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1st or 2nd generation bioethanol-impacts of technology integration & on feed production and land use

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Monday, 24 August 2009

Track 1 - Crops & Sustainable Forestry for Bioenergy
 [Co-chairs - Brendan George & Tat Smith]
 Forest Sciences Centre Rm 1001

-  **1:30 PM - Brendan George**
(New South Wales Department of Primary Industries, Australia / IEA Task 30)
 "Energy, agriculture, forestry and environmental policies for short rotation crop"
[Show abstract](#)
-  **1:50 PM - Peter Ralevic**
(University of Toronto, Canada)
 "Cross-country comparison of drivers, challenges & opportunities for bioenergy"
[Show abstract](#)
-  **2:10 PM - Blas Mola-Yudego**
(University of Joensuu, Finland)
 "The potential of short rotation willow coppice on agricultural land in Northern Europe based on empirical data"
 Presentation Received
[Show abstract](#)
-  **2:30 PM - Darren Allen**
(Natural Resources Canada, Canada)
 "Production Economics of Short Rotation Plantation Forestry in Canada"
 Presentation Received
[Show abstract](#)
-  **2:50 PM - Anthony Anyia**
(Alberta Research Council, Canada)
 "Jerusalem artichoke as a platform for inulin, ethanol and feed production in Canada"
 Presentation Received
[Show abstract](#)
- 3:10 - 3:40 PM - Coffee Break/Exhibits**
-  **3:40 PM - Jim Richardson**
(IEA Task 31)
 "Biomass production for energy from sustainable forestry"
 Presentation Received

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9:10 AM - Niclas Bentsen

(University of Copenhagen, Denmark)

"1st or 2nd generation bioethanol-impacts of technology integration & on feed production and land use"

Presentation Received

Hide abstract

Liquid bio fuels are perceived as a means of mitigating CO₂ emissions from transport and thus climate change, but much concern has been raised to the energy consumption from refining biomass to liquid fuels.

Integrating technologies such that waste stream can be used will reduce energy consumption in the production of bioethanol from wheat. We show that the integration of bio refining and combined heat and power generation reduces process energy requirements with 30-40 % and makes bioethanol production comparable to gasoline production in terms of energy loss.

Utilisation of biomass in the energy sector is inevitably linked to the utilisation of land. This is a key difference between fossil and bio based energy systems. Thus evaluations of bioethanol production based on energy balances alone are inadequate. 1st and 2nd generation bioethanol production exhibits major differences when evaluated on characteristics as feed energy and feed protein production and subsequently on land use changes.

1st generation bioethanol production based on wheat grain in Denmark may in fact reduce the pressure on agricultural land on a global scale, but increase the pressure on local/national scale. In contrast to that 2nd generation bioethanol based on wheat straw exhibits a poorer energy balance than 1st generation, but the induced imbalances on feed energy are smaller.

Proteins are some of the plant components with the poorest bio synthesis efficiency and as such the area demand for their production is relatively high. Preservation of the proteins in the biomass such as in feed by-products from bioethanol production is of paramount importance in developing sustainable utilisation of biomass in the energy sector.