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2nd Generation Biofuel Markets: present and future

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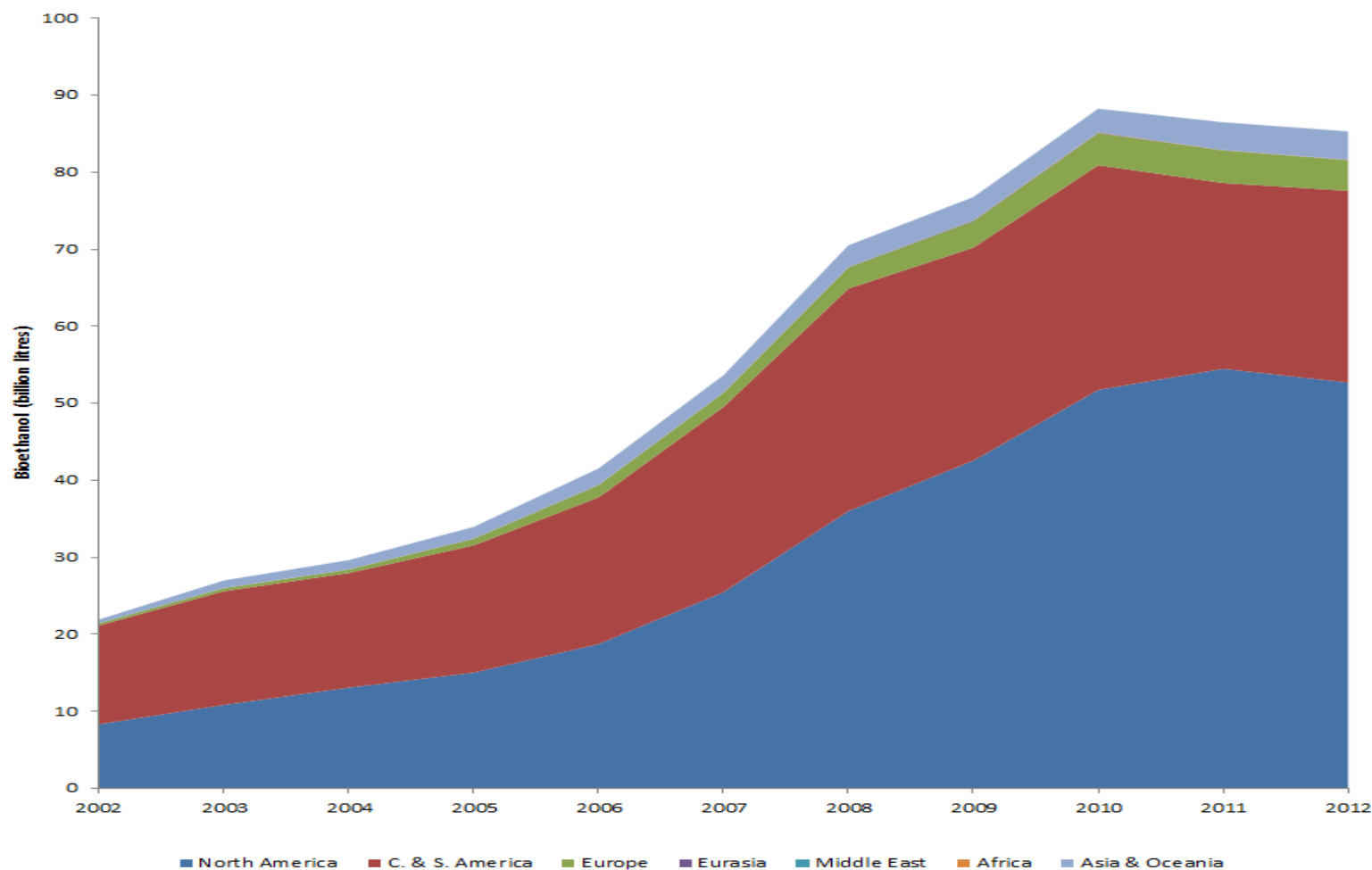
Meeting the SDGs... needs innovation.



