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# The Bioeconomy as a global trend: Will Europe be able to compete?

Adrian Higson, NNFCC

STATUS OF THE BIOECONOMY

Oslo, 2<sup>nd</sup> September 2015



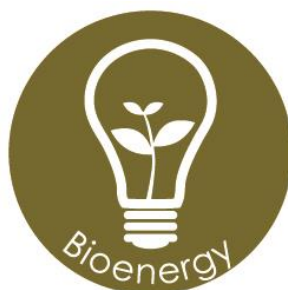


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## A UK based specialist 'not for profit' bioeconomy consultancy

Celebrating over 10 years of bioeconomy development



We view bio-based technologies as key components of the low carbon economy delivering economic, social and environmental benefits.





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# Services & Commercial Partners



NORTH ENERGY





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# Bioeconomy

What does the Bio in  
Bioeconomy mean?

SOME THINGS ARE BEST LEFT UNDERGROUND



MOLES



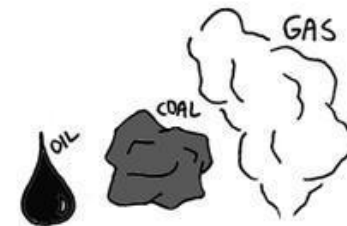
LAVA



UNEXPLODED  
ORDNANCE



CORPSES



FOSSIL FUELS

@CARTOONRALPH

'Bioeconomy...the part of the economy using **biological resources** (biomass), or **bioprocesses**, for the production of value added products, such as food, feed, materials, fuels, chemicals, bio-based products and bioenergy.'

Source:: Building a high value  
bioeconomy –  
Opportunities from Waste' UK  
Government 2015

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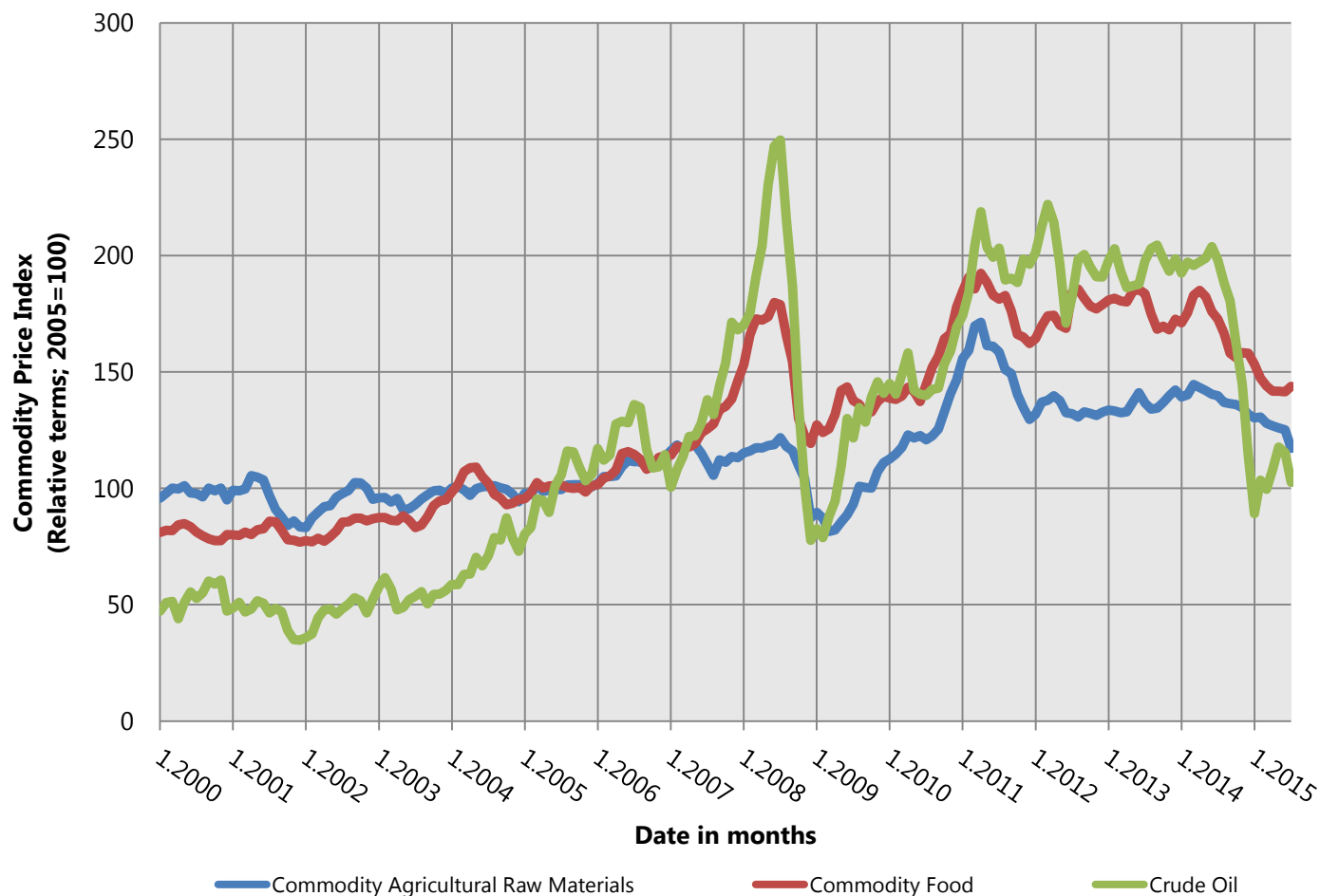




