

**EC Expert Workshop
Synergies between HYPOGEN and Hydrogen Economy
EC Brussels
18th January 2007**

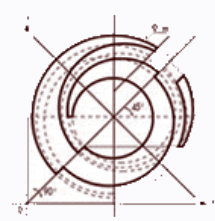
Bridging the Gap between Technology Platforms for Power and Hydrogen

Nick Otter

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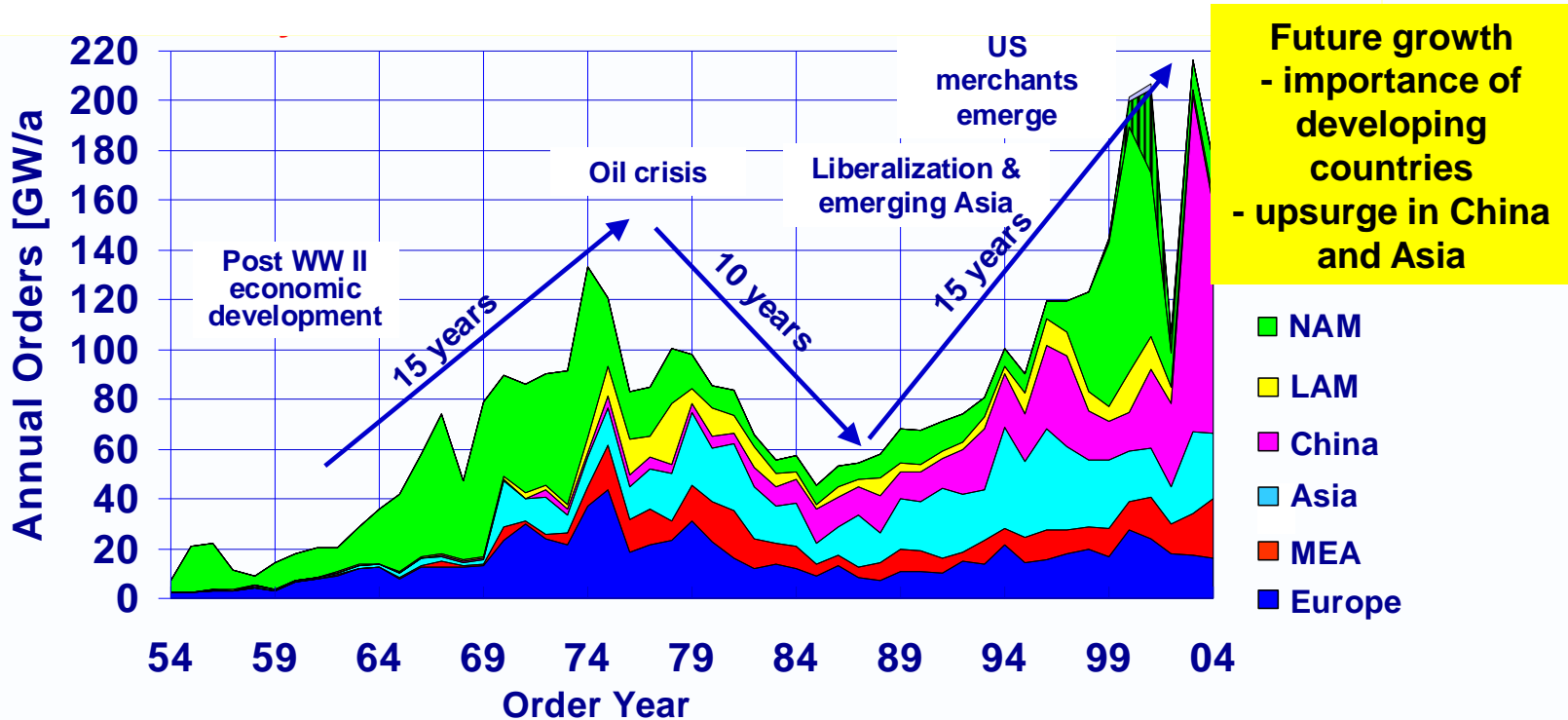
ALSTOM

- **INTRODUCTION and PERSPECTIVE**
- **INTERACTIONS, INITIATIVES and STRATEGIC POSITIONING OF “ZEPG” and “HYDROGEN” ARENAS**
- **GAPS/ISSUES**
- **WHAT TO DO ABOUT THEM?**

