



UNSW
SYDNEY

SPREE

UNSW SCHOOL OF PHOTOVOLTAIC AND
RENEWABLE ENERGY ENGINEERING

Bringing the renewable future to life



Powering the Clean Energy Transition From Innovation to Impact

For decades, UNSW SPREE has been at the forefront of solar and renewable energy innovation, contributing to breakthroughs that have shaped the global industry. Today, we're building upon our solid foundation in component-level research and technology development to embrace the full breadth of the renewable energy and electrification transition.

We are building capabilities in whole-system integration, advanced manufacturing, resilient supply chains, and international collaboration—connecting fundamental research to the complex, real-world challenges facing the global energy transformation.

Here at SPREE, our students, researchers, educators, and industry partners from around the world collaborate to design energy solutions that serve both people and the planet. We're creating technologies, systems, and frameworks that make a sustainable and equitable energy future possible—and we invite the next generation of global energy leaders to be part of this critical mission.



Message from our Head of School



Professor Ned Ekins-Daukes
Head of School of Photovoltaic and Renewable Energy Engineering
UNSW Sydney

Welcome to the UNSW School of Photovoltaic and Renewable Energy Engineering. We stand at a pivotal moment in history—a structural shift to clean energy that is fundamentally transforming our world. For the first time in a century, renewables have overtaken coal in the global electricity mix, reaching 33.8% of generation in 2025. Leading this transformation is solar power, which has grown more than tenfold since 2015, achieving a record 2,778 TWh in 2025—its highest growth rate in eight years.

UNSW SPREE has been instrumental in making this revolution possible. Our pioneering research has directly contributed to the development and global adoption of solar photovoltaic technology, helping to establish solar as one of the most cost-effective means of generating electricity. Equally important is our role in training current and future generations of renewable energy

leaders—alumni from our undergraduate, postgraduate coursework, and research programs who are at the forefront of the clean energy transition worldwide.

As the renewable energy sector rapidly evolves—integrating energy storage, grid modernization, electrification of transport, and emerging technologies—UNSW SPREE remains committed and ready to meet the industry's evolving needs. Our vision is to continue delivering world-class education, training, and research that not only advances solar and renewable energy technology but ensures a clean energy future is available to everyone, everywhere.

We are immensely proud of the impact our graduates and research have had globally. If you're interested in joining us in this vital mission through study, research, or collaboration, we would be delighted to hear from you.



Developing Future Leaders through World-Class Education

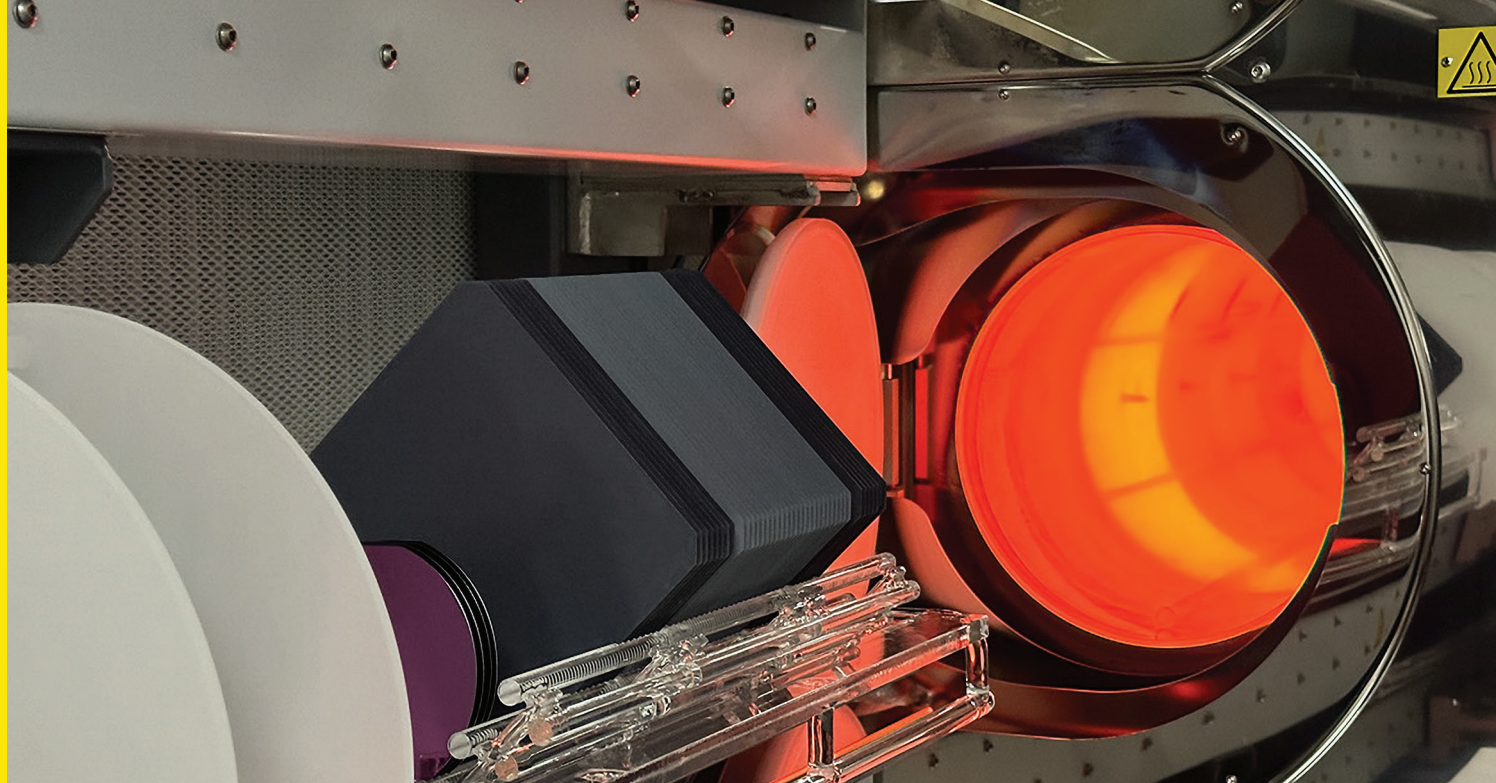
Equipping students worldwide with the knowledge, skills, and vision to lead the transformation of global energy systems across technology development, system integration, policy, and industry practice.

