



sustainable energy for everyone

Industrial energy use and emissions

Meeting Europe's demand for materials in an energy efficient way

Prof. dr. Kornelis Blok


Based on a presentation by Maarten Neelis


Brandstof of bedelstaf?


KIVI, Eindhoven, 21 Feb. 2014


Ecofys: experts in energy

Energy & Carbon Efficiency	Renewable Energy	Energy Systems & Markets	Energy & Climate Policy
Buildings	Wind Energy	Integrated Energy Systems	Policy Design & Evaluation
Sustainable Transport		Power Systems & Markets	
Industrial Processes	Bioenergy	Conventional Energy Systems	Market based Mechanisms
Supply Chains	Solar Energy		International Climate Policies









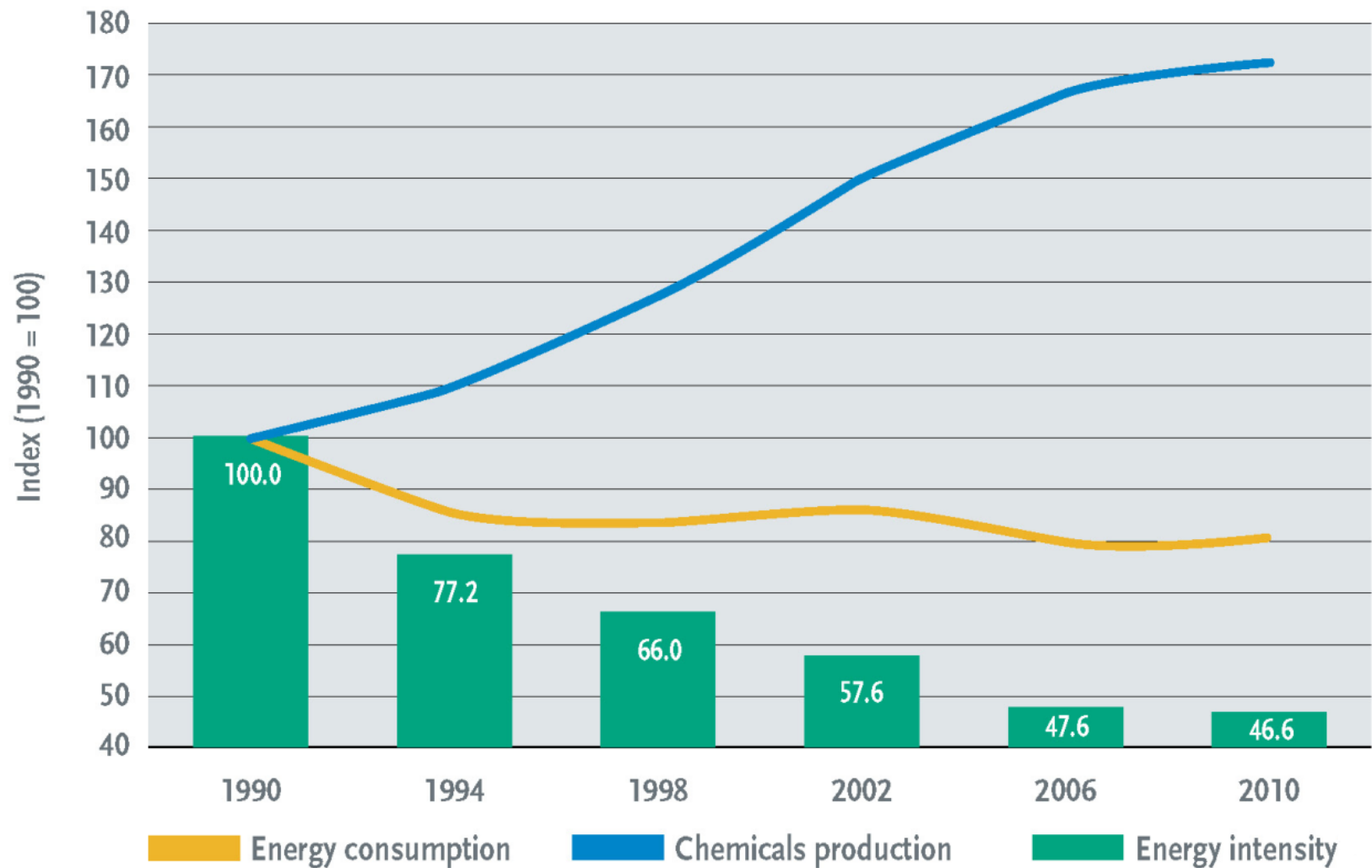
A selection of organisations that we served