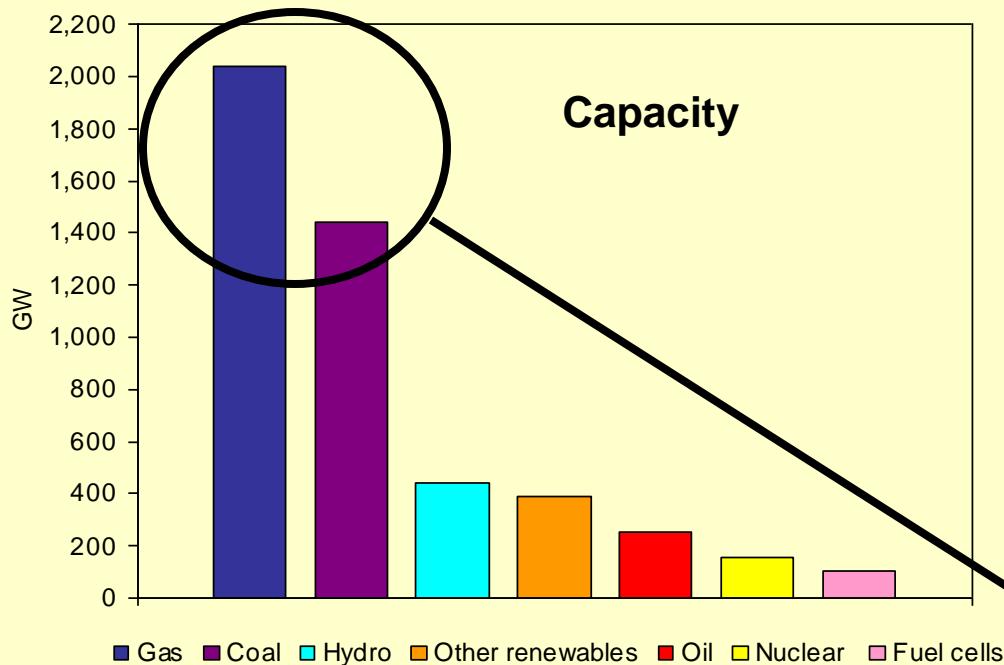
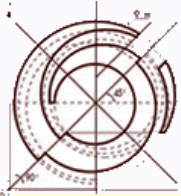


INTRODUCTION and PERSPECTIVE

Market Development 50 Years of Order Volumes by Regions



Significant market changesincreased liberalisation, de/re-regulation and privatisation



