

<h1>SunShare Connect(TM) - Patents and IP</h1>

<h2>Strategic IP Domains</h2>

<p>SunShare Connect(TM) will establish a hybrid IP portfolio combining utility patents, provisional filings, defensive publications, and modular open-source components.</p>

<p>We will protect core innovations across five verticals:</p>

<h3>1. Thermal-Optical Microchannel Arrays</h3>

<p>Patent Priority: Utility + International PCT

Claims Include:

- Integrated PV-microchannel panel with dual-phase energy capture
- Liquid-immersed optical structures for refractive beam steering
- Spectral-splitting fluid layers for wavelength-selective thermal harvesting
- Corrugated microchannel architecture for passive glare reduction</p>

<h3>2. Desalination + Water Recovery Modules</h3>

<p>Patent Priority: Utility (with modular retrofit claims)

Claims Include:

- Direct-contact membrane distillation (DCMD) integrated into PV panels
- Capillary-fed distillation layers using textured titanium
- Brine management systems using crystallizer synergy with thermal microchannels

- Thermosiphon loop heat reuse for off-grid water production</p>

3. Environmental Resilience Layers</h3>

Patent Priority: Utility + Defensive Disclosure

Claims Include:

- Self-healing elastomer layers for hail and UV protection
- Ultrasound-integrated headers to mitigate biofouling in microchannels
- Freeze-resilient glycol-nanofluid circuits with ePTFE anti-leak membranes</p>

4. Adaptive Optics & Smart Materials</h3>

Patent Priority: Provisional + Research Collaboration Licenses

Claims Include:

- Electrowetting-controlled fluid prisms for beam steering
- Dynamic glare-adaptive channel depths for angular light redirection
- Upconverting nanoparticle-infused liquids for infrared-to-visible light conversion</p>

5. Modular Deployment & Retrofits</h3>

Patent Priority: Utility + Open Design Standard

Claims Include:

- 3030 cm modular microchannel tile design compatible with legacy PV racking
- 3D-printed microfluidic panel backplates for low-cost prototyping
- Self-cleaning coatings with electrostatic particulate removal</p>

<h2>Target Environments & Use Cases</h2>

<p> Environment	Technology Pairing	IP Focus	
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Coastal	PV-MD + Electrodialysis	Freshwater yield optimization	
Arid Desert	CPV/T + Multi-Effect Distillation (MED)	Optical + thermal integration	
High Humidity	Atmospheric Water Harvesting + PVT	Water yield from AWG systems	
Urban Glare	Glare-Adaptive Microchannels + Liquid Prisms	Visual compliance + optics	</p>

<h2>Economic Edge & Patentable Advantages</h2>

- Efficiency Gains: 13-17.45% PV output boost + thermal capture + desalination
- Payback Periods: 3.8 years (retrofit), 6.2 years (integrated PVT-MD systems)
- Manufacturing Innovation: Sub-100m 3D-printed fluidics reduce costs by 50%
- Unmet Need: No standardized retrofit kits for framed solar modules exist

<h2>2025-2026 Pilot Deployment Timeline</h2>

<p> Phase	Location	Tech Stack	Objective	
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Alpha	Atacama, Chile	CPV + MED + Graphene-Coated Microfluidics	Test brine recycling loop	
Beta	UAE (coastal)	Solar MD + Crystallizer Integration	Maximize freshwater recovery	
Gamma	Singapore	AWG + Adaptive Optics + Modular Tiles	Humidity capture + light steer	</p>

<h2>Next Steps</h2>

<p>Draft USPTO provisional filings for:</p>

Multi-functional microchannel PV panel architecture

Optical prism integration for passive beam steering

Fluid-looped brine concentration in thermal desalination systems

<p>File defensive publications on:</p>

3D-printed microfluidic templates

Capillary wickless distillation geometries

Nanofluid-based cooling for PV efficiency and freeze mitigation

<p>Publish open standards for modular microchannel tile interconnects and system integration kits.</p>

<p> * Prepared by:*

SunShare Connect(TM) / GGCDs Research Division

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IP Guidance Provided by: Sage</p>