17 February 2015

Dear Shareholder

Graphene has been the centre of a flow of news both scientific and financial, and we can confidently predict that in 2015 this will only increase. As a shareholder in Strategic Energy Resources you are at the heart of these developments. So we are pleased here to update you on current progress in SER and our graphene based technology company, Ionic Industries. Shareholders who have held SER shares since the demerger of the Uley graphite mine will remember receiving "FREE" shares in our spin off company, Tarcoola Gold NL, renamed Valence Industries Limited (VXL). VXL was the best performing float in 2014 on ASX where the shares traded as high as 87 cents. As SER had been the owner of the Uley graphite mine for many years, we conducted research into graphene and we hope to shortly offer SER shareholders further "FREE" shares in our proposed graphene spin off, Ionic Industries. Details of Ionic Industries are contained in this letter.

As previously announced, WorleyParsons has been engaged to conduct a scoping study for the production of graphene oxide with SuperSand as an additional optional process stream, and a marketing study on SuperSand. We have received a draft of the marketing study which was undertaken to ascertain demand and the market potential. A summary of the report will be released to ASX once our internal review is complete.

The scoping study is currently in the review stage and is progressing well. Process flow diagrams have been produced and reviewed by members of the research team at Monash University. Estimated capital and operating costs numbers are currently being reviewed against industry metrics.

Ionic's Graphene for Water Purification and Energy Storage

Ionic Industries is focused on two critically important issues for human sustainability and advancement, namely water and energy. SER partnered with Monash University 5 years ago on graphene research and development. The relationship has benefited from being the recipients of two Australian Research Council Linkage grants on graphene based technologies, namely on our super capacitors and our graphene membrane technologies.

Water Purification

Water purification is a huge market and graphene will potentially contribute greatly to the advancement in technologies for water processing. Ionic Industries' SuperSand and membrane technologies are expected to benefit the water purification industry.

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Utilising (fluid phase dispersed) graphene oxide, we will develop scalable and industrially adaptable methods to manufacture thin yet mechanically robust, inert, fouling resistant, highly permeable graphene based asymmetric membranes. These advanced membranes could find wide application in reducing discharge of mining effluents and recovery of precious metals. This research is already underway by our team and has led to very encouraging results for water purification and an 'invention disclosure' for making graphene oxide (GO) / reduced graphene oxide (RGO) membranes has been filed by our researchers at Monash University. Graphene samples produced by our proprietary method were rigorously tested with the membrane casting equipment manufacturer and we are very pleased with the results obtained and thus decided to purchase the equipment. Delivery is expected soon. The new acquisition will enable our researchers to tailor the number of sheets of RGO that can be applied to the membrane substrate for specific purposes. The chemistry of the RGO can also be altered to target whatever impurity or precious metals sort to be filtered.

Energy Storage

Energy storage is the other key focus for Ionic Industries. We have been working on super capacitors with Dr Majumder's team from Monash University, who have been researching and developing our focussed ion beam super capacitor technology for some 5 years. This research is now at Technology Readiness Level 3, meaning it is at the analytical and experimental critical function, and characteristic proof of concept. With the proposed demerger and ASX listing of Ionic Industries we are aiming to have a working prototype of a basic planar super capacitor within six months of the listing.

Super capacitors and nanocapacitors are the next step in the evolution of energy storage. Research and development of these energy storage devices are advancing quickly and have many advantages over current battery technology.

In almost every case, desired performance is limited by the capability envelope of the energy storage systems currently available. The size (both by volume and by weight), limits the range, endurance and payload of the application as well as being a significant cost factor.

But there are several other relevant drivers of performance to consider:

How long does it take to recharge? This can be critical in some circumstances.
At what rate is it able to discharge its energy? This limits the power that can be extracted.
How efficient is it? How much energy gets wasted as heat that might require additional cooling? How long will it keep working and how many times can it be discharged and recharged? This affects the overall lifetime cost as well as the environmental aspect of disposal.

Does it maintain its rated voltage and power as it discharges? Chemical batteries do not because of their internal resistance and chemical processes, and so additional power conditioning is often required.
What is its shelf life when not in use? What range of environmental conditions is it able to be stored and operated in? Chemical batteries operate best in a very narrow temperature range, while some high performance batteries require very high temperatures, posing additional safety issues e.g. liquid sodium sulphur batteries (NAS).

A huge amount of R&D is currently in place, much of it targeting improvements in chemical batteries e.g. the many recently announced initiatives in lithium based systems. These will no doubt produce some improvements but the potential for improved performance is limited by the basic physics of the devices. Chemical batteries rely on moving ions between electrodes and so the theoretical limit for the energy density of all reversible chemical batteries is the energy density in ionic bonds, ~ 1GJ/m3. Current chemical battery technology is already close to that limit so there is not a lot of scope for improvement.

In the bigger picture, one can say that chemical batteries are a fairly mature technology which has limited scope for further improvement, and which will eventually be overtaken by radically different novel energy storage systems based on different physics, which have the potential to greatly exceed the performance limits of chemical batteries.

One such novel system is based on nanotechnology and the unique properties of graphene; arrays of nanocapacitors in which self-discharge is suppressed by quantum effects, and which can theoretically achieve energy densities up to 3 orders of magnitude greater than chemical batteries.

