

Strengthening Subsidies Rules to Tackle Trade-Distortions: Perspectives From the High-Tech Sector

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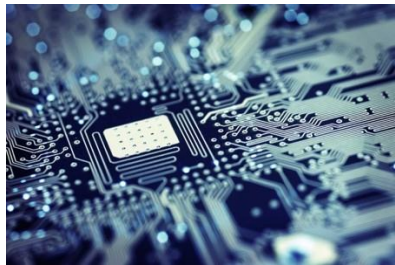
About ITIF

- The world's leading science and technology policy think tank.
- Supports policies driving global, innovation-based economic growth.
- Focuses on a host of issues at the intersection of technology innovation and public policy across several sectors:
 - Innovation and competitiveness
 - IT and data
 - Telecommunications
 - Trade and globalization
 - Clean energy, manufacturing, life sciences, and ag biotech



Innovation Industries Share Three Distinct Characteristics

1. They compete by inventing next-generation products or services.
2. They are characterized by very high initial fixed costs (e.g., R&D and design), but low marginal costs.
3. They fundamentally embody and depend on intellectual property.



Necessary Conditions for Global Innovation to Flourish

1. Access to large markets (e.g., economies of scale).
2. No excess, non-market-based competition (e.g., subsidies).
3. No forced localization requirements that unnecessarily fragment global production systems.
4. Protection of intellectual property rights.

Roles for Government in Fostering High-Tech Innovation

Appropriate Roles for Government

- Invest in basic and translational scientific research.
- Convene and fund sectoral PPPs focused on pre-competitive research, tech roadmaps, testbeds.
- Fund university R&D and industrial Ph.D.'s.
- Fund proof of concept grants for small businesses.
- Design tax policy to spur industrial competitiveness.
- Protect intellectual property rights (IPRs).
- Procure on a “best value” basis.

Inappropriate Roles for Government

- Provide WTO-inconsistent subsidies to industry.
- Fund private-sector M&A/FDI activity.
- Direct private-sector procurement activity.
- Deploy import substitution policies.
- Apply policies that discriminatorily favor domestic firms over foreign enterprises.
- Provide weak IPR protection/enforcement.
- Restrict investment/immigration activity.

China's Policies Targeting Clean-Energy Sector Leadership

- **2006 Indigenous Innovation Policy**

- Identified 11 key sectors for technology development, including clean energy.

- **2010 Strategic and Emerging Industries**

- Identified 7 key industries, including energy efficient and environmental technologies, new energy, and new energy vehicles.

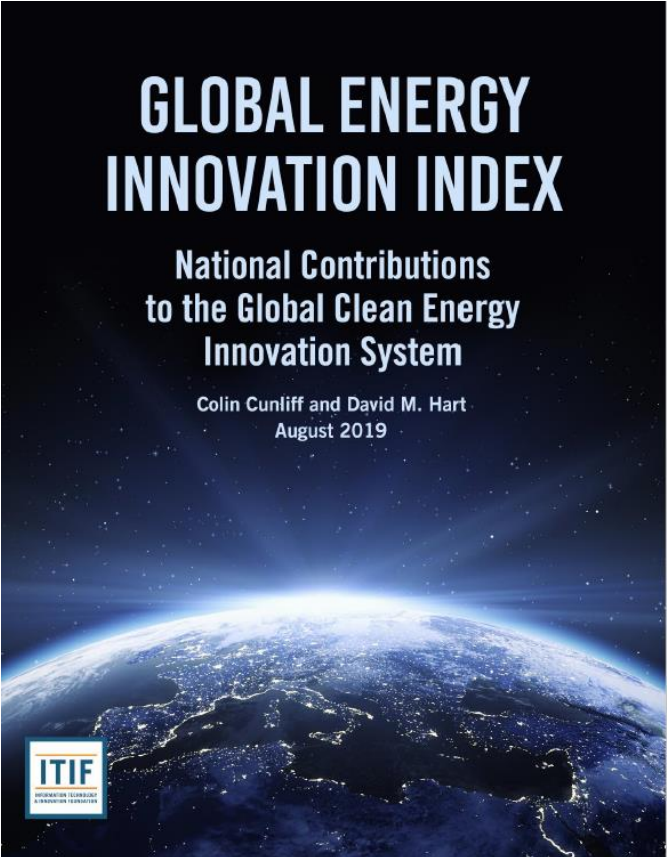
- **Made In China 2025**

- Calls for 70% “self-sufficiency” in key components of strategic industries.

