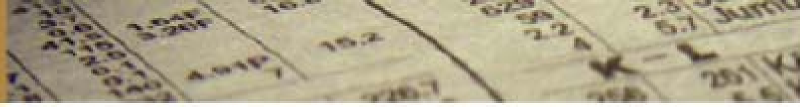


August 20, 2008

VERITAS INVESTMENT RESEARCH

TIMMINCO LTD.

TSX - TIM
Previous Close: C$12.31

The Timminco Primer

Canadian Pacific Tower
100 Wellington Street West
Suite 3110, PO Box 80
Toronto, Ontario, Canada
M5K 1E7

tel: (416) 866-8783
fax: (416) 866-4146
www.veritascorp.com

Special Situations

Neeraj Monga
nmonga@veritascorp.com

Chris Silvestre
csilvestre@veritascorp.com

THE TIMMINCO PRIMER

Timminco Limited (Timminco or the Company) with a market capitalization of approximately $1.3 billion has garnered media and investor attention based on an innovative new technique to produce solar grade silicon (SG Si). From penny stock status in January 2007 to a high approaching $35.00 in June 2008, to its current stock price of $13.00 or thereabouts, returns for early investors have been gargantuan (All amounts in Canadian dollars unless specified otherwise).

It's all about credibility

This report on Timminco is unlike any other published by Veritas. Our report highlights the circumstances surrounding Timminco's rise from obscurity to fame on the investing firmament. Along the way bullish owners of the company's shares have attained superstardom while those skeptical of the company's prospects have been threatened with lawsuits. Some think the stock is worthless, while others believe the company could earn upwards of half a billion dollars in EBITDA in 2010. We believe it boils down to management's credibility, which given the past infractions of Timminco's owners with the law in the U.S. and in Europe is suspect.

We also believe Timminco has not found the solar grade silicon (SG – Si) nirvana. SG-Si is expected to be at least 99.9999% (6N) pure which Timminco's silicon is not, nor does Timminco claim that it is. The company's 2007 AR clearly states that it makes Silicon of 99.999% (5N) purity with levels of Boron (B) and Phosphorus (P) which is acceptable to its customers.

Uncorroborated claims

Nonetheless, the company is trying to improve the quality of its product and claims to be succeeding, as it asserts on the Q2-08 conference call that its current material has much lower B and P content compared to that produced on average in Q2-08. Current specifications are also exponential improvements on 3rd party verified public disclosure of April 01, 2008. However, nothing has been independently verified by an outside agency, nor corroborated by any customers.

Nevertheless, affirmation of the suitability of the company's SG Si from users such as Q-Cells of Germany, currently the largest producer of solar cells in the world, lends credence to Timminco's claims. The problem is that the caveats associated with these contracts/assurances seem to be overlooked in the frenzy surrounding the solar energy markets. Given that spot prices of Polysilicon (Poly), used to make photovoltaic cells, are approaching $250.00/Kg or more, Timminco's Upgraded Metallurgical Silicon (UMG-Si) product which can be blended with Polysilicon to alleviate the shortage, appears to be in demand.

Our report highlights the following issues impacting the solar cell manufacturers and Timminco and accordingly makes an attempt to temper the hyperbole surrounding the company.

- The silicon boom.
- The myth of lower capital expenditures at Timminco.
- The significant capacity additions being planned by Polysilicon manufacturers.
- The provisional patent application.

- The economics of Timminco's process.
- The efficiency degradation in photovoltaic cells experienced by solar cell manufacturers using UMG-Si and the related impact on the entire value chain.
- The economic value of low grade feedstock.
- Who is using low grade feedstock and why?
- The balanced silicon market and Timminco's conundrum.
- Its convoluted ownership

We conclude that by 2010/2011 photovoltaic demand for SG-Si and its supply are likely to be in equilibrium. In a balanced market, assuming spot prices return to $60.00 or thereabouts, then based on the independently verified material specification outlined in management's April 1st presentation, each Kg of UMG-Si will contribute approximately $11.00 to company's EBITDA.

Final product quality will determine the full economic cost of Timminco's Silicon

If management can consistently deliver material meeting the specifications announced during the Q2-08 conference call, then Timminco would earn upwards of $39.00 per Kg of UMG-Si.

While Timminco claims that it can produce UMG-Si at a cost of $10-$15/Kg., we believe that based on 3rd party verified product specifications, the full economic costs of Timminco's Si is approximately $57.00 Kg.

Our review of industry literature, the view expressed by various industry participants in public forums, circumstantial evidence surrounding lack of progress in volume delivery at Timminco, a convoluted ownership structure involving a publicly listed company in Amsterdam, which in turn is owned by a private equity partnership based in the U.S. that will be unwinding by March 31, 2009, all suggests to us that it will be a miracle if Timminco can deliver on its promises.

Investing however is about diligence and fortitude and not miracles. Sell.

TERMS TO KNOW

Polysilicon – High purity silicon, usually over 99.999999% in purity; produced mainly by the capital intensive Siemens process.

Metallurgical grade silicon (MG) – 98.5% pure silicon used in metallurgical applications.

Upgraded metallurgical grade silicon (UMG) – Usually 99.999% pure silicon; metallurgical refining steps applied to MG in order to bypass capital intensive Siemens process.

Directional solidification (DS) – A technique used to transform silicon chunks, as delivered by silicon manufacturers, into solid cubes or cylinders ready for wafering into solar cells by melting the chunks and then solidifying the melt from one end to another (not all at the same time). Also results in the purification of the silicon feedstock by re-distributing the impurities (elements) throughout the solidified block or cube, as the impurities have a propensity to remain in the un-solidified melt.

Segregation coefficient – A number that varies for each element; dictates how the element will be re-distributed throughout a post directional solidification cube or cylinder.

Scheil equation – An equation that governs how the impurities are distributed throughout a directionally solidified ingot, based on the segregation coefficient of that impurity.

Multi/mono-crystalline – Descriptors for the way the silicon lattice is arranged in the post solidified silicon cube, cylinder, or wafer. Mono-crystalline cells are more efficient and exhibit one continuous silicon lattice, whereas multi-crystalline cells exhibit no particular pattern in the silicon lattice.

Czochralski process – A directional solidification process whereby silicon cylinders (ingots) are formed that exhibit mono-crystalline lattice structure.

ppmw – A measure of the proportion of weight of a particular element within a substance relative to the total weight of the substance, expressed in parts per million.

ppma – A measure of the number of atoms of an element in a substance relative to the total number of atoms in a substance, expressed in parts per million.

Types of Solar Cells

P-type cell – A solar cell that has more Boron atoms than Phosphorus atoms in the silicon base material.

N-type cell – A solar cell that has more Phosphorus atoms than Boron atoms in the silicon base material.

Figure 1:

Optimal Boron and Phosphorus Content for State of the Art Solar Cells

	Multi-Crystalline Cells 15.0%-16.5% Efficiency	Mono-Crystalline Cells 16.5% -17.0% Efficiency
B (ppma)/(ppmw)	0.35/0.13	0.10/0.04
P(ppma)	< 0.05	< 0.05
Other Metals (ppma)	< 0.05	< 0.05

Source: Q-Cells, 18.11.2006

The making of a solar cell – Polysilicon received in chunks at the wafer manufacturers' premises, undergoes directional solidification in furnaces to make circular or square ingots. These ingots are then sawed into thin wafers which become part of solar modules. Somewhere between DS and wafering, impurities in the form of B and P are added to the highly pure polysilicon to make it conductive.

