



# European Geosciences Union General Assembly 2015

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## The role of geoethics in the framework of a sustainable development of georesources supply

Mauro Buttinelli<sup>1,2</sup>, Salvatore Barba<sup>1,2</sup>, Giuseppe Di Capua<sup>1,2</sup>, Silvia Peppoloni<sup>1,2</sup>



**<sup>1</sup>INGV**

Italian Institute of  
Geophysics and Volcanology


**<sup>2</sup>IAPG**

International Association  
for Promoting Geoethics





## Prologue



"While I thought that  
I was learning how to live,  
I have been learning  
how to die."

**Actual meaning of  
"SUSTAINABLE"  
development  
of georesources supply  
→ GEOETHICS**

- Leonardo da Vinci



# TODAY/TOMORROW Energy supply system(s)

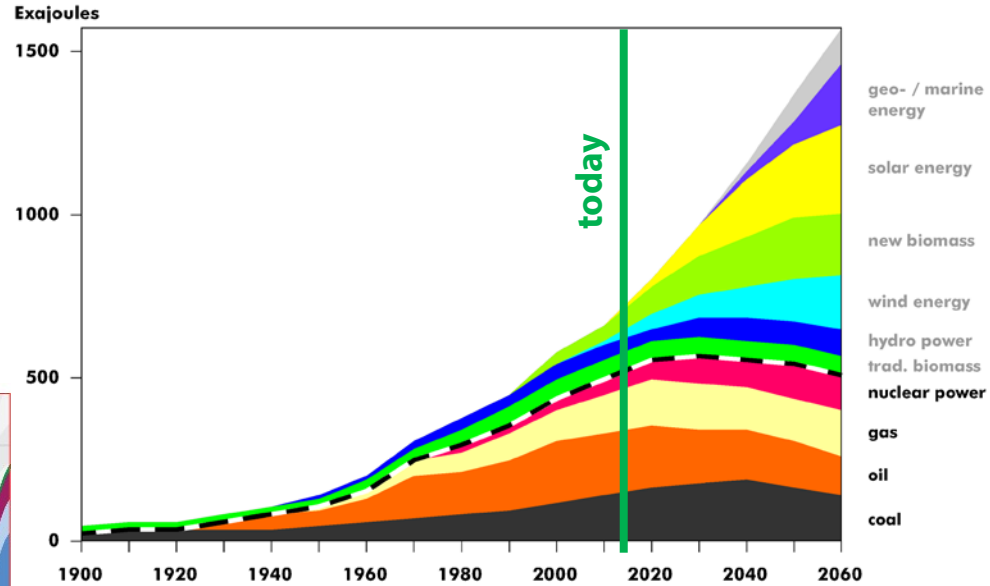
## World energy consumption

### TODAY

- Well established fossil fuels-based system

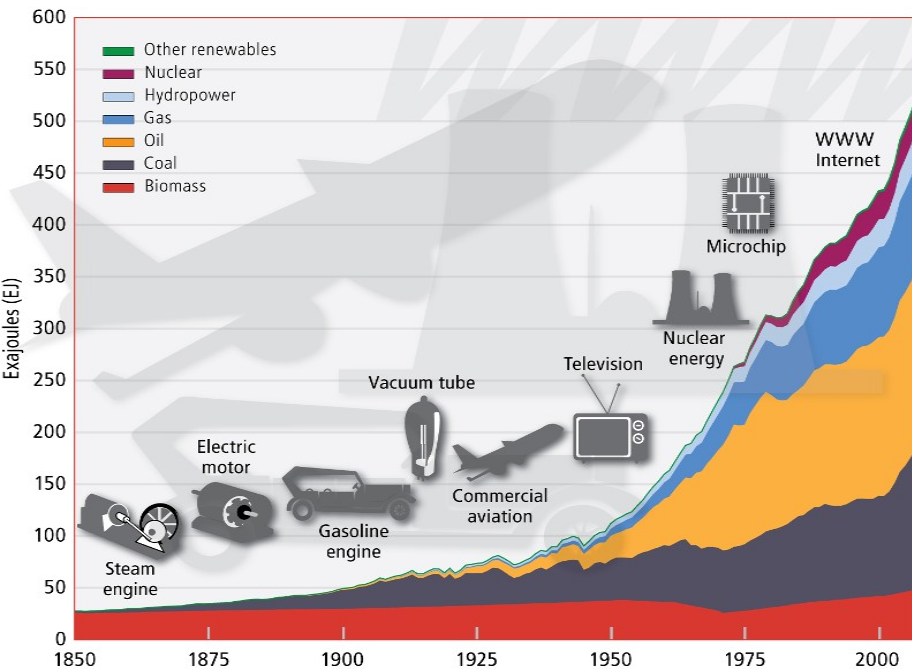
### "TOMORROW"

