

**Building a long term framework for  
investment in nuclear power in Europe**  
*, and survival of,*

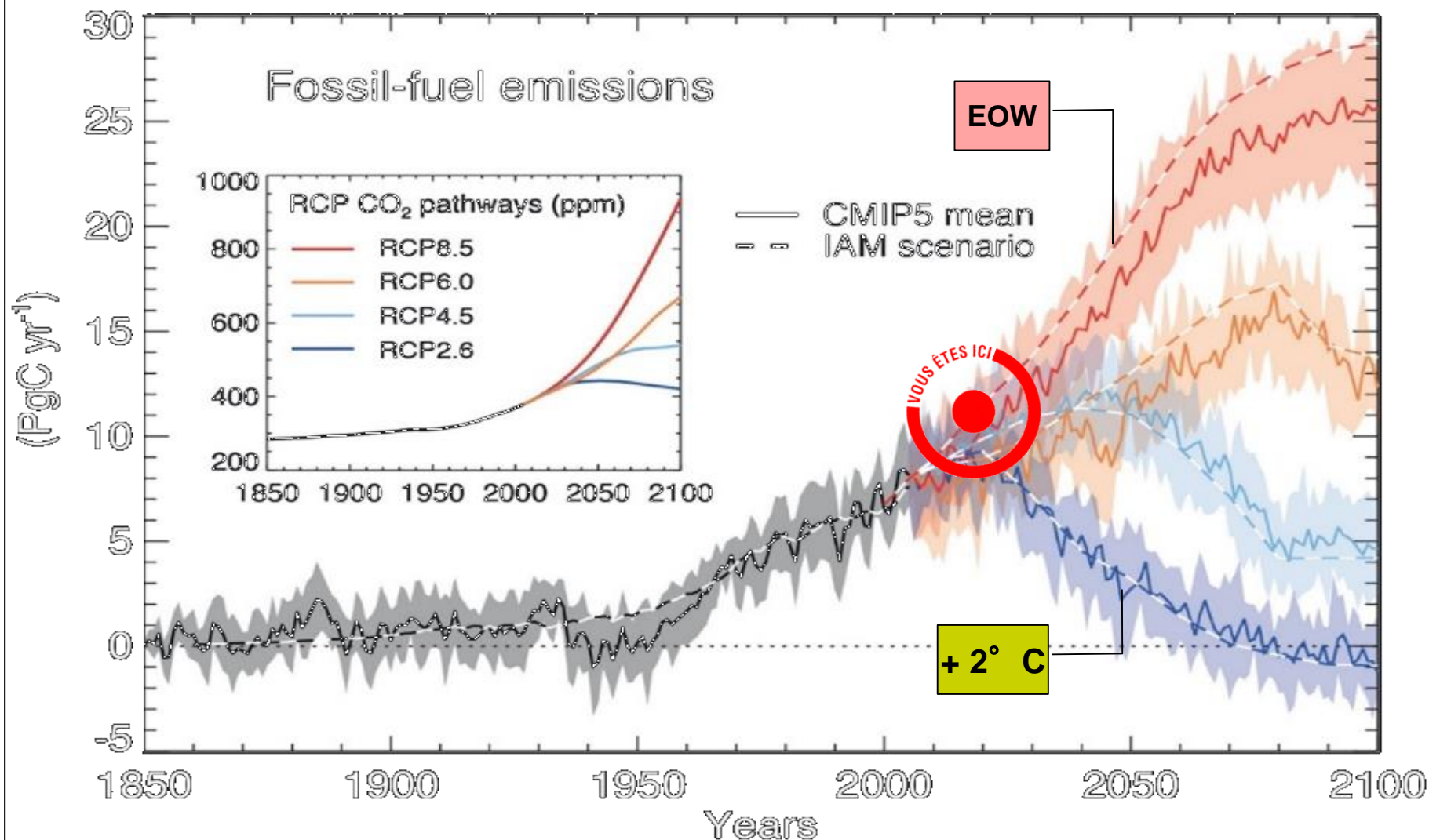
**LES ENTRETIENS EUROPÉENS**

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**Marriott – Grand Place, Bruxelles**  
**20 novembre 2016**

