# PLI for Polysilicon Scheme – Government Moves to Fill India’s Solar Manufacturing Gap

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## PLI for Polysilicon Latest News

- The Ministry of New and Renewable Energy is preparing a Production Linked Incentive scheme for polysilicon manufacturing, aiming to fill a critical gap in India’s solar supply chain where the country relies entirely on imports.

## The Solar Manufacturing Value Chain

- Solar photovoltaic manufacturing involves a sequence of stages, moving from raw material to the finished panel:
    - Polysilicon: High-purity silicon, the starting point of the chain, produced through a chemical and refining process.
    - Ingots: Polysilicon is melted and formed into solid blocks.
    - Wafers: Ingots are sliced into thin wafers.

    - Solar cells: Wafers are processed into cells that convert sunlight into electricity.
    - Modules or panels: Cells are assembled into finished solar panels.
- The first three stages form the upstream segment, while cells and modules constitute the downstream segment.

## India’s Position in the Chain

- India has expanded rapidly at the downstream end but remains weak upstream:
    - Solar module manufacturing capacity: More than 213 GW per annum.
    - Solar cell manufacturing capacity: Around 32 GW.
    - Ingot and wafer capacity: Limited, though expected to reach 80 GW by June 2028.
    - Polysilicon capacity: Effectively nil, with complete dependence on imports, primarily from China.
- This imbalance means that even as India builds large module capacity, the foundational raw material continues to come from abroad, leaving the supply chain exposed to external disruption.

Read about **PLI Scheme**

## Importance of Polysilicon

- It is the starting material for crystalline silicon solar cells, which dominate the global market.
- Complete import dependence creates strategic vulnerability, especially given the concentration of global supply in China.
- Any disruption in polysilicon supply can stall the entire downstream chain, regardless of domestic module capacity.
- High-purity polysilicon is also used in the semiconductor industry, making it relevant to India’s chip manufacturing ambitions.
- Because polysilicon production is essentially a chemical and refining process rather than a conventional electronics activity, the government is considering treating it as an independent industry rather than merely a part of the solar value chain.

## News Summary: Proposed PLI for Polysilicon

- The Ministry of New and Renewable Energy (MNRE) is working on a **dedicated Production Linked Incentive (PLI) scheme for polysilicon manufacturing**. The proposed scheme aims to:
    - Promote domestic polysilicon manufacturing, where investments have not materialised despite existing incentives.
    - Support more than **10 GW** of manufacturing capacity.
    - Operate separately from the existing PLI scheme for solar PV modules.
- The scheme’s size and structure have not yet been disclosed, and its announcement has been delayed.

## Need for a Separate Scheme

- The existing Solar PV Module PLI covers the entire value chain, from polysilicon, ingots and wafers to solar cells and modules.
- However, implementation has been uneven:
    - Solar cell and module manufacturing have expanded significantly.
    - Some ingot manufacturing capacity has been established.
    - No commercial polysilicon manufacturing has materialised.
- The government believes polysilicon requires a separate policy because:
    - It is a chemical refining industry rather than conventional manufacturing.
    - It has strategic importance beyond solar, particularly for semiconductors.

## Expansion of India's Solar Manufacturing Ecosystem

- Solar cell manufacturing capacity is expected to increase from **32 GW** to around **100 GW** within a year.
- Ingot and wafer manufacturing capacity is projected to reach at least **80 GW** by **June 2028**.
- An Approved List of Models and Manufacturers (ALMM) has been introduced for ingots and wafers.
- Expanding upstream manufacturing has become essential as India tightens domestic sourcing requirements for solar cells.

## Round-the-Clock (RE-RTC) Renewable Energy

- SECI's latest RE-RTC tender discovered a tariff of **Rs. 5.25/unit**. The project provides:
    - **90% assured power availability** in every time block.
    - Around **50% daytime solar generation**, with the remaining supply met through other renewable sources and energy storage.
- Officials noted that:
    - The tariff is approaching nuclear power tariffs.
    - Developers are confident of supplying electricity at this inflation-resistant price for the next **25 years**.

## Impact on DISCOMs

- Lower renewable energy prices are helping distribution companies reduce procurement costs. Over the past three years:
    - Average power purchase costs have either declined or remained stable after rising sharply earlier.
    - Combining solar, wind, storage and RE-RTC could reduce average procurement costs from around **Rs. 5.20/unit** to **Rs. 4.85/unit**.
- Lower electricity costs are expected to:
    - Improve industrial competitiveness.
    - Support data centre growth.
    - Accelerate India's green transition.

## Broader Clean Energy Push

- Officials also highlighted the following initiatives:

    - India has crossed **300 GW** of non-fossil fuel power capacity and aims to reach **500 GW by 2030**.
    - Green ammonia is being supplied to fertiliser plants, while green hydrogen is being supplied to oil refineries to create early demand.
    - Green methanol pilots are underway in shipping, supported by a SECI tender for **5 lakh tonnes** to aggregate demand.
- Pilot projects are also underway in:
    - Transport.
    - Steel (Direct Reduced Iron plants).
- India is expanding cross-border energy cooperation through:
    - Solar projects with Bhutan.
    - Discussions on a regional South Asian electricity market.

## Significance of the Polysilicon Push

- Import substitution: Reduces dependence on China for a critical raw material.
- Supply chain security: Improves resilience against geopolitical and trade disruptions.
- Semiconductor ecosystem: High-purity polysilicon supports India’s semiconductor ambitions.
- Higher domestic value addition: Increases manufacturing value retained within India.
- Energy security: Strengthens the foundation of India’s renewable energy transition.

## Key Challenges

- Capital intensity: Large investments and long gestation periods.
- High energy consumption: Refining polysilicon is energy-intensive and costly.
- Technology dependence: Advanced purification technology is controlled by a limited number of global firms.
- Competition from China: Chinese manufacturers benefit from economies of scale and lower production costs, making domestic competitiveness difficult without sustained policy support.
- Environmental concerns: Manufacturing requires careful management of chemical by-products and emissions.

**Source: IE | Down to Earth**

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