



## PERSONAL INFORMATION

<b>Name</b>	Uhlen, Kjetil
<b>Address</b>	Norwegian University of Science and Technology (NTNU) 7491 TRONDHEIM NORWAY
<b>Telephone</b>	+47 73 59 72 04
<b>Mobile</b>	+47 93 00 88 34
<b>E-mail</b>	Kjetil.Uhlen@ntnu.no
<b>Nationality</b>	Norwegian
<b>Date of birth</b>	04.05.1961

## WORK EXPERIENCE

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|--|---|
| <ul style="list-style-type: none"> <li>• Dates (from – to)</li> <li>• Name and address of employer               <ul style="list-style-type: none"> <li>• Type of business or sector</li> <li>• Occupation or position held</li> </ul> </li> </ul>   | <p>From April 2009 –<br/>NTNU - Norwegian University of Science and Technology<br/>University<br/>Professor in Electrical Power Systems</p>   |
| <ul style="list-style-type: none"> <li>• Dates (from – to)</li> <li>• Name and address of employer               <ul style="list-style-type: none"> <li>• Type of business or sector</li> <li>• Occupation or position held</li> </ul> </li> <li>• Main activities and responsibilities</li> </ul> | <p>2003-2009<br/>SINTEF Energy Research, Trondheim, Norway<br/>Energy systems research<br/>Senior Research Scientist<br/>- team leader<br/>- project leader</p>   |
| <ul style="list-style-type: none"> <li>• Dates (from – to)</li> <li>• Name and address of employer               <ul style="list-style-type: none"> <li>• Type of business or sector</li> <li>• Occupation or position held</li> </ul> </li> <li>• Main activities and responsibilities</li> </ul> | <p>1996-2002<br/>SINTEF Energy Research (formerly EFI), Trondheim, Norway<br/>Energy systems research<br/>Research Scientist<br/>- team leader from 1999<br/>- power system dynamics and security analysis<br/>- wind power integration<br/>- distribution automation</p> |
| <ul style="list-style-type: none"> <li>• Dates (from – to)</li> <li>• Name and address of employer               <ul style="list-style-type: none"> <li>• Type of business or sector</li> <li>• Occupation or position held</li> </ul> </li> <li>• Main activities and responsibilities</li> </ul> | <p>1987-1995<br/>The Norwegian Electric Power Research Institute (EFI), Trondheim, Norway<br/>Energy systems research<br/>Research Scientist<br/>- power system dynamics<br/>- Autonomous wind-diesel power systems<br/>- PhD studies</p>                                 |

## EDUCATION AND TRAINING

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|--|---|
| <ul style="list-style-type: none"> <li>• Dates (from – to)</li> <li>• Name and type of organisation</li> <li>• Principal subjects/occupational skills               <ul style="list-style-type: none"> <li>• Title of qualification awarded</li> </ul> </li> </ul> | <p>1989-1994<br/>The Norwegian Institute of Technology (NTH)<br/>Control and Electrical Engineering<br/>PhD</p> |
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- Dates (from – to)
- Name and type of organisation
- Principal subjects/occupational skills
- Title of qualification awarded

## LANGUAGES

### Mother tongue

### Other languages

- Ability to read and speak
  - Ability to write

## MEMBERSHIP IN PROFESSIONAL SOCIETIES

## COMMITTEES AND TASK FORCES

## THESIS / BOOKS

## SELECTED PUBLICATIONS

## Kjetil Uhlen

### *Curriculum Vitae*

1982-1986

The Norwegian Institute of Technology (NTH)

Control Engineering

MSc

### Norwegian

### English

Excellent

Excellent

### German

Basic

### French

Basic

- IEEE: The Institute of Electrical and Electronics Engineers

- TEKNA: The Norwegian Association of Chartered Engineers

Co-editor of IEEE Transactions on Power Systems.

