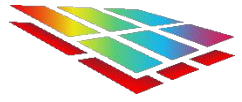


Tandem PV

iARPA proposers day

Colin Balie
Chief Technology Officer



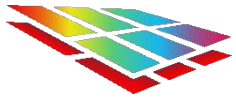
Who is Tandem PV?

Team of about 27 people

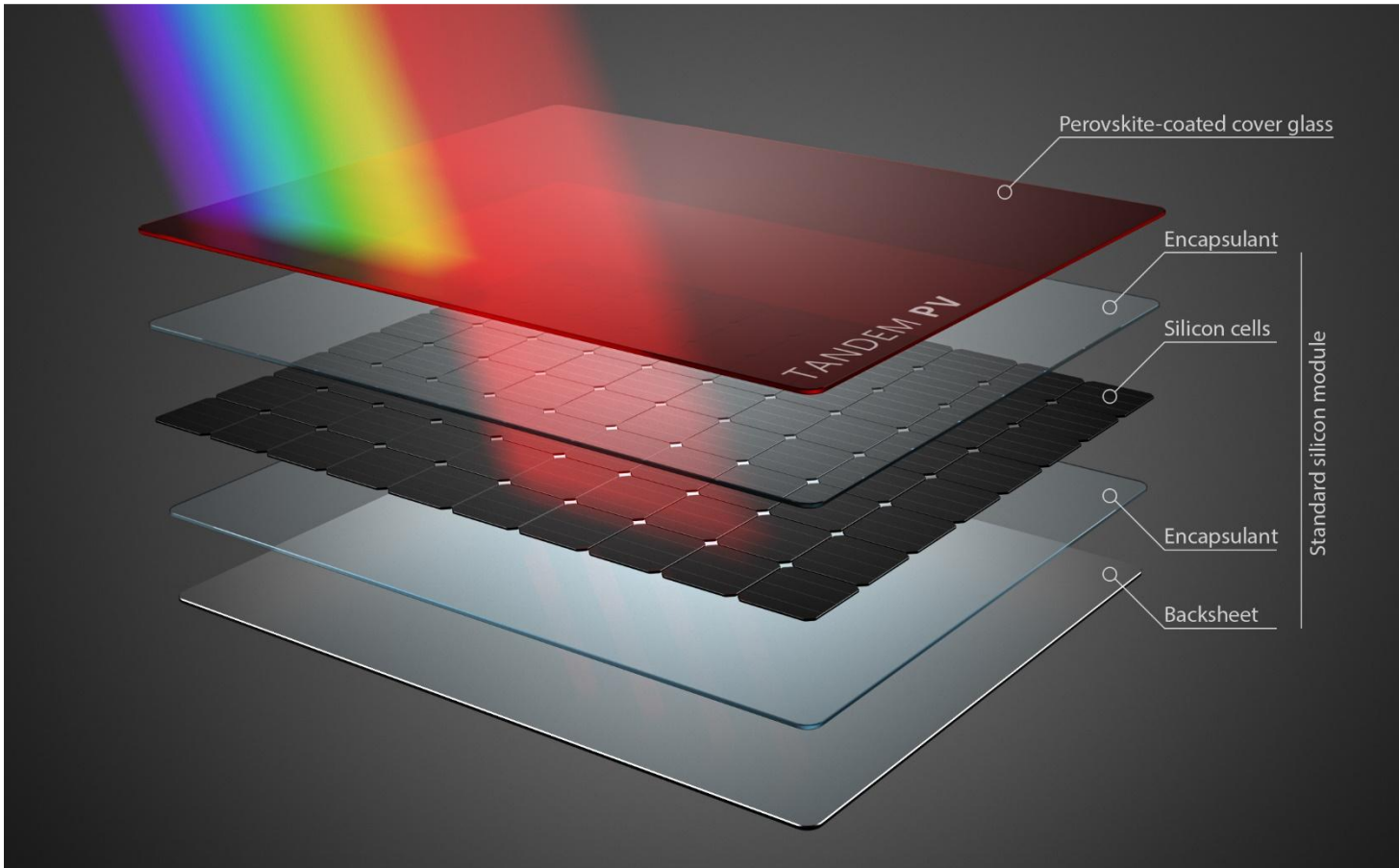
+ many partners

Main facility in San Jose, CA





4T Perovskite/Silicon Tandems



Configuration

Replace Si module cover glass with semi-transparent perovskite submodule

Advantages

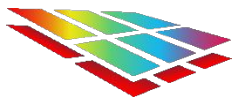