IEA projections of global power station build to 2030

IEA World Energy Outlook 2004

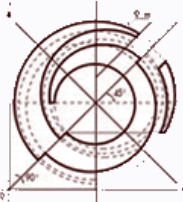
- **Different needs world-wide**

- uneven access to modern energy

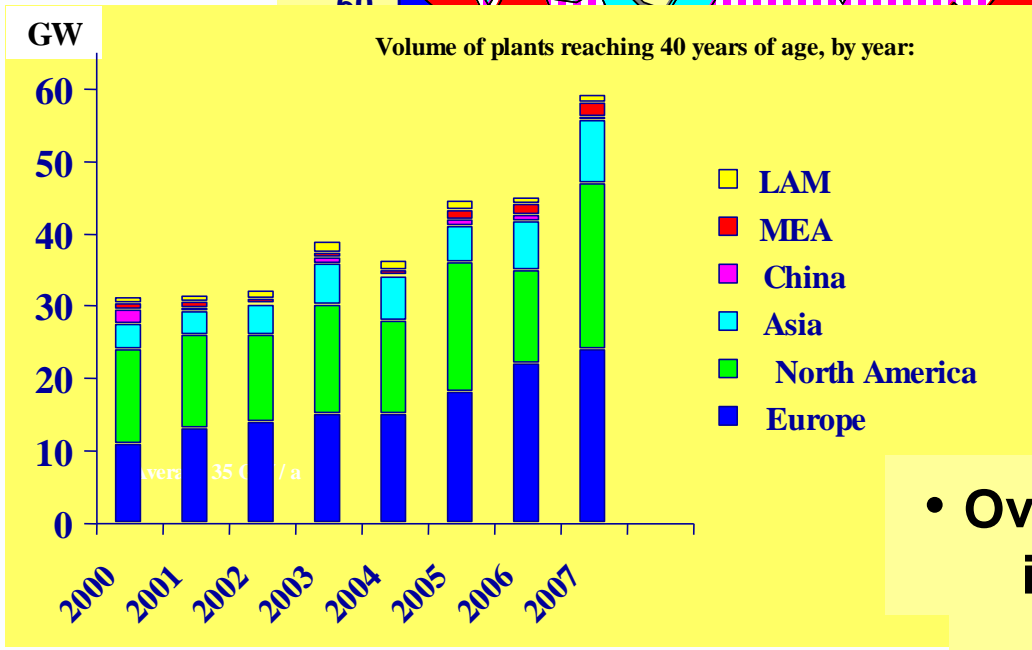
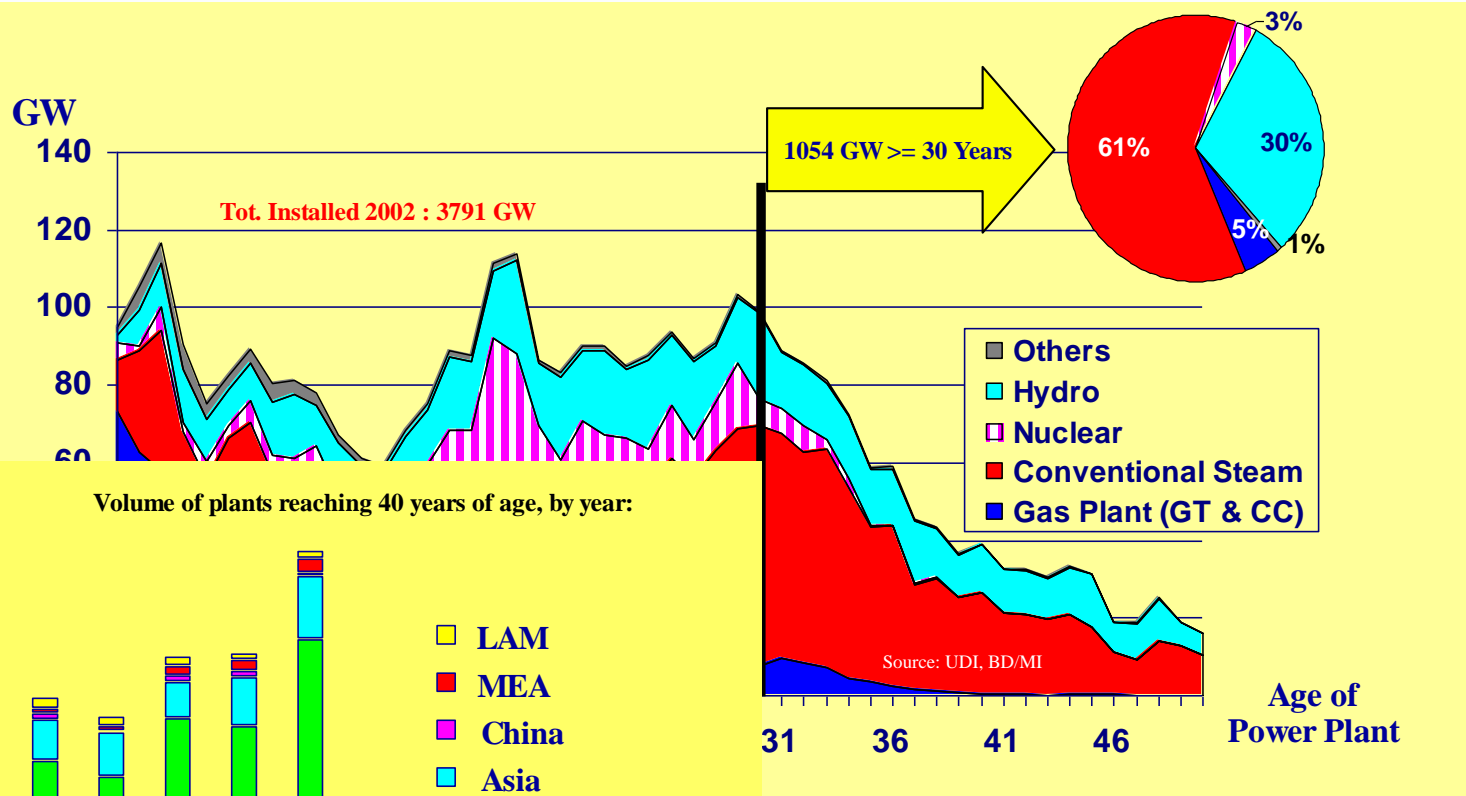
- **Growth of Renewable Energy and potential resurgence of nuclear but**