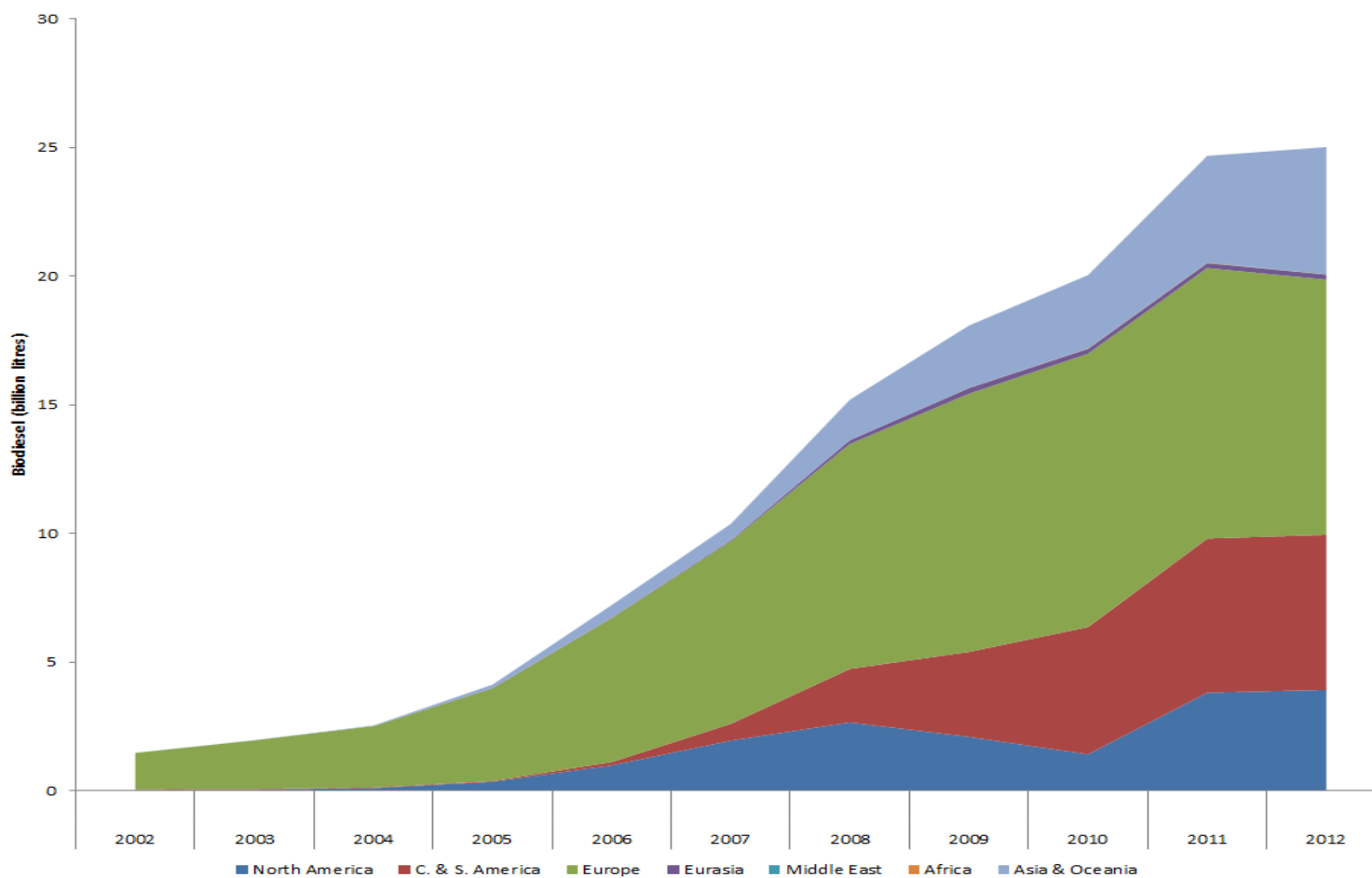
Ensure access to affordable, reliable, sustainable and modern energy for all

How can advanced bioenergy help?

World Bioethanol Market

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World Biodiesel Market

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United Nations Conference on Trade and Development

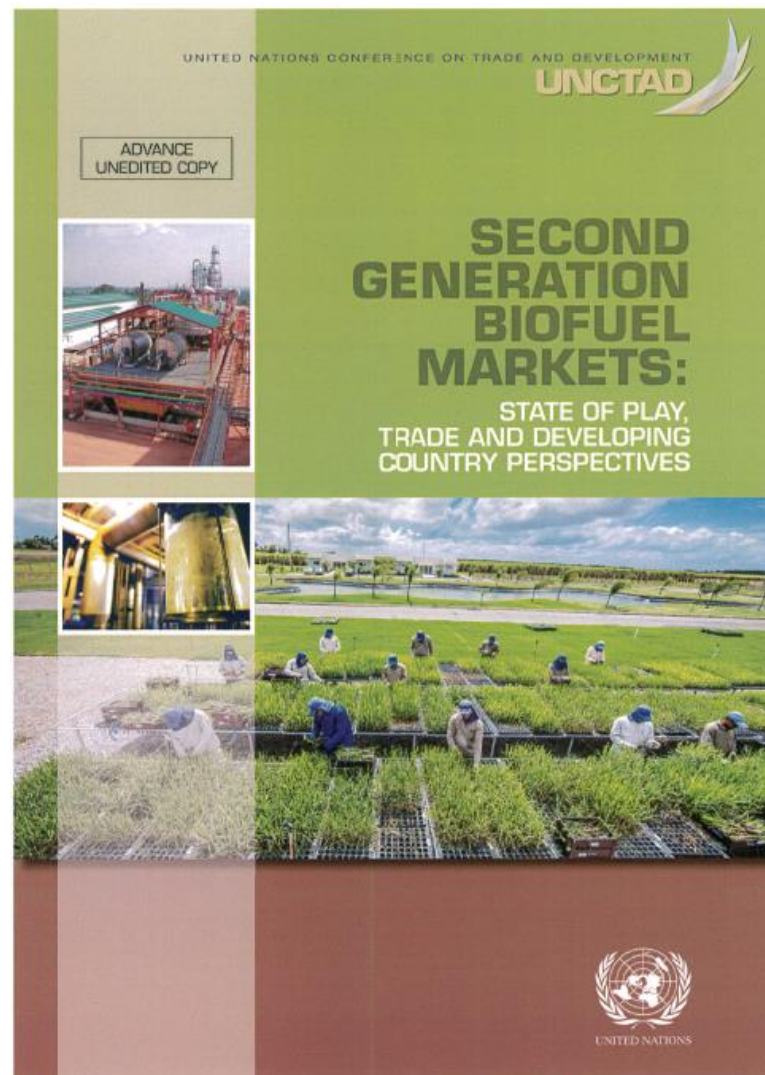
The Biofuels Market: Current Situation and Alternative Scenarios

