Gaps in Knowledge

Challenges

Difficult to get accurate research and need to find a place for data to be stored. Lots of organizations and research. **Standardization:** How do we have a standard and recent results/new data. How does that data become available to everyone in a format that is beneficial, scrutinized and validated.

Transesterfication: is it ever going to advance to hydrocracking; green diesel for advance biofuel. LCA with hydrocracking. New conversion routes that are being investigated, small demonstration/commercial scale, research is done in a cofidentional way, the yields, inputs to processing steps for new gen are not available. This is a challenge to LCA community, how do we get access to this data to better understand the environmental impacts to these future tech systems, can find out inputs so we can improve the impacts, and less harmful to the environment. Can't publish this data in the environment. What is the GREET model using, and claim they represent the real inputs. Need to get over the barrier of commercialization. ***Possible approach: develop better theoretical methods to model the advance processes/better modeling, we have an analytical tool to predict what these inputs are to the conversion steps, less reliant on industrial sphere. For chemistry and advance tools, catalytically upgrading, looking at thermochemical: (Olu's work).***

Compare methanol/ethanol for biodiesel. 2 in Sao Paulo using ethanol. Methanol is imported in Brazil.

LCA Methodology aspects: Big trend to consequentional which is not very transparent, things go black box, very hard to retain transparency. Really difficult to imagine a consequential LCA is these context. The effect of scale on the study. Preliminary specific location, attributional is okay. Large scale need to at consequential.
Jorge's comments: Adanced biofuels- lack of information, when the numbers are not good, don't publish, the numbers are good then we publish. Reality is that cellulose transformation, not good numbers, start to use fancy ways to improve the results, (are they fabricating results). Very hard to compare these types of studies. All the different assumptions and how to apply the tricks to make biofuels look good. The main problem is that we can fudge the numbers.

Jaime-difficulties of the metrics, not necessary LCA, but sustainability indicators are better, look at AIChE indicators of sustainability. Areas of research, define the 4 or 5 key parameters.

GREET: Regions or temporal analysis, getting close to the project basis, a company wants to have their own GHG emissions, based on their share of inputs, if you include that type of inputs hard to get stnadariation and harmonization in the industry, how to include those regional variations in our standardization products. **Better understanding of regional, spational and temporal of biofuel LCA**

Damion: uncoformatable with the 4 or 5, needs to be defined by people in the area, doesn't like the overarching, the problem is that we are trying to make a global thing into a regional problem, when we talk about regional, some communities care some don't care. **Need to expand the scope of LCA , need to consider local values and could be promising for future, what are the regional differences as what we value as sustainable.**

Virginia. Don't need individual, but look at what's consistent across, consistency among these different areas, then we can compare with them. Need to come up with legitatme mathematical ways, can't use arithmetic averages, theory of aggregation that you can apply. Moving towards less reported values, **really capture the worlds imagination in diversity, dealing with the complexity in a repeatable and reportable.**

AIChE Lady: Couldn't get enough support for standardization, asked to take a look at what EPA did, 250 measures for looking at biofuels, need to categorize them, base data had lots of variability, what is the data we need to put into assessment. How do we store the data, what is the though process for organizing the data.

Data availability is a huge problem-gap in knowledge for proper data.

- Country specific data. Not transparent.
    - On Cultivation, energy mixes, transportation. That we can start to develop place specific LCA's need different suppliers, good for policy prospective
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- How do you attribute that information to multiple purpose crops. Have the numbers but the end products are changing, How does the data change with responding

- Conversion steps-key inputs and processes used
    - Cultivation-yields
        - Effect on the landscape
    - Transportation logistics
- How can I access data to biodiversity and water quality of network of data with different bioproduction systems
- DOE has some Knowledge Discovery Framework housed at Oakridge have scientist which do data very well. USDA is encourage to put their data there, protocol for validating the data. USDA LCA commons.
    - Key problem is obtaining the data
- Damion's wish: is to get some type of insuttiona that will fund a project in Pan America for data collection, some type of entitity that we can all get the data. Express the value of data,
- AIChE lady DIPRR-have all the data in AIChE. Was funded by industry, gov, and acadamia, this could be something like that. Way to harmonize this data. Need to get industry to want this.
    - When the industry gets certified they will want this. Need to make them want it!
- Julio's wish: Biofuel industry thinking more broadly in the biorefinary system, how we define metrics, sustainability, global and regional, first attempt at doing small set of sustainability metrics with biorefineary in mind, chemical production sustainability, high value product, to produce how do we approach sustainability of a biorefinary instead of a single biofuel.
- Mark's wish, bring together the extreme ends of the LCA, bad and good emissions, let's try to push reasonable assumptions.
- Mike Cleavland all of us are competing, game of liar's poker, need something like ASTME for biofuels. The industry doesn't want a standard because you can play the game.
- Maria: What scale of production? Not comparing crops, comparing modes of production, extensive monocropping, this cannot be sustainable. Look at scale of production. Large oil companies controlling this,
- Which is better, smaller or larger production which is more sustainable, low intensity vs high intensity.

How we produce biomass on different scales in the world,