


# ***Restoring People's Confidence***

***Bertrand Barré***

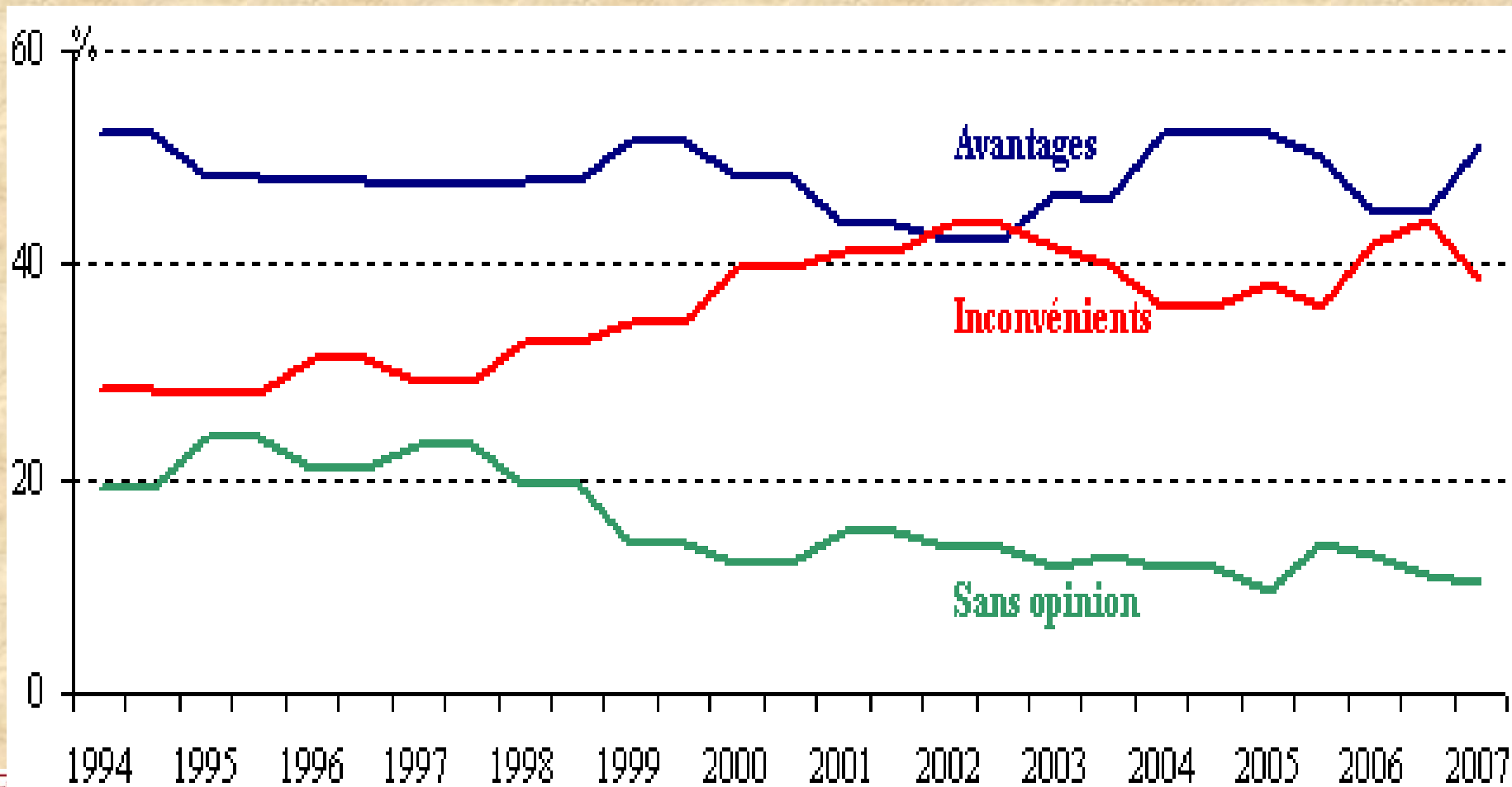
***Former Head of the Nuclear Reactor Direction, CEA***

