

A) General Information



Acronym: ETAlzmir – 20110531-01

Title of the User-Project: Determination of Inverter Conversion Efficiency Weighting Factors for Izmir

TA Call: 4th CALL - 31-05-2011

Host Research Infrastructure: AIT (DG Lab) - Vienna

Starting Date: August 14, 2011

End Date: September 4, 2011

Lead User : Ilker Ongun, Ege University, Ege Higher Vocational School Electronics Technology, Chief of Department, Izmir, Turkey (accessing the facility)

Additional Users: no additional users

B) Summary of the User-Project

Since inverters' efficiencies change depending on the PMPP composition supplied by the PV array, actual yield cannot be determined by using only the maximum conversion efficiency given by the manufacturer but a combination of efficiencies at different PMPP percentages and their contribution to annual yield. The coefficients of the "ηIZMIR weighted efficiency equation" will lead to an accurate determination of the annual yield estimation of photovoltaic inverters employed in the PV systems installed in this region. Weighting coefficients were searched for different classifications of the normalized MPP power, resulting in various sets of ηIZMIR coefficients (Table 1). Assuming five equal bins, five coefficients are found (Table 2). With the altered bin width for the purpose of consistency with EN50530 (requires measurement at PMPP/PSTC=75%), number of coefficients could have been reduced to four, since there is no PMPP/PSTC beyond 0,82% due to high module temperature levels in the Izmir region.

P _{MPP} /P _{STC}	5%	10%	15%	20%	25%	30%	50%	75%	100%
EURO	3%	6%		13%		10%	48%		20%
CEC		4%		5%		12%	21%	53%	5%
IZM (EURO)	1%	6%		10%		16%	29%		39%
IZM (CEC)		2%		7%		12%	19%	26%	34%

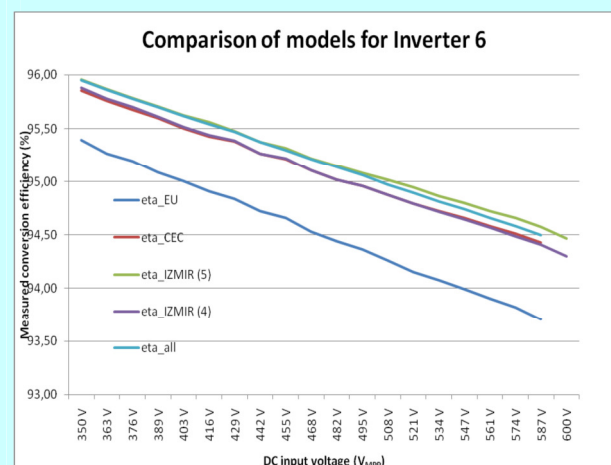
Table 1: CEC and Euro coefficients as given in EN 50530

P _{MPP} /P _{STC}	10%	30%	50%	70%	75%	90%
IZM (5)	2,3%	13,1%	21,8%	27,6	-	35,2%
IZM (4)	4%	12%	21%	53%	-	-

Table 2: Reduced number of Coefficients for ηIZMIR

C) Main Achievements

All the five coefficient sets introduced for the ηIZMIR were applied on various currently existing measurement data and all the efficiency calculating models were charted together for each efficiency maps. Comparisons clearly show that, calculations show close match with the ηCEC calculations and are different than the ηEURO results. Since both locations (California and Izmir) have similar irradiation and climate this was an expected result. Using just four coefficients – instead of the six – does not introduce any remarkable deviations from the real efficiency characteristic curve, allowing substantial convenience and simplicity.



D) Dissemination of the Results

Ilker Ongun: "Determination of Annual Weighted Conversion Efficiency Coefficient for Total Yield Evaluation Under Local Irradiation Conditions", doctorate thesis and paper for IEEE 6 Symposium (<http://www.egeenergy.org/>)

E) Use of the Resources

Nr. of Users involved:	1
Access Days/Units:	4
Stay Days:	21