



Académie royale  
des Sciences, des Lettres et des Beaux-Arts  
de Belgique

Samuel Furfari



## LE CHARBON

Le phénix va-t-il renaître de ses cendres? ...  
Non, car il n'était pas mort!



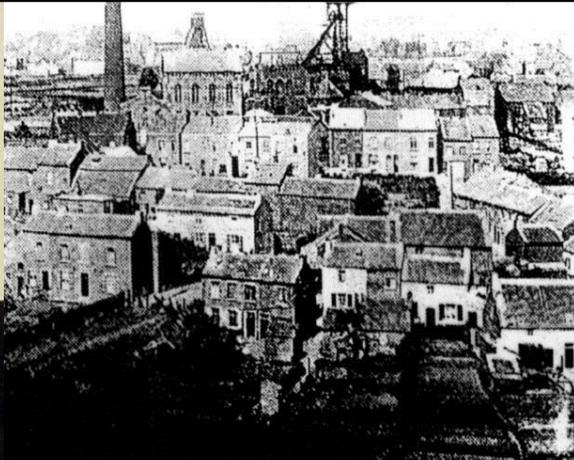
## Le charbon, la gloire du Pays Noir

RENÉ-P. HASQUIN

les grandes

**COLERES**

du  
PAYS NOIR



*Pour qu'ils sachent d'où ils viennent,  
Pour qu'ils mesurent le chemin parcouru,  
Pour qu'ils n'oublient jamais*

*Les leçons et les erreurs du passé*

ULB



ÉCOLE POLYTECHNIQUE DE

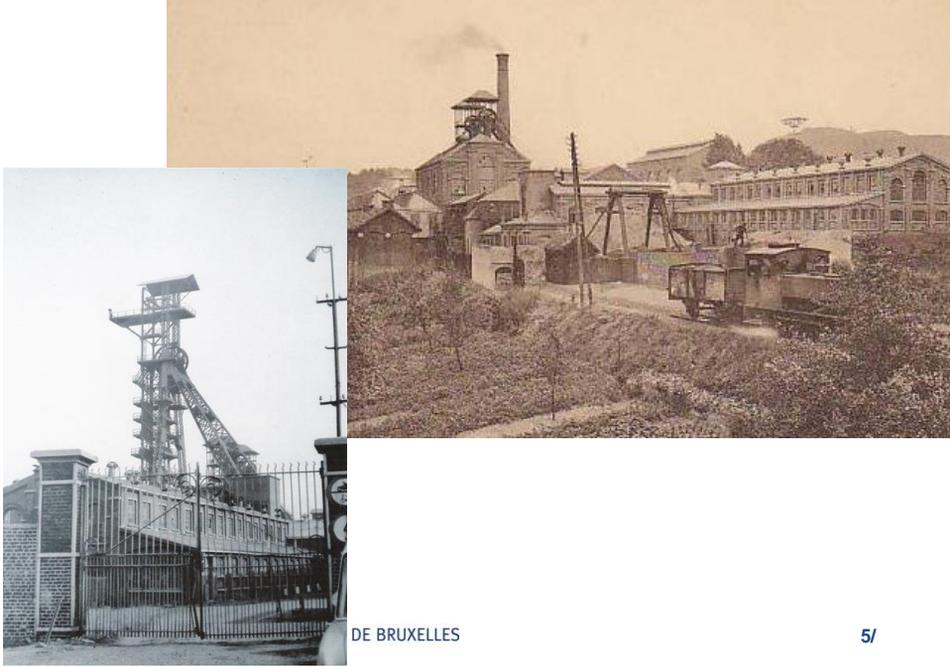
Dans des conditions inadmissibles aujourd'hui



Tout se faisait à la main



Le "6 Perier" de Monceau-Fontaine où mon père travaillait



DE BRUXELLES

5/

La fierté du charbon



ECOLE POLYTECHNIQUE DE BRUXELLES

# Marcinelles, 8 août 1956, 262 morts, le tournant



ULB

# Paix et réconciliation, Caux, Juillet 1946



Adenauer & Schuman



Adenauer & pastor Frank Buchman



Schuman & pastor Frank Buchman

## Le charbon à la base de la Paix dans l'UE



## Le charbon est un des fondement de l'UE



Robert Schuman (izquierda) y Jean Monnet



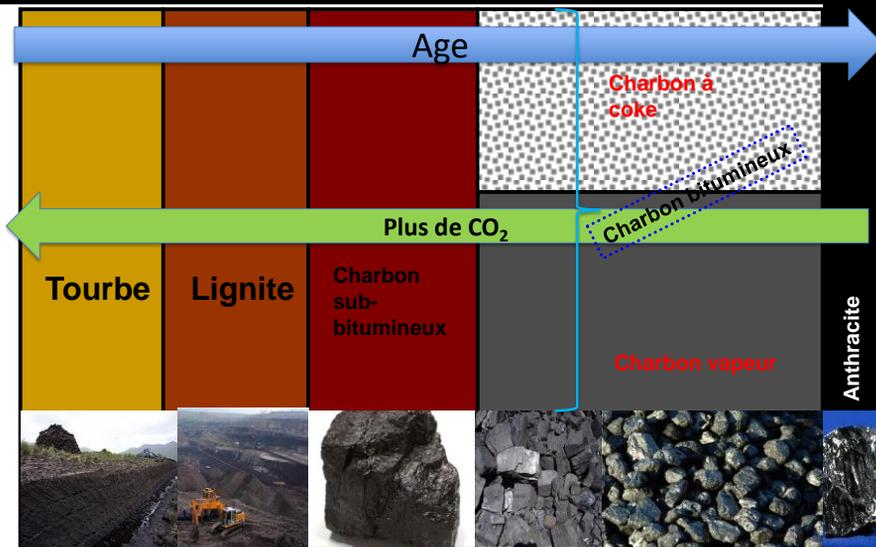
- **Déclaration Schuman**  
9 Mai 1950
- **Traité CECA**
  - juillet 1952 – juillet 2002
  - Haute autorité = commission
  - Marché intérieur
  - Mesures sociales : sécurité minière et logements sociaux
  - Recherche : article 55
  - Incorporation dans le traité de Nice

