



K2 Energy Limited



Investor Update

September 2010

Company Overview



Emerging Renewable Energy Company

- ❖ ASX listed small-cap renewable energy company focused on the commercialisation of a leading solar energy technology.
- ❖ Secured exclusive worldwide rights for solar energy technology from Mears Technologies Inc. ('MTI').
- ❖ Solar technology focused on a significant breakthrough in the cost/benefit of photovoltaic (PV) solar cells.
- ❖ Commercialisation of the technology is targeted during 2011.

Financial Summary

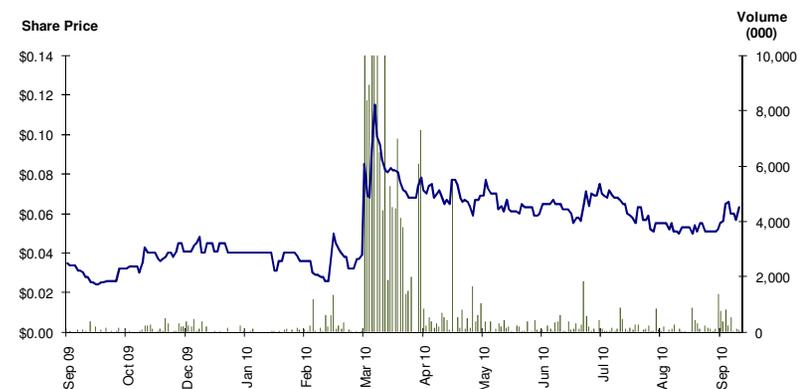
Shares on Issue 209 million

Share Price \$0.06

Market Capitalisation A\$12.5 million

Directors
Sam Gazal
Michael Reed
Dr. Robert Mears
Ken Gaunt

Share Price Performance



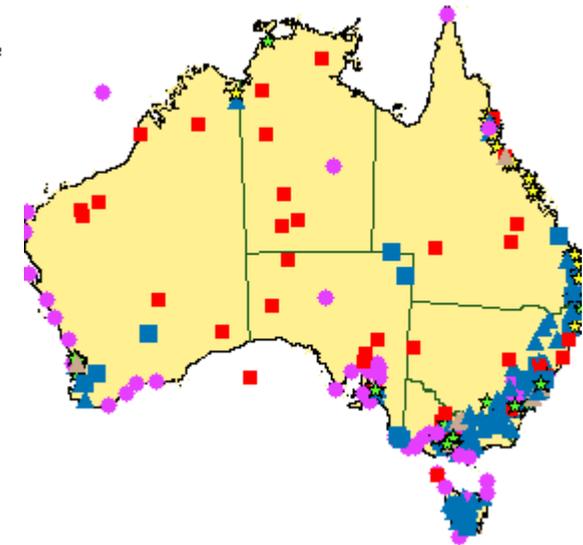
Global Focus on Renewable Energy



- ❖ Governments around the globe have a clear mandate to increase the generation of energy from renewable sources.
- ❖ Major renewable energy sources include:
 - Hydro, Wind, Geothermal and Solar
- ❖ Targeted fiscal stimulus in many countries, helped to boost global wind and solar generation capacity by 31% and 47% respectively.⁽¹⁾
- ❖ Incentives provided to ensure large-scale renewable energy projects are developed along with growth in small-scale domestic installations.
- ❖ In 2009 Australia had over 115 megawatts (0.115 GW) of solar PV capacity installed nationwide - an increase of more than 25 per cent on the previous year.
- ❖ Europe continues to be the leading region given its lack of indigenous fossil fuels, with nearly half the cumulative global capacity located in Germany.⁽²⁾

Operating Renewable Energy Generators

- ★ Bagasse
- ★ Landfill Methane
- Solar
- ▲ Water
- Wind
- ▲ Sewage Methane
- Other