- New energy vehicles must be 80% domestic and have 10% foreign sales.

- 2,041 government guidance funds created as of October 2018, with goal of raising \$1.7 trillion.

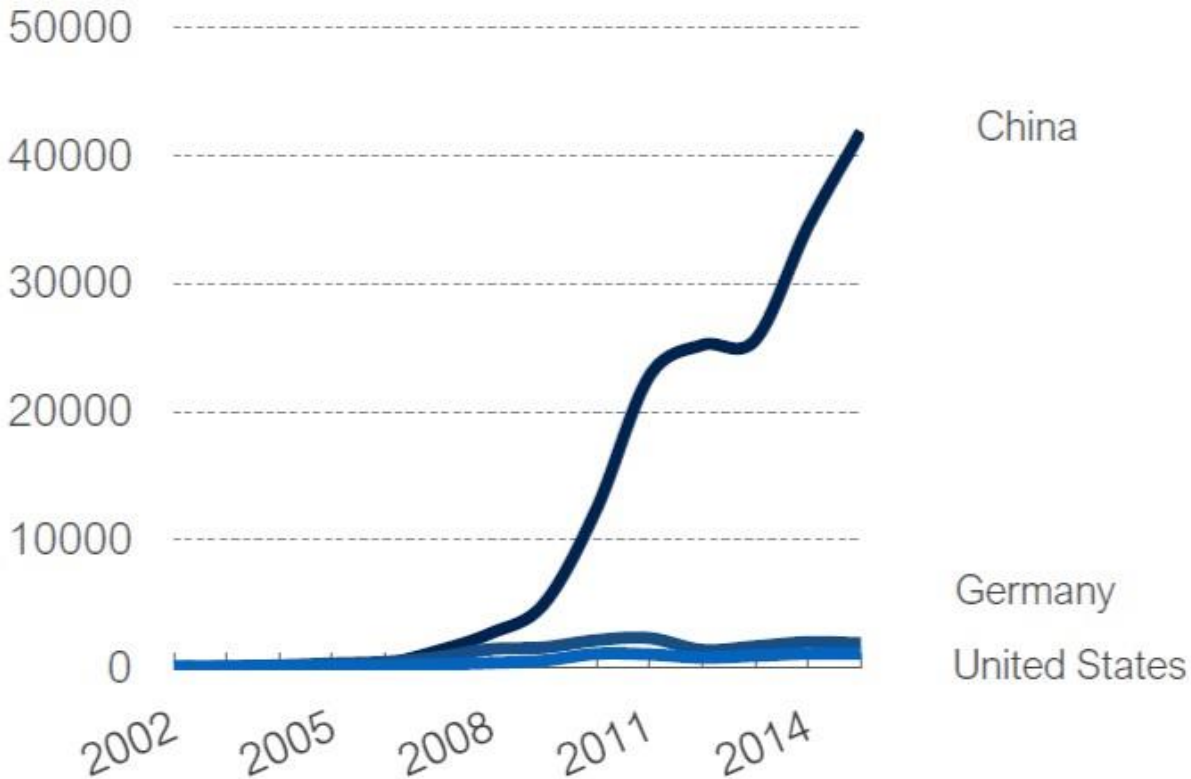
China Leads World in Clean-Energy Manufacturing Value-Added



Source: *The Economist*, "The East is Green: China is rapidly developing its clean-energy technology"

