Brian Vad Mathiesen
Email : bvm@plan.aau.dk
Work: 9940 7218
Mobile phone : 2944 0877

Curriculum Vitae

Brian Vad Mathiesen, Associate Professor, M. Sc. Eng, PhD, Research Coordinator Sustainable Cities, Deputy Head of 4DH Centre, Aalborg University, A.C. Meyers Vænge 15, DK-2450 Copenhagen SV

Research interests	I am affiliated to the Sustainable Cities and the Sustainable Energy Planning Research Groups, and The Danish Centre for Environmental Assessment at the Department of Development and Planning My main research interest is concentrated on energy system analyses of 100% renewable energy systems, analyses of the transition towards such systems and large-scale integration of intermittent renewable energy sources e.g. wind power. My research covers technical energy system analyses, feasibility studies as well as public regulation and technological change.
Research & management activities	**From January 2012: 4DH** – Deputy Head of Center in the Strategic Research Centre for 4th Generation District Heating Technologies and Systems. The Centre provides a platform for the interdisciplinary approach to the development of 4DH Technologies and Systems which is fundamental to the implementation of the Danish objective of being fossil fuel-free by 2050 as well as the European 2020 goals, i.e. the design of future district heating network technologies: the development of components and concepts; planning and management tools based on GIS; and tools for decision-making support of the involvement of production units in electricity markets. The Centre involves eight universities and 19 private partners and is financed by The Danish Council for Strategic Research. **From June 2011: Development of SOEC cells and stacks** – The focus is on developing solid oxide electrolysis cells (SOECs) cells and stack components and to analyse this in future energy systems. The technical and socio-economic effects of various SOEC application scenarios on future renewable energy systems and analysed, ideal locations are identified and the competitive strengths and possible weaknesses of SOEC technology in comparison with other competing technologies is evaluated. Collaboration with DTU-Risø and Topsoe Fuel cells Financed by the ForskEL-programme. **From June 2011: PV-Boost 2015** – The purpose of the project is to demonstrate PV in different building contexts and the research is focused on international experiences in public regulation for Photo Voltaic. Financed by the ForskVE-programme. **From June 2011: Limerick Clare Energy Plan** – The project is a short term 2020 renewable energy strategy for two counties in Ireland giving a 20% reduction in CO2-emissions, while ensuring that short-term actions are beneficial to the long-term goal of 100% renewable energy. In the research, the focus is on developing new methodologies for regional energy plans and to investigate the relation between cities and rural areas. Financed by the Limerick Clare Energy Agency. **From February 2011: JoRIEW** – The project is focused on improving the Jordanian research in integrated renewable energy and water supply. The project objective is creating research collaborations, exchanges and new networks, focusing on research on system integration, integrated energy and water planning, development of water supply systems that can be powered by intermittent renewable energy. Financed by EU FP7. **From January 2011: Research Centre on Zero Energy Buildings (ZEB)** – Analysis of renewable energy systems in relation to improving building proformance e.g. net zero emission buildings and 100% renewable energy systems. The purpose of ZEB is to develop integrated, intelligent technologies for buildings, which ensures significant energy savings and optimal use of renewable energy. Financed by the Danish Council for Strategic Research. **From January 2011: Energi Øresund** – Key challenges for a transformation of the Øresund region is analysed and students are involved in partner projects. The central challenges for integration more renewable energy are storage technologies, sector integration, energy sav-

Curriculum Vitae

ings and the key challenges in the implementation of such measures. Financed by EU Interreg.

From November 2010: Energy Vision for Ballerup Municipality – The research focuses on developing local energy strategies for 100% renewable energy in Ballerup Municipality from a technical and socio-economic perspective as well as new methodologies. In the project the national objective of 100% renewable energy was investigated in a local system with no/very few local renewable energy resources available. Financed by Ballerup Municipality and Vestforbrænding.

From January 2007: CEESA – Work package leader of a group analysing 100% renewable energy in transport and mapping biomass resources in the Coherent Energy and Environmental System Analyses project. Responsible for the overall technical and socio-economic analyses for the energy systems in the project. The purpose of the research is to reveal the potential and challenges in and towards 100% renewable energy systems. The project involves five Danish universities among others and is financed by The Danish Council for Strategic Research.

