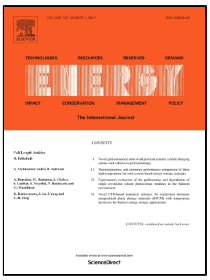
Accepted Manuscript



Stochastic energy market equilibrium modeling with multiple agents

Kjell Arne Brekke, Rolf Golombek, Michal Kaut, Sverre A.C. Kittelsen, Stein W. Wallace

PII:	S0360-5442(17)31050-2
DOI:	10.1016/j.energy.2017.06.056
Reference:	EGY 11064
To appear in:	*Energy*
Received Date:	08 April 2016
Revised Date:	18 May 2017
Accepted Date:	09 June 2017

Please cite this article as: Kjell Arne Brekke, Rolf Golombek, Michal Kaut, Sverre A.C. Kittelsen, Stein W. Wallace, Stochastic energy market equilibrium modeling with multiple agents, *Energy* (2017), doi: 10.1016/j.energy.2017.06.056

Stochastic energy market equilibrium modeling with multiple agents[1]

Kjell Arne Brekke[2], Rolf Golombek[3], Michal Kaut[4], Sverre A.C. Kittelsen[5] and Stein W. Wallace[6]

Abstract

The energy markets are characterized by many agents simultaneously solving decision problems under uncertainty. It is argued that Monte Carlo simulations are not an adequate way to assess behavioral uncertainty; one should rather rely on stochastic modelling. Drawing on economics, decision theory and operations research, a simple guide on how to transform a deterministic energy market equilibrium model - where several agents simultaneously make decisions - into a stochastic equilibrium model is offered. With our approach, no programming of a stochastic solution algorithm is required.

JEL classification: C63; C68; D58; D81; Q28; Q40;Q54

Key words: uncertainty; stochastic equilibrium; Monte Carlo; energy modeling

---

[1] Brekke, Golombek and Kittelsen are associated with CREE - the Oslo Centre for Research on Environmentally friendly Energy, which is supported by the Research Council of Norway. Earlier versions of this paper have been presented at the Frisch Centre, the Oslo Centre for Research on Environmentally friendly Energy, the annual meeting of the Norwegian economists, the conference of the European Association of Environmental and Resource Economists, the 3rd Energy Finance Christmas Workshop in Oslo, the 14th IAEE European Energy Conference, a workshop on uncertainty and investment at the Norwegian University of Science and Technology, and EcoMod2016 – we thank the participants for their comments. This research was made possible through financial support from the RENERGI and ENERGIX program under the Research Council of Norway.

[2] Department of Economics, University of Oslo. P.O. Box 1095, Blindern, N-0317 Oslo, Norway. Email: k.a.brekke@econ.uio.no

[3] Corresponding author. Frisch Centre, Gaustadalleen 21, N-0349 Oslo, Norway. Email: rolf.golombek@frisch.uio.no

[4] Department of applied economics, SINTEF Technology and Society. S.P. Andersens vei 5, N-7465 Trondheim, Norway. Email: michal.kaut@sintef.no

[5] Frisch Centre, Gaustadalleen 21, N-0349 Oslo, Norway. Email: sverre.kittelsen@frisch.uio.no

[6] Department of Business and Management Science, Norwegian School of Economics, NHH. Helleveien 30, N-5045 Bergen, Norway. Email: stein.wallace@nhh.no