



Deliverable Report

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Executive Summary

In the last two years, the production of modules (i.e. gluing and (pre)assembly of back frames) has developed from manual to semi-automatic.

The manufacturing processes like metal parts assembly, cleaning & quality, gluing & assembly, and logistics in general have been optimized. In addition, many quality aspects have been investigated and improved such as the process of automatic glue dispensing: by optimizing glue pattern, glue dosing & controlled variation, and gluing speed, as well as position tolerances on assembly of backframe versus the laminate by introducing tools and fixtures.

Purchasing from preferred suppliers for parts and the laminates helped us to get the requested quality, price and delivery times. Cooperate with these suppliers also helped enormously to improve the components and final product quickly and reduce the cost. As a result of WP4.3 / WP4.4 / WP4.5. several process and design improvements have been found and successfully implemented. The process improvements led to better quality and lower costs. The design improvements led to less components, better and simpler design of the components, reduced assembly time, higher assembly accuracy, and higher production efficiency in general.

Several types of “proof-of-principle” PV laminates have been sourced from Kameleon in The Netherlands as well as commercially produced laminates SI-Module in Freiburg Germany utilizing the Yparex long-life encapsulant. These laminates have been converted into COSMOS 120 cells modules for large power installations and BIPV modules for distributed energy generation and have been successfully used to achieve testing and WP5 demonstration goals.

The gluing- and assembly line (part 1) from Rimas has been delivered in March 2017 and successfully installed. From March 2017 until April 2018 an amount of 801 PV-modules have been produced. In general, production with the gluing- and assembly line is running very well. A new equipment section for the gluing- and assembly line (second step) for improved semi-automated assembly has been built by Rimas in the period Q3 2017 – Q1 2018 and is being installed in Waalwijk in the meantime. It is expected that production efficiency will further improve resulting in lower manufacturing costs per unit. Already now the production of COSMOS modules is very flexible as many modules sizes and types can be produced for various applications.

The current gluing- and assembly unit, in particular the glue-robot section, is capable of higher production rates up till 50 - 60 modules per hour, however in that case we do need to several other measures as specified in de conclusions chapter.

The quality of the production is very good: COSMOS WP4 modules produced with SI-Module laminates, including modules with Yparex encapsulant have been successfully tested and fully certified by KIWA in the meantime.

We are in regular contact with PV module producers such as Exasun and new back-contact PV module producer Energyra and as soon as these PV laminate producers are ready (achieve a stable Bill of Material) we will test and work with these laminates as well for commercial applications.

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