- Development of renewables



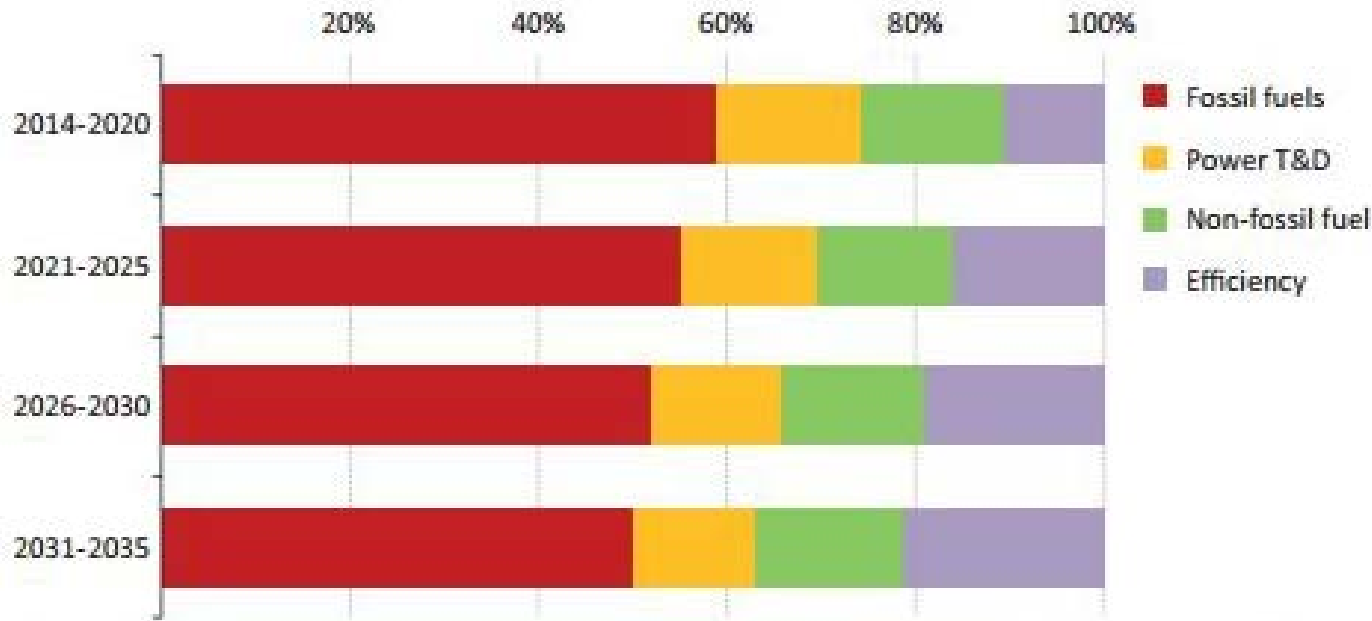
Courtesy of Shell

Grubler et al. (2012)