The European Chemical Industry Roadmap

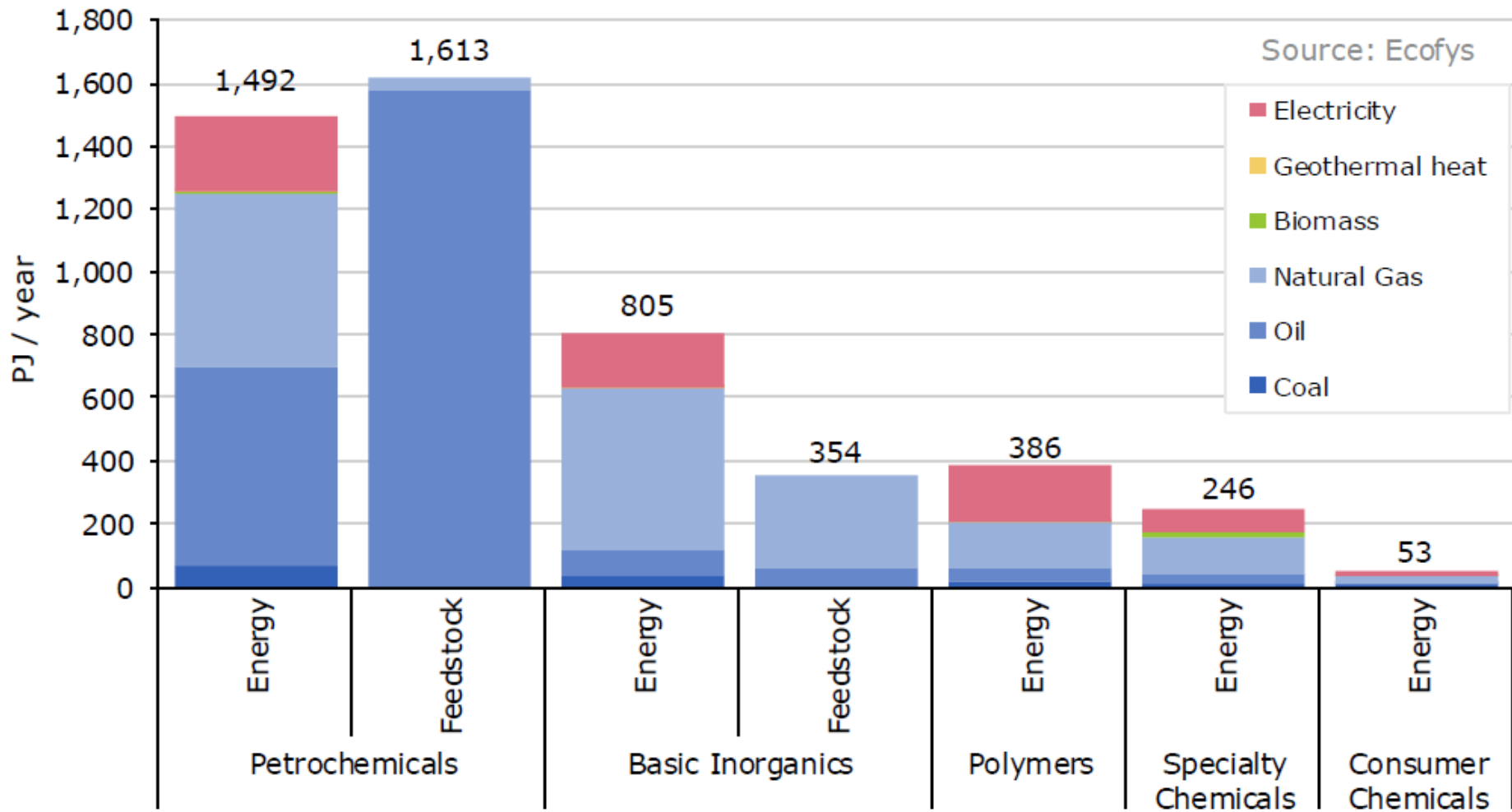


Past achievements in the EU industry



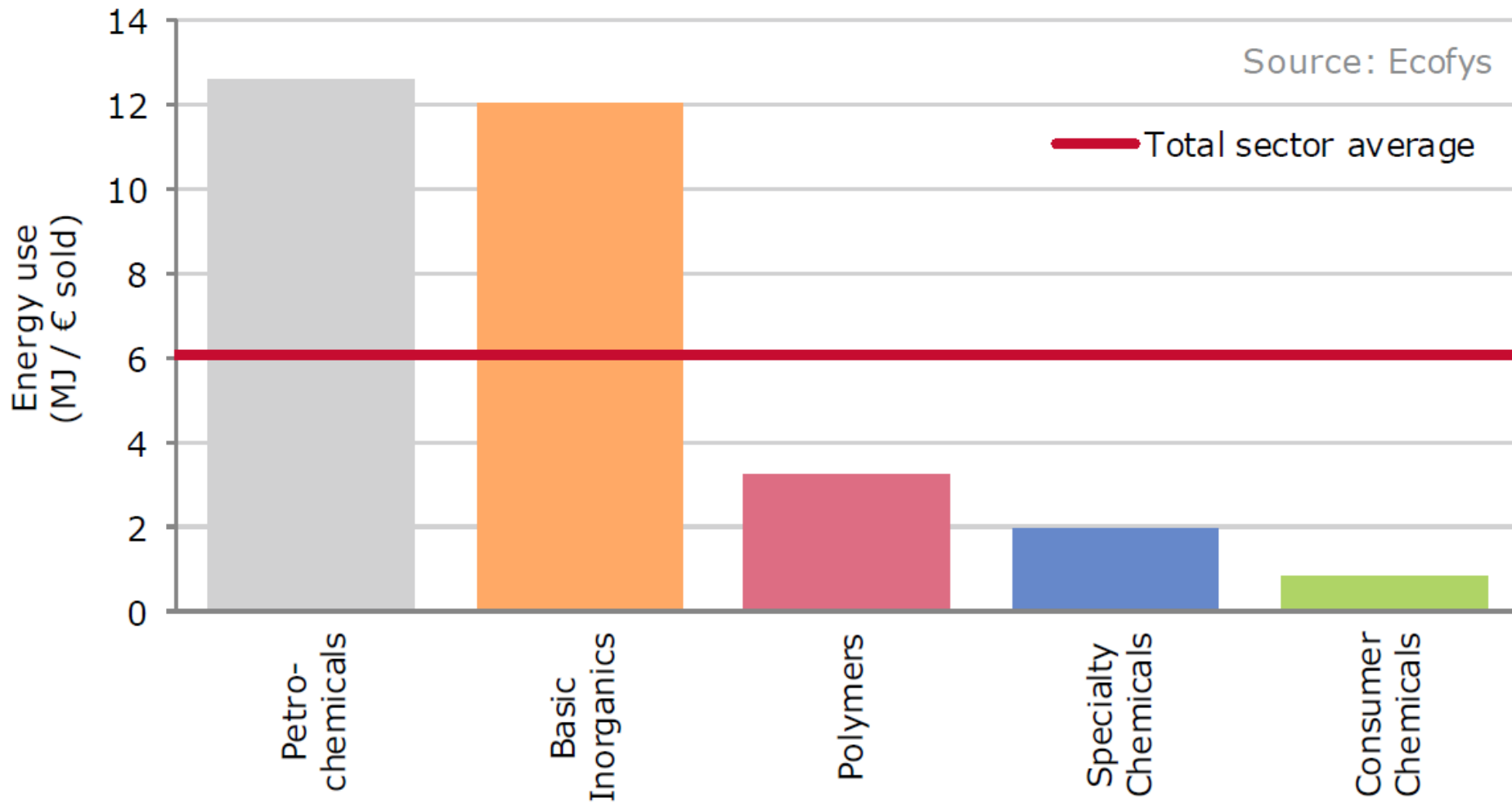
Source: *European chemistry for growth, CEFIC, 2013, supported by Ecofys*

Final energy use in the EU chemical industry (2010)



