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Next – generation interdigitated back-contacted silicon heterojunction solar cells and modules by design and process innovations

NextBase - Deliverable report

D9.4 Report on technology assessment at system level

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Publishable summary

This deliverable analyses the economics of the silicon heterojunction, interdigitated back contacted (SHJ-IBC) solar technology at the system level. This is done through the levelised cost of energy (LCOE) projections. The LCOE represents the ratio of the total related costs for a given technology energy source over the total energy produced by this technology over its lifetime. The LCOE is dependent on many factors aside from the cost and efficiency of the solar cells. Interest rates, degradation rates, inflation, taxes and climate are all location dependent inputs that have significant effects on the LCOE. Furthermore, the tilt angle and orientation of the solar panels also play a role.

We project an LCOE of 36-60 Euros/MWh for PV systems in Europe. The price range varies depending on the country and the module orientation. We can use the specific case of a PV system in France at an optimal module tilt angle to compare this technology to other leading, high efficiency PV technologies. In this case, the SHJ-IBC PV system has an LCOE of 43.58 Euros/MWh, a standard SHJ PV system has an LCOE of 45.62 Euros/MWh and a PERC PV system has an LCOE of 45.91 Euros/MWh. This means that the SHJ-IBC PV system is projected to have a lower LCOE than these technologies even though the cost of ownership of SHJ-IBC modules is slightly higher than that of PERC solar modules. This is mostly because of the higher efficiencies achievable with SHJ-IBC solar cells.

Finally, we demonstrate the effect of bifaciality on the LCOE. We show that if the bifaciality can reach levels of ~80%, as has been projected by Meyer Burger Research in this project, then the LCOE can reduce from 43.58 Euros/MWh to 38.91 Euros/MWh. This significant drop confirms the importance of bifaciality on the final energy costs linked to the increased amount of energy produced by a given system.

This deliverable marks the end of work package 9 in the NextBase project. After cost of ownership, life cycle analysis and LCOE calculations, we conclude that the technology developed by the NextBase consortium can be economically competitive with other leading high efficiency solar cell technologies. The advantage of SHJ-IBC solar cells is most apparent in the LCOE calculations given here where the LCOE of SHJ-IBC PV systems is even lower than that predicted for PERC systems. These findings may influence market share projections that currently still estimate on a very low market-share for IBC technologies compared to a very large market-share of PERC technologies.