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Curriculum Vitae  
**Dr. Klaus Illum**

## **EDUCATIONAL BACKGROUND**

M.Sc., civil engineering, The Technical University of Denmark, 1962.  
Ph.D., Energy Systems and Energy Planning, Aalborg University, 1981.

## **LANGUAGES**

English (fluent)  
German

## **POSITIONS HELD**

1962-63: Lecturer in mathematics and computer science at the Danish Academy of Engineering, Copenhagen.  
1964-65: Staff engineer at the Hanstholm Harbour construction project.  
1966-74: Lecturer in mathematics and computer science at the Danish Academy of Engineering, Aalborg.  
1975-2000: Associate professor (from 1989: Senior associate professor, Docent) in sectoral planning: energy systems and ecology, at the Department of Development and Planning, Aalborg University. Retired February 2000.  
2000- : Consultant.  
*ECO Consult: Systems Analysis. Energy, Ecology, Economy*

## **HONOURS**

The Statoil Reward 1987. For the development of the design and analysis of Local Cogeneration Utility Systems (LOCUS-systems).

The EUROSOLAR Reward (Denmark) 2000 for the development and application of the Sustainable Energy Systems Analysis Model (SESAM).

## **PROFESSIONAL EXPERIENCE AND INTERESTS**

From 1962-63 and 1966-74 mainly occupied with the development of educational programs in computer science alongside with studies in systems theory and cybernetics.

As associate professor at the Department of Development and Planning mainly engaged in the development of methods and computer models for the technological, environmental and economic analysis of alternative scenarios for the development of energy systems and agricultural production systems.

Since 1984 also engaged in studies of environmental policies and problems in Central and Eastern European countries. Since 1990 in particular engaged in energy planning in Czechoslovakia. Programme manager for the Nordic Training Programme for Energy Experts in the Baltic States, the PROCEED programme 1997-98.

Has developed comprehensive computer models for:

- numerical analysis of thermodynamic systems (power plants, cogeneration plants, integrated industrial processes etc.)
- energy planning on the national, the regional and the local energy system level
- technological-socioeconomic energy systems analysis
- economic assessment of alternative energy system projects
- flow analysis (nutrients and energy) and economic analysis of agricultural systems.

Has developed the SESAM model (The Sustainable Energy Systems Analysis Model), an advanced, general computer model for the analysis of scenarios for the future development of national, regional or local energy systems. The SESAM model has been used and is presently being used for the integrated technological, environmental, and economic analysis of present and possible future energy systems infrastructures in Denmark, the Czech Republic, Poland, and Germany.

Has been engaged as a consultant for Danish regional energy planning authorities in a number of projects.

Has been responsible for several publicly financed projects.

## PROJECT ACTIVITIES

- 1981-82: project manager for the project **"Energy and Employment in North Jutland"**. Financed by the Danish Ministry of Education and the Ministry of Labour.
- 1982-83: development of the computer model for the **"Alternative Energy Plan for Denmark"**
- 1983-84: project manager for the project **"The Ecology of Agriculture and Energy from Biomass"**. Financed by the Danish Ministry of the Environment.
- 1985-87: project manager for the project **"Regional Energy Planning for Bornholm County"**. Financed by the Danish Technological Council.
- 1984-89: participant in the (East&West-) European cooperation project **"Environmental Policies in Europe"**, the ECO-project, under the auspices of The Vienna Centre for Research and Documentation in Social Sciences.
- 1989-90: project manager for the project **"Renewable Energy Systems for Storstrøm County"**. Financed by the Danish Technological Council.
- 1990-92: project manager for the project **"Sustainable Energy Systems in North Jutland County"**. Financed by the Danish Energy Agency.
- 1993-94: project manager for the project **"Modelling of Ecological Agricultural Systems"**. Financed by the Danish Ministry of Agriculture.
- 1992-93: project manager for the project **"Pollution Abatement by the Efficient Use of Renewable and Other Energy Sources in Eastern Bohemia, the Czech Republic"**. Financed by the Danish Government.
- 1994-99: consultant for the project **"Initiation, Planning and Implementation of Efficient Energy Systems in the Hradec Králové and Pardubice Districts, Eastern Bohemia, the Czech Republic"**. Financed by the Danish Government.
- 1995-96: project manager for the project **"Solar energy in Danish Energy Systems"**. Financed by the Danish Energy Agency
- 1995-96: consultant for **the ESA project for the establishing of a European network for cooperation in energy systems analysis** for the development of sustainable energy systems. Financed by the EU ALTENER programme
- 1996-98: project manager for **the REVEILLE project comprising the setting up of a SESAM energy systems analysis model for the whole of Denmark** for the purpose of analyzing long-term scenarios for development of the Danish energy system.  
REVEILLE: Regulering af Energisystemer med VE I Landsdække og Lokale Energisystemer.  
Financed by the Danish Energy Agency