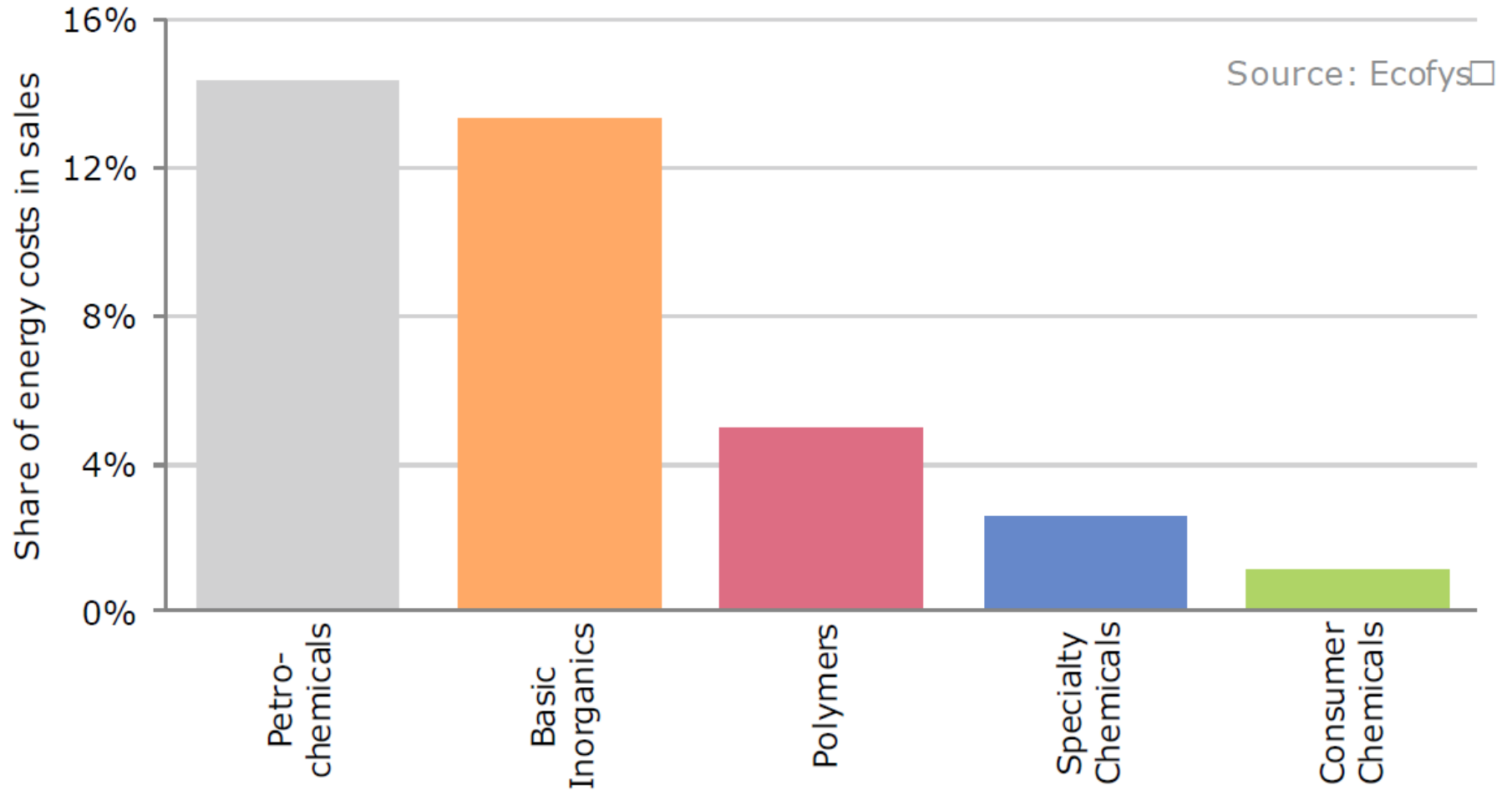
Source: European chemistry for growth, CEFIC, 2013, supported by Ecofys

Energy intensity by subsector



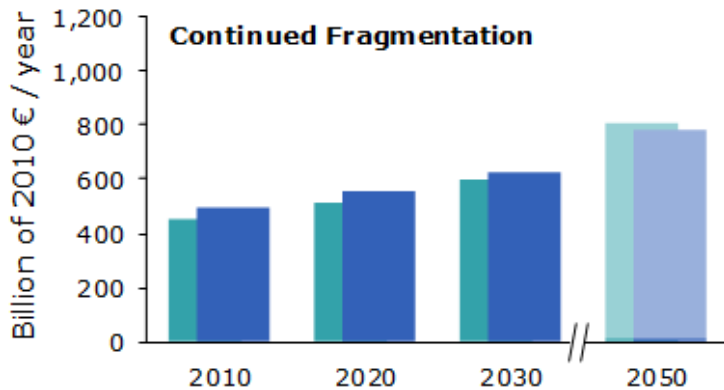
Source: European chemistry for growth, CEFIC, 2013, supported by Ecofys

