

## ECKEHARD TRÖSTER Ph.D.

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### CEO & Senior Consultant

Energynautics GmbH  
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Languages: German, English



### WORK EXPERIENCE

**in Germany, Austria, UK, USA, Denmark, India, Bangladesh, Thailand, Indonesia**

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|-------------------|---|
| since 08/2007     | CEO at Energynautics GmbH, a Germany-based research and consulting company in the area of renewable and distributed generation  |
| 09/2001 – 07/2007 | Research fellow at Darmstadt University of Technology, Institute of Electric Power Systems, Section Renewable Energies, Germany |
| 11/2000 – 03/2001 | Industrial placement at Solarcentury, a solar energy company, specialised in building integrated photovoltaics, London, UK      |

### EDUCATION

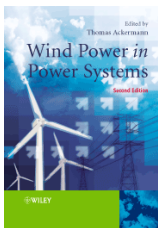
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| 09/2001 – 07/2007 | Ph.D. student at Darmstadt University of Technology, Institute of Electric Power Systems, Section Renewable Energies, Germany<br><br>Field of research: “Permanent Magnet Induction Generator for Wind Power Application”  |
| 10/1996 – 06/2001 | Diplomingenieur Elektrotechnik, equivalent to a Master's Degree in Electrical Engineering, Darmstadt University of Technology, Germany<br><br>specialised on: <ul style="list-style-type: none"><li>• power systems</li><li>• electrical machines</li><li>• renewable energies</li></ul> |

## EDUCATIONAL ACTIVITIES

- Since 2015                      Lecturing the “Renewable Energy Short Course, Hector Business School, KIT Karlsruhe, Germany (annually)
- 11/2011 – 12/2014            Lecturing the course „Renewable Energies“ at Darmstadt University of Technology, Germany

## SELECTED PUBLICATIONS

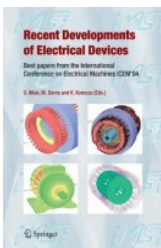
### Books and contributions to books



1. Editor: Ackermann, T.: **“Wind Power in Power Systems”**, 2. Edition, Wiley & Sons, April 2012, ISBN-10: 0470974168, Chapter 16: **“New Control Concept for Offshore Wind Power Plants: Constant-Speed Turbines on a Grid with Variable Frequency”**, by Tröster, E.



2. Tröster, E.: **„Hochpolige Asynchronmaschine mit Permanentmagnetzwischenläufer als Windkraftgenerator“**, Shaker Verlag, Aachen 2010, ISBN: 978-3-8322-9332-1.



3. Publisher: Wiak, S.; Deme, M.; Komeza, K.: **“Recent Development of Electrical Drives- Best papers from the International Conference on Electrical Machines ICEM’04”**, published 2006, Springer Verlag, ISBN: 10 1-4020-4534-4, **“Static and Dynamic Measurements of a Permanent Magnet Induction Generator: Test Results of a New Wind Generator Concept”** by Gail, G.; Tröster, E.; Hartkopf, T.; Höffling, M.

### Scientific articles with review

1. Koch, M.; Bauknecht, D.; Heinemann, C.; Ritter, D.; Vogel, M.; Tröster, E.: **„Modellgestützte Bewertung von Netzausbau im europäischen Netzverbund und Flexibilitätsoptionen im deutschen Stromsystem im Zeitraum 2020–2050“**, Zeitschrift für Energiewirtschaft, März 2015, Volume 39, Issue 1, pp 1-17.

