

# The Status and Future of Advanced Biofuels in the United States

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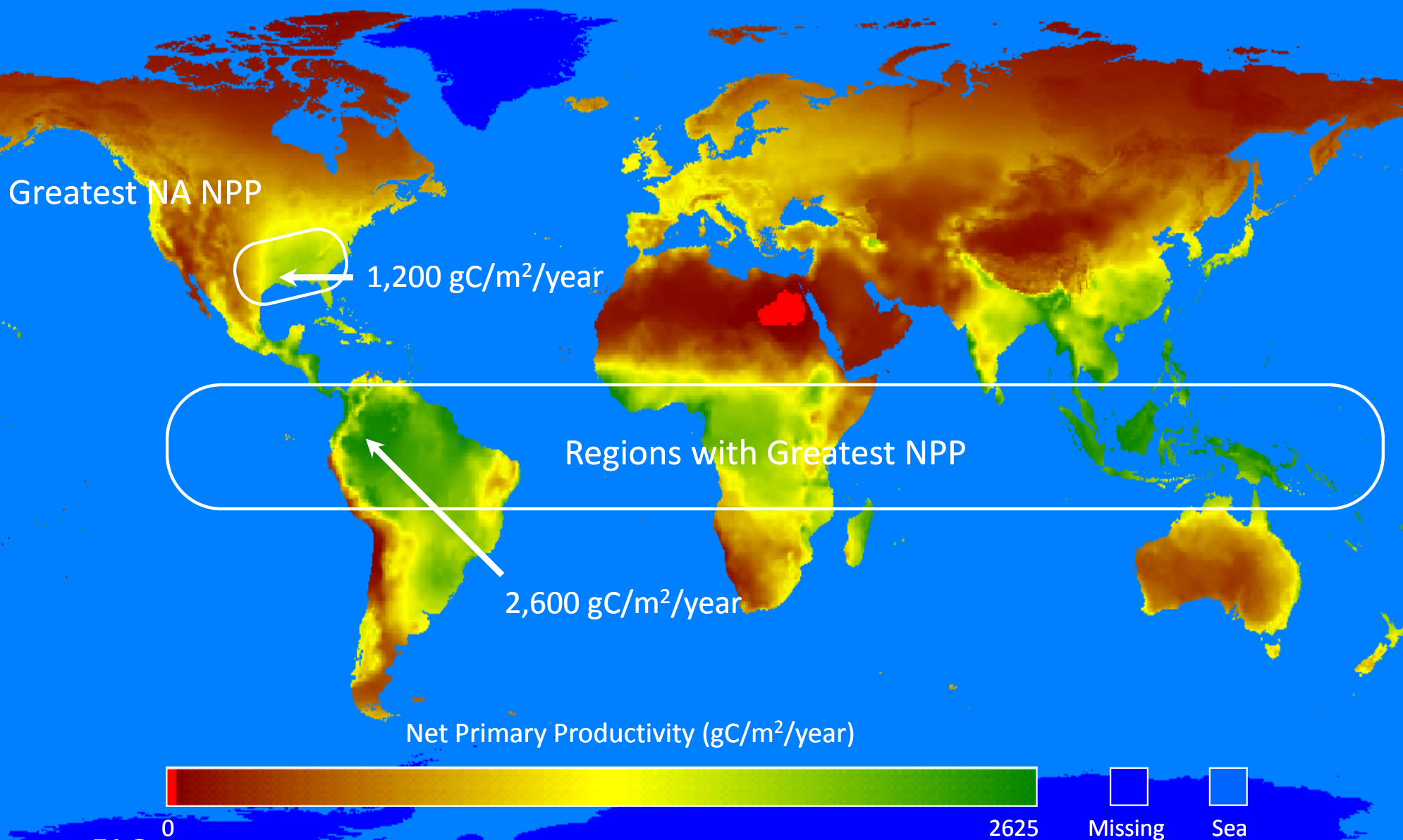
# What Will We Cover

- **Where does the U.S. Advanced Biofuel Market Stand?**
- **Where is the U.S. Going?**
- **What are the Challenges?**

