

*iNTeg-Risk: Early Recognition, Monitoring and Integrated Management of Emerging, New Technology Related Risks*

# Emerging Risks: How can Regulators Anticipate and React Proportionately

iNTeg-Risk Conference, Stuttgart, 2 June 2009  
Dr Laurence Cuscó & Dr Ju Lynne Saw  
Health & Safety Laboratory (UK)

- Regulators' mission
- Emerging risks
  - Horizon scanning
  - Key drivers
- “Case studies” on hot topics by HSL for HSE
  - Carbon Capture & Storage
  - The Hydrogen Economy
  - Nanotechnology
  - Sustainability
- Incident investigations – the importance of learning from past events

- Prevent death, injury and ill health to those at work and those affected by work activities
- Lead health & safety system
- Formulate and provide strategic direction
- In partnership with dutyholders, scan horizon for new/ emerging issues and risks
- Alert dutyholders to any emerging issues and risks



<http://www.hse.gov.uk/horizons/index.htm>

# Emerging Risks: Scanning the Horizon



“...the **systematic examination of potential threats, opportunities and likely future developments**, including (but not restricted to) those at the margins of current thinking and planning. Horizon scanning may explore novel and unexpected issues as well as persistent problems or trends.”

*Definition of Chief Scientific Adviser’s Committee,  
September 2004*

**“Looking Ahead – Looking Across”**

To:

- inform strategic thinking, planning and target setting;
- assist in formulation and delivery of HSE's strategic programmes.

By:

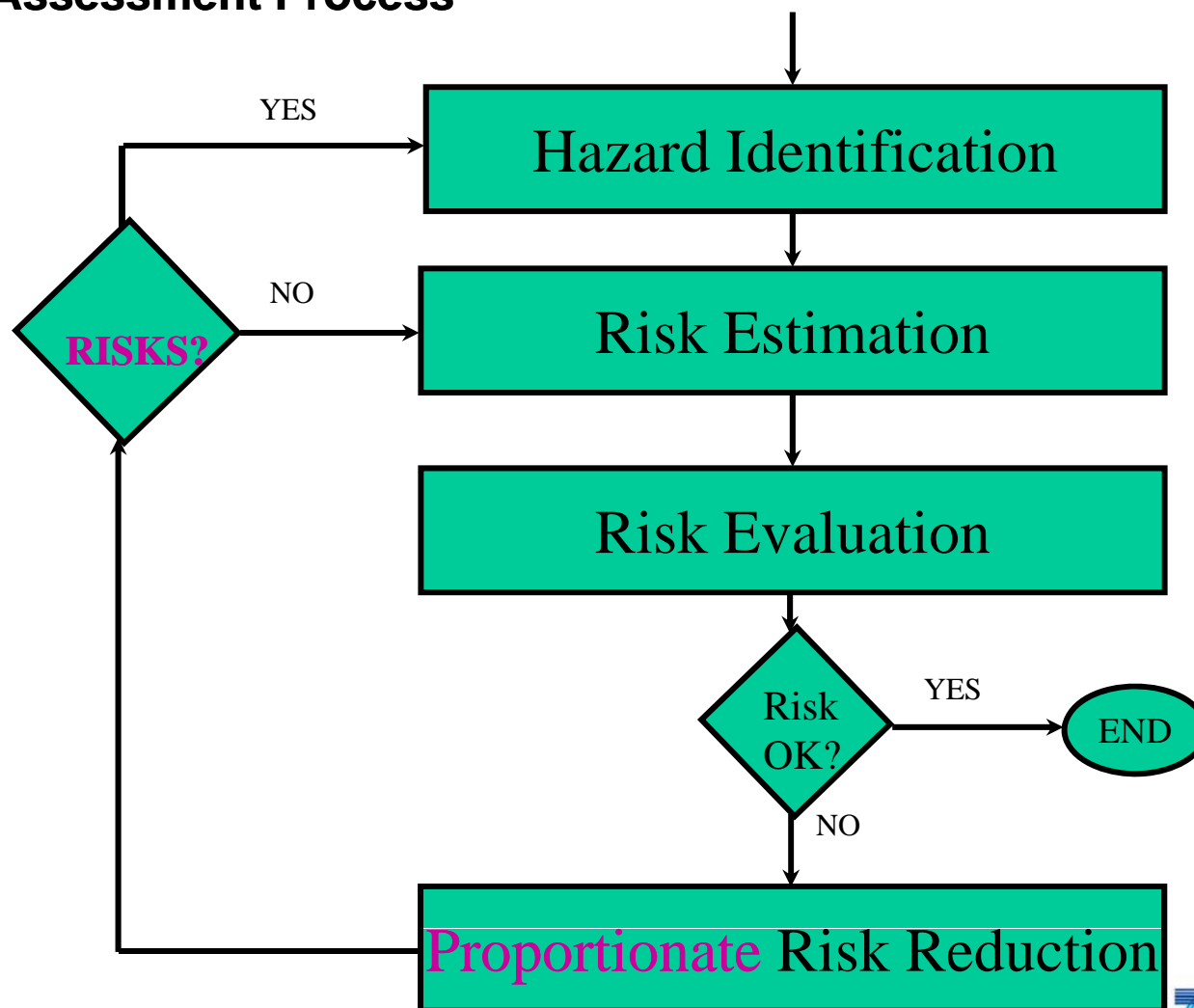
- systematically **anticipating, identifying and preparing for changing, new, emerging risks in workplaces and work activities**, which may appear on a 3-10 year horizon.

