

# Offshore Oil and Gas activities: From Deepwater Horizon to a framework for safer operations in Europe



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- **Background – Responsibility on Offshore Safety Policy within the Commission**
- **Deepwater Horizon accident as triggering event for Regulation and Research**
- **The EU Offshore Safety Directive**
- **JRC activities in support to offshore safety**



**DG ENERGY**

**DG ENVIRONMENT**

**DG RESEARCH**

**DG JRC**



**Policy DG on offshore safety**

**Provides Scientific Support to policy DGs**

# JRC: the Commission's in-house science service

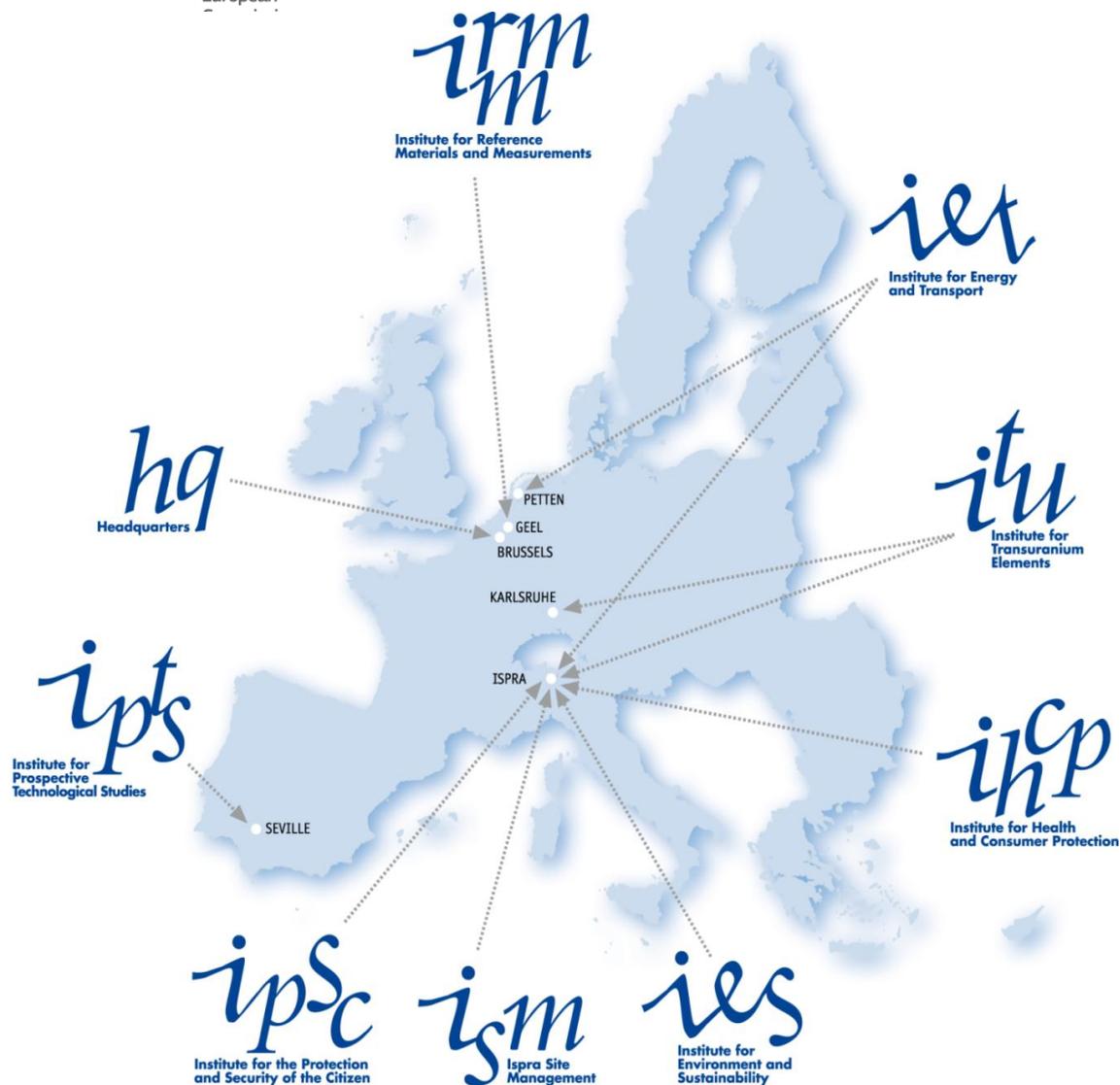


- ***Provides EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle***
- ***Cooperates with the Member States, industry, universities and research organisations in the EU and worldwide***
- ***Is independent of industrial and national interests.***

