

The Bioeconomy to 2030: Is there a plan or are we muddling through?

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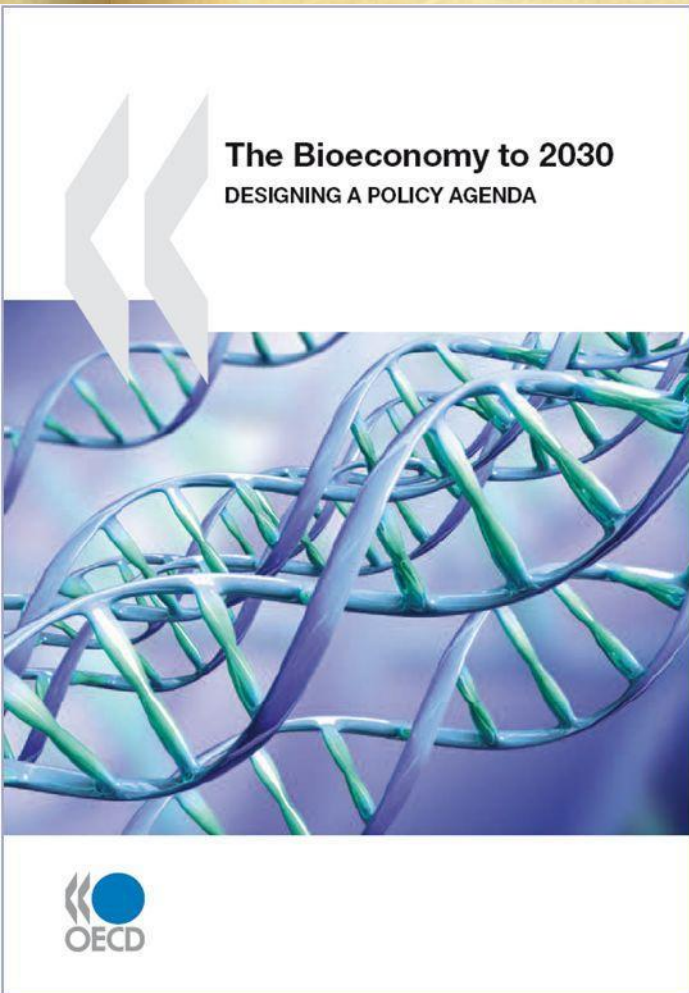
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- ◆ 1- Bioeconomy 2030: Designing a policy agenda (2009)
- ◆ 2- What 's in a name: issues of definitions
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I-The Bioeconomy to 2030



- ◆ 2-year project examines the future of biotechnology and socio-economic impacts
- ◆ 2006-2009 from onset to publication
- ◆ Covers the application of biotechnology to:
 - ◆ Agriculture
 - ◆ Health
 - ◆ Industry

Don't neglect agriculture and industry

Application	Share of total OECD business expenditures on biotech R&D in 2003	Estimated potential share of total biotechnology gross value added (GVA) ¹ in the OECD area ² for 2030
Health	87%	25%
Agriculture	4%	36%
Industry	2%	39%
Other	7%	-
	100%	100%