LES

# Production



# Terminologie



## Mines souterraines par chambres et piliers



## Mines souterraines par longue-tailles



## Ciel ouvert



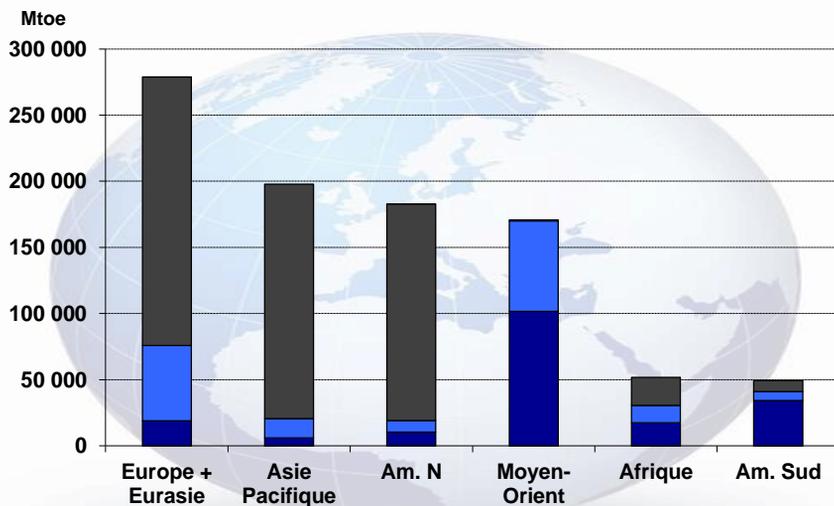
## Tourbière



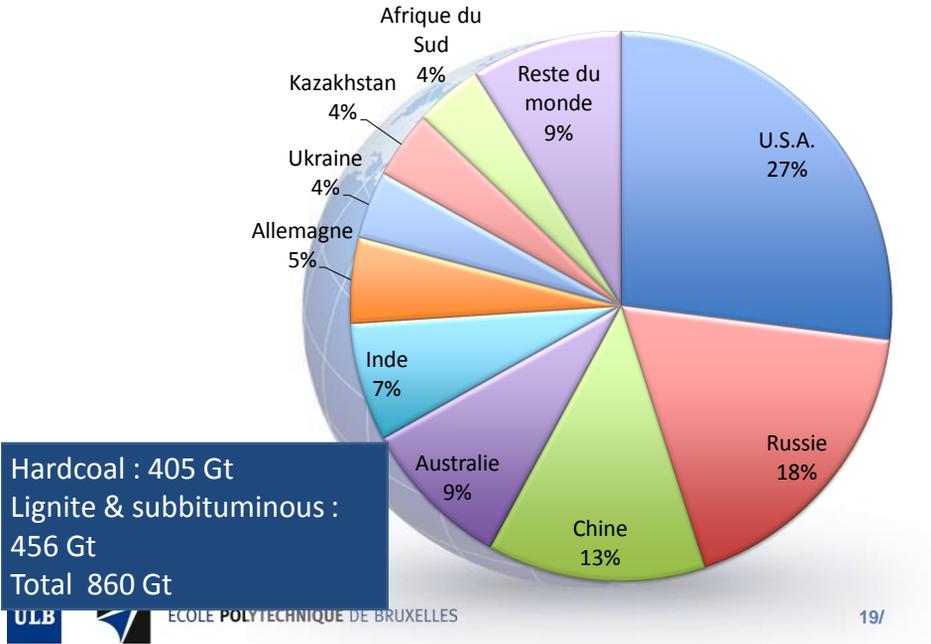
## Les réserves de charbon



### Le charbon, l'énergie fossile la plus abondante



# Réserves mondiales de charbon



# Mozambique – Tete bassin



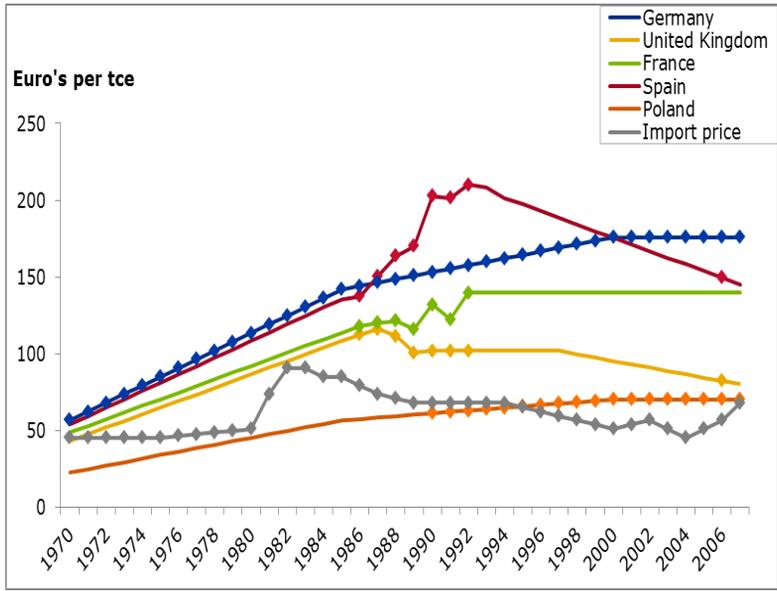
**Low prices hit Mozambique coal project**

July 22 2014 at 07:37pm  
 By Reuters

Maputo - A Thai-Mozambican consortium has set a 2018 target to commission a \$4.5 billion coal export railway and port terminal project in central Mozambique, but the depressed global coal prices outlook made the timing "tough", the company's president said.

Late last year, Mozambique's government picked Bangkok-based contractor Italian-Thai Development to construct the 537 km rail line from the Moatize coal mines in Tete province to Macuse on the coast in Zambezia province.

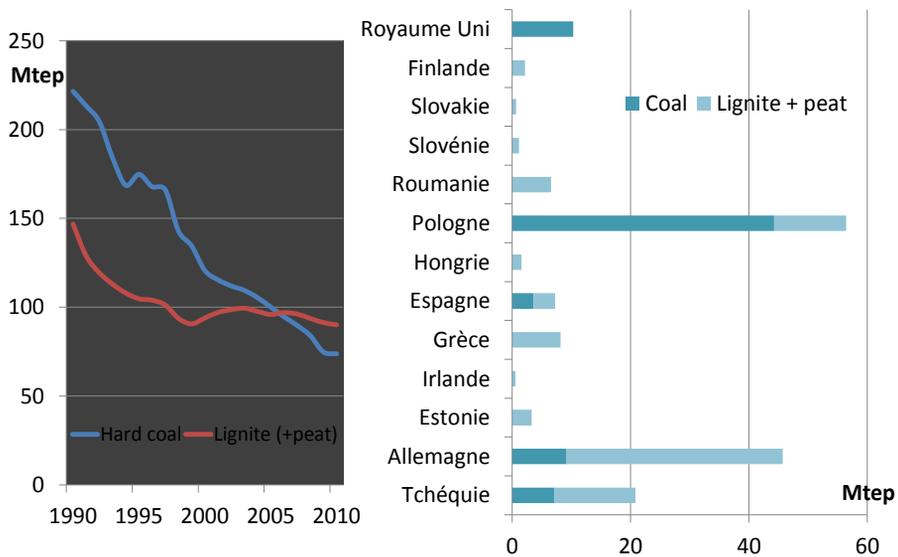
## Le cout de production du charbon européen le pénalise fortement