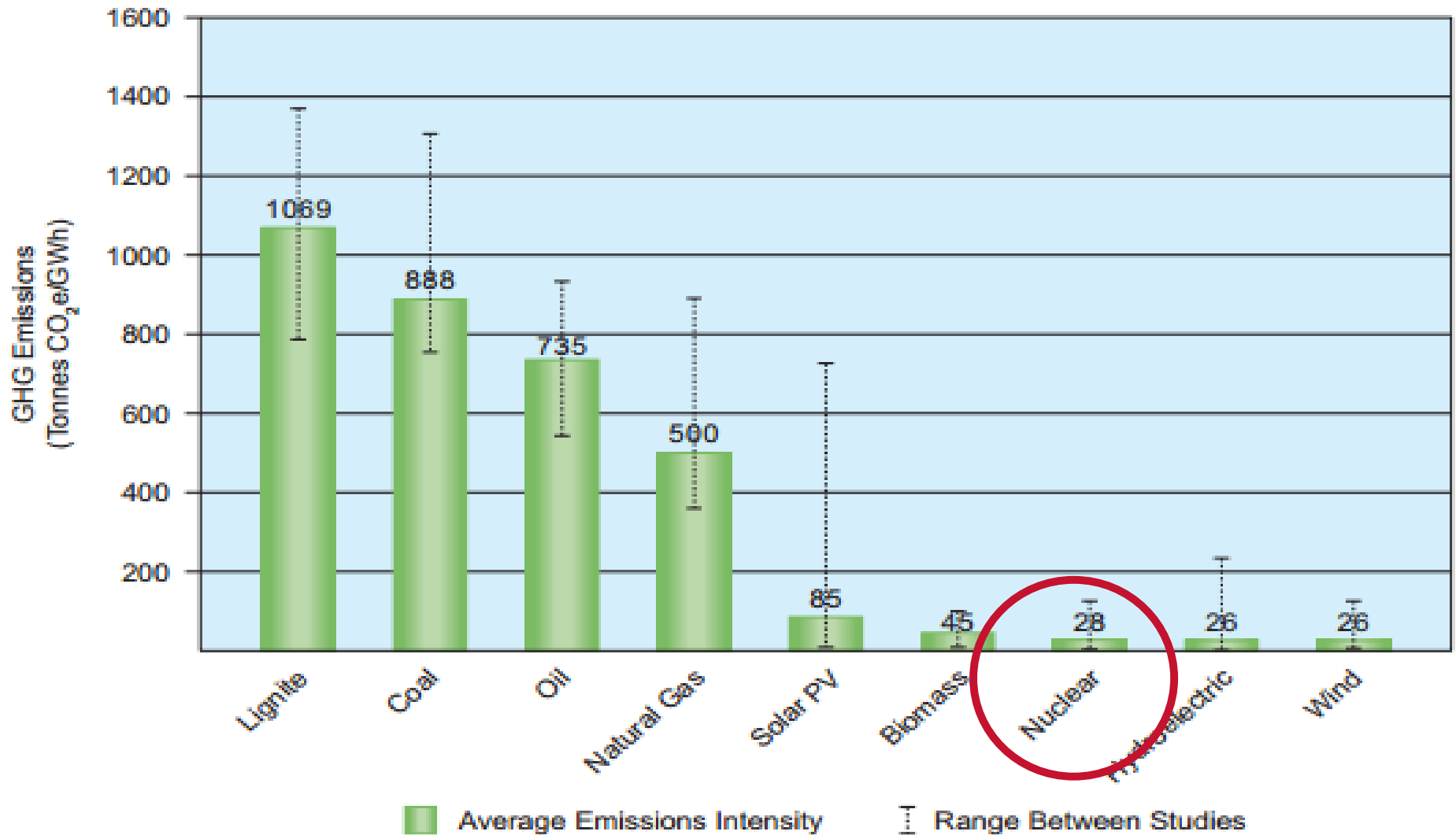
# IPCC Representative Concentration Pathways