February – May 2012: Heat Roadmap Europe 2050 : First pre-study for EU27 – The research objective was to identify future options for in EU27 based on local knowledge from geographical information systems. This knowledge was combined with energy systems analyses to reveal the effects on the primary energy demands, CO2-emissions, as well as the socio-economic consequences and job creation.

January 2011 – January 2012: TopWaste – Work package leader of a group creating an innovative easy to use waste management model based on LCA data – in current fossil energy systems and in future 100% renewable energy systems. The research objective is to contribute to improved use of waste for energy or material recycling integrating economic and environmental considerations including resource scarcity. Financed by the Danish Council for Strategic Research.

January 2010 – September 2010: Energy Vision for Aalborg Municipality 2050 – The research focused on developing local energy strategies for 100% renewable energy in Aalborg using local resources. In the project the national objective of 100% renewable energy was investigated on the local level, e.g. analysing local biomass and renewable energy resources as well as socio-economic costs. Financed by Aalborg Municipality.

May – August 2010: Heat Plan Denmark 2010 (Varmeplan Danmark 2010) – The project proposes an action plan which can help realise the recommendations in Heat Plan Denmark 2008. In this project, the aim is also to analyse the role of different heating technologies in 100% renewable energy systems where biomass is a scarce resource and analyse whether district heating is a good technology in this perspective.

October 2009 – May 2010: ROSES – The main objective of the project was to analyse the Croatian energy system with the aim of being independent from energy imports. Special attention was given to the mix of renewable energy sources and role of different energy storages (pumped hydro, hydrogen production and storage, compressed air energy storage, batteries, etc). Another important objective of the project was technology transfer, development of energy system analysis models and analyses of the Croatian energy system as well as education of Master and PhD students. In this project, I was a visiting researcher at the Department of Energy, Power Engineering and Environment at the University of Zagreb and located in Zagreb during October 2009 and May 2010.

September – December 2009: Product Category Rules (PCR) – The objective of the project was to establish two PCR's. One for heat and one for electricity delivered in Denmark for the use in environmental product declarations and development of new products based on life cycle assessments. The project was supported by the Danish Environmental Protection Agency (EPA).

December 2008 – May 2009: IDA Climate Plan 2050 (IDAs Klimaplan 2050) –

Curriculum Vitae

Coordinator of technical and socio-economic analyses. In the project, a detailed road map towards 100% renewable energy was developed, and the technical and socio-economic consequences were analysed. The aim was to show concrete technologies in the electricity, heat and transport sectors, both renewable energy sources and savings in end demand as well as concrete means to introduce these. The overall goal is to limit the temperature rise to 2 degrees, based on recommendations from the IPCC. Also the aim is to maintain Danish self-sufficiency and to expand industries and businesses within energy technology. The project was part of the international project "Future Climate", in which engineering associations worldwide cooperated in making suggestions as an input to the United Nations summit, COP 15, in Copenhagen.

February – October 2008: Heat Plan Denmark 2008 (Varmeplan Danmark) – In this project, the future heating options were analysed in the light of the current status and the future goal of 100% renewable energy. The project analysed the role of individual heating technologies as well as district heating technologies in both the short and the long term.

September 2005 – December 2008: Efficient conversion of renewable energy sources with electrolyses and fuel cells – My PhD dissertation was part of the research programme: Efficient conversion of renewable energy with solid oxide cells. The programme was a collaboration between six Danish universities and contained a total of eight sub-projects. In my project I was mainly concerned with:

- Future energy systems. Technical and economic energy system analyses of conventional and renewable energy systems.
- Utilisation of energy system analyses for uncovering the potential to integrate more renewable energy while maintaining fuel efficiency
- Analyses of technologies such as combined heat and power (CHP), fuel cells, electrolysers, electric boilers, heat pumps, hydrogen fuel cell and battery electric vehicles, wood and gas boilers, flexible electricity demand etc.
- Socio-economic analyses of technologies of national or regional energy systems.
- Methodology and uncertainties in life cycle assessments

During the project, I was a visiting researcher at Risø in the fall of 2006. The dissertation was completed on September 15th, 2008 and was successfully defended on December 11th, 2008 at Aalborg University. The project was partially funded by the Danish Research Agency's programme for strategic funding within sustainable energy administered by the Danish Technical Research Council (STVF).

