

K2 Solar

Executive Summary

- K2 Energy has secured the exclusive worldwide rights for solar energy technology from a leading US silicon technology company, Mears Technologies Inc (“MTI”).
- The MTI research team believes that significant gains in solar cells (PV) efficiency is possible as a result of computer simulation and successful optical characterisation.
- First demonstration models for testing October and December 2010.
- Commercialisation by way of licensing to existing PV cell manufacturers during 2011.

Renewable Energy

- Hydro
- Wind
- Geothermal
- Biomass/Biofuel
- Solar

Photovoltaic Solar Cells v Thermal Solar

- Thermal Solar uses the sun's heat to boil water, which is then used to create steam to turn a turbine.
- Photovoltaic (PV) solar cells convert sunlight (photons) into electricity using a PV solar cell usually constructed of silicon. The current produced is DC, which is then converted to AC by use of an inverter.

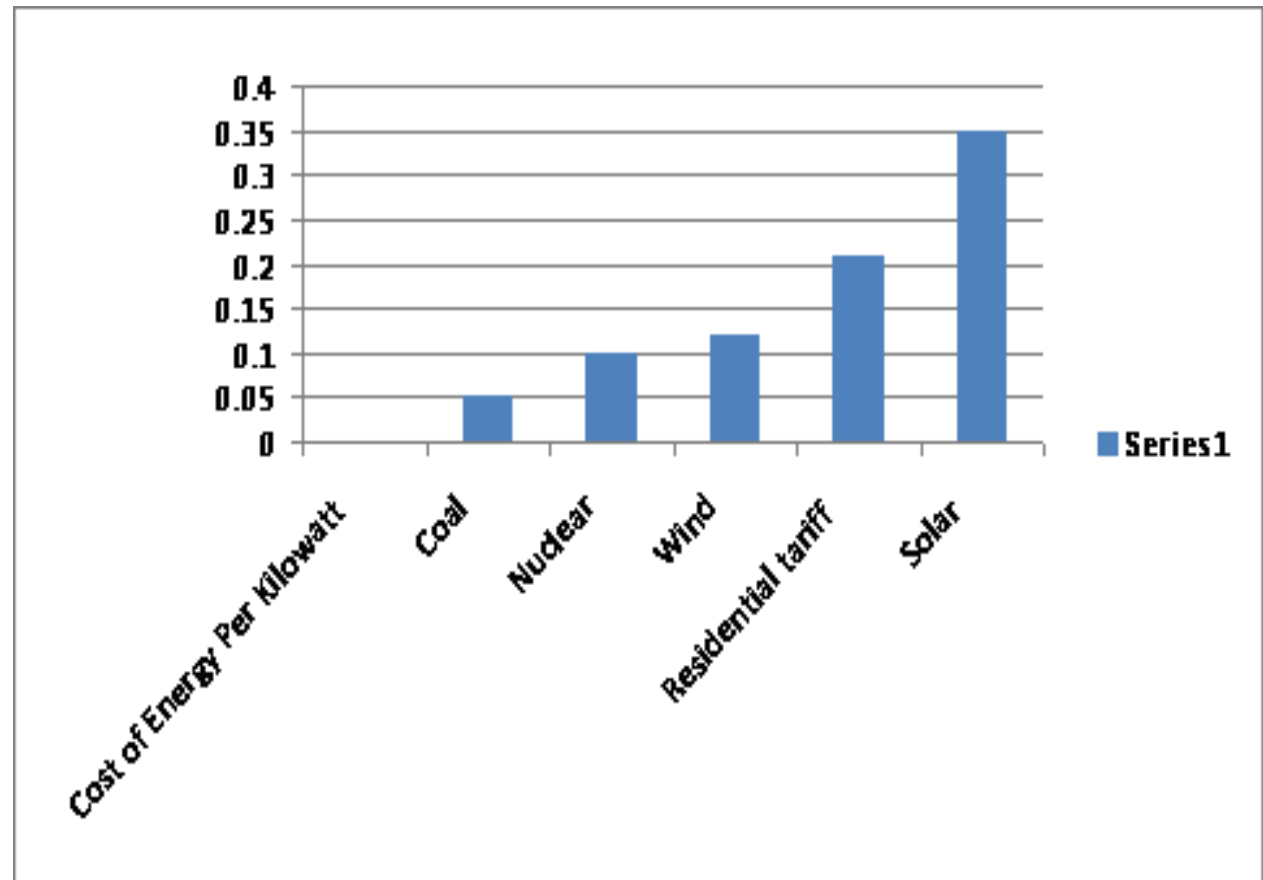
Solar Cells – Competitiveness

- Solar cells offer huge potential as sources of plentiful renewable energy and yet solar cells have barely penetrated the energy market. Enough sunshine falls on the Arizona desert to power the whole of the US.
- The key to effective market penetration is grid parity, where the unsubsidised energy cost of solar becomes competitive with alternative fossil fuels.

Comparison of Energy Costs

Cost of Energy Per Kilowatt *:

Coal-	0.05
Nuclear-	0.10
Wind-	0.12
Residential Tariff-	0.21
Solar-	0.35



* The company's best estimate on an unsubsidised basis.

Solar Cells Key Metrics

- 85% of solar cells are crystalline silicon.
- Roughly 50/50 module cost and installation cost.
- Up to 45% of module cost is silicon cost.
- Installation cost scales with area, and therefore (inversely) with electrical conversion efficiency: double efficiency = half area for same power = half cost.
- The solar industry has revenues of approximately \$38 billion (2008) and has been experiencing rapid growth.