SILICON

Silicon, the 8th most abundant element in the universe, is the second most common element on earth, by weight, after Oxygen, comprising 25.7% of the earth's crust. It never occurs free in nature, but only in combination with oxygen, in the form of quartz rock or silica sand. The quartz rock is reacted with various forms of carbon in a large furnace in order to separate the Si from the O; the carbon combines with the oxygen to form carbon monoxide gas, which is further oxidized to carbon dioxide gas, leaving behind silicon. The resultant Si is called metallurgical grade (MG); and is still rife with metallic and other impurities, which must largely be removed in order to produce silicon suitable for use in solar cells.

Without getting into specifics, for our purposes we accept the fact that silicon is particularly suited for the production of solar cells. To corroborate, the photovoltaic industry produced 2.54 GigaWatt of solar cells in 2006, 89.9% of which were made from mono- and multicrystalline Si wafers, 7.4% from thin films (Cadmium Telluride and others) and 2.6% from silicon ribbons.[1] SG has significantly higher purity than lower metallurgical grade silicon (MG), although it can be lower than electronic grade silicon (EG or polysilicon), which is used in the manufacture of semiconductor devices.

While MG can have up to 10,000 parts ppma of impurities and polysilicon requires less than 1 part per billion atomic (ppba) of impurities, SG should have no more than 5 ppma of metallic impurities.[2] In industry parlance SG should be at least 6N pure, while EG used in semiconductors is at least 99.9999999% or 9N pure. Figure 2 highlights the impurity content at various specifications.

Figure 2
Impurities in Parts per Million Atomic

	MG	SG	EG
% Pure Si	98.5% -99.0%	99.9999%	99.9999999%
Impurities			
PPM	15,000-10,000	0.5	0.0005

Clearly, purity requirements for solar cells are not as stringent as those for semiconductors. However, in the past, there was no dedicated source of silicon supply for the solar industry, and silicon was sourced from raw material rejects and off specification material produced by high grade semiconductor silicon manufacturers, such as TOKUYAMA of Japan and Wacker Chemie AG of Germany.

1 *Industrial Silicon Wafer Solar Cells – Dirk-Holger Neuhaus and Adolf Munzer, Advances in OptoElctronics, Volume 2007.*

2 *United States Patent Number U.S. 6,368,403 B1 April 9, 2002*

PRODUCING POLYSILICON

Producing Polysilicon is no walk in the park. The technology is capital intensive, has long lead times and there are only a few firms in the world capable of doing the design and construction of the facility. The ultra high purity is achieved first by the preparation of a volatile silicon hydride and its purification generally using fractional distillation[3]. This is followed by the decomposition of this hydride to very pure elemental silicon by reductive pyrolysis or chemical vapour deposition[4]. Many processes to produce polysilicon have been tested and patented over the years. Currently, three large commercial processes are active;

Highly technical and capital intensive

1. The Siemens Process – It is based on the thermal decomposition of tricholrosilane (a compound of silicon and Hydrochloric acid) at 1100° C onto a heated silicon rod.

2. A more recent process, developed by the now defunct Union Carbide Corporation, where the tricholrosilane has been replaced by monosilane SiH_4, but the principle of decomposition on a heated silicon rod inside a closed decomposition chamber is maintained.

3. In the third process, the heated silicon rod in the closed chamber has been replaced by a fluidized bed of heated silicon particles. The particles act as seeds on which SiH_4 is continuously decomposed on to larger granules of highly pure silicon. This is a continuous process unlike the previous two.

The end result of all three production processes is highly pure chunky polysilicon (9N-11N purity), that is not suitable for solar cell production; small proportions of B and P need to be introduced (a process called doping) to enable electrical conductivity. Additional steps involve directional solidification (DS) to make ingots for wafering. Wafers ultimately become part of modules that convert solar light into electric current.

THE SOLAR INDUSTRY HAS BOOMED…

The relentless upward march of oil prices, the emergence of fiscal support in the European Union for renewable sources of energy concomitant with an increasingly vocal green movement, have all contributed to an explosion in alternative energy demand in the world. Figure 3 depicts the tremendous growth experienced by the solar energy sector and highlights equally optimistic expectations going forward.

3 Fractional distillation is the separation of a mixture into its component parts, or fractions, such as in separating chemical compounds by their boiling point by heating them to a temperature at which several fractions of the compound will evaporate.

4 Chemical vapor deposition (CVD) is a chemical process used to produce high-purity, high-performance solid materials. The process is often used in the semiconductor industry to produce thin films.

Figure 3
Demand for Solar Energy

Secular growth

	2004	2005	2006	2007	2008E	2009E	2010E
MWp installed	1,087	1460	1,744	2,826	4,307	5,948	9,434
Growth YOY	82%	34%	19%	62%	52%	38%	59%

Source: Wacker Chemie AG – Positioned for Growth, June 12, 2008

Between 2004 and 2007, the solar energy sector grew at a compounded rate of 37%, and it is forecast to increase to an annualized growth rate of 48% from 2007-2010. Clearly, the sector is delivering on promised growth and is expected to continue to do so. However, the growth, though impressive, pales in comparison to the total energy requirements of the world. For instance, as of January 1, 2005, Canada had 120,282 MW of installed capacity; 29% gas and coal, 59% hydroelectric, 11% nuclear and 1% renewable (solar, wind, biomass and geothermal)[5]. Therefore, on a global scale, if solar power can become self sustaining, the sky is the limit.

…AND SO HAS DEMAND FOR SOLAR GRADE SILICON

The growing demand for solar power impacted the supply chain upstream and caused severe shortages of Si, despite improving efficiency in silicon usage on a per watt basis. A typical solar cell of 16% efficiency, made up of a wafer of 165 micrometer (µm or microns) width, consumed 10 grams per watt of Si in 2007.[6] Since 2003, wafer width in µms has halved and cell efficiency has improved by a total of approximately 9%, and therefore Si requirements during this time period, on a per watt basis have declined exponentially[7].

Silicon usage at Photowatt International (Photowatt) decreased 30% from 2004 to 2006 with the wafer width declining from 320-340 microns to 180-220 µm[8]. However, explosive growth in solar module production far outweighed the declining usage/watt igniting demand for SG-Si. Figure 4 highlights our estimate of the total growth in demand for Si as a result of the spectacular growth in production of solar modules using 2007 data on Si usage/watt.

Figure 4
The Silicon Boom

Boom times in the business

	MWp Installed	Silicon Usage in Tons
2004	1,087	10,870
2005	1,460	14,600
2006	1,744	17,440
2007	2,826	28,260

Source: Veritas estimates, Wacker Chemie AG, Industry research

5 U.S. Energy Information Administration
6 Dick Swanson, Presentation by SUNPOWER at Solar 2007
7 Based on data provided by Q.Cells in the 2007 AR
***8** Photowatt International IPO prospectus February 28,2007*

The annual consumption of Si was 4000 tons in 2000[9]. In a span of six years, demand increased by a factor of 7, despite increasingly more productive methods of manufacturing. Industry production of polysilicon was a shade below 25,000 tons in 2000 and approximately 34,000 tons in 2005, of which photovoltaic demand was 13,000 tons[10]. While polysilicon production capacity in five years grew by 9,000 tons, corresponding solar demand grew by approximately 10,600 tons.

Needless to say, with demand for semiconductors continuing to grow worldwide, spot purchasers of Si were caught in a price squeeze and Si prices rocketed skywards.