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# Collapsing crude oil price



Source:: IMF

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## Bio-based value propositions

$$value = \frac{functional\ benefit + emotional\ benefit}{monetary\ cost + psychic\ cost}$$

- New or enhanced product performance (in use phase or wider life cycle)
- Lower cost production routes
- Consumer desire for environmentally friendly products
- Value created through policy intervention







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# Brand Equity



## Consumers

- 79% have purchased an environmental product even if it costs more
- 66% have avoided a particular product or brand for environmental reasons
- 39% of consumers always / often look for environmental information on beverage packaging

## Industry

- 70% of influences declare environment has an impact on brand equity
- Recycling and renewability are some of the key areas where industry expects innovation from the packaging sector
- Barriers related to technology, quality and availability of sustainable materials have all declined vs 2013

Source: Environment Research 2015  
Millward Brown report for Tetra Pak

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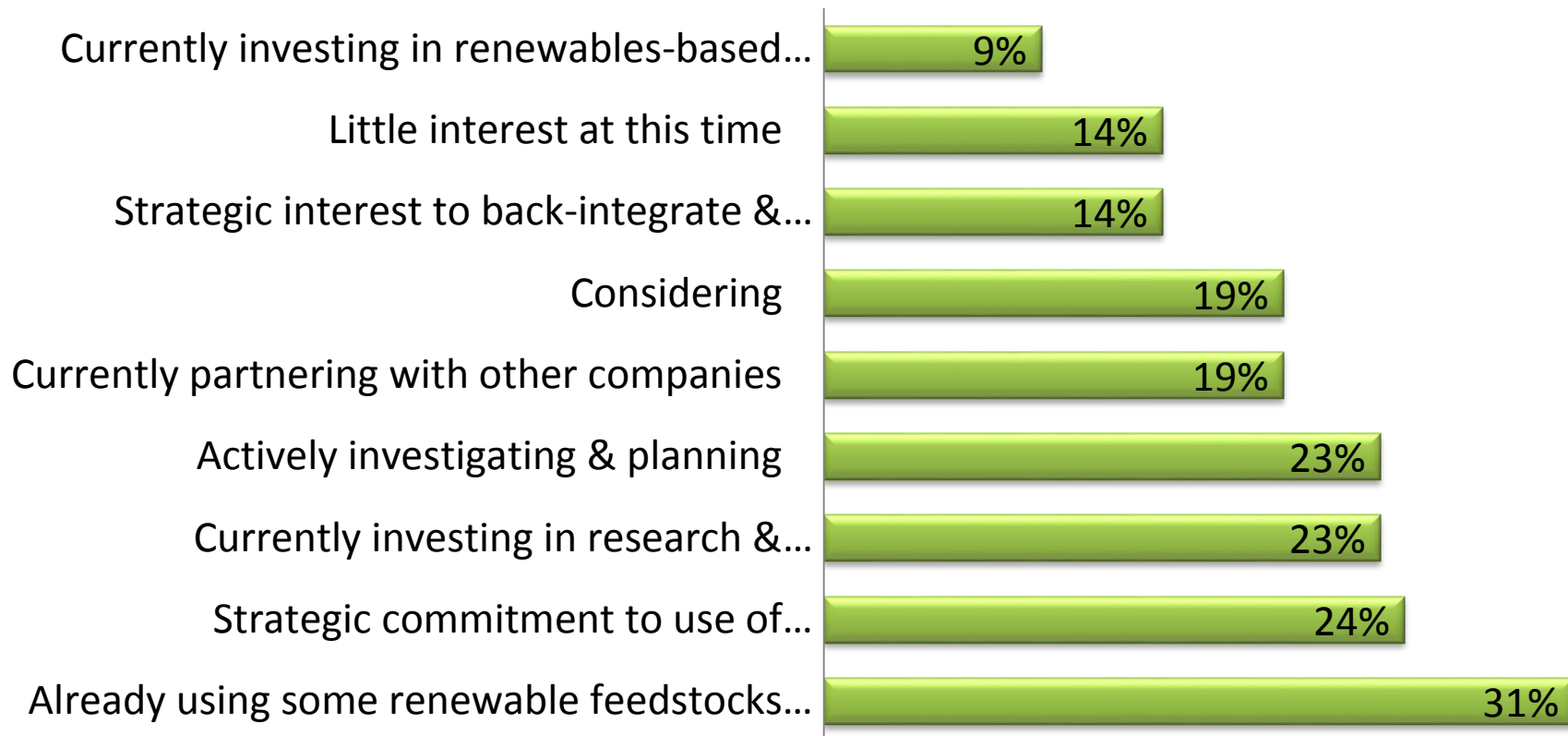




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## ICIS chemical business reader survey on sustainability



Based on responses  
of 960 participants

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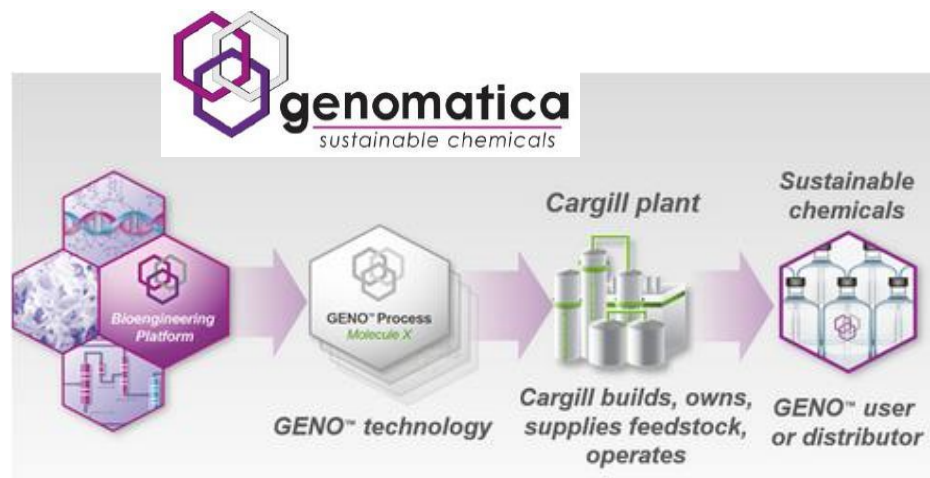


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## Platform Chemicals

Continued market development and progression towards commercialisation. However technical and cost financial remain.