# Overview of the JRC



- **7 institutes in 5 countries**
- **3,068 staff (35% short-term)**
- **744 peer reviewed scientific publications in 2013**
- **Budget 2014: €401,5 million**



# External collaborations Institute for Energy



**European/International Institutions/Associations**

**EU  
Member States**  
(Companies, research institutes  
and universities)

**LEI - LT**  
**IRSN - FR**  
**EDF - FR**  
**GRS - DE**  
**VTT - FIN**  
**Clingendael - NL**  
**TERNA - IT**

**International Atomic Energy Agency (IAEA)**  
**International Energy Agency (IEA)**  
**UNECE-GRPE**  
**CEN/CENELEC/ISO/IETSI/IEC**  
**ESA - ESTEC**  
**EUCAR & CONCAWE**  
**BDI**  
**ACEA**  
**Eurobat**

**Chalmers University - SE**  
**Universidad Politécnica de Madrid - ES**  
**Politecnico di Torino - IT**  
**TU Eindhoven/TU Delft - NL**  
**Aristotle University of Thessaloniki - GR**  
**Karlsruhe Institute of Technology - DE**  
**Universitätsklinikum Essen - DE**  
**Imperial College London - UK**  
**Grenoble INP- FR**

**Key International collaborations**

**Our partners**

**Platforms, Initiatives,  
Networks**

**Fuel Cell and Hydrogen JTI (FCH  
JTI)**  
**SET-Plan**  
**STT-Plan**  
**KIC Inno Energy**

**USA** DoE  
EPA  
NRC  
EPRI  
NIST

**ISRAEL** Ministry of Energy & Water of Israel  
Israel Atomic Energy Commission  
The Weizmann Institute of Science  
Ben Gurion University and others