## INVESTMENTS in the FUTURE Energy supply system(s)



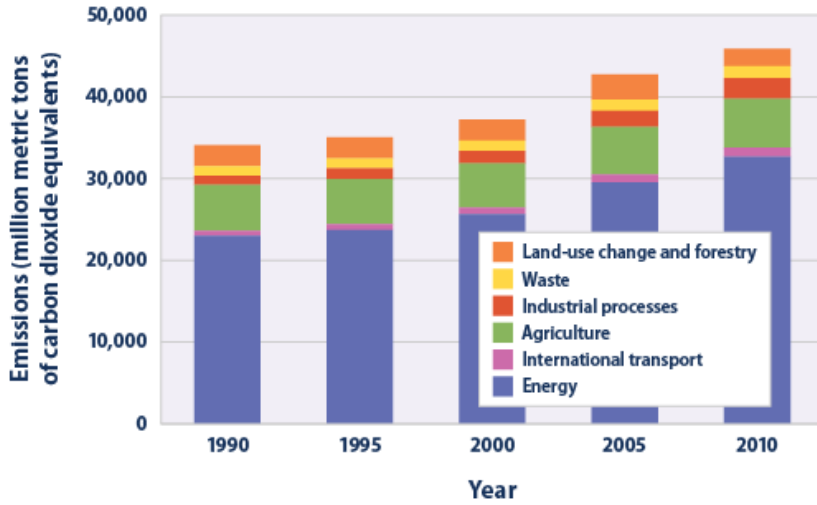
IEA, 2014

- Fossil fuels energy market will still absorb the 50% of investments
- Enhancement of efficiency of present power generators (no switch to new ones?)
- the global future energy supply scenario will NOT be hydrocarbons free

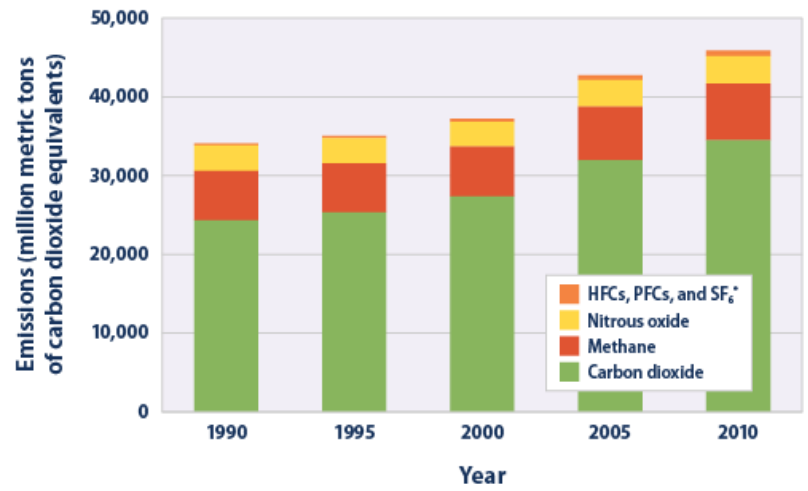


# Energy supply system(s) vs. GREENHOUSE gas

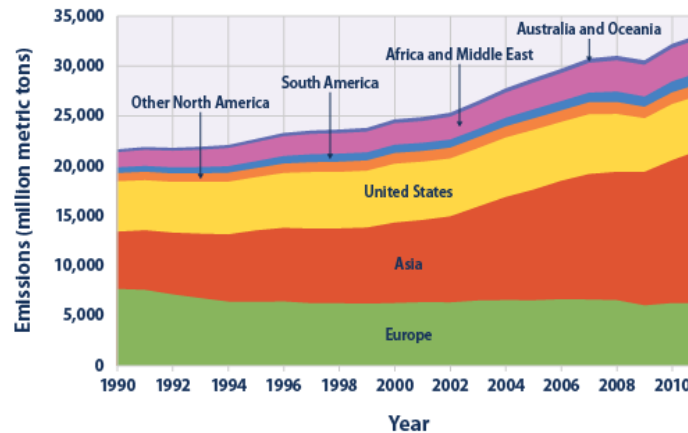
Global Greenhouse Gas Emissions by SECTOR (USEPA, 2014)



Global Greenhouse Gas Emissions by GAS (USEPA, 2014)



Global Greenhouse Gas Emissions by REGION (USEPA, 2014)





# What is Geoethics



**Geoethics is the research and reflection on the values which underpin appropriate behaviours and practices, wherever human activities interact with the geosphere**

Geoethics deals with the **ethical, social and cultural implications of geological education, research and practice**, providing a point of intersection between Geosciences, Sociology, Philosophy and Economy.

