



# International Ruhr Energy Conference 2020

## Uncertainties in Energy Markets

**September 09 / 10, 2020**  
**Digital Conference**



**House of  
Energy Markets  
& Finance**

# Greetings

## Conference Chairs



**Prof Dr Florian Ziel**

Chair for Environmental  
Economics, esp. Economics of  
Renewable Energy,  
University of Duisburg-Essen



**Prof Dr Christoph Weber**

Chair for Management Science  
and Energy Economics,  
University of Duisburg-Essen

## Dear participants,

Dear colleagues and friends,

the boom in the clean power industry entails an eminent transformation of the modern energy sector. The ongoing renewable revolution challenges fossil fuel producers, contributes to climate change mitigation, and promises significant long-term cost reductions. Yet, the transition to green power is intertwined with rigorous challenges and, no less importantly, numerous uncertainties.

This conference provides us with an excellent opportunity to examine these uncertainties. The coming two days will be filled with a variety of expert talks and engaging interdisciplinary discussions.

We highly encourage your active participation and hope you will enjoy your time in Essen.

Sincerely yours,

Florian Ziel

Christoph Weber



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# Day 1, September

Time	Stream: Electricity Markets		Stream: F
10:30	Joining the virtual conference rooms		
10:45	Welcome & Introduction		
11:00	<b>Panel Discussion:</b> Prof. Dr. Christoph Schmidt (RWI), Prof. Dr. Manfred Fischedick (Wuppertal I <i>180 € per tonne of CO2? – the key to achieving the</i>		
12:00	Lunch Break		
12:50	Joining the virtual conference rooms		
	<b>Session Title: Security of Supply</b>	<b>Session Chair: Christoph Weber</b>	<b>Session Title: Probabilistic Forecast</b>
13:00	<b>Speaker:</b> Lars Nolting (RWTH Aachen) - <i>A guideline to identify optimal levels of complexity in energy system models - insights from security of supply assessments</i>	<b>Discussant:</b> Marie-Louise Kloubert	<b>Speaker:</b> Jonathan Berrisch (University of Duisburg Essen) – <i>Data Science Methods for Probabilistic Natural Gas Price Forecasting</i>
13:40	<b>Speaker:</b> Marie-Louise Kloubert (TransnetBW) - <i>Assessment of Generation Adequacy considering Uncertainties</i>	<b>Discussant:</b> Lars Nolting	<b>Speaker:</b> Tim Janke (TU Darmstadt) - <i>An Empirical Evaluation of Forecast Combination Approaches for Probabilistic Electricity Price Forecasting</i>
14:20	Virtual Coffee Break		
14:40	Joining the virtual conference rooms		
	<b>Session Title: Best Paper Award Nominees</b>	<b>Session Chair: Christoph Weber</b>	<b>Session Title: Trading</b>
14:50	<b>Speaker:</b> Clemens Marggraf (EWI) - <i>Reducing Vehicle Cold Start Emissions through Carbon Pricing: Evidence from Germany</i>	<b>Discussant:</b> Jonas Zinke	<b>Speaker:</b> Emil Kraft (Karlsruhe Institute of Technology) - <i>Multi-Stage Stochastic Optimization of Trading Flexibility on Nested Electricity Markets: Trading Strategies for Balancing Reserve Markets</i>
15:30	<b>Speaker:</b> Jonas Zinke (EWI) - <i>One price fits all? Wind power expansion under uniform and nodal pricing in Germany.</i>	<b>Discussant:</b> Philipp Hauser	<b>Speaker:</b> Weronika Marta Nitka (Wrocław University) - <i>Balancing RES Generation: Profitability of an Energy Trader</i>
16:10	<b>Speaker:</b> Philipp Hauser (TU Dresden) - <i>The Contribution of Gas Infrastructure to Security of Gas Supply in Europe – A Stochastic Programming Approach</i>	<b>Discussant:</b> Clemens Marggraf	<b>Speaker:</b> Christopher Kath (RWE Supply&Trading GmbH) - <i>Optimal Order Execution in Intraday Markets: Minimizing C in Trade Trajectories</i>
16:50	Joining the virtual social event rooms		
17:00	Virtual Social Event		
18:30	End of Day 1		