This report provides a contribution to the Global Bioenergy Partnership (GBEP). It was produced with the support of the Italian Ministry for the Environment, Land and Sea.



United Nations
Geneva and New York, 2009

2008



2016

World installed capacity of cellulosic ethanol - 2015

Region	2G Ethanol Installed capacity (million litres)	% of world total
US	490.37	32%
China	340.19	21%
Canada	303.45	19%
EU	295.63	18%
Brazil	177.34	11%
World (2015) :	1637.26	100%

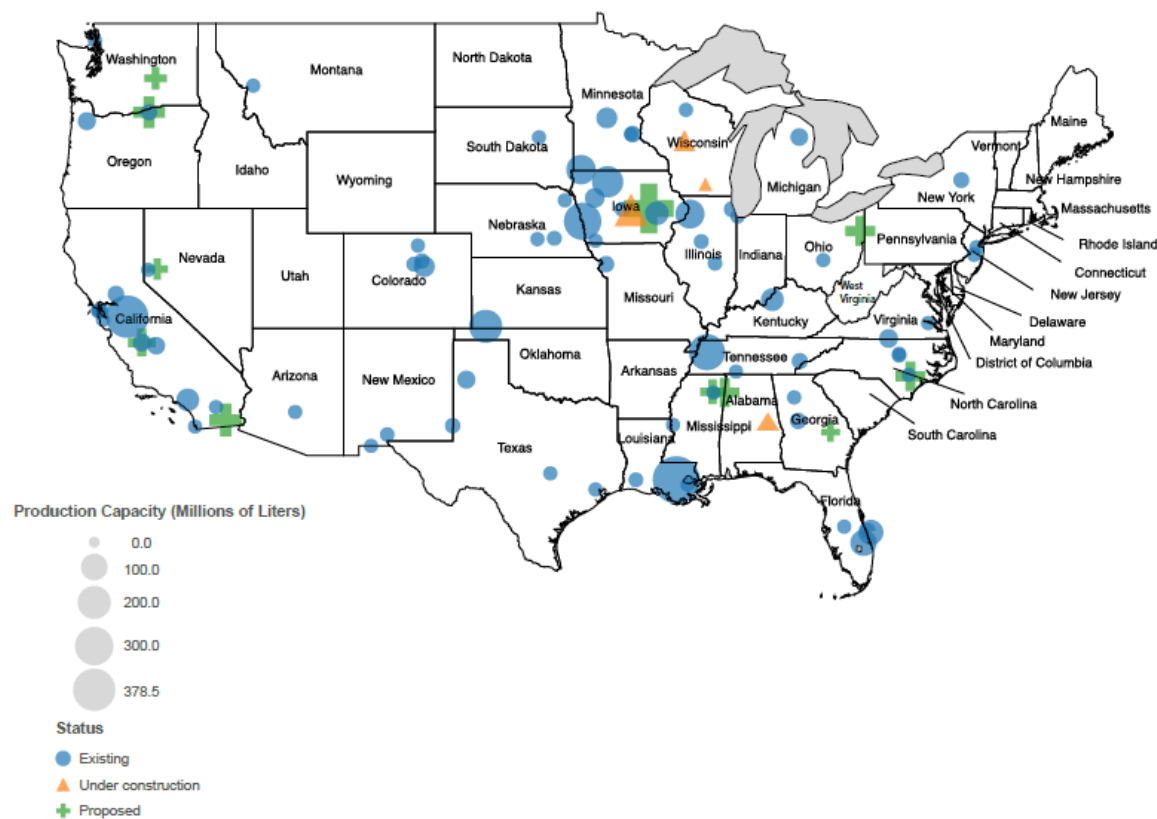


What is driving advanced biofuel markets?