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22/

## Mais pas de futur brillant pour les charbonnages européens



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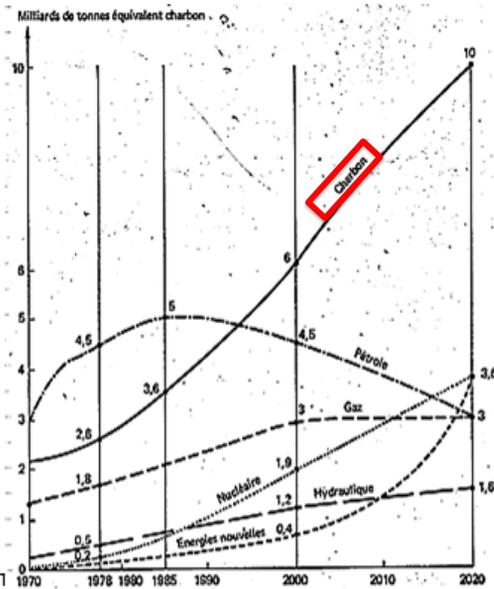
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## Le charbon...énergie de l'avenir...en 1980

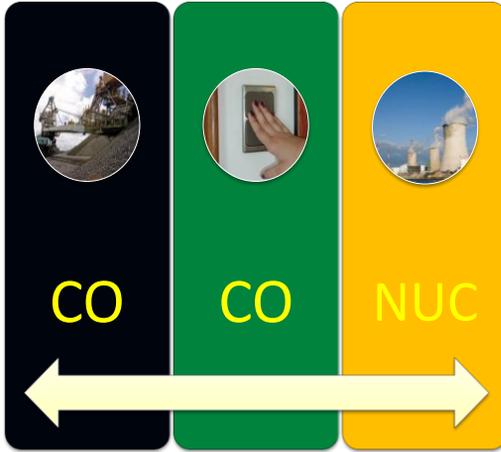


Il y a 40  
le charbon était l'énergie de l'avenir...

Cours du  
Prof. R Cypès  
"Questions de  
carbochimie"  
1978



# COCONUC, la stratégie de l'UE en 1980



COUNCIL RESOLUTION  
of 9 July 1980

concerning Community energy policy objectives for 1990 and convergence of the policies of the Member States

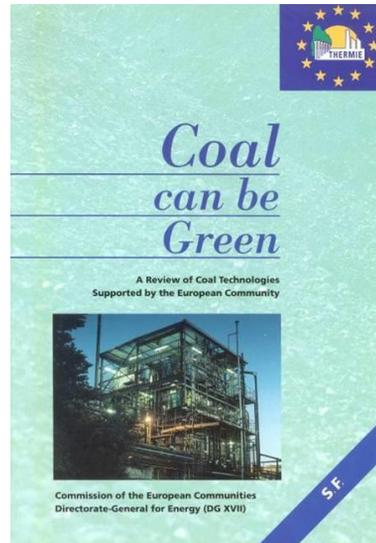
The Commission will base its examination on the following guidelines for the Community as a whole:

- to reduce to 0.7 or less the average ratio for the whole Community of the rate of growth in gross primary energy consumption to the rate of growth of the gross domestic product,
- to reduce oil consumption in the Community to a level of about 40 % of gross primary energy consumption,
- to cover 70 to 75 % of primary energy requirements for the production of electricity by means of solid fuels and nuclear energy,



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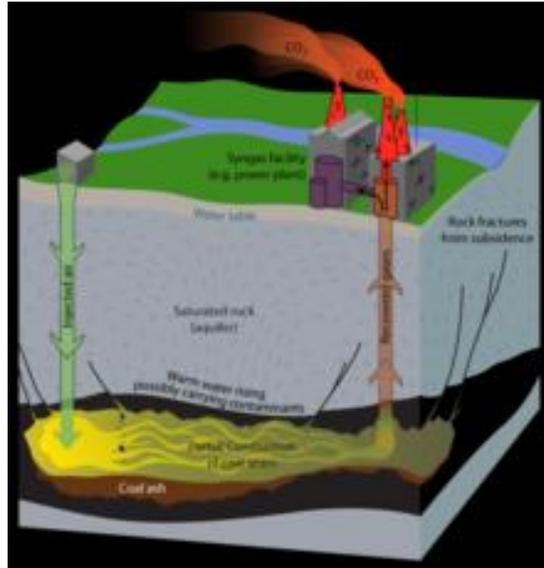
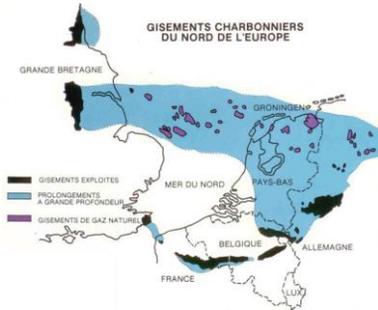
# Le "charbon propre"



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## L'époque de la gazéification souterraine

Projet  
belgo-allemand financé  
par la Commission  
européenne  
1980-1994  
Thulin (Borinage)

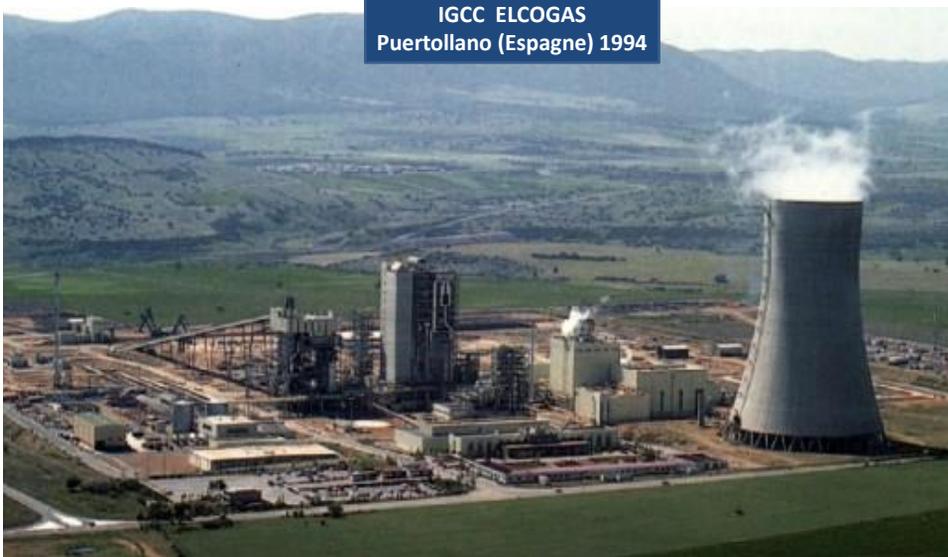


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28/

## L'époque des centrales avec gazéification du charbon

IGCC ELCOGAS  
Puertollano (Espagne) 1994



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29/

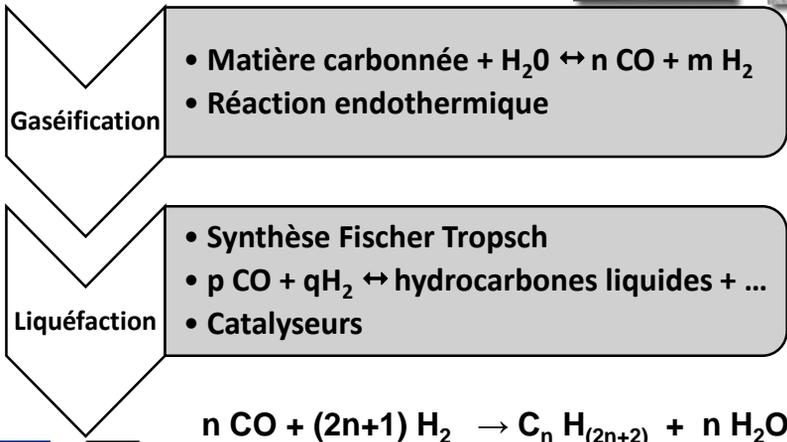
# L'époque de la liquéfaction du charbon