Advancing Global Industry through Visionary Research

Driving innovation from solar cells to grid-scale systems, sustainable manufacturing, circular economy frameworks, and emerging technologies that enable long-term, equitable energy production and consumption across diverse global contexts.

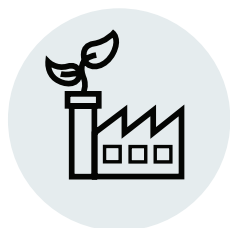
Solving global energy challenges with sustainable technology & impact

Turning research into commercial solutions and international partnerships.



Advancing industry through visionary research

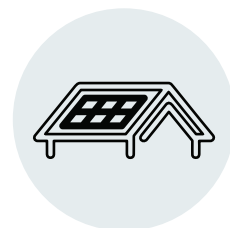
Our research strengths



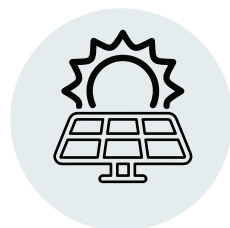
Industrial solar cell fabrication



Data analytics for solar system design, development & operation



Solar-integrated building practices



Advanced solar PV concepts & materials



Renewable energy resource assessment & forecasting



Renewable energy integration, policy development and market analysis



Advanced solar PV metrology and renewables



Solar PV Recycling processes and technology

Educating the Next Generation of Clean Energy Leaders

UNSW SPREE has been educating students from around the world for decades, many of whom have become leaders of successful global solar and renewable energy companies. As the demand for skilled renewable energy professionals intensifies worldwide, our alumni are at the forefront of this transformation—leading innovation, shaping policy, and building the clean energy systems of tomorrow across every continent.

At COP28, governments committed to tripling renewable electricity capacity globally by 2030 under the UAE Consensus. This accelerating energy transition will have profound implications for the global workforce. According to the International Renewable Energy Agency (IRENA), a Paris Climate Agreement-compliant pathway could create around 30 million renewable energy jobs and 77 million jobs in transition-related sectors—including energy efficiency, power grids, energy flexibility, and hydrogen—by 2030.

At UNSW SPREE, we're preparing the next generation of global leaders and innovators to meet this unprecedented workforce challenge and shape the future of the world's energy systems.

"SPREE's degree will give you the hands-on skills you need for a career with real impact on the world."

Jonathon Yates, Data Analyst and University Medal Winner



Courses we offer

Undergraduate Courses

- > Bachelor of Engineering (Honours) in Photovoltaics and Solar Energy SOLAAH
- > Bachelor of Engineering (Honours) in Renewable Energy SOLABH

Postgraduate Courses

- > Master of Engineering Science (Photovoltaics and Solar Energy) SOLACS
- > Master of Engineering Science (Renewable Energy) SOLADS
- > Graduate Diploma of Engineering Science (Photovoltaics and Solar Energy) SOLAES
- > Graduate Diploma of Engineering Science (Renewable Energy) SOLAFS

Postgraduate Research Degrees

- > Doctor of Philosophy (PhD)
- > Master of Philosophy by Research (MPhil)

Research impact

Each year our academics and research centres work with businesses, government and community organisations on tailored projects, transferring our research into practice. We are making an impact that matters with the following research:



Prof Martin Green

Founded PV research at UNSW in 1974 and pioneered the PERC and MINP tunnel-contact silicon PV technology that underpins present day TOPCon solar cells.

