

A photograph of a person standing in a field of tall, thin willow trees. The person is holding a long, thin white pole vertically against one of the trees, likely to measure its height. The trees are densely packed and reach up to the top of the frame. The ground is a mix of dirt and sparse vegetation. In the background, there are rolling green hills under a cloudy sky.

# Letters from America - reflections on willow production in the US

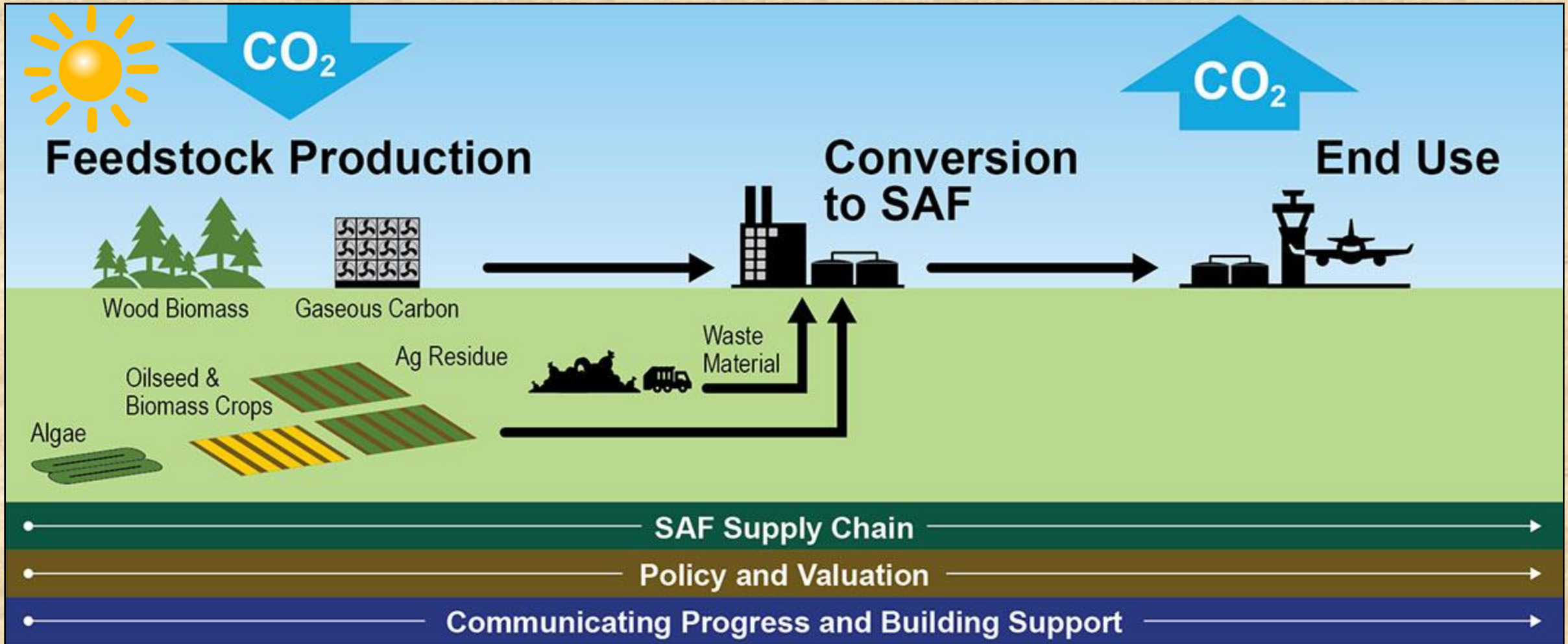
**Timothy Volk, SUNY ESF, Syracuse, NY**