30/

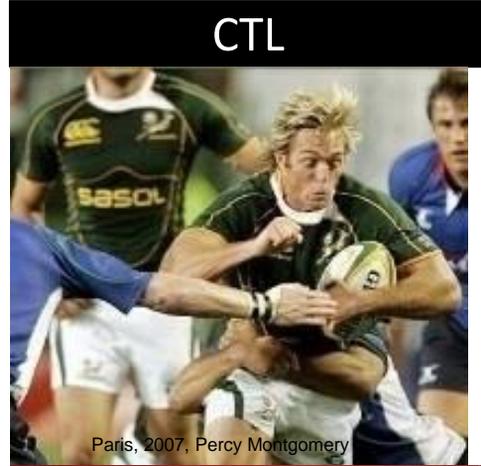
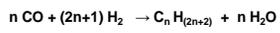
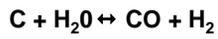
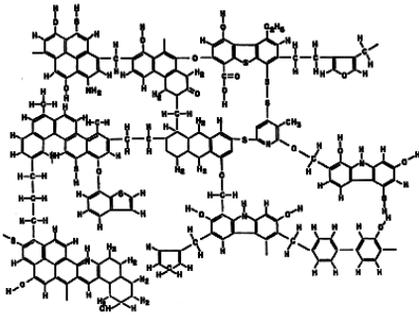
## Carburants à partir de charbon

