

# CAPTURING INNOVATION IN BIOFUEL LIFE CYCLE ANALYSIS

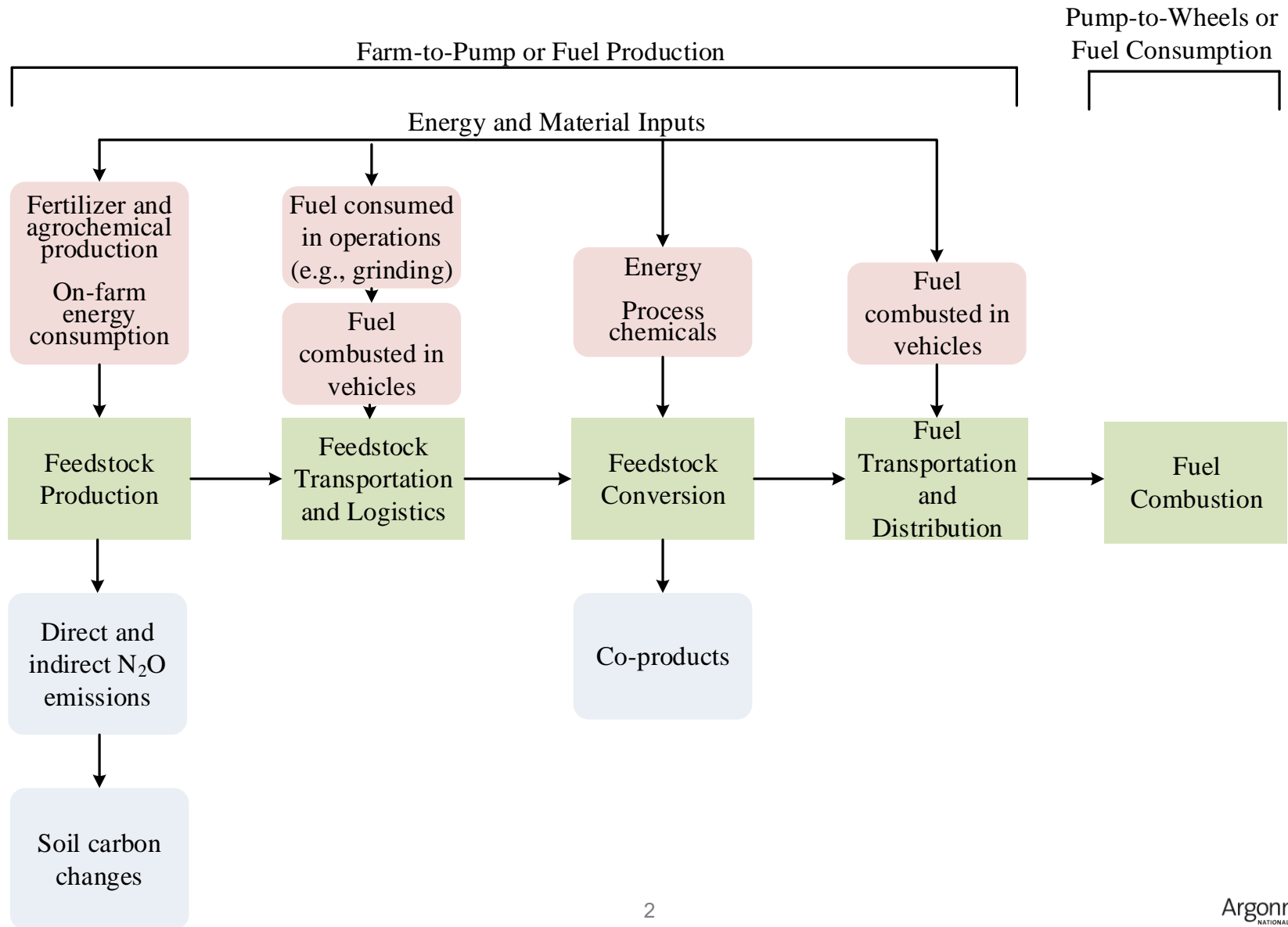


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# SUPPLY CHAIN AND LIFE CYCLE ANALYSIS



# SOIL CARBON CHANGE UPON LAND TRANSITIONS DEPENDS ON MANY FACTORS

- Land use history
- Yield
- Climate
- Soil depth
- Management practices
  - Manure application
  - Cover crop adoption



