

TS CIGS SERIES DELIVERING REAL WORLD PERFORMANCE

Since 2012, TSMC Solar modules have been proving their performance advantages in real world deployments over a wide-range of locations and conditions. Our CIGS technology advantages when operating at higher temperatures, light-soaking gains after deployment and low degradation are delivering excellent performance ratios, culminating in a 5-6% energy yield advantage over c-Si. This report provides a detailed look at our module's real world performance at test sites across the world.

Test Site Location	System Size	Performance Ratio		Irradiation (kWh/m ²)**	Temperature**	Reference Period
		Actual*	PVsyst			
Taichung, Taiwan	2kW	86.5%	85.4%	1,537	23.9°C	2 years + 2 months
Pingtung, Taiwan	2kW	85.6%	83.2%	1,558	24.9°C	2 years
Tempe, Arizona, USA	2.5kW	84.6%	83.7%	2,010	24.6°C	2 years
Raleigh, N. Carolina, USA	2.5kW	87.3%	86.2%	1,605	16.0°C	1 year + 9 months
San Antonio, Texas, USA	75kW	86.6%	85.9%	1,802	21.2°C	1 year + 9 months
Otjiwarongo, Namibia	1.4kW	N/A	N/A	2,404	22.7°C	1 year + 8 months
Doha, Qatar	2kW	73.8%	N/A	1,704	28.0°C	1 year + 6 months
Nicosia, Cyprus	1.2kW	86.9%	85.4%	1,987	19.9°C	9 months
Aurora, Colorado, USA***	2kW	90.8%	88.9%	1,713	12.3°C	1 year

* Collected to date

** Data from Meteornorm

*** Test site discontinued



A TSMC Company

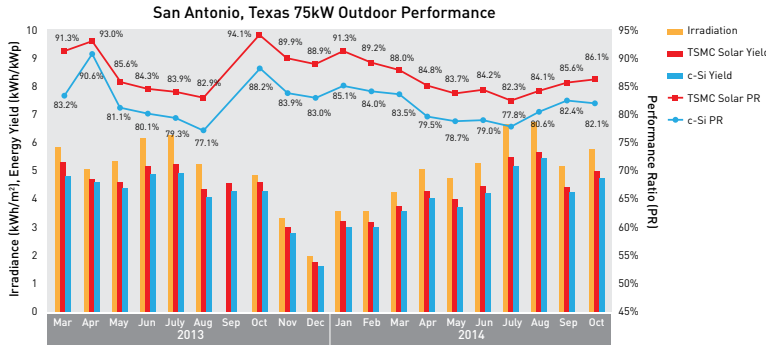
www.tsmc-solar.com

TSMC Solar Outperforms Conventional c-Si

5.9%

MORE ENERGY PRODUCED

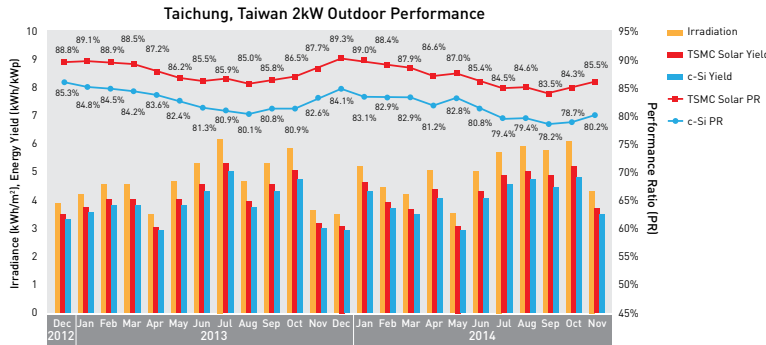
NORTH AMERICA



5.9%

MORE ENERGY PRODUCED

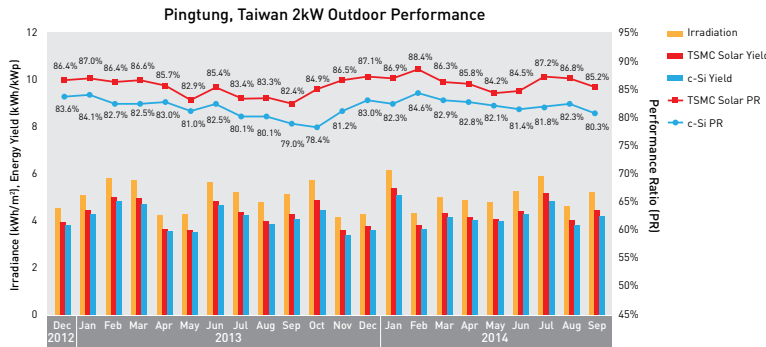
ASIA



4.6%

MORE ENERGY PRODUCED

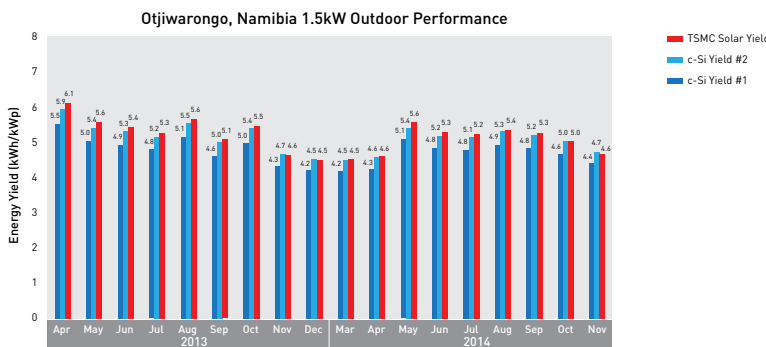
ASIA



4.9%

MORE ENERGY PRODUCED

AFRICA



Note: Jan/Feb data not collected.

ABOUT TSMC Solar

TSMC Solar Ltd. is a wholly-owned subsidiary of Taiwan Semiconductor Manufacturing, Inc. (NYSE: TSM), the acknowledged semiconductor dedicated foundry segment leader with market capitalization exceeding \$100 billion. TSMC's solar business was founded in May 2009 and is headquartered in Taichung, Taiwan, with regional sales offices in Hamburg, Germany and San Jose, California.

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New Thinking.

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