



AALBORG UNIVERSITY
DENMARK

Doctoral School of the Technical Faculty of IT and Design, Aalborg University

PhD course 2019:

Advanced Energy Systems Analysis on the EnergyPLAN model

Again in May 2019, we have the annual EnergyPLAN PhD course at Aalborg University, Denmark. The course has been conducted every year since 2005. The course gives an introduction to advanced energy system analysis using the EnergyPLAN computer tool and model. The course will take place in May 2019. Registration is open at <https://phd.moodle.aau.dk/course/view.php?id=1202>. To register, create a profile at <https://phd.moodle.aau.dk> and search for the course title "Advanced Energy System Analysis on the EnergyPLAN model (2019)". Deadline for registration is 15 April.

The PhD course gives an introduction to advanced energy system analysis using the EnergyPLAN tool. After the course the participants are expected to be able to understand methodologies of advanced energy system analysis and to be able to use the EnergyPLAN computer model as a tool in making energy system analysis.

The course is conducted as a combination of lectures and computer workshops of a total of 5 days (40 hours) and assignments of a total of 6-7 days (52 hours). Results of assignments will be presented by the participants.

Content:

Introduction to the EnergyPLAN model (How to download, install and use the model and how to construct new data-sets etc.) The use of the model in

- sustainable cities and communities
- technical analyses of large-scale integration of wind.
- analyses of exchange with external electricity markets
- combinations of different RES technologies.
- designing flexible energy systems using flexible technologies such as heat pumps, H₂-storage, Pump storage etc.
- district heating systems versus individual houses and zero energy buildings

Organiser:	Professor Henrik Lund, <i>e-mail</i> : lund@plan.aau.dk
Lecturer(s):	Henrik Lund, Poul Østergaard, Brian Vad Mathiesen, Jakob Zinck Thellufsen and Younes Noorollahi
ECTS:	3
Time:	6-8 May and 20-22 May 2019
Length:	6 days and assignments of 6-7 days (see above)
Place	Aalborg University, Aalborg
Fee:	750 DKK (100 EUR) for PhD students. Others pay 7500 DKK. All participants must cover own costs for travel and accommodation.
Registration:	Create a profile at https://phd.moodle.aau.dk
Payment:	Use the following link: https://www.erap.aau.dk/event/index.php/ESAotEPM2019
Deadline:	15 April 2019

Sustainable Energy Planning Research Projects: [http://vbn.aau.dk/en/organisations/energiplanlaegning\(4c54a0f3-1997-46e2-871c-f61500e14a6d\).html](http://vbn.aau.dk/en/organisations/energiplanlaegning(4c54a0f3-1997-46e2-871c-f61500e14a6d).html)



The PhD course is organised by Aalborg University in collaboration with the RE-INVEST, SuPREME, 4DH and CITIES projects

Preparations prior to the course

1. Install EnergyPLAN from energyplan.eu
2. Consider how you wish to use EnergyPLAN – preferably in your Ph.D. project – alternatively in independent analyses only made for the Ph.D. course (notice that agenda for the first morning – third bullet-point)
3. Read the FIDE guide (Finding and inputting data to EnergyPLAN) from energyplan.eu and consider what data you will need to do 2.
4. There are a number of training exercises at energyplan.eu You are strongly encouraged / expected to do these beforehand as this will enable you to make more advanced independent analyses during the actual course
5. Read the articles
 - a. Reviewing EnergyPLAN simulations and performance indicator applications in EnergyPLAN simulations, <http://dx.doi.org/10.1016/j.apenergy.2015.05.086>
 - b. Reviewing optimisation criteria for energy systems analyses of renewable energy integration, <http://dx.doi.org/10.1016/j.energy.2009.05.004>
 - c. Heat Roadmap Europe: Combining district heating with heat savings to decarbonise the EU energy system, <http://dx.doi.org/10.1016/j.enpol.2013.10.035>
 - d. A renewable energy scenario for Aalborg Municipality based on low-temperature geothermal heat, wind power and biomass, <http://dx.doi.org/10.1016/j.energy.2010.08.041>
 - e. Smart Energy Systems for coherent 100% renewable energy and transport solutions, <http://dx.doi.org/10.1016/j.apenergy.2015.01.075>

The course is conducted as a hand-on workshop based on each participant making an energy system analysis. Remember to bring a computer! The idea is to combine inspiration from lectures with work on your own analysis. Supervisors will be present in the room while working with the model.



Lecturers on the course: Henrik Lund, Poul Alberg Østergaard, Brian Vad Mathiesen, Jakob Zinck Thellufsen