Mears Technologies Inc. (“MTI”)

- MTI is an unlisted US corporation, formed in Boston in 2001 by Dr Robert Mears.
- MTI specialises in the development of “genetically” engineered silicon materials to enable breakthrough technologies, with major applications for improved performance in semiconductor (silicon) chips, solar cells and magnetic memory.
- Over the past 9 years MTI has developed Mears Silicon Technology (“MST”), which has been demonstrated to generate significant performance enhancement and power reduction in silicon CMOS technology.
- MTI has a portfolio of over 200 patents including 80 granted patents.
- Revenue to be generated by licensing the technology to semiconductor manufacturers.

Dr Robert Mears BA, MA in Physics (Oxford) Ph.D. (University of Southampton)

- Dr Robert Mears is recognised worldwide as one of the world's leading experts in photonics – the synthesis of electronics and optical communication.
- In the 1980's Dr Mears addressed the challenge of increasing the capacity and speed of data transmission of fibre optic cables in the telecommunications industry by inventing an optical amplifier, known as the Erbium Doped Amplifier ("EDFA"). EDFA technology increased usable capacity of optical fibre by more than 1000 times. It was and remains a key enabling technology of the internet.
- Dr Mears has agreed to join the Board of K2.

Mears Solar Technology

- Mears MST technology addresses the major limiting factors for PV technology and solar power generation, being the efficiency limits of silicon PV cells and the amount of silicon required in the PV cells.
- MTI believes that a key efficiency parameter can be lifted significantly using MST technology. The amount of silicon required can be significantly reduced, making PV cells both significantly more efficient and much less expensive.
- The MST technology involves the production of an altered or 'nano-doped' layer of silicon that can be inserted into the manufacture of silicon solar PV wafers. The process lends itself to application in existing silicon wafer manufacturing processes.

Mears Solar Technology

- Solar panels (“PV” panels) basically absorb light (photons) and convert it into electrical current. The most economical PV panels today utilise silicon as their main material, which represents up to 45% of the total cost of panel.
- Whilst silicon is effective at converting light into electricity, it is by nature a poor absorber of light. Mears Solar Technology alters the composition of the silicon wafers to substantially increase their optical absorption.
- This should permit the panels to be built using substantially less silicon (by 80% or more) for the same or higher efficiency. This breakthrough alone has the potential to make a huge difference to the costs and economics of solar technology.

K2's Solar Transaction with Mears

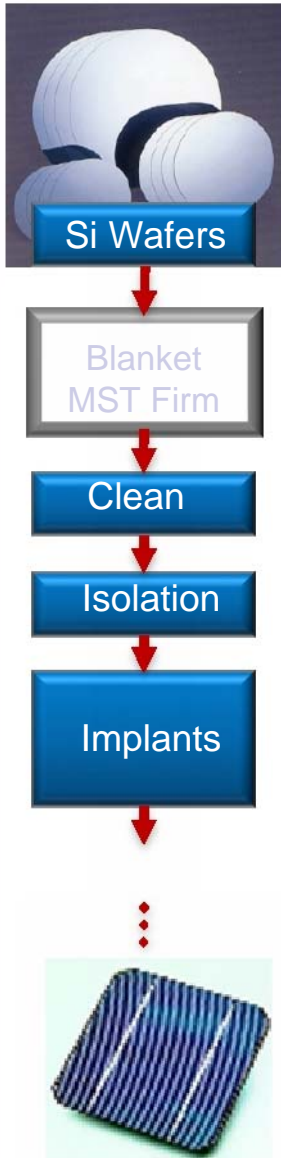
- K2 has the worldwide exclusive license to the Mears Solar Technology.
- K2 has agreed to fund solar R&D conducted by MTI at the rate of US \$1m/year.
- MTI is entitled to 50% of the earnings from the commercialisation of the solar technology.
- K2 made an investment of US \$1 million in MTI by way of a convertible note as part of the transaction to secure the MST solar technology.
- K2 intends to commercialise each generation of the Mears Solar Technology to large scale solar manufacturers.

Major Milestones for 2010

- Optical characterisation has been successful and has been completed earlier than anticipated. Optical characterisation is the analysis of materials to determine their light absorption properties.
- Discussions have already commenced with major solar manufacturers regarding a testing regime.
- Side by side test scheduled by December 2010.

Advantages

- Computer simulation has demonstrated achievability.
- Highly qualified research and development team led by:
 - Dr Marek Hytha – MSc & Ph.D. Physics – Charles University Prague
 - Dr Robert Stevenson – Ph.D. Nanotechnology (Electrical Engineering) – University of Cambridge
- Very strong IP protection.
- Breakthrough was a by-product of MTI's \$50 million R&D investment in modified silicon technology.



Integrating MST

- MST for Solar in the cell fabrication process:
 - No new/exotic materials required
 - No new tool required
 - Low cost
 - Scalable solution
- Single 'step' added to the start of the process.
- Or can be inserted selectively later in the process.

Mears Silicon Technology (“MST”) for CMOS (Silicon Computer Chips)

- What the MST technology actually delivers for silicon chips is a high performance chip with significantly lower power consumption (30-50%) and less heat, due to reductions in gate leakage (50%) and other leakage mechanisms.
- The net result is that this technology can lead to longer battery life in computer devices and reduced heat generation, which has been a serious problem in the computer industry for some years.
- Revenue of the global chip market is approximately \$250 billion and the chip technology should be applicable to a large percentage of this market.
- K2 investment in MST by way of a convertible note.