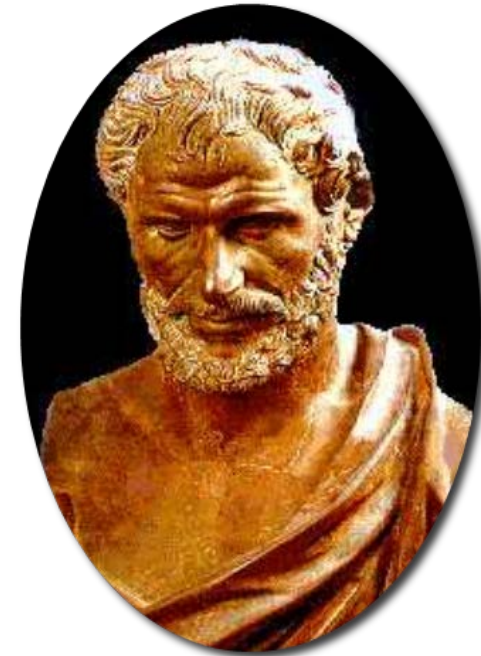
Geoethics represents an opportunity for Geoscientists to become more aware of their **social role and responsibilities** in conducting their activity and in the stewardship of the Planet.

Geoethics is a tool to influence the **awareness of society regarding problems related to the management of geo-resources and environment.**



## Ethics

term defined by Aristotle to denote the investigation and reflection on the practical behavior of mankind



Investigation

Reflection

universal shared values

on which to base appropriate behavior towards the Geosphere

procedures and practices

different social and cultural contexts

existing political and economic realities



## Geoethics applied to the geo-resources



- Responsibility
- Collaboration
- Research integrity
- Sustainability
- Equity

**(Geo)Ethical framework**

## How to act: key-concepts

- Energy efficiency
- Energy transition
- Increase in renewable energies
- Emission reduction of greenhouse gases
- Improvement of the environmental quality
- Intergenerational equity







## THIS ENERGY SUPPLY SYSTEM vs. GEOETHICS

### WHAT'S THE MESSAGE OF THIS TALK?

Make the right (geoethical) choices means

**NOT TO SAY NO**

before considering the most  
reliable and balanced solutions  
in THIS already established system

WHICH SOLUTIONS?

WHY GEOETHICS?