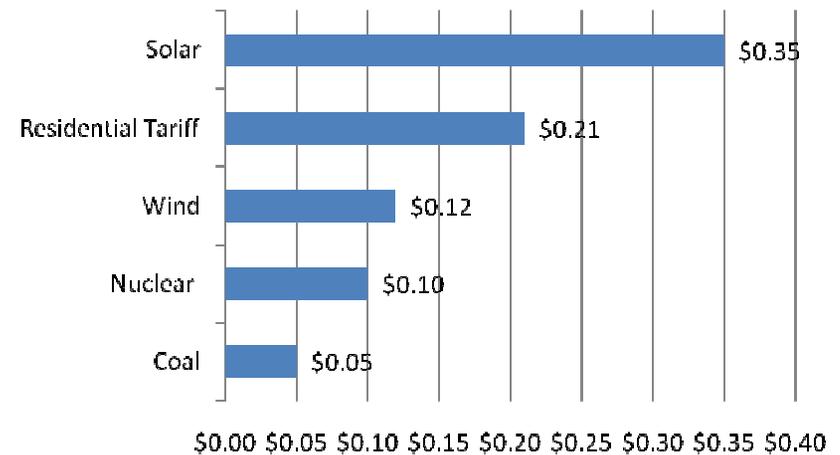
Source: Geoscience Australia

Solar Energy's Competitiveness



- ❖ Solar cells offer huge potential as a source of plentiful renewable energy.
- ❖ Penetration in the energy market has been restricted by cost barriers.
- ❖ Key to effective market penetration of solar energy is achieving “grid parity”.
- ❖ The unsubsidised energy cost of solar is trending to be more competitive with alternate sources (e.g. Coal, Nuclear, Wind).
- ❖ Module and installation costs remain the major barriers for solar to deliver a competitive cost of energy per kilowatt hour.
- ❖ Key drivers for cost competitiveness include:
 - Reduction in module and installation costs; and
 - Improvement in solar cell efficiency
 - Optical absorption
 - Conversion efficiency