Credit: P.F. Dunn



Credit: National Renewable Energy Laboratory

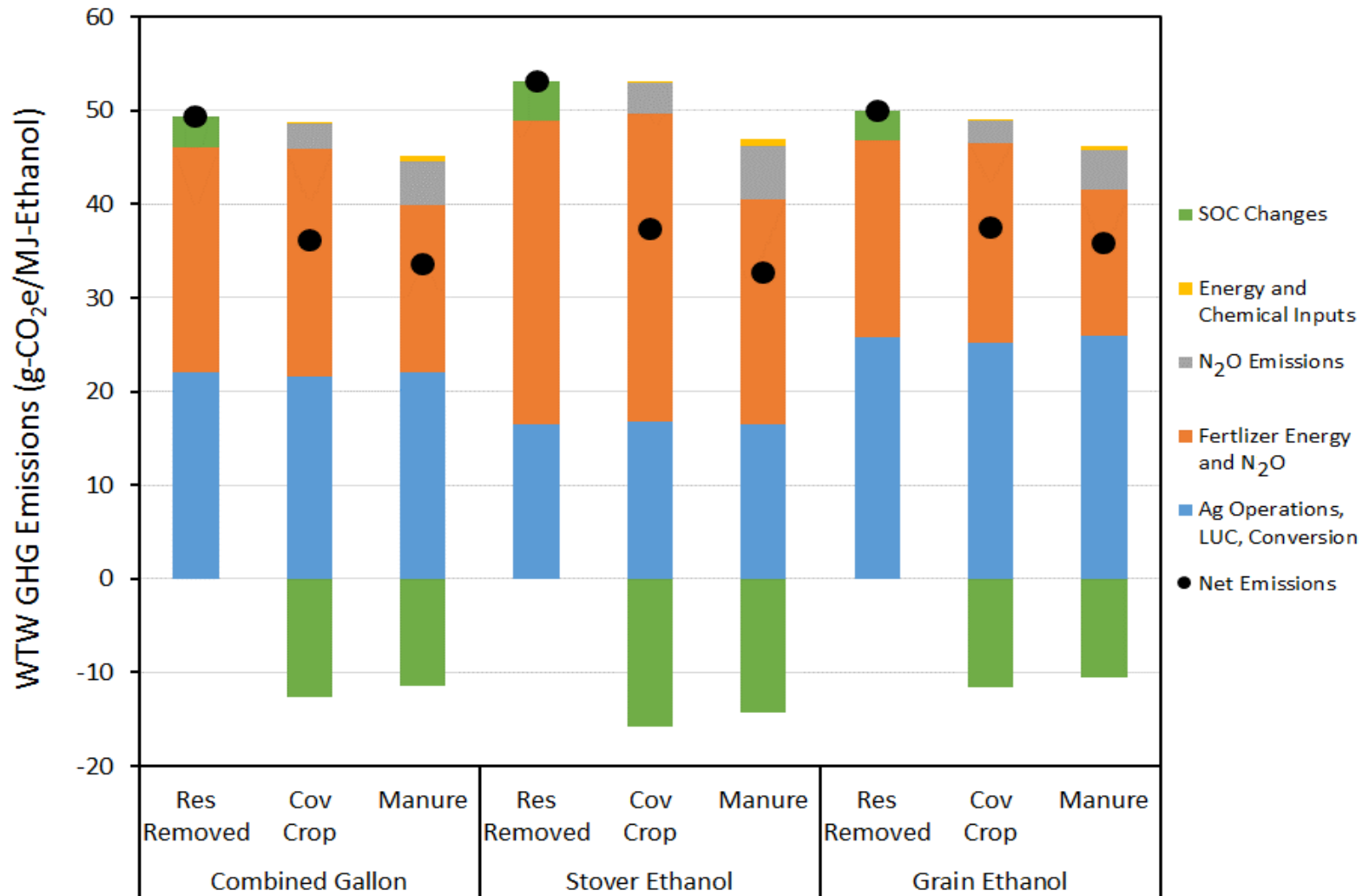


Credit: P.F. Dunn



Credit: Ken Goddard  
Argonne  
NATIONAL LABORATORY

# LAND MANAGEMENT PRACTICES INFLUENCE BIOFUEL LIFE-CYCLE GHG EMISSIONS



# CAPTURING INNOVATION IN CONVERSION THROUGH SUPPLY CHAIN SUSTAINABILITY ANALYSES



ANL/ESD-14/5

November 2013

## Supply Chain Sustainability Analysis of Three Biofuel Pathways

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*Biochemical Conversion of Corn Stover to Ethanol  
Indirect Gasification of Southern Pine to Ethanol  
Pyrolysis of Hybrid Poplar to Hydrocarbon Fuels*