**ECOWAS Centre for Renewable Energy & Energy Efficiency (ECREEE)**  
**International Renewable Energy Agency (IRENA)**

**Medgrid**  
**MED-TSO**  
**EURELECTRIC**  
**ENTSO-E**

**Euro-CASE**

# Fossil fuels in primary energy demand

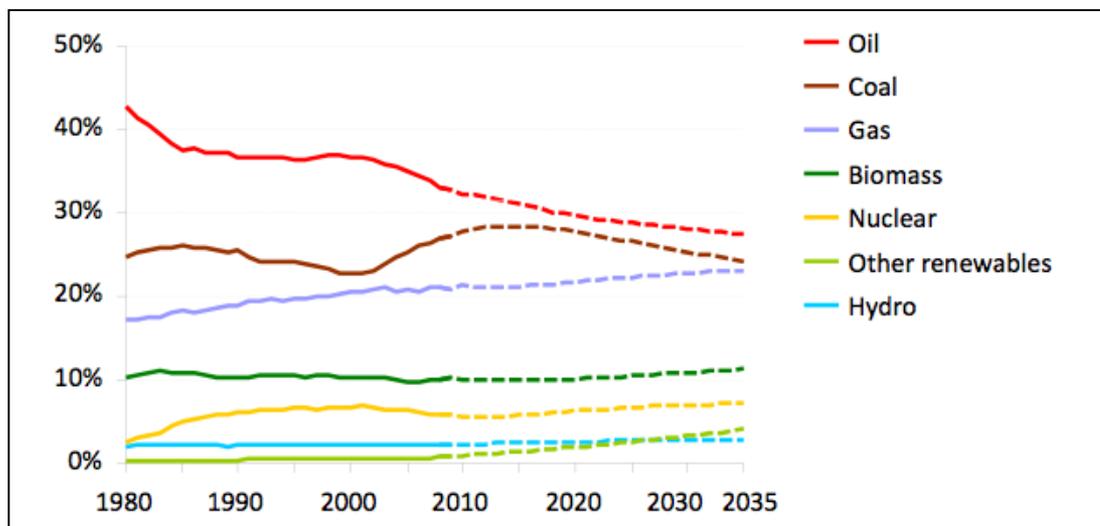


Oil and gas dominant primary energy sources  
*65% total, 95% in transport*

IEA prospect: 40% increase in primary energy demand 2009-2035

*Oil & gas 60% of demand*

*Long-term demand needs stable provision*



Offshore oil & gas  
most important European  
indigenous source of HC

*IEA New policies scenario (baseline)*

# Accidents do occur, threatening sustainability



# Deepwater Horizon: A landmark accident



## Offshore incidents pose severe risks to oil and gas energy supply (Macondo, Montara, ..., Gullfaks C)



### Deepwater Horizon accident (Macondo), Gulf of Mexico, 20 April 2010

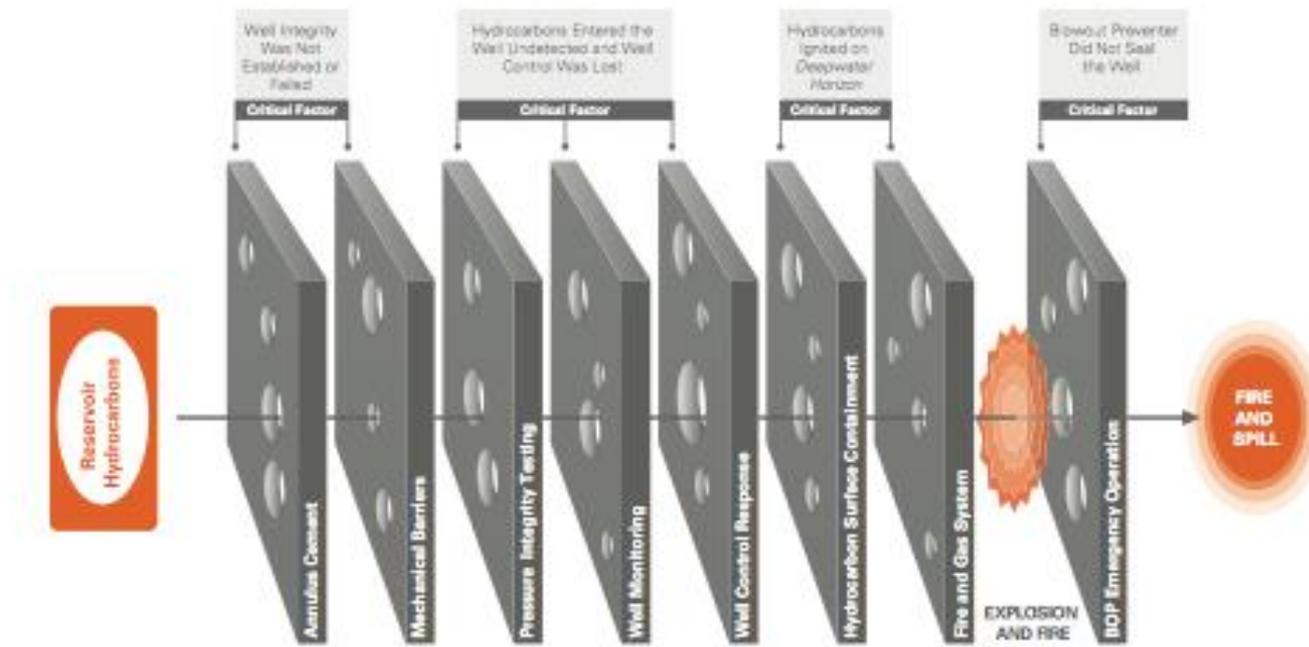
- *Blowout and explosion, high-tech platform, top engineering companies*
- *11 dead; 17 injured*
- *Release of 5 million barrels of crude oil in 84 days*
- *Environmental contamination and ecological disaster*
- *Total cost: ca. €30 billion*

### Socioeconomic consequences

- *Huge sea area contaminated by oil*
- *800 km of coastline contaminated*
- *Fishing prohibited in an area of 230.000 km<sup>2</sup> (1/3 of US GoM waters)*
- *Disaster to coastal economies and tourism*
- *Moratorium in all deepwater offshore drilling delayed US hydrocarbon exploitation program*



# Technical: 8 Barriers breached



- 1 The annulus cement barrier did not isolate the hydrocarbons.
- 2 The shoe track barriers did not isolate the hydrocarbons.
- 3 The negative-pressure test was accepted although well integrity had not been established.
- 4 Influx was not recognized until hydrocarbons were in the riser.
- 5 Well control response actions failed to regain control of the well.
- 6 Diversion to the mud gas separator resulted in gas venting onto the rig.
- 7 The fire and gas system did not prevent hydrocarbon ignition.
- 8 The BOP emergency mode did not seal the well.