- Supply instruments: Public R&D support, development bank loans for pilot and commercial plants
- Demand-pull: Blending mandates
 - US RFA2; EU 2020 targets
 - Specific blending target for cellulosic biofuels: US
 - Indicative sub-target: EU
- Double counting towards regional targets
- Diversification of business risk, new business/market opportunities
 - Sugarcane/beets perishable; woody biomass can be stored and more easily traded
 - More resilient industries, multiple inputs and outputs, biomaterials
 - Large feedstock potentials in developing world (e.g. Laos, Nepal)



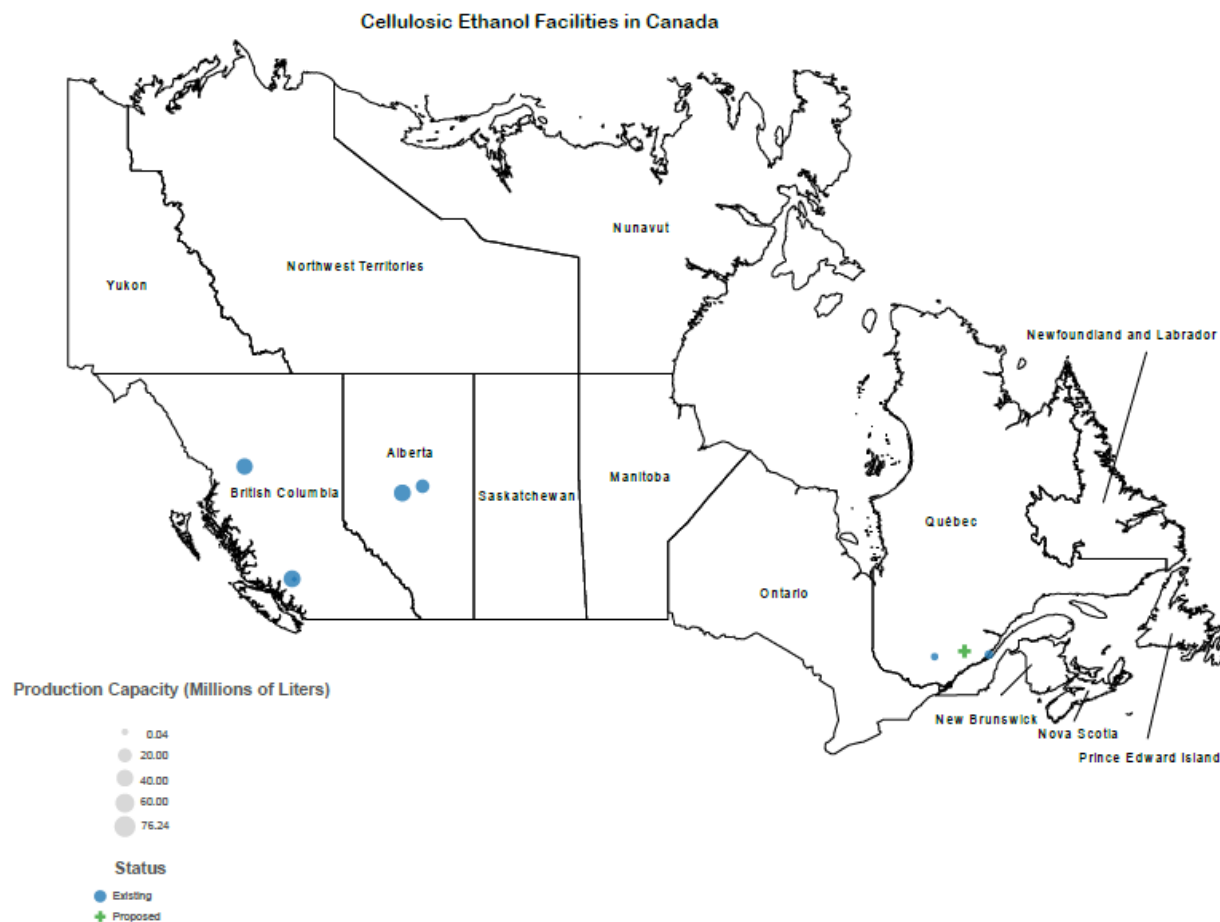
Second-Generation Biofuel Facilities in the United States



