

Biochain workshop and course: Developing dynamic models for calculation of economy, biogas production and GHG emission when producing biogas using straw and organic household waste.

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Detailed Time schedule

Arrival Monday the 28th September – evening.

Departure: Wednesday 30th of September 14:00.

Venue: Aarhus Universitets Kursus ejendom Sandbjerg gods Sandbjergvej 102, 6400 Sønderborg, Sønderjylland (Tel: 87153370). A great thank to Søren O. Petersen for having applied for a grant to pay for most of the cost.

Objective: The objective of the workshop is the development of the next generation of our Biochain model and to train students in methods for validating models. The biomass that the dynamic models have to consider as feed for AD is straw and household waste (clean) mixed with pig or cattle manure being the carrier stream and supplier of nutrients. The science engineering group shall focus their study on the organic pool assessment and the value chain group could focus on the use of these biomasses for biogas and relate this to the use of these for e.g. bioethanol production, incineration etc.

Monday the 28th of September 2015

Dinner at 19:00 for those who arrive later afternoon Monday the 28th sept. 15

Tuesday the 29th of September 2015

8:00 – 8:30	Introduction to the Biochain models, Demands to results from calculations, boundary conditions (incl. input variables), validation	Sven G. Sommer
8:30-9:15	Validation of models <ul style="list-style-type: none"> Søren O. Petersen will present a revised model for the calculation of methane emissions from liquid manure during storage, and experimental activities for validating the model. Potential use of the modelling approach for reporting of greenhouse gas emissions to IPCC will be discussed. 	Søren O Petersen
9:15-10:00	Validation of models <ul style="list-style-type: none"> How to validate a value chain model 	Ida G. Jensen og Lise S. Nielsen:
10:00-10:15	Break	
10:15-12:00	Validation of models <ul style="list-style-type: none"> Rationale for carrying out sensitivity analysis and assess validity of new models <p>Group work</p> <ul style="list-style-type: none"> Assignment: Propose additional or better validations of the models presented by Søren O. Petersen, Jinmi Triolo and 	Sander Bruun All supervisors

	<p>Nina Juul (Articles or reports will be send to all participants at the workshop)</p> <p>Three groups (1: methane emission, 2: biogas production related to recalcitrant pools, 3: Economy/value chain model) will work on the assignment and present the outcome of their work before lunch.</p>	
12:00-13:00	Lunch	
13:00-13:30	Presentation of variability in quality of biomass.	Presented by SG Sommer in absence of Alan Lunde
13:30-14:00	Presentation of the different categories of energy carriers and the related economy at Fredericia Sewage plant.	Annemarie Gotfredsen
14:00-14:20	Break	
14:20-14:50	Energy system perspectives of biogas	Rune Duban Grandal Energinet DK
14:50 – 15:20	Economy of distribution and use of residues from biogas production	Michael Støckler
15:20-15:40	Coffee break	
15:40 – 19:00	<p>Further work on developing joint models</p> <p>Group Discussion about model development:</p> <ol style="list-style-type: none"> 1) Science and engineering students will work on improving the two-pool model of Søren O. Petersen and agree on how to include it in the Biochain model . This will be the start of developing the next generation of our model, this time focus is on use of straw and household waste (clean) for biogas production 2) The value chain group will work on a dynamic value chain model and may discuss how the model can contribute to assess the use of straw for biogas production and alternative for ethanol production ??? 3) The most important decisions to be made is how to validate the models, i.e. agree on data needed, experiments to be carried out, . <p>PhD and post docs present the vision (No powerpoints – we will be standing) for their studies in relation to the development of the joint model, the focus should be on:</p> <ul style="list-style-type: none"> • Variables have the greatest effect on biogas production, Greenhouse Gas production, Carbon sequestration, economy etc. • Algorithms developed to calculate the transformation of organic matter • Need of data for economy calculations • What is the expected sensitivity to variation in input variables? 	PhD students post docs
19:00 – 20:00	Dinner	
Evening	Small talk about progress in developing the Biochain joint models and how submodels can contribute to this	All

<i>Wednesday the 30th of September</i>		
8:00 – 10:00	<p>Group work:</p> <ul style="list-style-type: none"> • <i>One or two biomass</i> groups will with support from Alessio and Jinmi use the existing model to carry out sensitivity analysis of the parameters that are expected to contribute to sensitivity of the outcome of calculations. Alessio will give a short introduction to sensitivity analysis of the models. • <i>One economy group</i> will assess the sensitivity of the economy as affected by chosen parameters • Both group will use the information from this work to set up the frame of the next generation of models 	Alessio and Jinmi All
10:00-10:30	Coffee break	
10:30-12:00	<p>Presentation</p> <ul style="list-style-type: none"> • Two or three short presentations of the outcome of group work • Partners comment the group work 	All
12:00-13:00	Lunch	
13:00-14:00	<p>Discussion and agree on ;</p> <ul style="list-style-type: none"> • How to organize the joint model work - The aim is that this must contribute to that the Biochain project deliver dynamic models that easily can interact – which variables, algorithms and output data. Ali and Triolo will take charge in working on the biomass model • outcome is presented in articles for a peer reviewed journal. 	All