1. Detailed methodology for determining potential share of GVA is included in the publication.

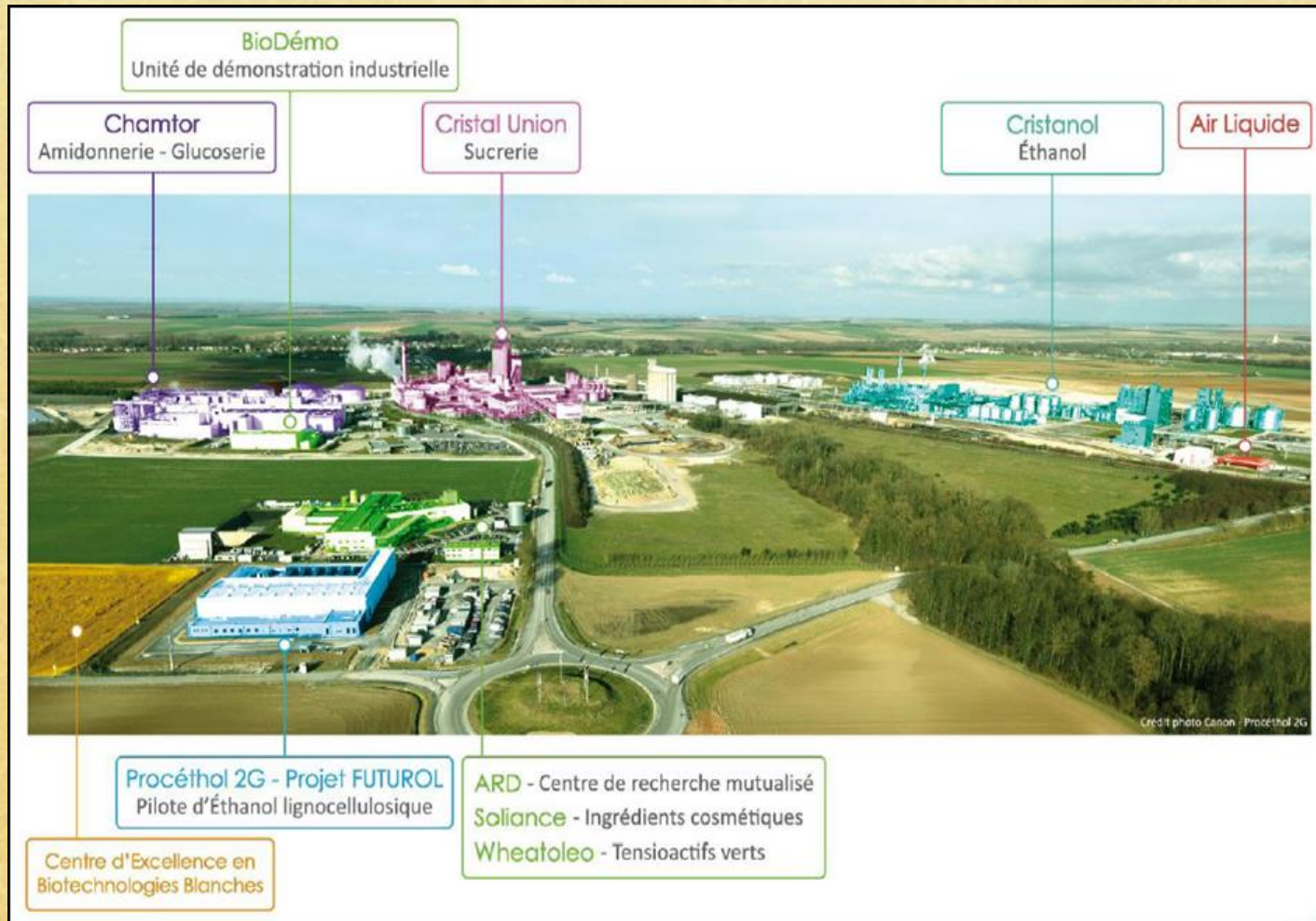
2. Most OECD member countries plus several EU-25 countries that are not members of the OECD.

Source: For the distribution of biotech R&D expenditures, OECD (2006), Biotechnology Statistics, OECD, Paris.

- The solution is not to reduce R&D expenditures in health, but to encourage substantially greater public and private investment in other applications of biotechnology.

Bazancourt-Pomacle biorefinery: profile

- 11 industrial and R-D actors on the same site
- 260 has, 1200 jobs (direct), 600 indirect
- cumulative investment in 2012 Euros: 1 bn Euro
- 700 million Euros turnover
- 2 million metric ton of sugar beets and
1 million ton of wheat as inputs
- built over 70 years
- TRL covered: 1 to 9 (one of only four sites in Europe)



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Figure 2.6. Vue panoramique de la plateforme de Bazancourt-Pomacle

Problems of definitions

- ♦ Bioeconomy: Lack of internationally agreed definition (no international comparisons, no databases, trade etc.)
- ♦ Biowaste: «wet » or « dry » not specified
- ♦ Biobased products (EC directive ?, USDA Preferred Program ?)

Proposal:

- a) Creation of a multilateral group of pioneers (OECD)
- b) Limit to agro and industrial bioeconomy ?

II- With or without roadmaps ?

- ◆ EC: Directive 2009/28/EC Renewable Energy Directive +2012 EC Strategy: A bioeconomy for Europe
- ◆ USA: National Bioeconomy Blueprint, 2012
- ◆ Finland, Germany, NL, UK versus France, Italy.
- What if « no teeth », lack of appropriate scope (chemicals in Europe) ?
- What if policies are not consistent over time ?
- What if competitiveness is not there ? Level playing field ?

