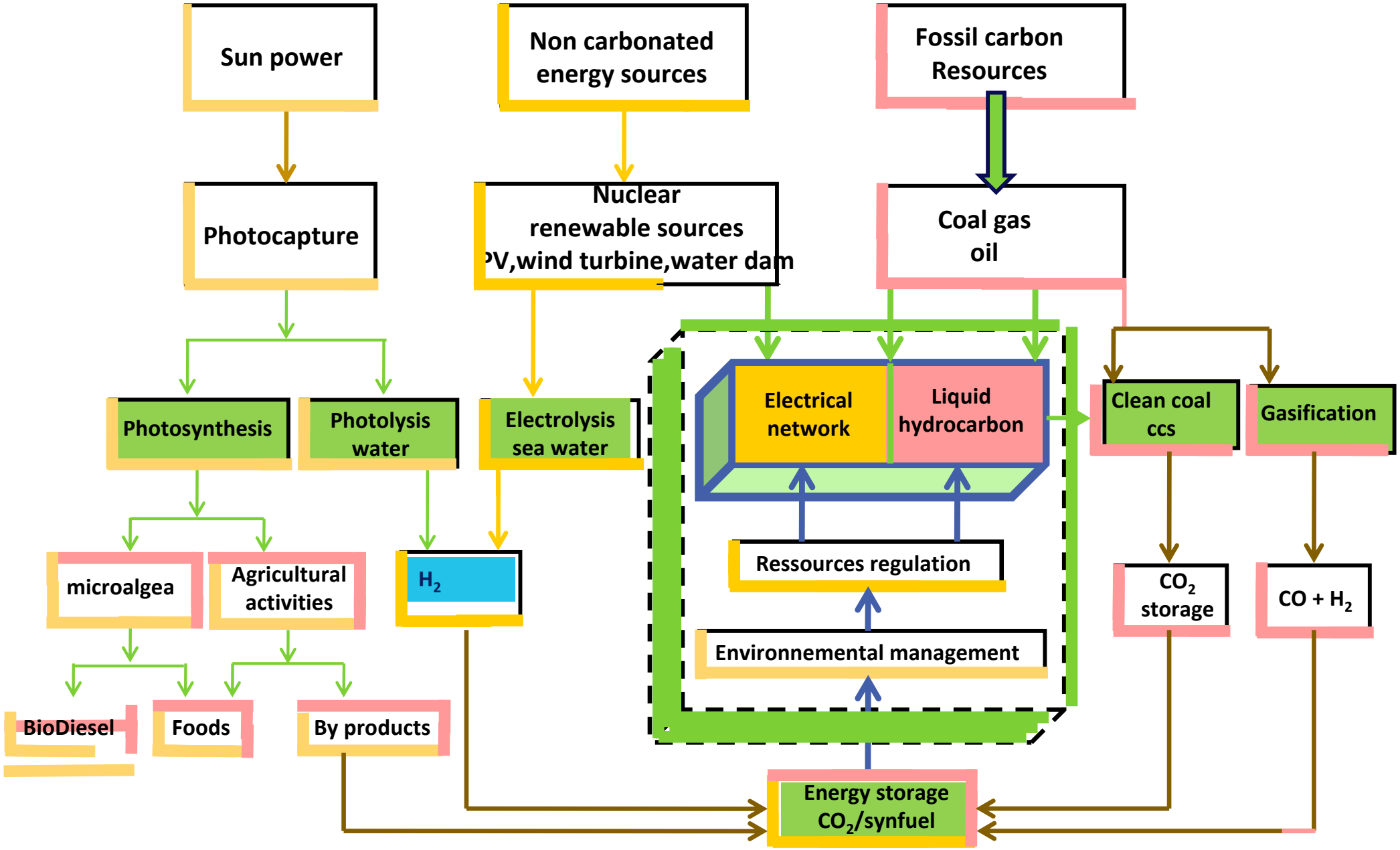
3°)strategy for the management of the mix energetic ressources and the carbon dioxide

- energy production and energy storage
- how to manage a sustainable world

Carbon dioxyde to synfuel



How to do that ?