2. Bauknecht, D.; Heinemann, C.; Koch, M.; Ritter, D.; Harthan, R.; Tröster, E.; Langanke S.: **“Entwicklung des Flexibilitätsbedarfs im Stromsystem und der Beitrag verschiedener Flexibilitätsoptionen“**, Energiewirtschaftliche Tagesfragen 64. Jg. (2014) Issue 11.
3. Tröster, E.; Koch, M.; Rothfuchs, H.: **„Verteilnetzstudie Rheinland-Pfalz – Integration von erneuerbaren Energien in die Stromnetze“**, Energiewirtschaftliche Tagesfragen 64. Jg. (2014) Issue 8.
4. Hagspiel, S.; Jägemann, C.; Lindenberger, D.; Brown, T.; Cherevatskiy, S.; Tröster, E.: **“Cost-Optimal Power System Extension under Flow-based Market Coupling”**, Energy – The International Journal, Volume 66, March 2014, pp. 654-666.
5. Fürsch, M.; Hagspiel, S.; Jägemann, C.; Nagl, S.; Lindenberger, D.; Tröster, E.: **“The role of grid extensions in a cost-efficient transformation of the European electricity system until 2050”**, Applied Energy, Volume 104, April 2013, pp. 642-652.
6. Martensen, N., Lund, P., Kley, H., Tröster, E, Ackermann, T.: **“The Danish cell project – Status and perspective of a smart grid demonstration”**, VGB Power Tech., Volume 91/2011, pp. 64-68.

## Reports

1. Teske, S.; Brown, T.; Tröster, E.; Schierhorn, P.-P.; Ackermann, T.: **“powE[R] 2030 – A European Grid for 3/4 Renewable Electricity by 2030”**, Greenpeace Germany, March 2014.
2. Tröster, E.; Untsch, S.; Brown, T.; Geidel, S.; Narasimhan, B.; Schierhorn, P.-P.; Ackermann, T.: **“Kurzgutachten zur Eigenstromerzeugung in Rheinland-Pfalz”**, Darmstadt, March 2014.
3. Ackermann, T.; Martensen, N.; Brown, T.; Untsch, S.; Tröster, E.; Geidel, S.; et al: **„Verteilnetzstudie Rheinland-Pfalz“** Darmstadt, Freiburg, Munich, January 2014.
4. Ackermann, T.; Martensen, N.; Brown, T.; Untsch, S.; Tröster, E.; Geidel, S.; et al: **“Distribution System Study Rhineland-Palatinate“ (English Summary)**, Darmstadt, Freiburg, Munich, January 2014.

5. Fürsch, M.; Hagspiel, S.; Jägemann, C.; Nagl, S.; Lindenberger, D.; Glotzbach, L.; Tröster, E.; Ackermann, T.: **“Roadmap 2050 – a closer look: Cost-efficient RES-E penetration and the role of grid extensions”**, Köln u. Langen, Deutschland, Oktober 2011.
6. Tröster, E.; Kuwahata, R.; Ackermann, T.: **“European Grid Study 2030/2050”**, Langen, Deutschland, Januar 2011.

## Conference Papers

1. Masendorf, D.; Hempel, S.; Tröster, E.; Koch, M.; Vogel, M.; Heinemann C.: **„Stronger Decentralization of the German Electricity-Heat-System”**, 10<sup>th</sup> International Workshop on Integration of Solar Power and Storage into Power Systems, Virtual, 05 November 2020.
2. Tröster, E.: **“Resilience of Power Systems with high RES Penetration”**, 10<sup>th</sup> International Workshop on Integration of Solar Power and Storage into Power Systems, Virtual, 05 November 2020.
3. Hülsmann, L.; Hempel, S.; Tröster, E.: **„Hosting Capacity Assessment of Electric Vehicles, Heat Pumps and Rooftop PV for the City of Worms, Germany”**, 4<sup>th</sup> E-Mobility Power System Integration Symposium, Virtual, 03 November 2020.
4. Schlößer, T.; Tröster, E.; Gambín Belinchón, P.: **“Control Aspects in Voltage Dependent Electric Vehicle Charging”**, 3<sup>rd</sup> E-Mobility Power System Integration Symposium, Dublin, Ireland, 14 October 2019.
5. Hülsmann, L.; Schlößer, T.; Tröster, E.; Koch, M.; Ohl, U.: **“Electric Vehicle and Heat Pump Hosting Capacity Assessment for a German 25,000-noded Distribution Network”**, 3<sup>rd</sup> E-Mobility Power System Integration Symposium, Dublin, Ireland, 14 October 2019.
6. Groene, B. J.; Hempel, S.; Tröster, E.: **“Strategies for Intelligent Low-Voltage Network Monitoring – Detection of Unregistered Electric Vehicles Using a Recurrent Neural Network”**, 3<sup>rd</sup> E-Mobility Power System Integration Symposium, Dublin, Ireland, 14 October 2019.