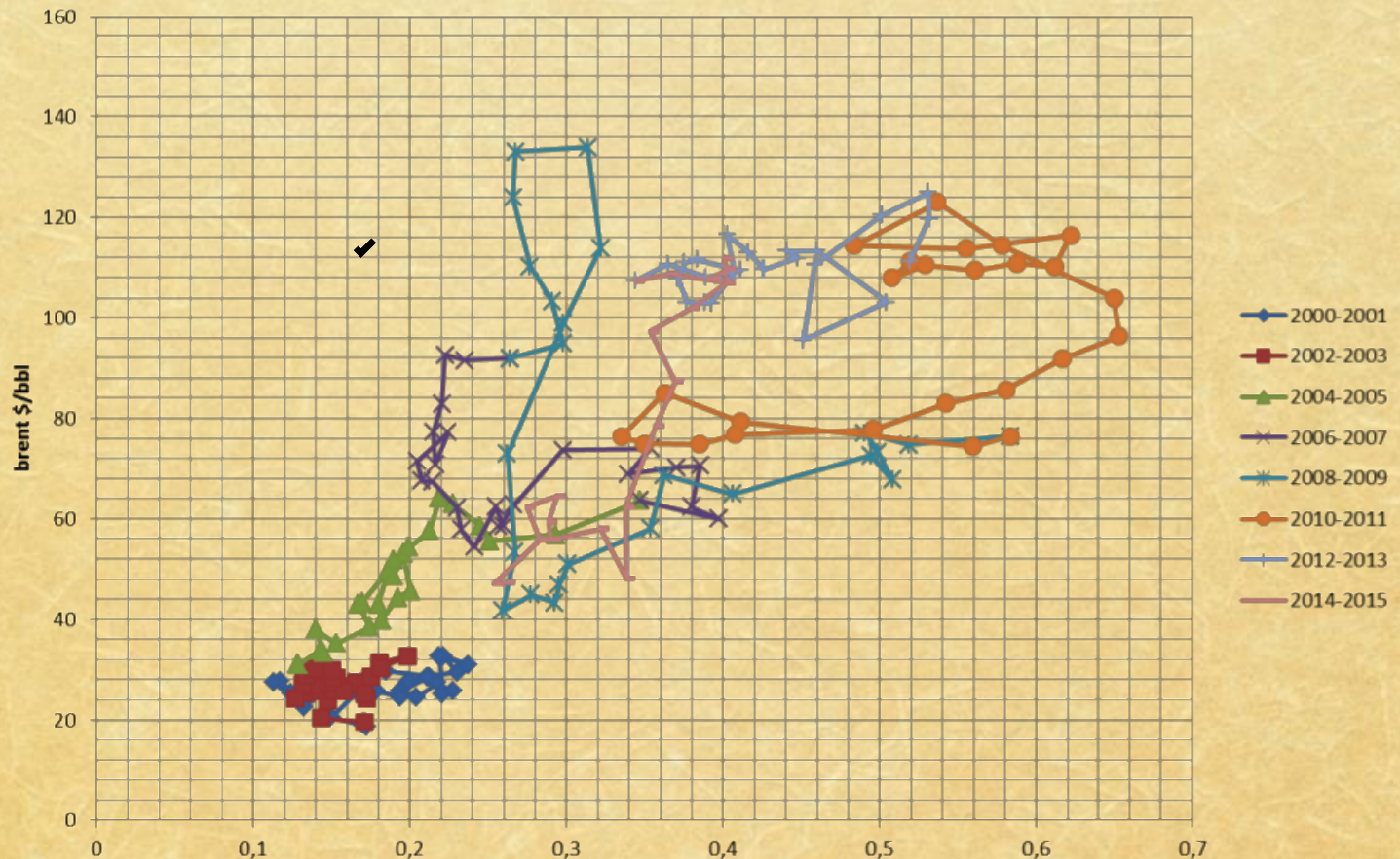
References (USA, EC)

- ◆ USDA/DOE: Federal Activities Report on The Bioeconomy (Feb. 2016): compendium of measures
- ◆ USDA Farm Bill (2015) : biomass, loan guarantees for higher value added biobased specialty chemicals
- ◆ EC: negotiation around update of Directive RED (biofuel mandate, 2015)

III- Competitiveness under adverse circumstances ?

- ◆ Volatility becoming a major impediment ?
- ◆ Relative prices of oil and gas versus biomass ?
- ◆ Unintended consequences of substitution between gaz and coal in Europe
- ◆ International trade and changes in production patterns?
- ◆ Solutions, answers ?