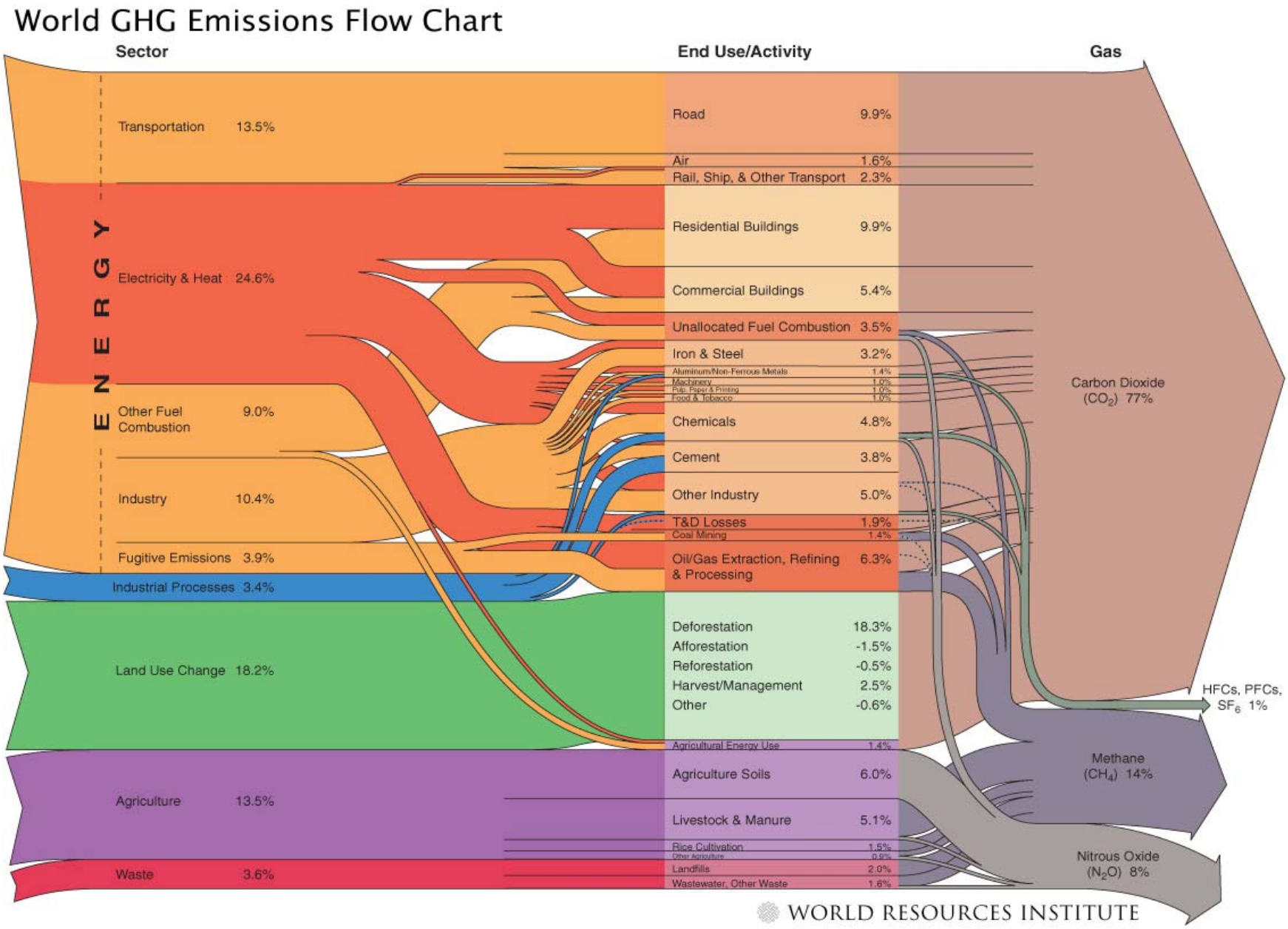
Key parameters

- Geopolitical cost / Jobi / energy dependancy
- European regulation ETC
- Waster consumption
- Energy cost (electrical / oil)
- Energy recovery through CO_2
- CAPEX OPEX scale up
- , interest cost

green gas production from human activities

13.5

51.3%



CARBON DOXIDE A RAW MATERIAL

Economic proposals:Joseph Stiglitz

Nobel prize in economy(2001)

