



Session 2: Technical Session

This session was again subdivided in two different parts.

The first part, “**PV industry Overview**”, moderated by Dr. Hoffmann, focused on a complete analysis of the whole PV value chain from the raw material to the system level, with special attention to BIPV (Building integrated PV) applications.

Mrs. **Mints** (Navigant consulting) highlighted the differences between the nominal PV capacity that was over 5GW in 2007 and the registered shipments were about 3GW. This difference is mainly due to the difficult access to raw material (primarily silicon) and new production equipment.

The contribution of PV Thin film technologies (mostly CdTe, a-Si and Cl(G)S) is growing with an impressive pace since 2005 and reached about 12% of the total shipments in 2007. The rest was dominated by silicon-based technologies (32% mono-crystalline, 53% poly-crystalline and 3% of ribbon-string silicon).

Regarding silicon availability, many new players are entering the market and a total production capacity of 48000MT is announced for 2010. This will lead to a significant reduction of average prices for all technologies, but in particular for thin films.

Total cost of modules was analysed both for c-Si and thin films technologies by Dr. **Schwirtlich** (Schott). While in c-Si modules the cells represent 75% of the total cost and other materials like glass, frame and junction box represent only 18%, the situation is very different for thin films: for a-Si the material represents 64% of the total cost.

The c-Si modules costs are foreseen to go down from 1.84€/Wp in 2007 to less than 1€/Wp in 2015.

Nevertheless, the modules are not the only element of the system to be analysed and therefore, Mr. **Bächler** (Phoenix Solar) presented the balance of system (BOS) costs. For systems with c-Si modules, the BOS costs represent 27%, while for systems using thin film modules, the BOS costs represent almost half (49%) of the total system costs. Although the BOS costs are higher for thin film systems than for c-Si, the potential to reduce these costs is also higher.

The unique and huge potential of photovoltaics is due to the fact that it is a, reliable, clean and silent electricity source, which can be easily integrated in a decentralized way into urban environment and built-up areas, while shifting power generation away from being large-scale and regionally located.

Decentralized PV systems make it possible to generate electricity where and when it is more needed, while avoiding the high costs involved in the extension of the electricity grid. A few projects on BIPV were presented by Mr. **Vlaswinkel** (Scheuten Solar).

The second part of the session “**Reliability of PV products**”, moderated by Mr. Cramer (EPIA Board Director), was dedicated to present the different activities carried out by the PV industry to assure high quality products and to prove that long-term reliable modules are a fact.

Many activities have been developed by the Joint Research Centre (**JRC**) of the EC during the last 25 years to verify the stability and performance of modules in the long-term. Some experiments have shown that 82% of modules (for c-Si) still perform over 80% of the nominal power after 20 years and therefore, they meet the manufacturers warranty criteria. An average degradation rate of 0.7%/year can be assumed for c-Si technologies (without differences between mono-crystalline and poly-crystalline configurations). Experiments on the field of thin films are ongoing; however, it is still too early to estimate their behaviour on the long-term.

Dr. **Herrmann** (TÜV Rheinland) presented the activities which the European certification institutes carried out in order to assure the quality of PV modules. *Damp heat* and *Thermal cycling* are some of the tests required under the IEC (International Electro technical Committee) standards in order to qualify modules and secure long-term performances and stabilities. Experience in the market has led to the availability of high quality modules, with over 80% of products passing successfully those qualification testing.

Mr. **Nordmann** (TNC Consulting) explained that although the systems performance is high during its whole life-time there is still room for improvement. It is important to note that although PV is a highly reliable and mature technology there are failures, like in all industries. It is the role of the PV industry to show how efficient and quick those failures can be solved. Therefore, a monitoring systems will play an important role for failure identification and cost saving.

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