**Biomass Connects Showcase Event : Harnessing innovation, the future of biomass**

**Warwick University, Nov. 7 – 8, 2024**

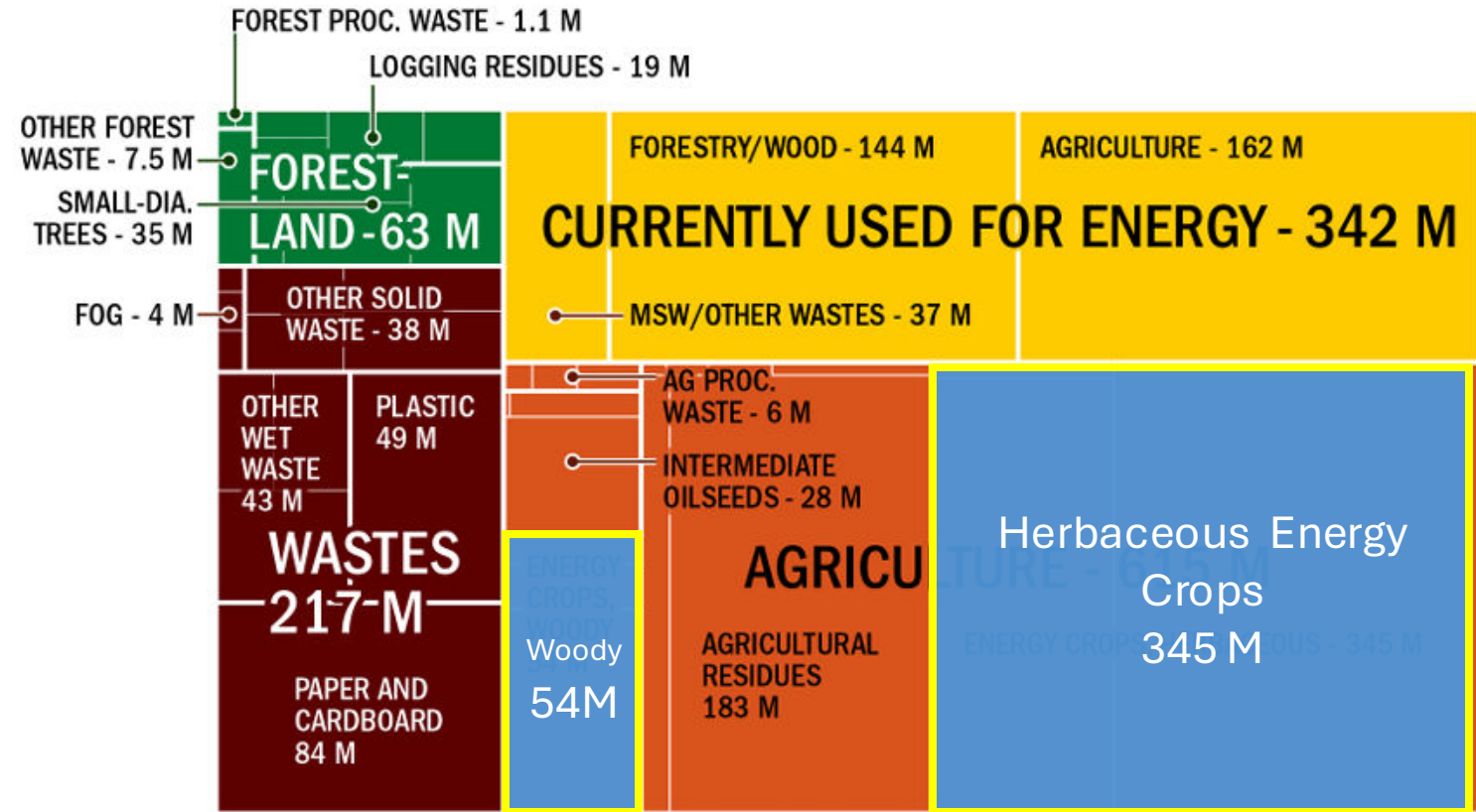
# Sustainable Aviation Fuel Grand Challenge

3 billion gallons by 2030, 35 billion by 2050



# Projected US Biomass Supply Potential

- Woody and herbaceous make up 32% of supply (399 million tons/yr)
- Scenario uses \$70/dry ton price
- 8 – 16 million ha of energy crops



1,238 M

Figure ES-2. Biomass resources in the mature-market medium scenario, totaling 1.2 billion dry short tons per year (under reference prices shown in Figure ES-1). This figure for other scenarios and units is available at <https://bioenergykdf.ornl.gov/bt23-data-portal>.

