***The Economics of Installing Solar Panels for All AGE Operations***

**Introduction**

When it comes to solar cells, there is good news and there is bad news. First the bad news. Installing photovoltaic solar panels on the roofs of your company buildings will cost you more than you save on electricity bills before the panels have to be replaced. The good news is that you will reduce your carbon footprint and save energy.

Solar and wind power, and other renewable sources, such as wave and tidal power, represent an energy source that could underpin a sustainable energy policy for your enterprise by minimising your reliance on fossil fuels and at the same time reducing carbon dioxide and other pollutant emissions. The main barrier that has so far hindered the development of a steady market for such "renewable" systems has been their cost.

**What We Found**

According to our studies, the amount of electricity that can be saved over the lifetime of a commercial PV panel is about 2000 kWh per square metre for thin film modules, with an expected life of 20 years, single-crystalline silicon devices with an anticipated lifespan of 25 years fare better producing 4400 kWh per square metre. But, from our studies, the initial costs are about 2.5 times the value of the electricity that will be produced.

We carried out a cost-benefit analysis and found that the total energy produced over a two-year period outweighs the energy used in manufacture, installation and maintenance. Our analysis also shows that the manufacture and use of PV panels produces less pollution than fossil fuel based electricity generation.

Our analysis holds even true even for your operations in countries with medium sunshine. This makes PV panels a viable alternative energy supply but one which will not save you money, unless the price of electricity rises three to four times, which will give a positive internal rate of return.

**Conclusions**

We would like to point out that cost should not be the only consideration. The total energy and pollution involved in sourcing the raw materials, manufacturing, installing, and maintaining any particular system should also be considered. After all, if it uses far more energy to build a wind farm or install solar panels than the energy they can produce during their lifetime then it does not make environmental or economic sense to install them.

With this in mind, we have analysed all of the costs from cradle to grave − in terms of energy use, pollution and carbon footprint, and economic − to find out whether photovoltaic cells are a truly viable alternative energy source for Alpheius Global Enterprise.

Three different kinds of PV devices were assessed: single-crystalline silicon, polycrystalline silicon, and thin film copper indium diselenide. We considered the costs from the point of manufacture to end-of-life disposal. *Our study considers the systems through the whole of their life cycle, from cradle to grave, leading to the estimation of the energy, economic and emission payback times.*

In our assessment of the three different PV panel types on the south-facing roofs of your northern Italian company offices, the team found that the energy produced by the panels over their lifetimes considerably overcomes the energy needed during manufacture. In fact, energy costs are recovered within two years in this medium sunshine climate. Our team also showed that carbon dioxide emissions are significantly lower over the PV panel lifetime from cradle-to-grave compared with conventional electricity generation. Economic costs, our team found, would only be recouped if the panels remained fully functional for more than twenty years.