***Former Chairman of SAGNE, IAEA***

# Support for nuclear power in France

- ▶ **Before 1973 : From enthusiasm to ignorance**
- ▶ **1974-1977 : Strong opposition (Erdeven, Plogoff, Creys-Malville, La Hague, Le Pellerin), decreasing**
- ▶ **1978-1985 : 2/3 in favour – Little impact of TMI - No impact of the majority change in 1981 (except Plogoff)**
- ▶ **1986 : Chernobyl + « Excess capacity » from public officials  Support collapses to 1/3 in favour**
- ▶ **1987-1997 : Slow recovery**
- ▶ **1997-2002 : Very slow decrease (« Majorité plurielle ») with 9-11 shock**
- ▶ **2002-2010 : Stability (30% pro, 20% anti, 50% rather pro but...)**
- ▶ **2011 : Fukushima... 2013 : Back to 2010**

**« All things considered, producing three quarters of the French electricity from Nuclear Power has more advantages than drawbacks, or the reverse ? »**



# IFOP Poll June 2013

## What is your opinion about Nuclear Power in France ?

	July 2011	Nov. 2011	June 2013
In Favor	32 %	33 %	36 %
Hesitates	37 %	40 %	34 %
Against	20 %	17 %	14 %
D.K.	11 %	10 %	13 %
<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>100</b>

## Which Share of Electricity from Nuclear Power ?

	March 2002	July 2008	March 2013	June 2013
Maintain share for energy independence	52 %	67 %	54 %	59 %
Reduce share because nuclear dangerous	47 %	33 %	46 %	41 %
D.K.	1 %	-	-	-

# ***No significant loss of confidence after TMI 2***

- ▶ ***Strong public perception of need after 2 Oil Shocks***
- ▶ ***Strong public support from the French Government***
- ▶ ***No contamination***
- ▶ ***Over the years, active communication on implementation of lessons learned***

# ***TMI “Lessons Learned”***

- ▶ ***Human Factor***
- ▶ ***Unambiguous Instrumentation***
- ▶ ***Control Room Ergonomy***
- ▶ ***Best Practices (INPO, then WANO)***
- ▶ ***Full Size Simulators – Periodic re-training Sessions***
- ▶ ***Components (water level measurement, valves, ...)***
- ▶ ***“Ultimate” Procedures***
- ▶ ***Sand filters, H<sub>2</sub> Recombiners***

# Backlash after Chernobyl

- ▶ **Until may 1st, the wind blows the « cloud » toward Sweden, then it changes direction toward Italy, Germany then France**
- ▶ **May 2<sup>nd</sup> : Health Authority announces that radioactivity is increasing all over the French Territory, *but without need for protective measures***
- ▶ **Extreme anxiety develops in Italy and Germany, with some precautionary measures (milk, salads)**
- ▶ **May 15th : *Backlash*. « They lied to us, the « cloud » did cross the border !!! »**
- ▶ ***Brutal loss of confidence*, boosted by the media, to Government, EDF, Safety & Health Authorities. Call for « independent » expertise, Suits (up to 2012 !)**

# Combination of Factors

- ▶ **Chernobyl**
- ▶ **No longer perception of need :**
  - ◆ **1985-86 Oil Countershock (Oil prices lower than in 1974)**
  - ◆ **Official statement of « Nuclear Overcapacity » (Demand lower than anticipated and NPP availability better than expected)**