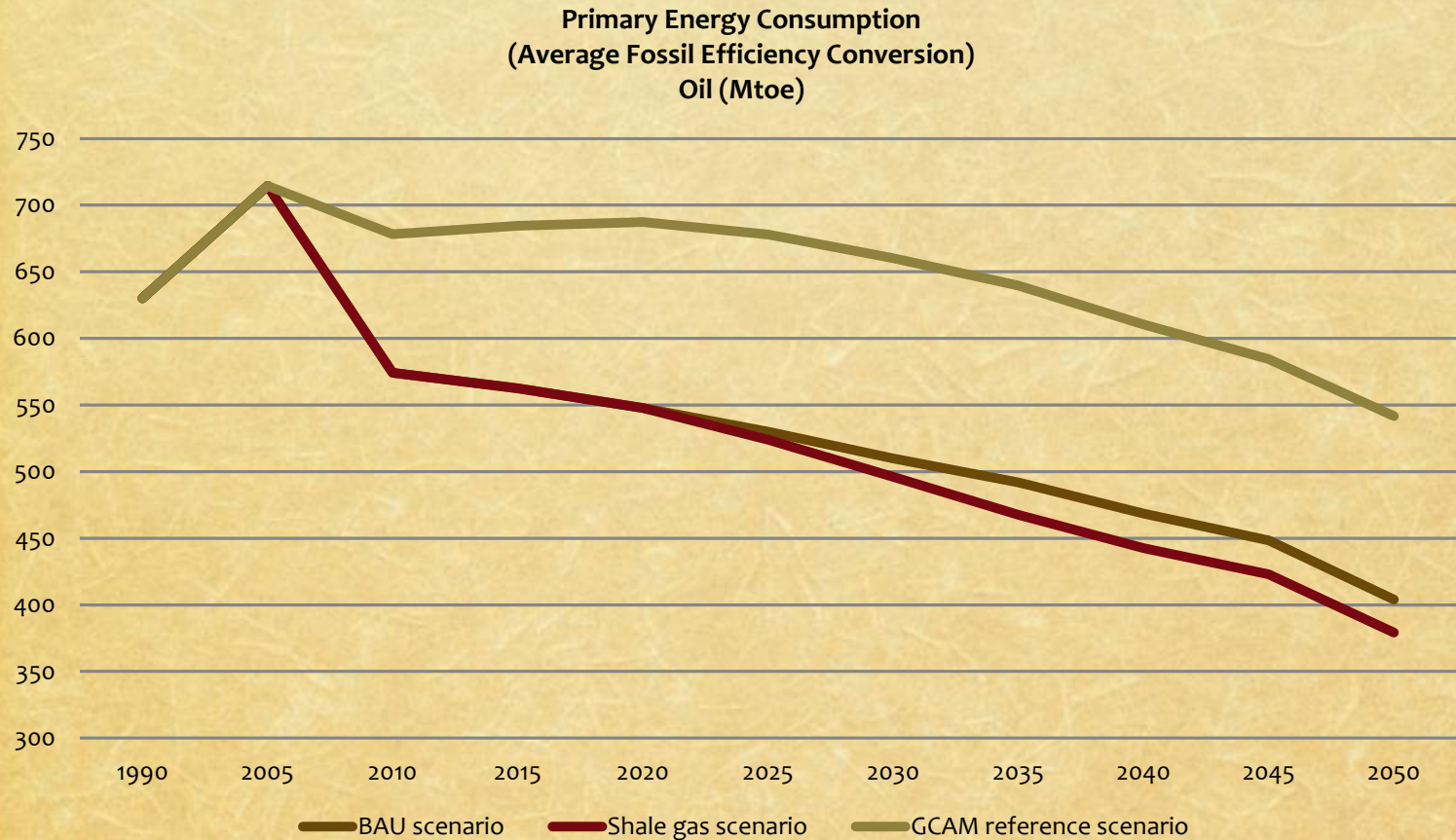
Relationship between the price of oil and the price of sugar during the period 2002-2015 (source : Solvay, François monnet).



