

RUDOLF GERARDUS EGGING-BRATSETH, PROFESSOR

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h-index: 11 www.scopus.com/authid/detail.uri?authorId=24066531800
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PROFILE

Ruud Egging-Bratseth is a professor in Managerial Economics at NTNU and holds affiliations with SINTEF in Trondheim and the German Institute for Economic Research (DIW Berlin). He is associate editor for Energy Strategy Reviews. Ruud has been involved in numerous national and international research projects and is on the strategic management board of the NTNU Energy Transition Initiative. Ruud is coordinator of dual master degree program Sustainable Energy Systems and Management (with TU Berlin). His expertise areas include energy markets and large-scale infrastructure development; managing and integration of large shares of renewable energy supply; natural gas markets; regional economic modeling, model linking, investment under uncertainty and risk aversion; stochastic equilibrium modeling, and decomposition algorithms.

WORK EXPERIENCE

2016/09 – Present **Professor** Department of Industrial Economics and Technology Management, Norwegian University of Science and Technology (NTNU), Trondheim, Norway;
2013/06 – 2016/09 **Associate professor** Industrial Economics and Technology Management, NTNU
2015/02 – 2017/09 **Section head** Managerial Economics, Finance and Operations Research, NTNU
2016/01 – Present **Associate editor** Energy Strategy Reviews Editorial Board, Elsevier.
2013/01 – Present **Research fellow** DIW Berlin, The German Institute for Economic Research
2017/11 – Present **Senior researcher** SINTEF Industry, Renewable Energy Technology, Value Chains and Optimization, Trondheim, Norway.
2011/01 – 2017/10 **Researcher** SINTEF Technology and Society, Applied Economics & Optimization. Model development and implementation, project acquisition;
2011/01 – 2013/05 **Post doc** NTNU Industrial Economics and Technology Management. FME CenSES – Centre for Sustainable Energy Studies (NFR # 209697) Energy markets, systems and infrastructure.
2011/01 – 2012/07 **Post doc** SINTEF Technology and Society, Applied Economics and Optimization. Portfolio Optimization and Strategic Development of LNG Value Chains. (NFR)
2005/08 – 2010/12 **Graduate research assistant**, University of Maryland, College Park, Maryland, USA, Civil and Environmental Engineering, Civil Systems
2005/05 – 2010/01 **Freelance Consultant**; Market studies; model audits, model development and implementations; and workshops for: GDF Suez (Paris, France), EnergiNet.dk (Denmark), Resources For the Future (Washington DC, USA), Statistics Norway

- 2002/11 – 2005/05 **Scientific researcher**, Energy Research Center of the Netherlands (ECN), Policy Studies Department, Amsterdam; Model development and implementation, data collection, policy analysis, project acquisition, natural gas markets, energy supply security (EC FP5 ENGAGED), biomass and biofuels (EC FP5 VIEWLS)
- 1998/02 – 2002/09 **Operations research consultant**, ORTEC, Gouda, The Netherlands
Model and software development, logistics advisory studies, project acquisition, revenue management (KLM), logistics (Railion-Deutsche Bahn, Budget Rent a Car); financial performance measurement (Shell Pension Fund)
- 1997/01 – 1997/12 **Master's thesis and follow-up assignment**, Public Transport Company Amsterdam; Optimal allocation of reserve tram drivers.

EDUCATION

- 2005/08 – 2010/12 **Civil and Environmental Engineering, PhD**, Civil Systems, University of Maryland, USA; *Multi-Period Natural Gas Market Modeling - Applications, Stochastic Extensions and Solution Approaches*, <http://hdl.handle.net/1903/11188>
- 1991/08 – 1997/10 **Business econometrics, M.A.**, Free University, Amsterdam (including *propedeuse* (first-year diploma) in Economics (1992) and in Mathematics (1995))

JOURNAL PAPERS – PUBLISHED OR ACCEPTED

1. Egging-Bratseth Baltensperger Tomasgard 2020. Solving oligopolistic equilibrium problems with convex optimization. Accepted at European Journal of Operational Research
2. U. Johansen R. Egging K. Johansen (2019) Regional wage responsiveness to unemployment – rural-urban heterogeneity and policy implications, Review of Labour economics and Industrial Relations 33(3). (Online: 13 March 2019)
<https://onlinelibrary.wiley.com/doi/full/10.1111/labr.12147>
3. J.M. Zepter, A. Lüth, P Crespo del Granado, R. Egging (2019) Prosumer integration in wholesale electricity markets: Synergies of peer-to-peer trade and residential storage, Energy and Buildings
<https://doi.org/10.1016/j.enbuild.2018.12.003>
4. U. Johansen, R. Egging, O. Ivanova (2018) Regional CGE and the role of inter-regional trade data: Policy simulations with a model for Norway. Regional Studies, Regional Science 5(1) 312-331,
<https://doi.org/10.1080/21681376.2018.1522967>
5. A. Lüth, J.M. Zepter, P Crespo del Granado, R. Egging (2018) Local electricity market designs for peer-to-peer trading: the role of battery flexibility Applied Energy 229, 1233-1243
<https://doi.org/10.1016/j.apenergy.2018.08.004>
6. R. Egging, A. Tomasgard, 2018. Norway's role in the European Energy Transition, Energy Strategy Reviews 20 <https://doi.org/10.1016/j.esr.2018.02.004>
7. R. Egging, S.-E. Fleten, I. Grønvik, A. Hadziomerovic, N. Ingvoldstad, 2017. Linear Decision Rules for Hydropower Scheduling under Uncertainty. IEEE Trans on Power Systems 32(1) 103-113.
<http://dx.doi.org/10.1109/TPWRS.2016.2555360>
8. R. Egging, A. Pichler, Ø. Kalvø, T. Walle-Hansen, 2017. Risk Aversion in Imperfect Natural Gas Markets. European Journal of Operational Research 259(1).
<http://dx.doi.org/10.1016/j.ejor.2016.10.020>
9. F. Holz, P.M. Richter, R. Egging, 2016. The Role of Natural Gas in a Low-Carbon Europe: Infrastructure and Supply Security, Energy Journal 37-S.I.3.

