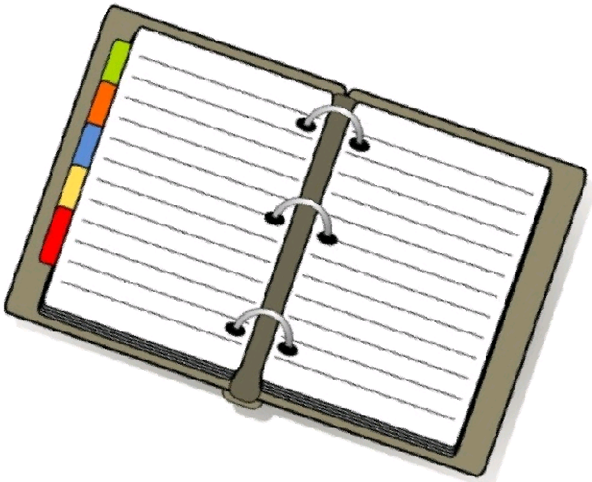
Biofuel Outlook

Terrence Higgins

EIA: August 1, 2012

Outline



I: Global Overview

II: Focus on Americas

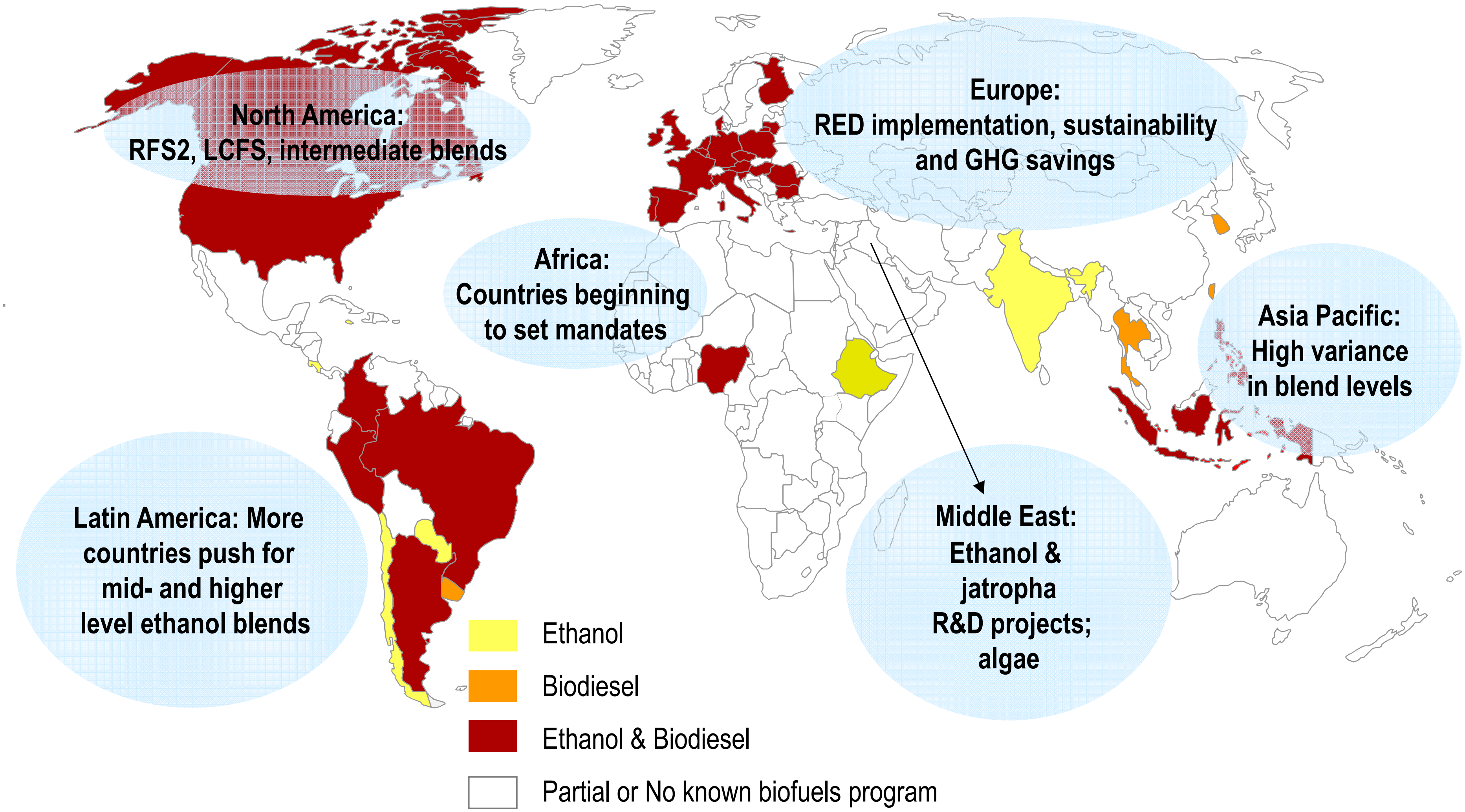
A. Brazilian Ethanol Supply

B. U.S. Biofuel

1. RFS Requirements
2. Ethanol Limitations
3. Advanced Biofuel

Global Outlook

Biofuel Mandates in 2012