> "*According to Solarbuzz, the average price of virgin polysilicon under long term supply contracts is expected to increase from approximately U.S.$35 to U.S.$40 per kilogram delivered in 2005 to U.S.$65 to U.S.$75 in 2008. In addition, according to Solarbuzz, spot polysilicon prices ranged from U.S.$250 per kilogram to U.S.$400 per kilogram in 2007*."
>
> LDK Solar Co. Ltd., 20-F, April 07, 2008

High prices for silicon created a market opportunity for companies looking to displace polysilicon and introduce upgraded metallurgical silicon (UMG) to solar cell and module manufacturers as a cheaper alternative.

Timminco is one amongst many on this quest for the holy grail of UMG. Figure 5 highlights a multitude of players entering the Si business in addition to expansion plans of existing participants.

9 Solar grade silicon feedstock, Bruno Ceccaroli and Otto Lohne, Handbook of photovoltaic science and engineering.

10 SoG-Si Feedstock: status, problems and solutions – R. Kopecek, University of Konstanz

Figure 5
It Will be a Slugfest

	Existing Players Increasing Polysilicon Capacity	New Entrants with Either UMG or Polysilicon Process
1.	Hemlock Semiconductor (U.S.)	Dow Corning (U.S)
2.	Wacker Chemie AG (Germany)	Elkem Solar AS(Norway)
3.	REC (Norway)	Solarvalue AG (Germany)
4.	Tokuyama (Japan)	Timminco (Canada)
5.	MEMC (U.S.)	DC Chemical(Korea)
6.	Mitsubishi (Japan)	SilPro (France)
7.	Sumitomo (Japan)	Shunda (China)
8.	-	Hoku (U.S.)
9.	-	LDK Solar (China)
10.	-	Nitol (Russia)
11.	-	Degussa (Russia)
12.	-	JSSI (Germany)
13.	-	Photosil (France)
14.	-	Globe Specialty Metals (Canada)
15.	-	6N Inc. (Canada)
16.	-	Arise Technologies (Canada)

Source: Veritas, Industry annual reports and presentations

A multitude of players entering the space

It is expected that by 2011, Hemlock Semiconductor Corporation (Hemlock) of the U.S. will have an annual polysilicon capacity of 36,000 tons per year. At that level, Hemlock would be bigger than the production of the entire polysilicon industry in 2005. We estimate that existing producers of polysilicon, and new entrants like Elkem Solar AS (Elkem), LDK Solar (LDK) and Arise Technologies, will likely produce upwards of 131,000 tons of SG Si by 2012, compared to estimated demand of 100,000 tons[11]. This estimate excludes supplies from UMG-Si players like Timminco and others. Moreover, a seven player capital intensive business is rapidly turning into a 23 player market, with most new entrants proclaiming low capital costs and, supposedly, an acceptable product.

Solarvalue AG (Solar), one of the new entrants, is publicizing an UMG process producing SG of 99.9998% purity compared to the solar industry requirement of 6N, and "[expects] that the current shortage of silicon raw material will be resolved by new production capacities in 2010 or perhaps already in 2009", by the time their process comes on stream[12]. Solarvalue expects to have annual production capacity of 2,000 tons by the end of 2008. Production costs are estimated at under €20 per Kg, including directional solidification, which are higher than Timminco's estimate of $12 per Kg. for 2008,[13] excluding directional solidification.

11 SOG SI feedstock: status, problems and solutions, R. Kopecek, University of Konstanz, Germany.

12 Solar Value Annual Report 2007. (Based on a process developed by BP Solar in the eighties)

13 Timminco AIF, March 28, 2008 and Solarvalue presentation dated November 2007.

LIFTING CAPEX FOG

With capacity additions and expansions underway worldwide to meet SG Si demand, capital cost comparisons are a favourite pastime to highlight the low cost advantage of Timminco. We believe such comparisons are unwarranted. For instance, LDK and Hemlock are in the process of adding polysilicon capacity (9N -11N purity) whereas Elkem and Timminco are adding solar grade silicon capacity (6N purity, although Timminco is not able to produce 6N yet). Figure 6 contrasts capital costs of those expansions with that of Timminco.

Figure 6

Capacity Additions and Costs

	Elkem Solar	LDK Solar	Hemlock	Timminco
Capacity Addition in tons	5,000	16,000	17,052	14,400
Total Capital Cost (US$ M)	645	1,200	1,000	93
Capital Cost per ton	129,000	75,000	58,644	6,458
Production Technology	Proprietary process	Siemens Process	Siemens Rod Process	U.S. patent pending for the metallurgical production process
Full capacity by	2009	2009	2010	2010
Product Quality	Typically > 15% efficiency with wafer breakage equaling that of polysilicon	Silicon purity in ppba as per contract with suppliers of equipment	Polysilicon quality	No data provided by the company
Expected production cost	< 20 USD/Kg	Unknown	Unknown	$12.00/Kg

Source: Company disclosures, Annual Reports, Investor Presentations. Press Releases

While Timminco's capital cost advantage appears conspicuous, the capital cost differences between LDK, Elkem and Hemlock are also significant.

Based on public disclosures, we believe that Elkem's process includes all costs along the value chain, up until the wafering stage.

A game of unequals

LDK produces chunky polysilicon, which then undergoes the DS process at additional cost. Therefore, in addition to the $1.2 billion (B) LDK is spending on manufacturing Poly, it has also ordered 242 Directional Solidification System (DSS) furnaces from GT Solar at substantial additional cost. It already owns 134 DSS furnaces[14]. These furnaces will allow LDK to directionally solidify its product in order to bring it to the same point in the value chain as Elkem's product. Correcting for the equipment cost differences, the capital costs of Elkem and LDK are roughly similar.

Like LDK and Hemlock, Timminco aims to supply chunky Si, albeit of a much lower grade, to its customers. So to analyze the capital expenditures on a comparable basis to those of Elkem, we must add over $300M to Timminco's budget to reflect the number of DS furnaces required to process 14,400 tons of silicon and bring the silicon to the same point in the value chain as at Elkem (post directional solidification). On a per ton basis, this would still amount to $27,000.

[14] *LDK Solar form 20-F, April 07, 2008*

Based on Timminco's Q2-08 disclosure and our discussion with management, its customers expect Timminco to achieve the product specifications of 0.5 ppmw of B and 1.5 ppmw of P by 2010, which is equivalent to that of Elkem's UMG-Si which Q-Cells has agreed to buy. (Optimal requirements are outlined in Figure 1 on page 3)

Is the industry headed towards stranded costs?

If Timminco could improve its current processes to deliver material comparable to that of Elkem, it would result in significant stranded costs for the entire polysilicon industry, which is banking on booming solar demand to keep capacity utilization high. Based on current estimates, production is expected to be more than expected demand by 2011/2012. Therefore, either the Polysilicon players are underestimating Timminco and its clan, or some investors are over enthusiastic about the prospects of UMG-Si players.

Still, Timminco management claim that the company has a valuable process that is worth defending and has demonstrated this through a patent filing.

THE TIMMINCO PATENT

Apparently the frenzy surrounding Timminco's prospects began with a press release stating that Timminco had filed a patent application for its UMG-Si process. Is Timminco's process groundbreaking? A patentable incremental improvement on existing processes maybe, but earth shattering definitely not. Timminco's provisional application for patenting the UMG process is titled, "Method and apparatus for smelting silicon from slag".