# Where does the U.S. Advanced Biofuel Market Stand?

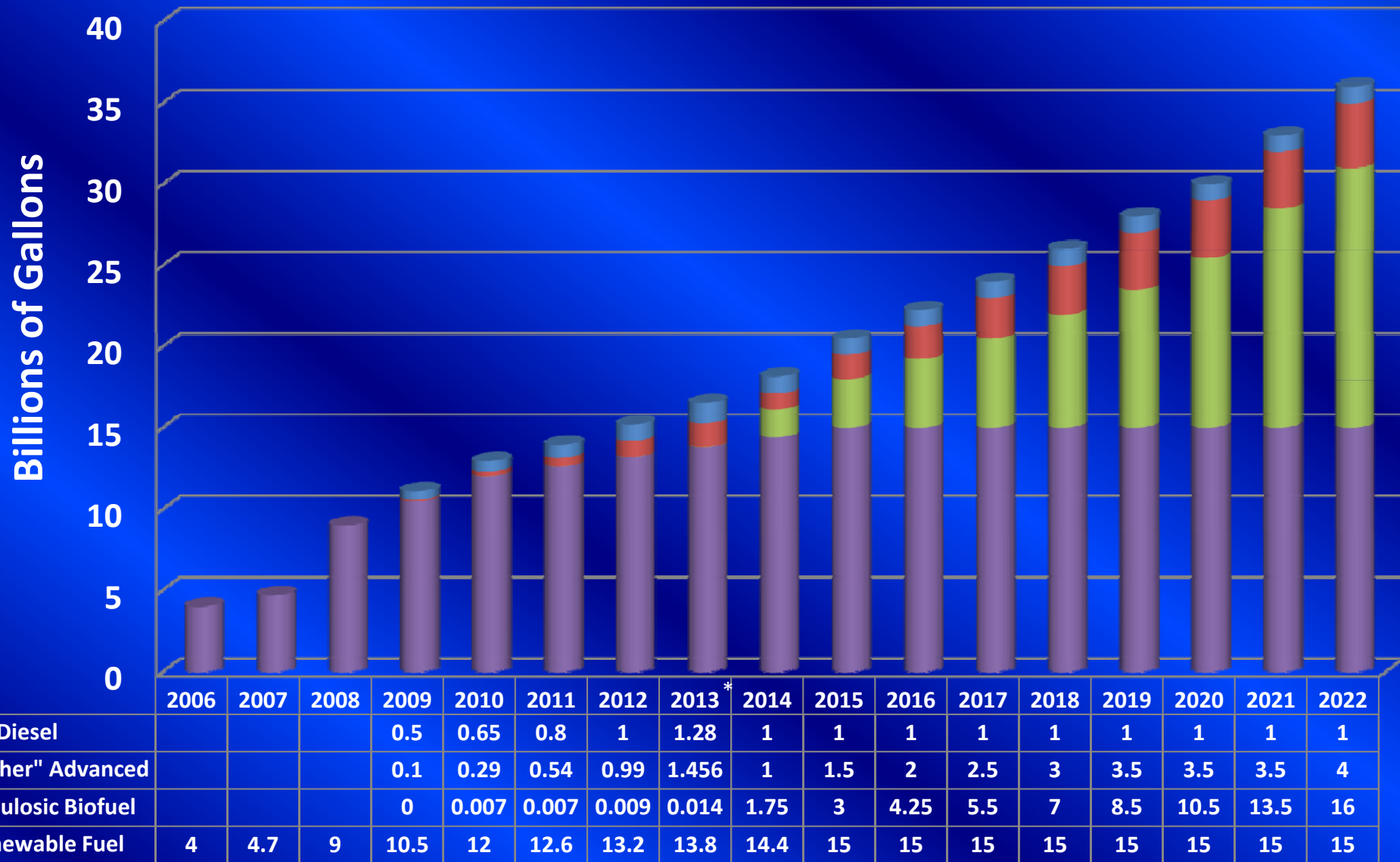


# Tropics have Advantage in Biomass Production Potential



Source: FAO

# U.S. RFS2 Volume Mandates



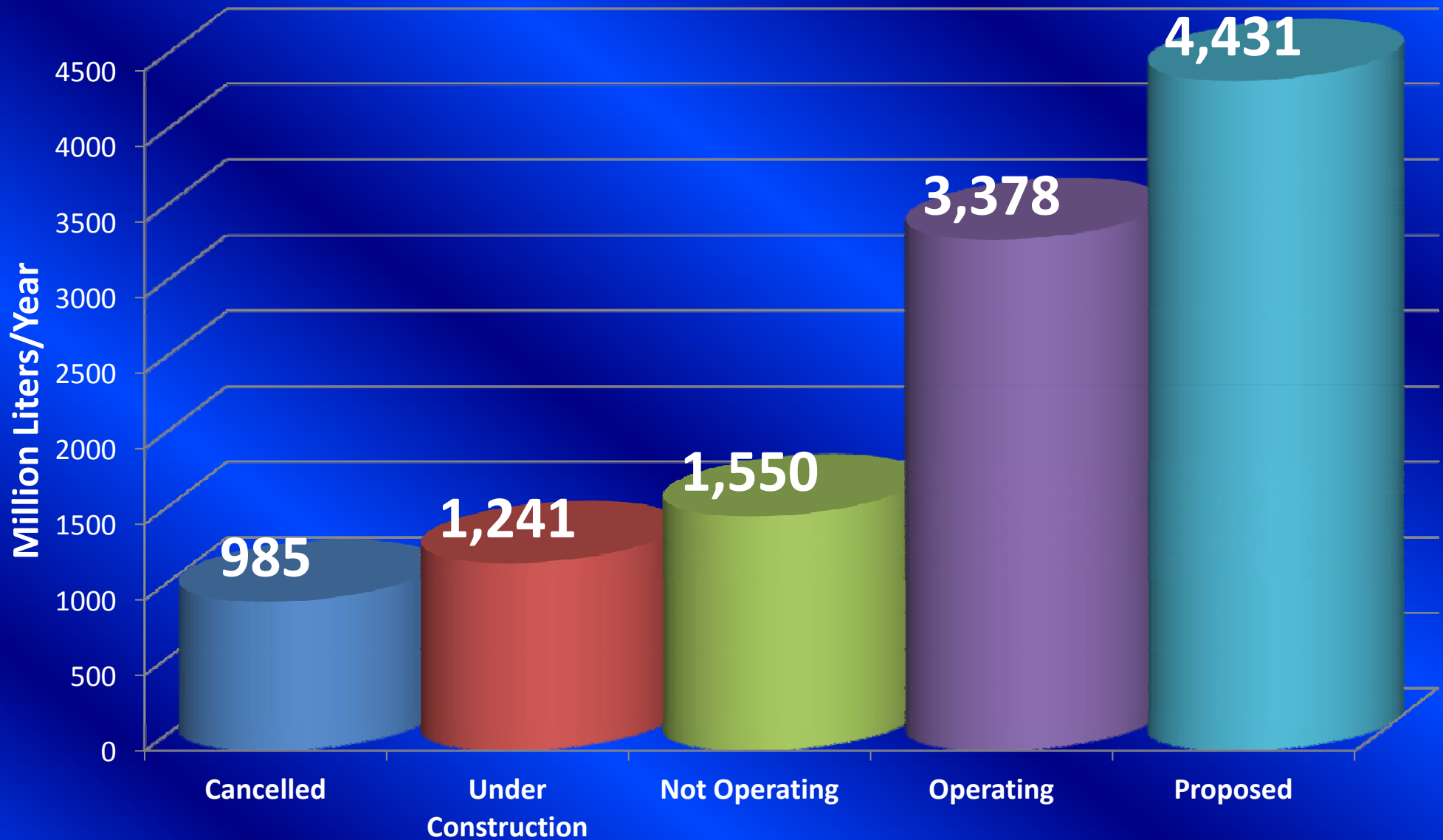
# What is Advanced Biofuel?



	Cellulosic Biofuel	Biomass-Based Diesel	Advanced Biofuel	Renewable Fuel
<b>Greenhouse Gas Reduction %</b>	60%	50%	50%	20%
<b>Biofuel Types</b>	Cellulosic and Drop-in type fuels	Biodiesel, renewable diesel, & cellulosic diesel	Sugarcane ethanol & All Cellulosic and Biomass-Based Diesel Fuels	Corn-based ethanol (Plus all other categories)
<b>Feedstocks</b>	Cellulose and hemicellulose based materials, non-food crops	Vegetable oils & fats; waste greases/tallow	Sugarcane ethanol & All Cellulosic and Biomass-Based Diesel Fuels	Corn starch & other grain starches, sorghum
<b>Processes</b>	Transesterification, thermochemical, catalytic depolymerization, FT, enzymatic hydrolysis	Transesterification, thermochemical, gasification catalytic depolymerization, FT processes	Fermentation, hydrotreating (dedicated or coprocessing)	Dry and wet mill, fermentation