## You are here!



# Average GHG Emissions intensity

*Nuclear ranks by far with the best-in-class*



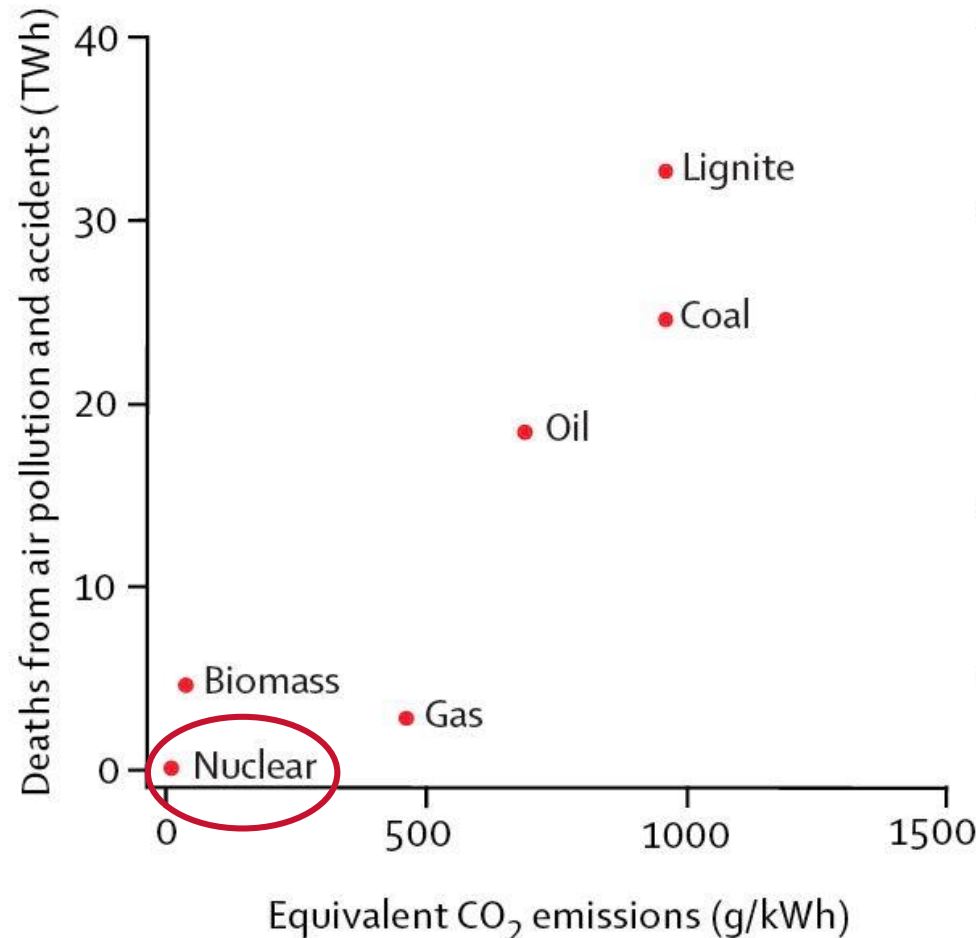
# Death from air pollution and accidents, excluding ones induced by climate change

***Fukushima: “No discernible increased incidence of radiation-related health effects are expected”***

United Nations Scientific Committee on the Effects of Atomic Radiation

Europe – excluding climate change induced deaths

Source : Electricity generation and health, Anil Markandya & Paul Wilkinson, The Lancet, 2007; 370: 979–90.



SOURCES, EFFECTS AND RISKS OF IONIZING RADIATION  
**UNSCEAR 2013 Report**

## Volume I

REPORT TO THE GENERAL ASSEMBLY

SCIENTIFIC ANNEX A:

Levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami

**The doses to the general public [...] are generally low or very low.**

**No discernible increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants.**

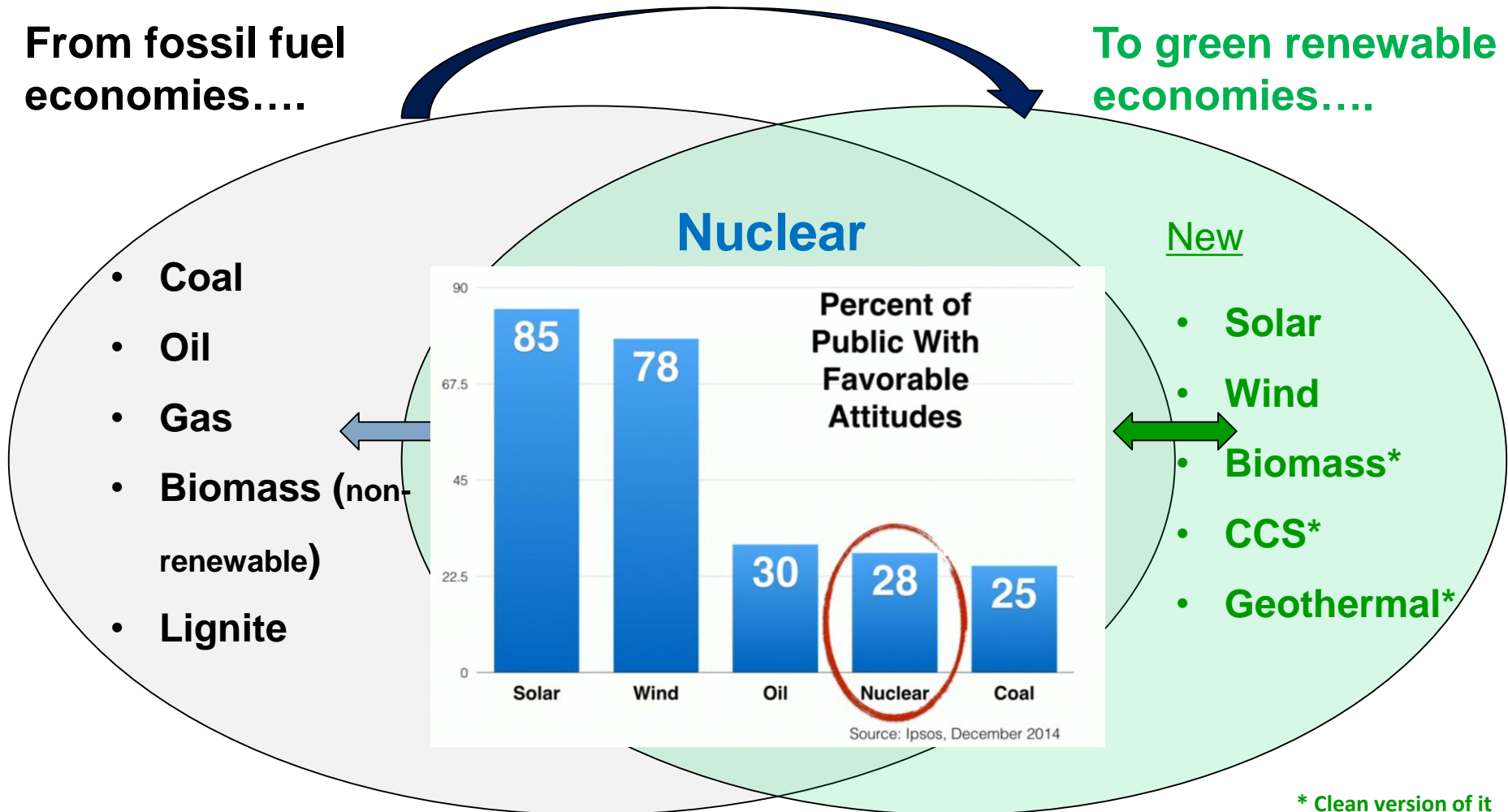
**(Page 10)**

# Nuclear, the ideal energy of the Energy Transition

Or so would physics and economics have you believe...

From fossil fuel economies....

To green renewable economies....



\* Clean version of it

# Is an inter-connected liberalized market with different rules still a liberal market?

“We estimate that the social cost of carbon is not \$37 per ton, as previously estimated, but **\$220 per ton (~200€),**”

*Nature Climate Change*, 5,127–131 (2015)  
Stanford's School of Earth Sciences

**30€/tCO<sub>2</sub>** – level at which the Oil&Gas industry says carbon price starts influencing their investment decision

**5,95 €/tCO<sub>2</sub>**  
price as of October 18, 2016

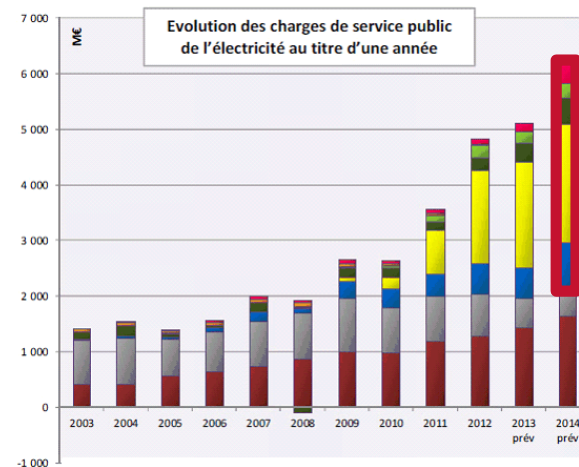
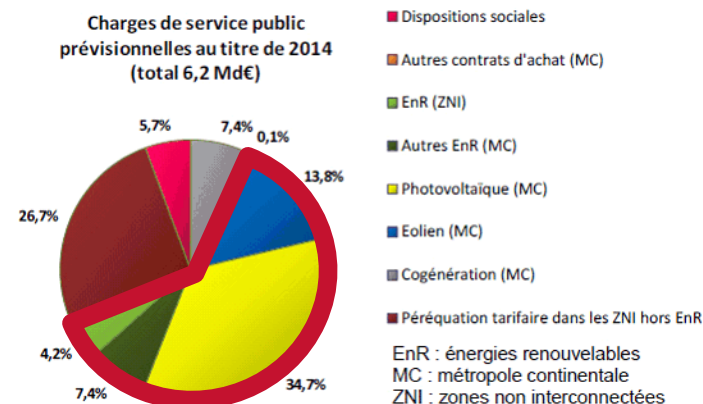


Source: Bloomberg, 2015.

EU ETS, EUR price of carbon per metric ton

still a liberal market?