China Leads World in Solar Cell Production

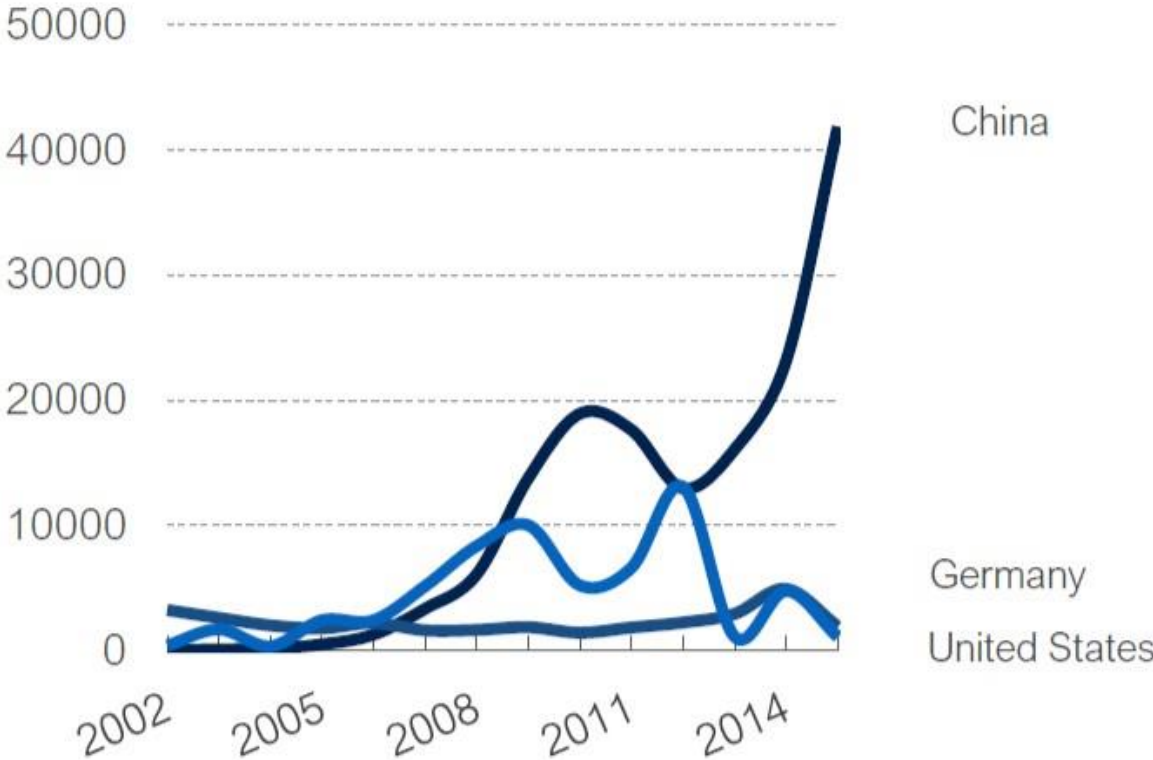
Annual Solar Module Production by Country, 2002-2015 (in MW)



Source: Joseph Nahm, "Industrial Policy for China's Renewable Energy Sectors"; Earth Policy Institute, 2016

China Leads World in Wind Turbine Production

Annual Wind Turbine Production by Country, 2002-2014 (in MW)



Source: Joseph Nahm, "Industrial Policy for China's Renewable Energy Sectors"; Earth Policy Institute, 2016

But Industrial Subsidies a Key Component of Chinese Strategy

- China “spent or loaned \$30-\$40 billion to establish its current position as the world’s leader in both solar and wind turbine technologies.”
- 95% of Chinese firms in tech industries received R&D subsidies in 2015, with those subsidies accounting for 22% of firms’ R&D investments.



Source: Lily Fang et al., “Corruption, Government Subsidies, and Innovation: Evidence from China”; Jonas Nahm, Johns Hopkins SAIS

Forms and Uses of Subsidies In Chinese Clean-Energy Sectors

Forms

- Feed-in-tariffs.
- Direct grants and low-cost loans.
- Holidays from VATs, import tariffs.
- Free or discounted land/utilities.
- Non-market based financing.