Source: Hart Energy's Global Biofuels Center, June 2012

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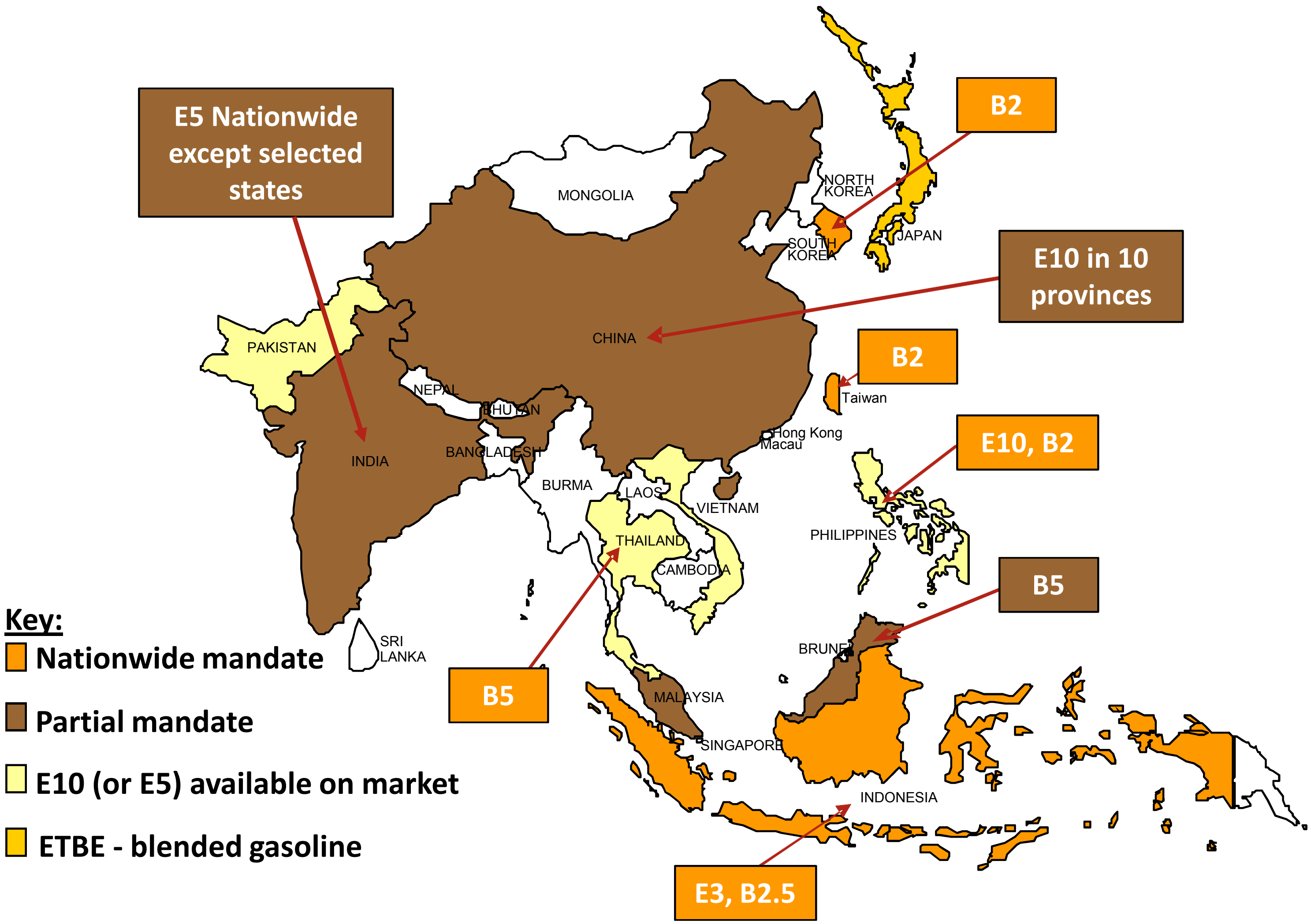
Current Mandates in Asia



Source: Hart Energy's Global Biofuels Center, July 2012

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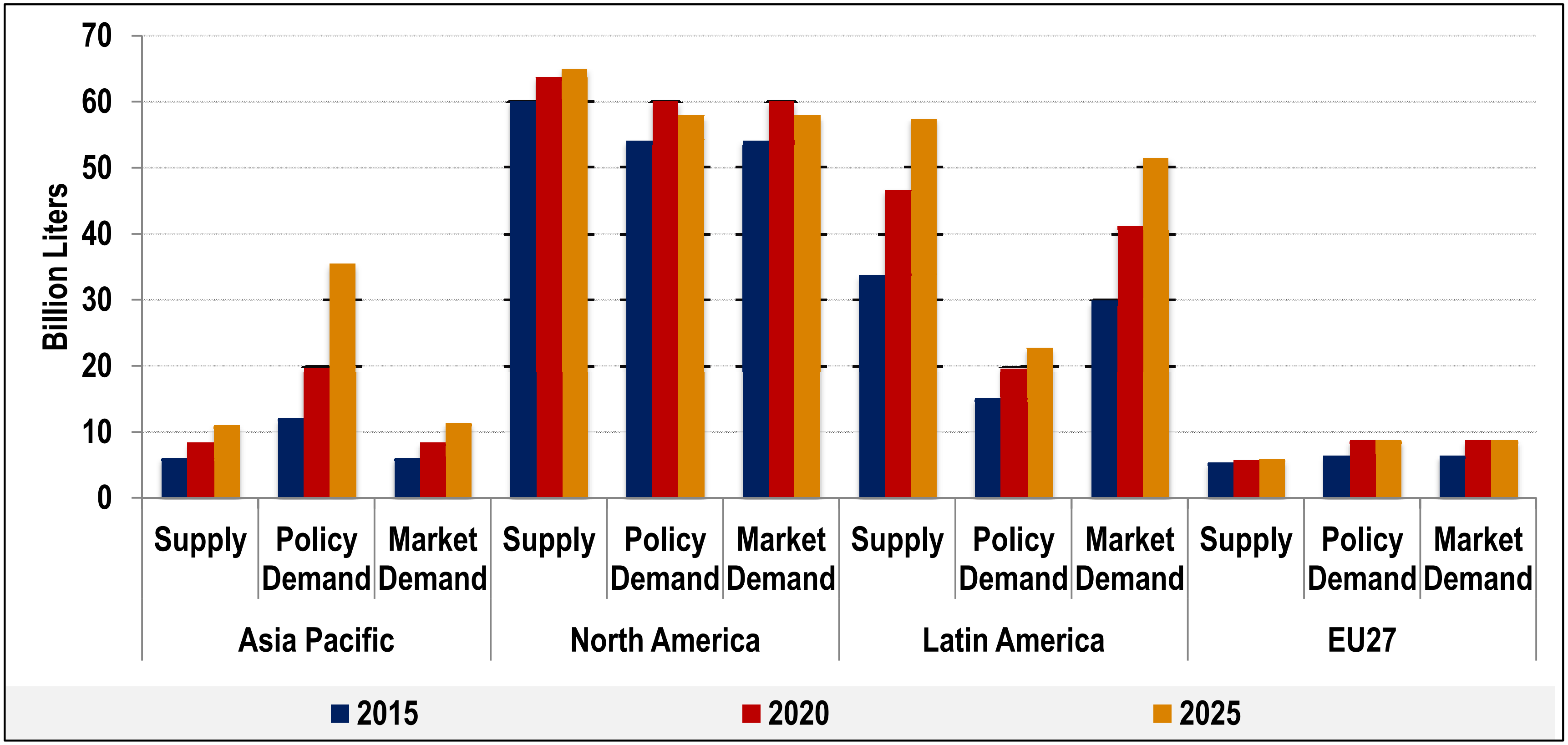
Supply & Demand for Ethanol