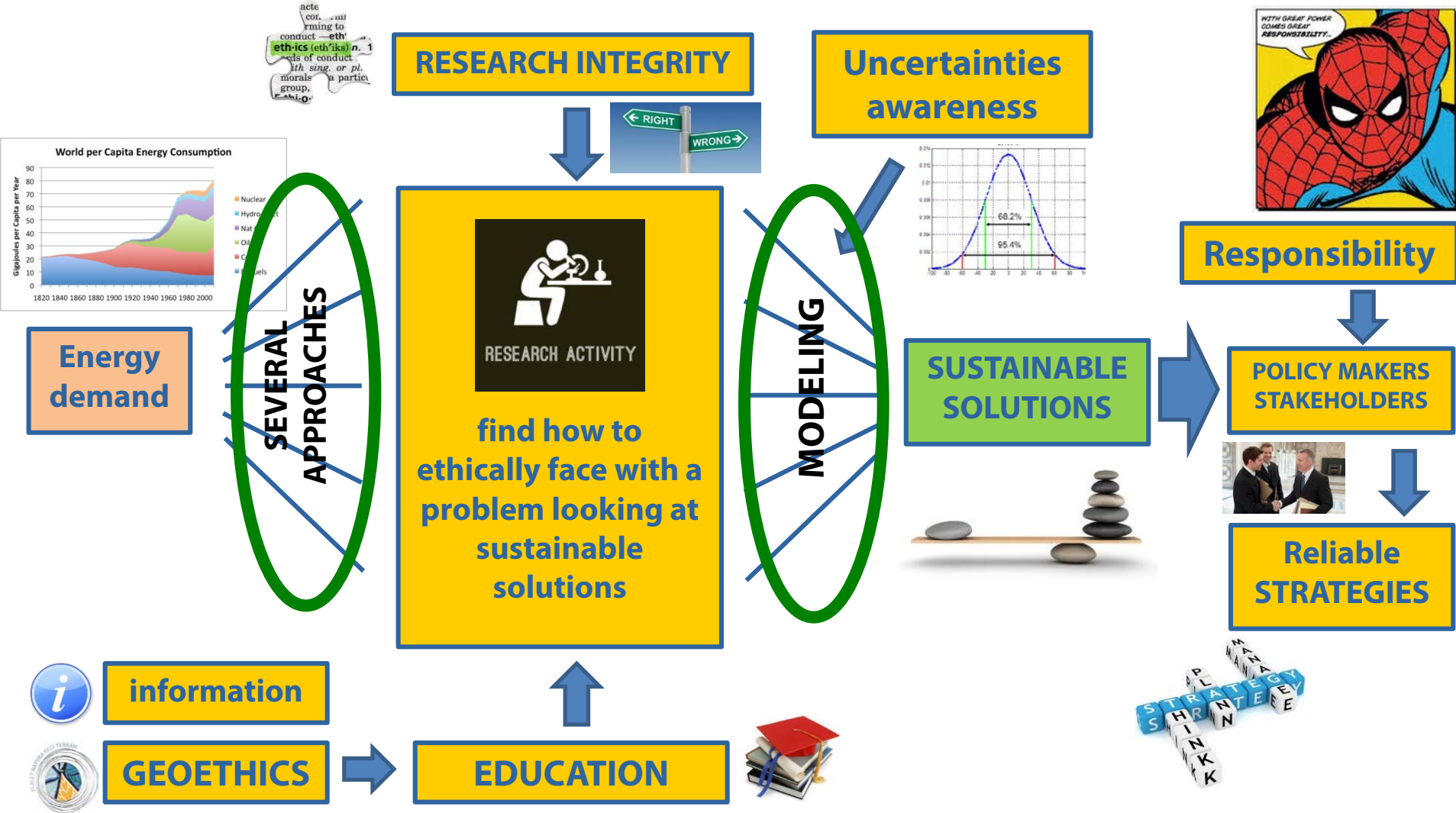


There is no coming to consciousness without pain.

(Carl Jung)

