



**ENVIRONMENTAL IMPACTS OF SOLAR PANELS:
NEED TO REVAMP LAWS FOR ENVIRONMENTAL
IMPACT ASSESSMENT**

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Environmental Impacts of Solar Panels: Need to Revamp Laws for Environmental Impact Assessment

INTRODUCTION

Solar energy has gained widespread acceptance as a clean and renewable energy source, offering significant potential for reducing greenhouse gas emissions and dependence on fossil fuels. However, the production, installation, and disposal of solar panels also pose environmental challenges that must be carefully assessed and managed.

Starting from extraction of raw material to manufacturing process, transporting and finally to disposal of a panel, each step towards producing solar panel(s) contribute to the overall carbon footprint of the process.

The phase-wise impact of producing solar panel(s) on environment can be summarised as under:

MANUFACTURING PHASE:

1. **Resource Depletion:** The production of solar panels requires significant amounts of raw materials such as silicon, cadmium, and silver, which can lead to depletion of natural resources.

2. **Energy Intensity:** Manufacturing processes are energy-intensive, often relying on fossil fuels, which can contribute to greenhouse gas emissions.
3. **Chemical Use:** Chemicals used in panel production, such as hydrofluoric acid and nitric acid, pose risks to both human health and the environment if not properly managed.

OPERATIONAL PHASE:

1. **Land Use:** Large-scale solar installations can require extensive land use, potentially impacting local ecosystems, habitats, and biodiversity.
2. **Water Use:** Some solar technologies, such as concentrated solar power plants, require significant amounts of water for cooling purposes, which can strain local water resources.

END-OF-LIFE PHASE:

1. **Waste Management:** Solar panels contain hazardous materials such as lead and cadmium, which can leach into the environment if not disposed of properly.
2. **Recycling Challenges:** Currently, there are challenges in recycling solar panels due to the complexity of materials and technologies involved, leading to potential environmental pollution. Panels are delicate, bulky pieces of equipment usually installed on rooftops in the residential context. [Specialized labour](#) is required to detach and remove them.

CURRENT LEGAL FRAMEWORK FOR EIAs AND CHALLENGES

The current legal framework for Environmental Impact Assessments (“EIAs”) varies significantly across jurisdictions and often does not comprehensively address the specific environmental impacts of solar panels. Some of the key challenges in this regard include:

- a. **Fragmented Regulations:** Regulations may be fragmented or outdated, failing to account for advancements in solar technology and evolving environmental concerns.
- b. **Limited Scope:** EIAs may focus primarily on the construction phase of solar projects and not adequately cover the entire life cycle of solar panels.
- c. **Lack of Enforcement:** Even where regulations exist, enforcement mechanisms may be weak, allowing non-compliance and inadequate mitigation measures.

THE CASE FOR REVAMPING LAWS ON EIAs

In view of the foregoing and given the rapid expansion of solar energy worldwide, there is an urgent need to revamp laws on Environmental Impact Assessment to ensure that the environmental impacts associated with solar panels are effectively managed. In this regard, the following suggestions/proposals are of considerable importance and relevance:

- a. **Comprehensive Life Cycle Assessments:** EIAs should encompass the entire life cycle of solar panels—from manufacturing and installation to operation and end-of-life disposal or recycling.
- b. **Stricter Environmental Standards:** Introduce stricter environmental standards for the manufacturing process to minimize resource consumption, energy use, and chemical emissions.
- c. **Enhanced Monitoring and Reporting:** Implement robust monitoring and reporting requirements to track environmental impacts throughout the life cycle of solar projects.
- d. **Promotion of Sustainable Practices:** Encourage the adoption of sustainable practices such as eco-design principles and the use of environmentally friendly materials in solar panel production.
- e. **Investment in Research and Development:** Invest in research and development to improve solar panel efficiency, reduce environmental impacts, and enhance recycling technologies.

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