Photovoltaic Technology Status Summary

The University of New South Wales (UNSW) School of Photovoltaic & Renewable Energy Engineering, including the ARC Photovoltaics Centre of Excellence, has a proud record of leadership over three decades in silicon solar cell technology and holds current records for cell (25%) and module efficiencies. It carries out research and development on affordable, advanced, cell technologies for wafer-based, thin film and third generation cells. The School also pioneered specialist photovoltaics engineering education in 2000 and offers two four-year undergraduate and three postgraduate coursework engineering degrees.

Licences and collaborative research agreements with UNSW are available for several technologies. The technologies that promise improved efficiency for mass-produced silicon wafer cells at low marginal production cost increase. These include;

1. Selective emitters achieve better efficiency through improved response of a cell to blue light. The Centre's patented processes for semiconductor fingers and for laser doping both offer this advantage.
2. Inkjet & aerosol printing methods developed at UNSW will soon be able to achieve control of fine surface features that approaches that available from the unaffordable photolithographic method which was used for all the record-setting cells but much more cheaply and fast enough for rapid production lines.
3. The Centre also has a suite of patents for processes to make solar modules of crystallised thin film silicon on glass that avoid the efficiency degradation problems inherent in amorphous silicon modules.

UNSW can help companies achieve the following large-scale production efficiencies on full-sized commercial wafers;

	NOW	2010	2011	2012
SP semiconductor finger cells CZ	18.3%			
SP semiconductor finger technology multi	16%			
SP transparent conductors CZ	17.8%		18.5%	
SP transparent conductors multi		16.5%	17%	
LDSE p-type CZ	18.5%	19%	>20%	
LDSE n-type CZ	18.6%	19.5%	>20%	21%
LDSE p-type multi	17%			18%
LDSE n-type multi	16%			
Inkjet/Aerosol technology p-type CZ			18%	>20%
Inkjet/Aerosol technology n-type CZ			19%	>20%

The licensing of UNSW technology and contract agreements for collaborative research are carried out by NewSouth Innovations (NSi). NSi is UNSW's commercialisation company & 100% owned by UNSW.

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Acronyms

LDSE : Laser Doping Selective Emitter
SP : Screen Print
CZ : Czochralski-method (Cz-Si) - mono
UNSW : University of New South Wales
NSi : New South Innovations

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