60% = Part of ENR subventions in the public service tax added to the price of electricity in France



Source : CRE



# Europe average wholesale baseload electricity prices

## 1st quarter of 2016



**Pan-EU average =  
33,2 €/MWh**

**<32€/MWh**

## **Nuclear Energy is a major contributor to...**

- ✓ **Ensure cheap reliable energy to populations**
- ✓ **Fight against climate change**
- ✓ **Increase our economies competitiveness**
- ✓ **Improve air quality**
- ✓ **Increase number of highly-qualified jobs**
- ✓ **Increase our diplomatic margin by increasing our energy independence**



# Biggest emitters of Greenhouse Gas

## Opinion poll next to French people – 2014 (ADEME/CSA)

Pour chacune des activités suivantes dites-moi si d'après ce que vous savez elle contribue beaucoup, assez, peu ou pas du tout à l'effet de serre (Réponse « beaucoup » + « assez »)

	Les activités industrielles	Les transports	La destruction des forêts	Les bombes aérosols	Le chauffage des bâtiments	Le traitement des déchets	Les centrales de production d'électricité au gaz au	Les centrales nucléaires	L'agriculture et l'élevage	L'activité volcanique
	<b>53% of French people think nuclear power plants are responsible for CO2 emissions</b>									
2014								53	66	36
2013								61	59	36
2010								61	59	42
2007	93	92	89	75	71	69	59	56	50	31
2004	90	88	87	73	58	70	62	63	41	28
2001	89	87	84	67	46	67	52	61	39	33
2000	85	83	79	64	39	57	60	59	33	30

- La formulation de cet item a changé en 2014 : l'Ademe a ajouté « au gaz, au charbon ou au fuel », ce qui a provoqué une augmentation artificielle de cet item (ces combustibles ont une image de polluants).  
Baromètre Ademe / CSA

# Business & Climate Summit 2016 in London

Over 500 leading businesses, investors, policy makers and NGO's from 39 countries  
Estimated global audience of 490 million

- Patrick Pouyanné, Chairman and CEO of TOTAL

***"We need reliable and clean energy: to go from wood to coal to oil to gaz and finally to renewables"***

***"Gaz is the cleanest way to ensure reliability"***

- Rachel Kyte, CEO of *Sustainable Energy For All* and Special Representative of the UN Secretary-General. Former World Bank Group VP and Special Envoy for Climate Change

***"Renewables can close the access gap, quickly, cleanly. cheaply"***

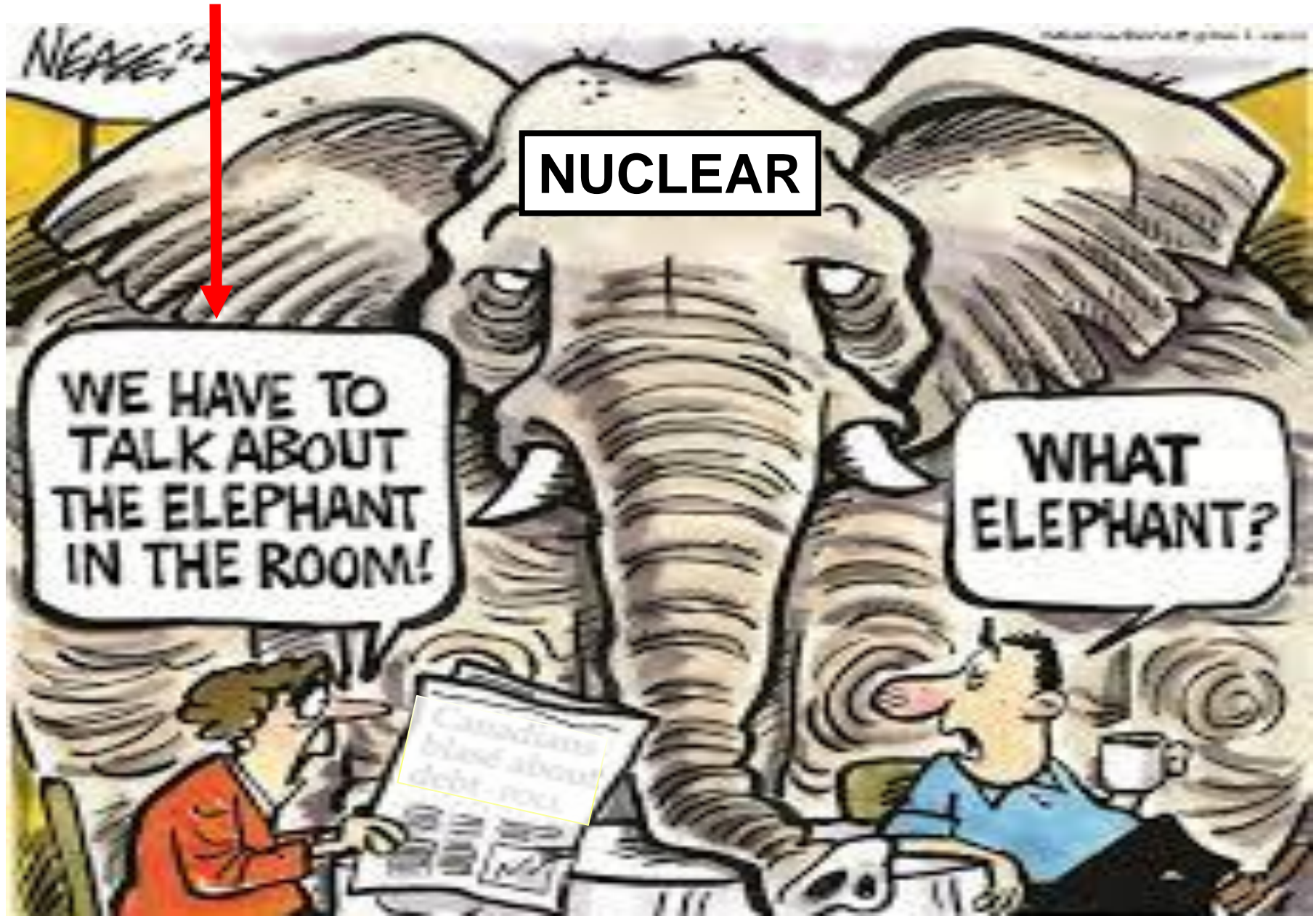
- Kerry Adler, President and CEO of Skypower

