

SYNTHESIS

Findings of the Inaugural Meeting of the Global Solar PV Brain Trust



There are no insurmountable production or supply chain-related barriers to achieving multi-Terawatt levels of annual solar PV deployment

- Solar has experienced the fastest scale-up of any energy technology in history.
- Global manufacturing capacity is nearing 1 TW and is expected to grow to 2 TW by 2025 and 3 TW by the early 2030s.
- Driven by its low cost, its modularity, and its ability to be scaled rapidly, solar PV is starting to have a significant influence on local and regional electricity markets, as well as on daytime power prices.
- Global deployment in 2023 has exceeded 400GW, marking a new record.
- Constraints and supply chain bottlenecks that periodically generate headlines (regarding the availability of silver, of bismuth, of polysilicon, or of indium) are real, but the industry is responding with improved manufacturing, the use of different input minerals, and reduced per-panel material requirements.

Solar PV continues to be underestimated, not just by lay people but also by experts

- An overview of recent reports from international organizations and leading international energy research institutes indicates that even seasoned energy planners and modelers continue to under-estimate solar.
- In fact, most forecasts from major agencies such as the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA) continue to assume modest growth in solar PV, or even declining annual growth.
- The result is that the role, impact, and importance of solar continues to be underestimated.
- If solar PV maintains anything near its historical growth rate of 25–30% per year, the total solar PV capacity will exceed 75 000 GW by 2050 (Science, 2023).¹ This represents six times (6x) the world's total current installed electricity generating capacity.

¹ <https://www.science.org/doi/10.1126/science.adf6957>

- And yet, although solar is becoming more visible on homes, businesses, and fields around the world, the astonishing growth of solar PV remains underappreciated by the average person on the street.
- The world cannot afford to underestimate the growth and potential of solar, as solar PV is now the lowest cost source of power generation nearly everywhere on the planet. Driven by its economics, solar PV is poised to make a massive contribution to decarbonizing the global economy.

Despite solar PV's seemingly unstoppable rise, policy still matters

- Recent policy changes in markets like Viet Nam, California, and Brazil have shown that policy still has a direct and immediate impact on solar PV deployment.
- To sustain double-digit growth rates in the coming years, policymakers will need to ensure that policy, regulatory, and tax conditions remain open to solar PV's rise.
- Policy frameworks need to be established for all market segments, including for improving the integration of solar PV into existing electricity systems (e.g., policies for solar+storage; flexible demand; etc.).
- Although China is currently the world's largest solar PV market with over 40% of the global total, the per capita picture is more nuanced: at the end of 2023, China had roughly 0.45kW of solar PV installed per person compared to 1.33kW in both Australia and the Netherlands, and 0.99kW/person in Germany.

Since grid constraints are emerging as a major bottleneck in certain high-growth markets, curtailment is becoming a growing issue

- While most existing PV projects are protected from curtailment by take-or-pay contracts, the rules for new solar PV projects are starting to change.
- Greater demand flexibility, combined with storage and other innovations are poised to play an increasingly important role in supporting solar PV's continued growth in the years ahead.



About the Global PV Brain Trust

The Brain Trust was initiated in 2023, building on the success of the German PV Think Tank, a group of solar industry experts from across Germany. Supporters/members of the Global PV Brain Trust currently include over 30 solar PV experts from around the world.

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