- <http://dx.doi.org/10.5547/01956574.37.SI3.fhol>
10. M. Fodstad, R. Egging, K. Midthun, A. Tomasgard, 2016. Natural Gas Infrastructure in Europe: Stochastic Modeling of an Uncertain Demand, *Energy Journal* 37-S.I.3.
<https://doi.org/10.5547/01956574.37.SI3.mfod>
 11. R. Egging, F. Holz, 2016. Risks in global natural gas markets: investment, hedging and trade. *Energy Policy* Vol.94, p.468 . <http://dx.doi.org/10.1016/j.enpol.2016.02.016>
 12. F. Holz, P. Richter, R. Egging, 2015. A Global Perspective on the Future of Natural Gas: Resources, Trade, and Climate Constraints. *Review of Environmental Economics and Policy* 2015 9(1): 85-106
<http://dx.doi.org/10.1093/reep/reu016>
 13. D. Huppmann, R. Egging, 2014. Market power, fuel substitution and infrastructure – A large-scale equilibrium model of global energy markets, *Energy* 75 pp. 483-500,
<http://dx.doi.org/10.1016/j.energy.2014.08.004>
 14. Werner. A., Uggen, K.T., Fodstad, M., Lium, A-G, Egging. R., 2014 Stochastic Mixed Integer Programming for Integrated Portfolio Planning in the LNG Supply Chain, *Energy Journal* 35(1)
<http://dx.doi.org/10.5547/01956574.35.1.5>
 15. R. Egging, 2013. Drivers, trends, and uncertainty in long-term price projections for energy management in public buildings, *Energy Policy* 62 pp. 617–624,
<http://dx.doi.org/10.1016/j.enpol.2013.07.022>
 16. R. Egging, 2013. Benders decomposition for multi-stage stochastic mixed complementarity problems – Applied to a global natural gas market model. *European Journal of Operational Research* 226, pp. 341-353. <http://dx.doi.org/10.1016/j.ejor.2012.11.024>
▪ See also: Egging, R., 2014. Corrigendum to '...' <http://dx.doi.org/10.1016/j.ejor.2014.07.001>
 17. S.A. Gabriel, K.E. Rosendahl, R. Egging, H. Avetisyan, S. Siddiqui, 2012. Cartelization in Gas Markets: Studying the Potential for a ‘Gas OPEC’, *Energy Economics*, 34 pp. 137–152.
 18. D. Huppmann, R. Egging, F. Holz, C. Von Hirschhausen, S. Rüster, 2011. The world gas market in 2030 – development scenarios using the World Gas Model, *Int. Journ. of Glob Energy Issues* 35(1).
 19. R. Egging, F. Holz, S. Gabriel, 2010. The World Gas Model - A Multi-Period Mixed Complementarity Model for the Global Natural Gas Market, *Energy* 35(10).
 20. R. Egging, S. Gabriel, F. Holz, C. Von Hirschhausen, 2009. Representing GASPEC with the World Gas Model, *Energy Journal* 30(Special Issue I).
 21. S. A. Gabriel, J. Zhuang, R. Egging, 2009. Solving Stochastic Complementarity Problems in Energy Market Modeling Using Scenario Reduction, *European Journal of Operational Research*, 197(3).
 22. R. Egging, S. A. Gabriel, F. Holz, J. Zhuang, 2008. A Complementarity Model for the European Natural Gas Market, *Energy Policy* 36(7).
 23. R.G. Egging, S.A. Gabriel, 2006. Examining Market Power in the European Natural Gas Market, *Energy Policy* 34(17).

JOURNAL PAPERS – IN REVIEW

24.

PEER-REVIEWED BOOK CHAPTERS

25. T Baltensperger R. Egging 2017. Stochastic Modeling of Imperfect Markets. In: Carlos N. Bouza Herrera; *Stochastic Programming. Theory, Applications and Impacts*. NOVA Science Publishers, New York, ISBN 9781536109405 (hardcover) / 9781536109511 (eBook)
26. M. Kaut, R. Egging, T. Flatberg, K. Tolstad Uggen, 2015. BLOMST – An optimization model for the bioenergy supply chain, in S. Eksioglu et al. (Eds.) *Handbook of Bioenergy. Bioenergy Supply Chain - Models and Applications*, Springer, 10.1007/978-3-319-20092-7_2 ISBN : 978-3-319-20091-0
27. R. Egging, F. Van Oostvoorn, 2005. The energy supply security and climate change. Chap 4 in: Kok and De Coninck (Eds.) *Beyond Climate. Options for broadening climate policy*, RIVM, Netherlands