# Deepwater Horizon Commission – Report to the President Recommendations



- **Risk-based approach:** Develop a proactive, risk-based performance approach specific to individual facilities, operations and environments
- **Environmental aspects in risk analysis**
- **Independent and adequately resourced Authority:** Create an independent agency to oversee offshore drilling safety; Ensure funding to allow availability of necessary competences
- Improving oil spills **containment and response**; improve well-containment capabilities
- **Lessons learning:** Sharing information on what went wrong in offshore operations, regardless of locations, is a key to avoiding such mistakes
- Ensure **financial responsibility**



## Industry challenges

- Ageing production infrastructure
- Changes of main players
- Challenges of the new frontiers

## Regulatory framework

- **Fragmented EU legal framework**
  - *goal setting versus prescriptive*
- **Uneven technical expertise** amongst regulators
- **Inconsistency** & lack of transparency in **incident data** & learning from investigations

## Liability for recovery & damages

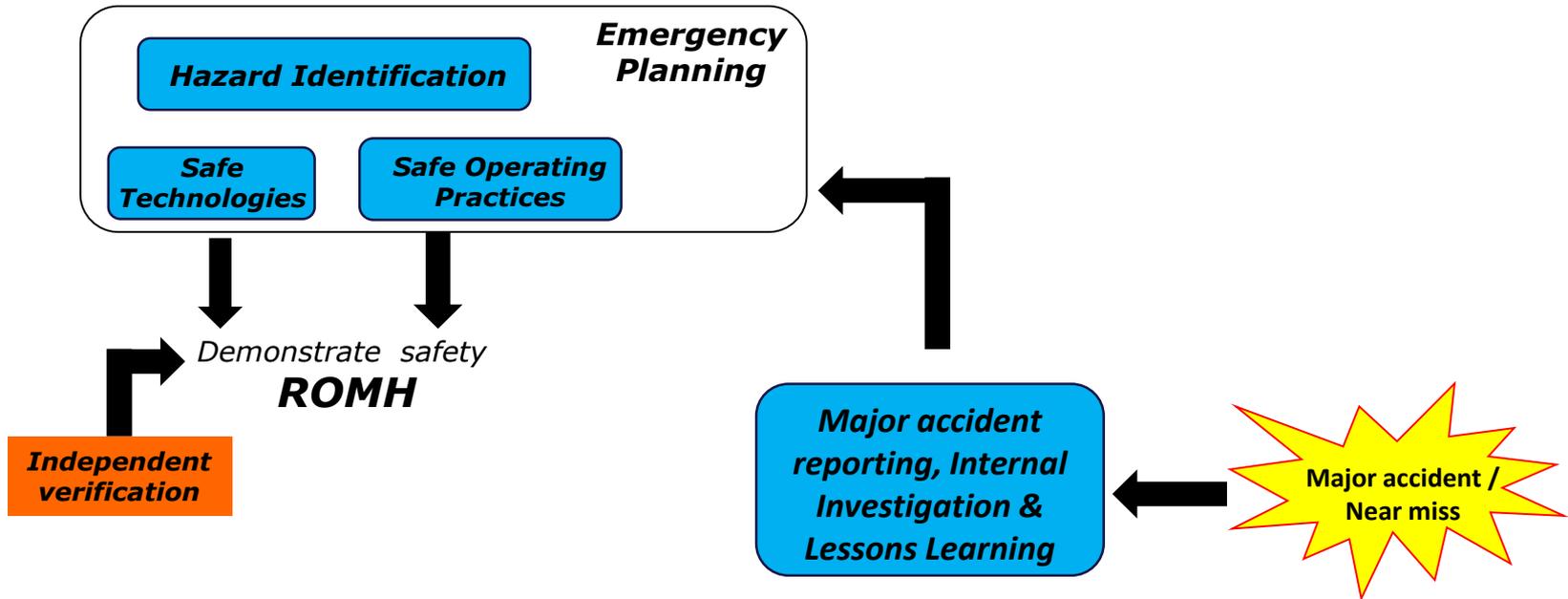
- Financial mechanisms inadequate
- Lack of clarity for environmental liability

