At present, photovoltaic (PV) power plants are growing rapidly to respond to the high demand for energy. In this case, improving the levelized cost of electricity (LCOE) and produced energy for PV power plants is a compli- cated design tradeoff that involves several parameters, such as meteorological data variation, nonlinear op- eration of the PV plant components, inverter types, and PV module efficiency. The PV module efficiency and technology affect the overall dimension of the PV power plant. Hence, this study intended to present the application of recent meta-heuristic techniques, namely, salp swarm algorithm (SSA), whale opti- mization algorithm (WOA), and grey wolf optimization (GWO), for two different cases. The new approaches have been compared with particle swarm optimization (PSO) algorithm.