

World leading Photovoltaic Research and Renewable Energy Technologies

UNSW is a world leader in research in silicon solar energy production and technologies. Established in the 1980's, UNSW's solar research group (lead by Professor Martin Green and Professor Stuart Wenham) has been responsible for a number of world leading commercial technologies used in silicon solar cells produced today. UNSW has held the world record for silicon cell performance for 30 of the past 34 years.

Key Technologies Available

High efficiency solar cell structures designed for industry

- PERC solar cell family originally developed at UNSW in the 1980's, predicted to have market share over 50% by 2023.
- Silicon/perovskite tandem solar cells, developing the future of high efficiency PV (> 40%).
- World-leading CZTS (copper-zinc-tin-sulphide) solar cell and perovskite cell research (world records), both suitable for stacking as thin-films onto silicon.

High efficiency manufacturing techniques

- UNSW Hydrogenation for improved silicon wafer quality, cell efficiency, and eliminating light induced degradation (LID)
- Metal plating, improving adhesion, efficiency and tool design
- Advanced manufacturing techniques, e.g. laser doping, surface passivation, carrier selective/passivated contacts, precision etching, thin-film fabrication, etc.

Characterisation and quality control

- Photoluminescence testing of silicon wafers, solar cells and modules.
- Metallisation process control.

PV Systems and deployment

- Energy generation forecasting of solar cells, modules and systems.
- Renewable energy grid integration, micro-grid, energy internet.
- Renewable energy policy.



Education and training

- Undergraduate and postgraduate degrees in PV&RE engineering.
- Manufacturing short courses.
- On-line courses.
- Textbooks, scientific publications and professional modeling software.

Commercialisation-oriented R&D

- New Tyree Energy Technologies Building provides world-leading experimental environment for innovation of pioneering technologies and proof of concepts.
- Proven concepts are deployed in Solar Industrial Research Facility (SIRF) for pilot production. The SIRF uses only mass-production equipment, guarantying that zero-gap between lab innovation and Commercialisation.

The Opportunity

UNSW has a long track record of partnering with some of the world's leading solar cell producers such as LONGi Solar, Suntech, China Sunergy, SUMEC, Sunport, LG, SolarWorld, focusing on developing industry applicable technologies.

UNSW is currently seeking commercial partners to license and/or to work collaboratively with UNSW to develop the next generation of PV technologies.