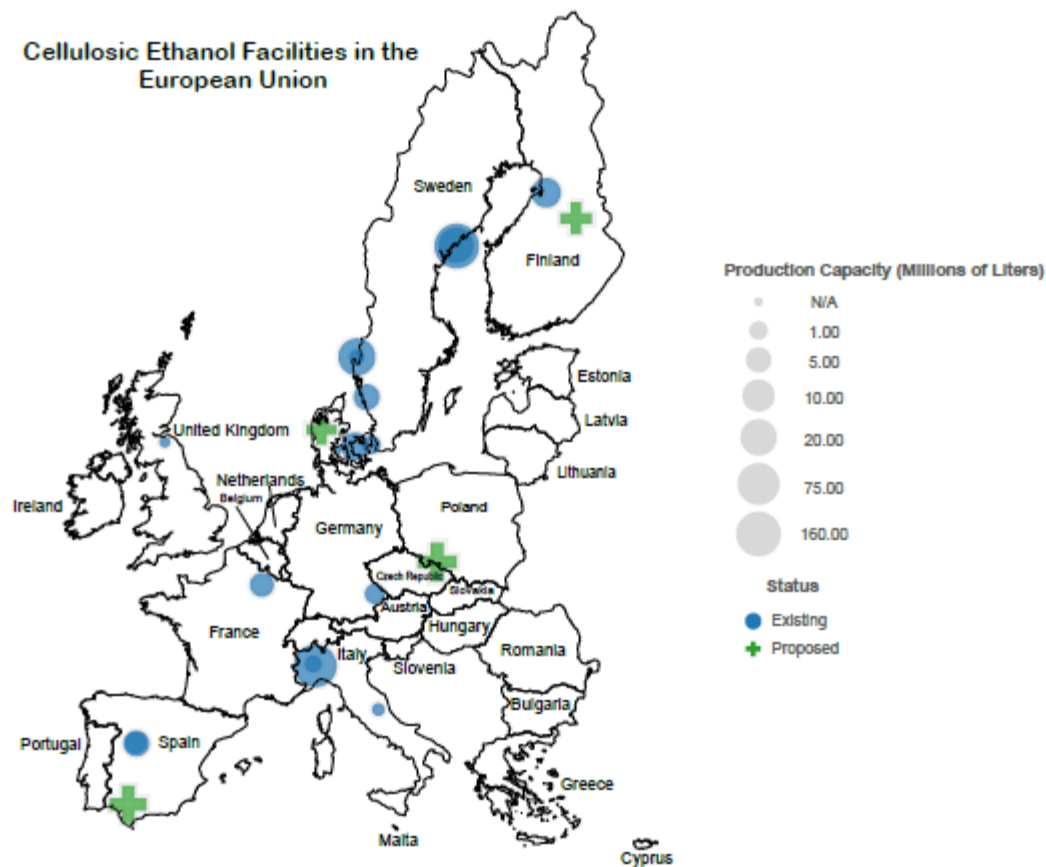
Source: Duke Center for Sustainability & Commerce.



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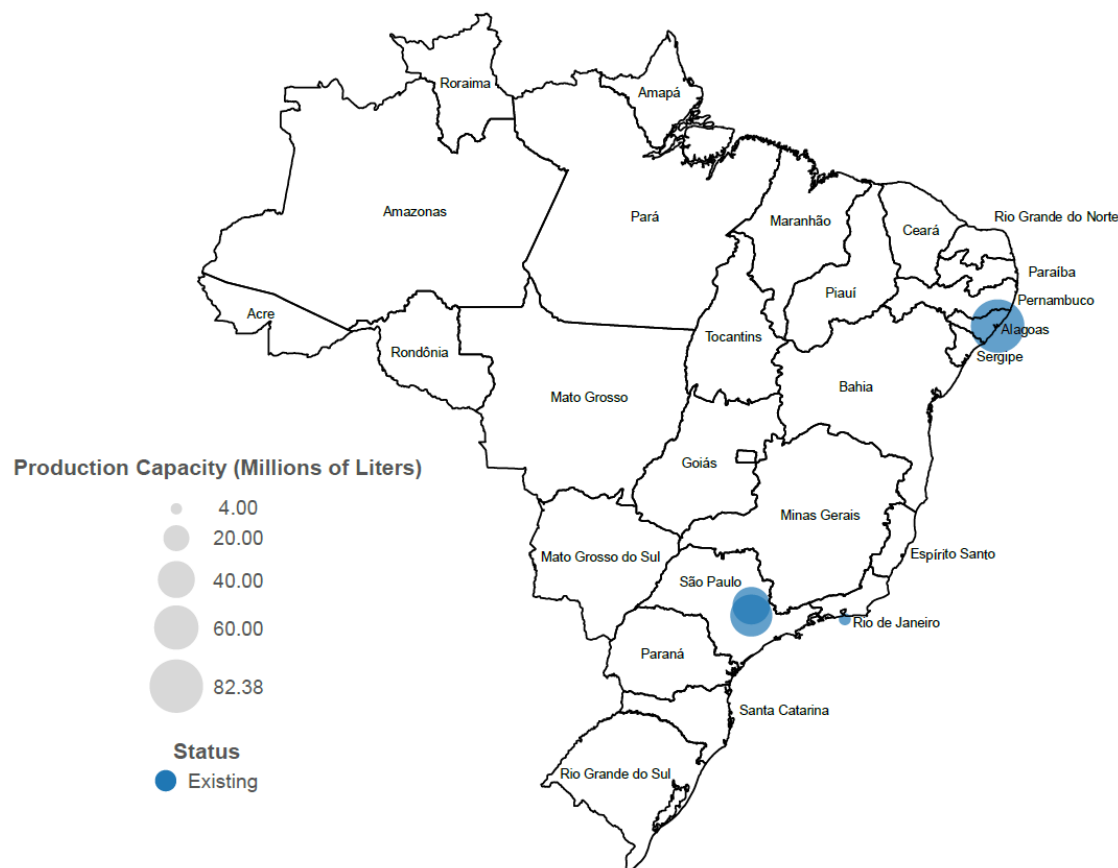
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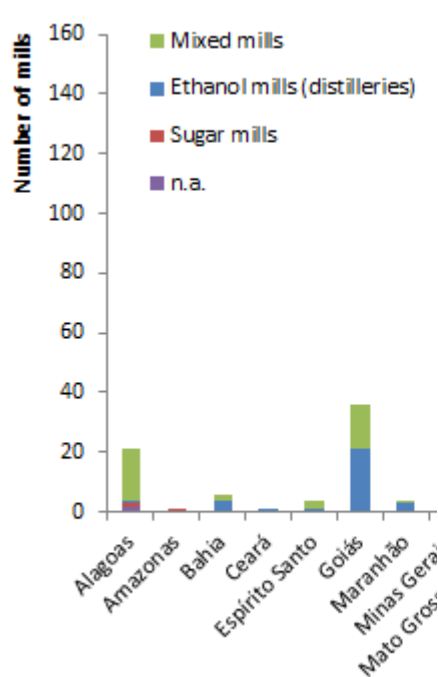


Cellulosic Ethanol Facilities in Brazil



Source: Duke Center for Sustainability & Commerce.