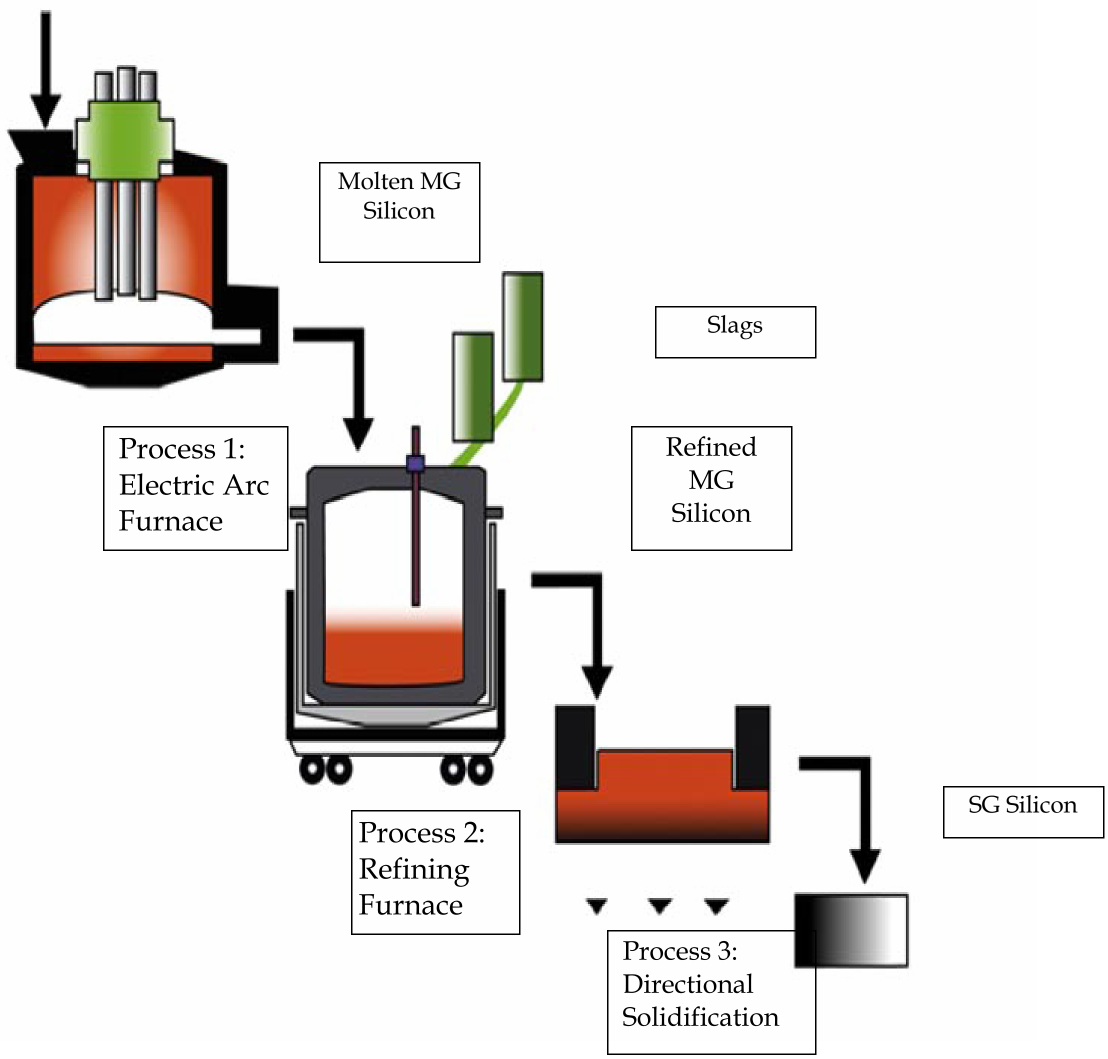
Page 12 and 16 of that application make the following assertions.

> "As already explained the method of the present invention is particularly advantageous for <u>smelting silicon from slag</u> and recovering purified silicon". [Emphasis added]
>
> ".... Furthermore, the above described method of the present invention <u>can also be advantageously used in combination with unidirectional solidification</u> method of the same Applicant..., for manufacturing solar grade silicon from metallurgical grade silicon." [Emphasis added]

Our research suggests that none of that underlined above is novel. Various scientists at the National Renewable Research Laboratory in the U.S. hold patents on similar processes. Moreover, even if Timminco's process is unique, there are other companies that are using a slightly different process than that of Timminco to achieve similarly higher levels of purity in silicon production.

For instance, Figure 7 highlights the process used by Solar for producing its 99.9998% pure SG silicon. Similarities with Timminco's claims are apparent.

Figure 7
Upgrading Metallurgical Grade Silicon to Solar Grade Silicon



Source: Solarvalue Annual Report 2007

Timminco's patent application filed with the World Intellectual Property Organization (WIPO) essentially says that the MG-Si is placed in a rotary drum furnace with an oxy fuel plasma burner (comparable to process 2 in Figure 7), where it is melted with a nitrogen-oxygen gas mixture. This causes all of the volatile elements to burn off as fumes. Additionally, a slag compound (a specially formulated mix) is introduced in order to suck up other impurities in the melted MG-Si (comparable to process 2 in Figure 7). With agitation and time, impurities in the slag and MG-Si reach equilibrium, thereby improving the purity concentration in the MG-Si.

Refined MG silicon then undergoes directional solidification to redistribute impurities with a low segregation content thereby resulting in SG silicon (comparable to process 3 in Figure 7). Now terminology, nuance and engineering aside, we fail to fathom any significant differences in Solar's process.

More importantly, Solar clearly states the purity level of its product; 99.9998%, whereas Timminco merely says the purity of its product is between 5N and 6N. Solar also says that the maximum theoretical yield of its process is 40%, which is lower than Timminco's claims of 50% or more.

Q-Cells made a presentation titled "Chances and obstacles of Si feedstock purity for solar cells from the Q-Cells perspective" in November 2006. Slide 15 of that presentation highlights a process similar to that of Solar, devised by Crystal Systems Inc., a pioneer of UMG-Si research and development. The principal owners of that firm (C.P. Khattak, D.B. Joyce and F. Schmid) have multiple U.S. patents in their name and have received funding in the past from the Department of Energy (DOE) in the U.S[15].

WHOSE PATENT IS IT ANYWAY[16]?

Page 11 of Timminco's provisional application says the following.

"... it has been known that silicon became purified of boron when the melting was carried out in a flow of a weakly oxidizing mixture of Ar-H_2-$H_2$0." - A

Then on Page 5 of its provisional patent application Timminco says;

"... the use of a rotary drum furnace equipped with an oxy-fuel burner for smelting silicon from slag was never been experimented yet". - B

The first issue we want to highlight is that there are significant similarities between the language used in the patent application and standard reference text books such as the Handbook of Photovoltaic Science and Engineering published by Wiley. We quote an entire paragraph from chapter 5 of the 2008 reprint, page 196.

Striking similarities between standard text books and Timminico's provisional patent application

> "Since the work published by Theuerer in 1956, it has been known that liquid silicon becomes purified with respect to boron when brought in contact with a gas mixture of Ar-H_2-H_2O (very similar to A outlined above). The sole role of H_2 and H_2O assisting the extraction has been emphasized by several authors such as Khattak et al., ... and the Japanese group of Kawasaki Steel[and NEDO] underlined the benefit of using oxidative plasma(B) in the presence of moisture and hydrogen".[17]

A cursory look comparison of the quote to the patent application suggests that language similarities are striking. While the usage of a rotary drum furnace might be new, the rest is not. The oxidative plasma referred to in the Kawasaki study is an oxygen rich heat source, which the oxy-fuel burner of Timminco purports to be.

Ultimately, industry experts believe that the Japanese program to produce upgraded metallurgical grade silicon was the most accomplished involving four steps[18].

