

## DR.-ING. ECHEHARD TRÖSTER

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### Geschäftsführer & Senior Consultant

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Sprachen: Deutsch, Englisch



### BERUFSERFAHRUNG

**in Deutschland, Bangladesch, Dänemark, Großbritannien, Indien, Indonesien, Irland, Malaysia, Niederlande, Österreich, Schweden, Schweiz, Thailand, USA**

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|-------------------|---|
| seit 07/2016      | Geschäftsführer bei Energynautics GmbH, ein in Deutschland ansässiges Forschungs- und Beratungsunternehmen auf dem Gebiet der erneuerbaren und dezentralen Energieerzeugung |
| seit 08/2007      | Senior Consultant bei Energynautics GmbH  |
| 09/2001 – 07/2007 | Wissenschaftlicher Mitarbeiter am Institut für elektrische Energiesysteme, Technische Universität Darmstadt, Deutschland  |
| 11/2000 – 03/2001 | Praktikum bei Solarcentury, ein Solarenergie Unternehmen, spezialisiert auf gebäudeintegrierte Photovoltaik-Anlagen, London, Großbritannien                                 |

### AUSBILDUNG

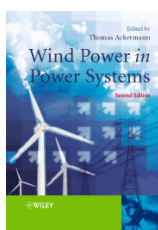
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| 09/2001 – 07/2007 | Promotion am Institut für elektrische Energiesysteme, Technische Universität Darmstadt, Deutschland<br><br>Promotionsthema: „Permanent Magnet erregter Asynchrongenerator für Windkraftanlagen“  |
| 10/1996 – 06/2001 | Diplomingenieur Elektrotechnik, Technische Universität Darmstadt, Deutschland<br><br>Schwerpunkte: <ul style="list-style-type: none"> <li>• elektrische Energiesysteme</li> <li>• elektrische Maschinen</li> <li>• erneuerbare Energien</li> </ul> |

## VORLESUNGEN

- 2/2015 – 4/2016 Renewable Energy Short Course, Hector Business School, KIT Karlsruhe, Deutschland
- 11/2011 – 12/2014 Dozent des Kurses „Renewable Energies“ an der Technischen Universität Darmstadt, Deutschland

## AUSGEWÄHLTE VERÖFFENTLICHUNGEN

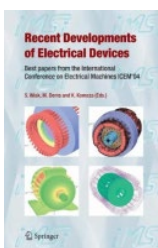
### Bücher und Buchbeiträge



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



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



3. Herausgeber: Wiak, S.; Doms, M.; Komez, K.: **“Recent Development of Electrical Drives- Best papers from the International Conference on Electrical Machines ICEM´04”**, veröffentlicht 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”** von Gail, G.; Tröster, E.; Hartkopf, T.; Höffling, M.

### Diverse Wissenschaftliche Artikel in der Netzpraxis

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) Heft 11.
3. Tröster, E.; Koch, M.; Rothfuchs, H.: **„Verteilnetzstudie Rheinland-Pfalz – Integration von erneuerbaren Energien in die Stromnetze“**, Energiewirtschaftliche Tagesfragen 64. Jg. (2014) Heft 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, März 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.

#### Diverse weitere Berichte seit 2014

1. Teske, S.; Brown, T.; Tröster, E.; Schierhorn, P.-P.; Ackermann, T.: **“Power Grid Report”** Greenpeace Germany, März 2014.
2. Tröster, E.; Untsch, S.; Brown, T.; Geidel, S.; Narasimhan, B.; Schierhorn, P.-P.; Ackermann, T.: **“Kurzgutachten zur Eigenstromerzeugung in Rheinland-Pfalz”**, Darmstadt, März 2014.
3. Ackermann, T.; Martensen, N.; Brown, T.; Untsch, S.; Tröster, E.; Geidel, S.; et al: **„Verteilnetzstudie Rheinland-Pfalz“** Darmstadt, Freiburg, München, Januar 2014.
4. 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.

5. Tröster, E.; Kuwahata, R.; Ackermann, T.: **"European Grid Study 2030/2050"**, Langen, Deutschland, Januar 2011.

### Konferenzbeiträge

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, 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, 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, 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, Irland, Oktober 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, Irland, Oktober 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, Irland, Oktober 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, Brüssel, Belgien, Oktober 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, Brüssel, Belgien, Oktober 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, Oktober 2013.

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

29. Tröster, E., Glotzbach, L., Ackermann, T. (Energynautics, Deutschland); Fürsch, M., Jägemann, C., Nagl, S.; Hagspiel, S.; Lindenberger, D. (EWI, Deutschland): **"The Importance of Grid Expansion in a High Wind Penetration Scenario for Europe until 2050"**, 10th International Workshop on Large-Scale Integration of Wind Power into Power Systems as well as on Transmission Networks for Offshore Wind Power Plants, Aarhus, Dänemark, Oktober 2011.
30. Theologitis, I.-T.; Tröster, E.; Ackermann, T.: **"Aspects of a generic photovoltaic model examined under the German Grid Code for Medium Voltage"**, 1st International Workshop on Integration of Solar Power into Power Systems, Aarhus, Dänemark, Oktober 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"**, 9th 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, Kanada, Oktober 2010.
32. Tröster, E.: **"New German Grid Codes for Connecting PV Systems to the Medium Voltage Power Grid"**; 2nd International Workshop on Concentrating Photovoltaic Power Plants: Optical Design, Production, Grid Connection, Darmstadt, 2009.
33. Ackermann, T.; Lund, P.; Martensen, N.; Tröster, E. and Knazkins, V.: **"Overview of the Danish Cell Project"**; 7th 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"**; 7th 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.