

Press release

The Swedish Royal Institute of Technology sets new fuel efficiency record with Midsummer's flexible solar cells

[Stockholm, Sweden, August 12, 2014.] [The Swedish Royal Institute of Technology \(KTH\)](#) set a new Swedish fuel efficiency record with 181.5 km/kWh in the [Shell Eco Marathon](#) competition, a race in which European universities compete with innovative solutions for how far a vehicle can travel with the energy equivalent to a litre of fuel. KTH competed with thin solar cells made by [Midsummer](#), a leading supplier of production lines for cost effective manufacturing of flexible thin film solar cells, CIGS.

Shell Eco Marathon is a competition for universities that compete in how far they can make a vehicle travel on the energy equivalent to 1 litre of fuel. Participants in the contest must come up with innovative solutions to create fuel-efficient vehicles. KTH participated with the car "Elba" and finished in fifth place.

In the contest, which was held in Rotterdam in the Netherlands, the new improved "Elba" was able to set a new Swedish record of 181.5 km/kWh, which can be compared to a car that drives a distance of 158 kilometres for a total cost of around 1 Swedish Krona (0.11 EUR or USD 0.15).

"The solar cells needed to be integrated into the car's design," said Alex Witt, Production Manager at Midsummer. "The only possible solar solution that would integrate in Elba's aerodynamic shape was Midsummer's flexible thin film solar cells on stainless steel, which could easily follow the curved body of the vehicle without cracking. This solution would have been impossible with silicon solar cells as they crack easily."

"In this year's competition KTH used last year's car "Elba", which was rebuilt. The custom-made flexible solar cell modules were placed strategically on the vehicle to optimize the exposure of the sun and thereafter connected in series to generate as high voltage as possible into the system," Alex Witt further explained.

Midsummer is a leading global provider of turnkey production lines for cost-effective manufacture of flexible thin film solar cells of the type CIGS (copper, indium, gallium and selenide). Midsummer has developed a rapid process for the production of these solar cells using sputtering of all layers of the solar cell. This allows for scalable and cost efficient manufacturing of thin film solar cells.

CIGS flexible solar modules are growing in popularity thanks to their low weight, flexibility and durability. Applications are e.g. floating modules, vehicles, landfills, portable power generation and membrane roofs on factories, offices and other structures that are not strong enough for traditional glass modules.

Midsummer has been named as one of Sweden's hottest technology companies and also been repeatedly featured on the list of the nation's fastest growing technology companies. Midsummer was the fastest growing clean tech company in the EMEA region in 2007-2011 (Deloitte, Fast 500).

For images of thin film CIGS solar cells and the Midsummer manufacturing equipment, please go to <http://www.midsummer.se/pressmediagallery.html> or contact Mr. Lindström.

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About Midsummer

Midsummer is a leading supplier of equipment for cost effective manufacturing of CIGS thin film flexible solar cells. Midsummer's turnkey manufacturing lines have a small footprint, are perfectly scalable and allow for small-scale production of solar cells and modules.

Midsummer's customers are thin film solar cell manufacturers all over the world. CIGS flexible solar modules are growing in popularity thanks to their low weight, flexibility and durability. Applications are e.g. floating modules, vehicles, landfills, portable power generation and membrane roofs on factories, offices and other structures that are not strong enough for traditional glass modules.

Founded in 2004 by people with a background from the optical disc manufacturing equipment and the photo mask industry, Midsummer has its head office in Stockholm, Sweden. Midsummer was the fastest growing greentech company in EMEA (Europe, Middle East and Africa) in 2007-2011 (according to Deloitte).

About CIGS thin film solar cells

CIGS stands for copper-indium-gallium-selenium, a metal alloy that converts the energy of light directly into electricity by the photovoltaic effect (PV). The CIGS absorber is deposited on a stainless steel substrate, along with electrodes on the front to collect current. The cells are then connected in series and covered by a protective layer of plastic to form a flexible solar module.

Since a stainless steel substrate is used, the modules can be made without glass. The CIGS solar modules are therefore much lighter, flexible and can be made frameless, to suit applications where traditional silicon solar cells cannot be used, e.g. on structures that are uneven, moving or weak.

CIGS solar cells are manufactured by sputtering the material onto 156x156 mm stainless steel substrates. The solar cells from Midsummer are free of cadmium, a toxic material usually used in CIGS and other thin film solar cells. Flexible CIGS solar modules are gaining market share thanks to its high efficiency, low weight, flexibility and durability.