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Low-carbon leapfrogging and globalization: How China developed its solar PV industry

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Understanding the "increasingly global" nature of technology innovation is key to explaining China's success in developing its solar PV industry, argued postdoctoral researcher Christian Binz in Monday's energy policy seminar.

Binz focused on understanding China's rapid takeover of the global solar PV industry, drawing on interviews with key players in China's major solar companies. China attained a dominant position in the market after overcoming early competition from the United States, Germany, and Japan. This competitive success is often attributed to factors such as government support, "dumping," and copy-catting, or to low Chinese labor costs. Binz, however, argued that we should be skeptical of all of these explanations. Government support was not notably present until the industry was already taking off in China, Binz argued; the Chinese solar industry has (some of the time) been profitable on its own merits; technical know-how has been largely provided by native Chinese researchers who have acquired the relevant technological expertise through post-graduate work abroad; and low labor costs have relatively little impact in the solar industry, because costs are dominated by capital expenditures, not labor.

Binz argued that we should think about China's solar PV industry as the product of "global entrepreneurs," bringing together an array of necessary elements, not all of which must be located in China: technological knowledge acquired abroad; German market demand (supported by generous feed-in tariffs); international financial investment; industry legitimacy provided by compliance with international quality standards; and China's hospitable regulatory environment for new high-tech companies.

Given that most of these global resources would have been equally available to China's competitors, Binz then focused on two elements to explain why China came out as the dominant force in solar PV module manufacturing. Although access to global resources was necessary, Binz argued, the key elements determining why China outpaced competing countries in developing its solar PV industry were its unique pool of managers with overseas experience (70% of the management in the early Chinese solar PV companies had master's degree from abroad) and the ease of building new production lines in China, where permissive regulations combine with abundant knowledge on the quick upscaling of industrial processes to reap economies of scale in mass production.

The talk was part of the Kennedy School's Energy Policy Seminar Series, which is jointly sponsored by the Energy Technology Innovation Policy research group of the Belfer Center for Science and International Affairs and by the Consortium for Energy Policy Research of the Mossavar-Rahmani Center on Business and Government.