Scientific proposals George Olah

Nobel Prize in chemistry (1994)

Political proposals:Steven Koonin

DOE july 2010

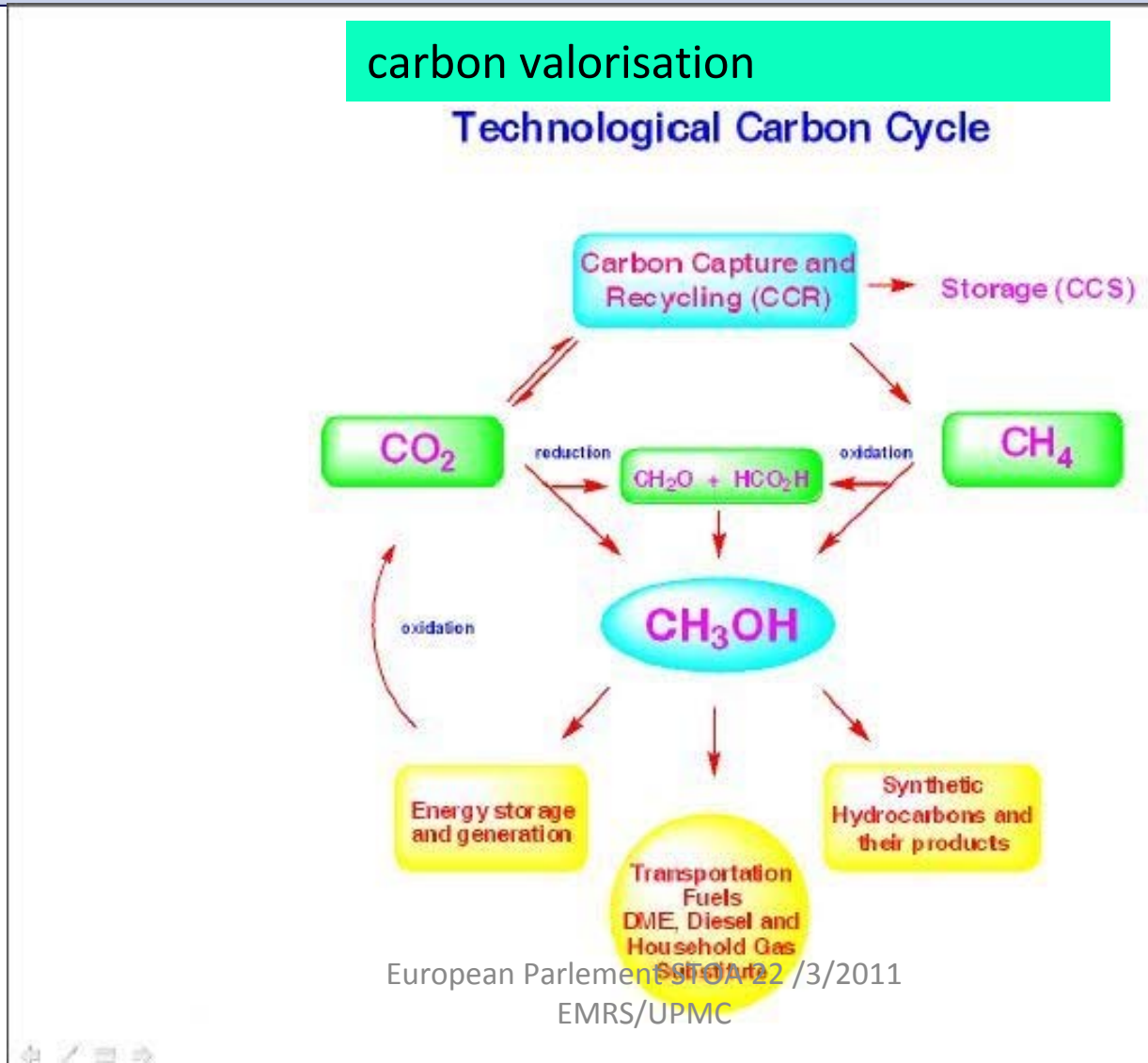
European Commission Proposals

2008 set plan-8 march 2011

EMRS Symposium from 2008 to 2010 to identify some new strategy

propositions of George A. Olah Nobel Price of Chemistry 1994

carbon valorisation



propositions of Joseph E.STIGLITZ Nobel Price of Economie 2001

- « Should the world endeavour to have carbon emissions paid at their real price (having all end users ,individuals and companies,pay for at cost with no government hidden subsidies)there would be high incitive to reinvest into the engine of the world economy:**energy creativity**
- it would them promote incentives for innovations and investment in all techniques companies,home equipments which are more energy efficient »

DOE Steven E.KOONIN
CEN-on line.org 5 july 2010
USA

- it is time for
- a « **renewable –energy revolution** »
- 100 Billions $ to support emerging energy technology
- « we need to couple those technologies to industries so that the technologies get deployed »

EMRS FALL MEETING
Varsaw 13-15 sept 2010
Symposium A

European decisions 2008-2011

- **1)Market place for CO2 emission trading organization: ETS : 15 euros/T (10-3-10)**

  EEC market in 2010 : 85 billions euros

- ***2) « EU ETS remains a key instrument to drive low carbon investments "***

3) GHG reduction by 2050:80 to 95%

- **4) saving fossil fuel import**

DOE Steven E. Koonin
MAIN GOALS of DOE Policy 2010

