

Heterojunction with intrinsic thin layer photovoltaic panels operation: Numerical simulation and outdoor tests in Moscow

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Heterojunction-with-intrinsic-thin-layer photovoltaic (HJT PV) panels are known for many years [1], but large-scale production began only after Panasonic Corporation patent for this technology had run out of action [2]. Thin film layers of hydrogenated amorphous silicon, doped also with boron and phosphorus, provide additional amount of captured photons from different than for mono-Si part of solar radiation spectrum and less parasitic recombination due to excellent defects passivation. But energy yield calculation for such panel based on standard approach, involving PV panel standard test conditions parameters, have given less energy, than mono- and multicrystalline panels. Outdoor tests in Moscow conditions showed that HJT PV panels provide higher yield at low insolation conditions. So for proper HJT PV panel energy yield one needs to take into account solar radiation spectral composition. The approach to empirical coefficient deriving, based on comparative outdoor tests of different panels, is proposed.

- [1] Bätzner D, Andrault Y, Andreetta L, Büchel A, Frammelsberger W, Guerin C, Holm N, Lachenal D, Meixenberger J, Papet P, Rau B, Strahm B, Wahli G and Wunsch F 2011 *Energy Procedia* **8** 153–9
- [2] Gifford J 2017 URL <https://www.pv-magazine.com/magazine-archive/momentum-builds-for-hjt/>