ANL/ESD-15/8

April 2015

## Supply Chain Sustainability Analysis of Whole Algae Hydrothermal Liquefaction and Upgrading

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ANL/ESD-15/24  
Rev. 1

March 2016

## Supply Chain Sustainability Analysis of Indirect Liquefaction of Blended Biomass to Produce High Octane Gasoline

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ANL/ESD-15/2  
Revision 1

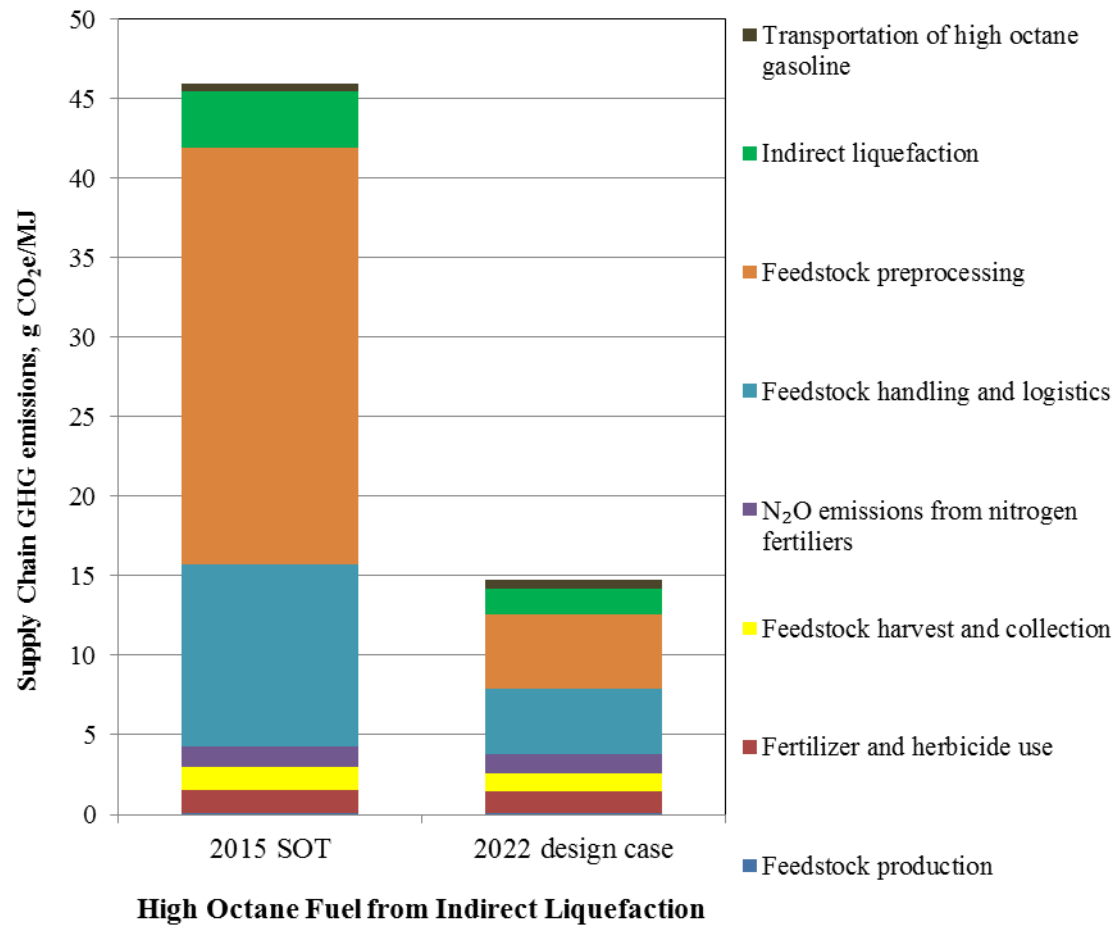
March 2016

## Supply Chain Sustainability Analysis of Fast Pyrolysis and Hydrotreating Bio-Oil to Produce Hydrocarbon Fuels

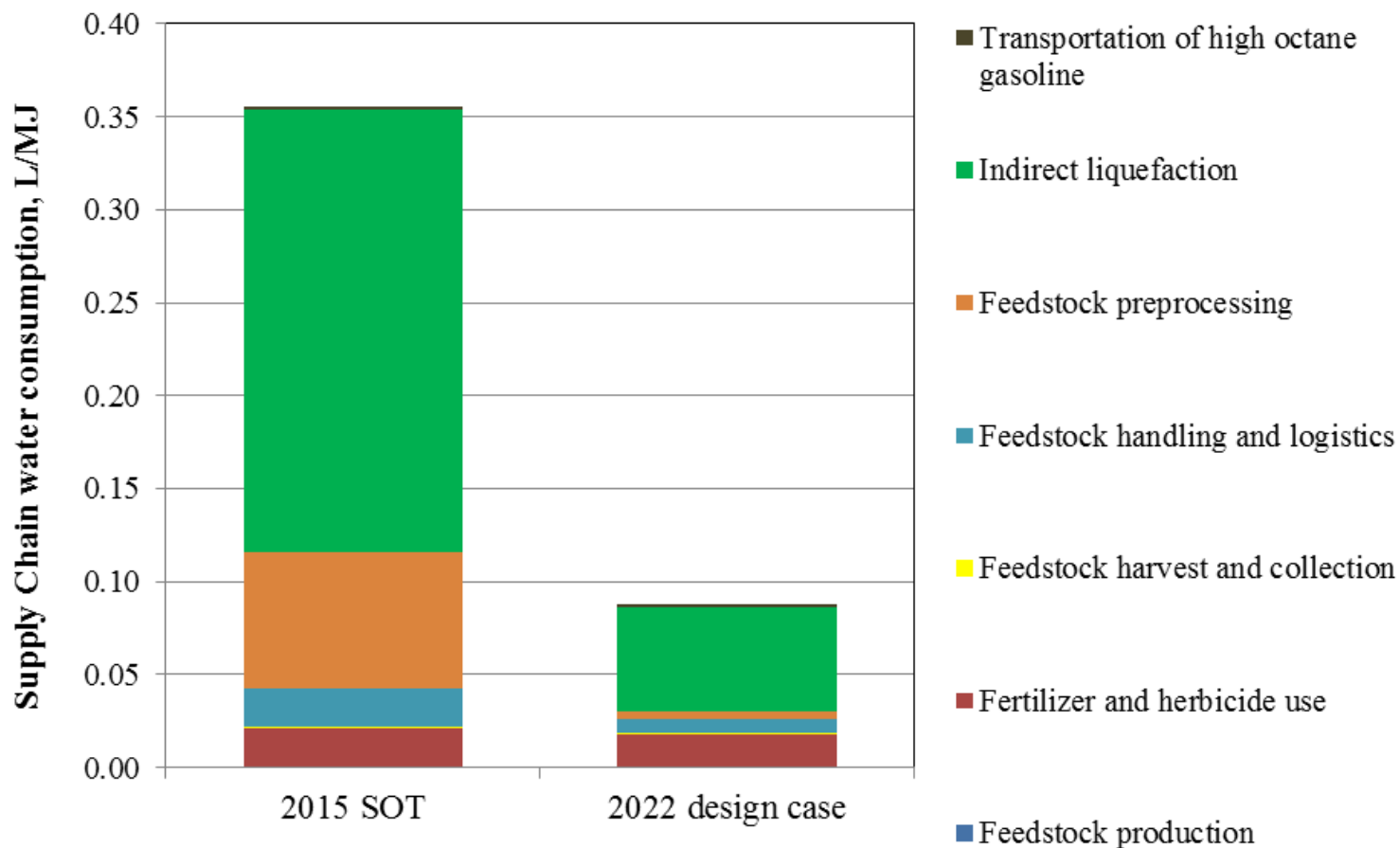
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# CAPTURING INNOVATION THROUGH SCSA: *GHG EMISSIONS*



# CAPTURING INNOVATION THROUGH SCSA: WATER CONSUMPTION



Petroleum baseline: 0.14 L/MJ

# KEY ISSUES IN QUANTIFYING ENVIRONMENTAL BENEFITS OF THE BIOECONOMY

- Data quality
- May rely on models, engineering calculations when data unavailable
- Allocating burdens among co-products
- Defining the business as usual case
- Communicating results transparently





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