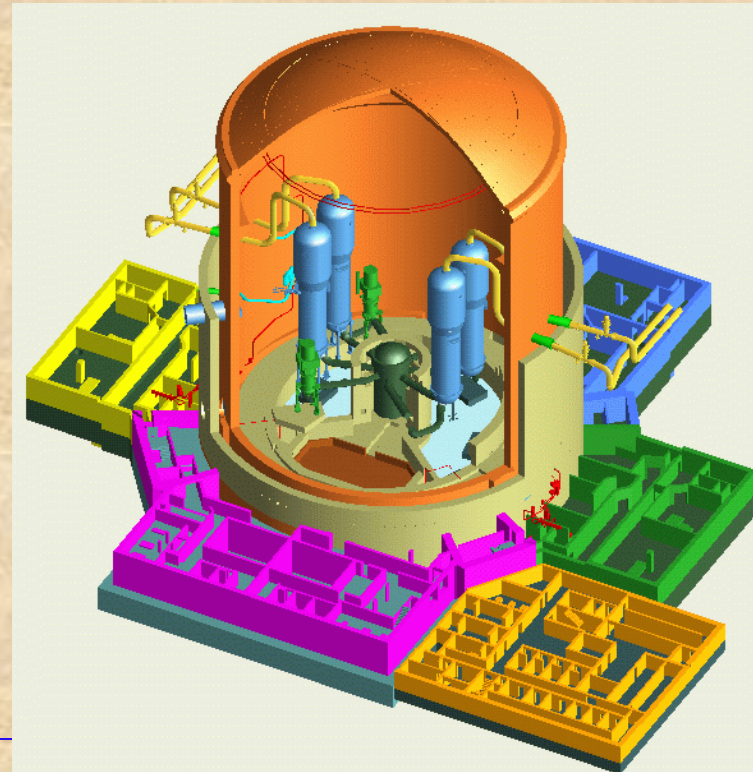


# ***Chernobyl « Lessons Learned »***

- **Importance of the Containment**
- **Protect it against agressions (from the accident and from outside)**
- **Safety Culture**
- ***Generation 3***
  
- **Harmonize Safety & Radiation Protection Norms & Standards**
- **Improve Transparency & Communication (*Local Commissions, High Committee on Transparency & Safety, Public Debates, 2002 Law, 2006 Law*)**

# *Since Tchernobyl, philosophy itself changed*

- ▶ *Design Basis Accident should be full core meltdown*
- ▶ *Preventing is not enough*
- ▶ *One must mitigate consequences*
- ▶ *Hence Generation 3*



# *First lessons learned from Fukushima*

- ▶ ***Gen 3 reactors are safer but 450 Gen 2 reactors still operating.***
- ▶ ***Reinforce their robustness against aggressions***
- ▶ ***Preserve water & power supply***
- ▶ ***Prepare Crisis Management***

# ***International Reactions***

## ▶ ***Shut down operating NPPs:***

- ◆ ***Germany***

## ▶ ***Cancel firm Projects:***

- ◆ ***Japan, Italy, Taiwan, Switzerland ?***

## ▶ ***Proceed with Nuclear Power:***

- ◆ ***USA, Russia, China, India, UK, Finland, France, Hungary, Czech Republic, Slovakia, Brazil, South Africa, South Korea, Argentina, UAE, Ukraine, Belarus...***