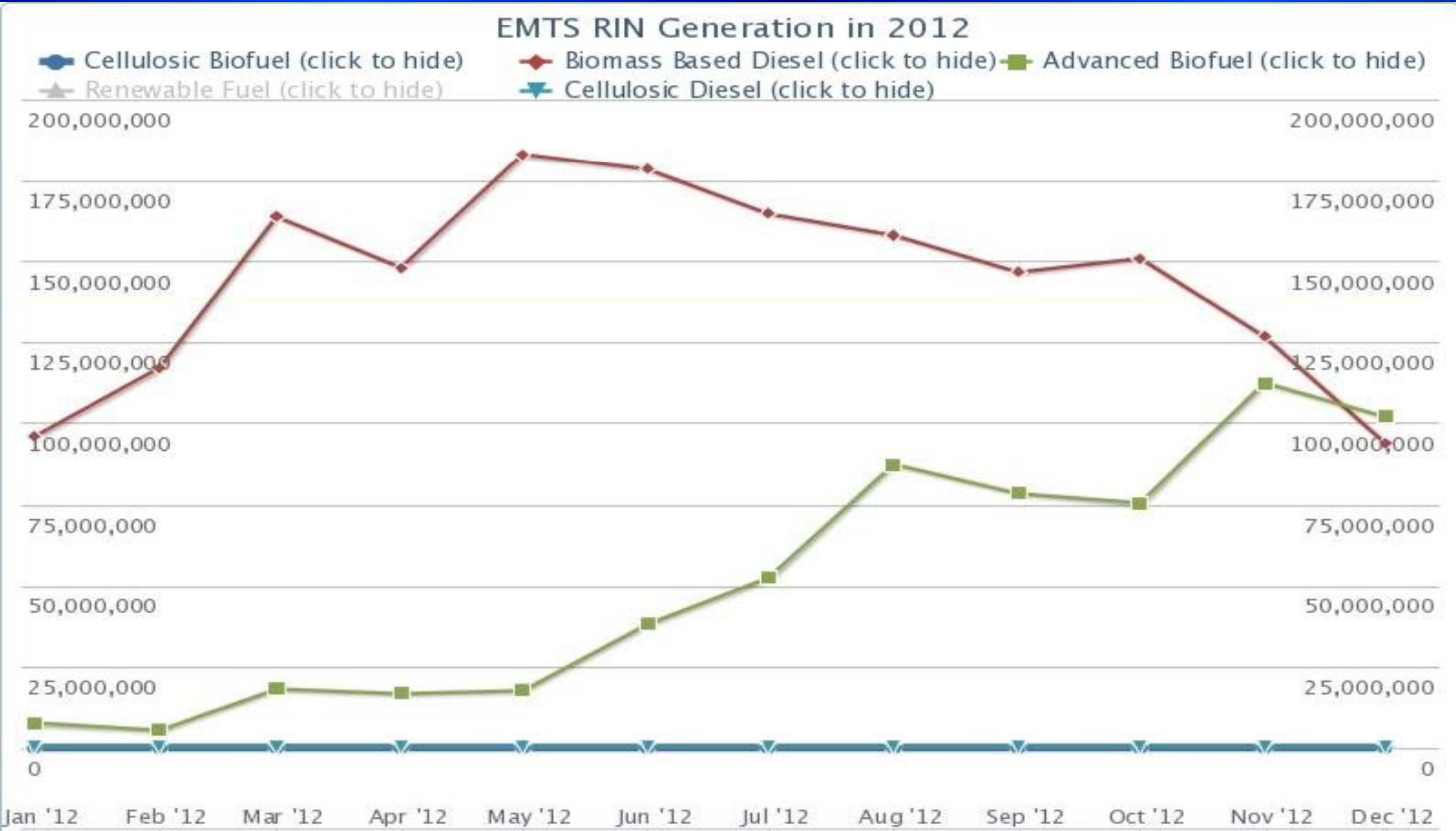
Source: FAS and Hart Energy

# U.S. Advanced Biofuel Production Capacity





# U.S. Advanced Biofuel RINS



Source: 2012 EPA Moderated Transaction System  
<http://www.epa.gov/otaq/fuels/rfsdata/2012emts.htm>



# Advanced Biofuel Support Programs

## *The Biomass Crop Assistance Program (BCAP)*

- *Matching Payments*
- *Annual Payments to Certain Producers.*

## *USDA Loan Guarantees*

## *Advanced Biofuel Production Payments*

## *Tax Incentives*

- *Cellulosic Biofuel Producer Tax Credit*
- *Depreciation Allowances for Cellulosic Biofuel Plants*



# Where is the U.S. Going?



# United States (expectations and key issues)

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## *Global Production & Trade in 2013 and Beyond*