BioAmber @BioAmber · Aug 6

BioAmber **\$BIOA** Announces Opening of World's Largest Succinic Acid Plant in Sarnia:



Maxx Chatsko @MaxxChatsko · Aug 5

Whoah, BioAmber **\$BIOA** went cliff diving at 2pm. No surprises in results yesterday.





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# Material Function - End of life options

Biodegradation and compostability address consumer desires and provide solutions to environmental issues



**FAO Newsroom** @FAOnews · Aug 11

An estimated 5 trillion pieces of #plastic currently float in the world's #oceans, up from none in 1950 [ow.ly/QKoWT](https://ow.ly/QKoWT) #EAFNansen



**Metabolix (MBLX)** @MetabolixInc · Jul 10

#Microplastic #pollution is preventable. Especially with #biodegradable options in development. [bit.ly/1GofPFG](https://bit.ly/1GofPFG)



**TerraVerdae BioWorks** @TerraVerdae · Aug 4

We have the alternative! >>>Ottawa plans to ban microbeads over environmental concerns [ctv.news/WVRasrd](https://ctv.news/WVRasrd) #microbeads







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## Novel Applications: 3D Printing



Award-winning Aenimal Bhulk mountain bike (Credit: Eurocompositi)





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# Disruptive Technology: Synthetic Biology



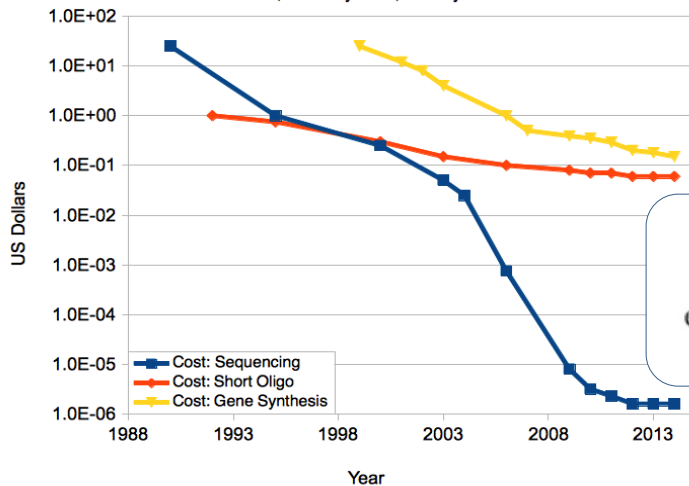
Amyris @Amyris · Jun 3

Amyris Officially Launches Biossance™,  
Its Consumer Beauty Brand

Explosion of start-up companies targeting  
markets from flavours and fragrances to  
personal care products

Price Per Base of DNA Sequencing and Synthesis

Rob Carlson, February 2014, [www.synthesis.cc](http://www.synthesis.cc)



Eve @EvolvaTweets · Aug 13

#DYK: Nootkatone associated w/ grapefruits is used by #perfumers  
for a fresh clean scent.





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# European Bioeconomy

## The Challenges

Exploitation of natural resources

Climate Change

Pressure of biodiversity

Population growth

## Current Value

- Worth an estimated €2 trillion
- Accounts for 22 million jobs
- 9% of total employment in the EU

## Tackling societal challenges

- Ensure food security
- Create jobs & maintaining competitiveness
- Mitigate & adapting to climate change
- Reduce dependence on non-renewable resources
- Manage natural resources sustainably