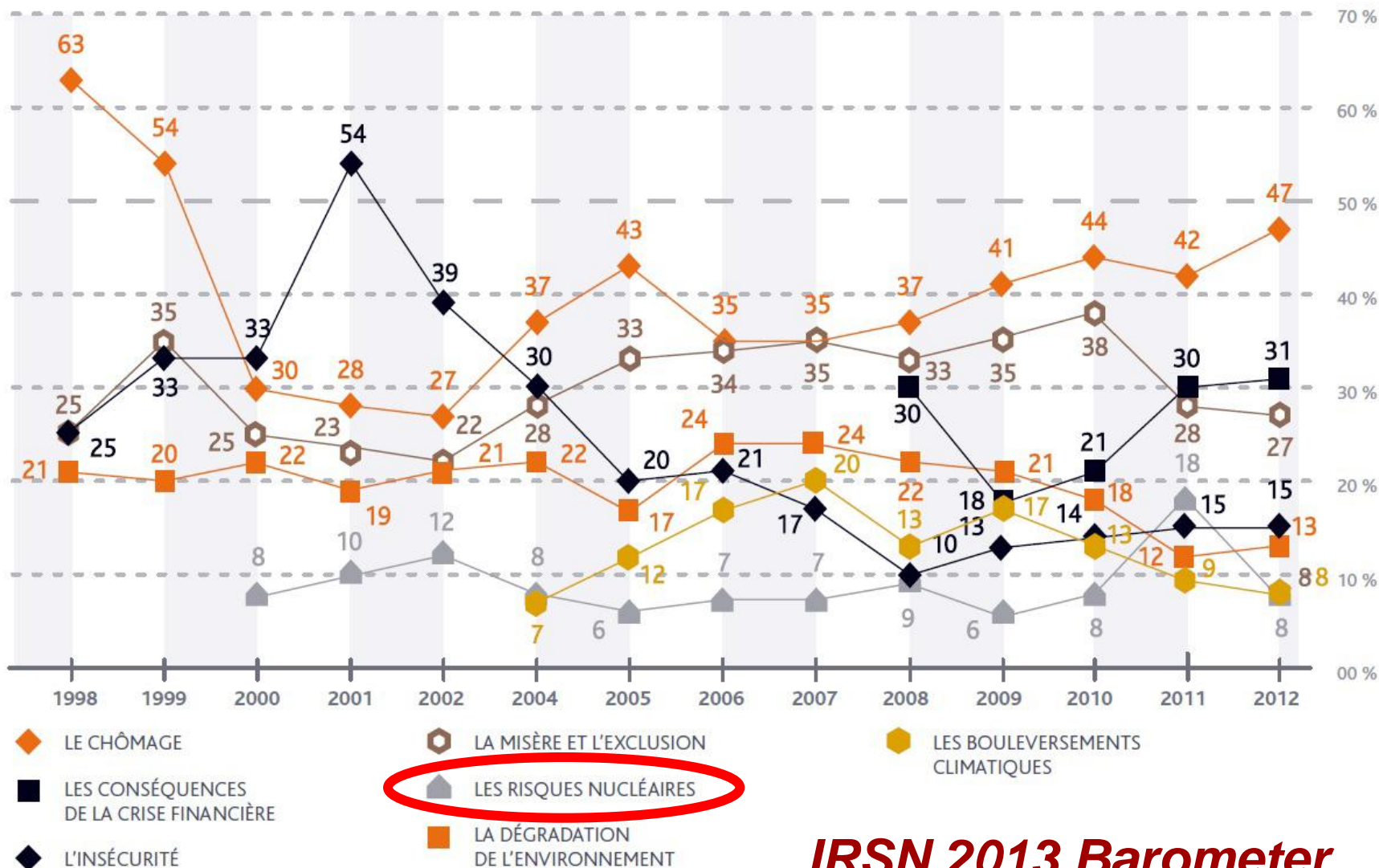
## ▶ ***Intend to start Nuclear:***

- ◆ ***Poland, Turkey, Saudi Arabia, Jordan, Vietnam, Bangladesh...***

***ALL : Additional Safety Analysis (Stress Tests)***

À la question « En France, parmi les problèmes actuels suivants, lequel est pour vous le plus préoccupant ? », la personne interrogée choisit deux problèmes parmi une liste de préoccupations. Le graphique ci-dessous présente les résultats cumulés correspondant à la somme des premier et second choix.

Évolution des préoccupations ayant enregistré les taux de réponse les plus importants depuis 1998. Ne figurent pas sur ce graphique « les risques alimentaires », « les risques chimiques », « les toxicomanies » (drogue, alcoolisme, tabagisme), qui récoltent de manière constante environ 5 % de réponses cumulées pour les deux premiers et autour de 10 % pour le dernier.