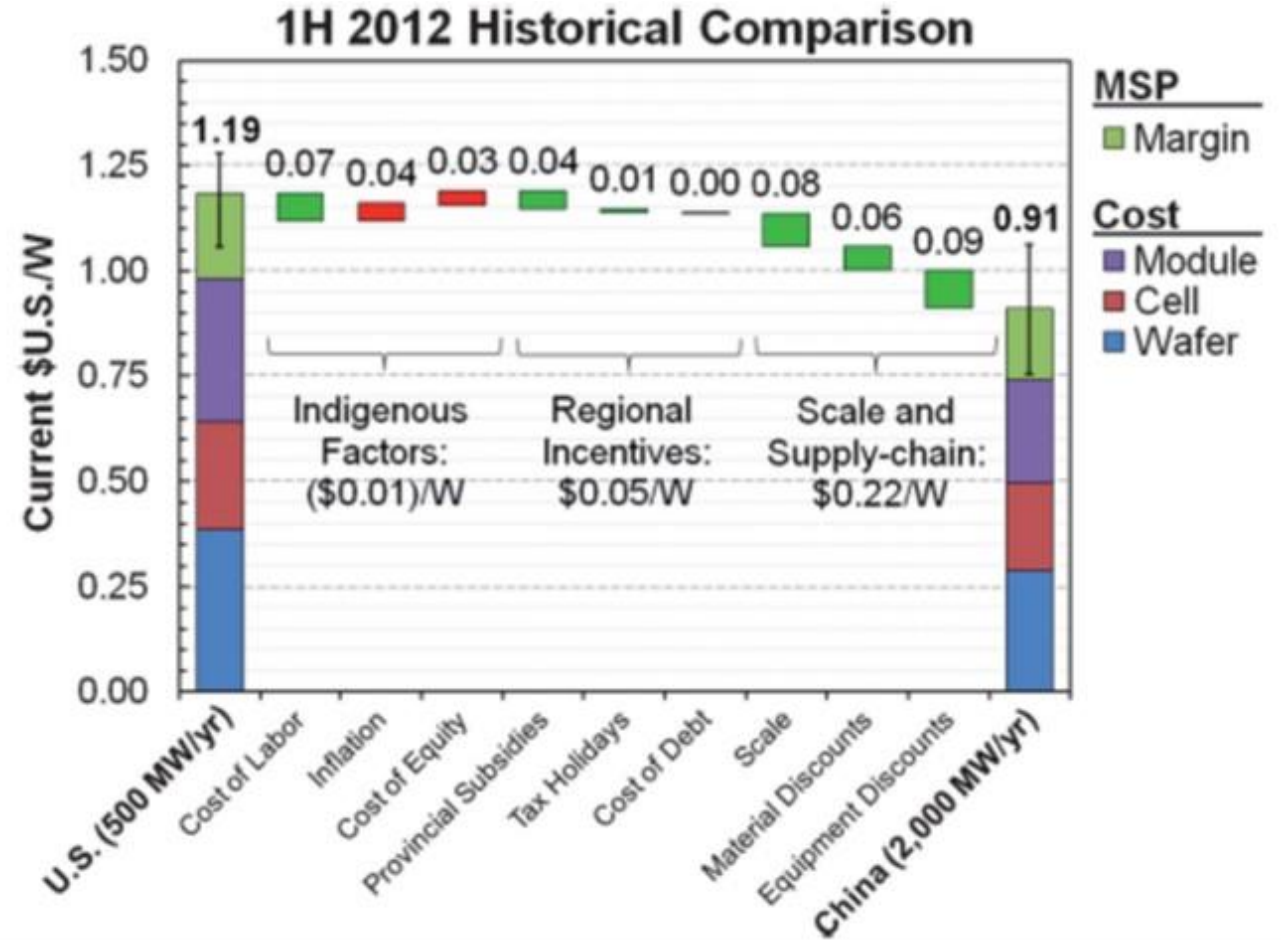
Uses

- Facilitate R&D, build production facilities.
- Help companies purchase licenses for advanced foreign technologies.
- Help purchase ownership interests in foreign technology firms.
- Leverage export credit on generous terms to subsidize sales in third-party markets.