Source: Hart Energy's Global Biofuels Center, June 2012

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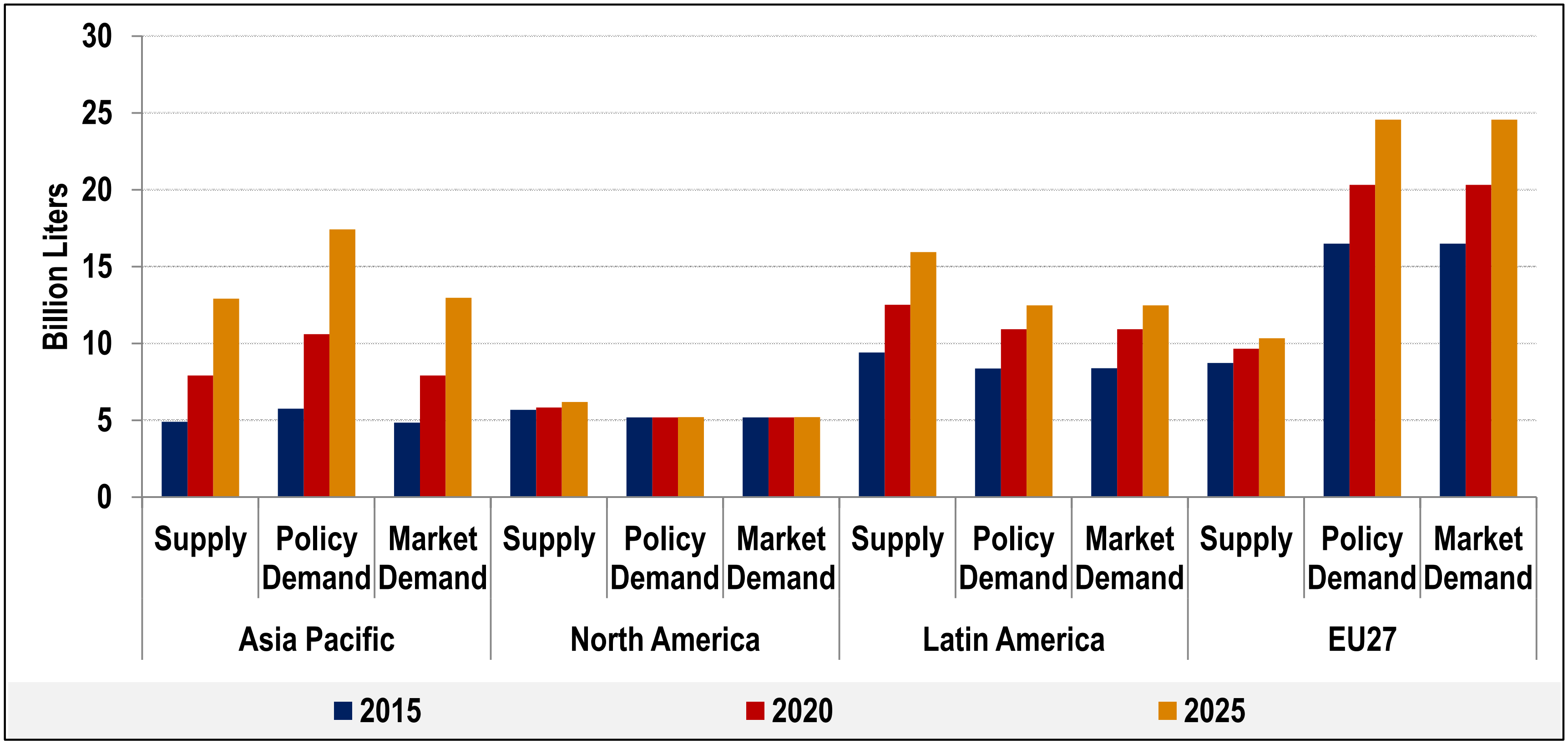
Supply & Demand for Biodiesel



