Does the policy mix matter? – The case of the PV industry in Germany?

[Special session „Renewable Energy Technologies, Innovation, and Policy Mix – first results from the GRETCHEN project"]

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(1) Overview

Since 1990, the share of renewable energy (RE) in the German power generation has enormously grown. No other country has been more successful in increasing its RET deployment share than Germany. This growth has been accompanied or pushed by diverse policies, which entails costs as well as benefits at the macro- and micro-economic level. Benefits occur in the area of employment, emission, competitiveness, energy security, technology advancement, etc. This paper aims at understanding the impact of policies on the PV market and industry structures and on technological changes in Germany. In particularly, it strives to assess the relevance of the German policy mix and selected instruments on technological advances in the PV technology.

(2) Methodological approach

Based on approaches from industrial organization and functions of a technological innovation system (TIS) described in Hekkert and Negro (2009), del Rio and Bleda (2012), the research approach sets the PV promoting policy mix in Germany in a specific framework that consists of policies, market development, industry structures and technological advances. In this framework, policies are assumed to have a direct impact on technological changes measured as knowledge development, or indirectly via market development or changes in industrial structures. In this contribution the specific research question addresses the relation between policies and industrial structures and investigates "to what extent does the German policy mix impact industrial structures in the German PV industry?" In a first step, relevant elements of the policy mix mainly in the area of power and renewable energies having a potential impact on the PV sector are identified. These elements comprise not only policy instruments, such as national acts, but also elements of the policy strategy, such as directives, roadmaps or plans. Further, the mix of instruments and policy strategies are included like long-term goals and targets or styles (Rennings 2000). To learn more on the operationalization of the policy mix and its characteristics, i.e. derivation of policy mix variables as well as of industry structure variables (Graf von der Schulenburg and Wagner 1991, Stoneman 1991, Laforet 2008, Wu 2012, etc.), a literature research has been conducted. Finally, the approach uses a composite variable for political commitment, variables reflecting number of policy activities and the type of policy, the difference between the German feed-in tariffs and the levelized costs of energy and other explaining variables. The market size variation including the number of actors is used as endogenous variable. The analysis is based on a multivariate approach.

(3) Expected results

While policy activities and elements of the policy mix could be traced back more than 20 years, data on industry structures are more difficult to get. Nevertheless, it is expected, that the number of policy activities as well as the political commitment proves to be important drivers of the industry growth. However, the expectation of profits due to feed-in tariffs is a necessary precondition for demand of PV modules and hence for the PV industry development. It is the main driver of structural changes in the industries, provided a certain level of investment certainty and low-level market barriers prevails.

(4) Conclusions

The structure of the industry depends on central features like the final demand for a product and the expectations on future final demand. Further, the available technology as well as the development potentials (Masini and Menichetti 2012) and market barriers are further factors that influence investment decisions and thus shape an industry's structure. The results suggest that the industry structure depends on the investor's expectation on future returns. This result has two dimensions. First, the certainty or future dimension: as long as these returns are certain (inter alia low market, performance and policy risks (Breitschopf and Pudlik 2013)), i.e. are proved by a strong political commitment, investments will be made and hence affect the industry structure. Second, the return dimension: If there are low market barriers, the market attracts suppliers as long as there is a profit margin. In the case of the PV market,

expected profits of PV generators drives the PV industry structure but only if there is a long-term certainty on returns. The return dimension is ensured via feed-in tariffs, while the long-term certainty, in turn, is backed by a strong political commitment that could be reflected by the policy strategy with its long-term vision, targets, and corresponding instrument mixes.

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