June 2008 – June 2009, CanDan 1.5 – Analysis of integration of renewable energy, socio-economy and CO_2 emissions from hydrogen fuel cell vehicles, as well as different charging strategies for hybrid hydrogen fuel cell vehicles and battery electric vehicles. Conventional vehicles with internal combustion engines and biofuels were included for comparison. The project was partially financed by the Danish TSO (Transmission System Operator), Energinet.dk.

June 2005 – July 2007, DESIRE – This project dealt with the integration of wind power and CHP in the European electricity grid. The purpose was to develop and test distributed CHP plants' ability and potential to integrate wind power in different European countries. I contributed to the project by identifying the role of fuel cells in this context. The project was partially financed by the European Union.

August – December 2006, IDAs Energy Plan 2030 – Using the skills of different professionals, the Danish Society of Engineers (IDA) focused on energy in 2006. The main goals were to halve emissions of CO_2, to quadruple export of energy technology and to double the amount of jobs in the sector. I participated in conducting the background calculations of such a plan as well as in the process of gathering relevant inputs to such calculations. I participated in conducting the overall technical and economic analyses as well as the sub-

Curriculum Vitae

	analysis for the background report of the IDA Energy Plan 2030. The report also contained a quantification of export potentials and a 100% renewable energy scenario for e.g. 2050. In May 2008, an up-date of the plan with new prices was conducted. **2002 - 2003 Alternatives for the disposal of food waste from large-scale catering establishments** – In this project, a life cycle assessment of food waste from large-scale catering establishments was conducted. Future possibilities for the handling of the waste were identified and the environmental, resource and energy flows were analysed. The three possibilities analysed were composting, biogasification and incineration. The project was conducted for the Danish Environmental Protection Agency (EPA).
Other academic activities	**From February 2012** (Ongoing) – Member of the Management Board of the International Centre for Sustainable Development of Energy, Water and Environment (SDEWES Centre) organisors of annual conferences **From July 2012** (Ongoing) – Guest Editor for a Special Issue for Elsevier international journal *Energy* **From June 2010** (Ongoing) – Member of the Scientific Advisory Board of SDEWES **September 2011 – August 2012** – Executive Guest Editor for a Special Issue for Elsevier international journal *Energy* **September 2011 – August 2012** – Guest Editor for a Special Issue for Applied Energy **From April 2010 – January 2012** – Advisor at The Danish Board of Technology (Teknologirådet) (technical advisory board for the Danish parliament). Technical advisor on the project "Sustainable transport scenarios, 100% renewable energy for transport systems".
Administrative & strategic activities	**From May 2010** (Ongoing) – Head of Program, Development of MSc in Sustainable Cities **From April 2010** (Ongoing) – Aalborg University's professional representative in the project and partnership network Gate 21 for companies and public authorities in the greater Copenhagen area. **From January 2010** (Ongoing) – Member of the Study Board for Planning and Geography **From August 2009 – July 2011** – Member of the Recruitment Committee at Aalborg University Copenhagen. **From September 2005 – July 2011**– Member of the marketing committee for the bachelor and MSc programmes at the Department of Development and Planning.
Education	**From October 2009** (ongoing) - Teacher Training course for Assistant professors 2009-2011 (Adjunktpædagogikum), Aalborg University **2011 ECIU Leadership Development Programme** – Completion of the international personal leadership and strategic management development programme of the European Consortium of Innovative Universities. **2005 – 2008** – PhD, Fuel cells and electrolysers in future energy systems, Aalborg University **October 2005 – October 2007 – PhD courses** - Energy System analyses, The International Doctoral School of Technology and Science, Aalborg University - Theories of Science, The International Doctoral School of Technology and Science, Aalborg University - Energy System Analyses of large-scale integration of Wind Power, The International Doctoral School of Technology and Science, Aalborg University - Institutions and Public regulation – Options for Planning and Managing Technological

Curriculum Vitae

Innovation, The International Doctoral School of Technology and Science, Aalborg University

- VTU Summer School 2008 on Solid Oxide Cells, The PhD programme Efficient Conversion of Renewable Energy using Solid Oxide Cells.
- Life Cycle Assessment and cost-benefit analysis – Bridging environmental and economic assessments for decision support, The LCA-Team at Aalborg University and The International Doctoral School of Technology and Science, Aalborg University.
- Advanced Energy System Analysis on the EnergyPLAN model
- HyFC graduate school – Summer School 2007- Hydrogen in a Renewable Energy System

1998 – 2003 Aalborg University, M.Sc. in Environmental Management.
Specialised in developing differentiated electricity products in the light of the re-regulated energy markets focusing on calculations of possible products as well as in the implementation of such schemes.