Source: Hart Energy's Global Biofuels Center, June 2012

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Global Trends

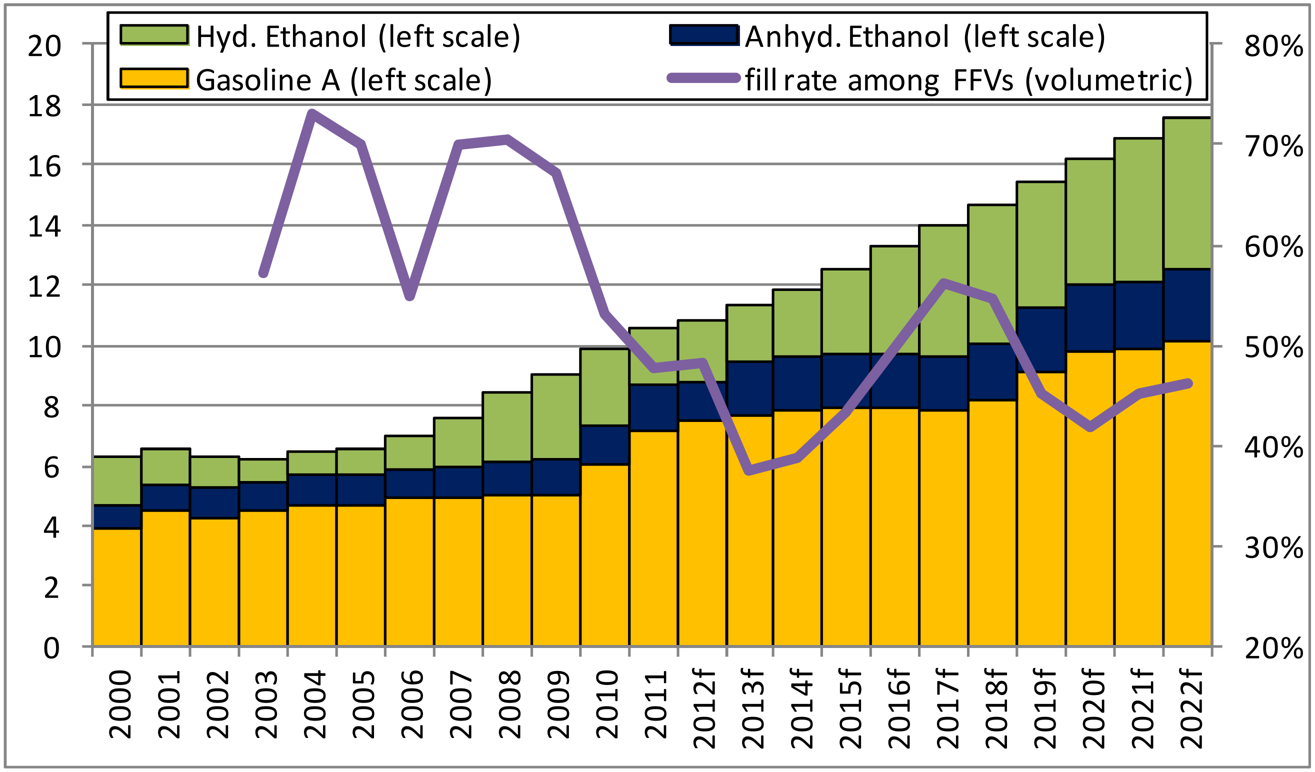
- Global biofuel will increase by 70% by 2020 and nearly double by 2025
- In 2020 88% of demand in North America, Latin America and Europe U.S. and Brazil will account for ¾ of ethanol.
- Ethanol: Strongest growth from U.S. and Brazil

  Biodiesel: Strongest growth from EU
- By 2020 biofuel potential to reach 7% of gasoline plus road diesel demand
- Difficulty meeting far reaching program goals in EU and U.S.
- EU competition for Brazilian sugar cane ethanol

Focus on the Americas

Brazil Otto-Fuel Demand Outlook

Fill rates will continue to reflect gasoline-ethanol price relationship.



Source: Hart Energy's Global Biofuels Center, March 2012

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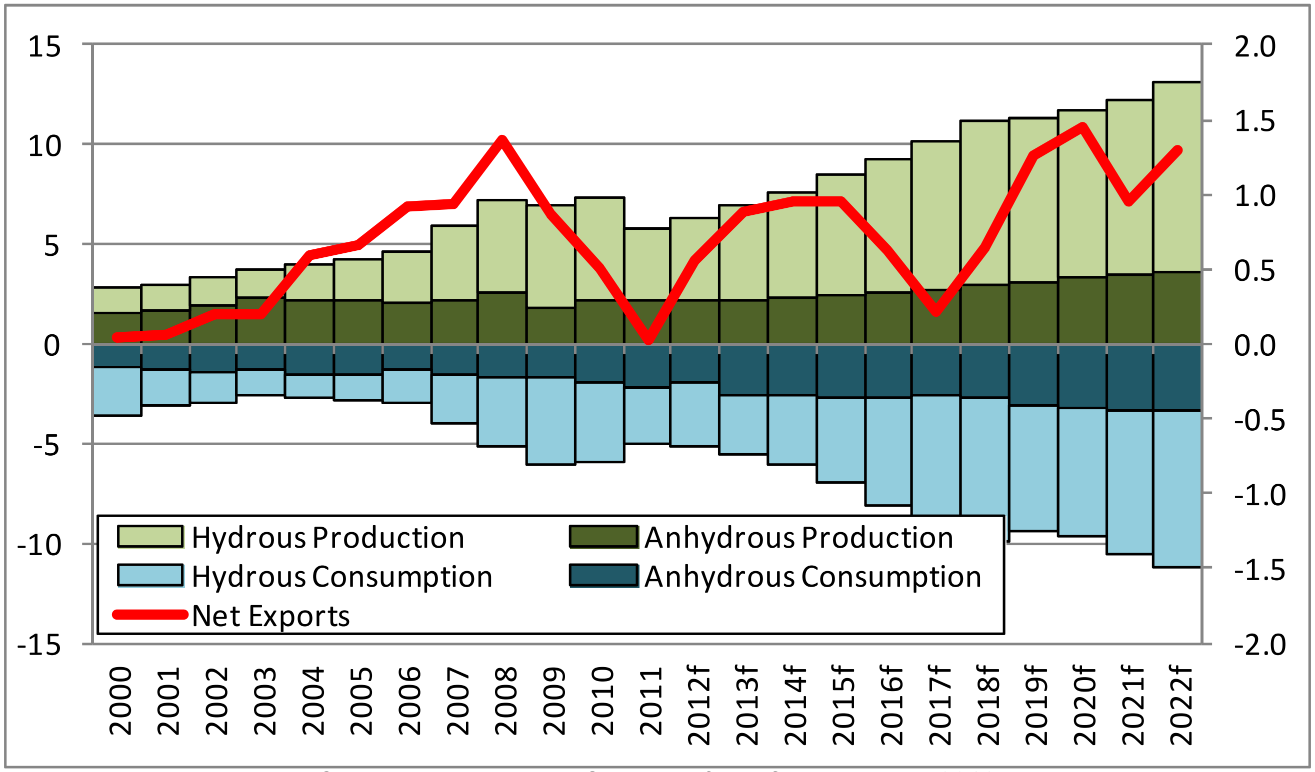
Brazil Ethanol Demand/Supply Balance