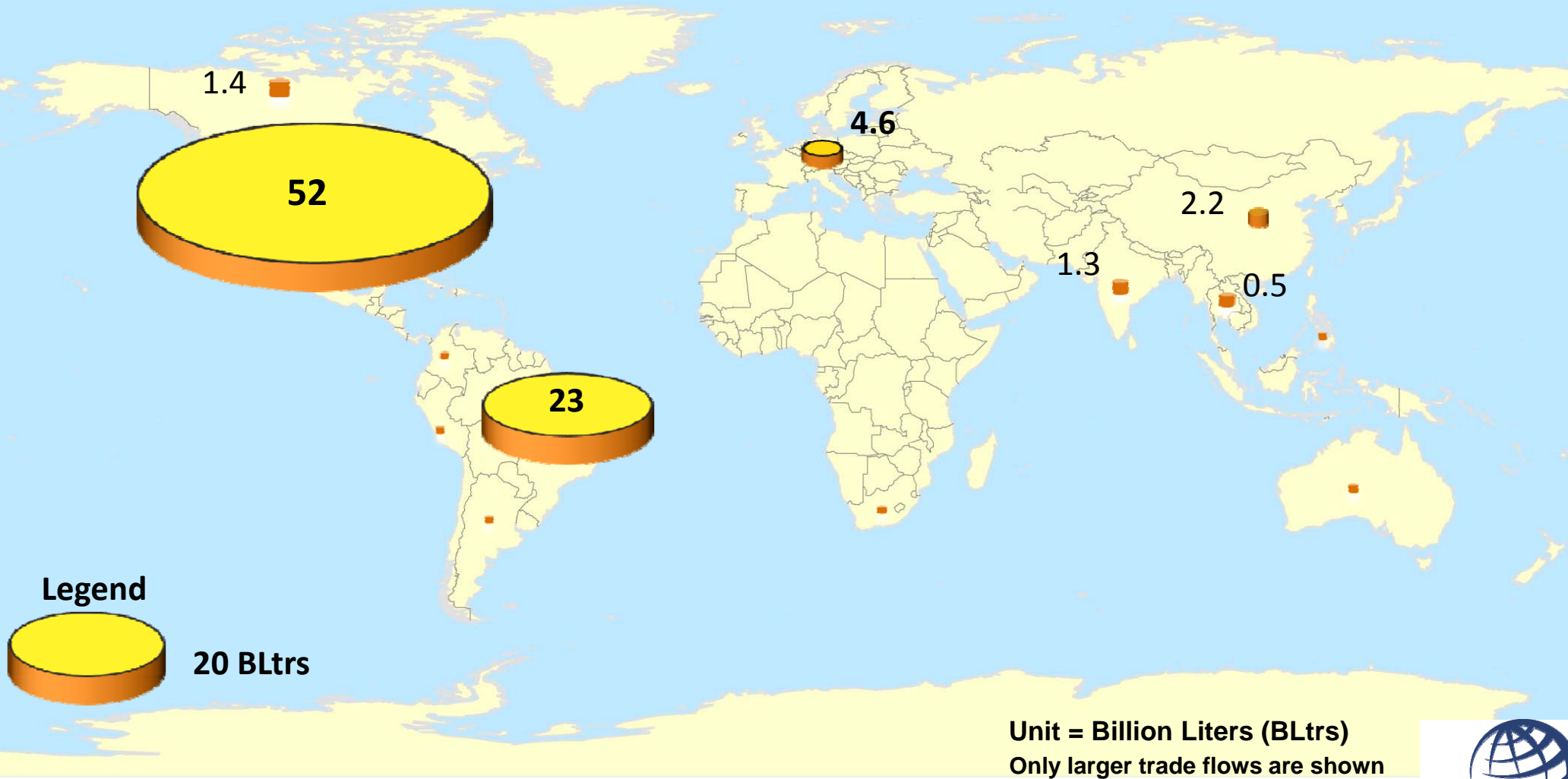
- *Remain largest producer & consumer*
- *E15 enlarges market potential by additional 6 BG (22 BL)*
- *Prices should go lower*
- *Export potential*

## *Key Market Determinates in 2013 and Beyond*

- *Blendwall concerns and adoption of higher blends*
- *Cellulosic production and “advanced” biofuel imports*
- *Competing fuels for ethanol market*

# 2011 Fuel Ethanol Production

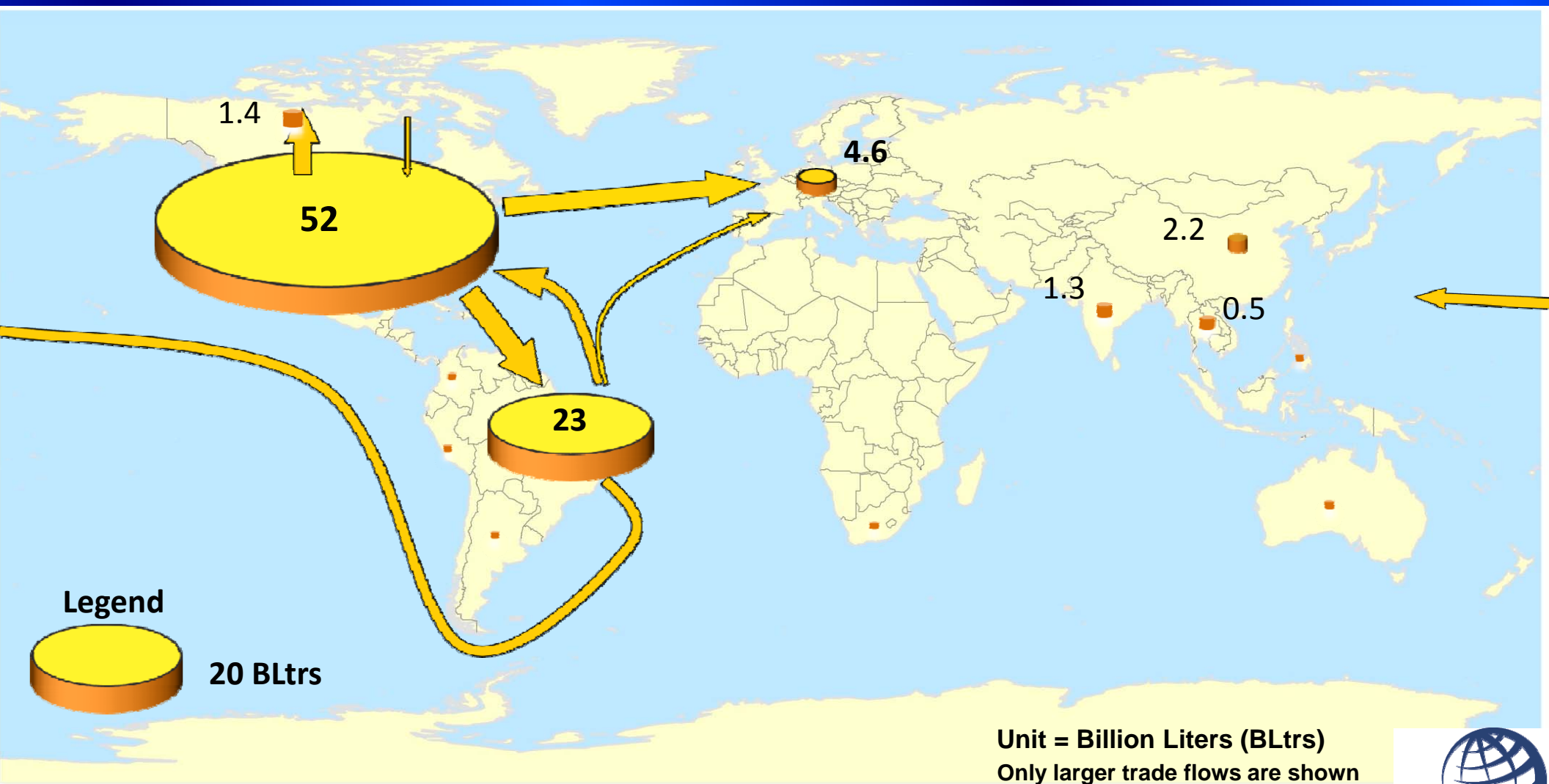
The US has rapidly outgrown Brazil to become the world's largest ethanol producer and consumer.