Cost of Energy Per Kilowatt

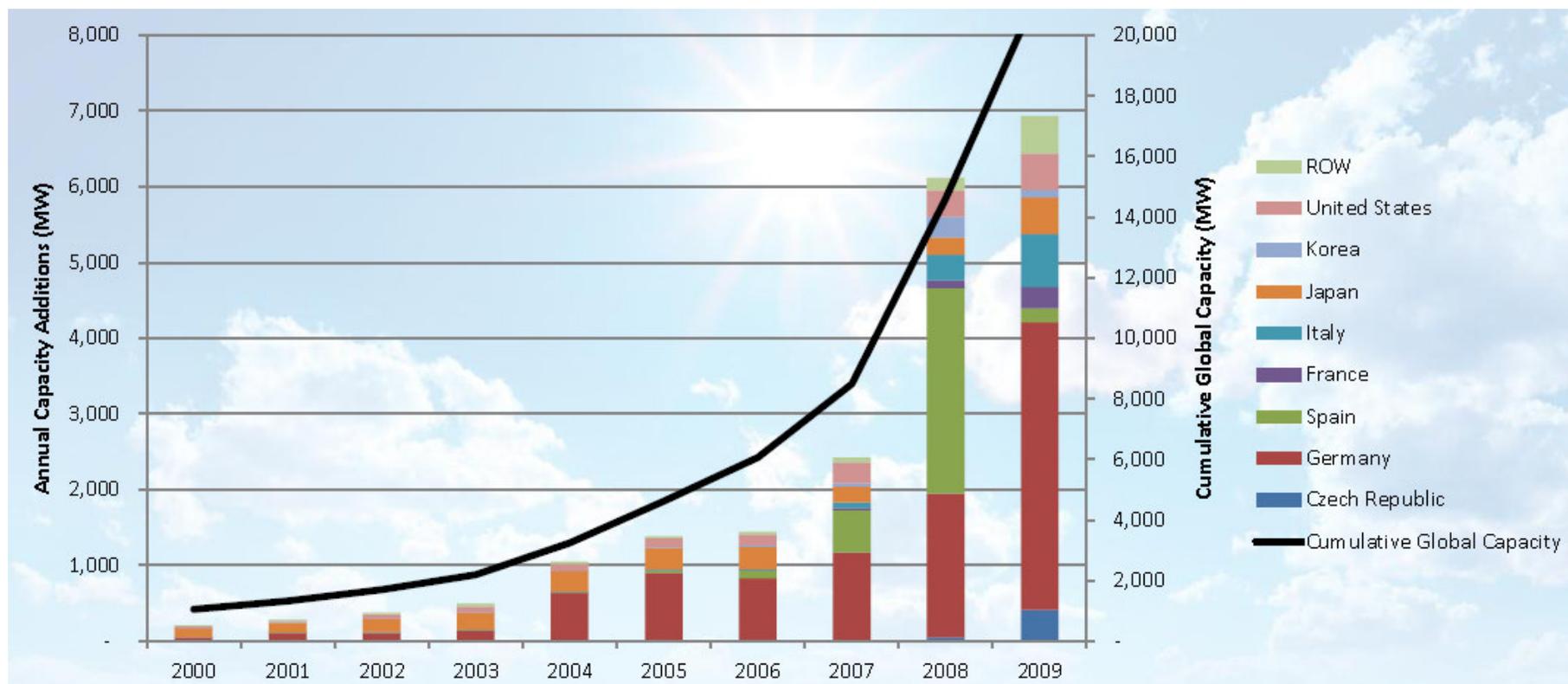


Source: Company estimates on an unsubsidised basis



Global Solar Electric Capacity

- ❖ Global installed solar capacity in 2009 was almost 7 GW with forecasted growth by a further 30% to around 10GW expected in 2010.
- ❖ Global solar electric capacity has now passed 21 GW.

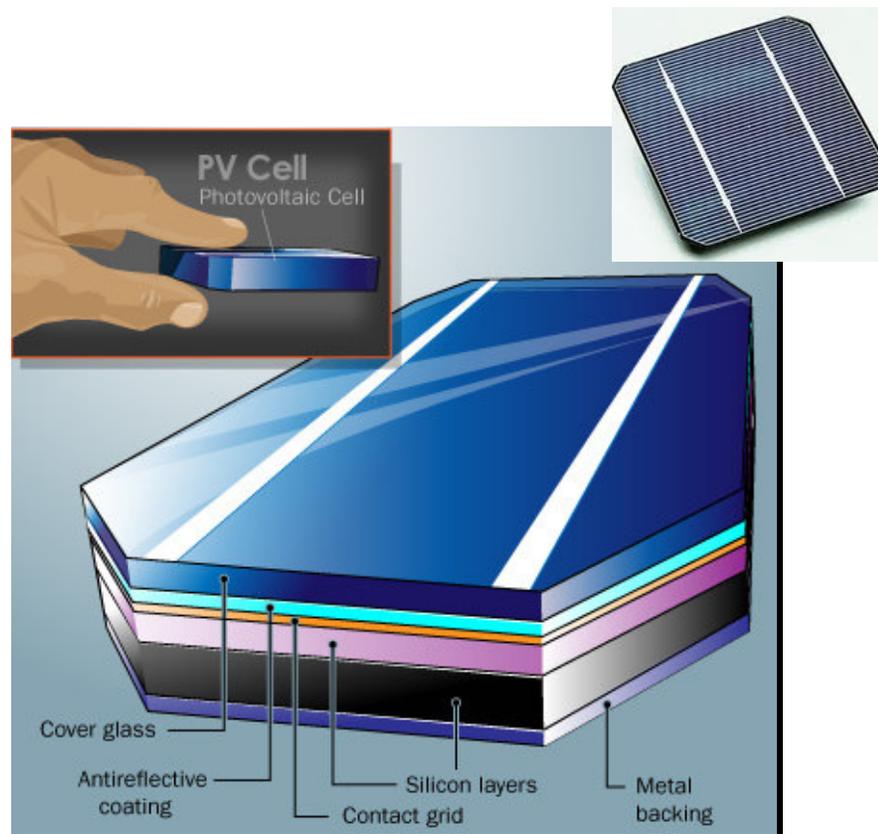


Source: SEIA, 2009



Photovoltaic Solar Cells

- ❖ Photovoltaic (PV) solar cells convert sunlight 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.
- ❖ A safe, clean, reliable source of energy.
- ❖ Lower prices for PV modules identified as the catalyst for continued growth in installed solar generation capacity.

