Nanotechnology: Micro Generation Of Energy Stored in Thin Film Batteries World Energy Market Shifts, Forecasts, and Strategies, 2007-2013

Description: Nanotechnology is providing us next generation systems that rely on micro-generation of energy stored in thin film batteries. Nanotechnology works on both sides of the equation. Solar and wind generators are made more efficient by the use of nanoparticles in the drive and collector mechanisms. Thin film batteries use new materials created using nanotechnology to achieve components that are used to manufacture batteries 40 times more efficient than current batteries.

World energy market shifts are a result of these new renewable energy and storage technologies. Wind and solar energy can be generated and stored as DC current in residential settings. Wind and solar power can be stored by using thin film batteries that in turn are used to power electronics, LED lights, and small appliances in the home. Systems work using a direct current (DC) power system that supplements the power coming off the grid into the home.

Wind and solar generators operating in residential settings store energy in thin film batteries for use in autos. Wind and solar power stored in thin film batteries can be used to power cars by hooking the car battery to the home battery with a wire and a plug at each end of the wire. This assumes that there are lots and lots of solar panels, small windmills like would be used on a boat, and thin film batteries. The billions of units needed create economies of scale and bring prices of these products well below the $100 per unit price.

Wind power and solar power are anticipated to be long-term energy sources for thin film batteries used to run cars and to provide a DC power connection in the home. Campus based stationary fuel cells, depend on landfill and wastewater treatment plants to provide gas for providing energy to manufacture hydrogen.

Micro-generation of energy is set to bring a worldwide economic revolution brought by the availability of thin film batteries that are more fuel-efficient, charge within minutes, and hold a charge 40 times longer than existing batteries. Thin film batteries can be charged from renewable energy sources and used to power the home and car.

Industrialization requires sustainable, highly efficient energy. Fossil fuel generation is being replaced by clean, renewable energy. Wind and solar energy can be stored in thin film batteries for residential and transportation uses. Renewable energy can be stored in the form of hydrogen for fleet and campus applications.

They do not take the home off grid, but they power lights, electronics, small appliances, and the car battery.

Thin film batteries support micro-generation of energy by making it possible to generate and store energy in the home. The battery is then used through a direct current wiring system that complements grid wring. LED light systems, electronics, small appliances, very small refrigeration systems, and hot water can be implemented piece meal in a home using a combination of small wind generators, solar panels, and thin film batteries to store the power that comes from the green renewable energy systems.

Increasingly societies are realizing that micro-generation has a role to play in combating global warming, increasing security of energy supplies, alleviating fuel poverty, and generally creating sustainable communities.

Micro generators include wind and solar have not been as efficient as buying electricity from the grid. Micro generation has developed independently of a grid connected house, office, or factory on boats and away from civilization. Now that technology is ready for mainstream use. Once the micro wind turbine has been purchased energy is free, and now it can be stored efficiently, which was never possible before. So there are very good reasons to install micro generation.

For homeowners seeking true electrical grid independence, micro-power generation takes away the dependence and limitations of the electric distribution grid, in a remote standalone package. Other systems provide heat for the home. This lets the homeowner live just about anywhere, in the mountains or deep woods, in the desert or on an island. Now that same technology is ready for the cities and the suburbs.

Fuel cells run on hydrogen that in turn needs to be manufactured. Hydrogen can be manufactured from nuclear, wind, and solar power. It may be more efficient to convert renewable energy directly to electricity because hydrogen evaporates so easily, but in some campus cases, the hydrogen is useful. Nuclear power run at 100% capacity can be used to generate hydrogen with the unused electricity. Stationary fuel cells promise to use that energy stored as hydrogen.

Stationary fuel cells generate grid or campus electric power by combining hydrogen with oxygen. Hydrogen fuels may be methanol, natural gas or petroleum for manufacturing the hydrogen. Natural gas is currently used as an energy source for stationary fuel cells. Landfill gas and wastewater treatment plants provide the most available renewable energy source for hydrogen or to be used directly with the generator. Excess power from nuclear power plants provides a source of energy to manufacture hydrogen over the next 50 years.

2-megawatt fuel cell power plants demonstrate the feasibility of fuel cell research. Monitoring and down time to replace parts are issues. More work still needs to be done to reduce the costs, to develop better catalysts to drive the machines. Research is concentrated on making units smaller and easier to use.

Wind and solar power can be stored by using the energy derived from these sources to make hydrogen that can be stored. Most likely the wind and tide energy will be transported as electricity to a location where the hydrogen can be manufactured. It is far easier to transport electricity than to transport hydrogen.

Combined heat and power (CHP) technologies produce electricity, hot water, chilled water, and/or steam from a single fuel at a facility.

Because hydrogen can be manufactured from landfill and wastewater treatment plants, many units are being located close to those energy sources. Giving fuel for stationary campus fuel cell units is a priority. Nuclear energy is also used to generate hydrogen from its excess capacity. The reactors in the world used for nuclear electricity generation in 2006 created 2,756 billion kilowatts of energy.

As the dollars per kilowatt for stationary fuel cell utility units decline to $4,500 in 2009, markets start to pick up with campus and grid utility power company units shipped.

The stationary fuel cell markets at $108 million in 2006 have been at stasis for several years, due to the high cost per kilowatt that is not competitive with existing utility technology. As the price of fuel rises, environmental concerns become more compelling, and demand for reliability more intense, the markets become more mature.

This is because the demand picks up for reliable units that can run on hydrogen from excess electricity generated by wind power. Solar power begins to be a factor as well, with nanotechnology breakthroughs giving solar photovoltaic power a cost competitive position in the energy chain. Fuel cells are needed to level out the power distribution.

Wind power is plentiful in the ocean, and can be used to generate electricity there, that can be transmitted to reforming stations where the electricity is stored as hydrogen for use in stationary fuel cells used by utility companies.

2-megawatt fuel cell power plants demonstrate the feasibility of fuel cell research. Monitoring and down time to replace parts are issues. More work needs to be done to reduce the costs and develop a better catalyst to drive machines. Research is concentrated on making units smaller and easier to use.

In the stationary power market, fuel cells could become competitive if they reach an installed cost of $1,500 or less per kilowatt. Companies aim to decrease costs to $400 per kilowatt in that time frame. The cost is in the $4,000+ range per kilowatt in 2007. In the automobile sector, a competitive cost is on the order of $60 - $100 per kilowatt, a much more stringent criteria.

Key Topics
- Thin Film Battery Market Forcasts
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- Impact Of Nanotechnology
- Thin Film Battery For Cell Phones
- Thin Film Solid-State Battery Construction
- Thin Film Battery for Smart Cards
- Battery Depends on Chemical Energy
- Thin Film Battery for Portable PCs
- Smart Actice Labels
- Thin Film Battery for Implantable Medical Devices
- Battery Assisted Tages
- RFID Tags
- Cell Construction
- Namind Standards for Cell Identification
- Polymer Film Substrate

Report Methodology
This is the 287th report in a series of market research reports that provide forecasts in communications, telecommunications, the internet, computer, software, and telephone equipment. The project leaders take direct responsibility for writing and preparing each report. They have significant experience preparing industry studies. Forecasts are based on primary research and proprietary data bases. Forecasts reflect analysis of the market trends in the segment and related segments. Unit and dollar shipments are analyzed through consideration of dollar volume of each market participation in the segment. Market share analysis includes conversations with key customers of products, industry segment leaders, marketing directors, distributors, leading market participants, and companies seeking to develop measurable market share. Over 200 in-depth interviews are conducted for each report with a broad range of key participants and opinion leaders in the market segment.

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