- 1997-98: programme manager for the **PROCEED programme, PROgramme for Cooperation in Energy-efficient Economic Development**, a training programme for energy experts in Lithuania, Latvia, and Estonia.  
Financed by the Nordic Council of Ministers
- 2000-02: consultant to the Technical University of Denmark on the accomplishing of **the EU JOINT project (Joint Implementation)**
- 2003-04: consultant to The Danish Board of Tehnology and The Society of Danish Enigneers (IDA) on the organization of the international conference **Oil Demand, Production and costs** (December 2003) and as the author of the report *Oil-based Technology and Economy - Prospects for the Future* (2004).

#### **PUBLICATIONS RELATED TO ENERGY/ENVIRONMENT RESEARCH**

- [1] *Kraftvarmesystemer - et analytisk bidrag til den politiske energiteknologi*. Licentiat-afhandling. Aalborg Universitetsforlag, 1981. (Cogeneration Systems. Ph.d. dissertation)
- [2] *Termodynamiske maskiner - numerisk analyse*. Institut for Samfundsudvikling og Planlægning, 1981. Dokumentation af den termodynamiske systemanalyse metode, jeg udviklede til brug for de i [1] beskrevne analyser af kraftværker, kraftvarmeværker og industrielle processer. (Numerical Analysis of Thermodynamic Processes).
- [3] *Integrated Multi-task Energy Systems*. Conference paper: Beyond the Energy Crisis: Third Int. Conference on Energy Use Management, Berlin 1981. Proceedings, vol.II.
- [4] *Energi, Organisation og Samfund*.  
Artikel i AUC's årsberetning 1980-82.  
(Energy, Organization and Society).
- [5] *To veje i dansk kraft- og varmeplanlægning*.  
Artikel i tidsskriftet *Politica*, Aarhus Universitet, 12. årg. no.1, 1980. Medforfattere: Frede Hvelplund og Niels Teglskov. (Two Options in Danish Power and Heat Supply Planning)
- [6] *Kraft-Wärme-Systeme: Kritik des physikalischen Energiebegriffs in praktischer Absicht*.  
Argument, Sonderband, 1983.  
Oversat af Rolf Czeskleba-Dupont.
- [7] *Energi for Fremtiden - Alternativ Energiplan 83*. Af Frede Hvelplund, Klaus Illum, Johs.Jensen, Niels I.Meyer, Jørgen S. Nørgaard, Bent Sørensen. Borgens Forlag 1983.  
(Energy for the Future - Alternative Energy Plan for Denmark)
- [8] *Konsekvensberegninger af alternative investeringsprogrammer for energisystemer - AE83*.  
Aalborg Universitetsforlag, 1983. (Computations of Consequences of Alternative Investment Programmes. Documentation results presented in [7])
- [9] *Kollektive kraftvarmesystemers økonomi*. Aalborg Universitetsforlag, 1983. (The Economy of Collective Cogeneration Systems)

