

WEDGE MKI ASIA NOTES

Timminco (TSX:TIM) Chinese solar operator **Canadian Solar (CSIQ)** has contracted to buy 5,000 tons of upgraded metallurgical silicon (UMG) through 2011 from Timminco, which is probably the market's leading proponent of UMG today. CSIQ expects to take 450 to 500 tons in 2008. CSIQ also claims that their technology allows them to make a high-efficiency module from 100% UMG materials, which would mean a dramatic cost reduction over traditional modules made from solar-grade polysilicon. Our interviews in the China market suggest, however, that this is a vast overstatement of the real use of UMG in CSIQ and that UMG is not currently a viable alternative to solar-grade polysilicon—at CSIQ or elsewhere.

Our analysis suggests that CSIQ this year has imported only 3 tons of UMG from Timminco at a cost of \$45 per kilo and probably blended 10% with 90% solar-grade polysilicon to yield 3MW of UMG modules in Q1. TIM adopted a process at its BSI (Becancour Silicon Inc.) division in 2007 to improve UMG purity from 98.5% to 3N-5N. UMG can be blended with solar-grade polysilicon to produce solar cells at a lower cost, and the technology helped push TIM's share price higher.

But we do not see much to be excited about in the technology. The UMG patent document that Timminco filed at the World Intellectual Property Organization is a silicon-processing technology that had been tested and rejected by other manufacturers, including **Dow Chemical (DOW)**. TIM reported in Q1 that its cost for producing a kilo of UMG, using the traditional Siemens Method, was between \$10-\$15, a bit higher than had been anticipated. Hemlock and **MEMC (WRF)** make solar-grade polysilicon for between \$30-40, and Hemlock expects to lower production costs at its second facility.

Like other UMG producers, TIM must blend UMG at a ratio between 10% to 20% to ensure solar cells efficiency. The highest conversion rate achieved by using 10% to 20% of UMG material is 15%, but that is rare; for cells using TIM's materials, CSIQ reports a 13.5% conversion rate, and we believe that is the highest achievable, not the average. Timminco's 0.8ppm of boron and 5ppm phosphor in the UMG are substantially higher than those impurities in virgin and scrap polysilicon and will, we believe, lead to higher decay rates. For power utilities, lower-efficiency modules increase the installation and maintenance costs.

In view of all these factors, we think that production efficiency in solar-grade polysilicon is likely to be improved faster than is the cost efficiency of UMG, making UMG obsolete before it is really commercialized in solar modules.

Before the world shortage of polysilicon, TIM was a Canadian smelting company engaged mainly in producing magnesium and metallurgical silicon.

Analysts

Kirk Adams 303-476-5933
Brian Blair 212-888-6601

Wedge Partners 9800 Mt. Pyramid Court, Suite 304 Englewood, CO 80112

MKI Consultants

Anne Stevenson-Yang Beijing Contact
David Hoffman Beijing Contact