# American Bioeconomy Executive Order

- 2022 White House “Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy”
- Catalyzing Across Sectors to Advance the Bioeconomy
  - Multi agency initiative to identify key areas for investment
  - 6 areas, with one focused on building resilient supply chains



**CASA-Bio**  
Catalyzing Across Sectors to  
Advance the Bioeconomy

## **Building Resilient Biomass Supply Chains for a Sustainable Bioeconomy**

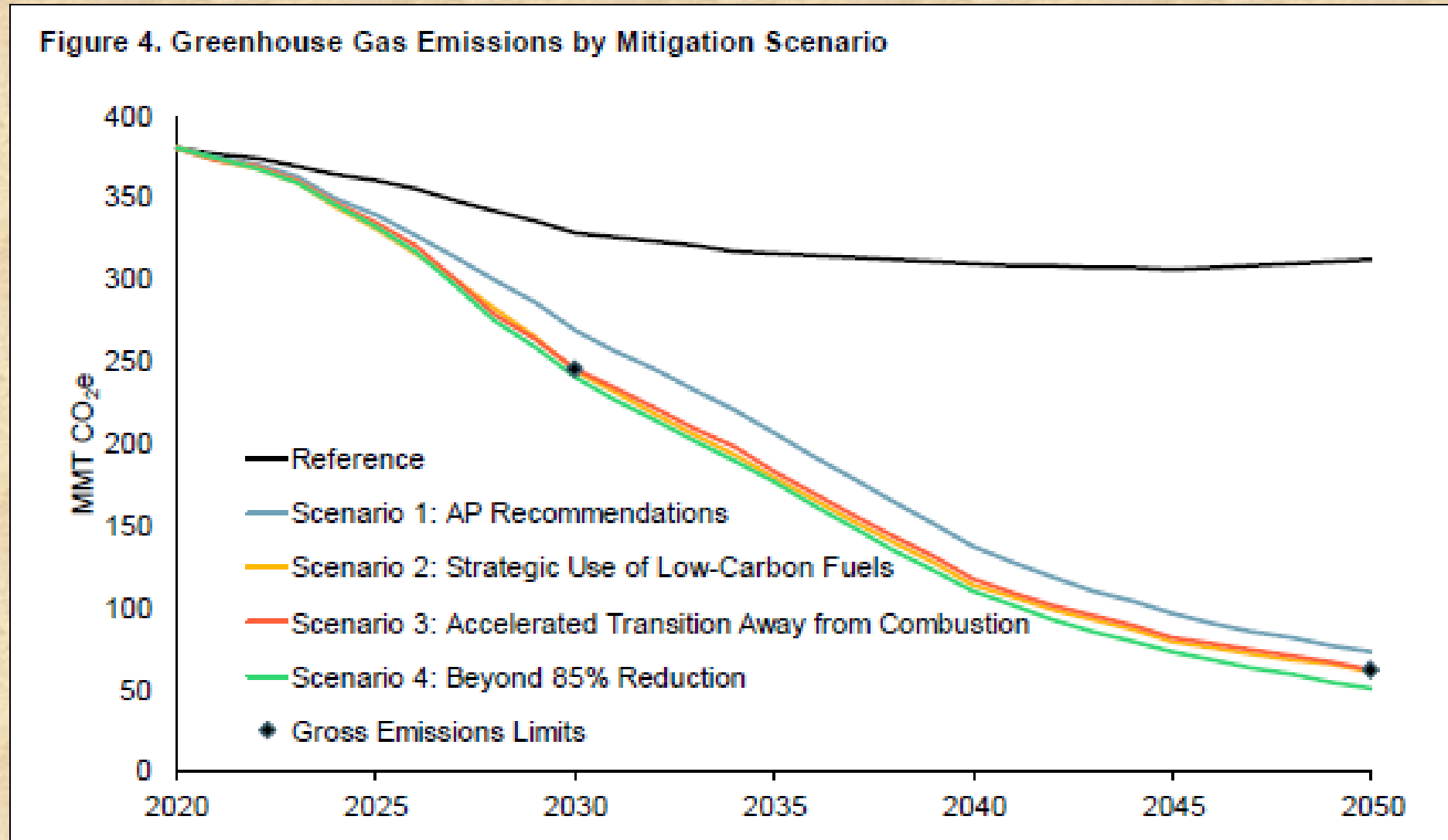
The U.S. must transition from a fossil-fuel-based economy to a bioeconomy that uses renewable biomass. This initiative focuses on creating resilient biomass supply chains to support the U.S. bioeconomy while reducing carbon emissions, enhancing sustainability, and generating economic growth.