- [10] *Fra varmeplanlægning til energiplanlægning*. Artikel, Byplan no.4, 1985. (From Heat Supply Planning to Energy Planning)
- [11] *Alternative metoder i dansk landbrug - problemer og systemanalyse*. Aalborg Universitetsforlag, 1987. (Alternative Methods in Danish Agriculture)
- [12] *ØKOERGI - et program for beregning af den stofflige, den energetiske og den økonomiske omsætning i jordbrugssystemer*. Miljøstyrelsen 1983. (A Computer Program for Computations of the Flows of Nutrient, Energy and Money in Agricultural Systems)
- [13] *Økologiske jordbrugsmodeller*.  
Artikel. Ugeskrift for Jordbrug, no. 28/29, 1986.  
(Models for Ecological Agriculture)
- [14] *Town and Country Planning, Denmark*. Article, European Environmental Yearbook, DOCTer International UK, London 1987.
- [15] *Agriculture and Rural Land Use, Denmark*. Artikel, European Environmental Yearbook, DOCTer International UK, London 1987.
- [16] *An Enquiry into the Nature of Our Ecological Problems*. Article in: G.Enyedi et al.(eds.): Environmental Policies in East and West. Taylor Graham, London, 1987.
- [17] *Evolution of Sustainable Energy Systems*, and  
[18] *Towards Sustainable Energy Systems In Denmark ?*  
Contributions to the ECO-seminars on Environmental Policies In Europe (East and West) held at Slettestrand, Denmark 1988, and London, 1989, under the auspices of European Coordination Centre for Research and Documentation in Social Sciences (the Vienna Centre).
- [19] *Lokale kraftvarmesystemer med vedvarende energi*. AUC, 1987. Heri matematiske definitioner af LOCUS-systemet (LOCAL Cogeneration Utility System).
- [20] *LOCUS-systems and Plants*. Article in: Advanced District Heating Catalogue. International Energy Agency, 1989.
- [21] *Lokale energisystemer i Aakirkeby Kommune*. Projektrapport, 1987. (Local Energy Systems in the Municipality of Aakirkeby, Bornholm, Denmark)
- [22] *Energianlægget i V.Hjermitslev*. Tekniske rapporter om rekonstruktion af biogas-kraftvarmeværket, 1988.  
(The Energy Plant in V.Hjermitslev, Denmark. Technical reports on the reconstruction of the biogas plant)
- [23] *Energy Planning in Hungary*. A review for the World Bank of a study made by the Ministry of Industry, Budapest. March 1990.
- [24] *Energy and Environment in Czechoslovakia - A Preliminary Assessment of the Problems and Prospects from a Danish Perspective*. Proceedings of the conference on "Energy and Environment in Central and Eastern Europe", EUREG, Usti na Laben, 28 - 30 November 1990.