Continuing reliance on fossil fuels

- especially likes of China and India



Installed Base Capacity - Aging Fleet



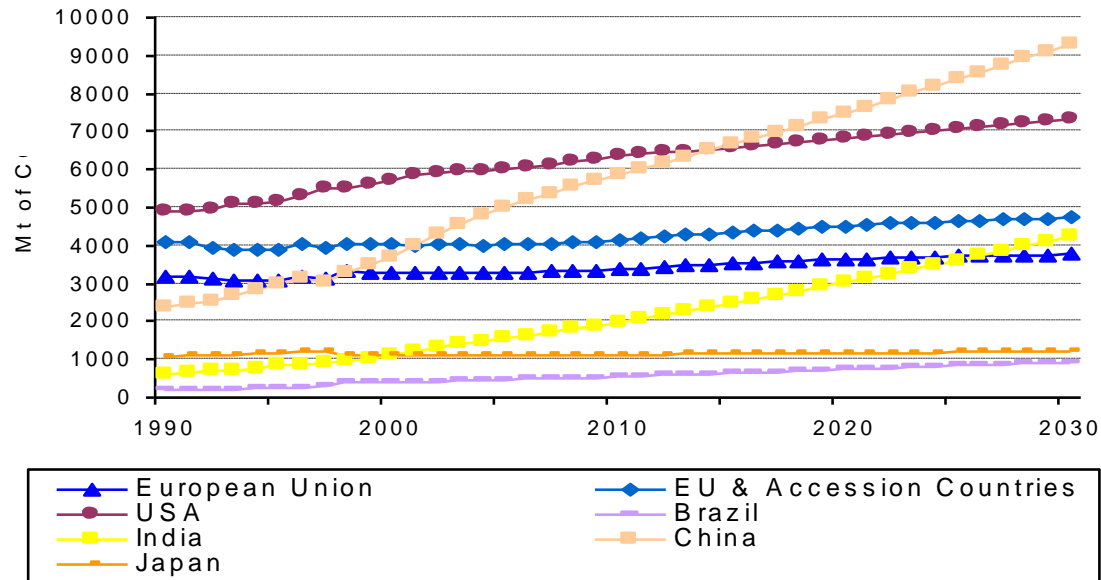
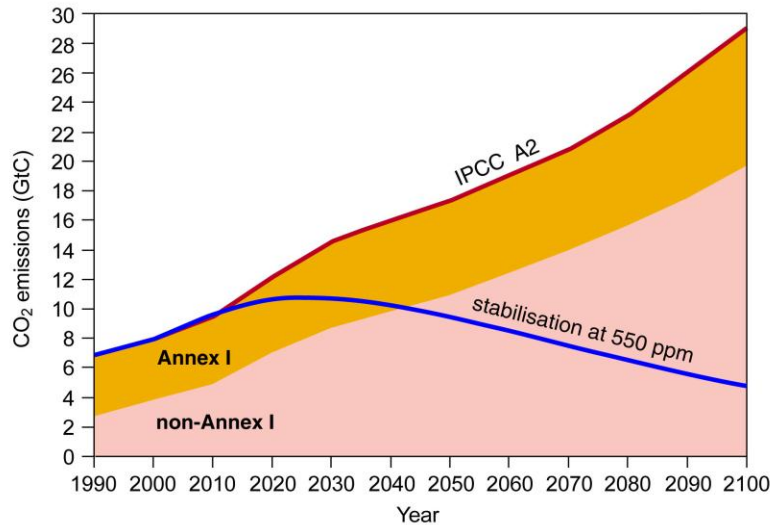
- Over 1/4 of world-wide capacity is more than 30 years old a lot in the developed world

Environmental Issues - 'longer term' aspects

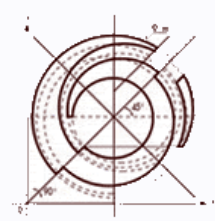
● Environment

- What happens post 2012?
- 60% GHG reductions by 2050?

