



Workshop:

## Economics for Energy Workshop

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ABSTRACT

### Transition Towards a Green Economy in Europe: Innovation and Knowledge Integration in the Renewable Energy Sector

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A major concern regarding innovation in clean technologies in the EU is that the fragmentation of its innovation system may hinder knowledge flows and, consequently, spillovers across member countries. A low intensity of knowledge flows across EU states can negatively impact their technological base, suppressing opportunities for further innovations and slowing the movement towards the technological frontier. This paper investigates the fragmentation of the EU innovation system in the field of renewable energy sources (RES) by estimating the intensity and direction of knowledge spillovers over the years 1985-2010. We modify the original double exponential knowledge diffusion model proposed by Caballero and Jaffe (1993) to provide information on the degree of integration of EU countries' innovation efforts and to assess how citation patterns changed over time. We show that EU RES inventors have increasingly built "on the shoulders of the other EU giants", intensifying their citations to other member countries and decreasing those to domestic inventors. Furthermore, the EU strengthened its position as source of RES knowledge for the US. Finally, we show that this pattern is peculiar to RES, with other traditional (i.e. fossil-based) energy technologies and other radically new technologies behaving differently.

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