Future projections - BR



Tipo de investimento	2016-20	2021-25	Total
Retrofit de usinas para E2G (1)	2,50	2,50	5,00
Expansão de usinas com E2G (2)	0,75	0,75	1,50
Novas usinas com E2G (2)	0,00	3,50	3,50
Total	3,25	6,75	10,00

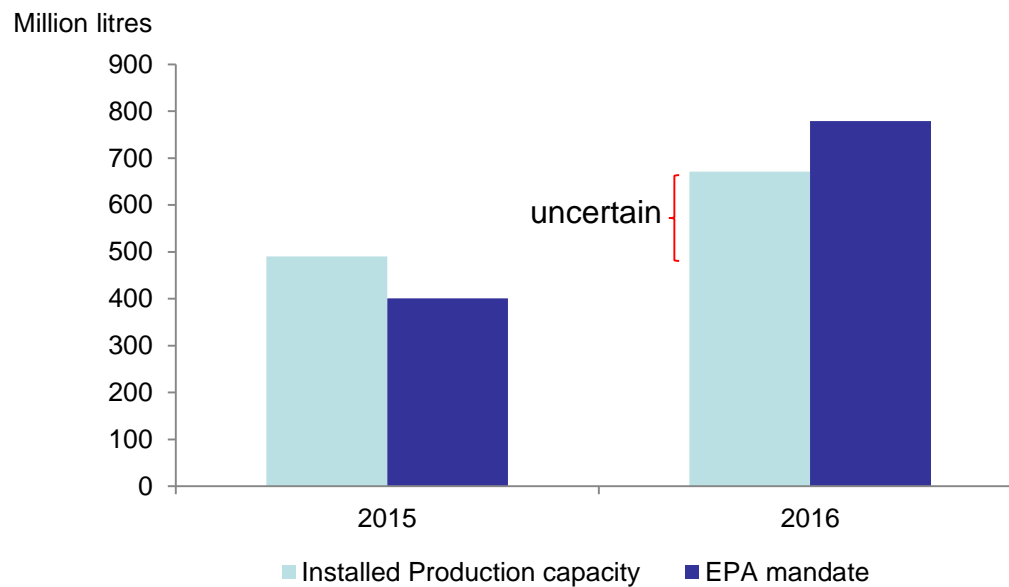
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Source: BNDES

Future projections: US

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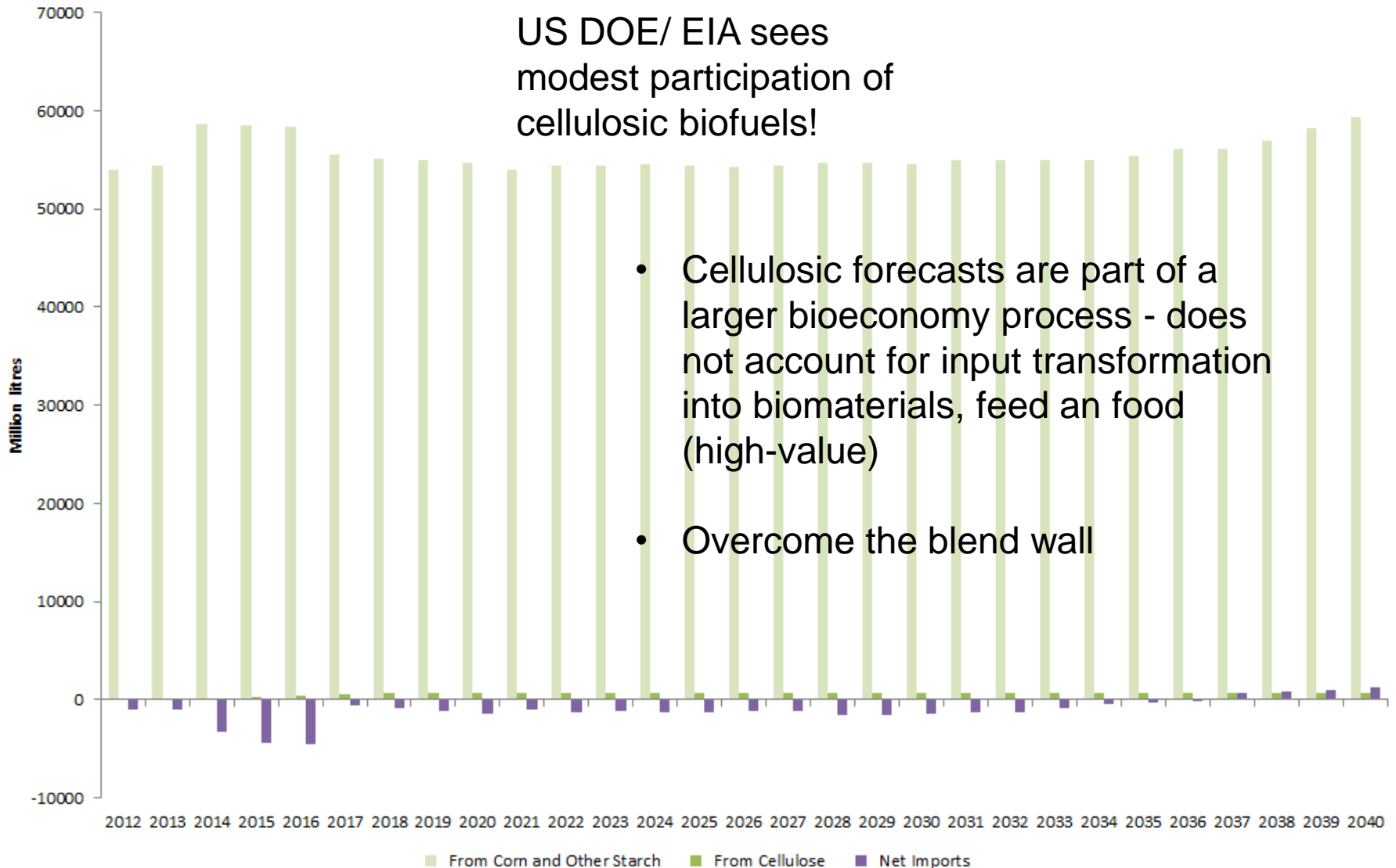
Cellulosic ethanol