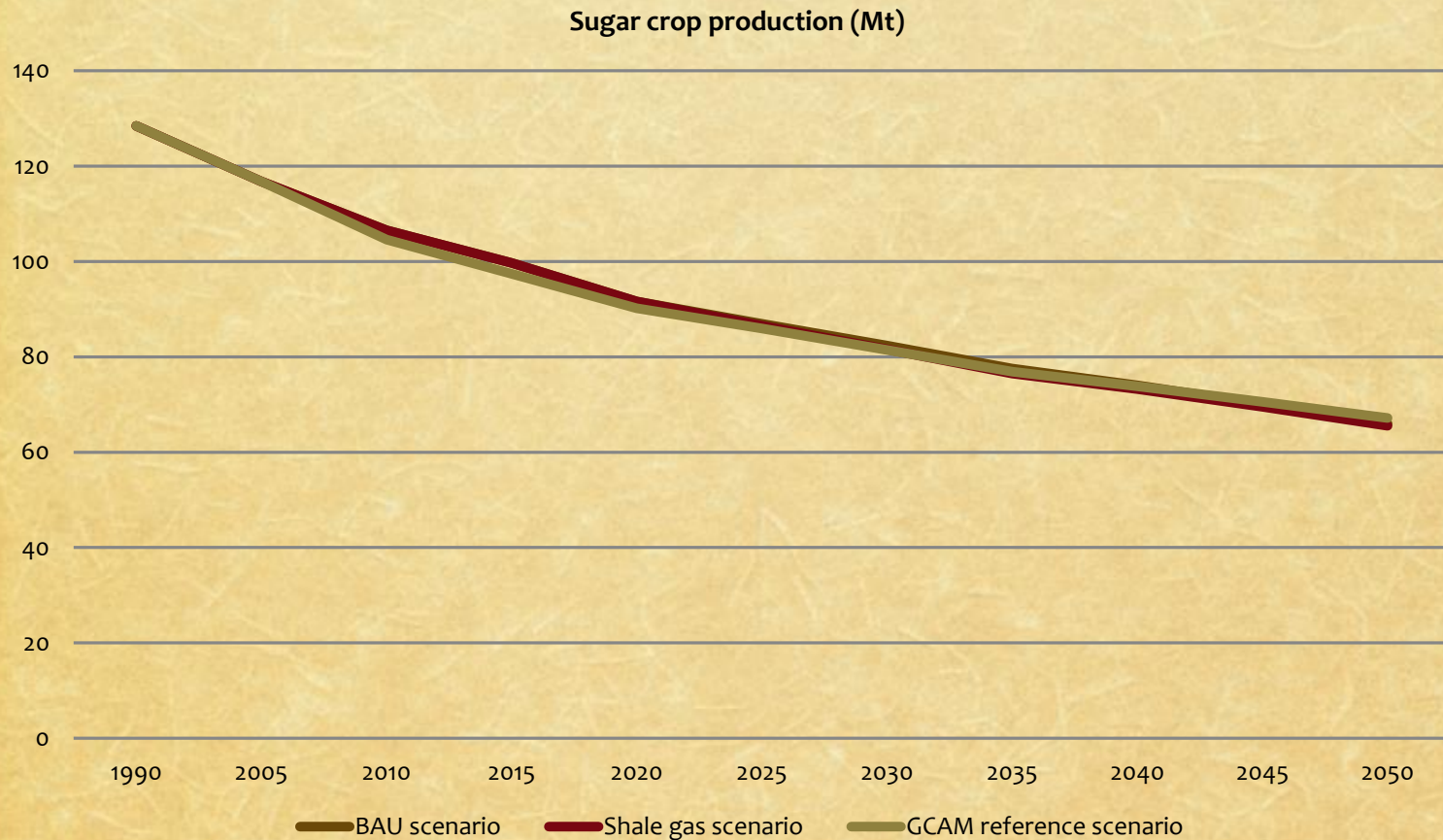
Results by GCAM

- ◆ Global Change Assessment Model
- ◆ PNNL (DOE) at University of Maryland
- ◆ Module on energy and module on agriculture are highly interconnected
- ◆ Version: GCAM BIOTECH 3.2
- ◆ Pending publication in French by L'Harmattan, Paris, 2016, 260 pages, « Competitiveness and Sustainability of Bioeconomy to 2050 » (English version in 2017)