Higher W/m^2 efficiency

Compatible with all Si technologies

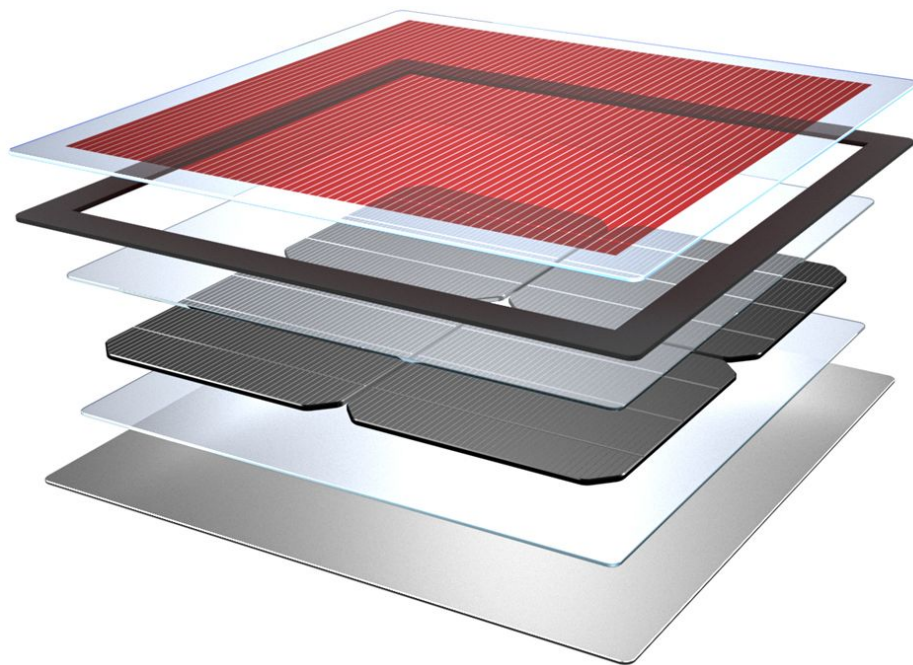
Easy upgrade in high-volume manufacturing

Lower $\$/W$ manufacturing cost



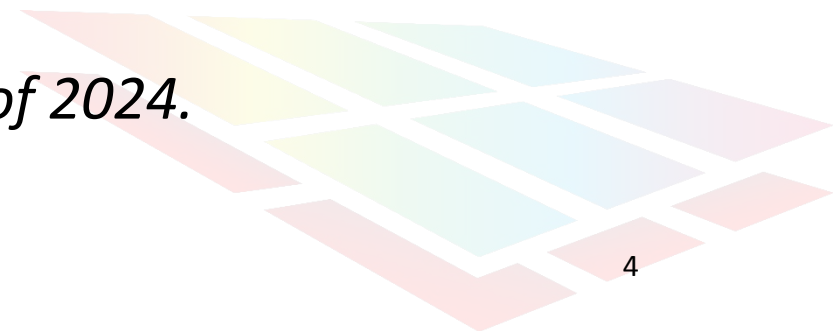


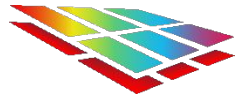
4T Perovskite/Silicon Tandems



— 18.28% Perovskite Panel
+
— 8.04% Silicon cell (20% alone)
=
26.32% tandem panel on 100cm²

Targeting >28% in Q2 2024, >30% by end of 2024.