# Key Drivers

---

- Science and technology
- The workplace and working practices
- Socio-economic trends that affect the labour market
- Trends in public attitudes towards risk
- Political agenda
- Developments in the European Union
- International developments (globalisation)

## The Risk Assessment Process



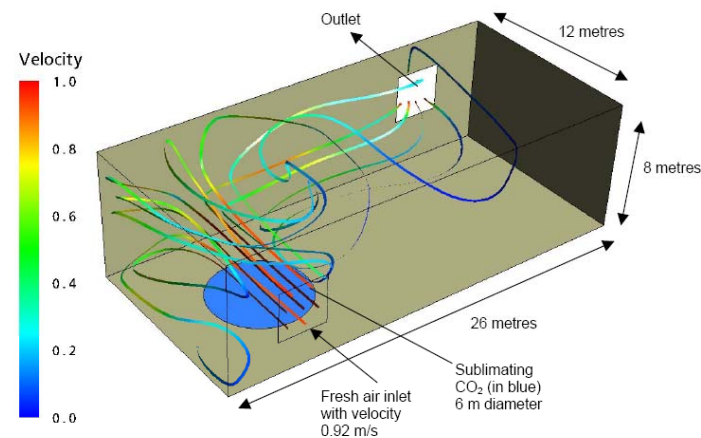
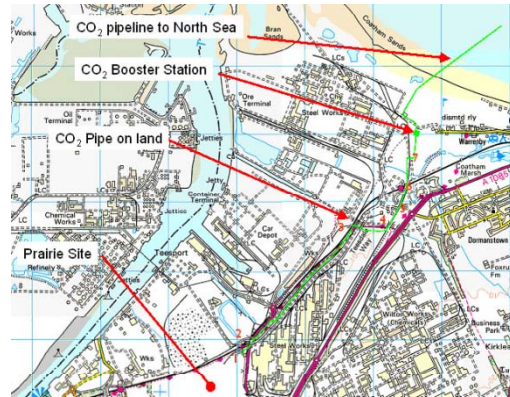


- CO<sub>2</sub> Capture & Storage
- Complex Working Practices
- Cyber Security
- Demographics
- Flexible Working Patterns
- Future of Keyboards
- Gene Therapy
- Human Performance Enhancement
- Hydrogen Economy
- Nanotechnology
- New & Emerging Pests
- Obesity
- Pervasive Computing
- Rapid Manufacturing
- Recycling
- Robotics
- Solvents Directive
- Sustainability
- TeraHertz Technology