PEER-REVIEWED CONFERENCE PROCEEDINGS

28. Hanne Høie Grøttum ; Siri Førstund Bjerland ; Pedro Crespo del Granado ; Ruud Egging. 2019 Modelling TSO-DSO coordination: The value of distributed flexible resources to the power system. IEEE 16th International Conference on the European Energy Market (EEM)
29. P Kotek ; P Crespo del Granado ; R. Egging ; B. Toth, 2019, European Natural Gas Infrastructure in the Energy Transition, IEEE 16th International Conference on the European Energy Market (EEM)
30. A. Lüth, J. Zepter, Pedro C. del Granado, R. Egging (2018) Batteries and electricity market designs for residential prosumers, 41st IAEE Internat Conf, 10-13 June 2018, Groningen , Netherlands
31. P. C. del Granado, C. Skar, R. Egging, 2017. Integrating electricity and natural gas planning: linking models and assessment of reciprocal effects, 15th IAEE Europ Conf , 3-6 Sep 2017, Vienna, Austria.
32. I. Grønvik, A. Hadziomerovic, N. Ingvoldstad, R. Egging, S.-E. Fleten, 2014. Feasibility of Linear Decision Rules to Hydropower Scheduling, IEEE Conference Proceedings, 13th International Conference on Probabilistic Methods Applied to Power Systems, Durham, 7-10 July 2014
33. R. Egging, D. Huppmann, 2012. Investigating a CO₂ tax and a nuclear phase out with a multi-fuel market equilibrium model, IEEE Conference Proceedings, Ninth International Conference on the European Energy Market (EEM), pp.1-8. doi: 10.1109/EEM.2012.6254690

WORK IN PROGRESS

34. Optimizing Fourth Generation District Heating under uncertainty
35. Country studies on Power to Gas as a flexibility option.
36. Egging-Bratseth Siddiqui, Risk averse equilibrium capacity expansion
37. Abrell Egging-Bratseth Equilibrium capacity expansion in a linked model setting
38. Egging-Bratseth Siddiqui, Classes of multi-level equilibrium problems that can be solved with convex optimization

RESEARCH PROJECTS AND ROLES

Period	funding - grant	Description
2019-2027	Norwegian Research Council (NFR)	FME NTRANS Norwegian Centre for Energy Transition Strategies. Researcher
2019-2023	EC H2020 835896	OpenEntrance. Open energy transition analyses for a low-carbon economy. Researcher
2019-2022	NFR	BEYOND - Blockchain based electricity trading for the integration of national and decentralized local markets. Advisory board
2011-2019	NFR 209697	FME CenSES Centre for Sustainable Energy Studies, Coordinator NTNU; Researcher
2016-2019	EC H2020 691843	SET-Nav Navigating the roadmap for clean, secure and efficient energy innovation. Lead WP 9, member steering board, NTNU 440 kEUR
2009-2012	NFR, Statoil, GDF Suez	LNGPlanner - Strategic and operational planning & optimization of the liquefied natural gas supply chain. Researcher
2018-2020	NFR INTPART	TACEMM Trans-atlantic cooperation on energy market models, global research and education network energy systems market design.
2011-2014	EC FP7 260041	EnRiMa-Energy efficiency and risk management in public buildings
2012-2015	NFR 216513	RegPol - Regional effects of energy policy. Researcher
2012-2016	EC FP7 311858	LogistEC – Supply chain logistics for biomass energy crops. Researcher
2003-2005	EC FP5	VIEWLS - Biomass & biofuels. Potentials and optimal supply chains in EU
2002-2004	EC FP5	ENGAGED – EU gas supply security. Researcher

GRANTS, AWARDS, FELLOWSHIPS AND HONORS

2019-2023	H2020 Open Entrance, 835896
2016-2019	EC H2020 LCE21 SET-Nav 691843 Navigating the roadmap for clean, secure and efficient energy innovation, lead WP 9 Comparative Assessment, member steering board, (NTNU 440 kEUR)
2018.04	My workshop at TU Dresden got special recognition at the organizing department. The PhD candidate Matthew Schmidt was awarded the Dr. Händel-Preis 2018 for enhancing international contacts. <i>Prof. Ruud Egging ist ein anerkannter Wissenschaftler im Feld der Modellierung von Mixed Complementary Problems und in der Untersuchung des europäischen und globalen Erdgasmarktes. Folglich referierte er in einer Keynote im des 12. ENERDAY 2018 zur Rolle von Erdgas in der europäischen Energiewende. Am darauffolgenden Tag unterrichtete Prof. Ruud Egging Doktoranden in einem Kurs mit dem Titel „Stochastic Optimization with Applications in Gas Markets</i> TACEMM Trans-atlantic cooperation on energy market models
2016	Strategic Positioning Funding NTNU SVT (50 kNok)
2014	Internationalization funding NTNU SVT (110 kNOK)
2013 Sept	GLOBVAC International networking event and proposal initiating workshop. (Support for event) Norwegian Research Council Project 234459 (270 k NOK, Project manager)
2013 – 2014	Carbon Leakage in Energy Resource and Goods Markets: A Partial Equilibrium Modeling Approach, 2013-2014, with DIW Berlin, Personal mobility grant – NFR & IS-DAAD Project 225197 (70 k NOK Project manager)
2013	MTRES-G, personal contract for research cooperation, DIW Berlin, (7,000 EUR)
2009-2010	GdF Suez Personal contract for gas market modeling consulting services (20,000 EUR)
2008 – 2010	Future Faculty Fellow, http://www.ee.umd.edu/academics/ffp-archives
2005 – 2008	Research assistantship funded through NSF grants CNS 0435206 and DMS 0408943