1. Liquéfaction directe
2. Liquéfaction indirecte



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31/



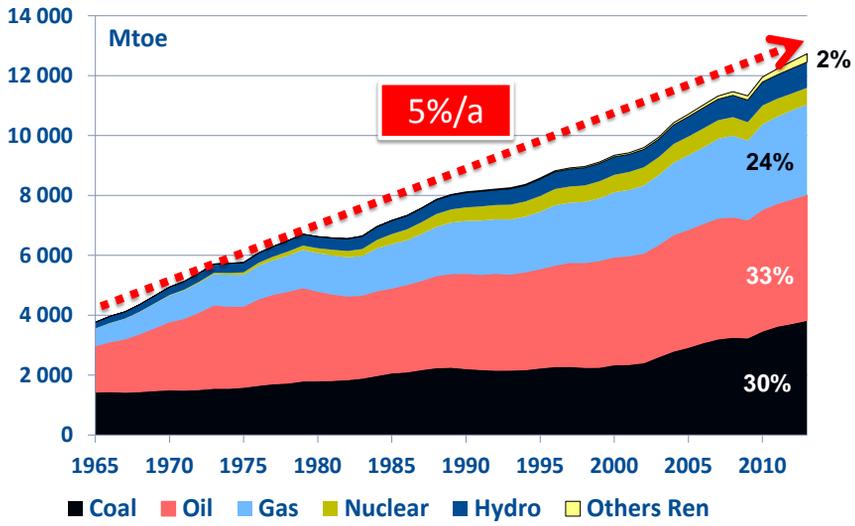
Paris, 2007, Percy Montgomery



Le charbon, une forte réalité d'aujourd'hui



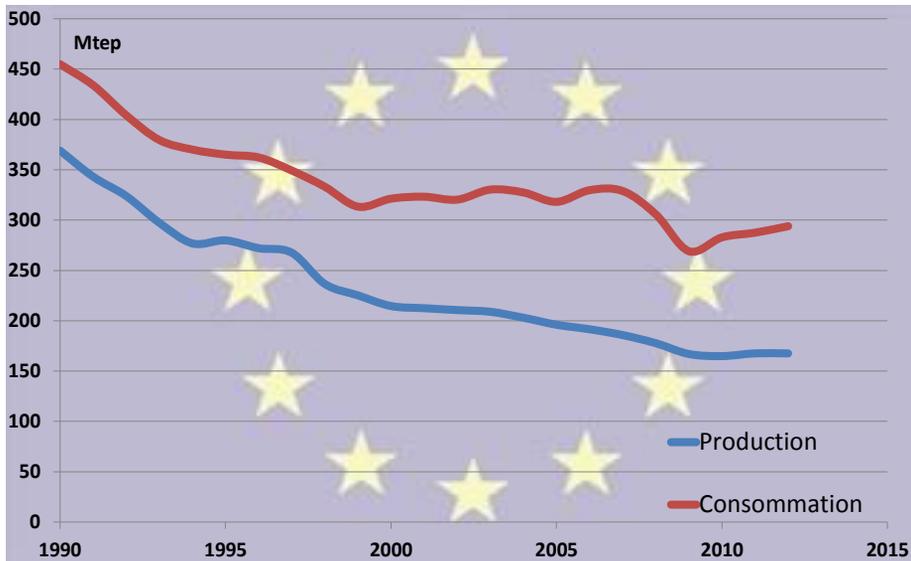
# Consommation mondiale d'énergie



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34

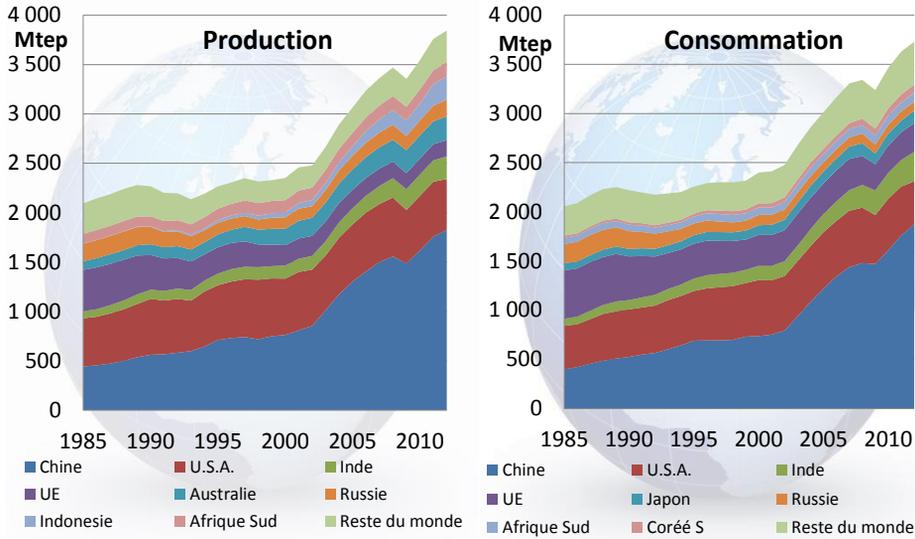
# Le charbon dans l'UE



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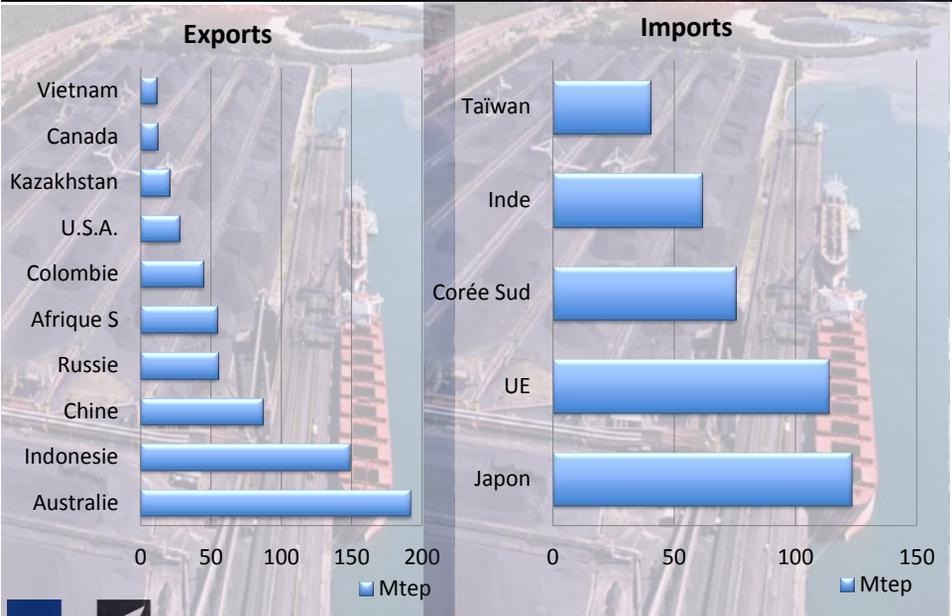
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# Le charbon dans le monde



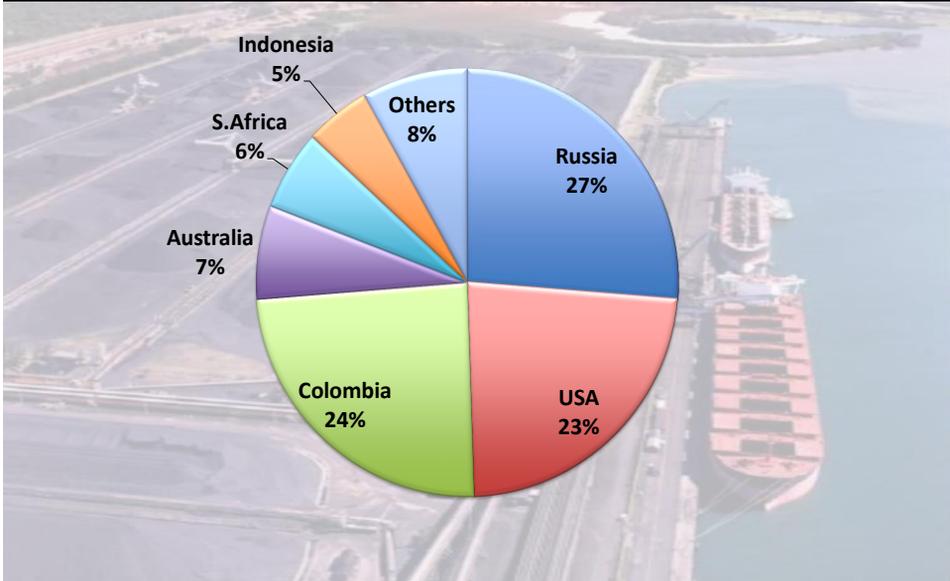
**ULB**  **Asia /Pacific : 70% of world consumption**  
**China : 50 % of world consumption**

# Principaux exportateurs et importateurs de charbon



**ULB**  **ECOLE POLYTECHNIQUE DE BRUXELLES** 371

## Importations de houille dans l'UE (2012)



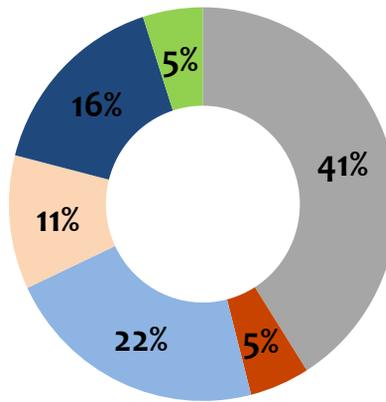
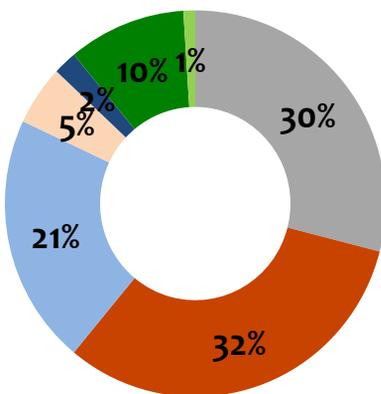
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38/

## Le charbon, important pour l'énergie et encore plus pour l'électricité

Total Primary Energy Supply  
19,1Tce

Gross Power Generation  
22 500Twh



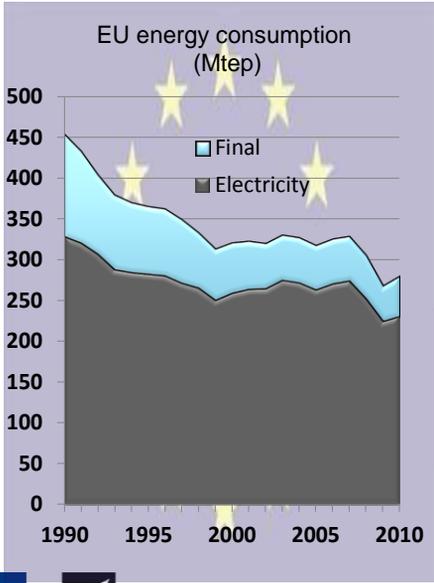
Coal  
 Oil  
 Natural Gas  
 Nuclear Energy  
 Hydro  
 New Renewables  
 Traditional Biomass



