

Efficient strategies for the integration of renewable energy into future energy infrastructures in Europe - An analysis based on transnational modeling and case studies for nine European regions

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Abstract— As a result of the current international climate change strategy, the European Commission has agreed on ambitious targets to reduce CO₂ emissions by more than 80% until 2050 as compared to 1990 levels and to increase the share of renewable energy and improve energy efficiency by 20% until 2020. Under this framework, renewable energy generation has increased considerably in the EU and it is expected to keep growing in the future years. This paper presents long-term strategies for transmission infrastructure development to integrate increasing amounts of renewable generation in the time horizon of 2030-2050. These are part of the outcomes of the SUSPLAN project,¹ which focuses on four possible future renewable deployment scenarios in different European regions taking into account the corresponding infrastructure needs, especially electricity and gas grids, both on regional and transnational level. The main objective of the project is the development of guidelines for the integration of renewable energy into future energy infrastructures while taking account of national and regional characteristics. Therefore, the analysis is based on a two-track approach: A transnational modeling exercise ("top-down") and in-depth case studies for nine representative European regions ("bottom-up").

Index Terms— Renewable energy; Grid integration strategies; Policy recommendations

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Citation:

Boie, I.; Fernandes, C.; Frías, P.; Klobasa, M.; "Efficient strategies for the integration of renewable energy into future energy infrastructures in Europe - An analysis based on transnational modeling and case studies for nine European

regions", Energy Policy, vol.online, no., pp.-. January, 2014.