Professional experience

From December 2010, Aalborg University
– Associate Professor in energy planning. Department of Development and Planning, Sustainable Energy Planning research group.

September 2008 – November 2010, Aalborg University
– Assistant Professor in energy planning. Department of Development and Planning, Sustainable Energy Planning research group.

October 2009 – May 2010, University of Zagreb
- Visiting researcher at the Department of Energy, Power Engineering and Environment at the University of Zagreb and located in Zagreb during October 2009 and may 2010.

September 2005 – August 2008, Aalborg University
– PhD Fellow in energy system analyses and electrolysers and fuel cells. Department of Development and Planning, Sustainable Energy Planning research group.

October – December 2006, Risø National Laboratory for Sustainable Energy
– Visiting researcher at the Systems Analysis Department.

June 2004 – August 2005, Public Utility Company Aalborg
– Energy and environmental planner and analyst focusing on energy and waste management.

October 2004 – June 2005, Aalborg University
– Research and Teaching Assistant, Department of Development and Planning.

January – May 2004, Sønderjylland County
– Planner

October 2000 – May 2003, Aalborg University
–Student counsellor at the central administration office.

August – December 2002, NIRAS Consulting Engineers and Planners a/s
– Internship working on a report about utilisation of organic waste for the Danish EPA.

Teaching experience

Master and Bachelor levels:

Since October 2004 I have had teaching experience within environmental and energy related issues and problems, energy system analyses from national to plant level, as well as scenario building and methodology. In addition, I have been the supervisor of about 30 groups of students, both as main and co-supervisor. I have also been co-supervisor coordinator.

My teaching activities have mainly been on the Master programme Sustainable Energy Planning and Management, the Master in International Technology Management, the Master of Technical Environmental Assessment, as well as on the bachelors level in Urban, Energy and Environmental Planning, Industry and Global Business development at AAU and Sustainable

Brian Vad Mathiesen
Email : bvm@plan.aau.dk
Work: 9940 7218
Mobile phone : 2944 0877

Curriculum Vitae

Energy Technology at Copenhagen University College of Engineering (IHK, Ingeniørhøjskolen i København). In addition I have taught courses in renewable energy and energy system analyses at summer schools at Aalborg University and in Croatia as well as been opponent on a Master thesis at Lund University.

PhD students:

January 2009 - June 2011 (finished) – co-supervisor for Karl Sperling on the thesis "Strategic Municipal Energy Planning in Denmark", at Aalborg University, co-funded by the Utility Company of Frederikshavn.

November 2008 – March 2011 (finished) - co-supervisor for David Connelly on the thesis "The integration of fluctuating renewable energy using energy storage", at the University of Limerick, Ireland co-funded by the Irish Research Council for Science, Engineering, and Technology.

PhD level teaching:

In 2010 I was a lecturer at the PhD course Climate Science and climate policy at Roskilde University.

In 2009, 2010 and 2011 I was co-organiser and lecturer at the PhD course "Advanced Energy System Analysis on the EnergyPLAN model" at Aalborg University.

In October 2008 I was a lecturer at the PhD course "Bridging environmental and economic assessments for decision support" at Aalborg University.

In 2007 I was the co-organiser of the PhD course "Energy System Analyses of large-scale integration of Wind Power" at Aalborg University.

In 2006 I was the co-organiser of the PhD course "Institutions and Public regulation" at Aalborg University.

Reviewer experience	ENERGY, The international journal, Renewable Energy, Applied Energy, Ecological Indicators, Journal of Cleaner production, International Journal of Hydrogen Energy, Energy Policy, Thermal Science
Publications (Summary)	19 papers in refereed international journals 19 papers and presentations in international proceedings 24 reports, books, book chapters etc. 9 popular articles and essays