Energy costs as a fraction of sales

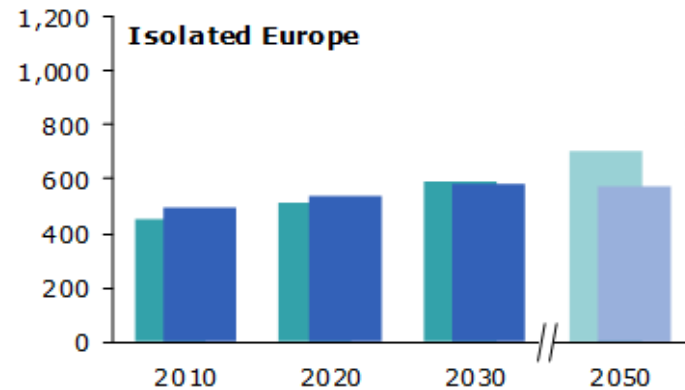


Source: *European chemistry for growth, CEFIC, 2013, supported by Ecofys*

An example: Europe's chemical industry



Demand CAGR	1.4%	1.6%	1.5%
Production CAGR	1.3%	1.2%	1.1%

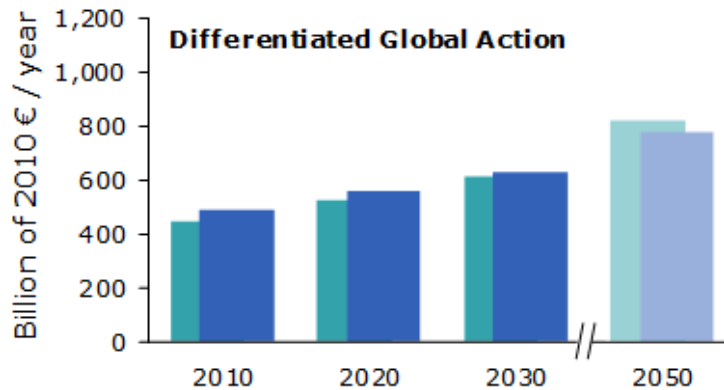


Demand CAGR	1.3%	1.4%	0.9%
Production CAGR	0.9%	0.8%	-0.1%

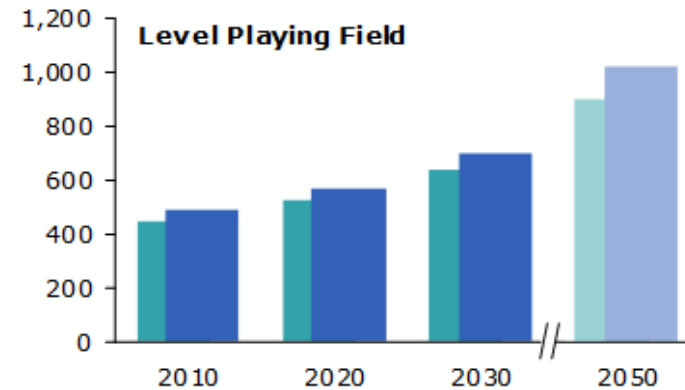
**European
chemical
industry**

■ Demand

■ Production



Demand CAGR	1.5%	1.6%	1.5%
Production CAGR	1.3%	1.2%	1.1%