# ber 09, 2020

Forecasting/Trading		Stream: Mixed	
Institut), Prof. Dr. Christoph Weber (EWL) climate targets?		Session Chair: Christoph Weber	
ing	Session Chair: Florian Ziel	Session Title: Political Hot Topics in an Energy Market Context	Session Chair: Benjamin Böcker
or	Discussant: Christopher Kath	Speaker: Carl-Philipp Anke, David Schönheit (TU Dresden) - <i>What caused 2019's drop in German carbon emissions: Sustainable transition or short-term market developments?</i>	Discussant: Christopher Ball
on e	Discussant: Jonathan Berrisch	Speaker: Christopher Ball (FZ Jülich) - <i>Electricity Market Relationship between the UK and its Neighbours: Distributional Effects of Brexit</i>	Discussant: Carl-Philip Anke
	Session Chair: Florian Ziel / Michal Narajewski	Session Title: Financial Incentives for the Energy Transition & Local Flexibility Markets	Session Chair: Benjamin Böcker
d	Discussant: Weronika Marta Nitka	Speaker: Niklas Vespermann (TU Munich) - <i>Access Economy for Storage in Energy Communities</i>	Discussant: Jan Priesmann
	Discussant: Tim Janke	Speaker: Jan Priesmann (RWTH Aachen) - <i>Energy transition and social justice - Allocation of cost of feed-in tariffs</i>	Discussant: Jakob Knauf
Cost	Discussant: Emil Kraft	Speaker: Jakob Knauf (University of St. Gallen) - <i>Can't buy me acceptance? – Public attitude and financial incentives in contested wind energy projects in Germany</i>	Discussant: Niklas Vespermann

# Day 2, September

Time	Stream: Electricity Markets		Stream:
	<b>Session Title: The future of Electricity Markets</b>	<b>Session Chair: Christoph Weber</b>	<b>Session Title: Neural Networks</b>
09:00	<b>Speaker:</b> Philipp Trotter (Oxford University) - <i>Predicting electricity generation mixes without scenario assumptions – A machine learning approach for power plant success factors and failure rates</i>	Discussant: Moritz Wüthrich	<b>Speaker:</b> Andreas Wagner (ITWM) - <i>Imp electricity price forecasting using embed layers in neural networks</i>
09:40	<b>Speaker:</b> Moritz Wüthrich (ETH Zurich) - <i>Data-driven forecast of long-term electricity market prices for the assessment of power purchase agreements</i>	Discussant: Philipp Trotter	<b>Speaker:</b> Grzegorz Marjasz (Wrocław University) - <i>Forecasting day-ahead electricity prices: best practices and state-of-the-art Deep Neural Networks</i>
10:20	Virtual Coffee Break		
10:40	<b>Keynote Speech 2:</b> Dr. Juan Bernabé Moreno - Chief Data Officer & Global Head of Analytics and AI at E.ON SE – Title		
11:30	<b>GEE Best Paper Award</b>		
11:40	Joining the virtual conference room		
	<b>Session Title: Flexibility Markets &amp; Congestion Management</b>	<b>Session Chair: Christoph Weber</b>	<b>Session Title: Electricity Prices</b>
11:50	<b>Speaker:</b> Lucas Jürgens (HAW Hamburg) - <i>Beyond the copper plate: Market-based congestion management in future Northern Germany</i>	Discussant: Manuel Eising	<b>Speaker:</b> Tomasz Serafin (Wrocław University) - <i>Ensemble Forecasting of Intraday Electricity Prices</i>
12:30	<b>Speaker:</b> Manuel Eising (EIFER) - <i>Redispatch patterns of concurrent market and reserve power plant activations in Germany</i>	Discussant: Lucas Jürgens	<b>Speaker:</b> Arkadiusz Jędrzejewski (Wrocław University) - <i>The importance of the long-seasonal component in day-ahead electricity price forecasting revisited: Parameter-rich models estimated via the LASSO</i>
13:10	Lunch Break		
14:00	<b>Keynote Speech 3:</b> Prof. Yannig Goude, Université Paris-Sud / EDF – Title: Machine learning methods for el		
14:50	Joining the virtual conference room		
	<b>Session Title: Demand Side Management</b>	<b>Session Chair: Christoph Weber</b>	<b>Session Title: Electricity Prices</b>
15:00	<b>Speaker:</b> Johannes Kochems (TU Berlin) - <i>Demand response potentials for Germany: potential clustering and comparison of modeling approaches</i>	Discussant: Oliver Ruhnau	<b>Speaker:</b> Felix Nitsch (German Aerospace Center) - <i>Model in model: Electricity price forecasts in agent-based energy system simulations</i>
15:40	<b>Speaker:</b> Oliver Ruhnau (Hertie School) - <i>Flexible electricity demand: a lower bound for the value of renewable energy</i>	Discussant: Johannes Kochems	<b>Speaker:</b> Bartosz Uniejewski (Wrocław University) - <i>PCA forecast averaging – predicting day-ahead and intraday electricity prices</i>
16:20	Closing Remarks Day 2		
16:30	End of Day 2		



