

# The Nano Investor

Issue 3: December 2005

Michael Sinkula  
mjsinkula@usnano.biz

## IN THIS ISSUE

Mobile Power Wanted	1
Equity Research: Medis Technologies	3

## SPONSORED BY



## Mobile Power Wanted

The confluence of several trends has created an environment that is ripe for mobile computing and mobile consumer electronics. Consumers and corporations are abandoning desktop PCs, the main information and computing tools for the past 20 years, for laptops and other mobile PCs. Contributing to this is the falling cost of laptops and the rapid evolution of wireless networks. As a result, roughly one quarter of all PCs is now laptops and in the coming years, portable computers will continue to take market share from stationary units. Laptops are just one of several mobile computing products experiencing recent growth – others include mobile tablet PCs, sensors, PDAs, etc. Consumers' desire for increased mobility combined with new technology with enhanced functionality has reinvigorated the growth of the PC market.

PC and mobile phones have combined to create a new market of products in a new area called the "converged mobile device market" where handheld device and mobile phone vendors are both seeking opportunity. This market has been created as a result of the enormous competition and difficulty in generating recurring customers in the mobile handheld device market. Many of the competitors in the handheld device, such as Sony and Toshiba, have shifted their resources towards leveraging their core competencies in mobility to bring advanced converged mobile devices to market. Competitors realize that they need to seek additional applications beyond personal information management (PIM) in order to generate sales growth going forward.

According to Bob Lifton, CEO of Medis Technologies, "People don't realize the revolution that just took place. Mobile computing is now available to everyone." Lifton says that Microsoft will enable direct communication with one's desktop computer as opposed to current handset networks where users must use the servers of the service provider. Lifton believes that the largest growth will be seen in the enterprise segment of the mobile computing market (the conversion of mobile phones and handheld devices). This is largely driven by the enabling abilities of new operating systems (such as those from Microsoft). But mobile operators suggest that the battery life of the mobile phones being delivered fall short of allowing the consumer to make full use of the capabilities presently being offered. It appears that power is the limiting factor to vastly increased functionality of mobile devices.

Other mobility factors, such as wireless capability, have advanced considerably over the last decade. Mobile and Wi-Fi capabilities (somewhat driven by new processors such as Intel's Centrino) have allowed handheld device manufacturers like Sony to command higher prices for devices such as PDAs while experiencing high volume growth. Similar products without wireless capabilities experienced a decline in sales over recent years. And as more and more mobile products become connected to networks, there will be increasing strains on battery requirements. While external features, such as bursts of light in camera phones or digital cameras, and start-up power needs are often targeted as huge consumers of battery power, it is actually the wireless capabilities that consume the most power when activated (as depicted earlier in the figure comparing power consumption of the display and wireless card). In fact, it is reported that a Dell PDA can run four times longer when the wireless capability is turned off.

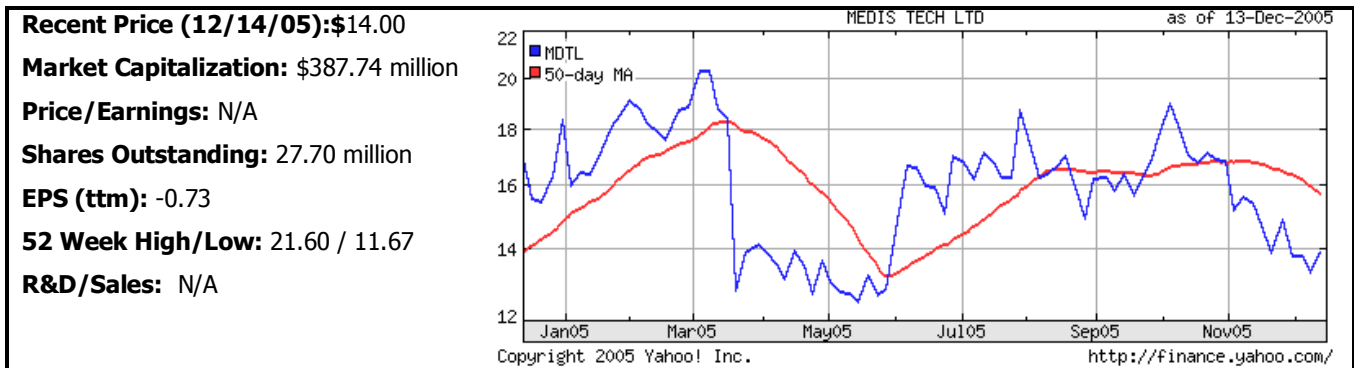
Consumers are demanding longer run times on their portable devices and manufacturers are building increasingly power-hungry applications. Already 3G phones and devices are proving to be too much of a power drain on their batteries. In fact, some sources in China report battery run-times of around one hour when used for power-hungry applications such as gaming. This limited capability may dramatically limit the success of these products.