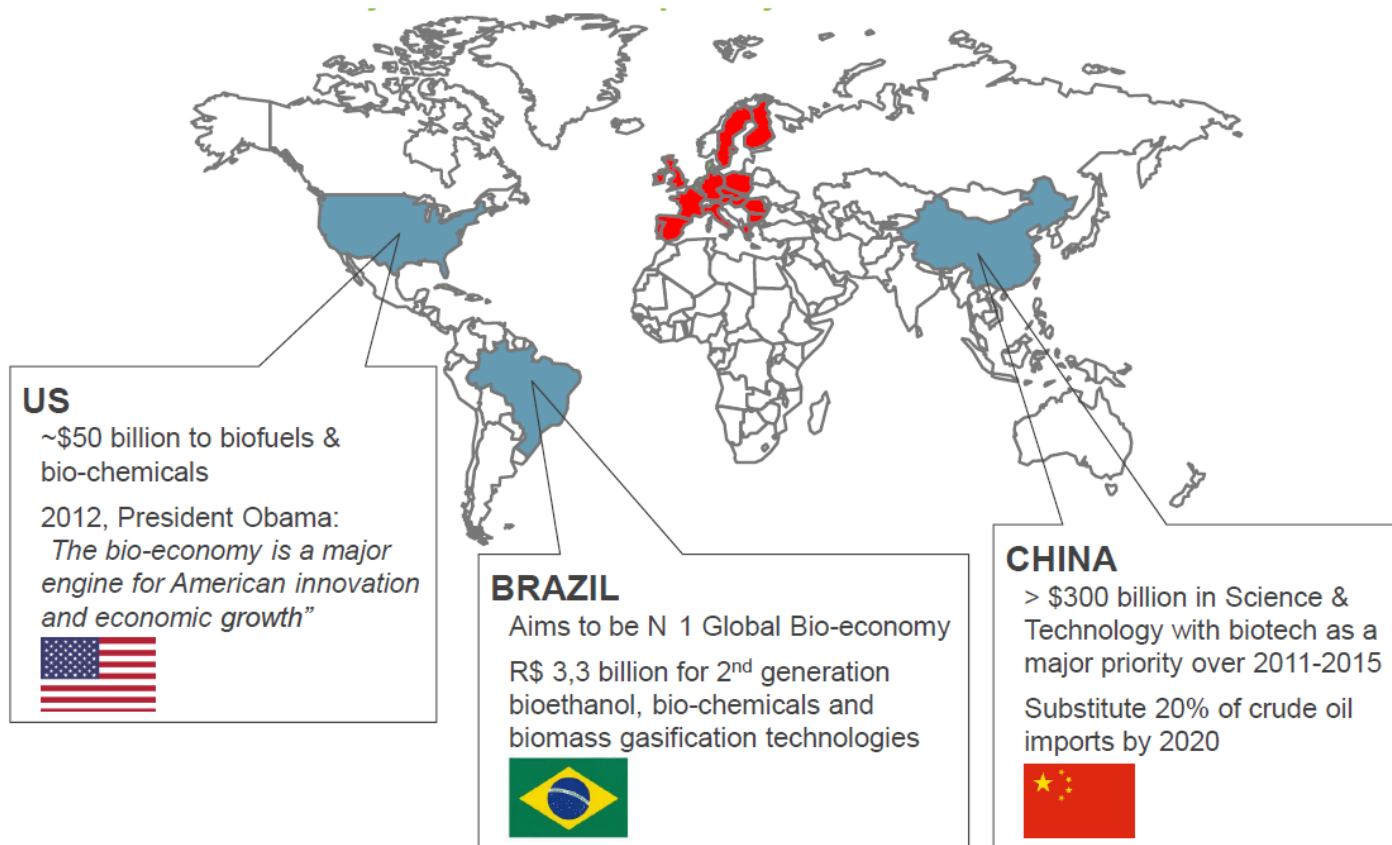




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# Bioeconomy: A global race



Source:







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## Europe's competitive position

Competitiveness  
relative to US, Brazil  
and China of Europe  
sugar platform.

