Solar PV & Concentrated Solar Power

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IEA Technology Definition

The IEA classifies solar photovoltaic (PV) and concentrated solar power (CSP) as core renewable energy supply technologies. Solar PV converts sunlight directly into electricity using semiconductor cells, while CSP uses mirrors or lenses to concentrate sunlight and generate thermal energy for power production. The ETP Clean Energy Technology Guide places solar PV among the most mature and rapidly scaling clean energy technologies globally.

Technology Readiness & Deployment

Solar PV is fully commercial and the fastest-growing power generation technology worldwide. Global installed capacity exceeded 1,600 GW by end-2024, with annual additions surpassing 400 GW. CSP remains at early commercial stage with approximately 7 GW installed globally, primarily in Spain, the United States, and MENA. The IEA Tracking Clean Energy Progress rates solar PV as on track for the Net Zero Emissions scenario, while CSP requires additional policy support.

Key Metrics & Benchmarks

Utility-scale solar PV LCOE has fallen below USD 30/MWh in optimal locations, making it the cheapest source of new electricity in most markets. Module costs have declined over 99% since 1976. CSP with thermal storage can provide dispatchable power at USD 80-120/MWh. China dominates the PV manufacturing supply chain, producing over 80% of wafers, cells, and modules globally.

LATAM Relevance

Latin America has exceptional solar resources, particularly in the Atacama Desert (Chile), northeastern Brazil, and northern Mexico. Chile leads regional solar deployment with over 10 GW installed capacity, including the region's first CSP plants. Brazil's distributed solar PV market is among the fastest-growing globally, driven by net metering policies. Colombia's La Guajira region offers strong solar potential still largely untapped.

Critical Minerals Link

Solar PV manufacturing requires silicon (polysilicon for wafers), silver (cell metallization), copper (wiring and inverters), and aluminium (frames). CSP depends on steel, glass, and specialized heat-transfer fluids. Chile and Peru supply copper essential for solar system balance-of-plant components.

Cleantech Taxonomy Crosswalk

Maps to Cleantech Taxonomy sectors: ES (Energy Systems) — solar generation and grid integration; IN (Industry) — PV manufacturing and supply chain; XS (Cross-Sectoral) — distributed generation across buildings and industry.

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