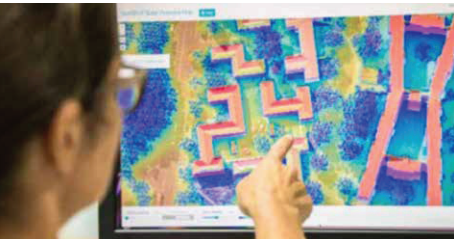


Developing higher efficiency solar cells

Since the invention of the PERC solar cell at UNSW in 1983, the technologies which make solar cells so powerful have been improving rapidly – in both the energy they generate, and how efficiently they produce it. How to make even more efficient solar cells with even longer lifespans is a core focus of work at SPREE, and some of the world's most respected and awarded researchers are leading our teams in the labs on campus.

A key area of this research is investigating the kinds of materials cells use to conduct electricity. Our teams work with tandem cells combining silicon with a second layer of material, including perovskites and other cutting edge innovations. The Federal Government prioritises funding this kind of research as we move towards a goal of Solar 30/30/30: to improve the efficiency of solar cells to 30 per cent, to reduce cost of solar modules to 30 cents a watt by the year 2030.

> **COLLABORATORS:** Australian Renewable Energy Agency, Australian Centre for Advanced Photovoltaics



Solar potential analysis

Electricity generation and distribution is changing from a centralised to a decentralised model. There is significant potential for distributed energy such as rooftop solar PV and batteries in Australia, but there has thus far been a lack of good quality information to make decisions about these investments, which impacts the cost, reliability and sustainability of our electricity industry.

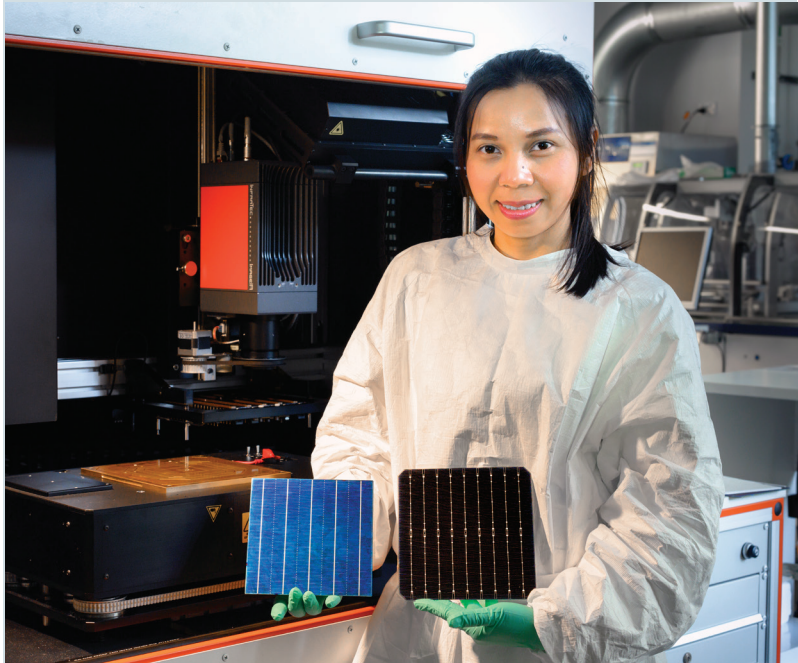
The SunSPoT Tool was developed at SPREE for the Australian PV Institute (APVI), using weather data and GIS models to calculate generation from individual PV systems on rooftops, accounting for available area, tilt, orientation, shading and different configurations. It has also been used to assess the best opportunities for PV in a region and the potential impact on network load profiles.

> **COLLABORATORS:**
Clean Energy Council, ITP, AECOM

World class facilities and capabilities

SPREE hosts the Australian Centre for Advanced Photovoltaics (ACAP) and conducts world- leading research ranging from blue- sky to applied research at the pilot scale level. The laboratories at the Tyree Energy Technology Building (TETB) are equipped with a wide range of deposition, etching, structuring, simulation, and metrology tools enabling diverse photovoltaic and renewable energy research.

Our Solar Industrial Research Facility (SIRF) houses a flexible R&D enabled pilot line for crystalline silicon solar cells and modules with a particular focus on equipment using UNSW-developed technology.



Our partners

At SPREE, we work with all levels of industry and government to bring the renewable future to life. Our network of industry partners ranges from **local solar start ups and national energy retailers to top-tier global solar manufacturers.**

With access to SPREE's worldclass solar researchers and our stateoftheart facilities, we help our partners achieve their goals to become a positive source of energy in the world.

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| • AEMO | • LONGi |
| • Aiko Solar | • NSW Government |
| • Airbus | • RayGen |
| • BoM | • SA Power Networks |
| • Canadian Solar | • Smart Energy Council |
| • Clean Energy Council | • Solar Analytics |
| • CSIRO | • Solar Citizens |
| • DAS Solar | • Solcast |
| • DR Laser | • Sundrive |
| • GSES | • Sunport |
| • HuaSun | • Tindo Solar |
| • Iberdrola Australia | • Tongwei |
| • ITP Renewables | • Trina Solar |
| • JA Solar | • WattWatchers |
| • Jinko Solar | • Yingfa Ruineng |
| • Jollywood | • YIST |
| • Leadmicro | |



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