---

15 Patent Number 6,368,403 B1, 5,972,107 A and others

16 This section makes extensive use of information from chapter 5 of Handbook of photovoltaic science and engineering.

17 Suzuki K, Sakaguchi K, Takano K, Sano N, Japanese Metallurgical, 168-172 (1990), NEDO= New Energy and Industrial Technology Development Organization of Japan

18 Solar Grade Silicon Feedstock, Bruno Ceccaroli and Otto Lohne

1. Melting of silicon by electron beam and evaporation under vacuum;

2. First directional solidification;

3. Re-melting of silicon and gas treatment (Oxygen+Water) assisted by plasma torch; and

4. Second directional solidification.

To close the loop on Timminco's patent; Page 16 of its provisional application states the following and we quote;

> "The process may comprise the steps of:
>
> 1. Melting metallurgical grade silicon in a rotary drum furnace equipped with an oxy-fuel burner;
>
> 2. Solidifying the melted silicon by the unidirectional solidification process described in US60/808,948 to provide a solid purified silicon;
>
> 3. Melting the solid purified silicon in a rotary drum furnace equipped with an oxy fuel burner; and
>
> 4. Solidifying the melted silicon obtained at the previous step by unidirectional solidification to provide an even more purified solid silicon".

Once again, the conceptual similarities between Timminco's claims viz. steps 2, 3 and 4 to those of the processes developed by NEDO and Kawasaki, who have invested hundreds of man years in research in development and significant capital, are clearly visible.

It's not new

However, Timminco does not claim to have invented anything new, and admits the metallurgical processes employed are well documented. The claim is that the company has employed the correct type of equipment (the rotary drum furnace), which allows the technology to be deployed on a commercial scale. The simplicity is worrisome and even if such basic equipment can be patented a multitude of others entering the UMG-Si are also filing for patents with similar claims.

But does the UMG technology actually work? Is it economic? To answer these questions, much deeper knowledge of the technology is necessary, our understanding of which we expound below.

THE ECONOMICS OF TIMMINCO'S PROCESS

Given that we know the spot prices of polysilicon, if Timminco provided information on variable cost of production of its UMG, it would be a simple calculation to estimate the economics of its business. So far, those seeking useful information have been rebuffed. The company provides no data on:

No information

- Cell efficiency
- Cell durability
- Cell degradation
- Spot pricing policy
- Contract pricing policy
- Process costs
- Melt and solidification time required to determine capacity
- Material yield during ingoting
- Ingoting costs
- Wafer yield per ingot

In the absence of any of this information Timminco's claims need scrutiny. At the 4th silicon conference in Munich on April 03, 2007, Elkem publicly disclosed data on cell efficiency, cell degradation, wafer yield and breakage, product stability and a few other characteristic of its UMG-Si. Moreover, Elkem's contacts with Q-Cells are "Take- or-pay[19]" until contract expiry in 2018, unlike Timminco's.

> "The terms of the Company's [**Timminco's**] new solar silicon contracts provide certain customers with limited rights of return. Revenue from such contracts is recorded net of an adjustment for estimated returns. The Company's estimate of returns requires assumptions to be made regarding the market price for solar silicon scrap in concert with actual experience of returns received. Should this estimate and these experiences change, the return provision will be adjusted in the period".
>
> Timminco Quarterly disclosure – Q1-08

Clearly, Timminco's customers are not entirely convinced by the company's claims and have protected their downside by quality specifications and inserting product return clauses in their contracts. Nonetheless, Q-Cells' CEO, Anton Milner said that, "The results that we have got on the Timminco product are with cell efficiency rates of well above 15%, which makes it a very interesting product, particularly given the cost of the alternative products"[20].

19 Presentation by Elkem's parent company ORKLA, May 31, 2007, Capital Markets Day

20 Q-Cells backs challenged silicon supplier Timminco, Tuesday, April 22 2008, Reuters News Agency.

In Q2-08 Timminco reported that it had received $23.9M in pre-payments from its customers, which would be credited against future deliveries of solar grade silicon. These amounts however are refundable under certain circumstances. The company is expecting another $37.1M through the rest of the year from its customers. These pre-payments will be utilized to meet the capital expenditure requirements associated with its announced capacity expansions.

ESTIMATING TIMMINCO'S COSTS[21]

Just to recap, manufacturing silicon for use in the production of solar cells involves multiple steps. The first, a well known process with which we will not concern ourselves, is to break down quartz rock through a reaction with carbon, a process that results in silicon that is 98.5% pure, or MG silicon. Second, Timminco's process involves melting this MG silicon in an oxy-fuel burner rotary drum furnace, then treating the melt with slag in order to obtain a purified silicon product, suitable for solar cells.

The silicon resulting from both Timminco's and other processes is in a chunky form, which must still be melted and re-solidified into a square or cylinder using a process called directional solidification. The resulting block silicon is then sliced into wafers, ready for solar cell manufacture.

Based on various publicly available disclosures, we have pieced together information that shows Timminco's product specification over time and also draws a comparison to SolSil, a competitor.

Figure 8

Competing Product Quality in Parts per Million Weight

	SolSil*	Timminco April Pres.	Timminco Q1	Timminco Q2
Boron	0.53	0.89	0.80	0.50
Phosphorous	1.10	4.50	3.00	1.70

Source: Elkem Solar and Globe Specialty Metals @ 6th Solar Conference Munich. Timminco presentation of February 07, 2008.

**A Globe Specialty Metals company*

Can Timminco deliver on improved product specification?

SolSil appears to have better specifications than Timminco's, though given that process type, yields and consistency are unknown; no definitive conclusions can be drawn.

A process that successfully deals with B and P also generally results in a product that meets the broad 5N purity criteria. Therefore, most of the processes beyond MG silicon are concerned with reducing B and P to lower levels. Timminco's patent application provides a useful formula for determining the level of B before and after its refining process is employed. The patent application does not provide a clear process for getting rid of the P.

21 Carbon and Oxygen concentrations also have an impact on cell performance and ingot yield. Since Timminco does not disclose that information, we have focused our attention on Boron and Phosphorus only.

GETTING RID OF BORON

Timminco's process is aimed primarily at removing all unnecessary Boron impurities from the metallurgical grade silicon. From the patent application, we estimate that one pass through Timminco's process reduces the B impurities by 2.7 times.[22]

Ultimately, the number of times the process must be run depends on how pure the MG-SI is to begin with; the desired specification is about 0.5 ppm B and 1.5 ppm P. Figure 9 summarizes the output of each run, depending on the initial impurity of the MG-Si. If the initial MG-Si contained 30 ppmw of B, on the fourth run B content would be lowered to a level much closer to that announced by Timminco on April 01, 2008.

Figure 9
Iterating Away Boron

Starting MG-Si	Boron Impurities (ppmw)			
B impurity (ppmw)	Iteration 1	Iteration 2	Iteration 3	Iteration 4
30.00	11.11	4.12	1.52	0.56
40.00	14.81	5.49	2.03	0.75
50.00	18.52	6.86	2.54	0.94

Source: Timminco patent and Veritas calculations

Silgrain, a high purity MG-Si produced by Elkem, contains about 25 ppm B and P, which would require four runs to achieve the acceptable impurity levels.

Management speak

Timminco's Rene Boisvert has told us that Timminco's MG-Si contains 10 ppm B and 25 ppm P (No published product specification of Timminco's material is available). Therefore, Timminco would have to pass the material through its process three times in order to get silicon of acceptable quality.

With the above information, we can estimate the cost of the process per kilogram of useable Si. Techniques similar to those of Timminco have been attempted in the past and are well documented, including the attempt by the US National Renewable Energy Laboratory (NREL) in 2001[23]. Timminco's process is remarkably similar. The costs of the process, along with adjustments needed to arrive at Timminco's estimated costs are outlined in Figure 10.