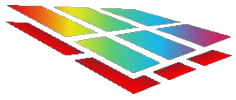
Module Development

276 cm²
with full
M6 Wafer



- Currently tooling for 30 cm x 30 cm parts.
- Goal of 2.7 m² panels

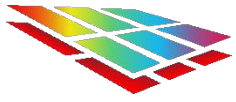




IEC Accelerated Stress Tests

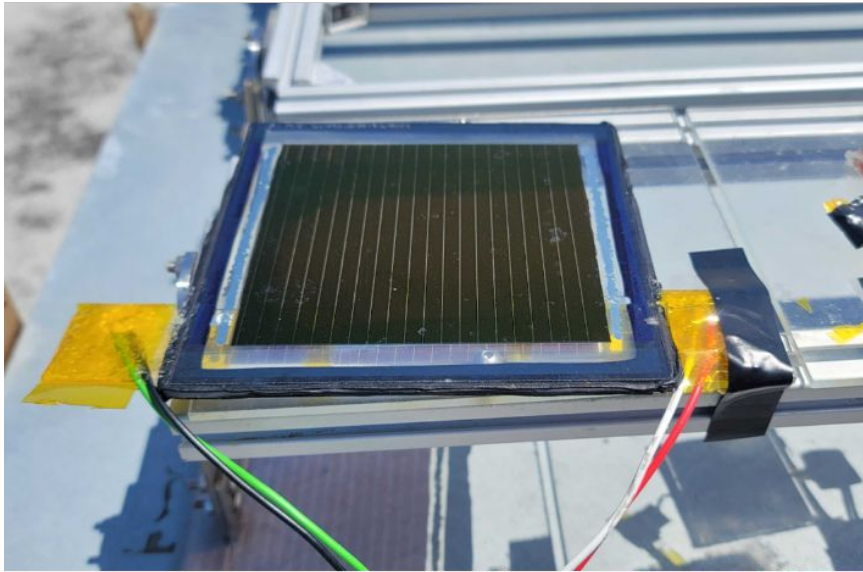
IEC Test	Test Duration	Test Condition	Result
Wet leakage current test	1min	500V applied in water	Passed
Thermal cycling test	50 cycles	-40°C to +85°C	Passed
Thermal cycling test	200 cycles	-40°C to +85°C	Passed
Thermal cycling test	600 cycles	-40°C to +85°C	Passed
Humidity freeze test	10 cycles	-40°C to +85°C/85%RH	Passed
Damp heat test	1,000 hours	+85°C/85%RH	Passed
Outdoor exposure test	60 kWh/m ²	Outdoors	Passed



