Illuminating the Future: Observations and Recommendations on Sustainability Disclosures for Photovoltaic Component Companies

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1. Background and Importance

- The global energy transition is accelerating, presenting development opportunities and higher disclosure requirements for the photovoltaic (PV) industry.
- The international community is pushing for increased renewable energy capacity, and China's "dual carbon" goals are advancing, necessitating stronger ESG (Environmental, Social, and Governance) disclosures by PV enterprises.
- In 2024, China introduced the "Guidelines for Sustainable Development Reporting by Listed Companies (Trial)" to promote corporate sustainability disclosures.

2. Data Sources and Methodology

- The article analyzes the energy consumption, water usage, greenhouse gas emissions, environmental protection investments, and "three wastes" management of 33 PV module companies based on the China Photovoltaic Industry Association's public list, shipment data from the past three years, and expert opinions.

3. Energy and Water Consumption of PV Module Companies

- Energy Consumption: Disclosure units for energy consumption are

inconsistent among companies. Some companies have reduced energy consumption through technological upgrades. Future industry energy consumption requirements may become stricter, potentially limiting production capacity for high-energy-consuming companies.

- Water Consumption: The PV manufacturing industry has significant water usage, with some companies consuming large amounts, mainly due to extensive business operations involving upstream silicon material and wafer production. Future efforts should focus on strengthening water resource management and increasing the use of recycled water.

4. Greenhouse Gas Emissions

- Scope 1 (Direct Emissions): Companies like Tongwei Co., Ltd. and LONGi Green Energy Technology have relatively high direct emissions.

- Scope 2 (Indirect Emissions): Emissions from purchased electricity account for a significant portion, with companies like Tongwei Co., Ltd. and JinkoSolar having high indirect emissions.

- Scope 3 (Value Chain Emissions): Only nine companies disclosed Scope 3 emissions data, with Tongwei Co., Ltd. and LONGi Green Energy Technology reporting high levels.

- Emission Intensity: Some companies disclosed greenhouse gas emission intensity based on economic or physical output, with Tongwei Co., Ltd. and TCL Zhonghuan showing higher intensity.

5. Product Carbon Footprint Management

- PV modules dominate the global export market, creating an urgent need for product carbon footprint management. Some companies have disclosed carbon footprint data, but disclosure for module products remains insufficient.
- China has issued the "Low Carbon Evaluation Requirements for PV Module Export Products (Draft for Comment)," and products with carbon footprints exceeding limits may face export restrictions in the future.

6. Environmental Violations and Environmental Protection Investments

- Except for Topray Solar, no other PV module companies were found to have significant environmental violations.
- Companies like Tongwei Co., Ltd. and JinkoSolar have made notable environmental protection investments, each exceeding 300 million yuan in 2023.
- Some companies performed well in disclosing "three wastes" management information, covering measures for wastewater, exhaust gas, and waste management.

7. Recommendations and Outlook

- Green and Low-Carbon Development: PV module companies should focus on green and low-carbon development, disclosing information by business

segment to help achieve emission reduction targets.

- Green Supply Chain Construction: Companies should enhance the disclosure of Scope 3 greenhouse gas emissions and promote green supply chain development.

- Product Carbon Footprint Management: Companies need to prioritize product carbon footprint management to address international green trade barriers and enhance product competitiveness.

8. Conclusion

- PV module companies have made positive progress in environmental protection, energy conservation, pollution reduction, and carbon reduction. However, faced with increasingly stringent domestic and international regulations and standards, the industry must enhance the disclosure of climate and environmental information to drive the entire sector toward a green and low-carbon transformation.

This article analyzes the energy consumption, water usage, greenhouse gas emissions, and environmental protection investments of PV module companies, offering recommendations for improving sustainability and disclosure practices