---

22 We have simplified here; the preceding assumes that the mass of MG-Si and slag are equal throughout the treatment process. However, putting more slag in would result in greater purification, but would also result in increased process time, and lead to less silicon being processed (because the drums can only handle so much material). So, we assume that the optimal mix for one run includes equal amounts of MG-Si and slag.

23 Production of Solar Grade (SoG) Silicon by Refining Liquid Metallurgical Grade(MG) Silicon, Final Report, April 19, 2001, NREL

Figure 10
Estimating Timminco Process Costs

Upgrading Costs as per NREL, per kg of silicon		Adjustments	Timminco Est. Costs
Direct Labor for Refining	$0.90	$-	$0.90
Ancillary Labor	0.45	-	0.45
Overhead	0.45	(0.45)	-
Feedstock	2.50	(2.50)	-
Crucible	1.25	(1.25)	-
Gases*	1.13	(0.73)	0.40
Slags	0.13	-	0.13
Expendables	0.25	-	0.25
Electricity	0.32	-	0.32
Miscellaneous	0.25	-	0.25
Total cost per iteration	$7.63	$(4.93)	2.70
Iterations (to get < 1 ppmw B)			3
Iteration costs per charge			8.10
Plus: feedstock cost			2.00
Total process cost/kg			$10.10

* *Based on patent calculations, 6.5 hrs at high heat, 1 hr at low heat, 2.5 mt of silicon*

Source: NREL "Production of Solar Grade Silicon by Refining Liquid Metallurgical Grade Silicon", April 19, 2001 and Veritas adjustments

Based on Timminco's patents we believe that a crucible will not be required and therefore we deduct the cost of the crucible from Timminco's process. Similarly, other overhead and allocable costs are removed from our calculation. Including feedstock costs, we arrive at an estimated cost of $10.10 per Kg for the company's upgraded Silicon. Thereafter the refined molten silicon undergoes unidirectional solidification which has additional costs along the value chain.

Timminco outlines in its annual information form that it can manufacture UMG at a cost approaching $12.00. Our estimates are similar, except that the product is not SG-Si yet.

WHAT ABOUT PHOSPHORUS?

So far we have only dealt with B. The material needs to be purified of most of the P. Timminco's process removes a substantial portion of P, but there are limits to the method's purification ability. The relevant data is summarized in Figure 11.

Figure 11
Boron and Phosphorus Concentration in Timminco's Samples

	Concentration (ppmw)	
Element	Q1 Timminco	Q2 Timminco conference call
Boron	0.8	0.50
Phosphorus	3.0	1.70

Source: Timminco presentation February 07, 2008

DIRECTIONAL SOLIDIFICATION

To obtain SG Si, Timminco's product must be directionally solidified (DS). In fact, all Si that is used in the production of multi crystalline (mc) solar cells must be.

A DS successfully redistributes the impurities among the silicon according to each element's segregation coefficient, with the fewest impurities located at the end of the silicon block that was first solidified. Elements with lower segregation coefficients experience more drastic redistribution among the ingot. The segregation coefficients and the Scheil equation for determining the redistributive effect of a DS are shown below.

Figure 12
Scheil Equation and Segregation Coefficients

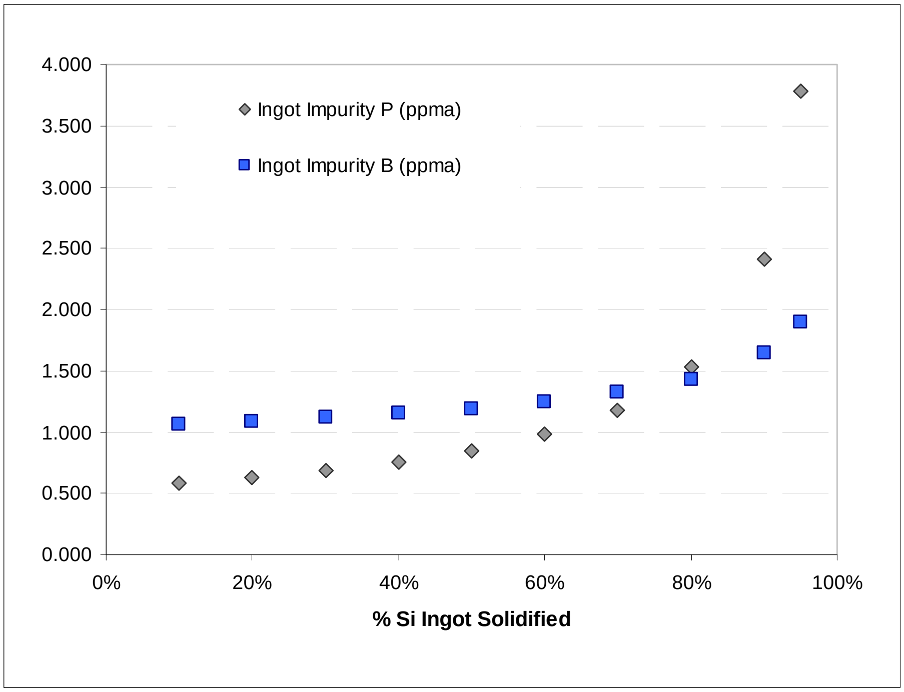
Impurity Distribution Formula
c = Co x K x (1-g)^K-1
Where:
Co = original average impurity level
K = segregation coefficient
g = fraction solidified

Segregation Coefficients	
Boron	0.80
Phosphorus	0.35

Since P has a lower segregation coefficient than B, a DS has a large redistributive effect on P but not on B. Remember that before a DS, the silicon must be melted and thus the impurity levels in the Si are evenly distributed throughout the molten material. The impurity redistribution of B and P for Timminco's Sample 2 from Figure 11, after one DS, is shown in Figure 13.

Figure 13

Distribution of Impurities After One Directional Solidification



Based on current specifications 80% of the ingot becomes usable after one run

It can be easily seen that near the beginning of the ingot, the P content has been lowered from 1.7 ppma to below 0.5 ppma. But since the DS does not remove, but simply redistributes the impurities, the P concentration rises sharply as we move to the end of the ingot.

Based on discussions with industry experts we believe that the P content should be lower than the B content to manufacture a usable p type solar cell[24]. At around the 80% mark, the P content begins to rise above the B content rendering the rest of the ingot unusable. To improve product yield Timminco can cut off some portion of the end of the ingot, where most impurities are concentrated, re-melt the remaining ingot, and then run another DS. But how much should be cut off?

That involves a trade-off between higher purity and higher product yield. In this case, it makes more sense to run a whole new batch of MG-Si rather than cut off 20% of the ingot and try to re-purify it.

Based on independently verified specifications approximately 44% of the ingot is usable after one run

Still, from a cost standpoint, approximately 1.3 DS are necessary to equate Timminco's process to that using polysilicon. Needless to say, this adds significant costs, the brunt of which Timminco would have to bear in a market where polysilicon is in adequate supply.

If Timminco is unable to deliver on the specifications outlined in its Q2-08 call and the process is only capable of delivering the 3rd party verified data of

[24] *As per the Handbook of Photovoltaic Science and Engineering minimum acceptable level of B is 0.3 ppmw and for P is 0.1 ppmw.*

April 01, 2008, then 3.0 DS are necessary to equate Timminco's process to that using Polysilicon.

QUANTIFYING DS COSTS

Timminco has no DS facilities at its premises and is in the process of receiving a DSS furnace in the near future. Timminco's material is shipped in the form of chunks to its customers. In order to quantify the costs of DS, we spoke to a representative from ALD Vacuum Technologies GmbH (ALD), a unit of Timminco's parent company, Advanced Metallurgical Group N.V. (AMG)

ALD specializes in the manufacture of solar silicon melting and crystallization furnaces and possesses expertise in DS furnaces. It provided us with detailed information on the process time and materials requirements per run, all of which is summarized in Figure 14.