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39/

# Le charbon, idéal pour la génération d'électricité



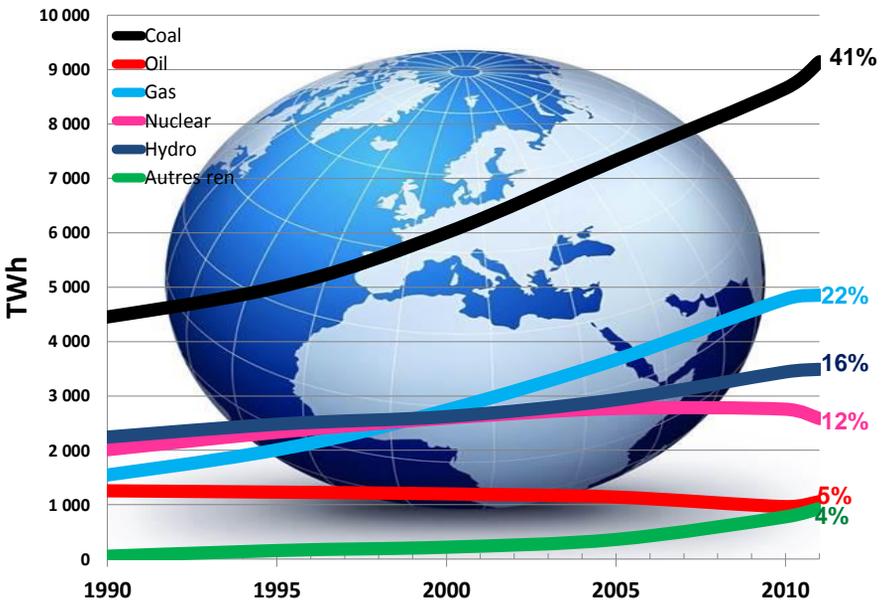
Coal, by far the best energy for electricity generation in poor countries



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40/

# Production mondiale d'électricité par énergie primaire

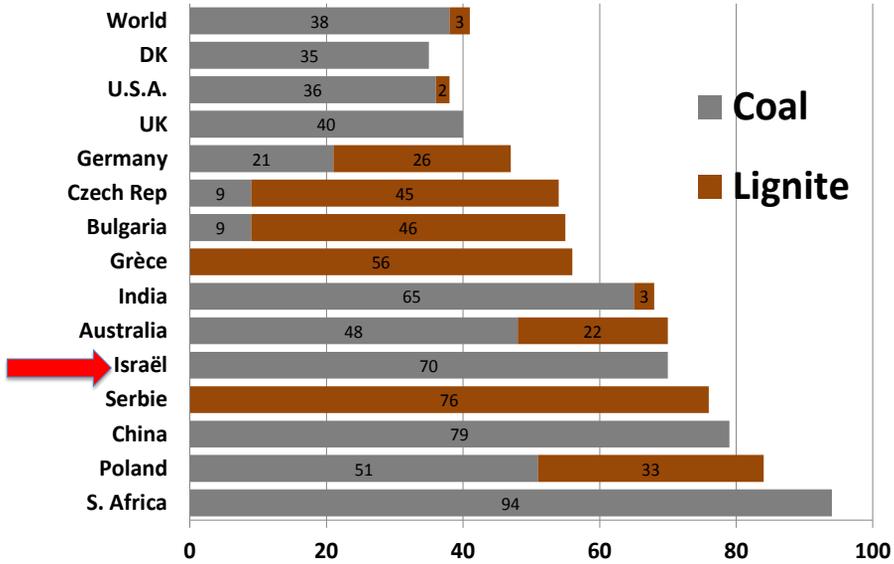


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Data : Energy Pocket Book (EC, 2014)

41/

## Part du charbon dans la génération d'électricité (%)

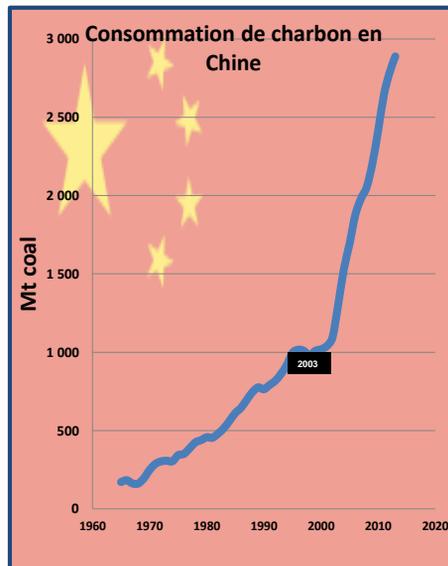
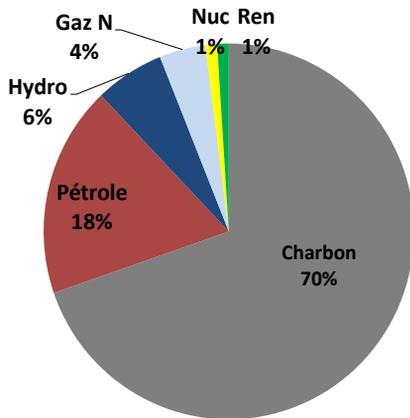


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42/

## Chine: le charbon n'a pas d'autres alternatives

- 400 millions "Occidentaux" + 1200 million "Indians"
- Country is completely electrified



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43/



## Diminution, vraiment ?



**Aiding the coal decline, China on Thursday set an overall economic growth goal for 2015 of about 7%, lower than last year's 7.4 % actual growth.**

**négociations internationales sur le CHANGEMENT CLIMATIQUE en vain**

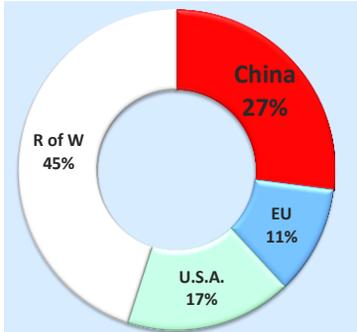


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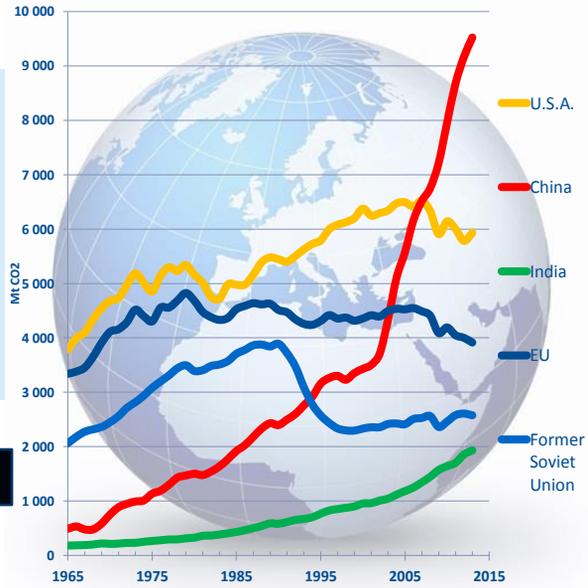


- Galilee basin (Queensland) : 80 Mt/a
- Waratah Coal (China): 40 Mt/a – 25 years
- 7 000 km to China
- 8 G\$
- 453 km to Abbot Point
- Opening mine and constructing railways (3 y)
- Financial difficulties with present coal price