Forecasted CO₂ Increases
Source: EC/EEA, 2004

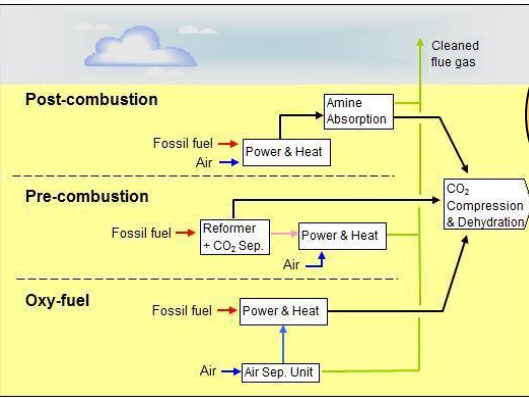
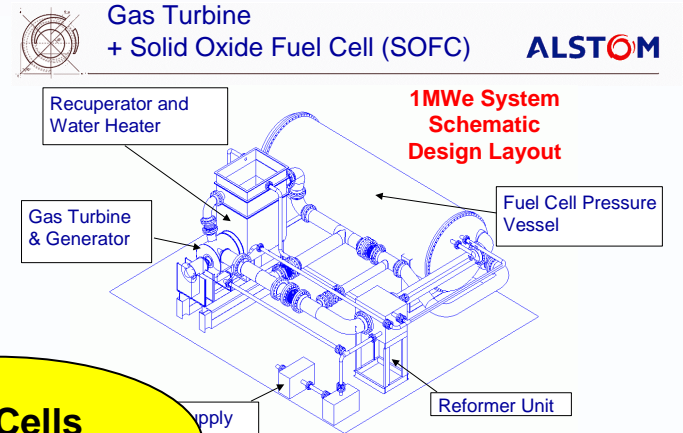
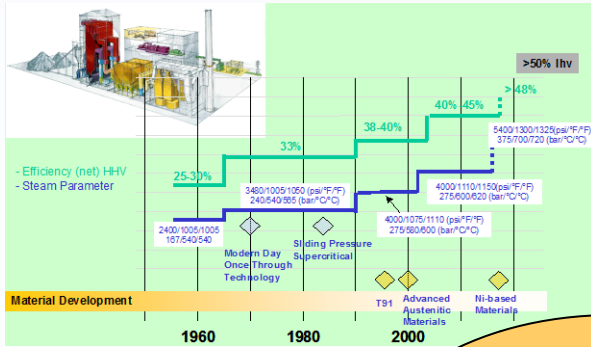
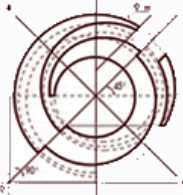


Mitigating climate change : cannot ignore fossil fuels



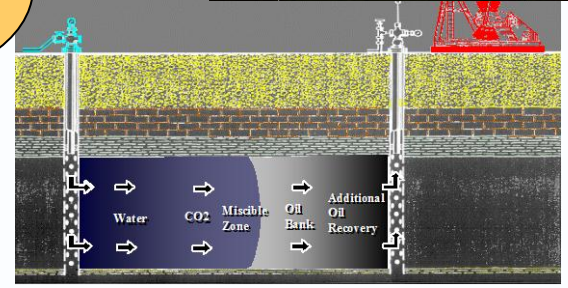
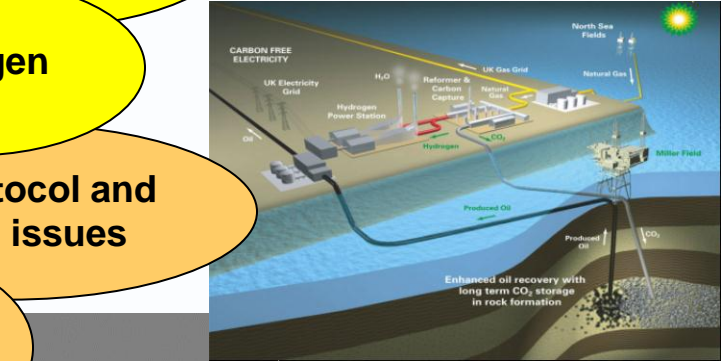
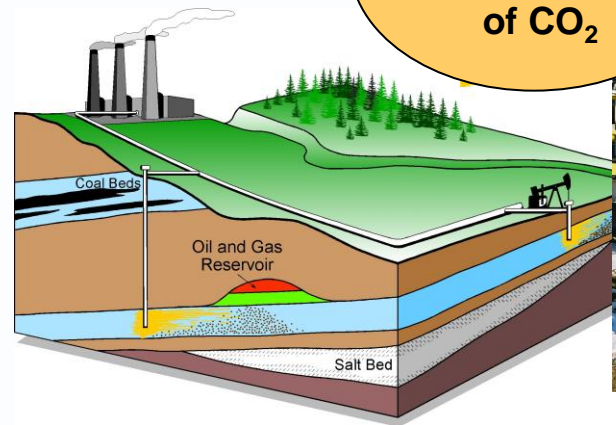
INTERACTIONS, INITIATIVES and STRATEGIC POSITIONING