PHD COMMITTEES

2020	Invited - Fabio Moret (DTU)
2017, Dec 22	Angel Gonzalez, Gas transmission networks: optimization algorithms and cost allocation methodologies, USC, Santiago De Compostela, Spain
2017, Dec 1	Florian Perrotton, The economics and regulation of natural gas pipeline networks: four essays on the impact of demand uncertainty, Université Paris Nanterre, France
2017, Mar 9	Stig Ottesen, <u>NTNU</u> , <i>Techno-economic models in Smart Grids: Demand side flexibility optimization for bidding and scheduling problems</i> , second opponent
2017, Jan	Mauro Vicarro, <u>Basilicata</u> , <i>Regional economic analyses and local impact of energy production</i> , external reviewer
2015, Dec 15	Pao-Yu Oei, <u>TU Berlin</u> , <i>Decarbonizing the European Electricity Sector - Modeling and Policy Analysis for Electricity and CO2 Infrastructure Networks</i> , external opponent
2015, Sep 10	Tobias Baltensperger, <u>ETH Zurich</u> , <i>Market power in natural gas markets</i> , external opponent
2014, Jun 26	Daniel Huppmann, <u>DIW Berlin</u> , <i>Strategic behaviour in energy markets advances in complementarity and multi-stage equilibrium modelling</i> , external opponent

TEACHING AND WORKSHOPS – PHD LEVEL

2018, Apr 28	Workshop Stochastic Modeling in Energy Markets, TU Dresden, Germany. This got special recognition from the TU. The PhD candidate inviting me Matthew Schmidt was awarded the Dr. Händel-Preis 2018 for enhancing international contacts.
2012, May 20-21	Workshop Energy Market Modeling in GAMS, DIW Berlin
2012, Apr 12	Workshop on Energy Market Modeling, NTNU
2011, Sep 19-20	Seminar , Equilibrium modeling in GAMS, in PhD course Energy Markets IØ8303
2011, March	Guest lecturer , Two sessions on equilibrium modeling and GAMS as part of PhD Winterschool, Oppdal, Norway, organized by NTNU and NHH Bergen
2009, Oct 12-16	Guest Lecturer , Week-long workshop on Natural gas market modeling as part of the annual ‘Infratrain’ at Technical University Berlin, Germany
2008, Apr 8-10	Guest lecturer , Three-day seminar on natural gas market modeling, as part of the annual ‘Enertrain’, Technical University Dresden, Chair of Energy Economics, DEU
2007, June 4	Workshop Mixed Complementarity Modeling in GAMS, DIW Berlin

TEACHING MASTER’S LEVEL

2020-2022	Coordinator & teacher , Experts in Team, Renewable Energy Management, TIØ4855
2018-2019	Contributing teacher , Production and network economics TIØ4285. Equil modeling
2017-	Coordinator and teacher , Energy Market Design and Policy TIØ4585
2018-	Coordinator , Sustainable Energy Systems & Markets TIØ4980, master’s thesis
2017-	Coordinator , Sustainable Energy Systems & Markets TIØ4580, specialization project
2014 - 2018	Coordinator and teacher , Experts in Team, Sustainable Affordable Housing for All
2014-2015	Guest lecture on scenario development in TEP 4300 Climate Change Mitigation (Industrial Ecology)
2013-2014	Guest lecturer , Two classes investment science, in TIØ 5200 Project Organizations
2012-2013	Guest lecturer , Two weeks non-linear programming and algorithms, in TIØ 4150: Industrial Optimization

TEACHING BACHELOR LEVEL

2013-2015, 2017	Teknostart - mathematics in economics for first-year industrial economics students
2017	Coordinator and teacher, Industrial Economic Analysis TIØ4118
2015	FORN330 Analysis of Renewable Energy Systems, Muiywa Sam Adaramola, Norwegian University of Life Sciences (NMBU) Exam grading and quality insurance
2015 – 2016	Coordinator and teacher, Microeconomics TIØ4117
2013 – 2014	Coordinator and teacher, Microeconomics and Investment Science, TIØ4116
2009, Jan – Feb	Visiting lecturer, Two weeks, Introduction to Linear Programming, BOZ311 Dept of Industrial & Systems Engineering, University of Pretoria, South Africa
2008, Spring	Adjunct professor, Teaching and grading of graduate course, Decision Analysis for Engineering (ENCE425), University of Maryland, Project Management Program
2007, Spring	Teaching and grading assistant, Decision Analysis for Engineering (ENCE425)

TEACHING WORKSHOPS AND OTHER

1996, Nov – Dec	Substitute, High school math, pre-exam year, Barlaeus Gymnasium, Amsterdam
2009	GdF model calibration
2008	EnergiNet.dk equilibrium modeling – with S. Gabriel
1991 – 1997	Tutor, High school math and economics.

ADMINISTRATION & MANAGEMENT

2019-2023	▪ Vice-chair Gemini Center Economic Modeling and Analysis
2020	▪ Guest editor Energies “Optimal Design of Local Energy Markets”
2017/09-present	▪ Management Group NTNU Energy Transition Program
2014-present	▪ Several evaluation and hiring committees for open positions at all academic levels; evaluations of professor competence qualifications
2019/08	▪ Scientific Committee, conference ICSP
2018/05	▪ Scientific Committee, conference CMS 2018 Committee, Trondheim, Norway
2017/08-present	▪ NTNU coordinator SESAM dual degree program NTNU – TU Berlin
2017/08-2018/07	▪ Research committee, Dept for Industrial Economics and Technology management
2017/09-2018/07	▪ Substitute section head
2015/02-2017/09	Section Head Finance, Managerial Economics and Operations Research
2016/09-2018/04	Develop new master’s program Sustainable Energy Systems and Markets https://www.ntnu.edu/studies/msse/sesam
2016 – Present	▪ Associate Editor, Energy Strategy Reviews Review Board www.journals.elsevier.com/energy-strategy-reviews
2012 – present	▪ Steering group member strategic collaboration TU Berlin-NTNU

FUNDING PROPOSAL REVIEWS

2015, September **Czech Science Foundation**, <http://www.gacr.cz/>, peer review of a research project proposal under Act No. 130/2002 Coll., on the Support of Research, Experimental Development and Innovation from Public Funds and on Amendments to Some Related Acts