# Emissions de CO<sub>2</sub>



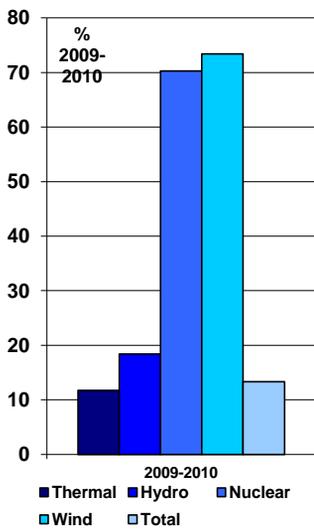
**+55% depuis Rio-1992**



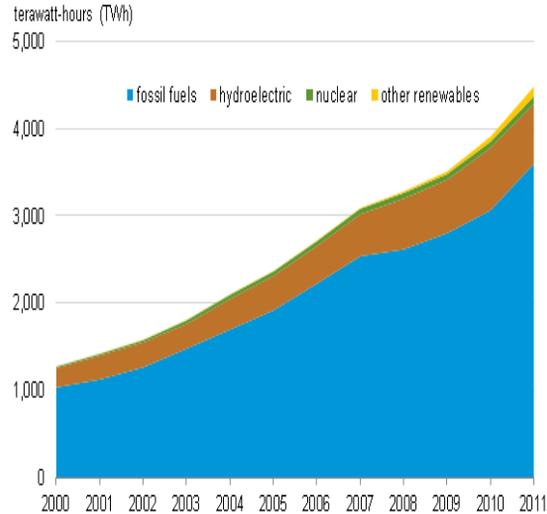
ECOLE POLYTECHNIQUE DE BRUXELLES

Data : BP 2014

# "La Chine mise sur les renouvelables". Vraiment ?



China's net electricity generation by fuel type, 2000-2011



Source : <http://www.energychinaforum.com/news>



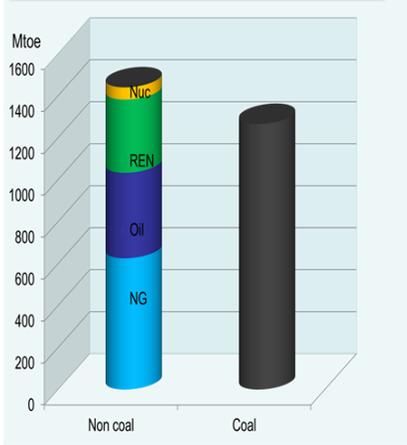
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Source : U.S. Energy Information Administration, International Energy Statistics

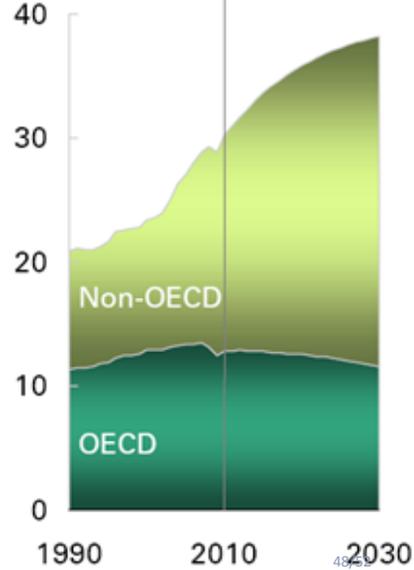
# La futilité des politiques et mesures

**Growth in energy demand between 2000 and 2010 in the world**



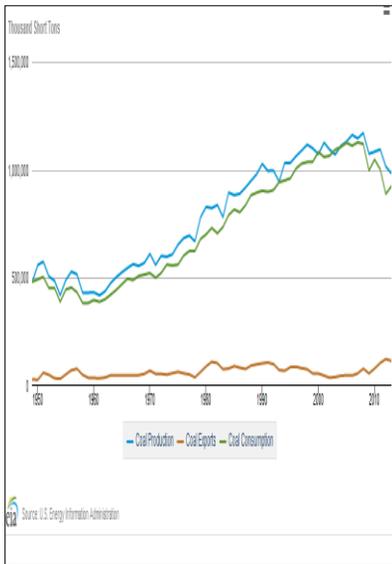
Source : IEA WEO 2011

**Billion tonnes CO<sub>2</sub>**

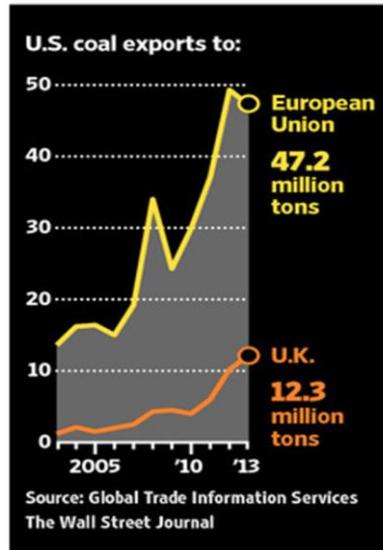


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# Le gaz de roche-mère US fait augmenter la consommation de charbon dans l'UE



Source: U.S. Energy Information Administration



Source: Global Trade Information Services  
The Wall Street Journal



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49/

## Le charbon, utilisation et pollution



## Le "bon vieux" chauffage au charbon



André Kertész

## Le smog de Londres était dû au charbon

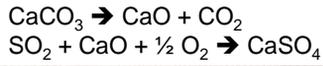
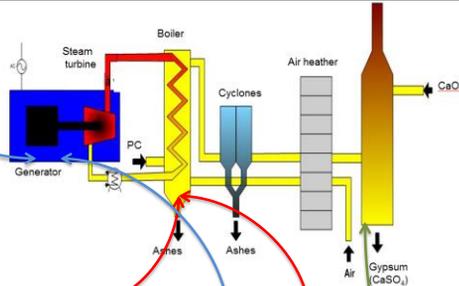