# EU Offshore Safety Directive 2013/30/EU

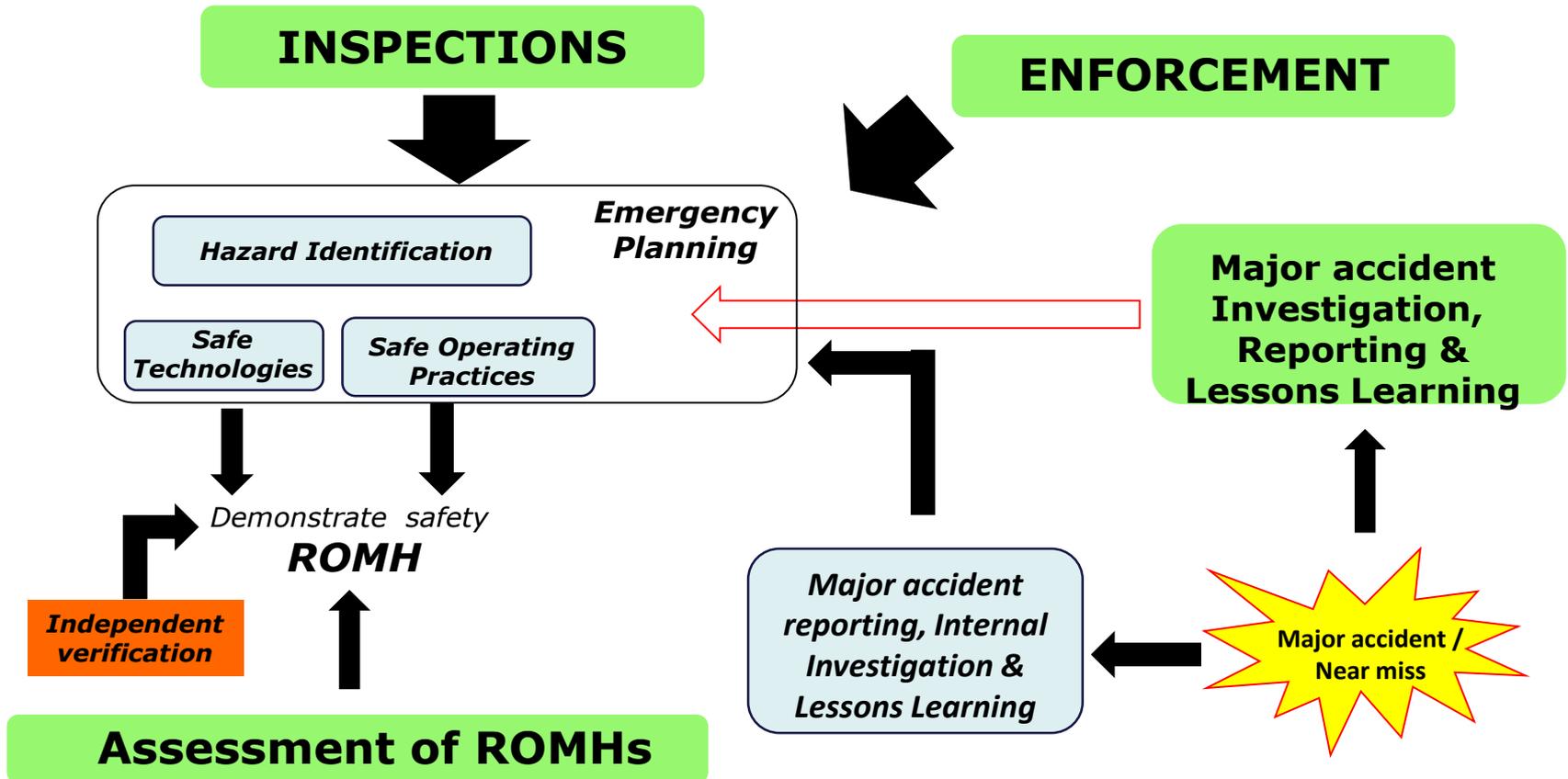


- Establishes minimum requirements for **preventing major accidents** in offshore oil and gas operations and **limiting the consequences** of such accidents.
- **Transposition** into national law by 19 July 2015
- Applicable to both **new and existing** (July 2016 and July 2018 respectively) offshore installations in the EU
- **Performance-based** (or goal-oriented) legislation
- An EU Offshore **Authorities Group** has been established  
<http://euoag.jrc.ec.europa.eu/>

# DIRECTIVE 2013/30/EU – ROLE OF OPERATORS (schematic)



# DIRECTIVE 2013/30/EU – ROLE OF COMPETENT AUTHORITIES (schematic)



**COM:** Ensure the application of Directive;  
Monitor the safety status.



- **Risk-based, location specific and goal-setting regulatory regime**
- **Environmental aspects integrated in Report on Major Hazards'**
- **EU-wide coherence in regulatory process (through EUOAG)**
- **EU lead in global responsibility and disclosure/transparency**
- **Clear industry responsibility and Member States authorities' empowerment**

