

Bridging Quantity Variations to Maximise Solar Wafer Output



SunEdison Kuching Sdn. Bhd. (formally MEMC Kuching Sdn. Bhd.) is a subsidiary of SunEdison Inc. SunEdison Kuching (SE) is the world's largest renewable energy development company. It transforms the way energy is generated, distributed and owned around the globe. SE was founded in 2010 with a total strength of 650 staff. It is located at Sama Jaya Free Industrial Zone, Kuching, Sarawak.

SE is among the world top solar wafer companies with the production capacity of solar wafer exceeding 800 MW annually. It provides a wide variety of features with numerous product specifications to meet customers' requirements. The company has always provided its customers with a reliable supply of high quality wafers with consistent characteristics.

Reducing waste and cost to offer competitive pricing to customers

When it comes to competition, businesses that offer better prices that match with the expected quality of the supplied products will succeed in the entire market. When producers are able to reduce the production cost, price offered will be lowered and SE is able to sustain in the market. This company adheres to the principle of cost saving and waste reduction in solar production operations.

The company encourages all its employees to identify the best possible areas needed to be improved using LEAN approach. It has also provided a series of LEAN training to equip the staff with sufficient knowledge. It is a vital step for a company to invest in ensuring the project to be completed successfully.

In 2013, a team of four people from the manufacturing division of SE took the initiative to solve a problem at the finishing line. Daily plant finished goods (FG) of solar wafer packed did not tally with the reported machine output quantity. This occurred during the daily operation. The record showed that wafer variation in between finished goods was always less than 3.6 percent as reported by the machine output. The insufficient number of solar wafers was due to unknown reasons that needed to be discovered through Kaizen activities. The team had undertaken initiatives to investigate in solving this problem.

An effective way to improve solar wafer quantity variance

The team started the implementation of LEAN program for 12 months from January to December 2013. The high variance between the reported machine output with

actual packed wafer quantity was rectified by using the methods of counting good wafer, loss of wafer and review on the rework flow. Three main steps were identified by the team namely to find out the exact location on the occurring problem, to analyse the root cause and execute the solution.

An analysis was done to identify and verify the origin of waste during the production of solar wafer. Below is a table on waste category and waste creation.

WASTE CATEGORY	WASTE CREATION BY ACTIVITIES
Over processing	No standardisation on rework practices in production floor.
	Variation of time due to different practices of rework.
Defect	Losses on quantity of solar wafer due to incorrect processes.
	Lack of attention for daily rework quantity.
Delay	Longer waiting time on rework of solar wafers.
	Unnecessary rework production causing less output.



From the root cause analysis, the team found multiple sources of variances for the wafer and needed actions for improvement:

ROOT CAUSE	KAIZEN IMPROVEMENT
Inefficient operators using incorrect methods of calculation / use reverse charging method.	Developing charging method
Undefined beam cut-off point using reverse charging method.	
Improper method used to count loss quantity of equipment.	Review loss code and define counting method
No separate beam ID for wafer rerun.	Develop rerun method (separate from production run)
No loss code definition for wafer rerun requirement.	
No standardisation in wafering system.	Review work standard

Analysis of LEAN project in SE

All the Kaizen actions have a positive impact to SE. The wafer variance between machine reported output and actual packaging has improved from -3.6 percent to -0.3 percent. Hence SE has successfully saved RM7.5 millions of cost in a year. Through this project, SE's staff are able to contribute to their fullest potentials and ultimately pushed the company to greater heights.

Indeed, LEAN is an excellent tool for manufacturers to use in their factories. LEAN unique solutions lead to a simple, conducive environment and also to reduce any wastage in the production line.

Matrix before and after LEAN project:

DESCRIPTION	BEFORE	AFTER
1. Processing time	2,800 WPH with 1.1 loss	2,900 WPH with 0.3 loss
2. Cost saving (RM)	-	7.5 mil
3. Process step	Manual	System (Counter) : non human dependent