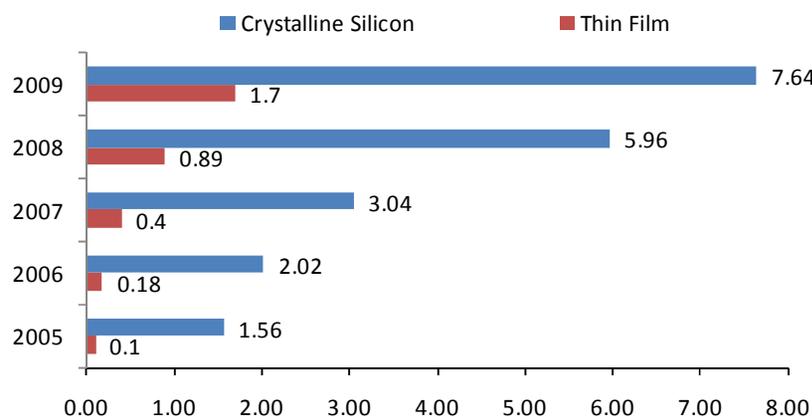




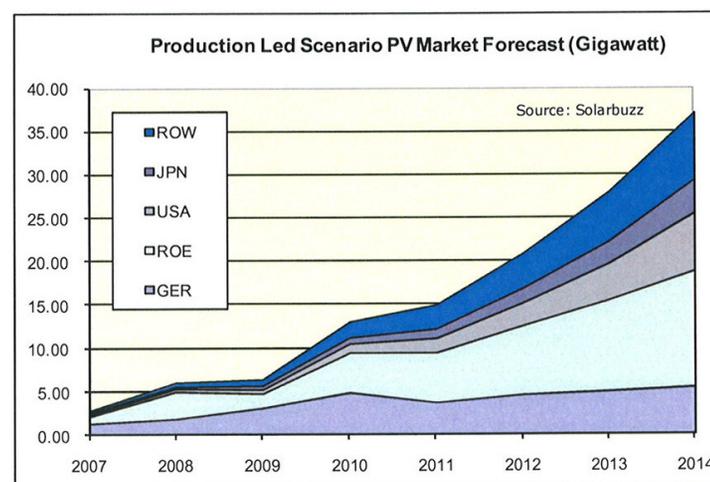
PV Solar Cells – Key Metrics

- ❖ 85% of solar cells are made from crystalline silicon.
- ❖ The cost of a PV solar energy plant is split approximately 50/50 between module cost and installation cost.
- ❖ PV solar panels absorb light energy and convert it into electrical current. The most economical PV panels today utilise silicon as their main material, which represents about 40% of the total cost of a solar panel.
- ❖ Installation cost scales with area, and therefore (inversely) with electrical conversion efficiency:
 - **A 100% increase in the efficiency = half the foot print area required = half the installation cost!**
- ❖ Global solar industry revenues estimated between US\$38-52 billion in 2010 and up to US\$100 billion by 2014.*
- ❖ Global solar photovoltaic (PV) market installations reached a record high of 7.3 GW in 2009, with annual growth averaging a compound rate of 50% since 2005.*

Global PV Cell Production (Gigawatt) 2005-2009*



Global PV Market Forecast (Gigawatt)*



K2's Transaction with Mears Technologies



Exclusive License to Solar Technology

- ❖ Secured the worldwide exclusive license to the MSTTMPV Solution.
- ❖ Commitment to fund the R&D programme of MSTTMPV Solution undertaken by MTI at the rate of US\$1m/year.
- ❖ MTI is be entitled to 50% of the earnings from the commercialisation of the solar technology.
- ❖ K2 intends to commercialise each generation of the MSTTM Solar Technology to large scale solar manufacturers.
- ❖ K2 has invested US\$1 million in MTI by way of a convertible note.

Overview of 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 TechnologyTM (MSTTM) for silicon chips which has been demonstrated to generate significant (leakage) power reduction in silicon CMOS technology.
- ❖ MTI has a portfolio of over 200 patents including 88 granted patents.
- ❖ MTI in major trials with 3 top-ten chip companies – revenue to be generated by technology licensing