# Requirements for the Operators



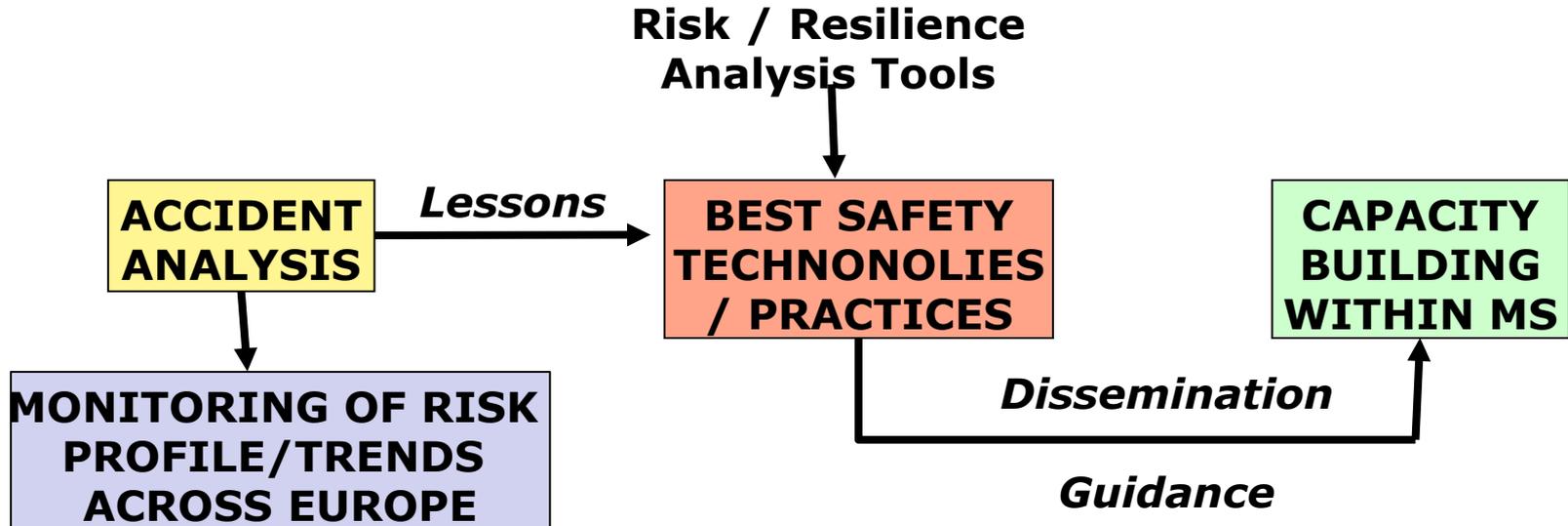
- Technical & financial capacity assessed at licensing stage (Art.4)
- Report on Major Hazards includes environmental consequences and must be 'accepted' by regulator (Art.12)
- Installation emergency response plans (Art.14)
- Well notifications (Art.15)
- Independent verification of safety critical elements and well plans (Art.17)
- Corporate major accident prevention policy (Art.19)
- EU-based operators to report on overseas major accidents (Art.20)
- Workforce to be consulted; whistle blowers protected (Art.22)
- Incidents and near-misses reported according to EU standard format (Art.23)

# Main requirements for the Member States



- The Member States are required to :
  - Control technical and financial liability at licensing
  - Ensure public participation before drilling in new areas starts
  - Appoint independent competent authority (CA) for major hazard regulation – safety & environment
- The Competent Authority must:
  - publish plans and procedures for handling risk assessment documents, inspections, investigations and enforcement
  - report offshore performance annually to COM
  - cooperate with neighboring MS
  - cooperate with EU Offshore Authorities Group
  - prepare external emergency response plans

- Scientific support to COM (ENER, ENTR) and the MS in development/implementation of legislation
- Collaboration with other Research Centres





- **Lessons learning from past accidents and near-misses**
- **Necessary technical and management measures / barriers for exploration activities in sensitive areas**
- **Quality of Reports on Major Hazards, esp. including Environmental aspects**
- **Dissemination of Best Safety Technologies and Practices**
- **Shift of focus from occupational incidents / pollution to prevention of Major Accidents**

**Thank you for your attention!**

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**For info:**

**[http://ec.europa.eu/energy/oil/offshore/standards\\_en.htm](http://ec.europa.eu/energy/oil/offshore/standards_en.htm)**

**<http://euoag.jrc.ec.europa.eu>**

