

# GTAP Recommendations from July 2010 Update

Comparative and Alternative  
Modeling Approaches Subgroup  
September 2010

# Outline

- Background: Request from CARB
- Overview of 3 Analyses in July 2010 report
- Recommendation of Comparative and Alternative Modeling Subgroup

# Background

- Purdue July 2010 Update on GTAP model with analysis of US Corn Ethanol Production
  - 2001 Baseline
  - 2006 Baseline
  - 2015 assuming growth in demand and crop yield
- Request from CARB to recommend which of these modeling options should be used
- This is not the subgroup's final, comprehensive report

# 2001 Baseline Updated Version

- Updated version of GTAP as used in the January 2009 analysis which was the basis for the lifecycle GHG numbers used by CARB
  - Included the updates as explained by Wally Tyner in his GTAP presentation to the Workgroup last June
  - Land required dropped 19% from 0.27 Ha./1000 gal to 0.22 Ha./1000 gal

# 2001 Baseline Updated Version

- Evaluated impact of increased ethanol production volumes
  - 2001 volume to actual 2006 volume (4.855 billion gallons)
  - 2006 actual volume to 7.0 billion gallons
  - Additional increments of 2 BG to a 2015 level of 15 BG
- Assumed factors such as population growth, yield improvement and economic growth after 2006 do not affect land use
- Note: CARB applied an external adjustment for improvements in crop yield

# 2006 Baseline

- Same model as in the 2001 Baseline Updated Version
- Used widely accepted data sources to reflect changes in the world economy between 2001 and 2006
- Same as 2001 Baseline Update Version for volume increments from 2006 actual (4.855 billion gallons) – 2015 target (15 billion gallons)
- Land required dropped by 32% from 0.22 Ha./1000 gallons with 2001 baseline to 0.15 Ha./1000 gallons

# 2015 Projections Assuming Growth in Demand and Crop Yield from 2006 and 2015

- To update forecast from 2006 to 2015 in the absence of actual data, simple assumptions were made about demand and supply
  - Demand is adjusted by assuming it grows proportionally to population growth at rates consistent with recent history
  - Supply is adjusted by assuming uniform global increase in crop yields of 1% per year
- Land required dropped slightly from 0.15 Ha./1000 gallons

# Subgroup Analysis

- Adjustment from 2001 to 2006 baseline used widely recognized data sources
  - E.g., FAO data on crop yield
- 2006 baseline version is as technically sound as 2001 version but reflects more up to date information

# Subgroup Analysis

- 2006 to 2015 model adjustment makes an attempt at reflecting impacts of likely changes in demand and crop yield
  - But assumptions drive the model results
  - As such, this version of model is likely best considered an “illustrative example” of what could happen if such factors are also considered
- Alternative, adopted in previous CARB work, is to assume “balanced growth” and make adjustment for corn yield growth outside GTAP.
  - Under “balanced growth” assumption, supply and demand growth are matched, and GTAP baseline is unchanged.
  - An adjustment external to GTAP is needed for biofuel feedstock yield growth, since fewer acres are used to produce the fuels.
- Both approaches require assumptions of comparable magnitude and importance, but the “balanced growth” approach may be more transparent and easier to explain and adjust than embedding the assumptions in the projected GTAP baseline.

# Subgroup Recommendation

- Use the 2006 Baseline version as representing both
  - Updates to GTAP (compared to the January 2009 version)
  - Updated data from 2001 to 2006
- Continue to use an external adjustment mechanism to account for improvements in crop yield and perhaps other factors
- Note: Results are still driven by model assumptions (e.g., response curves) and land use change factors outside the model (e.g., norms of behavior, enforcement of laws)