52/

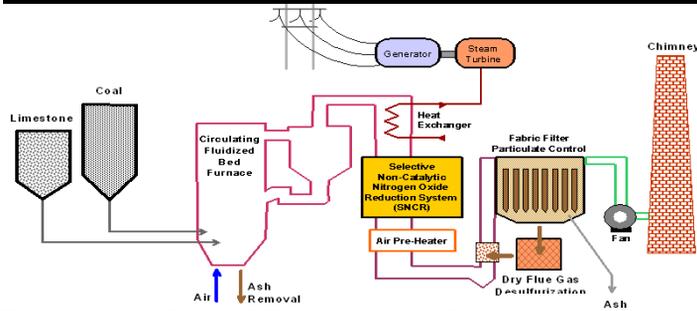
## La pollution en Chine due au charbon



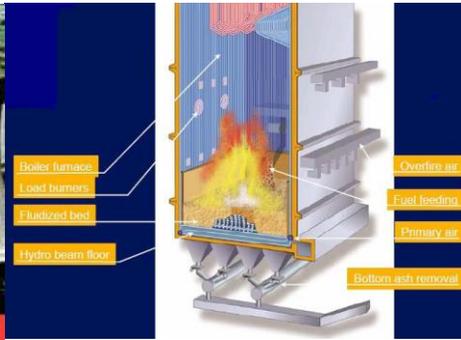
## L'épuration des fumées



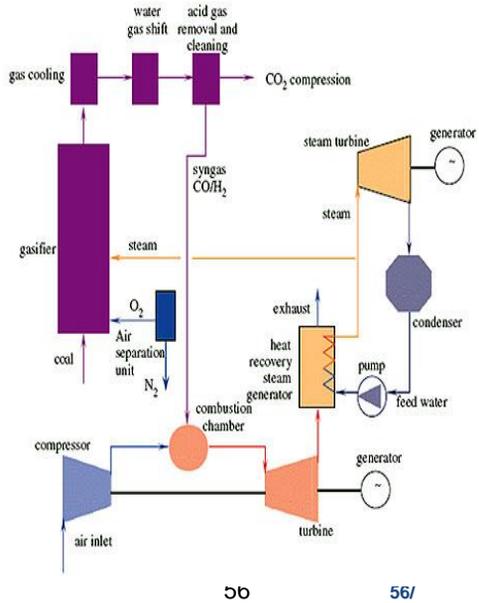
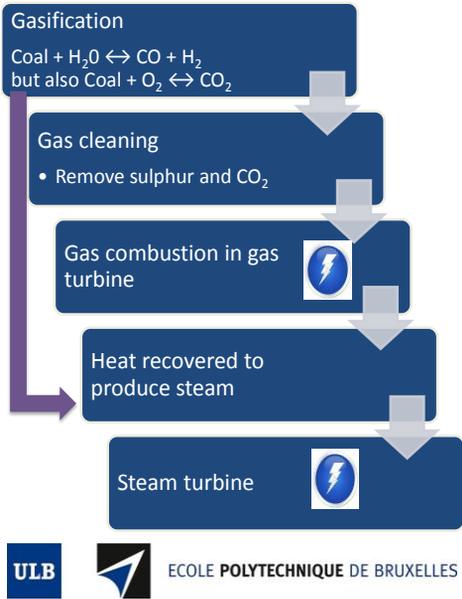
## Combustion en lit fluidisé



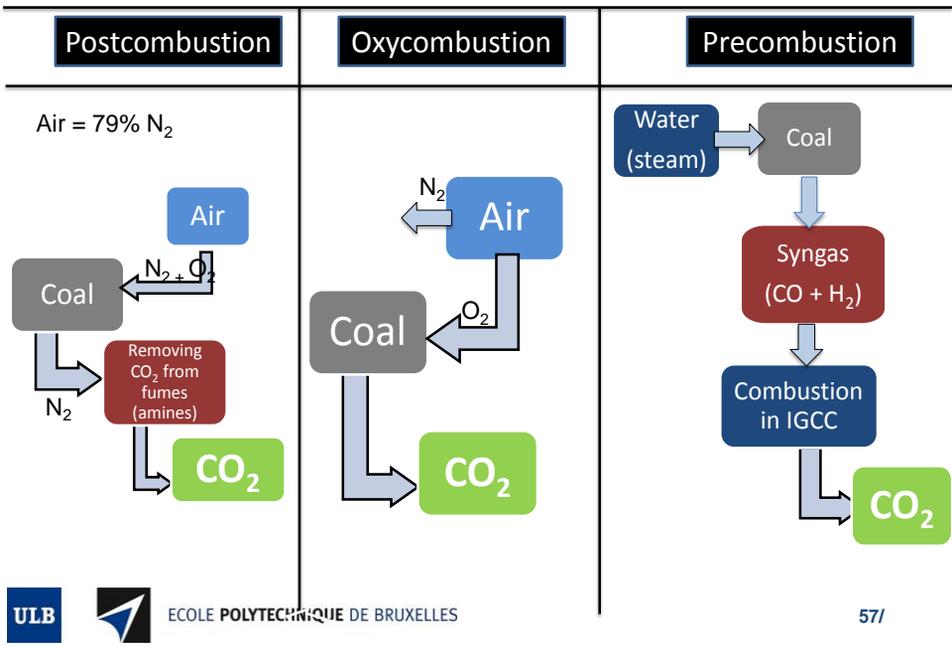
Lit fluidisé circulant de Carling



# Centrales IGCC peu polluantes



# La capture du carbone



# Le CCS

Fossil fuel fired power

CO<sub>2</sub> extracted compressed & piped to disposal area

35 - 50 €/TCO<sub>2</sub>

Platform

Pipeline

Sea

800m+

5 - 10 €/TCO<sub>2</sub>

Cap Rock (impermeable shale or mudstone)

Reservoir (sandstone)

CO<sub>2</sub>

Sleipner A

Sleipner T

Gas from Sleipner West

CO<sub>2</sub> Injection Well

Utsira Formation

Sleipner East Production and Injection Wells

Sleipner East Field

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## Tous contre tous... mais surtout contre le charbon

the guardian

UK world sport football opinion culture economy lifestyle

environment cities development

**Fossil fuel divestment**

**World's biggest sovereign wealth fund dumps dozens of coal companies**

Damian Carrington

Thursday 5 February 2015 17:43 GMT

136:47

120

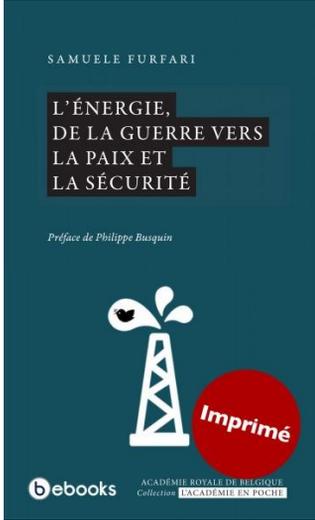
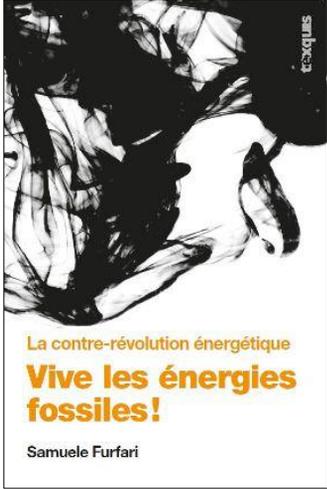
Norway's giant fund removes investments made risky by climate change and other environmental concerns, including coal, oil sands, cement and gold mining

The world's richest sovereign wealth fund removed 32 coal mining companies from its portfolio in 2014, citing the risk they face from regulatory action on climate change.

Norway's Government Pension Fund Global (GPGF), worth \$850bn (£556bn) and founded on the nation's oil and gas wealth, revealed a total of 114 companies had been dumped on environmental and climate grounds in its first report on responsible investing, released on Thursday. The companies divested also include tar sands producers, cement makers and gold miners.

*A source said: "The strategy on the gas side would be to kill coal, and of course to greenwash. On the renewables side it would be to partner with big business rather than the small players and NGOs, as they did in the past, and conquer a bigger, more conservative and more powerful auditorium."*

**Merci pour votre attention**  
**sfurfari@ulb.ac.be**



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60/