Kimberly Ogden, University of Arizona  
Erik Hagberg, Archer Daniels Midland  
Jason Quinn, Colorado State University  
Michael Ladisch, Purdue University  
Wei Gao, Dow Chemical

Timothy Volk, State University of New York - Environmental Science and Forestry  
Edward Yu, University of Tennessee-Knoxville  
David Zilberman, University of California, Berkeley

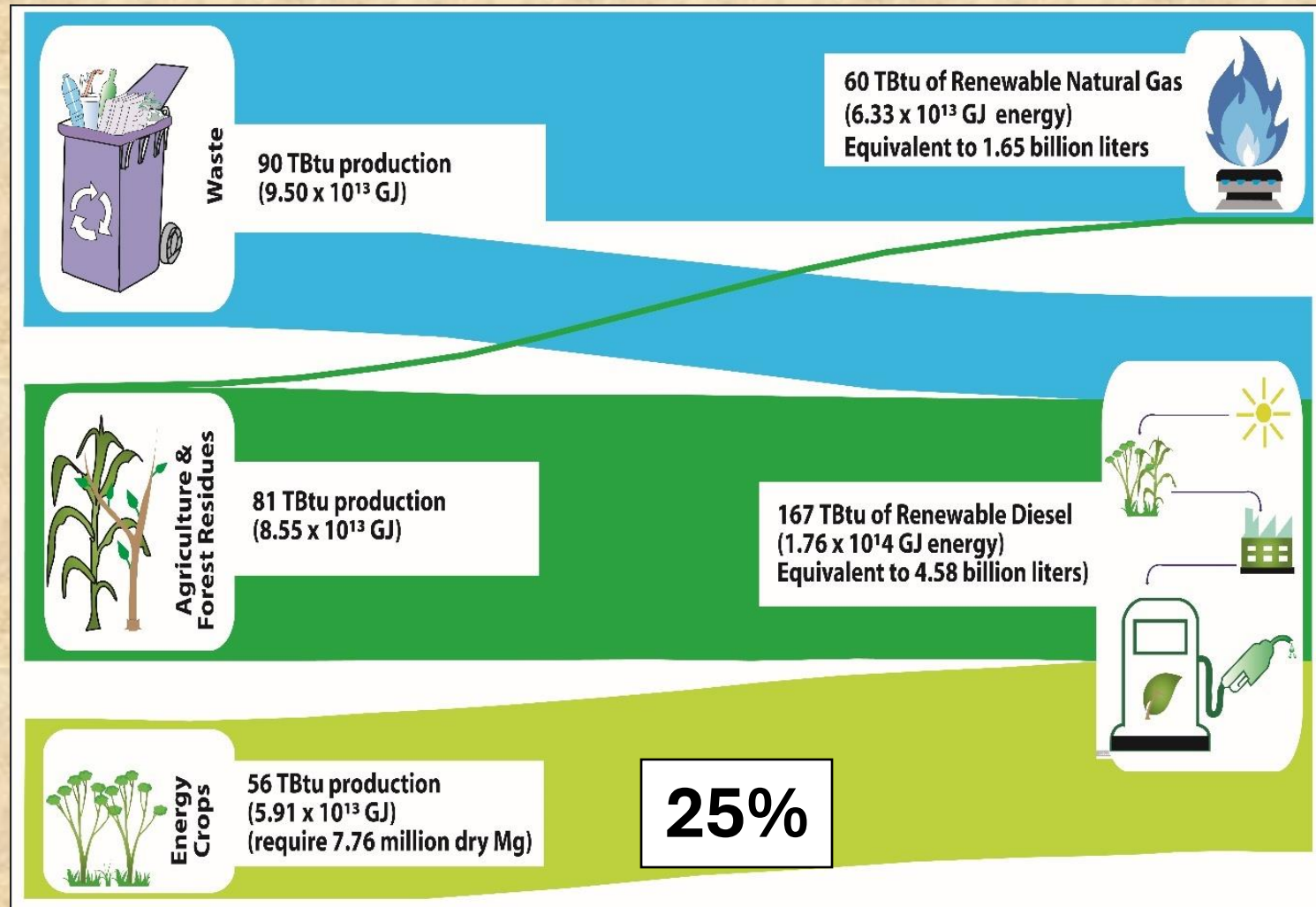
# New York State (NY) Climate Act Pathways

40% Reduction in GHG by 2030, 85% by 2050



(New York State Climate Action Council. 2022. “New York State Climate Action Council Scoping Plan.” [climate.ny.gov/ScopingPlan](https://climate.ny.gov/ScopingPlan))

# New York State (NY) Scoping Plan to Implement the Climate Act



(New York State Climate Action Council. 2022. "New York State Climate Action Council Scoping Plan." [climate.ny.gov/ScopingPlan](https://climate.ny.gov/ScopingPlan))