# ber 10, 2020

Forecasting/Trading		Stream: Mixed	
	Session Chair: Florian Ziel	Session Title: Modelling Conventional Power Plants	Session Chair: Christian Furtwängler
Improving trading	Discussant: Grzegorz Marcjasz	Speaker: Robin Leisen (University of Duisburg-Essen) - <i>Modelling of combined cycle power plants in a detailed electricity market model</i>	Discussant: Reinhard Madlener
Electricity	Discussant: Andreas Wagner	Speaker: Reinhard Madlener (RWTH Aachen) - <i>Real Options Model for the Disinvestment in Conventional Power Plants</i>	Discussant: Robin Leisen
Title: How E.ON is leveraging Data and AI to shape the energy world			Session Chair: Christoph Weber
			Session Chair: BPA Committee
	Session Chair: Florian Ziel	Session Title: Gas Markets and Hydrogen	Session Chair: Jonas Höckner
University) Electricity	Discussant: Arkadiusz Jędrzejewski	Speaker: Anna Christin Meißner (Fraunhofer ISIT) - <i>Beyond surplus electricity utilization - Analysis on smart application of electrolyzers for hydrogen production and ancillary services</i>	Discussant: Matthew Schmidt
Law term Electricity	Discussant: Tomasz Serafin	Speaker: Matthew Schmidt (TU Dresden) - <i>Assessing the Impact of Uncertainties on Infrastructure Developments in the European Natural Gas Market: A robust optimization approach</i>	Discussant: Anna Christin Meißner
Electricity load forecasting: contributions and perspectives			Session Chair: Florian Ziel
	Session Chair: Florian Ziel	Session Title: Portfolio and risk analysis	Session Chair: Philip Beran
ce ?	Discussant: Bartosz Uniejewski	Speaker: Barbara Glensk (RWTH Aachen) - <i>Fuzzy Portfolio Optimization of Onshore Wind Power Plants</i>	Discussant: Michael Chow
Electricity	Discussant: Felix Nitsch	Speaker: Michael Chow (ETH Zurich) - <i>Modeling and analysis of the risk associated with virtual power purchase agreements from an off-taker perspective</i>	Discussant: Barbara Glensk

### What we do

The House of Energy Markets and Finance researches the junction between energy and finance economics. The connection of energy economics and fiscal methods are unique in this context. Our member's expertise and international visibility are the pillars the House of Energy Markets and Finance is based on. The centre of research offers a platform for scientific analysis and support of the energy system's transformation. Our centre supports young academics in the fields of energy and finance economics and promotes interdisciplinary cooperation.