Batteries are the common choice for almost all portable electronic devices, but some portable fuel cell system costs are entering a competitive price range. In some portable applications, fuel cells can help improve the performance and life of batteries (and vice versa) thus extending the users experience. Battery technologies, primarily lithium and lithium polymer, are still improving, but at a very incremental pace. Some experts suggest that lithium based batteries will improve by only 50% over their lifetime. On the other hand, fuel cells offer much more attractive performance metrics and convenience, but cost has always been a limiting factor.

Consumers can look to the military market for products that may eventually emerge in the mainstream. The military has a higher tolerance for price when greater performance is offered. Soldiers currently carry pounds and pounds of primary batteries to power their devices. The military is desperate for lighter power sources with greater power density, qualities that fuel cells can potentially offer. If fuel cells prove to be successful in the military, then high end consumer electronics applications may soon follow. However, it is difficult to determine the exact timeframe because product cycles are so short in portable electronics – product makers usually take what is immediately available and proven. Thus, batteries will continue to dominate the portable power market and performance in portable electronics will suffer, but fuel cells will enable new capabilities and new products in a number of different markets. Eventually fuel cells will emerge on the consumer scene, allowing users to officially 'cut the cord'.

# Equity Research: Medis Technologies (Nasdaq: MDTL)

805 Third Avenue  
New York, NY 10022  
Phone: 212-935-8484  
www.medistl.com



## Profile

Medis Technologies produces fuel cells for recharging batteries in mobile applications in a number of different industries including consumer electronics and military gear. The company would enter more aggressively into other markets such as medical but there is currently a manufacturing issue where the demand is greater than the possible output. In fact, they believe that there are currently over 1.5 billion users of portable electronic devices world wide and expect this number to reach 2 billion by 2007, with reported annual sales of approximately 450 million devices per year. They are quickly developing the first manufacturing line, after which the management of the line will be outsourced. Their first products will be disposable fuel cell systems for recharging batteries.

The company understands that consumers are happy using an outlet for recharging (where the electricity is virtually free), but they are targeting their disposable recharging devices for the times when an outlet is unavailable.

## Technology and Products

The company has two primary innovations:

1. It has invented a fuel cell that uses borohydride that has limits of 1.3 watts and is 85% efficient. The aqueous borohydride compounds are characterized by very high levels of electrochemical activity which results in high levels of power density and energy capacity at a broad range of temperatures, even including room temperatures. The company's design is very different than traditional fuel cells that have relied on membranes and platinum catalysts (which can be very expensive). In addition, their system has avoided the need for water and heat management systems. The design is very simple. This has kept the costs 4-6 times lower than other fuel cell makers. However, some are concerned that the catalysts used in borohydride based fuel cells are easily poisoned and can be expensive.

2. They have also invented the usage of this fuel cell as a generic battery charger. This charger can be interfaced with a number of different devices and adjust for different voltages (using a simple interchangeable interconnect). Thus one recharger will be compatible with all portable electronics applications making it more convenient for the consumer.

They have developed fuel cells that have replacement cartridges (called Power Packs), but they believe that the disposable fuel cells are more consumer friendly because they do not involve replacing cartridges. The disposable fuel cells will be able power a cell phone for the equivalent of 20 hours of talk time. By powering with the Power Pack, the consumer can continue to use the device while at the same time charging the battery, even when the device's battery is running low or is discharged. This cycle can be repeated a number of times or, at the consumer's option, the Power Pack can be used to maintain the full charge of the battery.

## Business Strategy

In the consumer markets, the company has two primary sales channels. First the company has secured distribution partnerships with Kensington Technology Group, a leading maker of computer accessories. Kensington will place the fuel cell Power Packs in thousands of stores and commercial dealers throughout the world. The CEO indicated that the pack would be sold for roughly \$20 in retail stores. Medis has also entered into a distribution agreement with Superior Communications, which provides wireless accessories to major mobile operators, retailers and distributors across the United States.