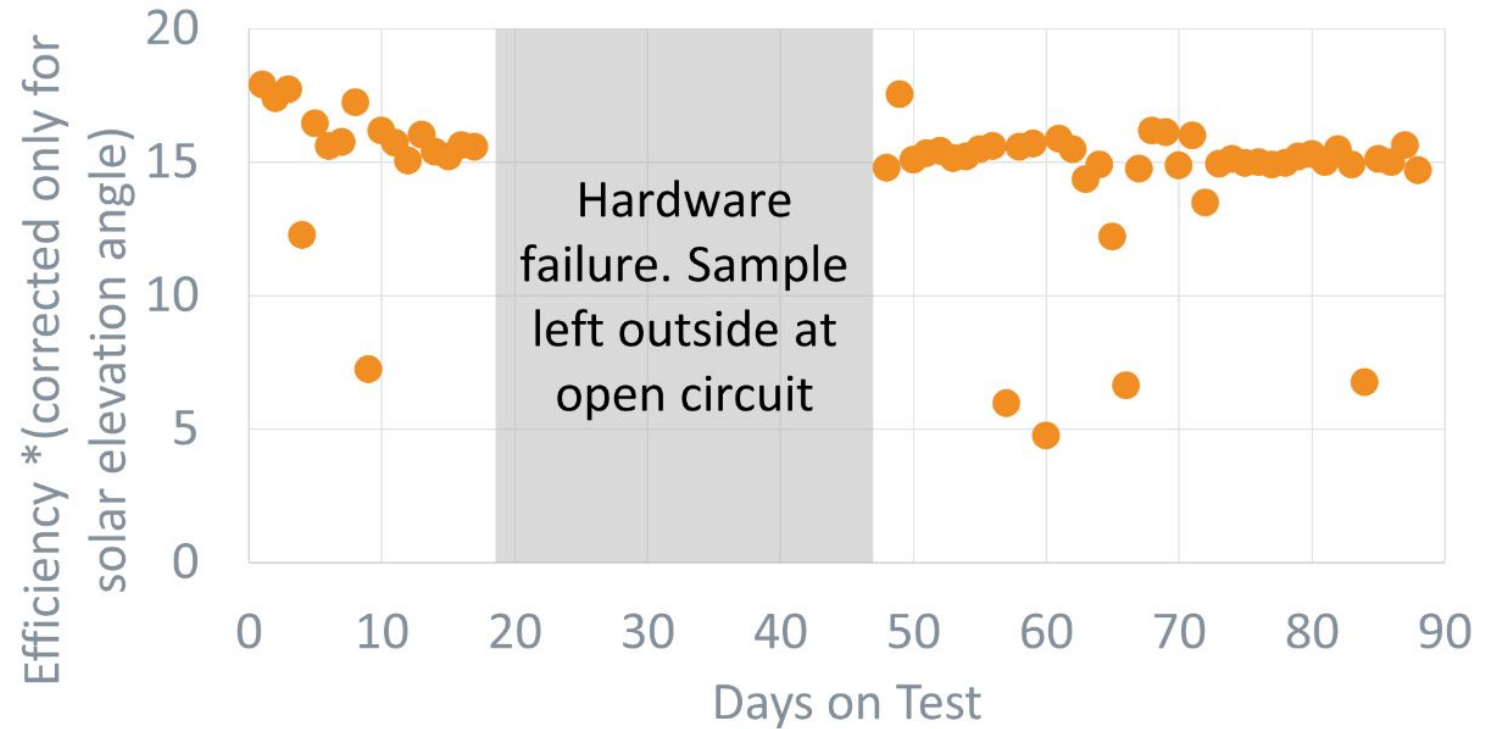


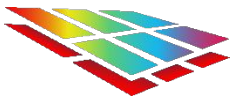
Outdoor field testing

Packaged panel on the roof at UCSD

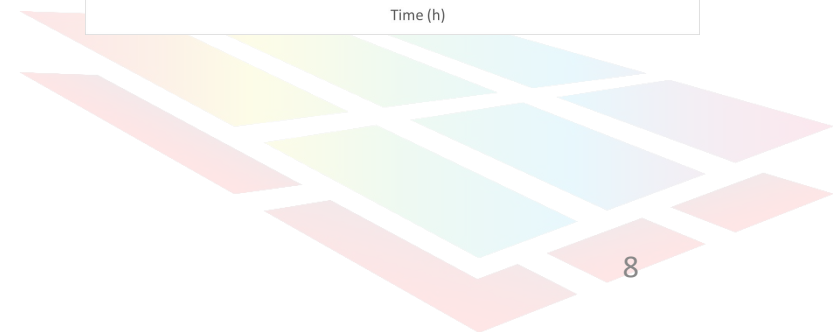
