



## Session 3

# Growing of Feedstocks and Soil/Fertilizer Interaction

## Session Objectives

- What are the information needs to refine GHG emissions estimates from feedstock production for current biofuels?
- How much is known about the energy and nutrient inputs and associated GHG emissions from purpose-grown energy crops and 2nd generation biofuel crops such as cellulose or algae? What are the key uncertainties and data needs?
- How can the uncertainties be reduced surrounding N<sub>2</sub>O emissions that are a function of fertilizer application rates, nitrogen fixing crop rotation patterns, temperature, soil moisture content, cropping methods, etc?
- How much is known about the impacts of putting into production land not previously used for growing crops, either for purpose grown energy crops or for dual-purpose crops? What are the knowns and unknowns about nutrient inputs and carbon emissions from the use of previously un-disturbed land?

**Chairpersons:**

**Don Scott (NBB)**

**Phil Heirigs (Chevron)**



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## Highlights and Learnings

- US crop acreage is in decline. Farmers must profit to stay in production. Future demand will require production ability.
- Feedstock diversity is growing. Yield increases will have significant impact.
- Small adjustments of LCA inputs have big impact on results. Efficiency improvements are important.
- N<sub>2</sub>O emissions are effected by the crop; type, rate, and timing of N application. Also driven by soil/water dynamic.
- Select crops can rebuild soil organic carbon and improve ecology.



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## Gaps Identified

- Crop insurance and other forms of risk management for new crops and improved efficiency for existing crops.
- Need thoroughly reviewed data for LCAs. LCA should accurately incorporate technology and yield improvements and multiple feedstocks.
- Data are limited or non-existent under commercial scale regimes for 2<sup>nd</sup> generation feedstocks.
- Need to better understand N<sub>2</sub>O dynamics impacted by crop, nutrient systems, temperature, and moisture.
- Variations in LCA methodologies and results compromise their ability to guide policy decisions