***"Why bother to build base load power?"***

***"A solar watt is cheaper than a watt of anything else"***



# Me in an energy and climate discussion



**1. Ask for a level-playing field**

**2. Go Green**

**We want**

**“CLEAN ENERGY NOW”**

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No CO2  
emissions

+

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Reliable and  
massive

+

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Available today



# Support to nuclear energy requires *Political courage*

*Fukushima prefecture, November 7, 2011*

*Makiko Segawa/The Wall Street Journal*

The Dalai Lama said **he is in support of using nuclear energy for peaceful means** as a way to bridge the socioeconomic gap in developing countries **in the absence of more efficient alternative energy sources**

[...] He noted that other energy sources like wind and solar are too inefficient to put into realistic practice to meet the needs of fast-developing countries

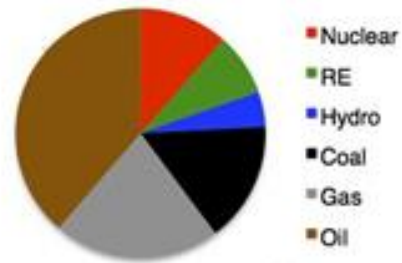


**Thank you**



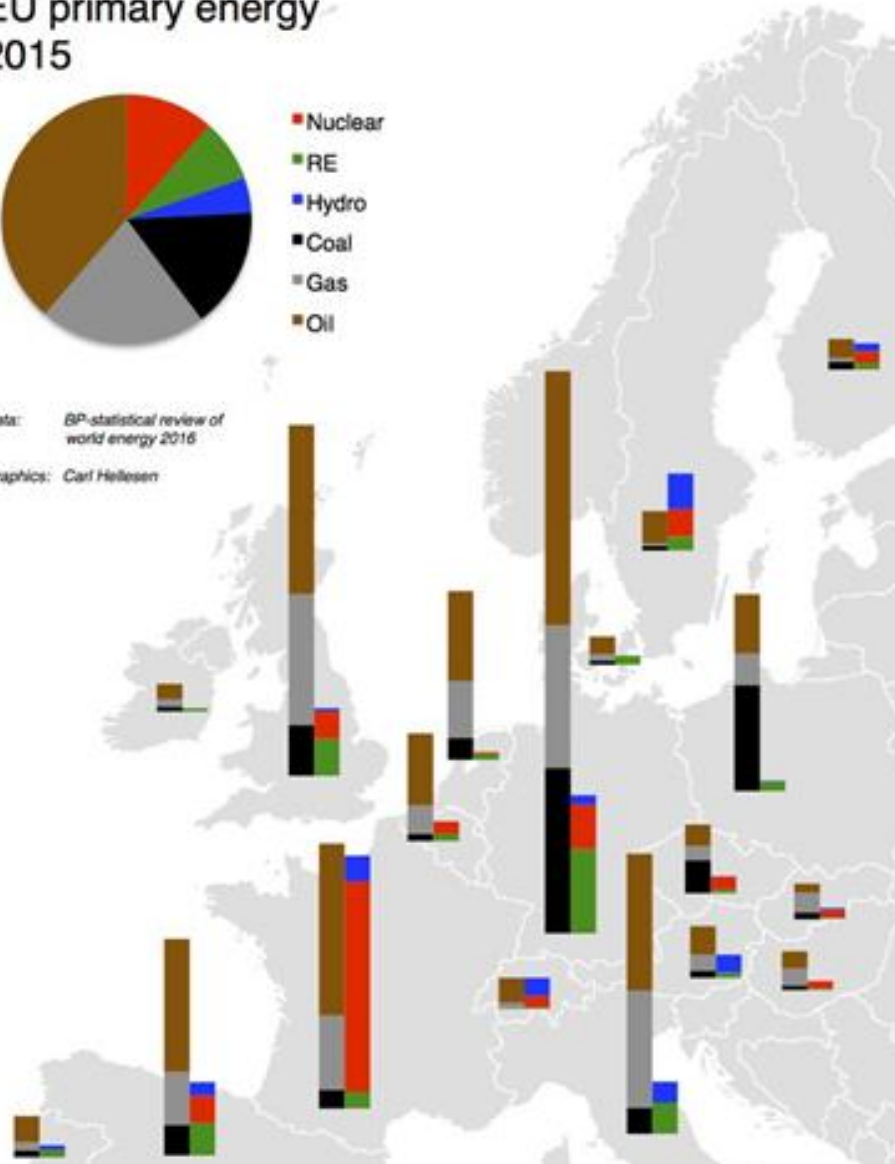
# EU primary energy mix in 2015

EU primary energy  
2015



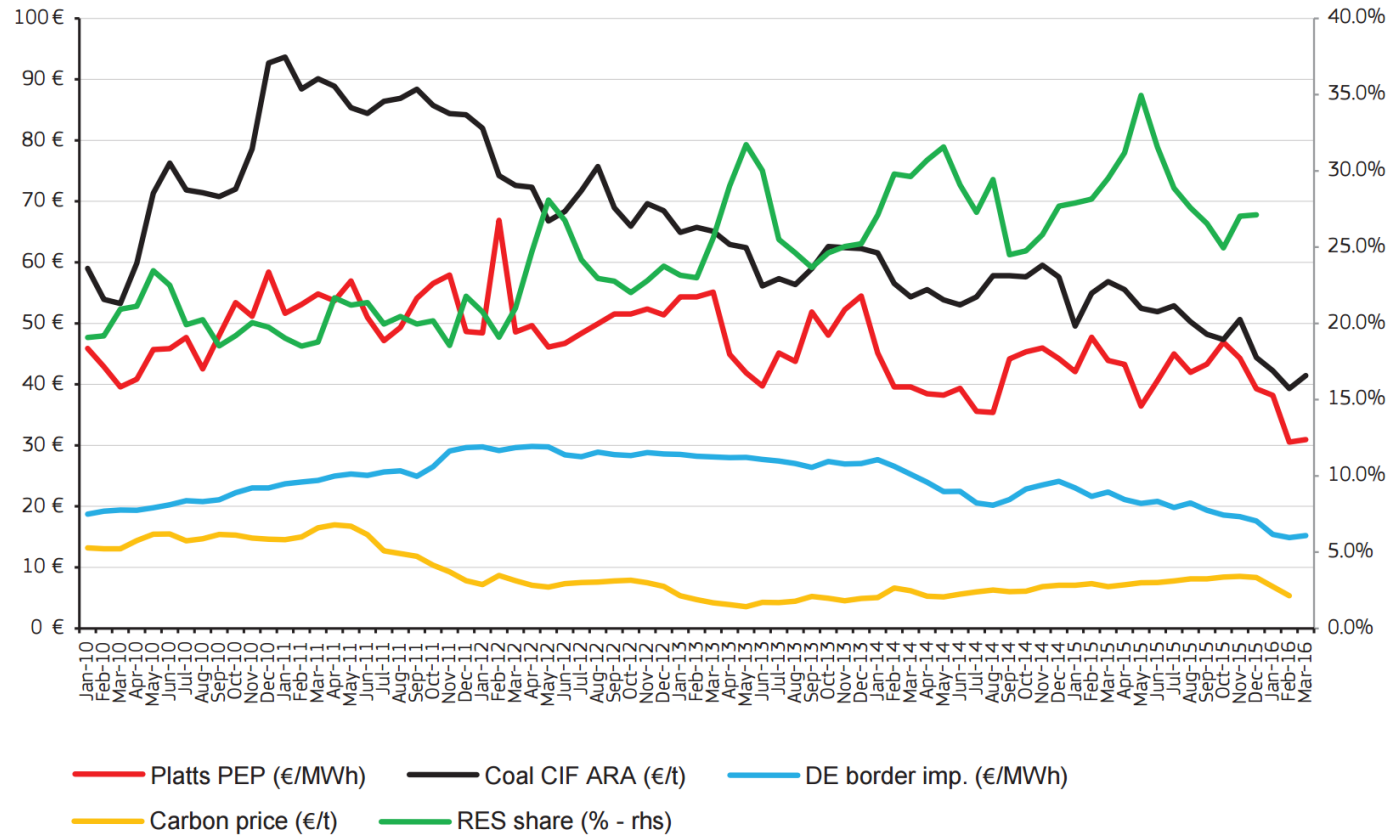
Data: BP-statistical review of  
world energy 2016