Figure 14

Cost of Running a DS Furnace (Amounts in Canadian dollars)

Cost of one run in Quebec

Costs in Europe are much higher

Process Requirement	Usage/Run	Units	Rate/Unit	Cost/Run
Water	600	Cubic Meters	$0.07	$40.00
Energy	4000	kWh	0.04	176.00
Gas*	60	Cubic Meters	0.46	27.45
Crucible	1	Units	1,248.00	1,248.00
Labor	20	Hours	$35.00	700.00
Total cost of one DS				$2,191.45
Process Time and Yield	**Ingot Growth**	**Whole Process**		
Time (hours)	25	50		
Ingot Weight (kg)	450			
DS cost/kg, 100% yield				**$4.87**

Source: Discussion with ALD

The costs are based on Quebec rates for electricity and water, the AECO spot for gas, and the crucible cost as divulged to us by the furnace representative. Therefore at 100% capacity utilization each DS would cost approximately $4.85 per KG in Canada.

Energy and labor costs in Europe are much higher, and since material is being shipped to Europe our estimate is conservative. Management disclosed to us that the cost of DS at customer premises ranges from $8.00-$10.00/kg. For our purposes we use $8.00/Kg as a base.

Given that Timminco's UMG will have to undergo 1.3 DS runs based on the 0.5 ppmw B and 1.7 ppmw P specification, we estimate it will cost the company customers $10.27 per kilogram. Of course, if the product spec improves, these costs would fall dramatically and vice versa.

SOLAR CELL EFFICIENCY

Sub-optimal Si leads to degradation in solar cell efficiency, a measure of how much electricity is generated from the sun's energy. This is important because solar cells are sold in terms of the wattage output they generate, with less efficient solar cells requiring a larger surface area to produce similar levels of wattage . Figure 15 highlights the additional solar cell area required per 0.4% change in efficiency of solar cells.

Figure 15

Additional Solar Cell Area Required per 0.4% Change in Efficiency

Cell Efficiency 10%	Area m^2 1000	Additional Area Required
13.0%	7.69	3.2%
13.4%	7.46	3.1%
13.8%	7.25	3.0%
14.2%	7.04	2.9%
14.6%	6.85	2.8%
15.0%	6.67	2.7%
15.4%	6.49	2.7%
15.8%	6.33	2.6%
16.2%	6.17	2.5%
16.6%	6.02	2.5%
17.0%	5.88	2.4%
17.4%	5.75	2.4%
17.8%	5.62	2.3%

* *Assuming standard test conditions and 1,000 watt output*

No surprise here

The above table illustrates that generating equivalent wattage when a cell's efficiency decreases from 14.2% to 13.8%, requires 3% more solar cell area. Steeper efficiency losses would require even larger cell areas, i.e. a 2% decline in solar cell efficiency, from 16.6% to 14.6% would require 13.3% more solar modules to generate equivalent output.

We believe it is important to be cognizant of efficiency losses, because increases in module area result in increased costs along the entire value chain. We believe, that in a balanced market for SG Si, any additional costs that are created along the value chain as a result of using lower quality silicon must be borne by the supplier.

Photowatt, a subsidiary of ATS Automation Tooling Systems Inc. (ATS), reported much lower efficiencies from its UMG solar cells. Figure 16 outlines the data.

UMG results in degradation of cell performance

Figure 16
Solar Cell Efficiency

	Q4-08	Q4-07	YOY Improvement
UMG Silicon	13.5%	12.6%	7.1%
Polysilicon	15.6%	14.8%	5.4%

Source: ATS Q4-08 disclosures

Clearly, Photowatt's experience shows an efficiency loss of about 2%, or 10% of the efficiency level, when using UMG. Q-Cells disclosed that a 1% decrease in cell efficiency increased costs approximately 7%. Efficiency losses of 2% would increase costs along the whole value chain at Photowatt by about 15%, a level that, if absorbed by the silicon manufacturer, would certainly render the UMG-Si uncompetitive.

CALCULATING EFFICIENCY COSTS

We know the approximate price of an installed watt is $9.00. We also know, based on various sources of information, that the wafer, cell and module costs, which are the value chain process steps that follow the silicon creation, comprise about 30% of the cost of a solar cell. Therefore, we calculate that 7.1% in additional costs attributable to that portion of the total is $0.23.

A 1% efficiency loss increases costs along the value chain by 22.50/kg

Figure 17
Absorbed Efficiency Costs

	1% loss	0.5% loss
Estimated average cell efficiency	15.0%	15.2%
Estimated cell efficiency made with MG Si	14.0%	14.8%
Additional cell area needed to equate wattage	7.1%	2.7%
Cost per installed Watt	$9.00	$9.00
Wafer, Cell, Mod cost as %	35%	35%
Wafer, Cell, Mod cost	$3.15	$3.15
Additional costs due to Timminco	$0.23	$0.09
Average grams of silicon per watt due to reduced thickness	10	10
Additional costs per kg	$22.50	$8.23

To find the figure on a per kilogram basis, we simply multiply by the number of cells that are manufactured from one kilogram of silicon – 100 in this case, assuming the industry norm of 10 grams of silicon usage per cell.

The net result of our calculation is that users of UMG could be currently absorbing additional costs of $8.23/Kg of silicon, for each 0.5% in efficiency losses to meet production commitments/high demand. At a 1% efficiency loss, half of that experienced by Photowatt, UMG-Si producers would need to absorb additional costs of $22.50/kg.

ECONOMIC VALUE OF LOW GRADE FEEDSTOCK

No discussion on Timminco can be complete without discussing the view of solar cell manufacturers on the lower quality raw material. We have outlined our view on efficiency losses and costs along the value chain. Industry experts have also voiced similar opinion, though given the paucity of Poly, support for UMG-Si currently exists.

Q-Cells states that "with a 10% power loss in cells, feedstock must be for free if used in state of the art production lines (all other materials and depreciation must still be paid)"[25]. Q-Cells also believes that[26];

- If low grade Si results in reduction of cell performance the system costs, by means of $/Watt, will be more expensive than using Polysilicon (i.e. costs along the entire value chain)
- Direct refining of MG-Si has the potential to satisfy the huge demand for SG-Si, but the focus must be to achieve a quality close to that attained by using doped Polysilicon.

Q-Cells' position would thus suggest that although they have looked/agreed to buy UMG-Si from Timminco they clearly prefer poly. Therefore, Timminco's pricing could end up being lower and product returns higher than the market is expecting.

Similarly, Photowatt says that, "to the extent we employ refined metallurgical silicon in the production of our wafers without blending substantial amounts of polysilicon in the production mix, we expect to experience lower operating margins".[27]

WHO IS BUYING UMG-SI?

In a presentation dated April 21, 2008, Arise Technologies displayed a chart on the silicon cost/Kg that a solar cell manufacturer can bear under the following conditions;

- Higher efficiencies require higher quality silicon
- Constant revenue and gross profit for cell manufacturer
- Industry average cell processing cost

Under these conditions, Arise believes that a manufacturer producing cells of 14% efficiency can afford to pay approximately $80/Kg for silicon, those producing cells of 16% efficiency can pay up to $150/Kg while companies that produce cells of 22% efficiency can pay approximately $350/Kg of Poly.