Upsurges in domestic demand – driven by softer prices – will periodically drive down net export availability. Even during peak years of availability, net exports will fall below most forecasts (e.g., Ministry of Agriculture, ICONE, UNICA, etc.)



Source: Hart Energy's Global Biofuels Center, March 2012

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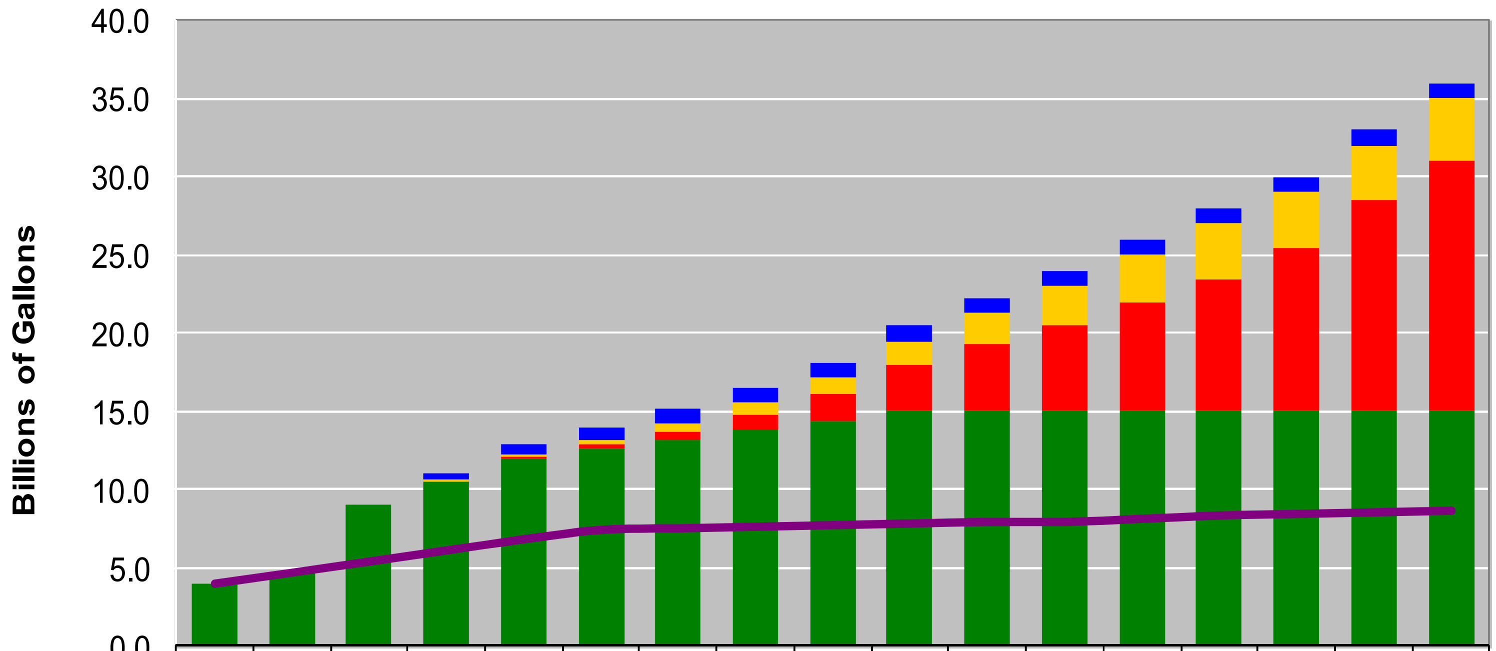
“RFS2” Program Requirements



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Biomass-Based Diesel				0.5	0.7	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Advanced Biofuels (Sugar)				0.1	0.2	0.3	0.5	0.8	1.0	1.5	2.0	2.5	3.0	3.5	3.5	3.5	4.0
Cellulosic Biofuels					0.1	0.25	0.5	1.0	1.8	3.0	4.25	5.5	7.0	8.5	10.5	13.5	16.0
Renewable Fuel (Corn Ethanol)	4.0	4.7	9.0	10.5	12.0	12.6	13.2	13.8	14.4	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
RFS1 Requirements	4.0	4.7	5.4	6.1	6.8	7.4	7.5	7.6	7.7	7.8	7.9	7.9	8.1	8.3	8.4	8.5	8.6
Total New RFS Requirement	4.0	4.7	9.0	11.1	13.0	14.0	15.2	16.6	18.2	20.5	22.3	24.0	26.0	28.0	30.0	33.0	36.0