### About INREC

The International Ruhr Energy Conference series started 2009 and has been organized jointly by the Chair for Energy Economics and the Chair for Energy Trading and Finance of the University of Duisburg-Essen for its first five issues. Recent issues have been devoted to various focal points of energy economics and energy finance, bringing together contributions from both research and economy.

This year, the House of Energy Markets and Finance has the honour to host the INREC for the fourth time after its founding in 2016. The INRECs 9th Issue will be organized by Professor Christoph Weber, Chair for Energy Economics, and Junior Professor Florian Ziel, Chair for Environmental Economics of the University Duisburg Essen.

The INREC 2020 will have a particular focus on the uncertainties that currently challenge all those working in the energy field, and especially those in close contact with the green power transition, be it as practitioner, regulator or scientist.



The GEE was founded in 1981 as a non-profit association in the midst of the discussion on the civil use of nuclear energy in Germany. Today, the German section of the IAEE (International Association for Energy Economics) comprises about 250 individual members. Experts from the energy industry, politics, associations and science are organised in the GEE in order to find a politically open, interdisciplinary forum for the professional discussion of energy-related topics.

In particular, the GEE was intended to create a neutral platform where the topic of civil nuclear energy use could be discussed controversially in the form of evening events, seminars and conferences. In the meantime, the spectrum of topics at the GEE events has broadened considerably. Topics such as liberalisation of the energy markets, market failure and regulation, trading in electricity and natural gas, emissions and emissions trading, prices of energy sources, prospects for investments in new technologies as well as energy system transformation are frequently the subject of regular meetings.

The GEE annually awards the GEE Prize of the Energy Forum Berlin in the categories Bachelor's/Master's Theses and Dissertations. The award honours current academic work in the field of energy management. In addition to economic concepts, technical, legal or energy policy approaches can also be dealt with. In terms of content, the papers should deal with practice-relevant topics and make a contribution to the classic questions of the energy industry.

Further information on the event and membership can be found at:



**Prof Florian Ziel** is an assistant professor of Environmental Economics, esp. Economics of Renewable Energy at the University of Duisburg-Essen (since February 2017). He studied mathematics and statistics at the TU Dresden and

University College Dublin (UCD). In June 2016 he received his doctoral degree in business administration and economics from the European University Viadrina, Frankfurt (Oder) writing a thesis about electricity price modeling and forecasting. During his PhD and post-doc period he researched at the European Centre for Advanced Research in Economics and Statistics of the Université libre de Bruxelles and at the Centre for Industrial and Applied Mathematics of the University of Oxford.

His research objectives are the quantitative modeling of energy markets with focus on the impact of renewable energy. Additionally, he is interested in time series analysis of seasonal data with application to energy and environmental economics such as statistical portfolio management.

**Prof Christoph Weber**, Professor of Energy Economics and Management Science at the University of Duisburg-Essen, received his PhD from the University of Hohenheim in 1999 and became full professor at the University of Duisburg-Essen in 2004. Between 1999 and 2004, he was head of a research group at the Institute for Energy Economics and the Rational Use of Energy (IER) at the University of Stuttgart. He has been a visiting professor at the John Hopkins University and the University of Auckland. His fields of research include energy risk management, energy market liberalization and the application of operations research methods to various issues.



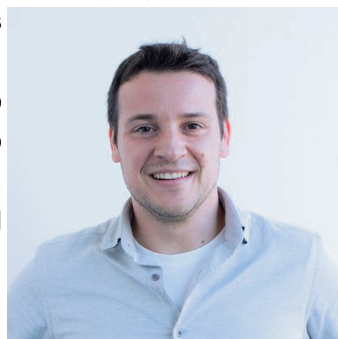


**Prof. Yannig Goude** has received a PhD in statistics and probability in 2007 at the University Paris-Sud 11 (Orsay). He is a research-engineer at Électricité de France

(EDF) R&D in the department "Optimisation Simulation Risk and Statistics" since 2008. He is the manager of the project project "Statistics for Energy Management" dedicated to research works on energy market modelling, providing new data analytics and statistical/machine learning methods to operational projects at EDF. Since 2013, he is also an associate professor in the department of mathematics at the University Paris-Sud 11 (Orsay). His research interests include electricity load forecasting, time series, machine learning, semi-parametric models and online aggregation of experts.