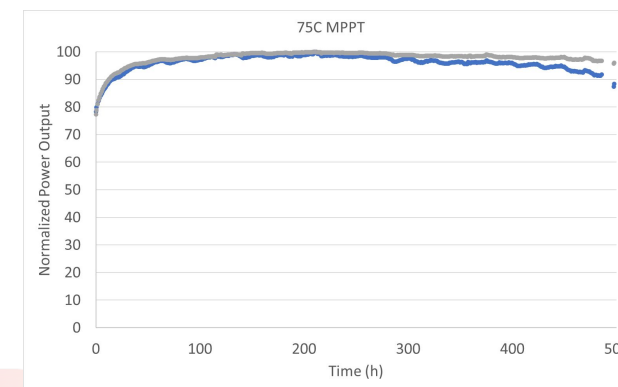
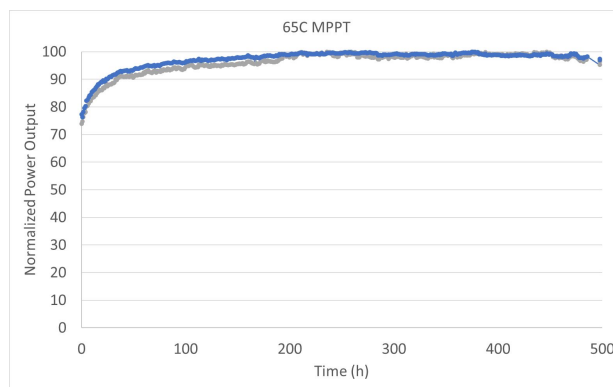
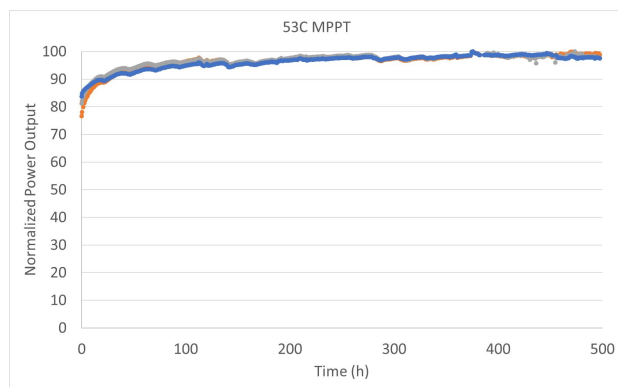
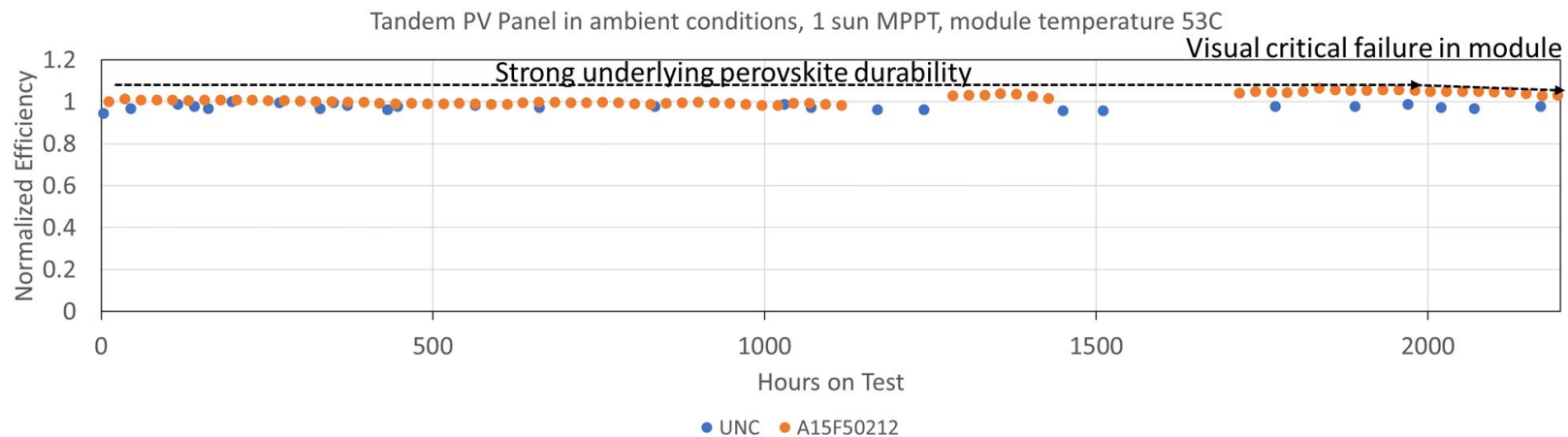