Future projections: US (2)

US DOE/ EIA sees
modest participation of
cellulosic biofuels!

- Cellulosic forecasts are part of a larger bioeconomy process - does not account for input transformation into biomaterials, feed and food (high-value)
- Overcome the blend wall





**Can such bioeconomy industries spread
benefits in developing world?**

Private investment already flowing...

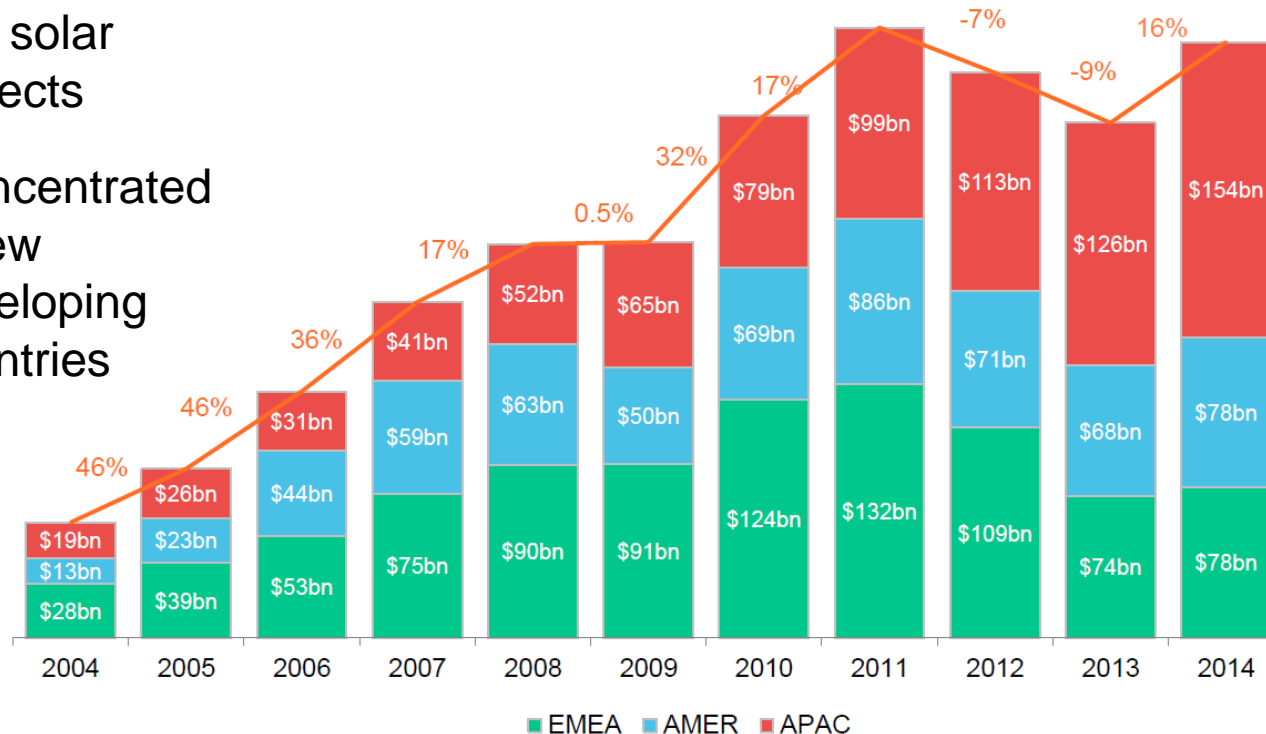
NEW INVESTMENT IN CLEAN ENERGY BY REGION