**Dr. Juan Bernabé-Moreno** received the M.Sc. and Ph.D. degrees in Computer Science from the University of Granada in 2002 and 2015, respectively. He has been leading data science and engineering teams in the telecommunication industry for more than 8 years. In 2017, he joined E.ON, where he is the Chief Data Officer and heads the global data and analytics team. Ever since, he is been driving data-driven initiatives and pushing AI to accelerate the energy transformation. In addition, he remains actively involved in research activities (Visiting Research Fellow at Oxford University and University of Granada). His current research interests include fuzzy linguistic

modeling, aggregation of information, information retrieval, bibliometric, recommender systems and social media, but also the interlink between Quantum Computing and AI and the ethical aspects of AI. He is a renowned data evangelist specialized in exploiting the value of data with state of the art techniques to optimize business results in big corporations, leveraging his scientific background to bridge the gap between academia and industry.



Our clients face diverse challenges, strive to put new ideas into practice and seek expert advice. They turn to us for comprehensive support and practical solutions that deliver maximum value. Whether for a global player, a family business or a public institution, we leverage all of our assets: experience, industry knowledge, high standards of quality, commitment to innovation and the resources of our expert network in 157 countries. Building a trusting and cooperative relationship with our clients is particularly important to us – the better we know and understand our clients' needs, the more effectively we can support them.



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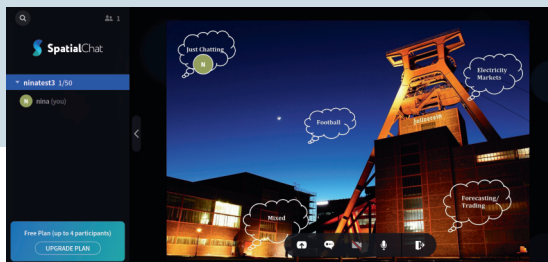
*€2.3 billion in turnover.*

*The leading auditing and consulting firm in Germany.*

## Social Events

This year's social event will be held via SpatialChat. SpatialChat is a virtual venue for networking events. It enables video chat conversations that recreate real-life social interactions. Move freely between groups of people to quickly change dialogue context.

**Grab your favourite drink and a snack and join the social event here:**



## Presentation Downloads

Some presentations will be available to download approximately two weeks after the conference. To gain access, visit [www.inrec.wiwi.uni-due.de](http://www.inrec.wiwi.uni-due.de)

Please use the username: **INREC20**

The downloaded area's password is: **Uncertainties2020**



<b>Andreas Wagner</b>	<b>DAY 2</b>
Improving electricity price forecasting using embedding layers in neural networks	Stream: Forecasting/Trading, 09:00
<b>Anna Christin Meißner</b>	<b>DAY 2</b>
Beyond surplus electricity utilization - Analysis on smart application of electrolyzers for hydrogen production and ancillary services	Stream: Mixed, 11:50
<b>Arkadiusz Jędrzejewski</b>	<b>DAY 2</b>
The importance of the long-term seasonal component in day-ahead electricity price forecasting revisited: Parameter-rich models estimated via the LASSO	Stream: Forecasting/Trading, 12:30
<b>Barbara Glensk</b>	<b>DAY 2</b>
Fuzzy Portfolio Optimization of Onshore Wind Power Plants	Stream: Mixed, 15:00
<b>Bartosz Uniejewski</b>	<b>DAY 2</b>
PCA forecast averaging -- predicting day-ahead and intraday electricity prices	Stream: Forecasting/Trading, 15:40
<b>Carl-Philipp Anke, David Schönheit</b>	<b>DAY 1</b>
What caused 2019's drop in German carbon emissions: Sustainable transition or short-term market developments?	Stream: Mixed, 13:00
<b>Christopher Ball</b>	<b>DAY 1</b>
Electricity Market Relationship between the UK and its Neighbours: Distributional Effects of Brexit	Stream: Mixed, 13:40
<b>Christopher Kath</b>	<b>DAY 1</b>
Optimal Order Execution in Intraday Markets: Minimizing Cost in Trade Trajectories	Stream: Forecasting/Trading, 16:10
<b>Clemens Marggraf</b>	<b>DAY 1</b>
Reducing Vehicle Cold Start Emissions through Carbon Pricing: Evidence from Germany	Stream: Electricity Markets, 14:50
<b>Emil Kraft</b>	<b>DAY 1</b>
Multi-Stage Stochastic Optimization of Trading Flexibility on Nested Electricity Markets: Trading Strategies for Balancing Reserve Markets	Stream: Forecasting/Trading, 14:50
<b>Felix Nitsch</b>	<b>DAY 2</b>
Model in model: Electricity price forecasts in agent-based energy system simulations	Stream: Forecasting/Trading, 15:00