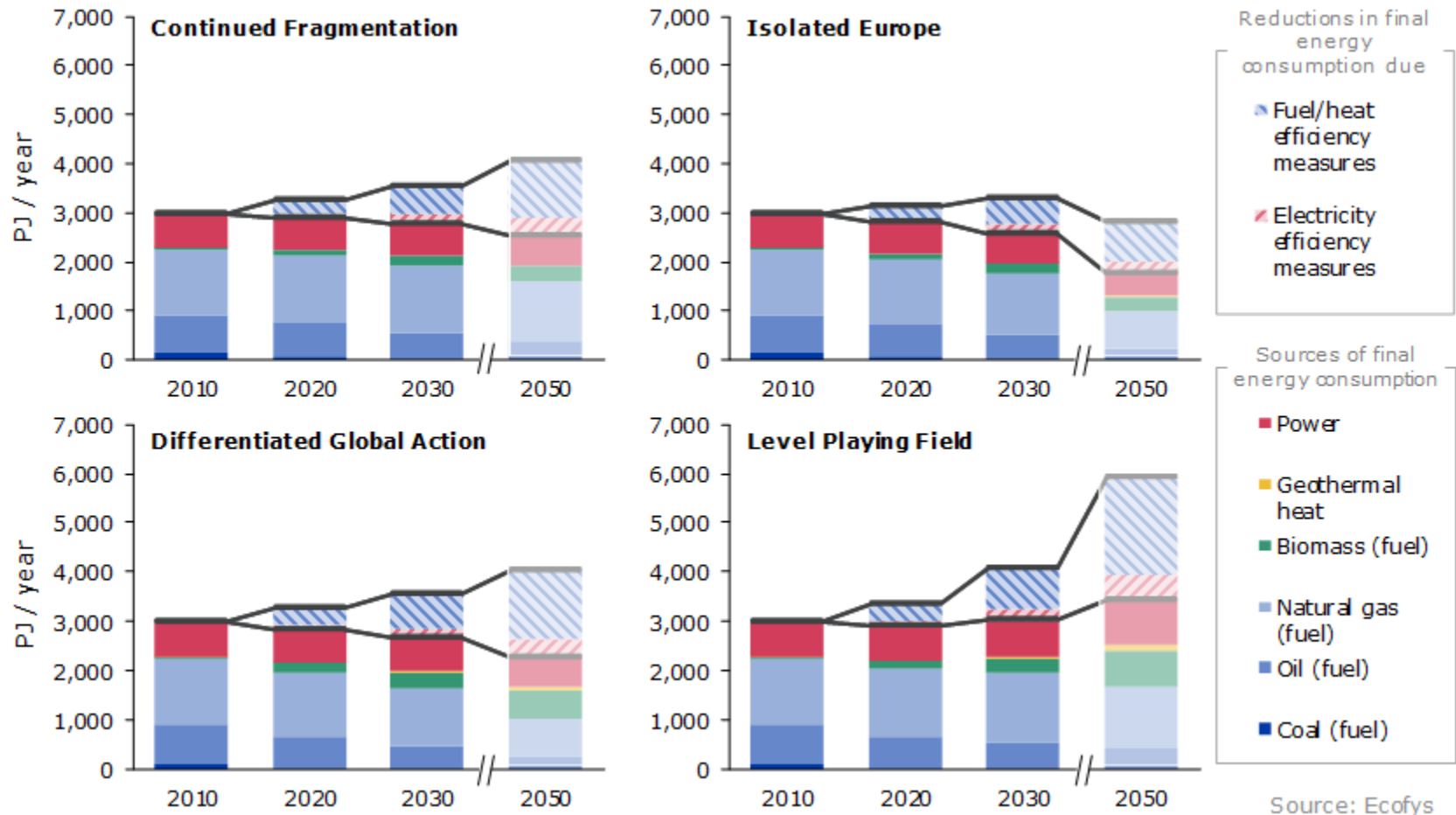


Demand CAGR	1.6%	1.9%	1.7%
Production CAGR	1.5%	2.1%	1.9%

Source: Ecofys

Source: European chemistry for growth, CEFIC, 2013, supported by Ecofys

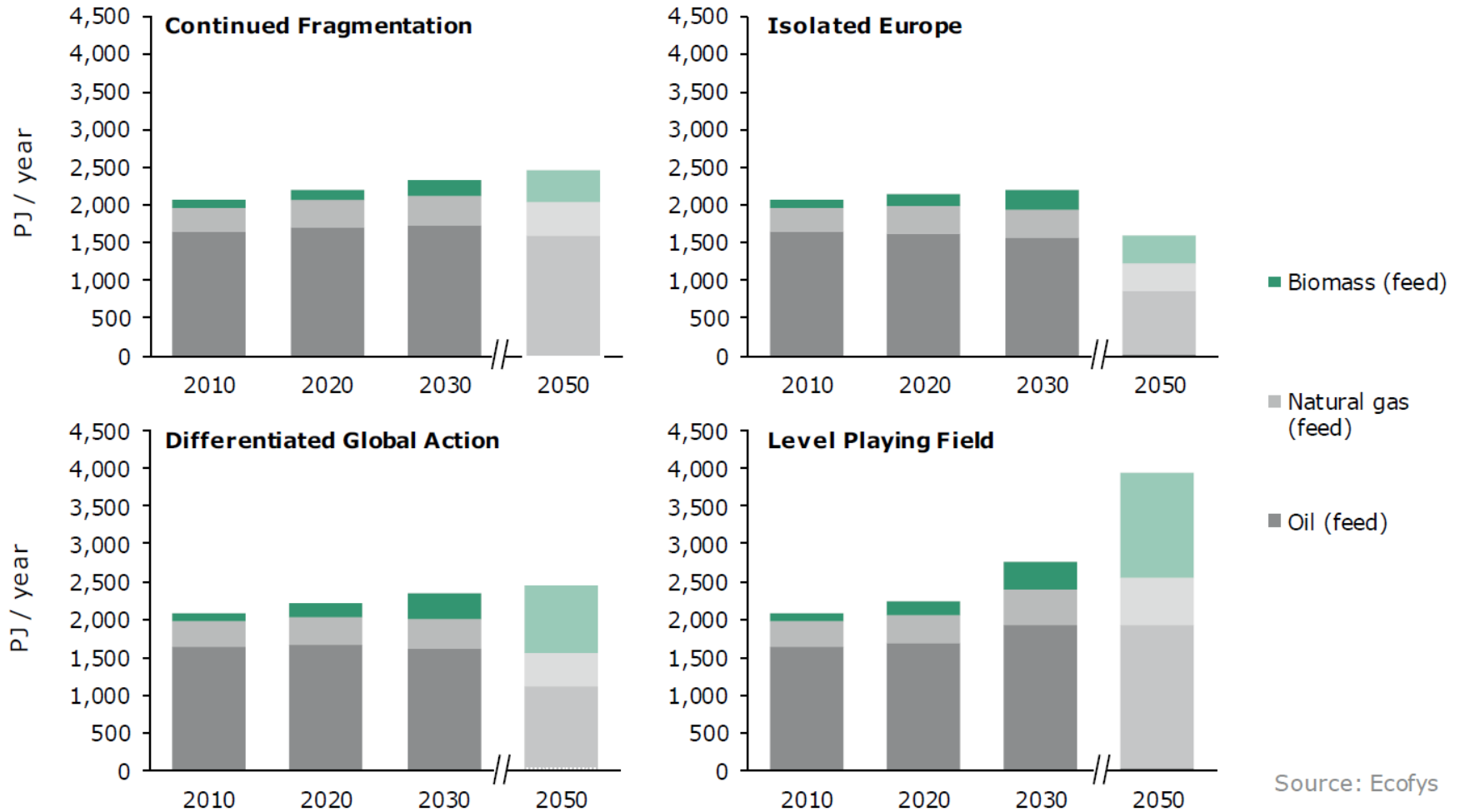
The European chemical industry towards 2050 – energy



> Upper lines reflect energy use with projected production and 2010 energy intensity

Source: *European chemistry for growth, CEFIC, 2013, supported by Ecofys*

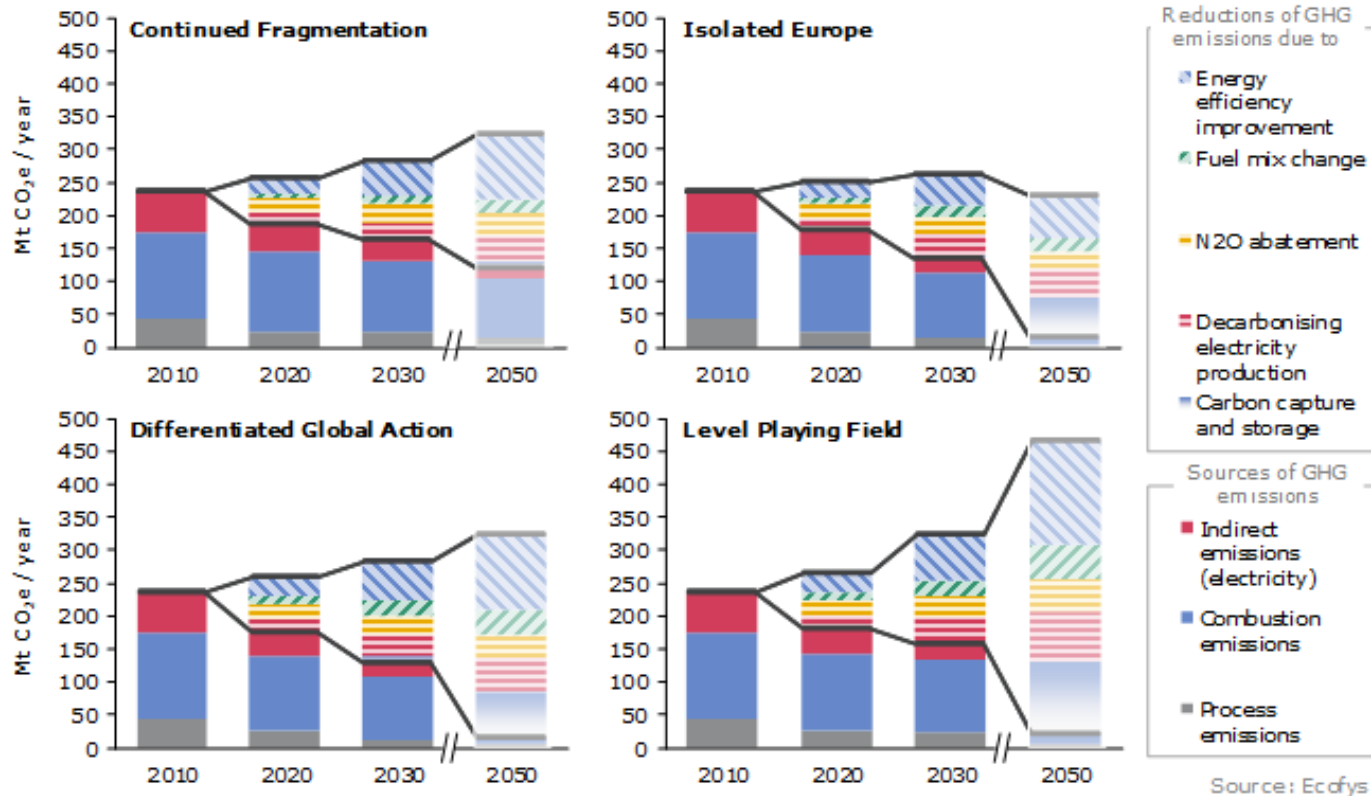
Feedstock use in the EU chemical industry