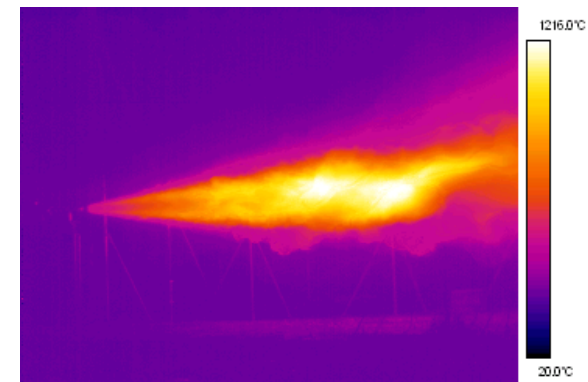
➤ Capture

→ Pipeline

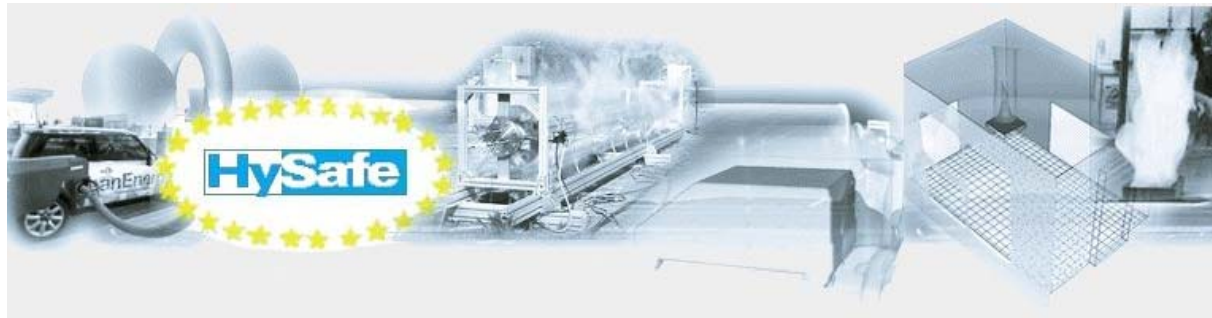
→ Storage



- Combustion or Fuel Cells
- Vehicular and Stationary Applications (CHP)
- H<sub>2</sub> Generation
- Storage (High Pressure, Adsorption)
- Distribution
- Public Perception



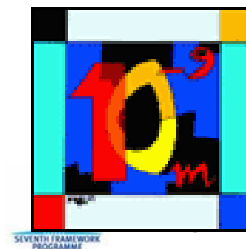
- HySafe
  - EC Network of Excellence
  - Safety of H<sub>2</sub> as an “Energy Carrier”



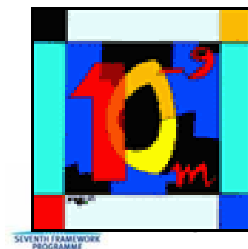
- HYPER
  - Installation permitting guidance
  - Stationary Fuel Cell applications