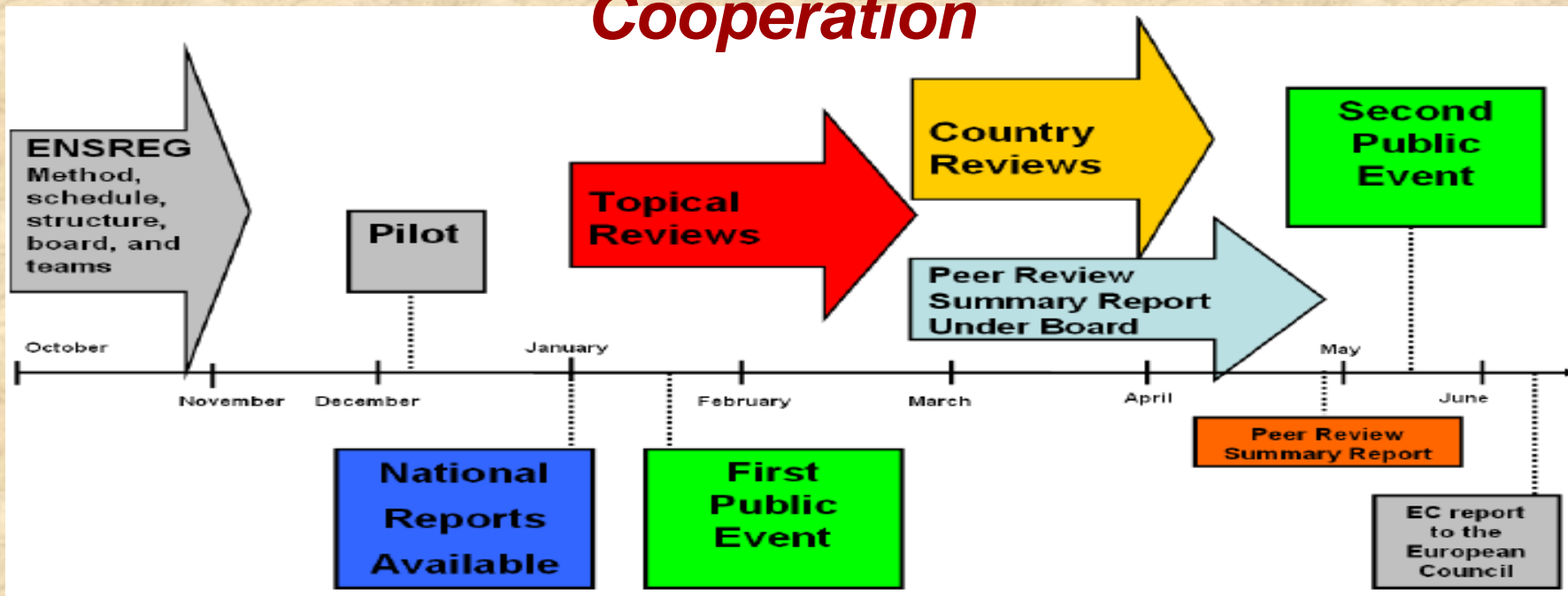


## IRSN 2013 Barometer

1. Somme des réponses citées pour le chômage, les conséquences de la crise financière et l'exclusion.



# Stress Tests in EU : Regional Regulatory Cooperation



- ▶ *Peer reviews were launched in Jan. 2012 , they include representatives of other countries, plus the European Commission. Peer reviews aim at evaluating the country reports*
- ▶ *These reviews support the EC at getting input for further improvements and harmonizing safety level within EU*
- ▶ *Their conclusions form the basis of the EC consolidated report presented to the European Council in June 2012*

## **Main Actions from Stress Tests (in France)**

- ▶ **Reinforce NPP protection against external aggressions (seism, flood,...)**
- ▶ **Reinforce electricity and water supply sources**
- ▶ **Limit releases in case of severe accidents (no significant and longlasting contamination of outside lands)**
- ▶ **Reinforce local and national Crisis Management**
  
- ▶ **« Hard Kernel » of water and emergency power supply reinforced beyond initial dimensioning. Plug & Play inlets. Reinforced crisis building.**
- ▶ **Rapid Nuclear Action Force (FARN), able to help the operators anywhere in France within 24 hours : ~300 trained specialists with materials & airlift capability.**
- ▶ **~10 billion Euros for 58 French units.**

# ***Evolution of public support to Nuclear Power from April 2011 to September 2012***

## **▶ *More Support :***

***USA, China, S. Arabia, France, India, UK, Italy, S. Korea, Turkey,  
Australia, Indonesia, Mexico, Hungary, Belgium, Canada,  
Brazil, Germany, Russia***