Source: FAS Annual Biofuels Reports and FAS/Washington staff analysis.

# 2011 Fuel Ethanol Production & Key Trade Flows

The US has rapidly outgrown Brazil to become the world's largest ethanol producer and consumer. Trade....

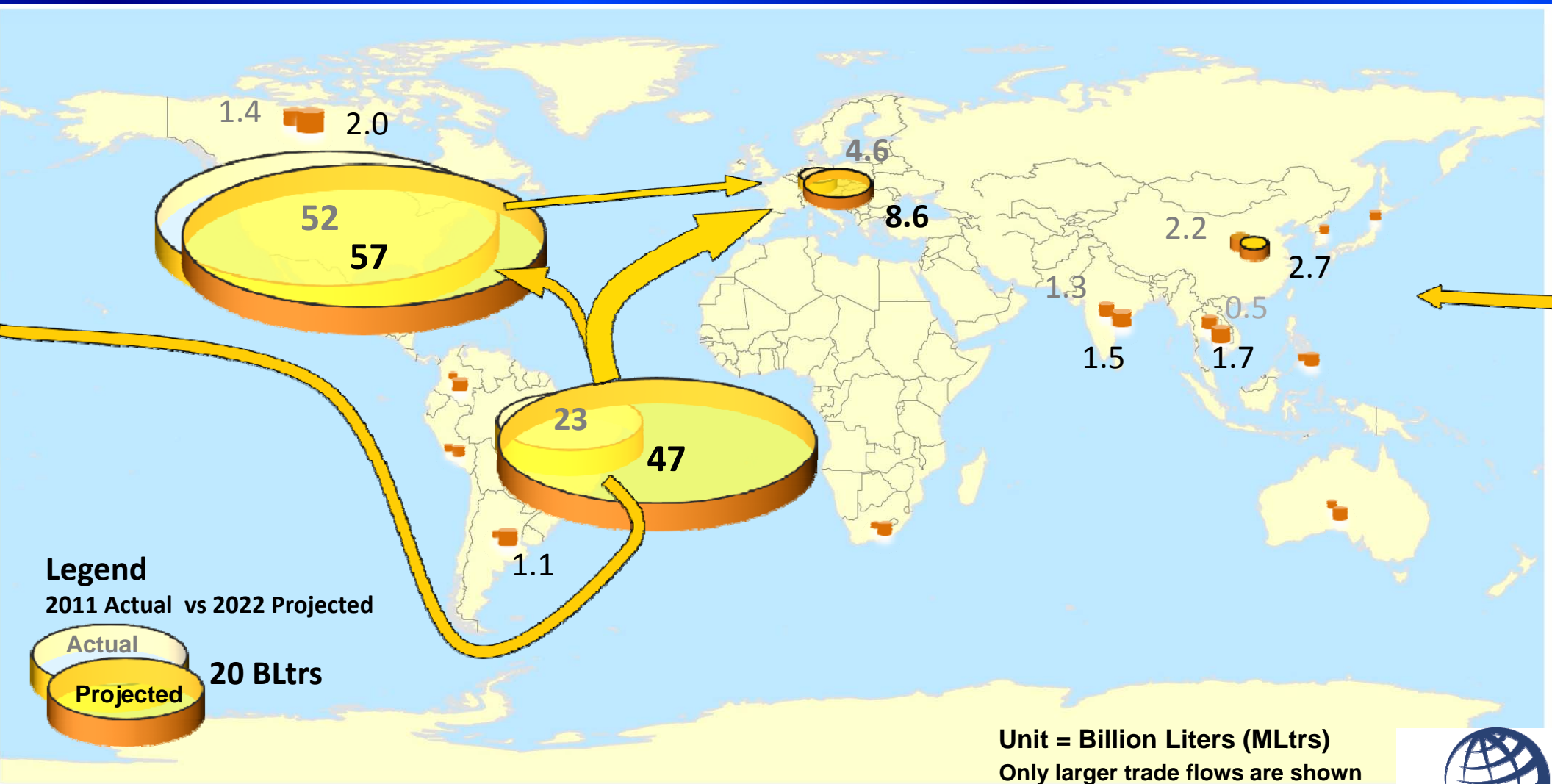


Source: FAS Annual Biofuels Reports and FAS/Washington staff analysis.