SUPERVISION AND CO-SUPERVISION

Name	Level		Subject	Period
Thorsten Burandt	PhD	2	Low-carbon transition in China, Europe and India	2021E
Ulf Johansen	Phd-Mn	1	Regional policy analysis	2019
Vegard Skonseng	PhD-Co	4	Market designs and business models for carbon capture and storage value chains	2021E
Bjerketvedt				
Hector Maranon-Ledesma	Phd-Co	3	Energy market modeling	2019E
Mauro Viccaro	Phd-Co	2	University of Basilicata – local economic impact of bio-energy	Oct15-Mar16
Zhonghua Su	Phd-Co	1	multi-stage multi-horizon stochastic equilibrium modeling	Feb13-Oct15
Ozgu Turket	Postdoc		Carbon Capture and Storage	Dec17-Nov19
Pedro C. del Granado	Postdoc		Energy systems modeling – SET-Nav project	Feb17-Jan19
Tobias Baltensperger	Postdoc		Visiting researcher – ETH Zurich	Mar16-May16
Wang Xiaolin	Postdoc		Visiting– China Univ. of Geo sciences- Chinese gas market	Aug15-Jul16
Willoch, Martin	Master	34	Planning and operation of disease outbreak response	2020E
Haufe, Ina	Master	34	District Heating operation and demand side management	2020E
Ettayebi, Amina	Master	33	District Heating operation and demand side management	2020E
Bakke, Sara	Master	32	District Heating operation and demand side management	2020E
Predel, Johannes	Master	31	Gas to Power	2020E
Xiong, Bobby	Master	30	Gas to Power	2020E
Bjerland, Siri	Master	29	DSO TSO integration	2020E
Grøttum, Hanne	Master	28	DSO TSO integration	2019
Gulbrandsøy, Erik	Master	27	Batteries positioning and sizing in DSO grids	2019
Lueth, Aleksandra	Master	26	Local smart grids - storage, flexibility and market design	2019
Zepter, Jan	Master	25	Local smart grids - storage, flexibility and market design	2019
Madeleine	Master	24	Aluminium purchasing portfolio	2018
Thavarajan, Maulisha	Master	23	LNG Annual deliverly program	2018
Bugge, Ingrid	Master	22	LNG Annual deliverly program	
Nysæther, Ingvild,	Master	21	Verdikjeder i skognæringa	2018E
Nakken, Karl	Master	20	Linear Decision Rules in Equilibrium Models	2018E
Leiva, David	Master	19	Agent based modeling for hydrogen car market in Norway	2016
Hofgaard, Anniken	Master	18	CGE modeling for sustainable economic growth	2016
Rasmussen, Pål	Master	17	A price-based algorithm for multi-player equilibrium problems	2015
Wilthil, Mads	Master	16	A price-based algorithm for multi-player equilibrium problems	2015
Kalvø, Øyvind,	Master	15	The effects of risk preferences on investments and trade in the natural gas market	2014
Walle-Hansen, Tomas	Master	14	The effects of risk preferences on investments and trade in the natural gas market	2014
Bondevik, Halfdan	Master	13	Tramp shipping in the LNG trade	2014
Fretheim, Steinar	Master	12	Tramp shipping in the LNG trade	2014
Aamot, Frida	Master	11	strategic investments in electricity transmission	2014
Ytterbø, Marianne	Master	10	strategic investments in electricity transmission	2014
Siggerud, Emily	Master	9	Benders decomposition for a stochastic energy markets	2014
Grønvik, Ida	Master	8	Hydropower sched. under uncertainty - linear decision rules	2013
Hadziomerovic, Ajla	Master	7	Hydropower sched. under uncertainty - linear decision rules	2013
Ingvoldstad, Nina	Master	6	Hydropower sched. under uncertainty - linear decision rules	2013
Erichsen, Jeanette,	Master	5	Stochastic optimization of floating liquefaction units	2012
Røstad, Lars	Master	4	Stochastic optimization of floating liquefaction units	2012
Samseth, Eivind	Master	3	European Power Market Model	2012
Haga, Geir	Master	2	European Power Market Model	2012
Vefring, Signy,	Project	1	Value of storage to a wind power producer	2012