International Energy Agency (IEA) Implementing Agreement on Electricity Networks Analysis, Research & Development (ENARD). Operating Agent and coordinator of Annex IV:- Transmission Systems (2009-2012).

Norwegian member of CIGRE Study Committee C4, "System technical performance" (2004 - 2012). Convenor of Advisory Group C4.6 "Power system security assessment" (2004 – 2010).

Cigre Working Group WG C4.601: "Power system security assessment". Member of WG (2004 - 2010).

Cigre Task Force TF 38.02.23: "Coordinated Voltage Control in transmission Networks". Member of TF (2000-2004).

Cigre Task Force TF 38.02.16: "Impact on interaction among power system controls". Member of TF (1997-2000).

IEEE PES Power Systems Stability Subcommittee

International Energy Agency (IEA) R&D Wind programme: Member of Task VIII: Study of decentralised applications for wind energy (1987 - 1991).

Uhlen, K. (1994) *Modelling and Robust Control of Autonomous Hybrid Power Systems*. PhD thesis, The Norwegian Institute of Technology (NTH).

Hunter, Elliot. (1994) *Wind-Diesel Systems*. Cambridge University Press, UK. (Co-author).

Skarstein, Uhlen. (1989) "Design Consideration with Respect to Long-Term Diesel Saving in Wind/Diesel Plants". *Journal of Wind Engineering*, Vol. 13, No. 2.

Uhlen, Foss, Gjøsæter. (1994) "Robust control and analysis of a wind-diesel hybrid power plant". *IEEE Transactions on Energy Conversion*, Volume 9, Issue 4, Dec. 1994, Pages: 701 – 708.

Uhlen, Toftevaag. (1996) "Design and Operating Experience of a Second



## SELECTED PUBLICATIONS (cont'd)

### Kjetil Uhlen

#### *Curriculum Vitae*

Generation Wind-Diesel System". *Proc. European Union Wind Energy Conference, EUWEC'96*, Göteborg, Sweden, May 1996.

Uhlen, Petterteig, Kjølle, Holen, Løvås, Meisingset. (1998) "On-line Security Assessment and Control – Probabilistic versus Deterministic Operational Criteria". *Proceedings of the European Conference on Safety and Reliability – ESREL'98*. Trondheim, Norway, June 1998.

Lubozha, Uhlen, Skarstein. (1999) "Stability analysis and stabilizer design of the interconnected power systems of southern Africa". *Proceedings of the 13<sup>th</sup> Power System Computation Conference (PSCC'99)*. Trondheim 1999.

Uhlen, Gjøsæter, Martins, Quintao. (2000) "Application of Small Signal Stability Analysis to the Nordel Power System". *Proceedings of the VII SEPOPE*, May 2000, Curitiba, Brazil.

Quaintance, Uhlen, Julian, Gjerde, Vu, Vormedal. (2000) "Raising energy transfers in corridors constrained by voltage instability – Statnett case". *Proceedings of the IEEE PES 2000 Summer Meeting*. Seattle, USA, July, 2000.

Uhlen, Kjølle, Løvås, Breidablik. (2000) "A Probabilistic Security Criterion for Determination of Power Transfer Limits in a Deregulated Environment". 38<sup>th</sup> *Cigre Session 2000*, Paper 38-106, Paris, 2000.

Pålsson, Uhlen. (2000) "Control of an autonomous wind/diesel system incorporating battery energy storage – A comparison of two alternatives". *International Journal of Renewable Energy Engineering*. Vol. 2, No. 2, August 2000.

Tande, Uhlen. (2001) "Wind turbines in weak grids – Constraints and solutions". *Proc. 16th International Conference and Exhibition on Electricity Distribution - CIRED 2001 (IEE Conf. Publ No. 482)*, 18-21 June 2001, Amsterdam, Netherlands, 2001.

Bakken, Uhlen (2001) "Market based AGC with online bidding of regulating reserves". *Proc. IEEE Power Engineering Society 2001 Summer Meeting*, July 15-10, Vancouver, Canada, 2001.