# 2022 Fuel Ethanol Outlook

US remains largest producer and consumer, but Brazil closes the gap.  
 Brazil reasserts its position as largest exporter, and US becomes net importer.

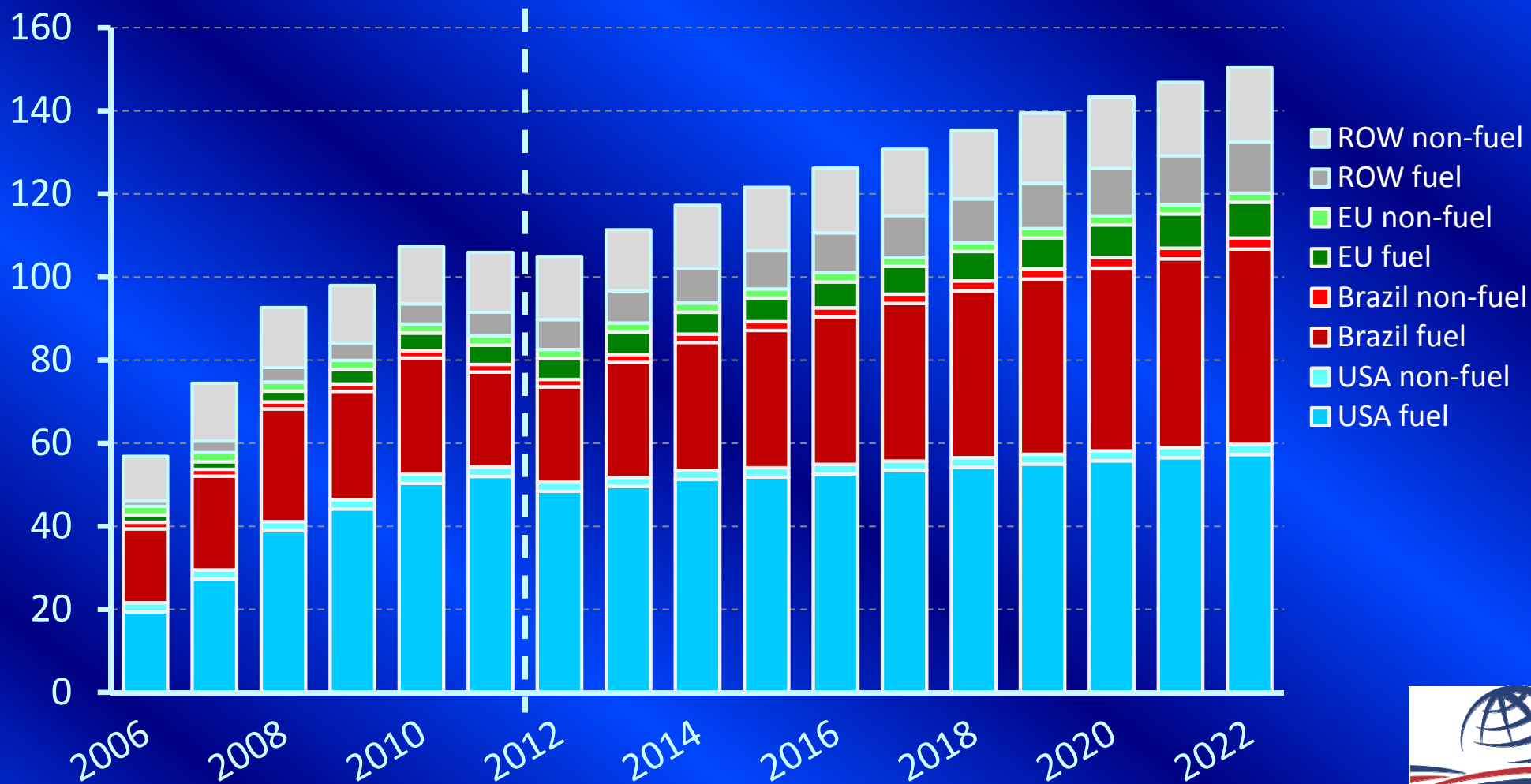


Source: Outlook based on FAS/Washington staff analysis and generally consistent with USDA's 2012 long-term projections.