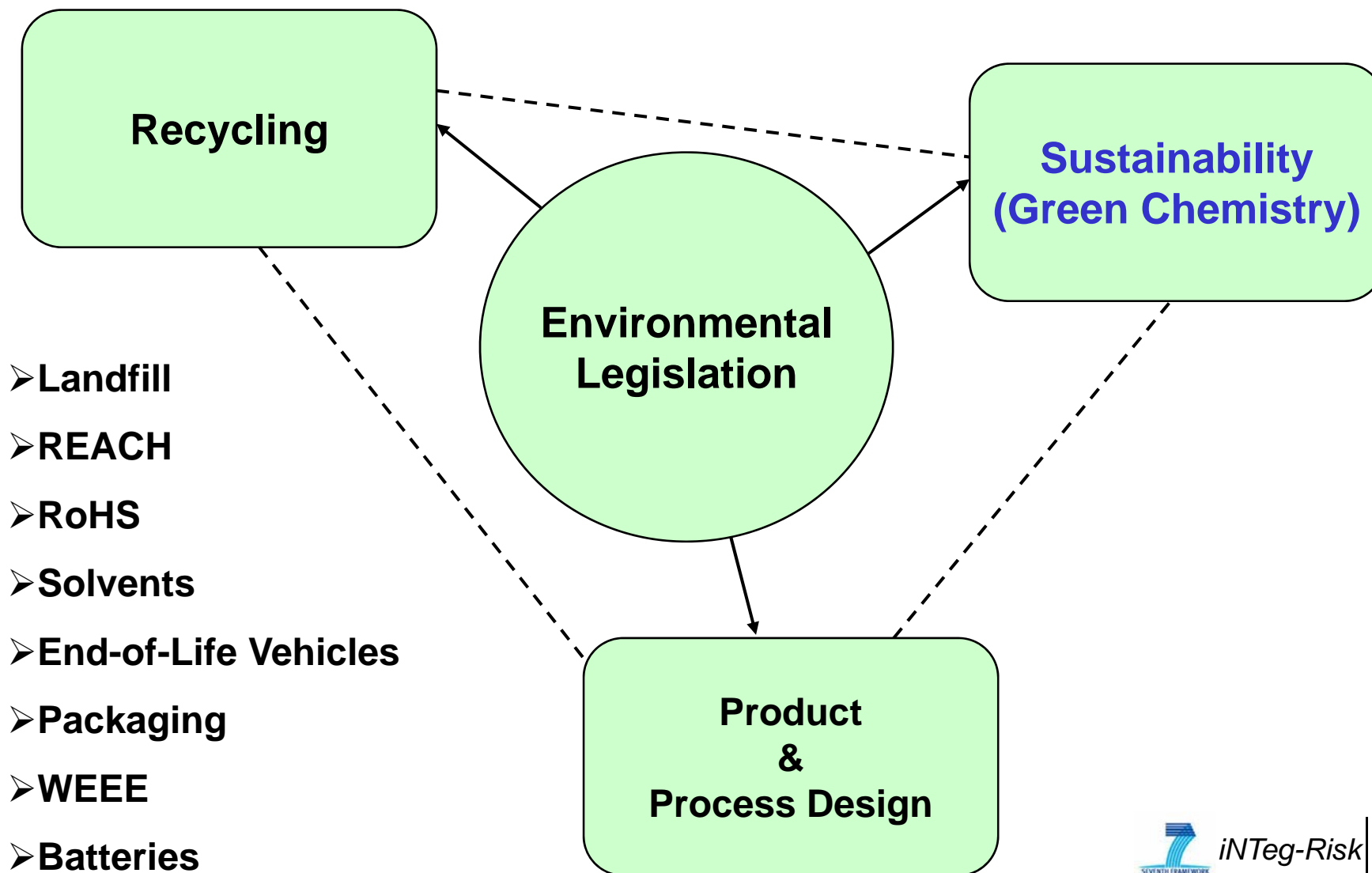
- Sources of Nanoparticulates
  - Ambient (Combustion Products)
  - Inadvertent Generation (e.g. Welding Fumes)
  - Engineered (Carbon Nanotubes, Titanium Dioxide, Silver)
  
- UK Model for Assessing and Managing Risk
  - National Research Co-ordination Group Established
  - Metrology, Exposure, Human Health, Environmental, Social and Economic Aspects
  - Members from Government, Industry and Academia



- NANOSH
  - Particle characterisation, workplace exposure assessment
  - Research labs and Universities
  
- Nanosafe2
  - Standards, regulations and societal implications
  
- NOSH Consortium
  - Nanoparticle aerosols
  - Generate, measure and evaluate protection







- European Technology Platform
  - Strong Industry Support
  
- Materials Technology
  - Energy, Construction, Healthcare
  
- Industrial Biotechnology
  - Vegetable Oils/Sugars as Raw Materials
  - Fermentation, Enzymes, Biocatalysis
  - Bio-Plastics, Fuels, Pesticides
  
- Reaction & Process Design
  - Process Intensification/Optimisation
  - Pressure Systems, Ionic Solvents, Supercritical CO<sub>2</sub>





- Help identify **emerging risks**/ risks which have been overlooked previously
  - e.g. atypical events like Buncefield, Dec 2005, UK
- Similar events occurred globally in previous decades but the risks were not properly addressed and reacted to proportionately
- Lessons for knowledge management



- Not all up to the Regulator to anticipate and react to emerging risks
- Primary responsibility lies with the dutyholder
- Regulators can provide assistance and guidance