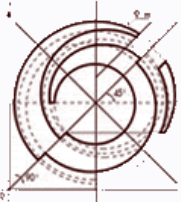
Interactions : ZEPG/H₂ Issues



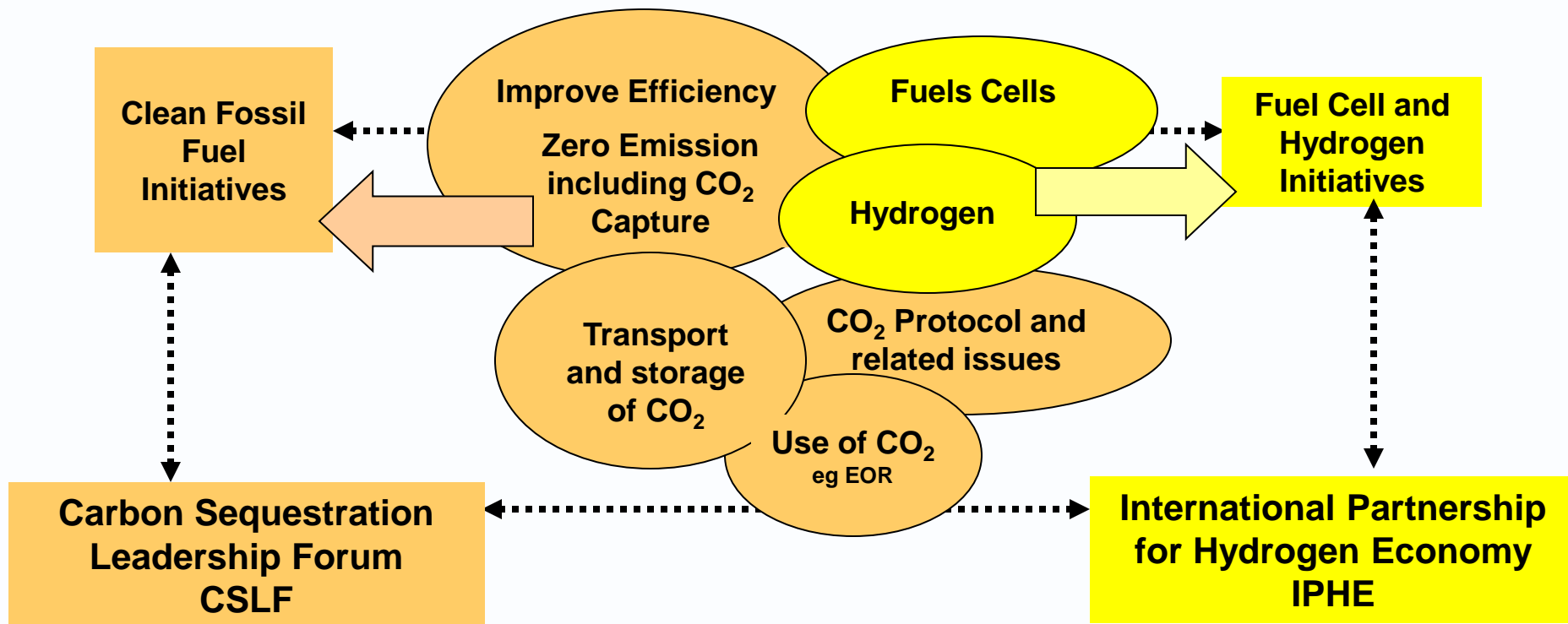
Central Themes:

