlock significant value for our shareholders and our plan is to deliver the first prototype in 2016.

LWP remains committed to its ceramic proppant technology and it is business as usual in this regard. We remain firmly focused on our commercial negotiations, which are progressing. Oil & gas markets appear to be stabilising which will assist in negotiations that had stalled in some markets.

LWP now has two primary disruptive technologies in the global energy sector and we look forward to commercialising the technologies by licensing our portfolio to product manufacturers."

ENDS

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WIKIPEDIA description of Graphene:

“**Graphene** (/ˈɡræf.iːn/)^{[1][2]} is an [allotrope](#) of [carbon](#) in the form of a [two-dimensional](#), atomic-scale, honey-comb lattice in which one atom forms each [vertex](#). It is the basic structural element of other allotropes, including [graphite](#), [charcoal](#), [carbon nanotubes](#) and [fullerenes](#). It can also be considered as an indefinitely large [aromatic](#) molecule, the ultimate case of the family of flat [polycyclic aromatic hydrocarbons](#).

Graphene has many extraordinary properties. It is about 100 times stronger than the strongest steel with a hypothetical thickness of 3.35Å which is equal to the thickness of the graphene sheet.^[3] It conducts heat and electricity efficiently and is nearly transparent.^[4] Researchers have identified the [bipolar transistor effect](#), [ballistic transport of charges](#) and large [quantum oscillations](#) in the material”.