Source: Ecofys

Source: European chemistry for growth, CEFIC, 2013, supported by Ecofys

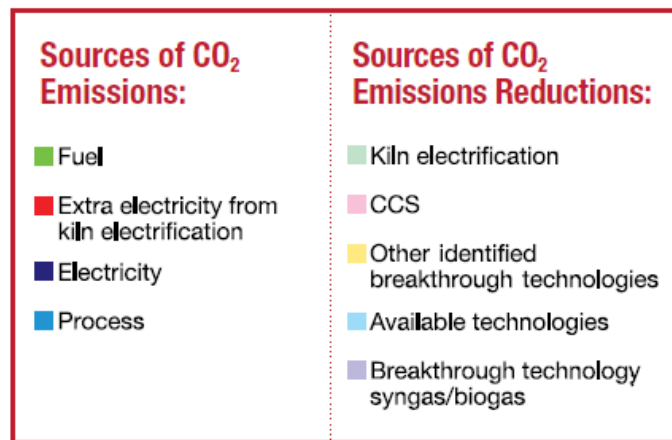
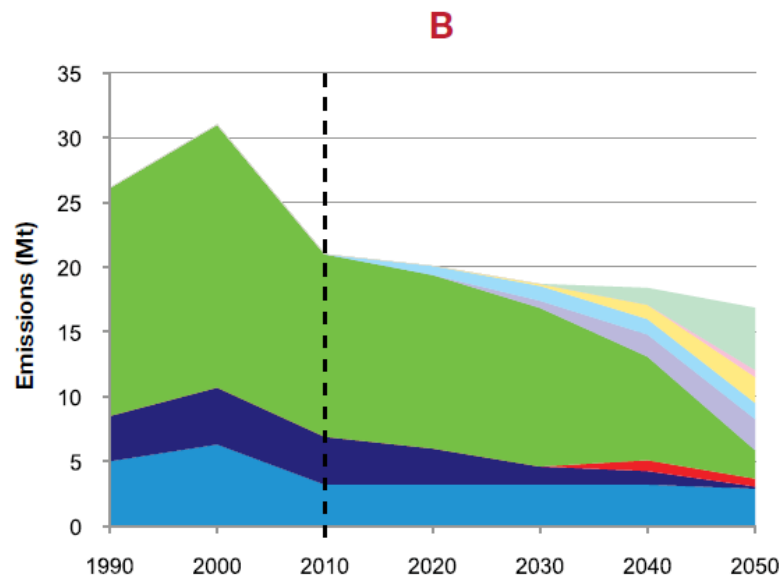
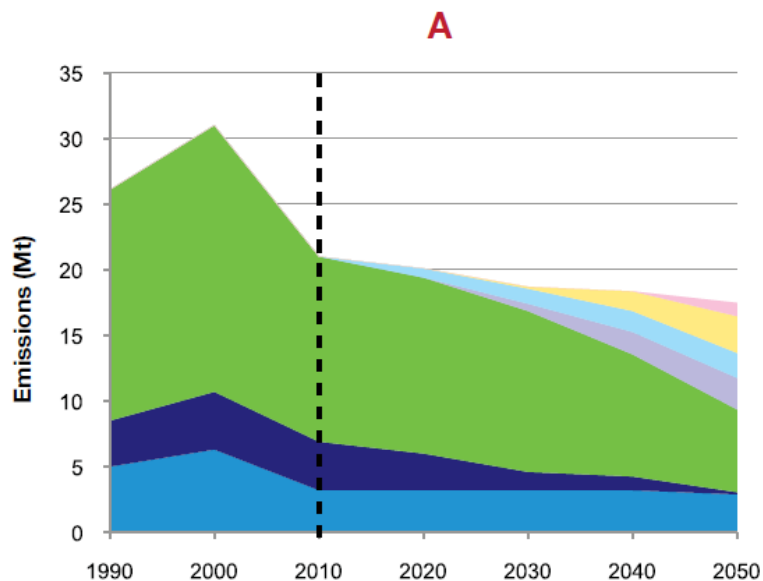
The European chemical industry towards 2050 – emissions



- > Upper lines reflect GHG emissions with projected production and 2010 GHG emission intensity;
- > Emissions are scope 1 and 2 only

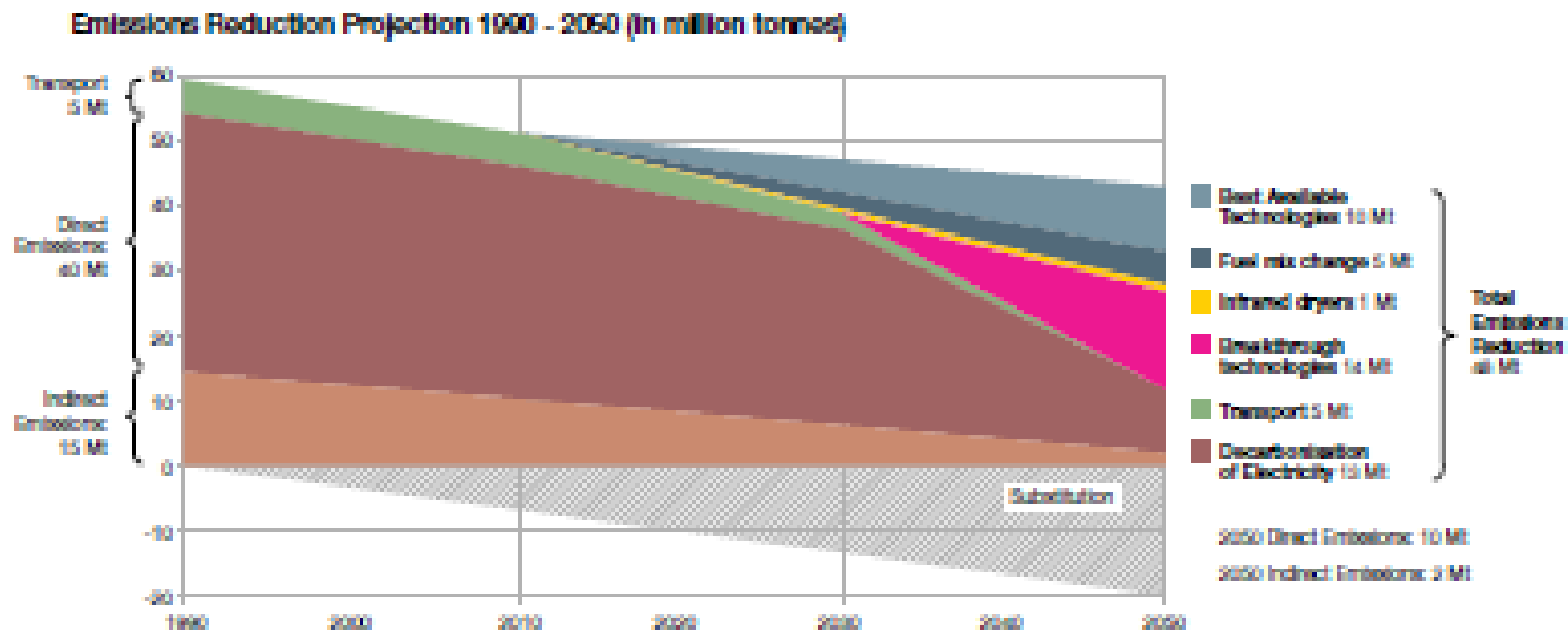
Source: *European chemistry for growth, CEFIC, 2013, supported by Ecofys*