- **reduce green house gas emissions(CO2)** by 80% to the middle of the century
- **enhance U.S. competitiveness** and create **jobs**
- **reduce dependence** on imported oil

- cen-online.org july 5 2010 p 19

HOW to CHANGE

« our fundamental reliance on fossil fuels »

- how do we take the sun's energy and convert it into chemical energy?
- hubs centers to mix industrial researchers and academic onces
- understand the economical and cultural implications of these new technologies

- DOE/ USA cen-online.org july 5 2010 p 18

US.FUNDS COMPANIES THAT MAKE USE OF CO2

- **Six companies will receive a total of 106 millions dollars** from the American Recovery and Reinvestment act of 2009 to develop processes that use carbon dioxide as a raw material
- Novomer will get **18.4** millions to work with Albemarle and Eastman Kodak on its process for converting CO2 into carbonate polymers
- Calera will receive **19.9** million to advance its process for mineralizing CO2 into construction materials
- Alcoa will get **12.0** million to develop technology for converting CO2 into carbonates and bicarbonates using an enzyme catalyst
- www.CEN-on line .org CEN august 2010,2,p24

BUYING A SUSTAINABLE ECONOMY

The record **RECOVERY ACT ENERGY SPENDING** may trigger a new clean-energy industry

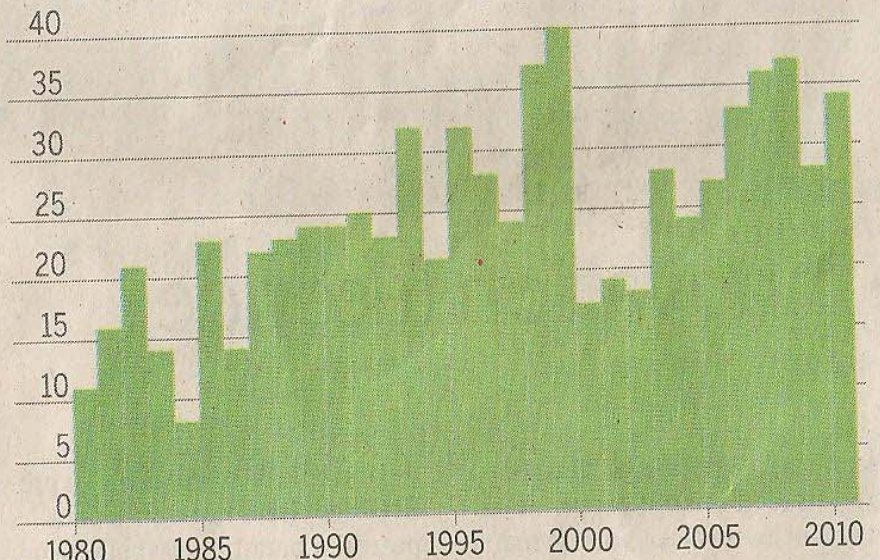
JEFF JOHNSON, C&EN WASHINGTON

world investment from 2006 to 2030 for a scenario needed to control the carbon dioxide emission at a level 550ppm (Nicholas Stern report 2006)

