Managing Renewable Energy Production Risk

Martin Hain, Hans Schermeyer, Marliese Uhrig-Homburg,
Wolf Fichtner

PII: S0378-4266(18)30188-2
DOI: https://doi.org/10.1016/j.jbankfin.2018.09.001
Reference: JBF 5409

To appear in: *Journal of Banking and Finance*

Received date: 9 May 2017
Revised date: 18 July 2018
Accepted date: 1 September 2018

Please cite this article as: Martin Hain, Hans Schermeyer, Marliese Uhrig-Homburg, Wolf Fichtner, Managing Renewable Energy Production Risk, *Journal of Banking and Finance* (2018), doi: https://doi.org/10.1016/j.jbankfin.2018.09.001

Managing Renewable Energy Production Risk

Martin Hain[*], Hans Schermeyer[†], Marliese Uhrig-Homburg[‡], and Wolf Fichtner[§]

September 24, 2018

Abstract

The growing share of renewables paired with their intermittent nature introduces significant new challenges for market participants along the value-chain in power markets. Taking the view of an owner of such a physical renewable asset we showcase the management of the associated stochastic production risks in Germany, one of the most dynamic electricity markets and the largest producer of renewable energy in the EU-28. We find that unhedged renewable portfolios are very risky and existing vanilla derivatives are poor hedges. New exotic quantity-related weather contracts proposed by major energy exchanges (EEX) show a lot of potential but are still very illiquid. Their hedging performance is heavily driven by the market wide renewable generation portfolio which, in its current state, favors specific regions. In the long-run price-related derivatives will transform into more useful hedging instruments due to the growing importance of renewables in the formation of wholesale market prices.

JEL classification: G10, G13, Q40, Q42

Keywords: Power markets; Risk management; Structural model; Hedging; Weather-risks; Climate change economics

[*]Martin Hain, BASF SE, Ludwigshafen am Rhein, Germany, Email: martin.hain @ basf.com

[†]Hans Schermeyer, Institute for Industrial Production (IIP) , Karlsruhe Institute of Technology (KIT), P.O. Box 6980, D-76049 Karlsruhe, Germany, Phone: +49 721 608 44458, Fax: +49 721 608 44682, Email: Hans.schermeyer @ kit.edu

[‡]Marliese Uhrig-Homburg, Chair of Financial Engineering and Derivatives, Karlsruhe Institute of Technology (KIT), P.O. Box 6980, D-76049 Karlsruhe, Germany, Phone: +49 721 608 48183, Fax: +49 721 608 48190, Email: uhrig @ kit edu.

[§]Wolf Fichtner, Institute for Industrial Production (IIP), Karlsruhe Institute of Technology (KIT), P.O. Box 6980, D-76049 Karlsruhe, Germany, Phone: +49 721 608 44460, Fax: +49 721 608 44682, Email: wolf.fichtner @ kit.edu