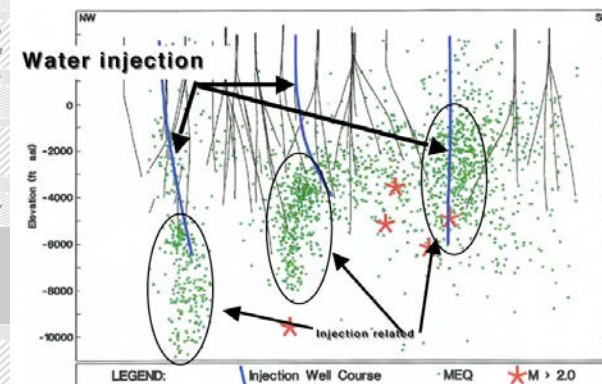
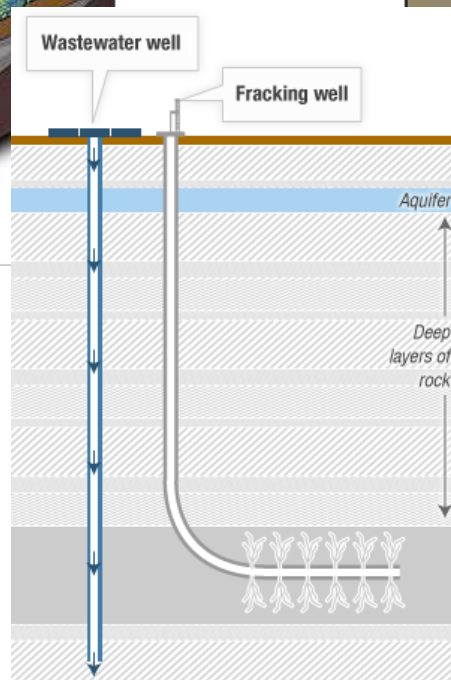
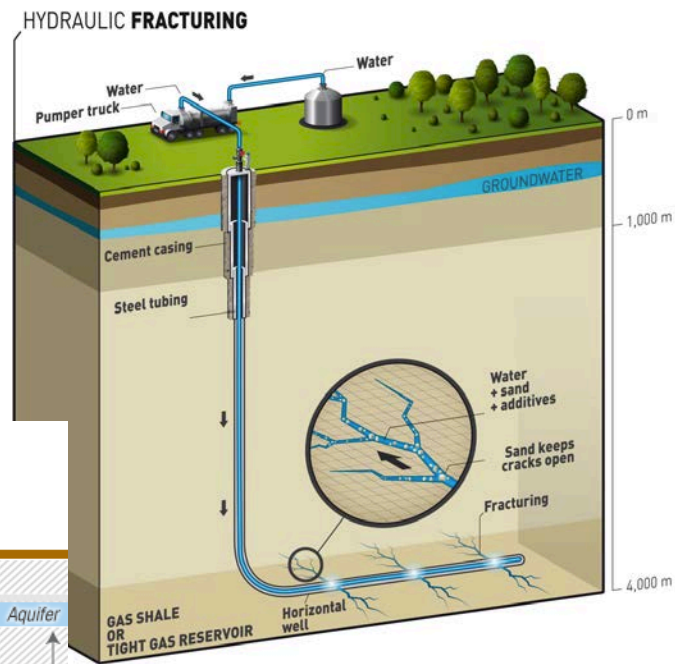
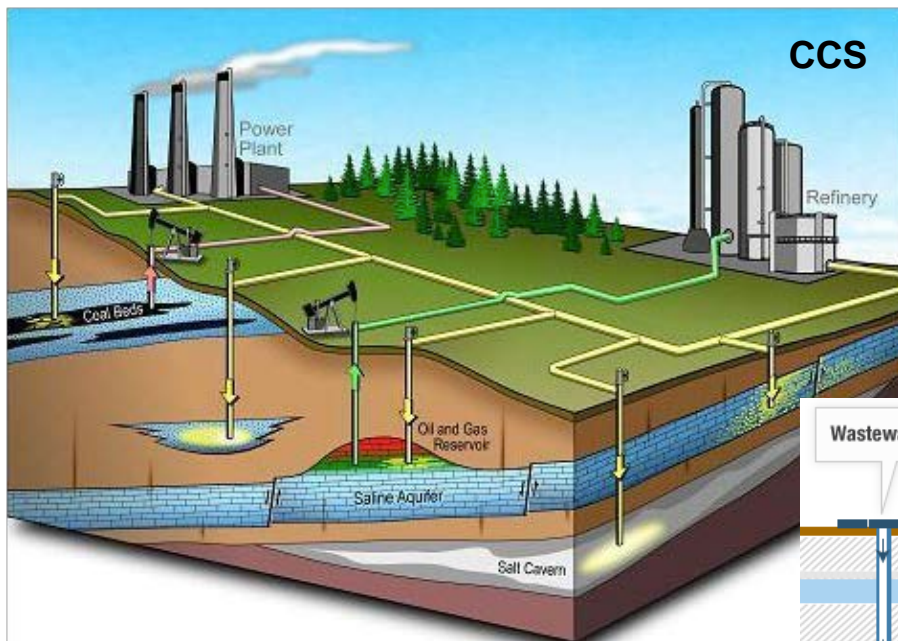