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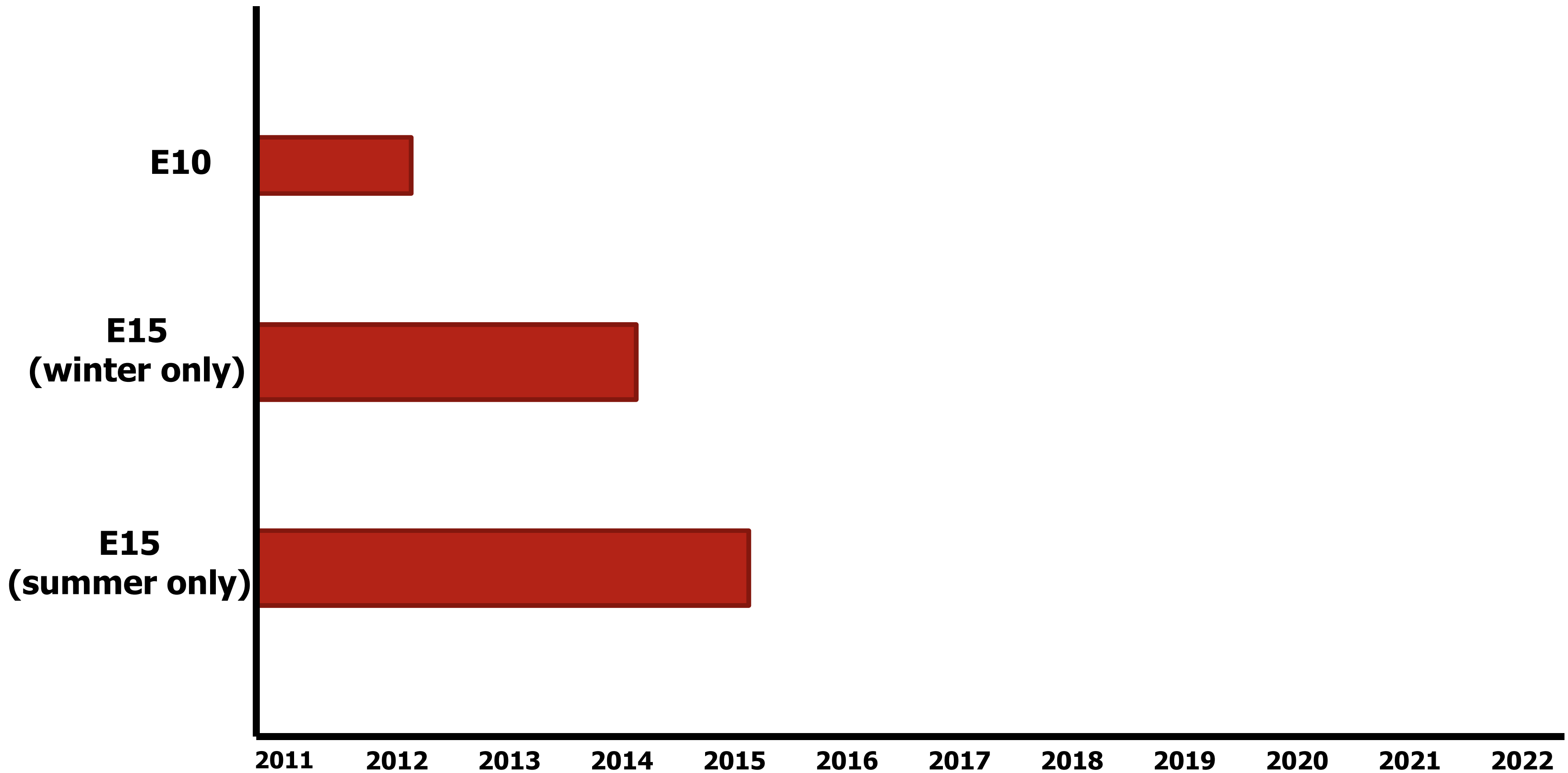
US Ethanol Blend Wall Scenario