Source: E4Tech, RECORD,  
Wageningen UR



Production costs  
Policy landscape  
Commercial activity



R&D excellence





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## Innovating for Sustainable Growth: A Bioeconomy for Europe (Feb, 2012)



### Action Plan

- Invest in research, innovation and skills
  - Significant investment, Cross sectorial and multi-disciplinary research , Human capacity
- Reinforce policy interaction and stakeholder engagement
  - Bioeconomy Panel, Bioeconomy Observatory, regional & national strategies, international collaboration
- Enhance of markets and competitiveness in bioeconomy
  - Knowledge, Networks, Standards, Labels





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## European Networks



**Bio Base NWE**

Innovation and training  
for the biobased economy



**Biorefining & Bioenergy**

AN ENTERPRISE IRELAND  
& IDA IRELAND INITIATIVE

**CLIB**  
2 0 2 1  
CLUSTER  
INDUSTRIELLE  
BIOTECHNOLOGIE



**Bio Base Europe**  
Pilot Plant



**Bio Base Europe**  
Training Center



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**GHENT  
BIO-ECONOMY  
VALLEY**



**NV REWIN**  
WEST-BRABANT

[www.biobasenwe.org](http://www.biobasenwe.org)

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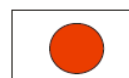
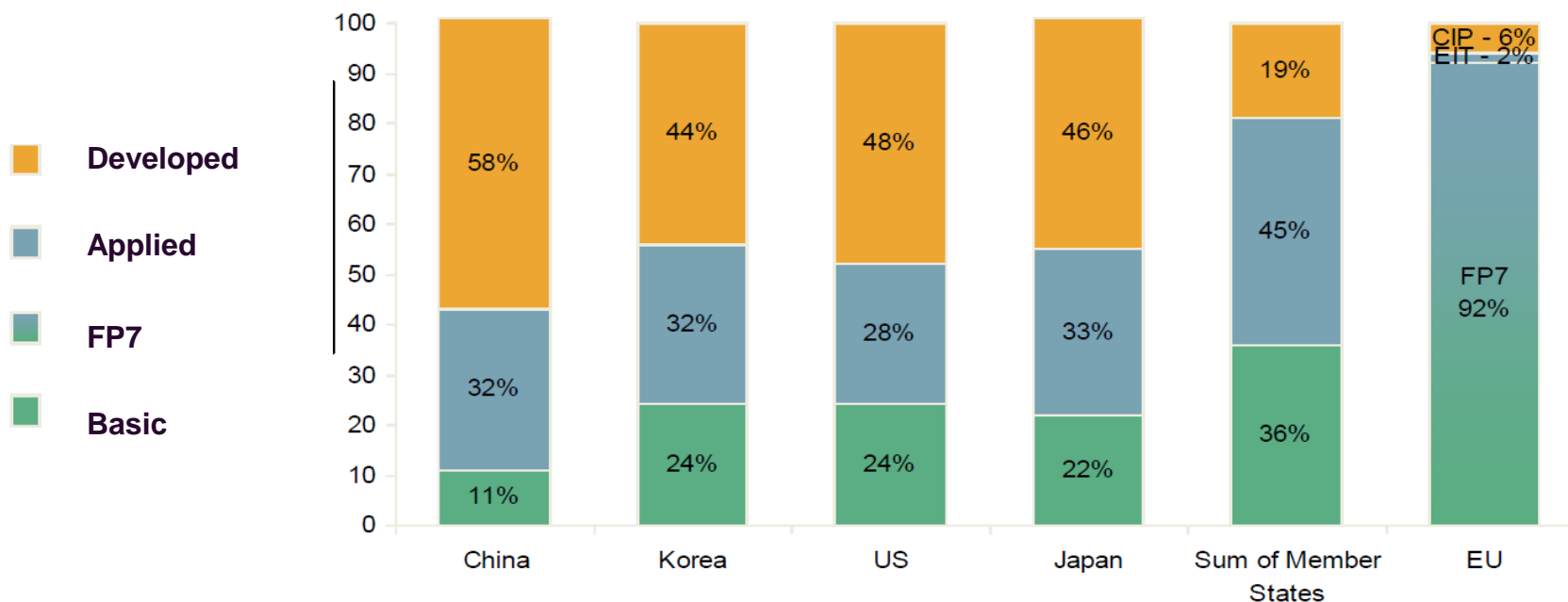