# The (GEO)ETHIC position of research





# Few examples : CCS, SHALE GAS, TIGHT OIL and WASTEWATER RE-INJECTION



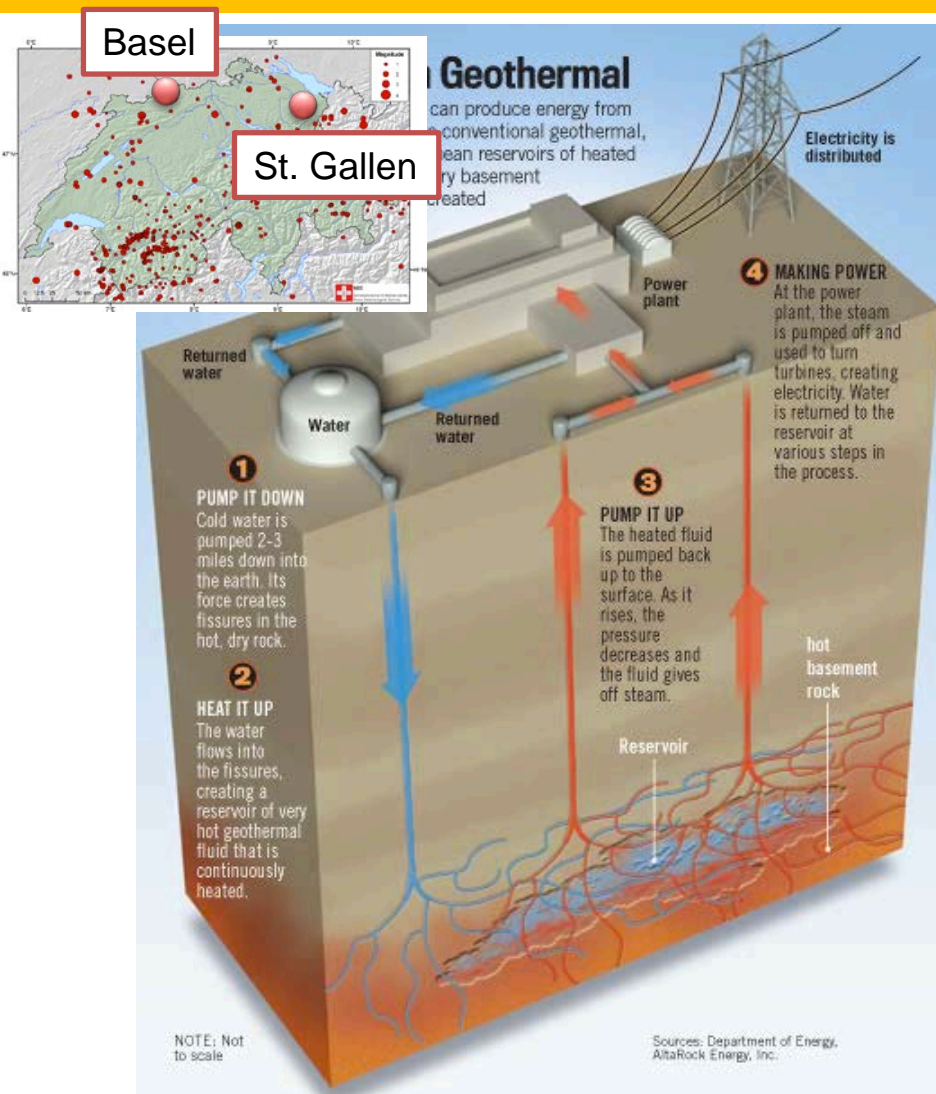
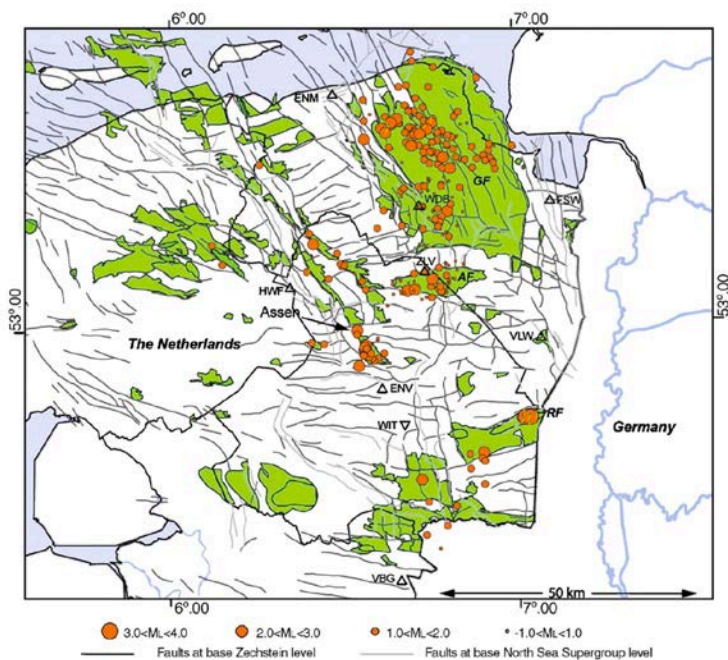
**MORE GAS (EGR, ECBM, SHALE GAS),  
MORE OIL (EOR, TIGHT OILS), LESS  
EMITTED CO<sub>2</sub> (SALINE AQUIFERS),**