MST™PV Solution



MST™PV Solution	
Photovoltaics	<ul style="list-style-type: none"> ▪ Key technology option to realise the shift to a de-carbonised energy supply.
US\$40 Billion Industry	<ul style="list-style-type: none"> ▪ Advances in PV performance largely derived from: <ul style="list-style-type: none"> ▪ Advances in materials ▪ Advances in PV architecture ▪ For PV to become a mainstay energy generating technology, the challenge is to greatly improve the energy absorption and electrical conversion efficiency of silicon.
Silicon	<ul style="list-style-type: none"> ▪ Silicon has been the mainstay PV material for 30+ years. ▪ Base material for 85% of all PV installations. ▪ Accounts for approx 40% of the PV Cell manufacturing cost.
BUT!!	<ul style="list-style-type: none"> ▪ Silicon electrical conversion efficiency only ~15%.
What is MST™PV	<ul style="list-style-type: none"> ▪ Precision nano-doped thin film silicon layer (in development). ▪ Applied to a Solar PV Cell.
Benefits	<ul style="list-style-type: none"> ▪ Performance <ul style="list-style-type: none"> ▪ Significantly higher absorption efficiency (proven) ▪ Significantly higher electrical conversion efficiency (projected) ▪ Ease of cell manufacture <ul style="list-style-type: none"> ▪ No new materials ▪ Uses existing manufacturing tools and processes ▪ High throughput potential ▪ PV economics <ul style="list-style-type: none"> ▪ Opex: reduction in manufacturing cost (less silicon) ▪ Capex: negligible addition to capital equipment ▪ For end-customers: MST™PV means lower installed cost / higher efficiency

MST™PV Commercialisation



MST™PV Commercialisation	
Development Status	<ul style="list-style-type: none"> Optical characterisation of MST™PV done: proven ↑ 5x more absorptive than Si Engineering MST™PV enabled cell underway Side by side bench test (standard PV cell vsMST™PV enabled cell) scheduled Dec-10
Target Market	<ul style="list-style-type: none"> Major PV cell manufacturers
Implementation	<ul style="list-style-type: none"> MST™PV licensed to K2 Energy Limited (ASX:KTE) March 2010 <ul style="list-style-type: none"> MEARS retains 100% ownership of IP and all R&D obligations K2 invested \$1.0m in MEARS and funds min \$1.0m R&D annually K2 responsible for commercialising MST™PV via IP licensing agreements
Products	<ul style="list-style-type: none"> 1st generation MST™PV PV Cell - enhanced absorption (2011) <ul style="list-style-type: none"> Using significantly less silicon = \$/kW reduction 2nd generation MST™PV PV Cell - enhanced absorption + enhanced efficiency (2012) <ul style="list-style-type: none"> Major \$/kW reduction
License Deals	<ul style="list-style-type: none"> Anticipate conversion to license deals during 2011 <ul style="list-style-type: none"> Up-front licensing fee Royalty on PV cell sales payable quarterly (% of sales) License per product generation
The Opportunity	<ul style="list-style-type: none"> 10% penetration of the \$40b global market = \$2b annual PV cell sales * Each 1% royalty on \$2b = \$20m annual revenue to KTE (MEARS 50% profit share) <p>* Assuming each PV cell accounts for 50% of PV array sales</p>

Commercialisation Milestones for 2010



- ❖ Successful optical characterisation tests completed earlier than expected.
- ❖ Light absorption increased by 5-50x, enabling much thinner and more efficient cells made available for initial side-by-side test programme.

Milestone	Details	Timing	Status
Computer Simulation	Simulation to demonstrate achievability.	2Q 2010	SUCCESSFULLY COMPLETED
Optical Characterisation Test	Analysis of materials to determine their light absorption properties	2Q 2010	SUCCESSFULLY COMPLETED
Side-by-side Test	Test undertaken by recognised facility against current PV cell.	Q4 2010	Finalising testing regime
Licensing Agreements	Secure commercial agreements with solar cell manufacturers	2011	Engaging with interested parties

- ❖ **Staged Licensing Programme to ensure early commercialisation**
 - Stage 1: MODULE COST REDUCTION: Targeting 2011 on the basis of a successful test of cells manufactured with a significant reduction in silicon volume achieving the same or greater efficiency in light absorption.
 - Stage 2: EFFICIENCY IMPROVEMENT: Targeting 2012 for a significant increase in efficiency due to greater light absorption.

Appendices



Introduction to MEARS Technologies Inc.