- [25] *SESAM - Denmark. The Sustainable Energy Systems Analysis Model.*  
J. Fenham et al.(eds.): Environmental Models: Emissions and Consequences. Risø International Conference on Developments in Environmental Modelling. 22-25 May 1989.
- [26] *Vedvarende energikilder i energisystemet.* Systemanalyse. Juni 1990. Medforfattere: Henrik Lund, Henning Mæng.  
(Renewable Energy Sources in the Energy System)
- [27] *Bæredygtige energisystemer - Problemstillinger og modeldannelse.*  
Sesam-skriftserie nr. 1, Aalborg Universitetsforlag, Januar 1991.  
(Sustainable Energy Systems - General Problems and Model Formulation)
- [28] *Bæredygtige energisystemer - Et studie i Storstrøms Amt.*  
Sesam-skriftserie nr. 2, Aalborg Universitetsforlag, Februar 1991.  
(Sustainable Energy Systems - A Case study for Storstrøm County)
- [29] *Brundtland-planlægning for Nordjyllands Amt. Energi, Miljø, Økonomi.*  
Fire scenarier for energisystemets udvikling 1991-2020 med særligt henblik på ELSAM's udvidelsesplaner. Medforfatter: Henning Mæng.  
Sammenfattende del-rapport fra projektet "Brundtland-planlægning for Nordjyllands amt.  
Februar 1992.  
(Brundtland Planning for the County of North Jutland. Energy, Environment, and Economy)
- [30] *The SESAM-model.*  
Conference paper. 2nd Int. Conference on Energy Consulting. Graz, Austria, September 25-27 1991.
- [31] *Bæredygtige energisystemer - Brundtland-planlægning for Nordjyllands amt.* Sesam-skriftserie nr. 3. Aalborg Universitetsforlag 1992.  
(Sustainable Energy Systems - Brundtland Planning for the County of North Jutland. Two volumes)
- [32] *Regional Energy Planning in the Hradec Králove and Pardubice regions, Eastern Bohemia, the Czech Republic.*(Four volumes). Aalborg University Press, 1994.
- [33] *Regional Energy Planning. Least-cost Integrated Resource Planning under Environmental Constraints by Means of the SESAM model.* Conference paper, 1994. (Energi-modeller, Chalmers Technical University, Sweden. 1994)
- [34] *Regionale Energieplanung - "Least-cost"-integrierte Ressourcenplanung unter Umweltzwängen unter Anwendung des SESAM-Modells.*  
(German translation of [33]).
- [35] *SESAM - The Sustainable Energy Systems Analysis Model.*  
Aalborg University Press, 1995 (220 pages)
- [36] *A Professional Platform for Cooperation in Energy Planning.*  
Proceedings of the ECEEE-conference, Mandelieu, France, 1995

- [37] *Energy Systems Analysis - a General Information Systems Approach to Environmental and Economic Cost&Benefit Assessment*.  
Report from the EU-ESA project. August 1997
- [38] *Energipolitikens teknologiske Råderum - Nedtrapning af CO<sub>2</sub>-emissionen*. 1998.  
Technological Options for Danish Energy Policy. Report from the REVEILLE project 1996-98, financed by the Danish Energy Agency. Medforfatter: Bernd Möller.  
A comprehensive, detailed analysis of a wide spectrum of scenarios for the future development of the Danish energy system, carried out by means of the SESAM model. The Department of Development and Planning, Aalborg University, Denmark.
- [39] *Towards Sustainable Energy Systems in Europe. Regional Energy Planning in Eastern Bohemia, Czech Republic. September, 1999*.  
A comprehensive analysis of technological, environmental, and economic opportunities for the development of the energy systems in the region. Financed by the Danish Ministry of Environment. Distributed by CityPlan, Prague, and PlanEnergi, Skoerping, Denmark.
- [40] *Bæredygtig Samfundsudvikling - en humanistisk teknologiudvikling*.  
Essay i 'Dansk Naturpolitik - i bæredygtighedens perspektiv', Naturrådet, Temarapport nr. 2 2000.
- [41] *The Kyoto Protocol and Joint Implementation. National Baselines and Additional Emission Reductions. Methodology and a Case Study*. Report from the EU JOINT project. August 2001.
- [43] *Oil-based Technology and Economy - Prospects for the Future*. An analysis prepared for The Danish Board of Technology and the Society of Danish Engineers. April 2004.
- [44] *I Drivhuset - Fortællinger om naturens energi og samfundets energikrise*. En populær fremstilling. 147 sider. Udgivet af Fagligt Fællesforbund (3F) 2006.
- [45] *A Viable Energy Strategy for the Nordic Countries 2006 - 2030*. Greenpeace Nordic 2006.
- [46] *A SESAM Model of the Nordic Energy System. Methodology and the modelling of the Nordic energy system*. 2006.
- [47] *Nedtrapning af CO<sub>2</sub>-udslippet*. Et målrettet scenarie. Greenpeace 2008.
- [48] *Om-tanke. Ved vendepunktet ved vækstens grænser*. Forlaget BIOS, 2009.
- [49] *En grøn energiøkonomi. Virkemidler: Incitamentter til at gøre det nødvendige*. Greenpeace, 2009.
- [50] *Klima og Energi. Ombygningen af energisystemet*. Problemstilling og fremgangsmåde. Greenpeace, 2010.