- 26000 billions of dollars (ref AIE)
- 10000 billions for OCDE
- 16000 billions for the others
- or it can be evaluated at 1% of the world GDP
- but the risk is evaluated at 5% of the world GDP

- the cost of CO2 could reach 90$/T in the near futur
- report N.Stern 2006
- humanite face au changement climatique R.Dautray,J.Lesourne ed.Odile Jacob

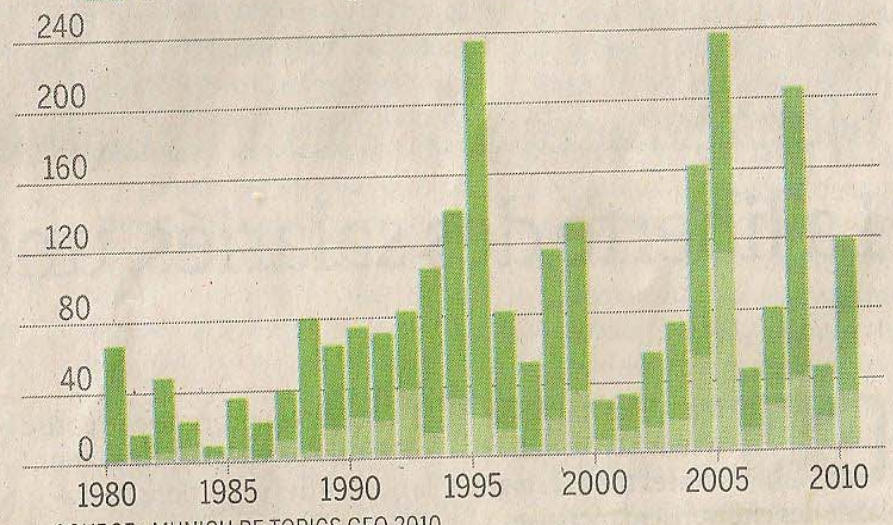
NOMBRE DE CATASTROPHES NATURELLES DE « GRANDE AMPLEUR »