* E15 used in Model Year 2001+

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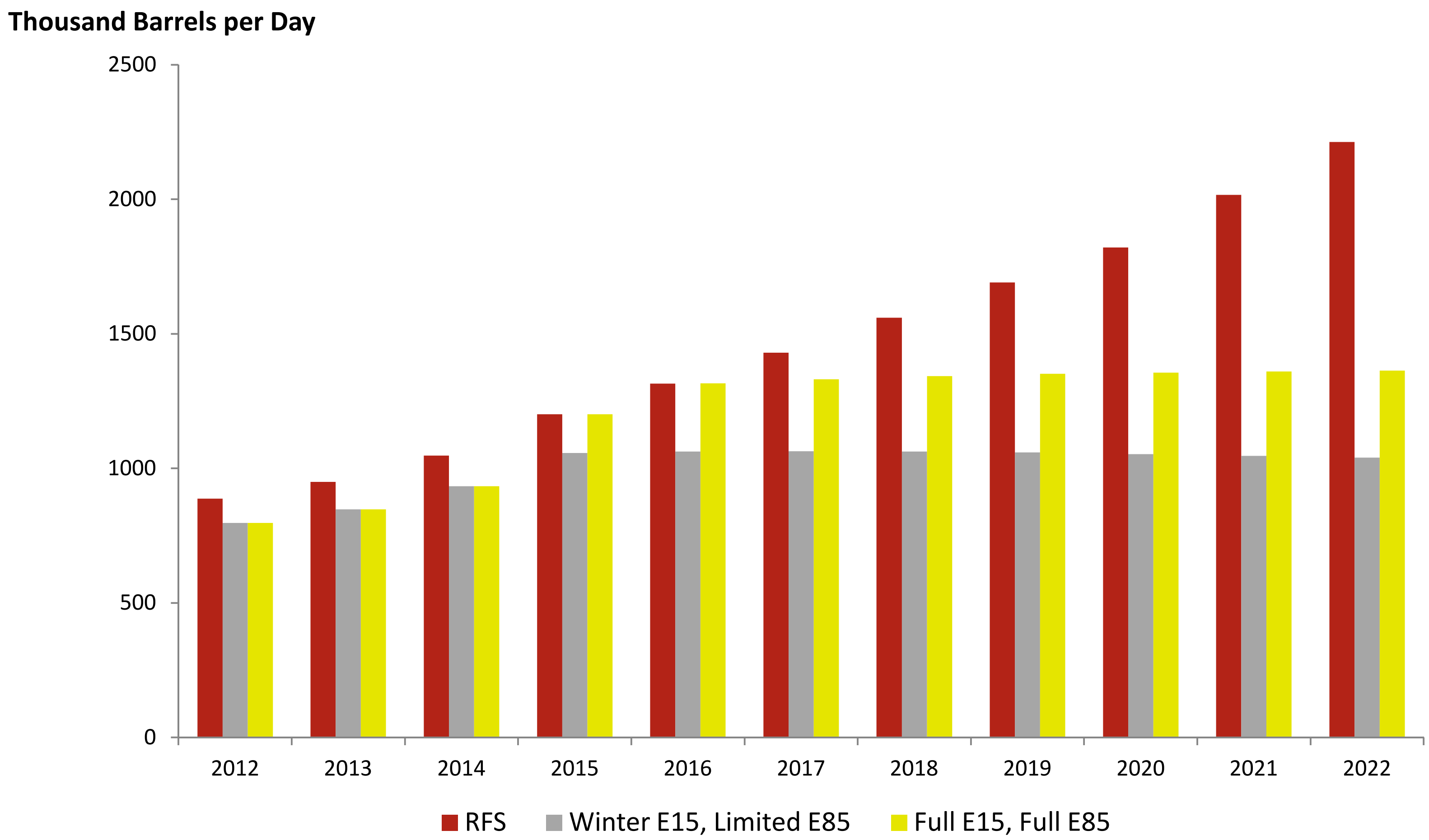
RFS versus Ethanol Blend Capability



Source: Hart Energy's Global Biofuels Center, June 2012

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Next Generation Operating Capacity

25 operating next generation biofuels pilot/demo plants in the U.S.

- 18 cellulosic ethanol plants with capacities ranging from 1,600 gallons per year to 1.5 million gallons per year
- 5 FT or HVO renewable diesel plants: undisclosed to 0.07 gallons per year to 5 million gallons per year
- 2 for biogasoline or biojet

2 operating commercial plants in the U.S.

- Gevo: 18 million gallons per year of butanol
- Dynamic Fuels: 18 million gallons per year of HVO renewable diesel

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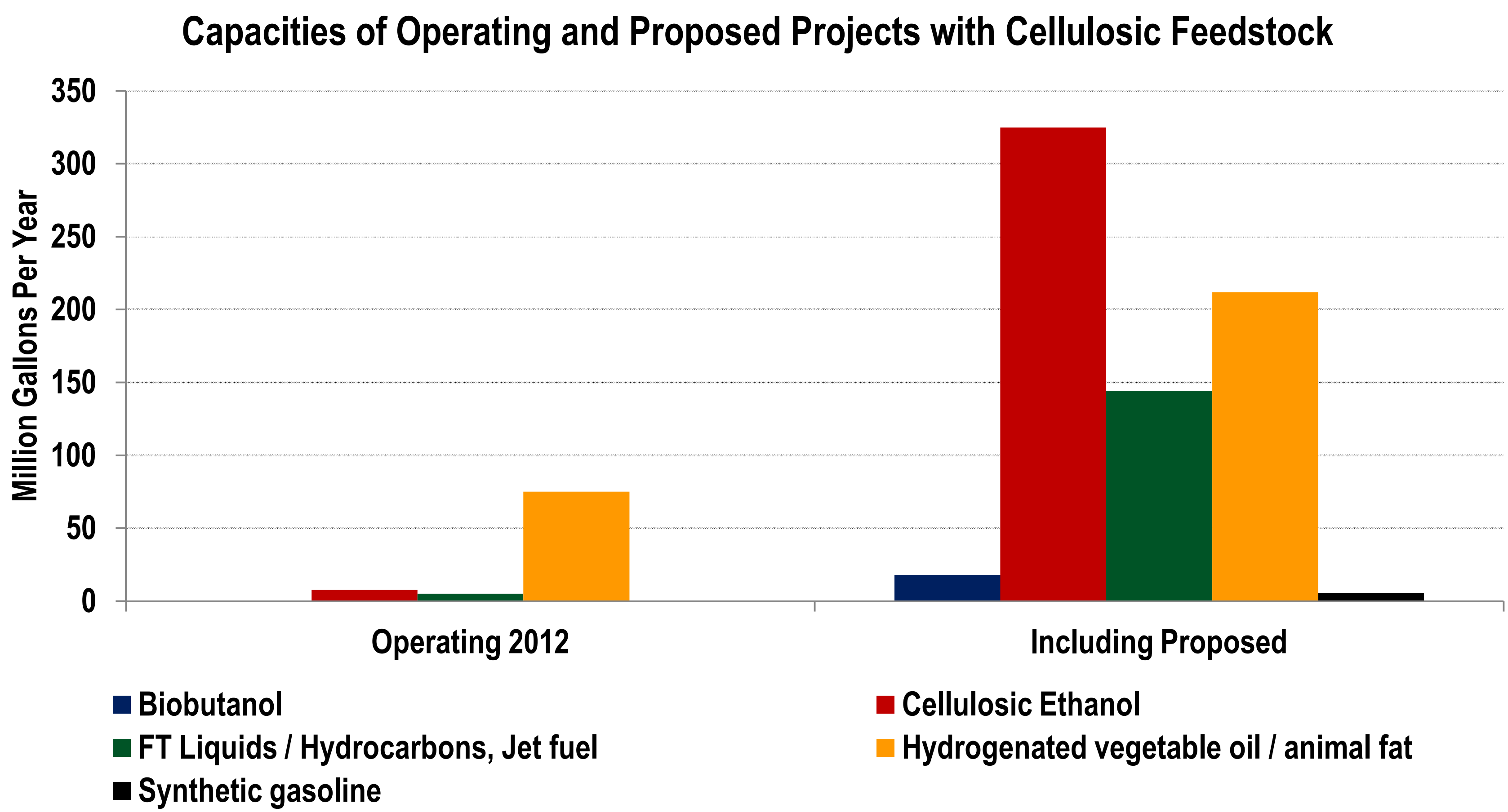
Projects with Cellulosic Feedstock



