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Small Amorphous Silicon panels proven in the field **“Free Energy Europe panels best value for money in Kenya”**

Background

Kenya has an active solar home systems market with sales of approximately 20,000 modules per year. Small amorphous silicon modules of 10-14 Watts make up the majority of these sales. The cash & carry market model in Kenya could be a role model for a successful PV application in developing countries, because the basic panels used are directly affordable to a large part of the population.

However, until now most major donors involved in PV projects in developing countries have not focused on this market approach due to doubts on sustainability and technical quality of the products used. The first generations of small a-Si have had technical problems with power degradation that has brought about a general doubt about this technology. Instead, the focus has been on marketing expensive larger 50Watt crystalline silicon solar home systems in heavily financed credit projects, the success of which has been very limited.

An independent research team of Berkeley University, Princeton University (USA) and Energy Alternatives Africa (Kenya), has now undertaken an extensive field evaluation of the technical functioning of the small amorphous silicon products in Kenya.

Main findings

1. Over the past decades the quality of the small amorphous silicon has been strongly improved by several suppliers (Free Energy Europe is now using its 4th generation module manufacturing technology).
2. The research concludes that two out of three brands tested performs adequately. Of the three brands tested, Free Energy Europe panels (brand B2) have been found to be best-performing in the field, with a stable power output after only a few weeks in the field.
3. Only panels from one single manufacturer offering 11Watt and 14Watt amorphous silicon panels showed a power degradation of 39-45% on average. Measures will be developed and proposed to protect the market from this type of substandard panels.
4. Furthermore the research has shown that long-term degradation of amorphous silicon modules is comparable to that of crystalline silicon. This suggests that higher quality a-Si modules hold their performance levels adequately over time.

Conclusions

The scientific analysis has shown the adequate long-term quality in the field in developing countries of well designed small a-Si panels (such as produced by Free Energy Europe). For these brands, the existing doubts in the PV sector about the quality of small a-Si panels have been proven to be misplaced.

More efforts will now be undertaken to replicate the well developed Kenyan market model, based on small a-Si panels, in other developing countries in Africa, Latin America and Asia.

AMORPHOUS SILICON PANELS TESTED IN THE FIELD

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Method:

Field measurements in spring 1999 to test the behaviour of single junction amorphous silicon panels in the field.

Tested 164 PV modules.

Results:

Table 1. Main tested modules

MANUFACTURER	POWER RATING	CODE	RATED OUTPUT	MEASURED OUTPUT	% OF RATED OUTPUT	FAILED MODULES (*)
Brand "A"	12 Wp	A	12 Wp	10.0 Wp	83%	6%
NAPS France (3 rd generation)	11 Wp	B1	11 Wp	9.7 Wp	88%	0%
Free Energy Europe (4 th generation)	12 Wp	B2	12 Wp	10.6 Wp	89%	0%
Brand "C"	11 Wp	C1	11 Wp	6.8 Wp	61%	46%
	14 Wp	C2	14 Wp	7.7 Wp	55%	40%
17 crystalline-S panels of various makes					87%	

*) module failure has been defined as producing less than 10% of rated output. The failed modules were excluded from the mean performance estimates.

NOTE: Due to possible legal implications, the researchers have not linked the codes to the brand names. However they have noted that "it is easy to figure out which is which (our data is unmistakable)".

The researchers have confirmed that the B2 brand is Free Energy Europe/NAPS 4th generation (polymer framed), and B1 is NAPS 3rd generation (aluminium/polycarbonate framed).

More information

See attached paper.

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