<b>Grzegorz Marcjasz</b>	<b>DAY 2</b>
Forecasting day-ahead electricity prices: best practices and state-of-the-art Deep Neural Networks	Stream: Forecasting/Trading, 09:40
<b>Jakob Knauf</b>	<b>Day 1</b>
Can't buy me acceptance? – Public attitude and financial incentives in contested wind energy projects in Germany	Stream: Mixed, 16:10
<b>Jan Priesmann</b>	<b>DAY 1</b>
Energy transition and social justice - Allocation of cost of feed-in tariffs	Stream: Mixed, 15:30
<b>Johannes Kochems</b>	<b>DAY 2</b>
Demand response potentials for Germany: potential clustering and comparison of modeling approaches	Stream: Electricity Markets, 15:00
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One price fits all? Wind power expansion under uniform and nodal pricing in Germany.	Stream: Electricity Markets, 15:30
<b>Jonathan Berrisch</b>	<b>DAY 1</b>
Data Science Methods for Probabilistic Natural Gas Price Forecasting	Stream: Forecasting/Trading, 13:00
<b>Lars Nolting</b>	<b>DAY 1</b>
A guideline to identify optimal levels of complexity in energy system models - insights from security of supply assessments	Stream: Electricity Markets, 13:00
<b>Lucas Jürgens</b>	<b>DAY 2</b>
Beyond the copper plate: Market-based congestion management in future Northern Germany	Stream: Electricity Markets, 11:50
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Assessment of Generation Adequacy considering Uncertainties	Stream: Electricity Markets, 13:40
<b>Matthew Schmidt</b>	<b>DAY 2</b>
Assessing the Impact of Uncertainties on Infrastructure Developments in the European Natural Gas Market: A robust optimization approach	Stream: Mixed, 12:30

<b>Michael Chow</b>	<b>DAY 2</b>
Modeling and analysis of the risk associated with virtual power purchase agreements from an off-taker perspective	Stream: Mixed, 15:40
<b>Moritz Wüthrich</b>	<b>DAY 2</b>
Data-driven forecast of long-term electricity market prices for the assessment of power purchase agreements	Stream: Electricity Markets, 09:40
<b>Niklas Vespermann</b>	<b>DAY 1</b>
Access Economy for Storage in Energy Communities	Stream: Mixed, 14:50
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Predicting electricity generation mixes without scenario assumptions – A machine learning approach for power plant success factors and failure rates	Stream: Electricity Markets, 09:00
<b>Reinhard Madlener</b>	<b>DAY 2</b>
Real Options Model for the Disinvestment in Conventional Power Plants	Stream: Mixed, 09:40
<b>Robin Leisen</b>	<b>DAY 2</b>
Modelling of combined cycle power plants in a detailed electricity market model	Stream: Mixed, 09:00
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Balancing RES Generation: Profitability of an Energy Trader	Stream: Forecasting/Trading, 15:30



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