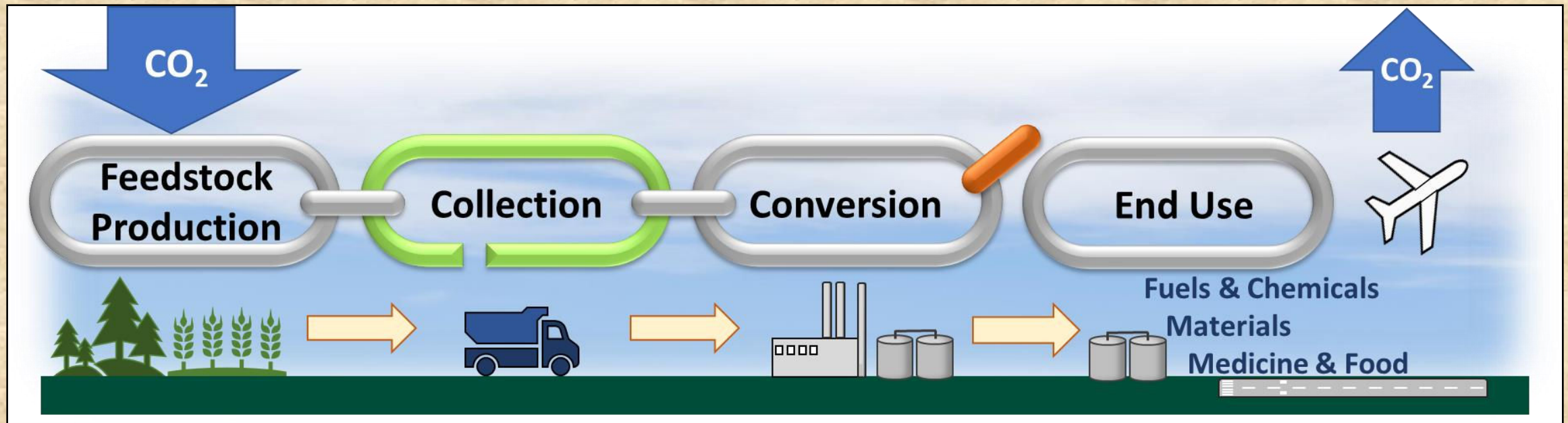
# Status of Woody Crops in the US



- Despite all the lofty goals and plans the area in SRC (poplar and willow) is at the lowest it has been in many years
- About 550 ha of willow and less than 1,000 ha of poplar
  - Much of the poplar was removed due to change in pulp and paper industry and land being sold for higher value water rights on the west coast
- Need to connect the parts of the supply chain and have them grow together

Harvesting willow (top) and poplar (bottom)

# Need to Raise the Entire Supply Chain Together



- A break in any of the link in the chain will cause system to fail
- Connections and interactions are essential for success
- Risk needs to be shared across the supply chain
- Policy needs to support all link, or at least not create breaks, in the chain



# Big Picture Lessons Learned

## Almost 40 Years of Willow Research and Development

- Establishment is key to success – it is a one-time investment for 20 – 25 years
  - Planning before planting, especially for harvesting
  - Stand establishment is key for long term success
  - Weed control – before is much easier than after planting
- Risk mitigation for a perennial crop – should be shared along the supply chain
  - Variety selection and choice – some diversity for anticipated challenges
  - Markets, markets, markets.... with consistent and reasonable value for growers
- Harvesting – conditions matter because one harvest impacts the next
- Supply chain – it is part of a supply chain and all pieces need to be supported and developed for all the benefit
  - Markets of different sizes are needed
  - Share the risk, and the rewards
  - Policy need to include long term support

# Advancing Commercialization



- Reduce costs and GHG emissions
  - Planting system are key cost drivers
  - Harvesting systems impact both costs and GHG
  - Fertilizer is a cost and GHG emissions driver
- Yield is key for success – breeding, crop management,
- Reliable, year round quality of the biomass
- Value ecosystem services
  - Soil and belowground carbon, water quality, biodiversity etc.

# Advancing Commercialization



- For markets scale matters – need to develop markets at a range of scale to build confidence and success among growers, harvesting and logistics teams, and end users
  - Mulch, compost and peat, wood insulation, small scale heating, biochar etc.
  - Environmental applications
- Need a much better understanding of the social and behavioral drivers and barriers for people all along the supply chain
- Collaboration and sharing of lessons learned and ideas being developed is key to success

# Questions and Discussion



Contact: [tavolk@esf.edu](mailto:tavolk@esf.edu) or [www.esf.edu/willow](http://www.esf.edu/willow)