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# Public funding and the valley of death



Source: Novozymes  
Key Science and  
Engineering Indicators,  
National Scientific Board,  
2010 Digest, NSF,  
<http://cordis.europa.eu/erawatch>, OECD "Research &  
Development Statistics

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Source:



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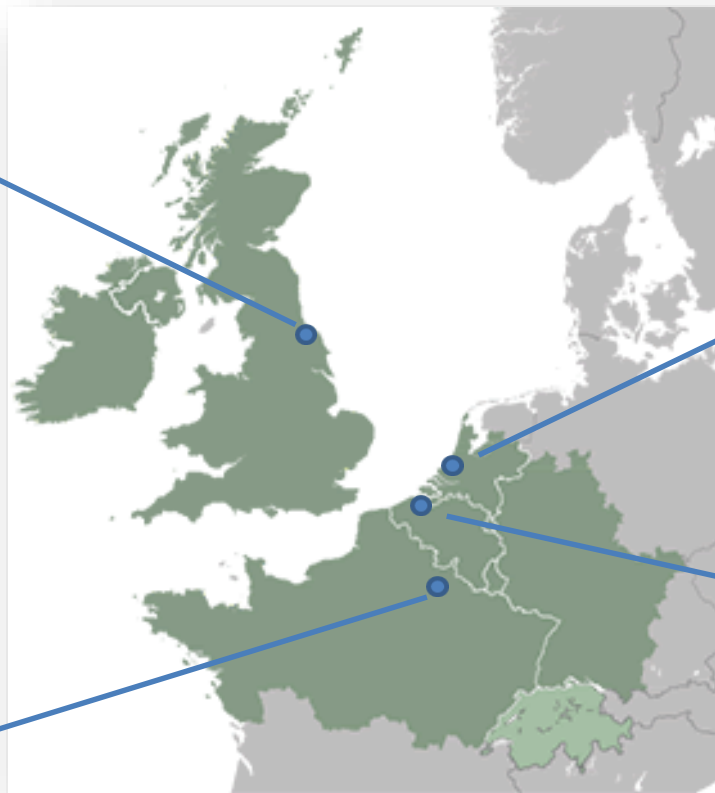