Snapshots from other industry roadmaps - ceramics



Illustrative model for CO₂ emissions reduction between 1990 and 2050: A excluding and B including electrification. Source: Paving the way to 2050, the ceramic industry roadmap, Cerame-Unie, 2012

Snapshots from other industry roadmaps - paper



The exploration shows that a reduction of 50 to 60% of CO₂ emissions is possible given the right circumstances. To achieve a minus 60% reduction, however, the sector will need breakthrough technologies.

Source: *Unfold the future. The forest fibre industry 2050 roadmap to a low-carbon bio-economy*, CEPI, 2011

And the industry projection by the EU....

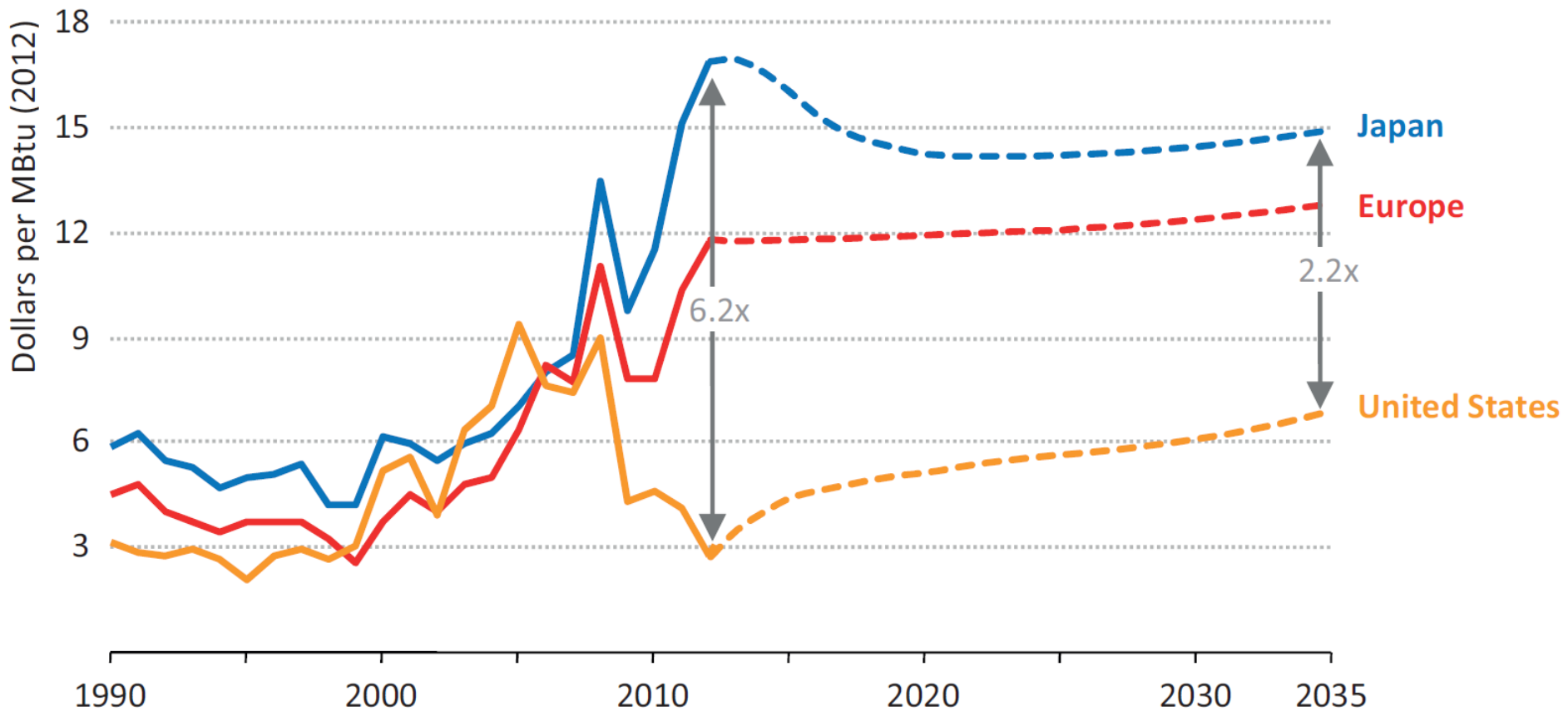
Table 14: CO2 emission reductions in energy intensive industries in 2030 and 2050

% emission reduction in 2030/ 2050 compared to 1990	<i>Reference</i>	Effective Technologies scenarios		
		global action, low fossil fuel prices	Fragmented action, reference fossil fuel prices	
			No special treatment EII	Lower EII effort
<i>Total CO2 emissions all sectors</i>	-24/-37%	-36/-85%	-37/-86%	-37/-78%
CO2 emissions Energy intensive industries	-30/-33%	-34/-88%	-34/-87%	-31/-51%

Source: PRIMES, GAINS

Source: Impact assessment to "A roadmap for moving to a competitive low carbon economy in 2050, European Commission, 2011