Source: U.S. & Brazil Ethanol Outlook to 2022, April 2012

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Americas Biofuel Trends

- Continued growth from Brazil, but exports will fall below expectations
- E10 blend wall concerns, E15 only limited solution
- E15 and higher blending constraints and limited E85 use will keep ethanol below RFS requirements
- RFS faces fundamental challenges
  - Blend wall
  - Shortage of cellulosic biofuel
  - Slow commercialization of advanced biofuel technologies
  - Near term limits on sugarcane ethanol imports

Outlook and Conclusions

- Changes to RFS2 likely
- Advanced biofuels costly and limited, but offer improved opportunity for incremental biofuel introduction
- Drop in fuel advantages over ethanol

Thank You! / Questions?

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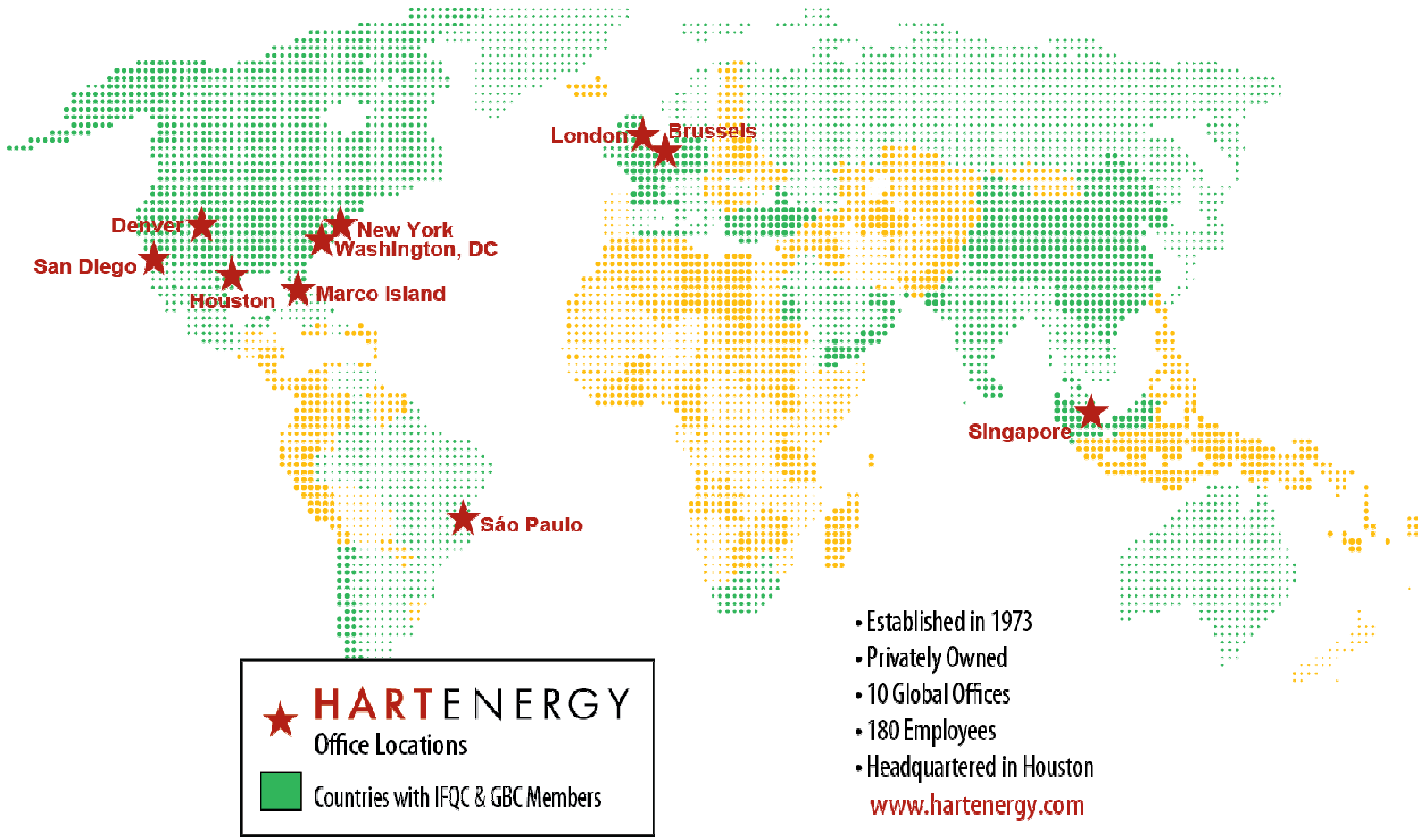

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