Bio Base NWE

Innovation and training  
for the biobased economy



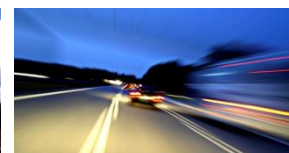
## Accessing pilot capabilities



BIOPROCESS  
PILOT FACILITY



Bio Base Europe  
Pilot Plant





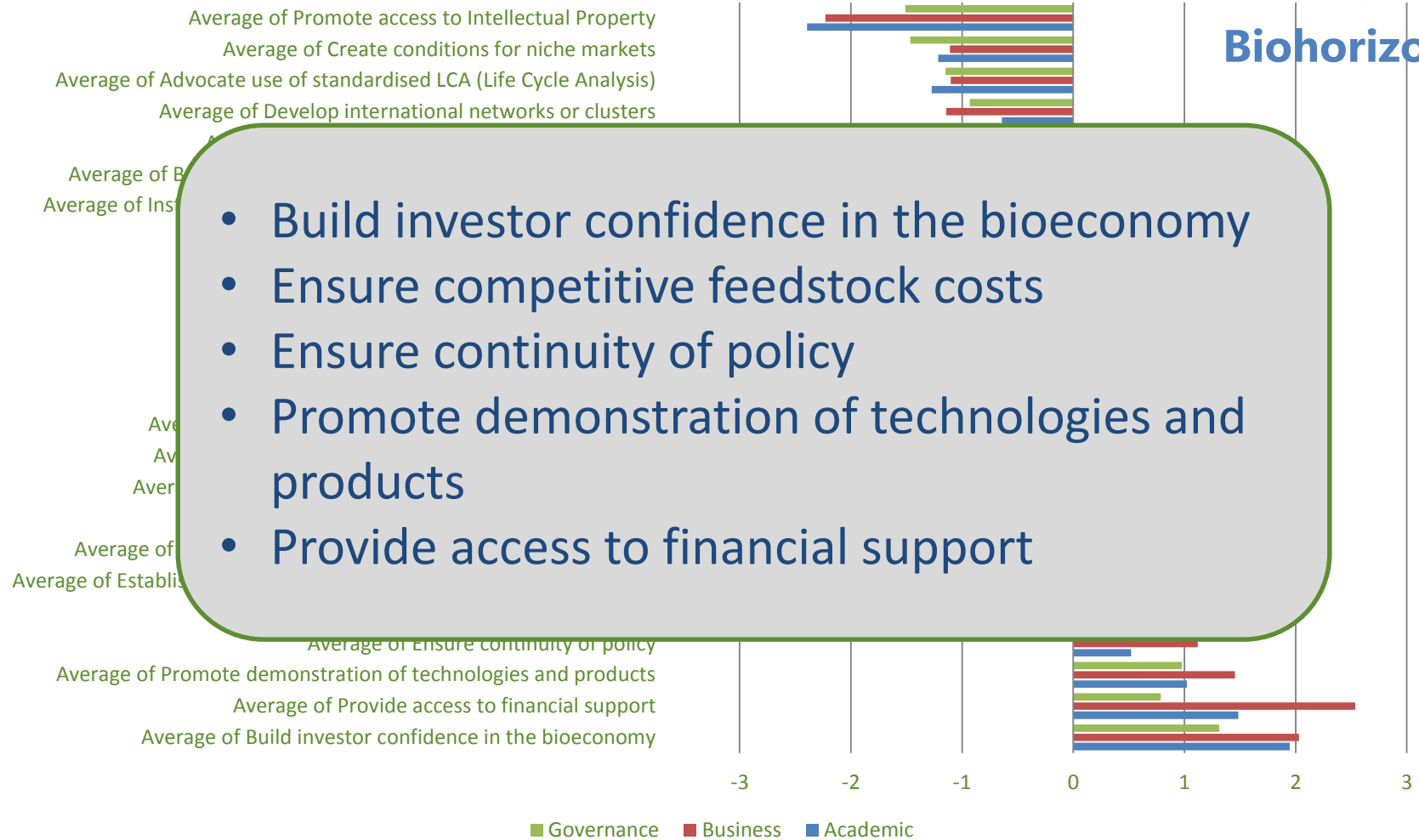


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Biohorizons





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# Creating markets

While Europe develops standards the US develops markets

## BioPreferred®



USDA Dept. of Agriculture @USDA

Following

A new report shows the #biobased industry contributes \$369B & 4M jobs to US economy [1.usa.gov/1d1psPN](http://1.usa.gov/1d1psPN) #RuralMade

### Key Findings of the U.S. Biobased Products Industry in 2013

**4 Million**

The number of American jobs contributed by the U.S. biobased products industry in 2013

**\$369 Billion**

Value added contribution to the U.S. economy from the U.S. biobased products industry in 2013

**x2.64**

The jobs multiplier: for every 1 biobased products job, 1.64 more jobs are created in the United States

#ruralmade USDA





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# EU Companies participating in USDA BioPreferred Programme

BioPreferred®





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## Summary

Europe can compete and already does,

- World leading research and innovation capabilities
- Globally competitive companies
- Developed agriculture and forestry with available feedstock
- Market opportunity and consumer awareness

To enhance competitiveness Europe needs to,

- Focus on value and inherent technology advantages
- Implement progressive market development
- Introduce clear and stable long term policies
- Provide competitive financing mechanisms for large scale biorefinery projects and access to competitive feedstock







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# Thank you for listening

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@biobasedchem





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## Celebrating 10 years of Bioeconomy development

NNFCC is a UK based consultancy with expertise on the conversion of biomass to **bioenergy, biofuels** and **biobased products**.

We help industry solve complex business challenges and provide vital evidence for policy makers.



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