Source: Adapted From Dominik Kümmerle and Dr. Christian Schmidkonz, "China's Strategic Trade Policy"; Governor's Wind and Solar Energy Coalition, "China used 'chaos' and lots of cash to dominate renewable energy competitors"

Solar PV Cost Differences and Chinese Subsidies

- Cost of making a solar panel (per MW) \$0.28 higher in the U.S. than in China.
- Direct subsidies account for 1/6th the gap.
- However, scale and supply chain effects, which account for 80% of the difference, are a direct effect of the subsidies.
- Effect: “Some 200 to 300 U.S. solar start-up companies knocked out of business.”



Source: U.S. National Renewable Energy Laboratory, Dominik Kümmerle and Dr. Christian Schmidkonz, “China’s Strategic Trade Policy”

Indian Subsidies for Renewable Energy Industries

- India has sought to become a global leader in renewable energy production, but has resorted to local content requirements and subsidies.
- India's Jawaharlal Nehru Solar Mission launched in 2010 with an initial tranche of \$2 billion in capital subsidies.
- India's central government provided \$2.24 billion in renewable energy subsidies in 2017, including \$1.3 billion for solar and \$214 billion for wind turbines.



Harms Caused By Aggressive Industrial Subsidization

- When inferior technologies prevail, especially through excessive subsidization, it locks the global economy in at a lower level of technological innovation.
- Inhibits market-based competition not just on the technological features/value of a product, but also on more environmentally friendly production systems.

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1

Design for Location? The Impact of Manufacturing Offshore on Technology Competitiveness in the Optoelectronics Industry

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This paper presents a case study of the impact of manufacturing offshore on technology competitiveness in the optoelectronics industry. It looks, in particular, at a critical design / facility location decision being faced by optoelectronic component manufacturers. The paper uses a combination of simulation modeling and empirical data to demonstrate the economic constraints facing these firms. The results show that production location changes the relative economics of the two competing designs – one emerging, one prevailing – which are perfect substitutes for each other on the telecom market. Specifically, if optoelectronic component firms shift production from the U.S. to countries in developing East Asia, the emerging designs that were developed in the U.S. no longer pay. Production characteristics are different abroad, and the prevailing design can be more cost-effective in developing country production environments. The emerging designs, however, have performance characteristics, which may be valuable in the long term to the larger computing market and to pushing forward Moore's Law. The paper concludes by exploring the dilemma this creates for the optoelectronic component manufacturers, and recommending a framework based on which the results may be generalized to other industries.

Key words: international, product development, design for manufacturing

History: This paper was first submitted to *Management Science* on January 2, 2008. The review was received on April 4, 2008. The paper was resubmitted on February 23, 2009.

1 Introduction: A Dilemma for Optoelectronic Component Manufacturers

Today only 28% of manufacturing value (MVA) added occurs within the U.S. (UNIDO, 2007). While this figure steadily declines, the percentage of MVA in South and East Asia continues to grow (2007).¹ Despite this continuing shift in the distribution of manufacturing activity, there is surprisingly little empirical literature quantifying global differences in operation parameters, and the implications of these differences for product strategy and technology choice. Nor are all firms moving manufacturing offshore alike. Whereas traditional literature suggested that firms would at first produce in the North, close to the

¹China's annual growth in manufacturing value added rose to 10.5% between 2000-2005, compared to growth of 1.9% in North America during the same period (UNIDO, 2007: *International Yearbook of Industrial Statistics*, Cheltenham, U.K., Edward Elgar).

1

Recommendations for Policymakers

- Improve transparency: Insist upon timely and complete notification of subsidies.
- Establish a presumption of prejudice toward subsidies not timely notified.
- Clarify the definition of “public body,” extending it to include state-influenced activities of entities such as state-owned enterprises or private firms.
- Obligate the subsidizing country to prove that a given subsidy does not inflict harm on others.
- Designate an annual meeting between WTO members and the appellate body to discuss patterns and challenges pertaining to excessive use of subsidies.

Thank You!

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