**BUT...**

**MORE INDUCED SEISMICITY  
WATER FOR FRACKING OPERATIONS**



## Few examples: 2) GAS EXTRACTION-STORAGE and EGS



**MORE GAS (during winters if stored in summer), MORE ENERGY PRODUCTION (EGS - HOT DRY ROCKS)**

**BUT...**

**MORE INDUCED SEISMICITY WATER FOR INJECTION OPERATIONS**

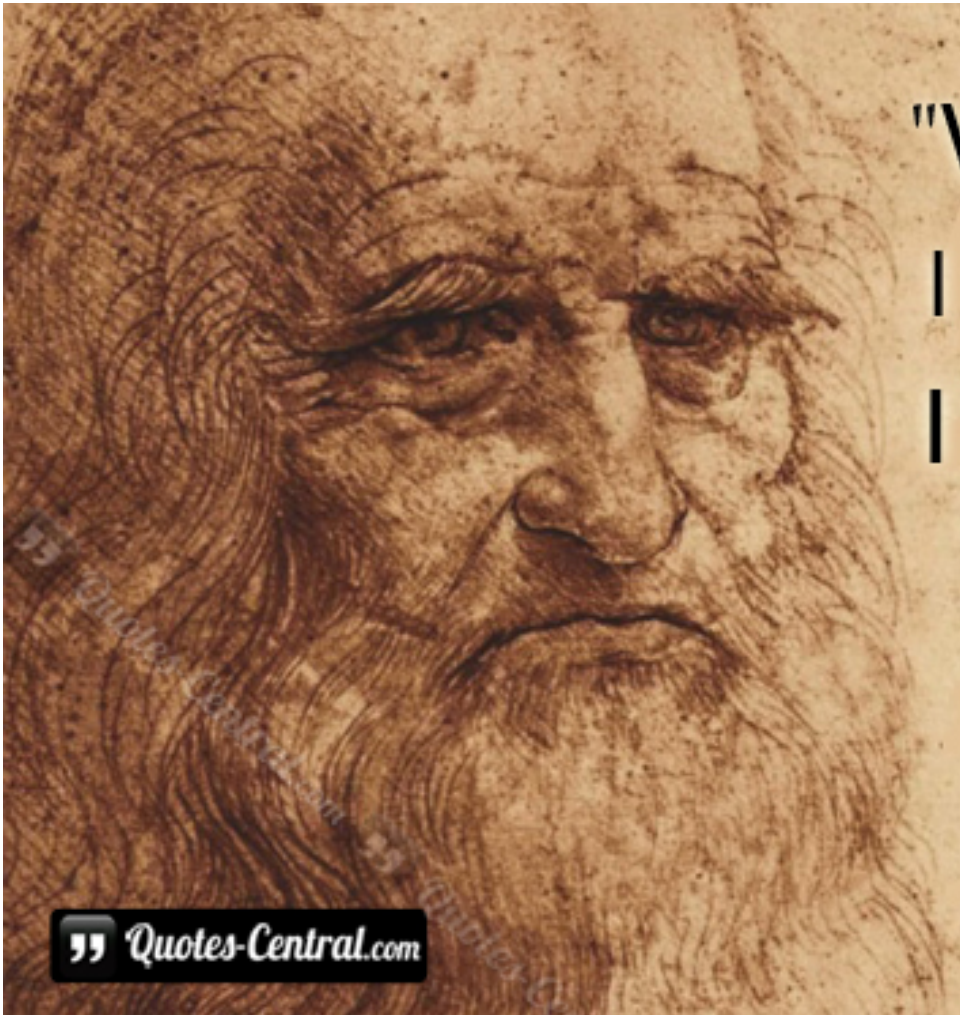


## ...RESUMING...

- ✓ We live in a world characterized by a well established energy supply system, which will not be hydrocarbon-free in the early future
- ✓ Energy demand will increase, and the research community is asked to find SOLUTIONS
- ✓ after understanding THIS system, GEOETHICS MUST play a key role in making the research community aware to choose reliable and balanced (SUSTAINABLE) solutions for such requests



## THANK YOU FOR YOUR ATTENTION



"While I thought that  
I was learning how to live,  
I have been learning  
how to die."