

Sunday, May 10

TBD PL-1 Renewable Energy – Innovative Solutions and Trends

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Invited 40 min. Talk

In a high level seminar arranged in September 2008 by the Swedish-American Chamber of Commerce, discussions about the rapid increase of carbon dioxide content in the air took place. Some delegates compared the situation with writing a book and suggested that chapter one was ready. Chapter one dealt with the problem of getting the world to understand that the carbon dioxide increase is a problem. The delegates were in agreement that the problem was understood. It is now necessary to find the best solutions and act. The future will show if this book turned out to be a drama, a thriller or, if we are lucky, a comedy. To succeed in this we cannot just act as we have always done by improving the existing solutions. We need to have a new type of wild, daring and humanitarian solution, but still cost-efficient. Innovative solutions must be found. Any idea/solution initially has to be “tested” intellectually against the Physical Laws. Few politicians know the facts about different renewable energies. The facts are for average power: sun – 100W/m², wind (11m/s) – 1kW/m², wave (Sweden) = 5-10Kw/m wave, wave (USA) – 15-60kW/m wave and underwater current (2m/s) – 4kW/m². Another interesting fact is that the number of full load hours differs widely as follows: sun – 1,000 h/year, wind (Sweden) – 2,200 h/year, wave (Sweden) – 3,000 to 4,000 h/year, wave (USA) – 3,000 to 6,000 h/year and underwater currents – 7,000 h/year. Having these facts as background three new ways of extracting renewable energy have been invented in Sweden. For wind energy there is a solution that uses a vertical arrangement, which of course, will lead to better cost performance and lower risk for failures or breakdown. For wave energy, the solution is based on a Wave Energy Converter (WEC) placed on the sea bed (well protected) having a point absorber driving a linear generator. Arrays of WECs are then connected via underwater switchgears to the grid. For underwater current, the solution is based on a vertical arranged turbine with a slow speed generator. This will also result in a minimum or no negative influence on the environment. The trend we see nowadays is an increased focus on environment friendly solutions that will get even stronger in the future. However, it is important to question solutions that are not cost-effective and do not focus on the environment for the whole supply chain including recycling.