2004-14 (\$BN)

Bloomberg
NEW ENERGY FINANCE

*most in wind
and solar
projects

*concentrated
in few
developing
countries



Wind&solar:
less «politically
charged» than
biomass

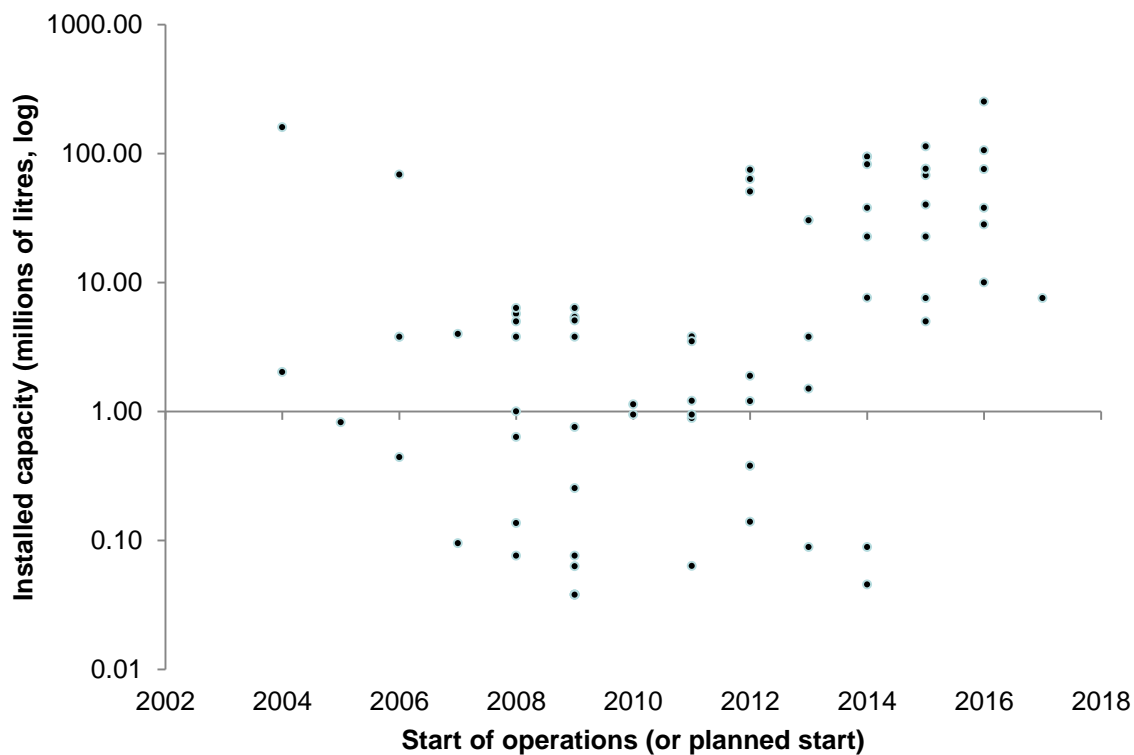
Biofuels:
Regulatory
uncertainty
(e.g. US/RVO;
EU iLUC, etc)

Note: Total values include estimates for undisclosed deals. Includes corporate and government R&D, and spending for digital energy and energy storage projects (not reported in quarterly statistics).

Source: Bloomberg New Energy Finance

Deployment of advanced biofuels

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2nd Generation Project

Where are they absent?

- Eurasia
- Africa
 - Why?
- Advanced economies
 - Mode



ewhere



Biomass Heating -
Sweden



Biomass cookstoves



Can it be done in developing countries?

- Feedstock costs (1st gen)
- **Capital** costs (2nd gen)
 - How to overcome investment risk?
 - Linkages with local economy
 - Agriculture and forestry

- The Swedish Development Finance Institution Swedfund
- The Netherlands Development Finance Company (FMO)
- The African Development Bank (AfDB)
- The German Investment Corporation (DEG)
- The UK-based Emerging Africa Infrastructure Fund (EAIF)
- The Infrastructure Fund managed by Cordiant Capital
- The South African Industrial Development Corporation (IDC), and
- The Belgian Development Bank (BIO)



Addax Bioenergy project in
Makeni, Sierra Leone

8 stakeholders



Conclusions

- Cellulosic fuels now a reality
 - Tech and facilities limited to a handful of countries
 - Uncertain rules / markets slows down deployment
 - Blend wall, sustainability rules, lack of strong push in traditional areas such as BR
 - Unlikely to grow exponentially like 1st gen did 2007-2010
- Investments and tech transfer to developing countries and LDCs is possible
 - International Cooperation -> China sets example
 - Avoid straightjacket adv biofuel models
 - Best returns might be initially elsewhere and in biomaterials
- WTO issues: Likely depend on future industry growth and upcoming regulations

Thank you
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