7. Ackermann, T.; Tröster, E.; Hülsmann, L.; Ohl, U.; Koch, M.: **“Effectiveness of different flexibility options and innovative network technologies for the use in the BDEW traffic light concept, on the basis of a German distribution grid”**, Session 2018 of the International Council on Large Electric Systems (CIGRE), Paris - awarded as the best paper of session C6 'Active Distribution Systems and Distributed Energy Resources' 2018.
8. Masendorf, D.; Tröster, E.: **„Practical Experiences in Developing and Using a Wind Turbine Model based on IEC 61400-27-1”**, 16<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, Germany, Oktober 2017.
9. Hülsmann, L.; Tröster, E.; Ohl, U.; Koch, M.: **“Improving the Reactive Power Balance between a German MV and HV Grid through Coordinated Reactive Power Provision by Wind Power Plants”**, 16<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, Germany, Oktober 2017.
10. Hempel, S.; Schmidt, J. D.; Tröster, E.; Ackermann, T.: **„Smart Network Control with Coordinated PV Infeed“**, 7<sup>th</sup> International Workshop on Integration of Solar Power and Storage into Power Systems, Berlin, Germany, October 2017.
11. Schweinsberg, C.; Schmidt, J.-D.; Tröster, E.; Maihöfner, D.; Hanson, J.: **„Development of a Grid-Friendly Active Power Control of PV-Batteries using Rolling Forecasts“**, 7<sup>th</sup> International Workshop on Integration of Solar Power and Storage into Power Systems, Berlin, Germany, October 2017.
12. Wagner, L.; Tröster, E.: **“Influence of the Spatial Distribution of Generation on Frequency Stability after a Generation Outage”**, 14<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Brussels, Belgium, October 2015.
13. Wagner, L.; Tröster, E. (Energynautics); Krämer, J.; Betz, B. (EWR Netz, Germany): **“Impact of a 100 % Renewables**

- Strategy on a Distribution Grid in Rhineland-Palatinate**", 5th International Workshop on Integration of Solar Power into Power Systems, Brussels, Belgium, October 2015.
14. Tröster, E.; Langanke, S.: **"Scenario Based Evaluation of Different Flexibility Options in the German Electricity System from 2020 to 2050: The Grid"**, 13<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, November 2014.
  15. Brown, T.; Schierhorn, P.-P.; Tröster, E.; Ackermann, T.: **"Optimising the European Transmission System for 77% Renewables by 2030"**, 13<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, November 2014.
  16. Tröster, E.; Martensen, N.; Brown, T.; Ackermann, T.; Geidel, S.; Langanke, S.: **"Solar Power in a 100% Renewables Scenario for Rhineland-Palatinate"**, 4<sup>th</sup> International Workshop on Integration of Solar Power into Power Systems, Berlin, November 2014.
  17. Martensen, N.; Tröster, E.; Brown, T.; Ackermann, T.; Geidel, S.; Langanke, S.: **"Wind Power in a 100% Renewables Scenario for Rhineland-Palatinate"**, 13<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, November 2014.
  18. Schierhorn, P.-P.; Brown, T.; Tröster, E.: **"Cycling Requirements for Conventional Power Plants at High Shares of Renewable"**, 13<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, November 2014.
  19. Wagner, L.; Tröster, E.: **"Demand Side Response System Frequency Control using Temperature Controlled Devices: Potentials and Requirement in Germany by 2020"**, 13<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, Berlin, November 2014.
  20. Schmidt, J.-D.; Tröster, E.; Papaioannou, G.; Hanson, J.: **"Frequency Issues of Island Power Systems with High**