NON PEER REVIEWED AND POPULAR PUBLICATIONS AND REPORTS

- Ruud Egging and Franziska Holz (2019): Global Gas Model - Model and Data Documentation v3.0 (2019). DIW Data Documentation 100. DIW Berlin, Berlin (Germany). ISSN 1861-1532
- Crespo Del Granado et al. 2019 SET-Nav Comparative Assessment Report
- Lumbreras et al. 2019 WP6 summary report
- Egging Kotek et al 2019 workshop policy brief Role of Gas in Electrifying Europe – WP2
- Egging Ansari 2019 [workshop discussion paper](#) Convexification of MCPs
- Egging, Helgesen, Perez-Valdes, Wiebe, 2017, A three-model linkage for energy-economics-environmental analysis: TIMES, REMES and EXIOBASE. SET-Nav discussion paper. D10.1iii
- D. Ansari, R. Egging, Proceedings of the Modelling Workshop “Top-Down Bottom-Up Hybrid Modelling” November 24-25, 2016 at NTNU Trondheim, (work package 10, deliverable D10.1ii)
- F. Holz, R. Egging, D. Ansari, P.I. Helgesen, Hybrid Modelling: Linking and Integrating Top-Down and Bottom-Up Models, Issue Paper prepared for the Workshop “Top-Down Bottom-Up Hybrid Modelling” Nov 24-25, 2016, NTNU Trondheim, (work package 10, deliverable D10.1i)
- C. Skar, R. Egging, A. Tomasgard, 2016, The Role of Transmission and Energy Storage for Integrating Large Shares of Renewables in Europe, IAAE Energy Forum 2016 Q1 Jan
- Su, Z., Egging, R., Huppmann, D. & Tomasgard, A. 2015. A Multi-stage Multi-Horizon Stochastic Equilibrium Model of Multi-Fuel Energy Markets. [CenSES Working paper 2/2015](#).
- R. Egging, K. Midthun (2015) The Role of Global Natural Gas Market, ESI Bulletin on Energy Trends and Development - Vol. 8(1) March 2015. Invited article
- R. Egging (2011) Technical progress and learning curves – discussion note for EnRiMa (SINTEF)
- R. Egging (2011) Considerations for gas price projections – discussion note for EnRiMa (SINTEF)
- R. Egging (2011) Quantitative Natural Gas Market Models: No Story Without Numbers, No Numbers Without a Story, Invited article for EDI Quarterly Vol. 3(3)
- S.P.A. Brown, S.A. Gabriel, R. Egging (2010), Abundant Shale Gas Resources: Some Implications for Energy Policy, National Energy Policy Institute Working Paper 10-03, nepinstitute.org/publications
- R. Egging (2009), An evaluation of input data, assumptions and functionality of the natural gas market modeling aspects in NEMS, NEPI Working Paper 10-07 <http://nepinstitute.org/publications/toward-a-new-national-energy-policy-assessing-the-options/>
- R. Egging, D. Huppmann, (2009), User Manual, Functional and Technical Documentation for the World Gas Model 2008, Working paper, www.tu-dresden.de/wwwbwleeg/publications/wp_rm_20.pdf
- S.A. Gabriel, R. Egging, F. Holz, (2009) Study of the United Kingdom Natural Gas Market in 2015, A Model-Based Analysis Using the World Gas Model (WGM), Report for Gaz De France
- X. van Tilburg, R. Egging, HM Londo, (2006) Biotrans functional and technical description (ECN)
- A. Wakker et al., (2005) Biofuel and bioenergy implementation scenarios. Final report of VIEWLS WP5, modeling studies (ECN)
- A. Wakker, et al. (2005) VIEWLS: Biofuel implementation scenarios up to 2030 explored by the Biotrans model (ECN)
- F. van Oostvoorn et al., (2003), Long-term gas supply security in an enlarged Europe. Final report ENGAGED project (ECN)
- R. Egging, (2001), Transparency in Railroad Logistical Processes (ORTEC, in Dutch)
- E. van Herpt, R. Egging, (2001), Revenue Management in the Car Rental Industry (ORTEC, in Dutch)
- R. Egging, J. Geenen, (1998), Financial Performance Measurement and Methodologies (ORTEC)
- R. Egging (1997) Optimal Locations of Reserve Tram Drivers (Master's Thesis, in Dutch)