Nanocapacitors also have several other advantages. Since it is electrons rather than ions that move, the speed at which they can be charged and discharged is limited by the speed of electrons moving, which can be 10% of the speed of light. For practical purposes, this is close enough to instantaneous, and so can deliver very high power and be recharged very fast. In principle they also maintain fixed output performance with no drop off or heating, and they can be configured to provide any desired voltage and power.

Such technologies are likely to eventually overtake the existing chemical battery energy storage systems in many applications but there is still a lot of R&D required before this happens. We are fortunate to be in on the ground floor of this potential technology revolution and to be able to be part of its development.

The Importance of Graphene in the Future of Energy Storage Solutions

There is no argument that at the rate that civilisation is consuming fossil fuels, it is only a matter of time before economic extraction becomes difficult. The question is how long do we have. Some of the more pessimistic scenarios indicate that it is only 30 to 40 years or just less than two generations. So how will we feed, clothe and supply energy to a projected 10 to 12 billion people?

Clearly we will need to find an alternative source of energy. In the electricity sector, renewables, in particular wind and solar, provide a solution. These sources are already a significant part of the energy mix in a number of countries and are expected to account for an increasing share of the world's electricity output in the future. But these renewables are intermittent in that solar photovoltaics (PV) do not generate electricity at night or when there is cloud cover; when the wind does not blow no windmill electricity is produced.

So for these renewable sources to supply us with reliable and continuous power, electricity that is generated when there is a surplus has to be stored and released when renewables are not generating. With the transformation of electricity grids from centrally supplied legacy grids to smarter grids this storage in the form of in home battery banks and grid banks can now be deployed and activated in the networks.

Distributed storage overcomes the intermittency limitations of renewables, smoothing out the peaks and troughs of the load profiles, thus creating an efficient and reliable integrated energy system that displaces fossil fired base load plant.

Storage also improves the distribution grids' stability, where the potential for regional balancing can be limited when storage is unavailable. Given this fundamental role that distributed storage will play in the emerging smarter grids, global demand is expected to soar over the next two decades, as renewables become increasingly cost competitive, and a large component of the generating plant mix.

Much progress is being made in storage technologies but currently they are still developing. Greatest progress has however been made with solar PV paired with battery storage.

At the grass roots level, solar PV paired with battery storage has already reached the viability threshold in a number of countries. For some consumers it is now less expensive to self-generate electricity using solar PV paired with storage and supplemented with embedded generation than it is to use electricity from the grid.

The economics are compelling for decentralised, stand alone, residential applications, where retail energy prices are high, compensation for electricity fed into the grid is low or government support for solar PV paired with battery storage is available.

This is improving the economics of distributed storage to the point where cost reductions are beginning to track the profile of solar PVs experienced in the last five years, making off grid storage the preferred option for many consumers and consequently reducing our reliance on fossil fuels.

Ionic Industries Research Facility

After the proposed demerger, and possible seed capital raising, we will begin interviewing research staff to be employed directly by Ionic who will be focussed on fabrication and product development.

This will be a fundamental shift in our business and future growth. We will be utilising the facilities of Monash University when required under our Collaboration Agreement with Monash University under the leadership of Dr Mainak Majumder, but we will also establish our own facilities, where Ionic research staff will be undertaking product development, product evaluation and benchmarking, in particular on making our working super capacitor prototype and expanding and optimising our GO making process, amongst other things.

Graphene: an Amazing Vision of the Future

The research and development work done on graphene by Ionic Industries and SER is only a fraction of the scientific advancement made possible by projecting the developments of this allotrope of carbon. Our collective experience as previous owners of the Uley graphite mine keeps us in the box seat as further uses for graphene flood in.

* Spent uranium
Containment of nuclear waste.

* Ion harvesting
The discoverer of graphene, Nobel Prize winner Sir Andrew Geim, speculated that graphene could be used to filter hydrogen from the atmosphere and burned in a fuel cell to generate electricity. A motor could generate its own fuel, just from the surrounding air. Harvard University researchers are currently working on ways to feed the hydrogen to a bacteria colony, sparking a reaction that will convert the carbon dioxide into a form of propane oil.

http://spectrum.ieee.org/nanoclast/green-tech/fuel-cells/graphenebased-fuel-cell-membrane-could-extract-hydrogen-directly-from-air

* Communications
Graphene based mobile phones and communications instruments can be smaller, lighter, flexible, and with a much longer battery capacity. IBM has already invested $3billion into research and developing products.

* Computing
Just as silicon is reaching the limits of capacity, graphene opens up the whole field of an electronics industry built on the microscopic wonders of nanotechnology. So much of the recent advances can be replicated but at a fraction of size and weight. As one of the leading computer magazines, PC World, declared last year: "Graphene is the super substance that could replace silicon, plastic and glass."

* Military
Its remarkable strength   200 times greater than steel   lightness, flexibility and electronic conductivity are of course highly attractive to military researchers.

* Naval
Similarly, its uses in ships and submarines are being studied. In the construction of submarines it is capable of considerably strengthening the hull, even as it considerably reduces weight. In addition, it could extract ions from seawater - and provide its own propulsion.

As a SER shareholder you are fortunate to be in at the start of a possible technical and manufacturing revolution which could be the solution to so many of the earth's huge problems. I hope you will enjoy this exciting ride into the future.

Yours sincerely

Mark Muzzin
CEO