Uhlen, Pålsson, Time, Kirkeluten, Gjerde. (2002) "Raising stability limits in the Nordic power transmission system". *Proceedings of the 14<sup>th</sup> Power System Computation Conference (PSCC'02)*. Sevilla, Spain, 24-28 June 2002.

Pålsson, Toftevaag, Uhlen, Tande. (2002) "Large scale wind power integration and voltage stability limits in regional networks". *Proc. IEEE Power Engineering Society 2000 Summer Meeting*. 21-25 July, Chicago, USA, 2002.

Nordgård, Uhlen, Bakken, Løvås, Breidablik. (2002) "Implementation of a probabilistic security assessment tool for determination of power transfer limits". 39<sup>th</sup> *Cigre Session 2002*, Paper 39-305, Paris, 2002.

Uhlen, Elenius, Norheim, Jyrinsalo, Elovaara, Lakervi. (2003) "Application of linear analysis for stability improvements in the Nordic power transmission system". *Proc. IEEE Power Engineering Society 2003 General Meeting*, Toronto, July 2003.

Pålsson, Toftevaag, Uhlen, Tande. (2003) "Control Concepts to Enable Increased Wind Power Penetration". *Proc. IEEE Power Engineering Society 2003 General Meeting*, Toronto, July 2003.

Tande, Uhlen. (2004) "Cost analysis case study of grid integration of larger wind farms". *Journal of Wind Engineering*. Vol. 28, No. 3, 2004, Pages: 265-273.



## SELECTED PUBLICATIONS (cont'd)

### Kjetil Uhlen

#### *Curriculum Vitae*

Uhlen, Warland, Gjerde, Vu, Kirkeluten. (2004) "Concepts for intelligent monitoring and control of power grids by use of new measurement technologies" Paper B5-109, *Cigre 2004 Session*, Paris 2004.

Warland, Holen, Solem, Uhlen, Gimmestad. (2004) "Decision support for network operation in an open power market". *International Conference on Probabilistic Methods Applied to Power Systems, PMAPS 2004*, 12-16 Sept. 2004 Pages: 236-241.

Leirbukt, Albert, Uhlen, Kjetil, Palsson, Magni T., Gjerde, Jan Ove, Vu, Khoi, and Kirkeluten, Øystein. (2004) "Voltage Monitoring and Control for Enhanced Utilization of Power Grids", *Proc. IEEE Power System Conference & Exhibition, PSCE*, New York, NY, October 10-13, 2004.

Uhlen, Grande, Warland, Solem, Norheim. (2004) "Alternative Model for Area Price Determination in a Deregulated Power System", *Proc. 2004 IEEE PES Power System Conference & Exposition, PSCE* (Panel paper), New York, NY, October 10-13, 2004.

Hagstrøm, Norheim, Uhlen. (2005) "Large-scale wind power integration in Norway and impact on damping in the Nordic grid". *Wind Energy Journal*, Vol.8, no. 3, 2005, Pages: 375-384.

Meisingset, Ohnstad, Uhlen, Strand. (2005) "Field tests and modelling of a wind farm with doubly fed induction generators". *Wind Energy Journal*, Vol. 8, No. 3, 2005, Pages: 333-344.

Elenius, Uhlen, Lakervi. (2005) "Effects of controlled shunt and series compensation on damping in the Nordel system". Paper TPWRS-00147-2005.R1, *IEEE trans. Power Systems*, Vol. 20, No. 4, November 2005.

Uhlen, Warland, Grande. (2005) "Model for Area Price Determination and Congestion Management in Joint Power Markets". *2<sup>nd</sup> CIGRE/IEEE PES Symposium on Congestion Management in a Market Environment*. San Antonio, Texas, USA, 5-7 October 2005.