More importantly, the company has entered into an agreement with a major mobile carrier who has over 50 million subscribers. The company believes that this only the tip of the iceberg and several other smaller mobile operators will follow suit, potentially adding up to a reach of several million mobile device users. The company is targeting mobile operators because they ultimately control the other elements of the market – for example, the mobile operators buy \$13 billion of phones each year. They decide what products and services will be marketed with every mobile product. When a mobile operator offers Medis' products, they are essentially enhancing two business segments. They are selling products, on which they may take a margin, but they are also helping their core business by creating a mechanism for people to use the mobile device for a longer period of time.

The company is very bullish on the mobile computing market, particularly the enterprise segment. But it appears that Medis is taking a very broad approach to the consumer market, essentially making their products available to everyone for multiple applications. Some experts do not believe that Medis has a solid value proposition contending that consumers will not purchase their recharging systems when batteries can offer the same solution for half the cost.

The company has military contracts for recharging fuel cells that are compatible with several devices including GSM phones, notebooks, PDAs, radio equipment. The company believes that disposable fuel cells are a better solution than a fixed fuel cell with cartridges because the disposable ones are easier for the soldier to handle under hectic conditions. At present, a military PDA is charged by a battery sleeve with eight lithium manganese oxide batteries. For a 72 hour mission, always on, the present system would require the military team to carry about 140 batteries costing approximately \$450 (Medis Technologies estimates). The company's Power Pack is expected to provide approximately 72 hours of operating time with the use of only four or five refueling cartridges, making it lighter and less expensive than the present system. In late 2004, the company (through General Dynamics) received an order for five prototype fuel cell Power Packs and associated cartridges as power sources for 10 prototype tablet computers in support of the United States Air Force (USAF) Wearable Computer Power Program.

The production-delivery targets are as follows:

- Delivery of semi-automated production units in Q1 06
- In 2H 06, the company will be booking orders and commitments for the first production line
- In December 2006, Ismeca will deliver the completed automated line to Celestica
- In Q1 07, Medis will deliver the first products from the automated line

## Financial Condition

Medis has been well funded with both equity and debt and is healthy with over \$50 million in cash. In addition, the company claims that the 2006 burn rate will be \$5 million per quarter. Funding for the automated production line is \$11 million and requirements for the fuel line, framing and working capital total \$6 million.

Like most developmental companies, Medis has not generated noteworthy revenues to date and has consistently reported annual losses in the \$10 million range. With that said, it looks like 2006 will be a substantial revenue year for the company. They anticipate product orders and commitments to ramp up in the second half of 2006 with deliveries of products from the automated line in the first quarter of 2007. The company projects that units from the automated line (capable of producing 1.5 million units/month) will each generate a profit of \$3.00.

### Medis Financial Metrics

	2002	2003	2004
Revenues (\$M)	1	1	0
R&D (\$M)	4	5	10
Operating Income (\$M)	(10)	(10)	(16)

Source: Medis

## Commentary

Medis' product is very unique in the fact that it appeals to a very broad array of potential customers. It appears that their product is even broader than most batteries as the Power Pack is compatible with multiple portable electronics products. Medis is targeting every mobile phone user, but particularly users that are frequently away from recharging outlets. The value proposition is most appealing to the enterprise market where business travellers are often 'on the road' for days at a time. As the Power Pack will provide 20-30 hours of talk time, obvious productivity benefits are easy to market. Couple that with the fact that Microsoft expects to have 100 million devices using the power hungry Windows Mobile 5.0 and there will be plenty of opportunity for the Power Pack.

The key to securing recurring revenues is signing contracts with major mobile providers – they control the sales channels of mobile products. It appears that mobile providers are excited about this product, which bodes very well for Medis. Mobile operators have a multitude of marketing mechanisms to get the Power Pack into the hands of the consumer or it may simply be used for promotional purposes. In addition, General Dynamics should be able to penetrate the military market for early revenues.

Insiders are still a very strong force in this growth stage company, owning nearly 50% of the stock. This can mean several things, but since the CEO is heavily invested in the company and is not allocating a salary to himself, it appears that management has significant motivation to make this a successful company. As one of the only fuel cell companies with an 'economic' product on the market, Medis should benefit heavily from the first mover advantage, particularly in the mobile market. The stock is trading at the lower end of its one year range and below its 50 day moving average, making it very attractive for a long term play.