- Penetration of Hydroelectric and Wind Power”, 12<sup>th</sup>**  
International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Power Plants, London, United Kingdom, October 2013.
21. Schmidt, J.-D.; Tröster, E.: **“Evaluating the Benefits of Storage in Low Voltage Distribution Systems with High PV Penetration”**, 3<sup>rd</sup> International Workshop on Integration of Solar Power into Power Systems, London, United Kingdom, October 2013.
  22. Tröster, E.; Ackermann, T.; Betz, B.: **“Using storage to integrate renewables into the distribution system – A case study”**, Paper 1335, CIRED, 22<sup>nd</sup> International Conference on Electricity Distribution, Stockholm, Sweden, June 2013.
  23. Brown, T., Cherevatskiy, S., Tröster, E.: **“Transporting the Wind: Systematic Planning for Long-Distance HVDC Lines”**; EWEA 2013 Annual Event, Vienna, Austria, February 2013.
  24. Tröster, E.; Langanke, S.; Betz, B.: **“Pushing the Distribution System to its Limits and Beyond”**; 11<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Lisbon, Portugal, November 2012.
  25. Cherevatskiy, S., Tröster, E.: **“Determining the Maximum Feasible Amount of Photovoltaics in the European Transmission Grid under Optimal PV Utilization”**, 2<sup>nd</sup> International Workshop on Integration of Solar Power into Power Systems, Lisbon, Portugal, November 2012.
  26. Tröster, E.; Schmidt, J.-D.: **“Evaluating the Impact of PV Module Orientation on Grid Operation”**, 2<sup>nd</sup> International Workshop on Integration of Solar Power into Power Systems, Lisbon, Portugal, November 2012.
  27. Hagspiel, S.; Jägemann, C.; Lindenberger, D. (EWI, Germany); Cherevatskiy, S.; Tröster E.; Brown, T., (Energynautics, Germany): **“Cost-optimal Power System Extension Under Flow-based Market Coupling and High Shares of Photovoltaics”**; 2<sup>nd</sup> International Workshop on Integration of Solar Power into Power Systems, Lisbon, Portugal, November 2012.

28. Mengapche, D. F.; Tröster, E.; Betz, B.; Schnell, R.: **“Grid Optimizer: Werkzeug zur rückwirkungsarmen Netzeinbindung von Erneuerbare-Energien-Anlagen und für optimierten Netzbetrieb“**; 12. Symposium Energieinnovation, Graz, Austria, February 2012.
29. Tröster, E., Glotzbach, L., Ackermann, T. (Energynautics, Germany); Fürsch, M., Jägemann, C., Nagl, S.; Hagspiel, S.; Lindenberger, D. (EWI, Germany): **“The Importance of Grid Expansion in a High Wind Penetration Scenario for Europe until 2050”**; 10<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Aarhus, Denmark, October 2011.
30. Theologitis, I.-T.; Tröster, E.; Ackermann, T.: **“Aspects of a generic photovoltaic model examined under the German Grid Code for Medium Voltage”**; 1<sup>st</sup> International Workshop on Integration of Solar Power into Power Systems, Aarhus, Denmark, October 2011.
31. Tröster, E., Kuwahata, R., Ackermann, T.: **“The Role of Wind Power in the Future European Power System and its Impact on Grid Expansion”**; 9<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Québec City, Canada, October 2010.
32. Tröster, E.: **“New German Grid Codes for Connecting PV Systems to the Medium Voltage Power Grid”**; 2<sup>nd</sup> International Workshop on Concentrating Photovoltaic Power Plants: Optical Design, Production, Grid Connection, Darmstadt, Germany, 2009.
33. Ackermann, T.; Lund, P.; Martensen, N.; Tröster, E. and Knazkins, V.: **“Overview of the Danish Cell Project”**; 7<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Madrid, 2008.
34. Tröster, E.: **“Constant Speed Turbines on a Grid with Variable Frequency – A Comparison in Terms of Energy Capture”**; 7<sup>th</sup> International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Madrid, 2008.



35. Tröster, E.; Sperling, M.; Hartkopf, T.: **“Finite Element Analysis of a Permanent Magnet Induction Machine”**; Int’l Symposium on Power Electronics, Electrical Drives, Automation and Motion, Taormina, 2006.
36. Tröster, E.; Gail, G.; Hartkopf, T.: **“A New Control Concept for Offshore Wind-Parks – Constant Speed Turbines on a Grid with Variable Frequency”**; European Wind Energy Conference, London, 2004.
37. Tröster, E.; Gail, G.; Henschel, M.; Hartkopf, T.: **“Analysis of the Equivalent Circuit Diagram of a Permanent Magnet Induction Machine”**; International Conference on Electrical Machines, Krakow, 2004.