Title:

Coalitional cohesion in technology policy: The case of the early solar cell industry in the United States

Authors:

Ergen, Timur

Year of Publication:

2017

Series/Report no.:

MPIfG Discussion Paper 17/7

Abstract:

The paper traces the rise and decline of solar cell commercialization efforts during the 1970s and early 1980s in the United States. It shows how technology policies for photovoltaic appliances gained and lost support in a time of increasing uncertainty about future resource supplies and the future of energy provision. Contrary to conventional explanations of the long history of failures to commercialize renewable energy technologies that emphasize path dependencies around established energy technologies, this paper explains the rise and decline of early solar cell policies from the perspective of internal sectoral developments. It demonstrates that cohesion among political economic supporters was critical for public perceptions of the intermediary success of the effort, to continuous investment by industry, and to the maintenance of political support. The paper suggests that support for new industries and technologies is dependent on sectoral order among supporting groups over time. The case of the early photovoltaics policies illustrates how the failure to keep groups unified and committed undermined the implementation of the technology policies, weakened the credibility of the developmental effort, and ultimately led to a decline in political support. The paper contributes to recent debates about the conditions of successful industrial and technology policies by demonstrating that network failures have an important political dimension if ruptures of sectoral cooperation feed back on state support for the respective industry or technology.

Abstract (Translated):

Der Aufsatz zeichnet den Aufstieg und Niedergang früher Kommerzialisierungsinitiativen für Solarzellen in den USA während der 1970er- und 1980er-Jahre nach. Er erklärt, warum Förderprogramme für Photovoltaikanlagen in einer Zeit wachsender Unsicherheit über die zukünftige Gestalt von Energieversorgungssystemen Unterstützung erhielten und wieder verloren. Im Unterschied zu konventionellen Erklärungen der Geschichte von Fehlschlägen in der Kommerzialisierung von Solartechnologien, die größtenteils die Beharrungskräften etablierter Energieerzeugungssysteme herausstellen, fokussiert der Aufsatz interne sektorale Entwicklungen. Er zeigt, dass Kohäsion unter Unterstützern kritisch für die Wahrnehmung der Effektivität der Unterstützungsprogramme, für kontinuierliche Industrieinvestitionen und für die Stabilität staatlicher Förderung war. Der Fall der frühen Photovoltaikprogramme zeigt, dass nachlassender Zusammenhalt unter beteiligten Akteuren die Implementation der Unterstützungsprogramme und die Glaubwürdigkeit des Entwicklungsanlaufs untergraben hat und letztlich zum Abflauen staatlicher Förderung führte. Der Aufsatz trägt zu neueren Debatten über die Bedingungen erfolgreicher Industrie- und Technologiepolitik bei, indem er zeigt, dass industrielle "Netzwerkfehler" eine politische Dimension haben, sobald Unterbrechungen sektoraler Kooperation auf die staatliche Unterstützungsbereitschaft zurückwirken.

Subjects:

technology policy
renewable energy
institutional change
governance
innovation
Technologiepolitik

erneuerbare Energien
institutioneller Wandel
Governance
Innovation

Persistent Identifier of the first edition:

hdl:11858/00-001M-0000-002D-6E07-7

Document Type:

Working Paper

Appears in Collections:

MPIfG Discussion Paper, Max-Planck-Institut für Gesellschaftsforschung

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The history of coal mining in the United States goes back to the 1300s, when the Hopi Indians used coal. The first commercial use came in 1701, within the

decline it remains a significant source of energy in 2019. The oil industry was born in the United States around the time of the Civil War. As the world's largest oil producer and exporter, the US supplied the oil on which the Allied Forces floated to victory in World War I. In 1920, sixty-four percent of the world's oil was produced in the United States. Reminiscent of the post-World War I scare, numerous articles began to appear in both technical and popular journals announcing that the United States was running out of oil. American oil fields were producing more than the rest of the world combined, and as a result domestic reserves were being drawn down faster than new reserves were being discovered. In the shortage atmosphere of early 1943, the Roosevelt Administration grew even more receptive to Aramco's problems. In the 1930s, with the United States reeling from the Great Depression, the government began to use fiscal policy not just to support itself or pursue social policies but to promote overall economic growth and stability as well. Policy-makers were influenced by John Maynard Keynes, an English economist who argued in The General Theory of Employment, Interest, and Money (1936) that the rampant joblessness of his time resulted from inadequate demand for goods and services. According to Keynes, people did not have enough income to buy everything the economy could produce, so prices fell and compa The top five solar cell supply countries in the world in sequential order are China, Taiwan, the United States of America, Japan, and Germany. The capacity of Taiwanese solar cell production is ranked top two in the globe. The revenue of the solar photovoltaic industry is globally predicted to reach US$150 billion in 2014 [1]. Figure 2. Revenue of global solar photovoltaic industry. Sustained policy support in countries such as Germany, Italy, United States, Japan, and China attributed to the impetus behind the recent growth of solar technologies [20]. The global installed capacity for PV had reached around 40 GW by December 2010 of which 85% were grid connected and the remaining were 15% off-grid [20]. This study examines technological collaboration in the solar cell industry using the information of patent assignees and inventors as defined by the United States Patent and Trademark Office. Three different collaborative types, namely local (same city), domestic (different cities of the same country), and international collaboration, are discussed. The general status of solar cell patent collaborations, transforming trends of collaborative patterns, average numbers of assignees and inventors for three collaborative types, and international collaboration countries are studied. Trend detection on thin-film solar cell technology using cluster analysis and modified data crystallization. International Conference on Computational Collective Intelligence, 6421 (2010), 152–161.