## **▶ *Little Change :***

***S. Africa, Argentina***

## **▶ *Less Support :***

***Spain, Poland, Japan***

**IPSOS-Mori Poll, 24 countries, October 2012**



## **Germany : Off, On and Off again...**

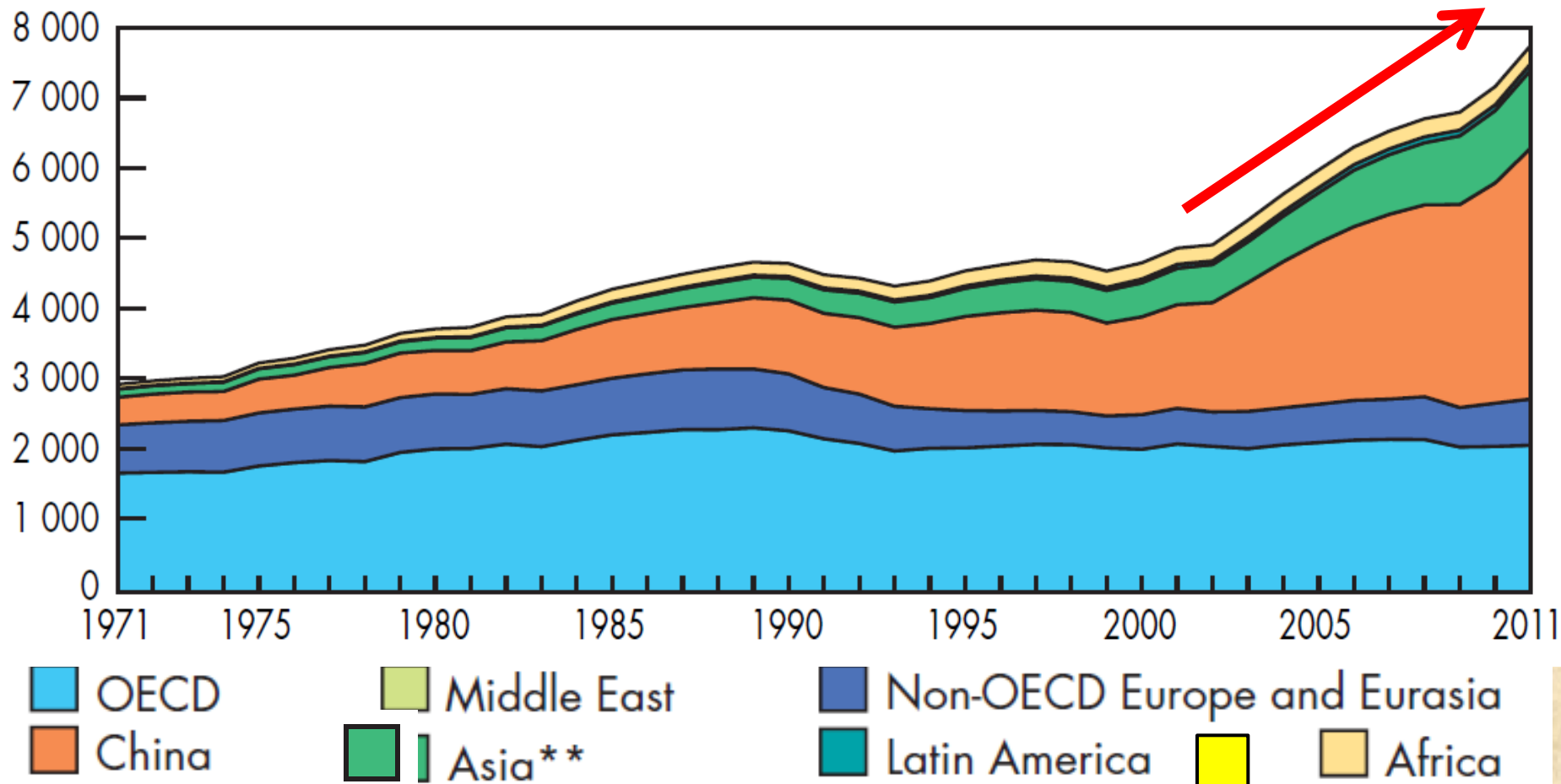
- ▶ **« No Nukes » from Weapons to Plants : strong Grassroot Opposition**
- ▶ **1998 : SPD – Grünen Coalition starts negociatin phaseout with German Utilities**
- ▶ **2001 : Phaseout Law (by 2021). Renewables Development**
- ▶ **September 2010 : CDU & Angela Merkel manage to pass in Bundestag a 12 years delay to Phaseout**
- ▶ **March 2011, just after Fukushima, « temporary » shutdown of 7 old NPPs. Nevertheless CDU loses some Länder**
- ▶ **May 2011 : Back to Phaseout in 2022, with immediate termination of 8 NPPs.**
- ▶ **2012 – 2013 : Increase of Coal imports and Lignite Open-pit Mining !**

# « *Energiewende* » in Germany



# World Coal Production 1971-2011 (Mt)

(add 910 Mt of lignite)



**China 2012 : Production 3550 Mt + Imports 280 Mt !**