# World Ethanol Production

## Major Markets and Rest of World (ROW)

Billion Liters



Sources: FAS staff analysis, FOLicht, OECD-FAO; US fuel ethanol (WASDE, 2012 USDA Baseline)

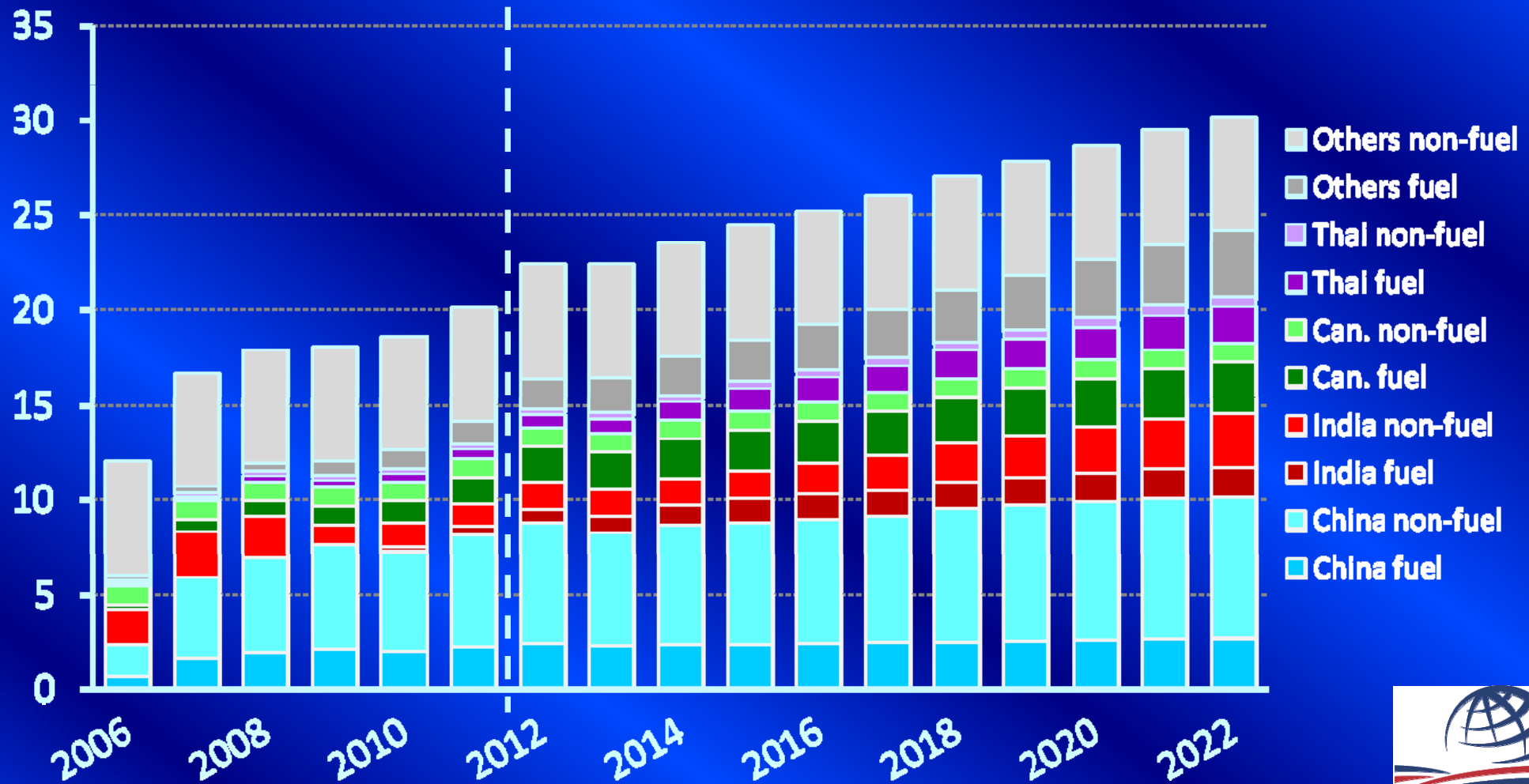




# World Ethanol Production

## Secondary and Minor Markets

Billion Liters



Sources: FAS staff analysis, FOLicht, OECD-FAO; US fuel ethanol (WASDE, 2012 USDA Baseline)



# What are the Challenges?



# Challenges for Advanced Biofuel in the United States

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## *Competition*

- *Cheap Shale Gas*
- *Electrified Vehicles*
- *Cellulosic production and “advanced” biofuel imports*

## *The U.S. Blendwall-13.4 Billion Gallons*

- *Will E15 and E85 Increase the market?*

# Challenges for Advanced Biofuel in the United States

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## *Feedstock Supply*

- *Competition for ligno-cellulose*

## *Credit Availability*

- *Uncertainty in Credit Markets*

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