INVITED TALKS, CONFERENCE PAPERS AND PRESENTATIONS

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| 21 Jun 2019 | 1. | Egging, Challenges and Opportunities for Natural Gas in the Energy Transition. 2 nd Paris international conference on the economics of natural gas, Paris-Dauphine University. keynote |
| 21 Mar 2019 | 2. | Egging, Kotek et al. Effects of pathways scenarios on the gas infrastructure SET-NAV Final Conference, Brussels, keynote + panelist |
| 20 Mar 2019 | 3. | Egging et al. The Role of Natural Gas in an Electrifying Europe - SET-NAV Final Policy Event, Brussels keynote + panelist |
| 2019, 27 Feb | 4. | R Egging & F Holz, Uncertainties in (European) Natural Gas Markets, Abschlussworkshop des BMWi-Projektes LKD-EU - Langfristige Planung und kurzfristige Optimierung des Elektrizitätssystems in Deutschland im europäischen Kontext invited |
| 2019, 19 Feb | 5. | "Natural gas: ideas for a research agenda" DIW seminar "Erdgas-Abschied?!" invited |
| 2018, Nov 22 | 6. | CenSES Yearly Conference – invited Pathways I + session chair Pathways II |
| 2018, Jun 12 | 7. | <i>Energy Scenarios and Methodological Developments, Dual-plenary session 1: Long-term Energy Scenarios, IAEE 2018, Groningen, Netherlands. Invited, Dual Plenary</i> |
| 2018, May 30 | 8. | <i>Risk aversion in energy markets, 2018, Trondheim, Norway CMS?</i> |
| 2018, Apr, 27 | 9. | <i>The Role of Natural Gas in The Energy Transition - EnerDay conference, TU Dresden, Germany - invited keynote</i> |
| 2018, Feb 12 | 10. | Risk aversion in imperfect markets, Winterschool on Stochastic Modeling, Geilo, Norway - invited |
| 2017, Dec 21 | 11. | Market power, uncertainty and risk in international energy markets, 21 Dec 2017 |
| | 12. | IMAT Operations Research Workshop, University of Santiago de Compostela - invited |
| 2017, Nov 30 | 13. | Evaluation of PCI natural gas projects with three different models, Mines Paris Tech - invited |
| 2017, May 17 | 14. | Session at EC LCE-21 Energy modelling platform for Europe, EC Headquarters Brussels. www.youtube.com/watch?v=UFL00fBRM6w&feature=em-share_video_user - invited |
| 2017, May 17 | 15. | Poster, EC LCE-21 Energy Modelling Platform Europe (EMP-E), EC Headquarters, Brussels |
| 2017, Aug 29- Sep 1 | 16. | Viccaro et al. Promoting The Bioelectricity Sector At The Regional Level: An Impact Analysis Of Energy Tax Policy, XV EAAE Congress 2017, Parma, Aug 29 – Sep 1 2017 (Contributed Paper) |
| 2016, Nov 13 | 17. | R. Egging, Pichler, Ø Kalvø, T Walle-Hansen, Risk aversion in imperfect natural gas market - Shale gas investment in Poland and Ukraine. Presented at INFORMS, Nashville, TN, USA, |
| | 18. | Chair invited session: Advances in Energy Systems Modeling |
| 2015 Dec 14 | 19. | R. Egging, F. Holz, Global Uncertainty – Local Consequences: Capacity Development and LNG Trade under Shale Gas and Demand Uncertainty and Disruption Risk, RESOURCES project final workshop, DIW Berlin, Germany, 2015 (invited) |
| 2015 Sep 10 | 20. | R. Egging, Challenges in Stochastic Equilibrium Modeling for Energy Markets, Presented at ETH Automatic Control Seminar, Zurich, Switzerland (invited talk) |
| 2015 Aug 25 | 21. | Discussant of "Shapley-Based Stackelberg Leadership Formation in Networks", |
| | 22. | Ivan Belik, Kurt Jörnsten, Research School Conference, Trondheim Business School |
| 2015 Jun 16 | 23. | <u>R. Egging</u> , A Pichler, Ø Kalvø, T Walle-Hansen, Risk aversion in imperfect natural gas market - Shale gas investment in Poland and Ukraine. Presented at 17 th British-French-German (BFG) Conference on Optimization, London, United Kingdom. |
| | | Chair invited session: Planning under Uncertainty in Imperfect Energy Markets |
| 2015 Jun 10 | 24. | <u>R. Egging</u> , A P, Ø Kalvø, T Walle-Hansen, Risk aversion in imperfect natural gas market - Shale gas investment in Poland and Ukraine. Presented at Nordic Environmental Social Science (NESS) Conference 2015 Trondheim |
| 2014 Dec 5 | 25. | <u>R. Egging</u> , Practical insights from a global multi-energy market & infrastructure model, presented at CenSES yearly conference, Oslo (in Norwegian) |
| 2014 Nov 18 | 26. | Ø Kalvø, T Walle-Hansen, <u>R. Egging</u> , A Pichler, Risk aversion in imperfect natural gas markets, Workshop CREE – CenSES/CICEP, Usikkerhet og investeringsrisiko i energisektoren, Trondheim |
| 2014 Oct 3 | 27. | <u>R. Egging</u> , K. Midthun "The Role of China in the Global Natural Gas Market" plenary talk, Forum: Opportunities and Challenges in China's Energy Development – Energy and Carbon Markets at Energy Studies Institute, National University of Singapore |
| 2014 July 14 | 28. | <u>R. Egging</u> , Risk aversion in imperfect natural gas markets. Presented in invited session at IFORS 2014, Barcelona, Spain. |

- 2014 April 11 29. D. Huppmann, R. Egging, *MultiMOD – A multi-fuel market equilibrium model and case studies*, DTU Copenhagen, Dept of Management Engineering, Systems Analysis Group
- 2013 Nov 29 30. R. Egging, *Instruments of Climate and Energy Policy in a Multi-Fuel Market Equilibrium Model*, Research Seminar of Environment, Resources, Climate Economics TU Berlin & DIW
- 2013 Oct 24 31. R. Egging, *An SCGE model integrating the energy system and the regional economy*, Workshop CenSES meets CREE, Frisch Centre, Oslo
- 2013 Oct 24 32. R. Egging, *MultiMOD – An equilibrium model for energy market & infrastructure analysis*, Workshop CenSES meets CREE, Frisch Centre, Oslo
- 2013 Jul 9 33. R. Egging, *Benders Decomposition for solving multi-stage stochastic mixed complementarity problems*. 13th International Conference on Stochastic Programming. (ICSP) Bergamo, Italy
- 2013 Jul 2 34. R. Egging, *Benders Decomposition for solving multi-stage stochastic mixed complementarity problems*. EURO/INFORMS 26th European Conference on Operational Research, Rome, Italy
- 2012, Nov 6 35. R. Egging, *Market Power in International Oil and Gas Markets*, NTNU IØT.
- 2012, Oct 19 36. R. Egging, P. Richter, F. Holz, *Gas Transport Infrastructure Developments in an Increasing Consumption Scenario*, Energy Modeling Forum EMF 28, Final meeting, Berlin, Germany
- 2012, Oct 5 37. R. Egging, P. Schütz, *A rolling horizon heuristic for optimizing LNG spot trade under uncertainty*, Energy Finance Conference, Trondheim, Norway
- 2012, Aug 6 38. R. Egging, *MultiMOD - Insight in energy markets*, 1st NorRen Summer School, Asker, NO
- 2012, Jun 8 39. R. Egging, P. Schütz, *A rolling horizon heuristic for optimal trading in the LNG spot market*, Fifth Nordic Optimization Symposium, Trondheim, Norway
- 2012, Mar 23 40. R. Egging, *The Timing of Natural Gas Infrastructure Investments in an Uncertain World*, Workshop on managing uncertainty in energy systems and markets, Oppdal, Norway
- 2011, Nov 11 41. R. Egging, D. Huppmann, *Case studies with a multi-fuel market equilibrium model*, Fifth Transatlantic Infraday, Washington DC, USA
- 2011, Apr 4 42. R. Egging, Part 1. *Brief Introduction to Complementarity Modeling*, Part 2. *Flexibility in the NG and LNG supply chain*, GasTerra Groningen, Netherlands
- 2010, Nov 9 43. R. Egging, *Stochastic Natural Gas Market Modeling and Benders Decomposition*, Presented at INFORMS Annual Meeting, Austin, TX
- 2010, Nov 3 44. R. Egging, *Multi-period Natural Gas Market Modeling - Applications, Stochastic Extensions & Solution Approaches*, Dissertation Defense, University of Maryland, CP, USA
- 2009, Dec 17 45. R. Egging, F. Holz, *Stochastic Modeling - Timing of Investments in an Uncertain World*, Academic Excellence Conference 2009 – End Of Year Summit, DIW Berlin, Germany
- 2009, Nov 13 46. R. Egging, F. Holz, *Timing of Investments in an Uncertain World*, Third Transatlantic Infraday, Washington DC, USA
- 2009, Mar 23 47. R. Egging, F. Holz, *Analysis of the Global Natural Gas Market up to 2030, Scenario Analysis and Stochastic Modeling with the World Gas Model*, Presented at 2nd Latin American Meeting On Energy Economics, Santiago, Chile
- 2009, Feb 19 48. R. Egging, *The Global Natural Gas Market up to 2030 - Scenario Analysis and Stochastic Modeling with the World Gas Model*, Department of Energy, Washington D.C., Invited talk
- 2008, Dec 3 49. R. Egging, F. Holz, D. Huppmann, *Infrastructural and Environmental Implications of an LNG Import Terminal Ban for the US Pacific Coast Up To 2030*, Presented at 28th USAEE/IAEE North American conference, New Orleans
- 2008, Nov 14 50. R. Egging et al., *Investigating Carbon Dioxide Policy Implications for Future Investments and Developments in the Global Natural Gas Market*, Presented at 2nd Transatlantic Infraday, Washington D.C.
- 2008, Oct 13 51. R. Egging et al. *Analyzing Future Investments and Developments in the Global Natural Gas Market with the World Gas Model*, Presented at INFORMS, Washington D.C.
- 2008, Oct 12 52. R. Egging, *Implementing Benders Decomposition using COIN-OR*, Presented at INFORMS Annual Meeting, Washington D.C.