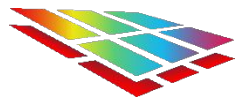
Tandem PV panel outdoors at UCSD



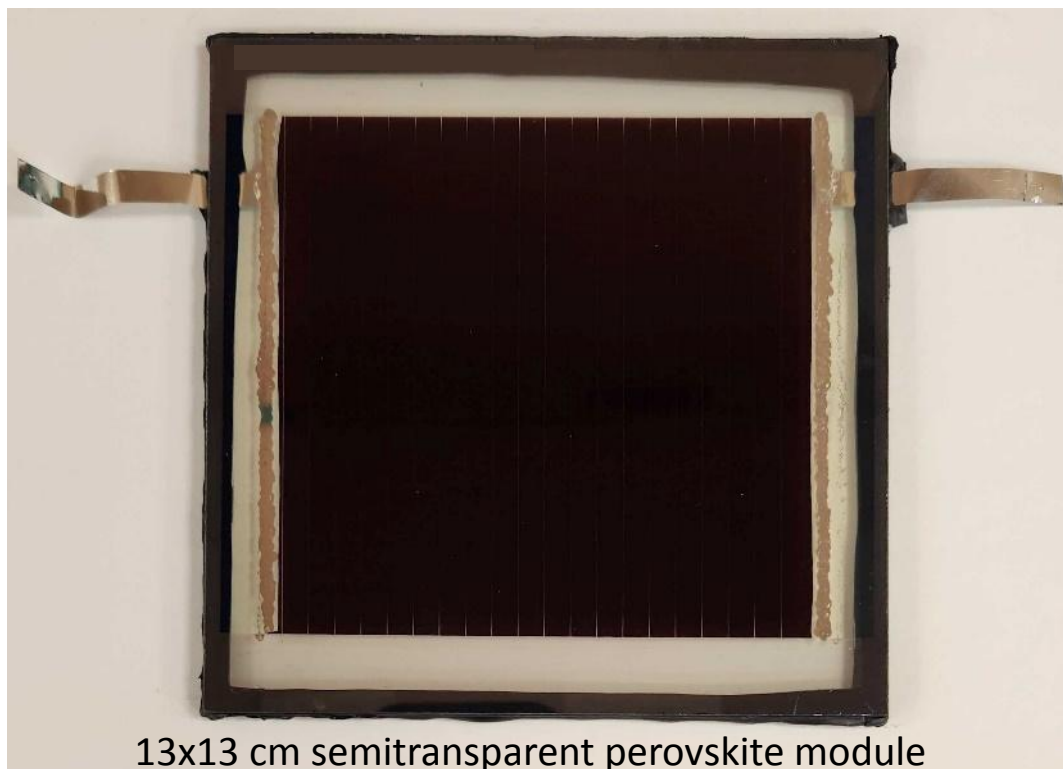


Indoor MPPT tests





Tandem PV Capabilities



13x13 cm semitransparent perovskite module

- We are making 100s/month of 100cm² aperture area panels. Transitioning to prototypes on M6/M10 formats.
- Plan to enter market with a 28-30% efficient tandem product in 2026
- Can make either bifacial perovskite modules, bifacial 4T tandem modules, or monofacial 4T tandem modules
- We make perovskite prototype panels that are durable to accelerated stress tests and multiple months of outdoor field testing.
- We are open and interested to work on designs of interest to iARPA

