We demonstrated a cost model to analyze the economic viability of the III-V-Si hybrid concentrator photovoltaics (CPV) system for the first time, highlighting its comparisons with conventional flat-panel and concentrator photovoltaic system. III-V-Si hybrid concentrator module adds a backplane silicon module in the conventional CPV module to absorb the diffused solar irradiance\(^1,2\), which is not absorbed efficiently by conventional CPV. However, it is not clear that whether this new CPV architecture can be eventually more cost effective than conventional CPV or flat panel PV. To resolve this, we devised a model to compare the annual energy yields and the levelized cost of energy (LCOE) of different PV system in different locations and solar irradiance contents. Our aim is to study the criteria of the component cost and the solar irradiances contents that could make this new design cost competitive to other types of PV systems. Some of the results are shown in Figure 2. We conclude that the areal cost of hybrid CPV has to be further reduced by 300 A/m\(^2\) to compete with state-of-the-art flat panel systems. Also, hybrid CPV would suit the locations with M-shaped distribution of the ratio of direct and diffused sunlight. These results provide guidelines of how to redesign and improve the hybrid CPV systems.


\(^2\)N. Yamada and D. Hirai, Progress in Photovoltaics ... 24, 846 (2016).