Founder	<ul style="list-style-type: none">▪ Dr. Robert Mears (CEO, President) (British citizen)▪ In mid-1980s he invented the Erbium Doped Fibre Amplifier (“EDFA”)▪ Re-engineered silica optical fibre by adding atoms of erbium to silica atomic lattice▪ This fundamentally changed the <u>optical properties</u> of the silica optical fibre▪ EDFA expanded the bandwidth of optical fibre more than 1,000 x▪ Revolutionised the development of broadband communications
Quarter Century Later	<ul style="list-style-type: none">▪ MEARS Technologies raised >\$52m Spent 9 years on R&D Generated >200 patents▪ Developed the MEARS Advanced Materials Platform▪ Synthesis of quantum mechanical and semiconductor process engineering▪ Focused on re-engineering materials that are strategic to certain multi-billion \$ sectors▪ Fundamental Δs to electrical / optical properties =fundamental Δs to performance▪ Now poised to commercialise new breakthrough re-engineered
Target Industries	<ul style="list-style-type: none">▪ Silicon based semiconductor chip industry▪ Silicon based solar photovoltaic industry▪ Other silicon based industries - magnetic memory, sensors / actuators▪ Silicon now reaching its fundamental electrical / optical limits across each industry▪ Each represent multi-billion \$ opportunities

Appendices



Introduction to MEARS Technologies Inc. (continued)

USP	<ul style="list-style-type: none"> ▪ Generate new material technologies (proven) ▪ Can be inexpensively manufactured (proven) ▪ Can be manufactured in high volume environments (proven) ▪ Breakthrough performance, power consumption and efficiency improvements (proven)
Commercialisation	<ul style="list-style-type: none"> ▪ Business model is IP licensing ▪ 2 x significant products at the forefront of commercialisation: <ul style="list-style-type: none"> ▪ MST™C – licensing scheduled to commence Q4 2010 ▪ MST™PV – licensing scheduled to commence 2011
MST™C	<ul style="list-style-type: none"> ▪ MEARS Silicon Technology™ for Chips (MST™C) <ul style="list-style-type: none"> ▪ \$310 bill industry ▪ Addresses major industry problem of transistor power leakage ▪ Reduces chip power consumption up to 40%-50% Enhances performance ▪ Technology evaluation deals with 3 x leading global chip manufacturers
MST™PV	<ul style="list-style-type: none"> ▪ MEARS Silicon Technology™ for Solar Photovoltaics (MST™PV) <ul style="list-style-type: none"> ▪ \$40bill industry ▪ Strong double digit growth projected over next 5 years ▪ Addresses 3 x key issues: Improved Absorption Conversion Efficiency Lower \$/kW

Appendices



Founder - MEARS Technologies Inc.

Dr. Robert Mears

- Recognised as one of the world's leading experts in photonics
- Successful track record of developing industry shaping technologies
- Invented the EDFA
 - Breakthrough technology in the mid-1980s
 - Re-engineered silica optical fibre by adding atoms of erbium (rare earth element) to silica
 - Expanded the bandwidth of optical fibre more than 1,000 times
 - Led to rapid development of long-distance optical broadband networks in the 1990s
 - Remains a key backbone technology of the internet
- Background
 - British Citizen residing in Massachusetts since 2001
 - Emeritus Fellow, Pembroke College, University of Cambridge
 - Formerly a Reader (Professor) in Photonics at the University of Cambridge
 - PhD in Electronics and Computer Science, Southampton University
 - BA and MA (Physics), University of Oxford
 - Published over 100 papers

Appendices



MEARS Advanced Materials Platform

Materials	<ul style="list-style-type: none">Advances in technology are constrained by the performance of the constituent materials used in any given application - Stone Age, Bronze Age, Steel Age, Silicon Age (chips, photovoltaic cells).
Atomic Structure	<ul style="list-style-type: none">Changing the atomic structure of a material changes its fundamental electrical and/or optical profile and therefore the performance of a given application (e.g. adding atoms of erbium to silica fibre permitted amplification of the optical signal).
Design Platform	<ul style="list-style-type: none">MEARS has developed the MEARS Advanced Materials Platform, a synthesis of:<ul style="list-style-type: none">materials engineering / quantum mechanics (computational materials science).semiconductor process technology and know-how (engineering).
Design Goals	<ul style="list-style-type: none">The Platform generates new energy-efficient material designs constrained by 3 goals:<ul style="list-style-type: none">MUST deliver breakthrough performance characteristics for specific applications.MUST be capable of low-cost production using existing tools.MUST be scalable / robust in high-throughput manufacturing flows.
Opportunity	<ul style="list-style-type: none">Each new candidate material targets a multi-billion dollar market opportunity.