Leirbukt, Gjerde, Korba, Uhlen, Vormedal, Warland. (2006) "Wide Area Monitoring Experiences in Norway". *Power Systems Conference and Exposition, 2006. PSCE '06*. 2006 IEEE PES, Oct. 29 - Nov. 1 2006 Pages: 353 - 360

Doorman, Uhlen, Kjølle, Huse. (2006) "Vulnerability analysis of the Nordic power system". Paper TPWRS.2005.857849, *IEEE Transactions on Power Systems*, Volume 21, Issue 1, Feb. 2006, Pages: 402 – 410.

Korba, Scholtz, Leribukt, Uhlen. (2007) "Combining forces to provide stability : Statnett, SINTEF and ABB act together to tame the large Norwegian electric grid". *ABB Review*, No. 3, 2007, pages: 34-38

Sørensen, Norheim, Meibom, Uhlen. (2007) "Simulations of wind power integration with complementary power system planning tools". *Electric Power System Research*, doi:10.1016/j.epsr.2007.08.008

Uhlen, Warland, Gjerde, Breidablik, Uusitalo, Leirbukt, Korba. (2008) "Monitoring Amplitude, Frequency and Damping of Power System Oscillations with PMU Measurements". *Proc. IEEE Power Engineering Society 2008 General Meeting*, Pittsburgh, July 2008 (panel paper).

Korba, P.; Uhlen, K. (2010) "Wide-area monitoring of electromechanical oscillations in the nordic power system: practical experience". *IET Journal on Generation, Transmission & Distribution*, Volume: 4, Issue: 10, 2010, Page(s): 1116 – 1126.

Haileselassie, T.M.; Uhlen, K. (2010) "Primary frequency control of remote

**Kjetil Uhlen***Curriculum Vitae*

grids connected by multi-terminal HVDC". Proceedings of the IEEE Power and Energy Society General Meeting, 2010.

Haileselassie, T.M.; Uhlen, K. (2012) "Impact of DC Line Voltage Drops on Power Flow of MTDC Using Droop Control". IEEE Transactions on Power Systems, Volume: 27 , Issue: 3, 2012 , Page(s): 1441 - 1449

Kalcon, G. O.; Adam, G. P.; Anaya-Lara, O.; Lo, S.; Uhlen, K. (2012) "Small-Signal Stability Analysis of Multi-Terminal VSC-Based DC Transmission Systems". IEEE Transactions on Power Systems, 2012

**SELECTED PROJECTS****1996-2000****Operational Security Assessment – Planning and Control**

Role: Project Participant and Project Leader

Client: Research program financed by Statnett SF and the Research Council of Norway.

**2001-2006****Increased Utilisation of the Nordic Power Transmission System**

Role: Project Leader and Coordinator

Client: Research program financed by the Research Council of Norway and the Nordic Transmission System Operators.

**2004****Vulnerability Study of the Nordic Power System**

A comprehensive analysis of the vulnerability of the Nordic Power System. The objectives of the analysis are to identify the vulnerability of the Nordic power system, identify barriers to reduce vulnerability in a Nordic context and to propose possible actions. The study focuses on vulnerability with respect to energy shortage, capacity shortage and power system failures.

Role: Project Participant

Client: Nordic Council of Ministers

**2009 - 2012****IEA Enard Annex IV "Transmission Systems"**

Role: Operating Agent

Client: IEA Implementing Agreement on Electricity Networks Analysis, Research and Development (Enard).

**2009 –****NOWITECH - Norwegian Research Centre for Offshore Wind Technology**

Role: Work package leader and member of centre management

Client: Research Centre financed by the Research Council of Norway together with Norwegian and Danish wind industry and power companies.

**2011-****STRONG<sup>2</sup>rid – Smart Transmission Grid Operation and Control**

Role: Project coordinator

Client: Nordic research project financed by Nordic Energy Research and the Nordic TSOs. With participation from the Nordic Universities (Aalto, DTU, KTH, Univ. of Iceland and NTNU) and the Nordic TSOs (Statnett, Svenska Kraftnät, Fingrid and Landsnet).