Graphics: Carl Hellesen



# Power prices follow coal as RES keep out of the fall

**FIGURE 5 - EVOLUTION OF EUROPEAN AVERAGE WHOLESALE POWER PRICE COMPARED WITH COAL, GAS AND CARBON PRICES AND THE SHARE OF RENEWABLES IN POWER GENERATION**



Source: Source: Platts, BAFA, ENSTO-E

Platts PEP: Pan European Power Index (in €/MWh)

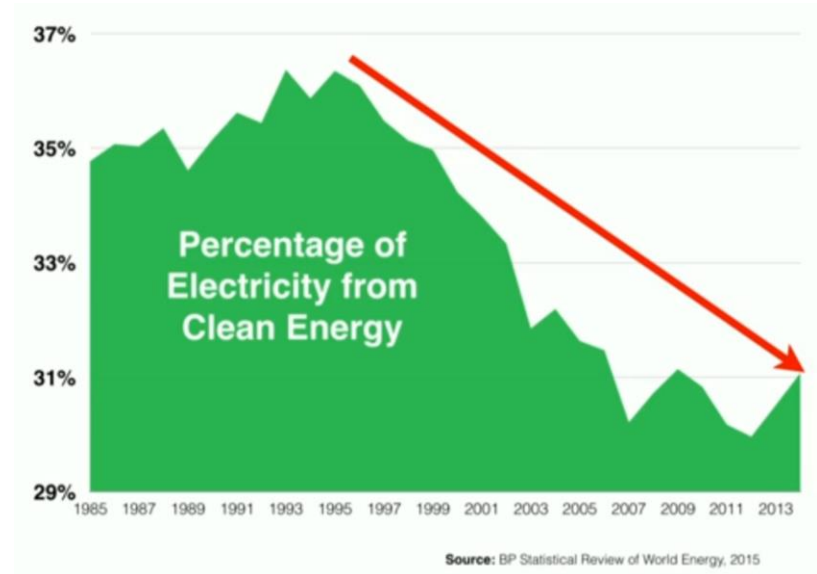
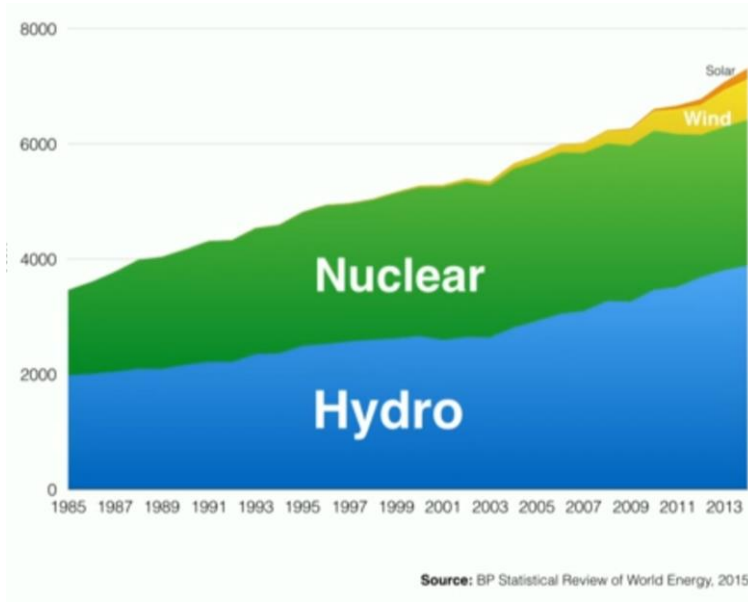
Coal CIF ARA: Principal coal import price benchmark in North Western Europe (in €/Mt)

DE border imp. stands for long term contract based import natural gas price on the German border

RES (renewables) includes hydro, wind, solar and biomass; RES share in the total power generation (right hand scale)

- **October 2016**
- IPCC just released a new version of their "Summary for Policy Makers", just prior to COP22
- 
- **[http://climateaction2020.unfccc.int/media/1281/unfccc\\_spm\\_2016.pdf](http://climateaction2020.unfccc.int/media/1281/unfccc_spm_2016.pdf)**
- 
- Last year, they had produced a whole report, proposing a lot of solutions, without mentioning nuclear at all!!
- " There are several key opportunities for reducing emissions in the (energy) sector, namely promoting carbon-free energy sources such as increasing renewable energy and nuclear power, enhancing energy efficiency at all stages of energy production, distribution and consumption, deployment of carbon capture, use and storage (CCUS) and developing other innovative technologies (Edenhofer et al, 2014)"

# We are not in a clean energy revolution but in a clean energy crisis



**We could lose four times more clean energy than we lost over the last ten years**