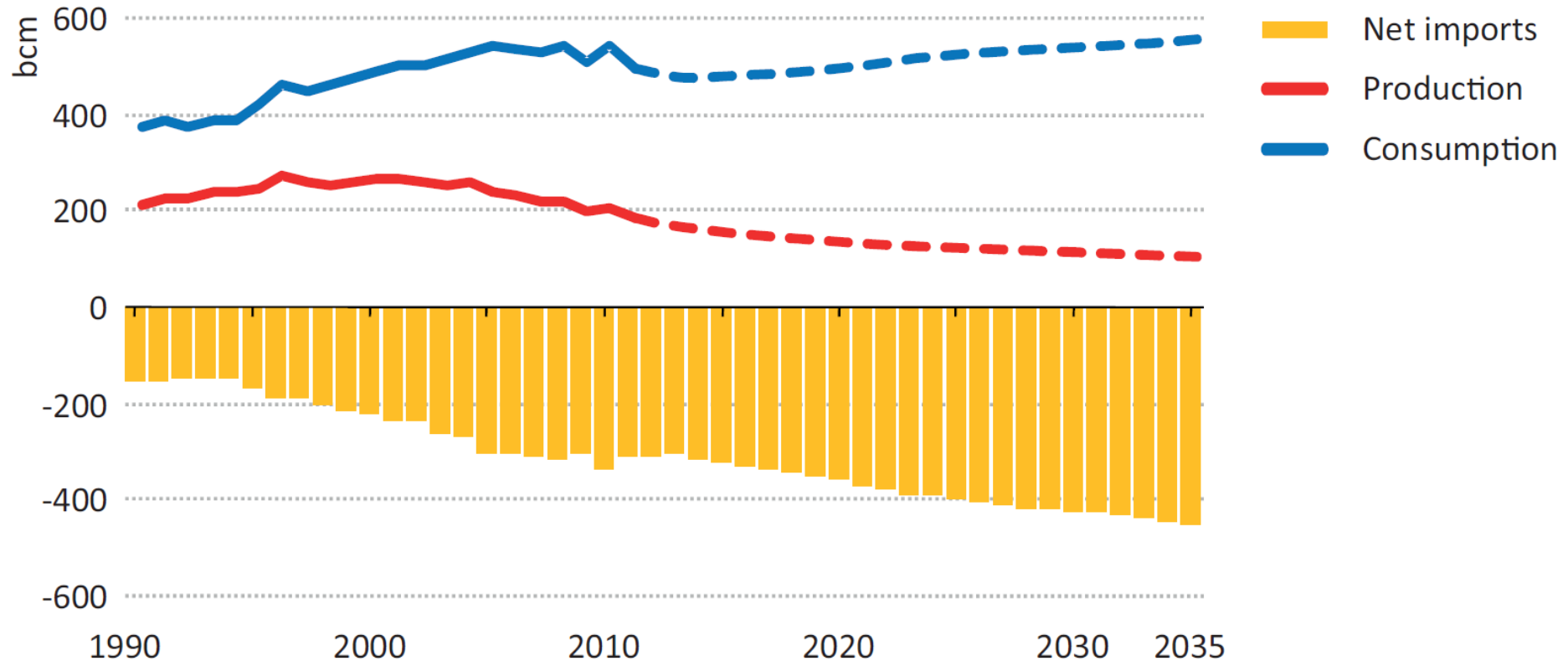
Natural gas prices



Source: IEA, World Energy Outlook 2013

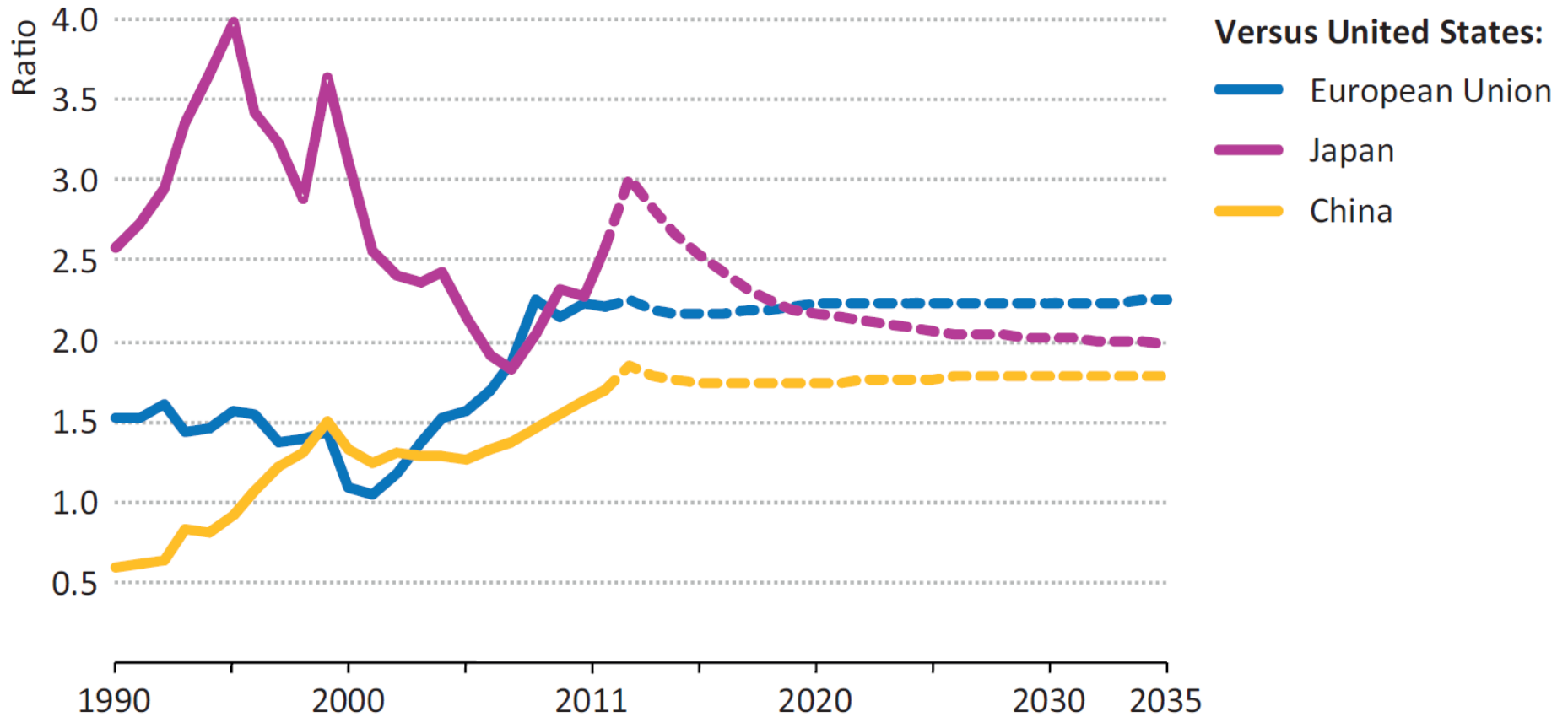
European natural gas demand and production

New Policies scenario



Source: IEA, World Energy Outlook 2013

Industrial electricity prices (compared to US prices)



Source: IEA, World Energy Outlook 2013

Thank you!



Prof. dr. Kornelis Blok
Director of Science

Ecofys
Kanaalweg 15-G
3526 KL Utrecht
The Netherlands

Phone: +31-30-6623399
E-mail: k.blok@ecofys.com
Twitter: @kornelisblok

www.ecofys.com

sustainable energy for everyone