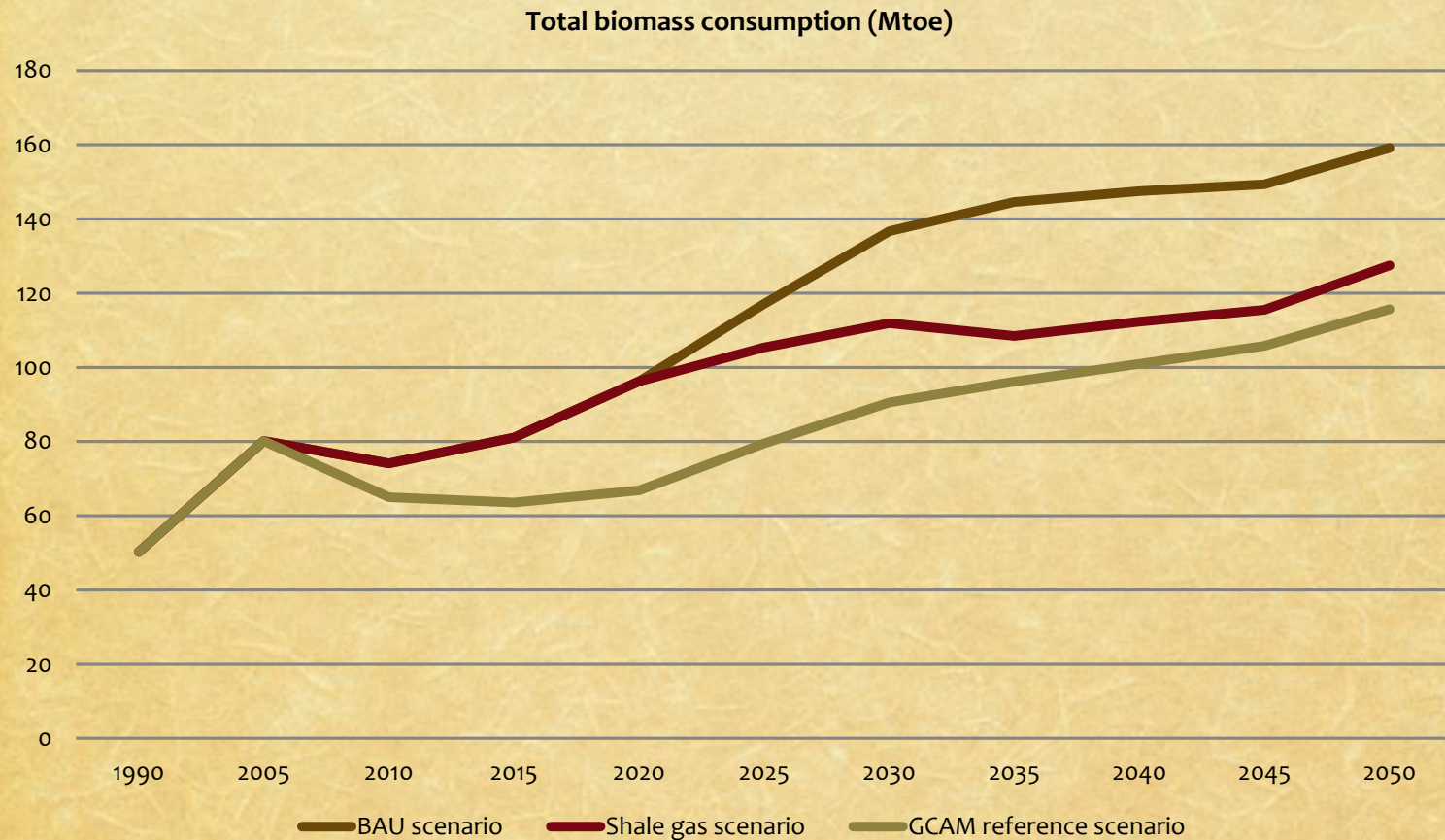
Primary Energy Consumption In Europe by 2050 (Schieb & Chelly, 2016)



Sugar Crop Production in Europe by 2050 (Schieb & Chelly, 2016)



Total biomass consumption in Europe by 2050 (Schieb & Chelly, 2016)



IV- Level playing field

Issue of carbon tax : a game changer (COP 22)

Issue of direct and indirect subsidies to fossil fuels:

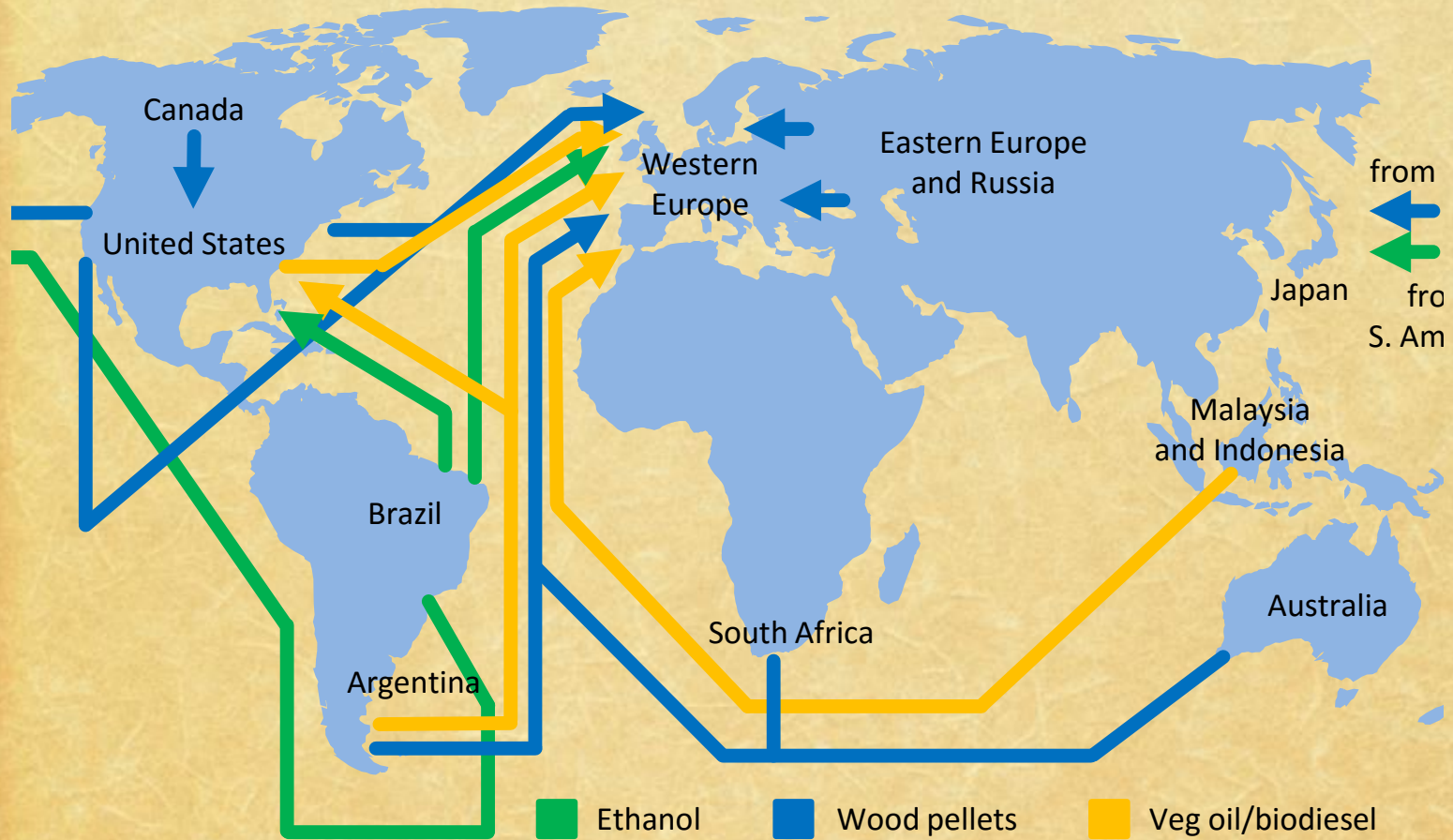
◆ Estimates vary according to scope: direct versus indirect, pretax or post tax (externalities)