We find that interesting given that our call to investor relations at SunPower (a manufacturer producing cells of 22% efficiency), inquiring about their interest in UMG-Si got a negative response i.e. SunPower said they were not interested in UMG-Si, while lower efficiency producers like Photowatt (14.5% to 15.5%) and Q-Cells(15%-16.5%) have both shown an interest in UMG-Si. Arises'

25 Chances and obstacles of Si feedstock purity for solar cells form the Q.Cells perspective – November 2006

26 Ibid

27 Photowatt International IPO Prospectus assumptions seem to bear out in the market with both Photowatt and Q-cells unable to bear the current spot polysilicon prices upwards of $250/Kg. and therefore choosing to blend UMG-Si into their ingots.

That begets the question, "What happens in an adequately supplied market?"

Clearly, UMG-Si is currently a marginal product, which will be discarded as soon as equilibrium returns to the poly market, unless UMG-Si manufacturers can bring their product specifications and volume production in line with a manufacturer's current requirements expeditiously.

THE BALANCED MARKET CONUNDRUM!

We believe, UMG Si manufacturers will have to absorb the costs of reduced cell efficiency in an adequately supplied market. In addition, declining silicon usage/watt will lead to more costs that might need to be absorbed, which may be partially or fully offset by improved system efficiencies.

Ultimately our estimate of the full/economic costs of Timminco' product to its users, are aggregated and outlined in Figure 18.

A moving target

Figure 18

Veritas Estimate of Timminco's Full Costs

	A	B	C
	Q2 conference call information	Q1 Information based on published financials	Public Information April 01, 2008 independently verified
B content (ppmw)	0.5	0.8	0.89
P content (ppmw)	1.7	3.0	4.5
Efficiency degradation	0.40%	0.40%	1.0%*
DS runs required	1.3	1.4	3
Costs			
Efficiency losses	8.23	8.23	22.50
DS cost	10.27	11.44	24.15
MG Si upgrading	10.10	10.10	10.10
Total costs	**28.60**	**29.77**	**56.75**
Selling price			
Poly	60.00	60.00	60.00
Plus: DS cost	**8.00**	**8.00**	**8.00**
Equalized Selling Price	**68.00**	**68.00**	**68.00**
Margin	**39.40**	**38.23**	**11.25**

Source: Veritas

We believe that at a long term polysilicon price of $60.00, under a scenario discussed in column C where Timminco absorbs on average a 1% efficiency loss, and consistently produces product at that specification, it is likely to earn a margin of approximately $11.00 per Kg. At its forecast full capacity of 14,400 tons by 2010, that implies a contribution from UMG of approximately $158M.

Under scenario A, due to better product specification, which has not been corroborated by either the users of UMG-Si or an independent third party but claimed by the company, including lower efficiency losses of 0.4% as per management, a contribution of $576M from UMG-Si is plausible at full capacity. Management's view is that currently they have to absorb no efficiency loss because the spot prices of polysilicon are really high, implying that as the market returns to equilibrium, or even excess polysilicon in 2011/2012, the situation could easily reverse.

TIMMINCO - PERFORMANCE SO FAR

Ultimately, if Timminco's product is useful to customers, shipments will rise exponentially. However, Timminco has failed to deliver tangible results in terms of production and shipments to customers amid all of the hype, as shown in Figure 19.

Unable to deliver?

Figure 19

	Q2 2008	Q1 2008	Q4 2007
Capacity/Quarter	900	900	300
Produced	221	124	33
Shipped	221	100	33
Utilization %	24.6%	13.8%	11.0%
Year End Target	1,350	1,350	
Cumulative % of Target	23.8%	7.4%	

Clearly, the market was disappointed by Timminco's Q2-08 results, and the stock has sold off. Management's reason for the production shortfall was contaminated furnace lining causing the company to discard over 70 tons of material. If this is true, then the market has overreacted, especially since management disclosed concurrently that its material is now of an acceptable quality and has maintained production and cost targets. However, the company seems to have used up its goodwill and the market will now only reward the company for tangible results.

Timminco has also said that "higher purity levels may also increase the Company's production costs for solar grade silicon. The company intends to invest certain resources to achieve improvements in purity levels of its solar grade silicon. However, there is no assurance that the company will consistently achieve purity levels for its solar grade silicon."

CONVOLUTED OWNERSHIP

Safeguard International L.P. (Safeguard), a private equity fund founded in 1997, with an initial life of eight years, owns 26.6% of AMG, which in turn owns 50.6% of Timminco or 52.56 million shares. AMG, a collection of materials and engineering businesses spanning the globe, was incorporated in Netherlands as a public limited company on November 21, 2006 by Safeguard via the aggregation of its various affiliates.

Safeguard's current ownership of AMG, at 26.6%, has declined by 64.9%, from its 91.51% ownership as of June 26, 2007 (The day the prospectus for AMG's IPO was filed). After receiving its third extension, Safeguard is expected to "wind down prior to 31/03/09 by liquidating its investments or distributing them to its limited partners"[28].

Behind the veil

At a time when investors are looking to 2009 and 2010, game changing years for Timminco and the solar industry, its biggest proponent would have cashed out, as it has been doing all along. Safeguard's ownership share in AMG was 40.2% in July 2007 and fell to 26.6% in October 2007.

Timminco represents more than half of AMG's market capitalization of approximately $2.0B as of August 07, 2008. Therefore, by selling its AMG stake Safeguard is essentially cashing indirectly out of Timminco. Safeguard, through ALD, one of its controlled subsidiaries, also holds convertible debt at a cost of approximately $7.1 million, convertible into 17.5 million Timminco shares with a current value of approximately $376 million.

CONCLUSION

Sell

After all of our work, we see only two possible scenarios. The first is that management is promising the moon with respect to product specification, cost estimates, and production capabilities, and that Safeguard LP wisely timed the IPO of Timminco and its exit thereof. The second is that the private equity LP had reached the end of its specified life, and management is telling the truth. The stock is either worth $0, or a lot more than where it's trading.

We advise erring on the side of caution. Sell.

28 AMG 2nd quarter investor presentation

VERITAS INVESTMENT RESEARCH CORPORATION

RESEARCH

Consumer Products & Staples / REITs

Michael Palmer, MBA
mpalmer@veritascorp.com

Chris Silvestre
csilvestre@veritascorp.com

Asha Soares
asoares@veritascorp.com

Financial Services

Ohad Lederer, CA, CPA, CFA
olederer@veritascorp.com

Sara Tsang, CA, CFA, CPA
stsang@veritascorp.com

Power Funds & Business Trusts

Darryl McCoubrey, CA
dmccoubrey@veritascorp.com

Special Situations - Accounting

Anthony Scilipoti, CA, CPA
ascilipoti@veritascorp.com

Dimitry Khmelnitsky, CA
dkhmelnitsky@veritascorp.com

Telecommunications & Cable

Neeraj Monga, MBA
nmonga@veritascorp.com

Dharmesh Samji, CA, MBA
dsamji@veritascorp.com

Energy

Sam La Bell, MBA
slabell@veritascorp.com

Michael Valicek, CFA
mvalicek@veritascorp.com

MARKETING

Anthony Scilipoti, CA, CPA
ascilipoti@veritascorp.com

PUBLISHING & ADMINISTRATION

Michelle Mercer
mmercer@veritascorp.com

Brandi Miotto
bmiotto@veritascorp.com

Nancy Cardoso
ncardoso@veritascorp.com

VERITAS
INVESTMENT RESEARCH

Canadian Pacific Tower
100 Wellington Street West
Suite 3110, PO Box 80
Toronto, Ontario, Canada
M5K 1E7

tel: (416) 866-8783
fax: (416) 866-4146
www.veritascorp.com