- 2008, Aug 1 53. R. Egging, Multi-Period Natural Gas Modeling - The World Gas Model, Zuse Institute Berlin, Germany, Invited talk
- 2008, Mar 28 54. R. Egging, R. Borndörfer, *A Dynamic Capacitated Coverage Location Problem With Repositioning Costs And Penalties For Lost Demand*, Presented at the 9th INFORMS Telecommunications Conference
- 2007, Nov 2 55. R. Egging, S. Bhulai, R. Van der Mei, S. Milner *Proactive Repositioning of Mobile Base Stations*, Presented at 1st Transatlantic Infraday, College Park, MD
- 2007, Oct 16 56. R. Egging, *Benders Decomposition for Optimal Deployment of Wireless Repositionable Base Stations*, Zuse Institute Berlin, Germany, Invited talk
- 2007, Oct 13 57. R. Egging, *Benders Decomposition for Optimal Deployment of Wireless Repositionable Base Stations*, TU Berlin, Matheon Workshop 'Mathematics meets Economics, Invited talk
- 2007, Aug 27 58. R. Egging, *Optimal Deployment Strategies for Repositionable Base Stations*, CWI, Amsterdam, weekly seminar Probability and Stochastic Networks group, Invited talk
- 2007, Aug 23 59. R. Egging, *Optimal Deployment of Wireless Repositionable Base Stations*, Free University Amsterdam, Faculty of Sciences, Optimization of Business Processes group, Invited talk
- 2007, Jun 22 60. R. Egging, S. Gabriel, *Stochastic Mixed Complementarity Problems - Modeling Stochastic Factors in the Natural Gas Market*, University Paris-Dauphine, France, June 22, 5th European Ph.D. seminar on natural gas, Invited talk
- 2007, May 31 61. R. Egging et al. *Global Dependencies in Natural Gas Markets - How do the European Natural Gas Market and the Worldwide LNG Market affect each other?* Presented at 1st CESSA Conference, Berlin, Germany, Invited talk
- 2005, Apr 11 62. R. Egging, G. Berndes, *Biofuel and Bio-energy implementation scenarios*, Presented at Research Experts Seminar, The VIEWLS project (European Union Fifth Framework Programme), Brussels, Belgium
- 2004, Sep 4 63. R. Egging, M. Boots, S. Gabriel, *GASTALE - Analysis of Gas Supply Security in Europe*, Presented at 6th IAEE European Conference, Zurich, Switzerland
- 2003, Jun 25 64. R. Egging, M. Boots, *Gas Market Equilibrium Model for an Enlarged Europe - GAME 2003*, Presented at International Energy Workshop IIASA, Laxenburg, Austria

PERFORMED PEER REVIEWS

European Journal of Operational Research (2013,2014,2016,2018,2020)	Optimization and Engineering (2016)
Energy Journal (2004,2005,2006,2008 (2x),2010,2011,2013,2014,2016:2x,2018,2019)	IEEE Transactions on Power Systems (2007,2014)
Energy Strategy Reviews (2012,2016,2017,2019)	Springer Chapters (Reliability Engineering 2014)
Energy Economics (2011, 2013,2017,2018)	Networks and Spatial Economics (2012)
Nature Energy (2017)	Stochastic Programming Neringa Workshop (2012)
Energy Policy (2008,2009,2011,2016:2x)	Energy Systems (2012;2x)
Energy (2015)	Optimization methods and software (2011)
Operations Research (2014)	Annals of Operations Research (2011)
	Automation In Construction (2005)

LANGUAGES

Dutch (native), English (fluent), Norwegian: (conversing and reading fluent, writing (Bokmål) moderate), German (moderate), French (basics)