IEA,OECD,IMF

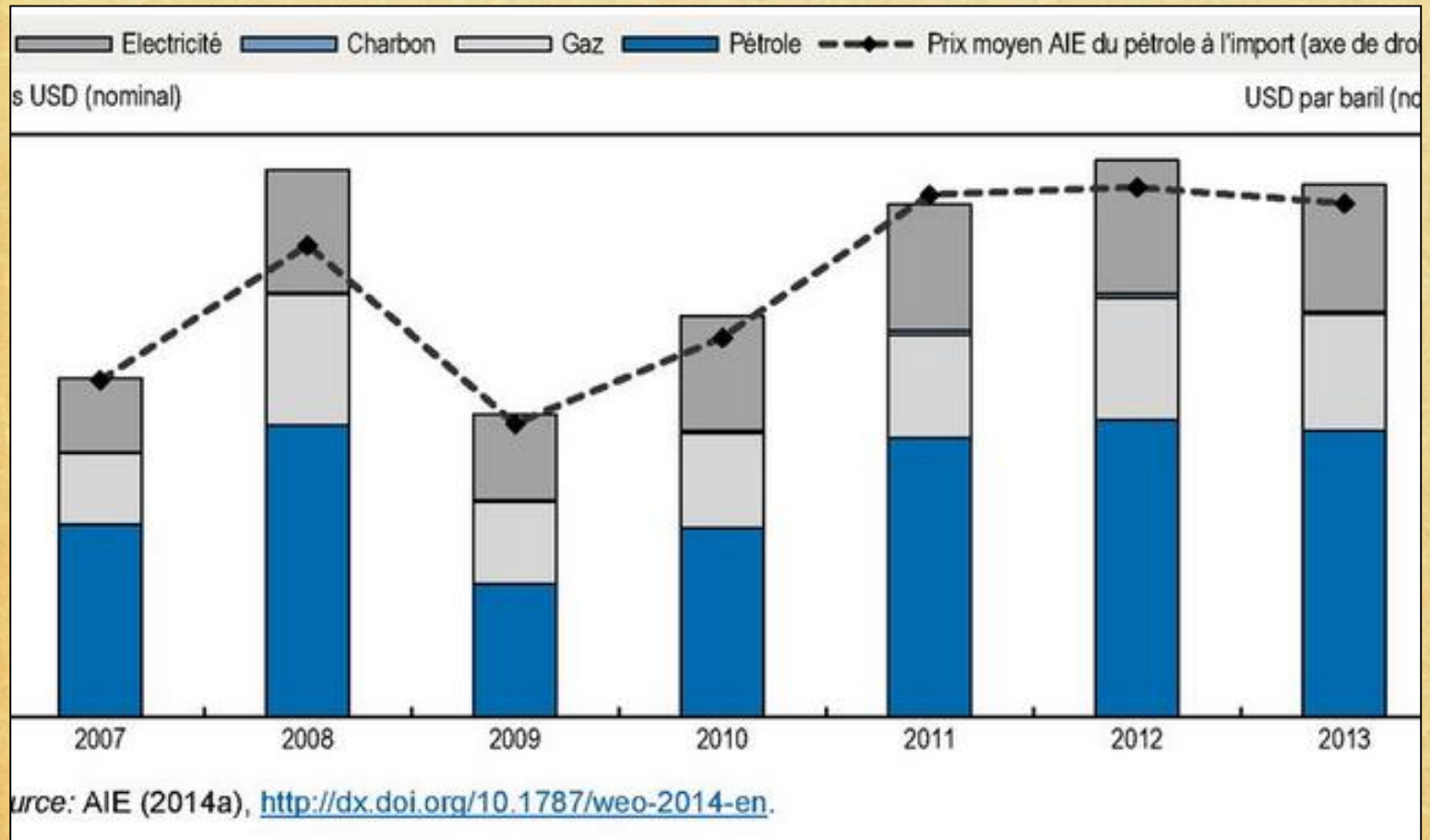
◆ The case of international transportation (air and maritime freight « bunkers ») (Schieb P-A, Chelly, M, 2016)

