

Solar Growth not Impacted by Oil

The recent fall in the oil price has caused the share prices of solar stocks to fall. This fall is indicative of a growing negative sentiment towards energy investing, but is not supported by rational analysis of the economics of the solar industry.

When considering the economics of unsubsidized solar, the main competitors are utilities whose retail electricity prices are rarely driven by oil prices. Just 10% of world electricity is generated by oil, and much of that is in the Middle East who would benefit more by exporting their oil for hard currency. The big drivers for electricity are the costs of natural gas, coal and nuclear power. The cost of these has not fallen, and the cost of building new plants, particularly nuclear, is now considerably higher than it has been historically. The oil price is not a driver of the solar sector, and solar's basic economics do not support the fall in solar companies' share prices, which is why we think now is an attractive time to own solar company shares.

The main drivers of installation growth are the dramatic fall in installation costs and ambitious subsidy programs in China, Japan and the US. Behind those are an increasing number of countries where unsubsidized installations work at current installation costs, including India, the Middle East and much of Africa.

The International Energy Agency (IEA) recently predicted in their *2014 Technology Roadmap: Solar Photovoltaic Energy* that solar energy would account for 16% of the world's electricity by 2050. While this forecast shines positive light on the industry, we think it actually underestimates how much photovoltaic (PV) solar could be installed and by possibly a considerable margin.

It is always difficult to predict the uptake and transition to new technologies. However, we believe that the IEA is being cautious in their approach. Total annual solar installations have already exceeded IEA targets for 2020 – seven years ahead of schedule and just four years after they were made. As a result, IEA forecasts have increased from 11% of global electricity generation to 16% of global electricity generation. It is notoriously difficult to make accurate long-term forecasts when an industry is in the middle of a growth phase like the one solar energy is going through now, and we think it is likely that the acceleration will continue, and in turn, the estimation will likely increase from here. We think the solar industry is similar to the personal computer and cell phone industries where expected growth has been repeatedly exceeded.

In the 2014 report, utility costs are forecast to fall 30% between 2030 and 2050. However, the 2030 price levels forecasted (\$1,000 per kilowatt peak - kWp) are nearly being realized for some Chinese installations. Best in class prices being achieved internationally are approximately \$1,170 per kWp. However, installation prices in many countries, including the US, are still more than double those being achieved in China. For example, in the third quarter, Solarcity reported a cost of installation of \$2,900 per kWp, which included \$710 per kWp of sales, general and administration costs. This means that in many countries the industry has significant scope for cost reductions without requiring the core technology (i.e. the modules and inverters) to improve in performance and price. Installers and financiers in those countries should be able to achieve further meaningful cost reductions by adopting international best practices.

We think solar could be installed at \$1,000 per kilowatt (kW) in most countries by 2020, ten years prior to the IEA's expectations. Extrapolating the potential cost reductions is probably not a realistic approach, but we think it would not be unreasonable to anticipate a halving in that price to \$500 per kW by 2050. Pricing at \$500 per kWp would allow for competition with utility pricing in many countries. For example in the US, payback of the \$500 per kWp installation cost could be achieved in 10 years with pricing of 3.3 cents/kilowatt hour (c/kWh), which compares favorably to both retail and utility prices for electricity.

Current estimates of 2014 solar installations have increased seven-fold since 2008. Elon Musk, CEO of Tesla Motors and Chairman of SolarCity, has forecasted 400 per gigawatt peak (GWp) of installations per year which would be approximately 4% of global electricity generating capacity. 400 gigawatt (GW) of annual expenditure on solar at \$500 per kWp would result in \$200 billion per year of solar installations in 2050. This compares to IEA estimates of an average of \$420 billion per year of annual investment in electricity generating plants across all technologies. We don't think it is unreasonable that solar could possibly account for 50% or more of annual investment in new electricity generating plants.

We cannot predict exactly how big the solar industry can become, as we are still learning how to make the best use of our solar resource. However, it appears that solar has reached a tipping point in scalability and cost, and we can very easily see an industry 10 or more times bigger than what we have today.

This growth potential is what solar investors should be focused on—we believe that investors can look forward to a decoupling in returns from conventional energy prices as companies benefit from that potential growth over the next three years and beyond.

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