SOURCE : MUNICH RE TOPICS GEO 2010

COÛT DES CATASTROPHES NATURELLES

en milliards de dollars



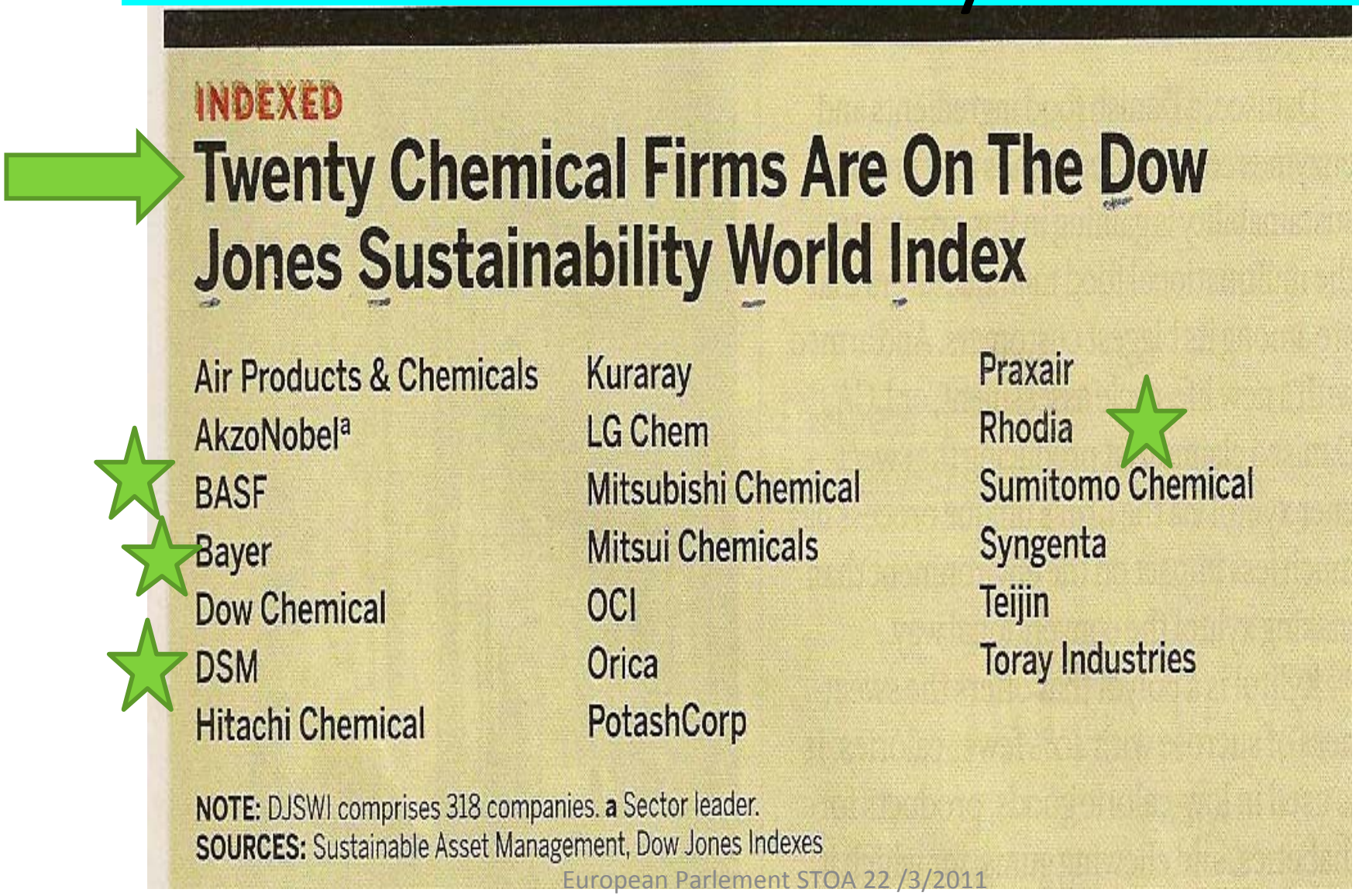
SOURCE : MUNICH RE TOPICS GEO 2010

LES DIX SINISTRES LES PLUS COÛTEUX DE LA PÉRIODE 1970-2009

Dommages assurés en millions de dollars	Victimes	Evénement
71 163	1 836	Ouragan Katrina 2005 (Etats-Unis, golfe du Mexique, Bahamas, Atlantique Nord)
24 479	43	Ouragan Andrew 1992 (Etats-Unis, Bahamas)
22 767	2 982	Attentat terroriste contre le WTC et le Pentagone 2001 (Etats-Unis)
20 276	61	Séisme de Northridge 1994 (Etats-Unis)
19 940	136	Ouragan Ike 2008 (Etats-Unis, Caraïbes)
14 642	124	Ouragan Ivan 2004 (Etats-Unis, Caraïbes)
13 807	35	Ouragan Wilma 2005 (Etats-Unis, Mexique, Jamaïque)
11 089	34	Ouragan Rita 2005 (Etats-Unis, golfe du Mexique)
9 148	24	Ouragan Charley 2004 (Etats-Unis, Cuba, Jamaïque)
8 899	51	Typhon Mireille 1991 (Japon)

SOURCE : SWISS RE. SIGMA N° 1/2010

Dow jones index for a sustainable industry



INDEXED

Twenty Chemical Firms Are On The Dow Jones Sustainability World Index

Air Products & Chemicals	Kuraray	Praxair
AkzoNobel[a]	LG Chem	Rhodia
BASF	Mitsubishi Chemical	Sumitomo Chemical
Bayer	Mitsui Chemicals	Syngenta
Dow Chemical	OCI	Teijin
DSM	Orica	Toray Industries
Hitachi Chemical	PotashCorp	

NOTE: DJSWI comprises 318 companies. **a** Sector leader.
SOURCES: Sustainable Asset Management, Dow Jones Indexes