◆ Proposal: if impossible to change at WTO/multilateral level, subsidies or other measures to help renewable resources would be acceptable.

World biomass shipping routes in 2011



Estimate of subsidies to fossil fuels over the period 2007-2013. (IEA, 2014)



Estimation of tax breaks in international transportation for France (Schieb and Chelly)

2016)

	Transport aérien	Transport maritime	Total
Carburant(s)	Kérosène	Le DIESEL MARINE LEGER (DML) ou Essence bleue SP98 ou FUEL SOUTE	
Consommation 2012 (Mtep)⁶	6,66	2,28	8,94
Consommation 2013 (Mtep)⁷	6,6	2,1	8,7
Détaxation année 2012 (milliards €)	4,9	1,07	5,97
Détaxation année 2013 (milliards €)	4,85	0,98	5,84

Table 3: Estimation des montants de détaxation des carburants utilisés dans le transport international en France

Source : Schieb, P-A, Chelly, M.M,

V- - Alignment of actors: why, how ?

Why ?

- ◆ Issue of acceptability of biotechnologies etc.
- ◆ Issue of social choices
- ◆ Issue of de-risking measures
- ◆ Issue of industrial policies
- ◆ Issue of time horizon, consistency

How ?

Bioeconomy councils or equivalent ?

Partnerships: a matrix

Partners Items	Farmers	NGOs	Indus. actors	Gradu ate schoo ls	Cities Local public bod.	Clusters	Coop erative s	Regulat ors	Large comp anies	Ind. associ ations
Externalities		X			X	X		X		
Foresight			X	X	X	X				
R-D-I			X	X	X	X			X	X
Industrial ecology	X		X				X	X		
Funding			X		X					
Lobbying	X		X		X	X	X			X

VII-Conclusion

« Muddling through » looks like the most plausible scenario

Game changers ?

- ♦ Carbon tax at global level : at/or over 50 \$ / ton
- ♦ Rise of oil price : over 80 \$ a barrel for a sufficient long period
- ♦ Creation of a level playing field by national/regional players (compensating incumbents privileges)

VII-Messages

Canada can be a « champion » to promote:

- ♦An update of the OECD Bioeconomy 2030 report
- ♦Create a multinational group of countries about definitions at OECD
- ♦Success stories, case studies of of biorefineries (ongoing BioRef survey by OECD)

Canada might have to further discuss:

- ♦Local valorisation of biomass (again)
- ♦Proactive industrial policy
- ♦Alignment of actors

Publications

- ◆ Biorefinery 2030: Future Prospects, SPRINGER Verlag, Heidelberg, 2015 (Version française, L'Harmattan, 255 pages, Paris, 2014)
- ◆ OECD STI/BNCT: survey in OECD Countries about biorefineries. To be discussed in an OECD Workshop (tentatively: March 2017)
- ◆ James Philp, Pierre-Alain Schieb & Mohamed Chelly: Understanding Value chains in industrial bioeconomy (Réalités Industrielles), November 2016
- ◆ Pierre-Alain Schieb & Mohamed Chelly: Compétitivité et soutenabilité de la bioéconomie, Novembre 2016, 260 pages, L'Harmattan, Paris.
- ◆ European Commission, FLAGSHIP, FP7 Research Project, Case study on bioeconomy/biorefinery, Schieb Pierre-Alain, 2016 (forthcoming)

**Thank you for your
attention**

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