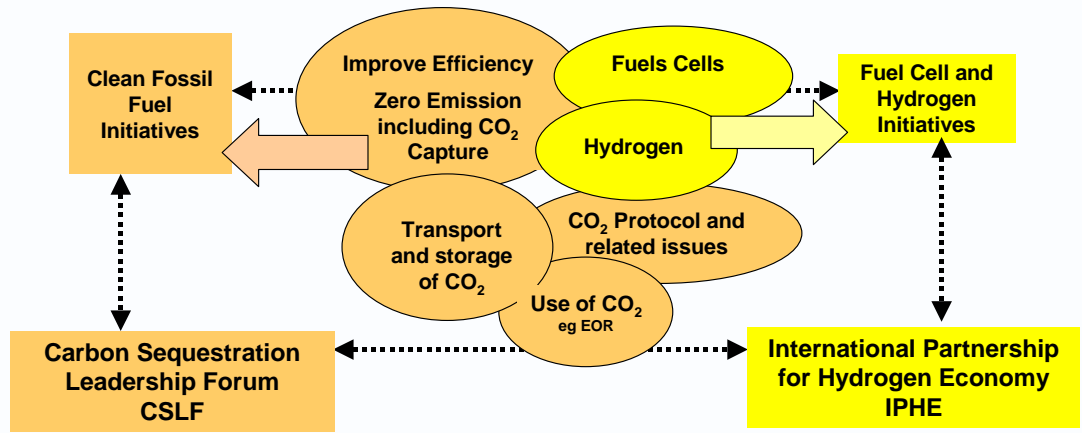
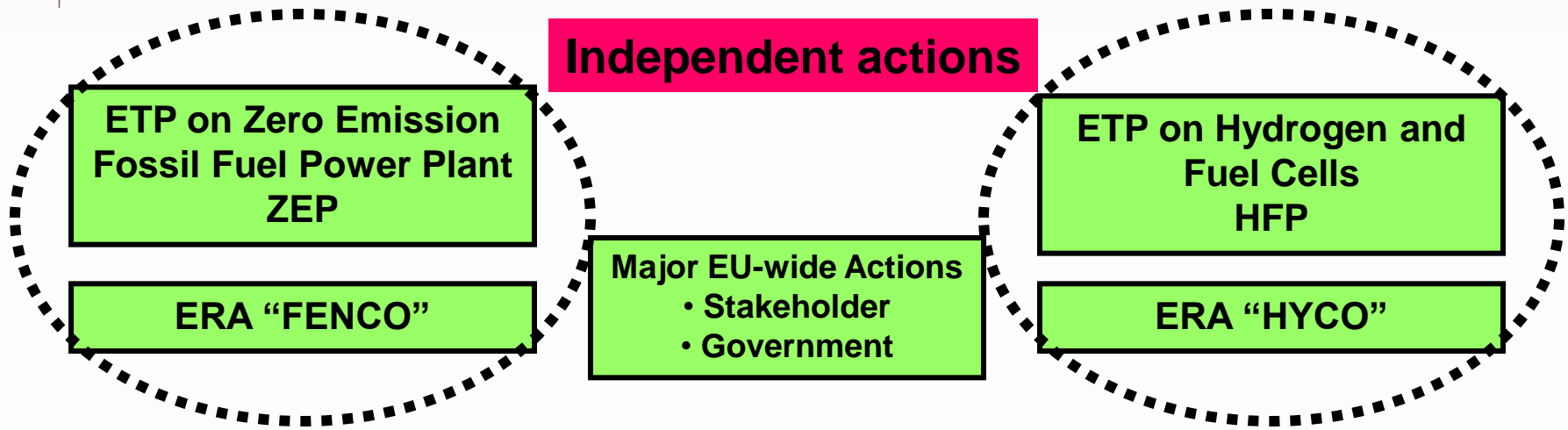
- Improve Efficiency
- Fuels Cells
- Zero Emission including CO₂ Capture
- Hydrogen
- Transport and storage of CO₂
- CO₂ Protocol and related issues
- Use of CO₂ eg EOR





An overall strategic framework embracing clean fossil fuels as a key element of a sustainable energy portfolio



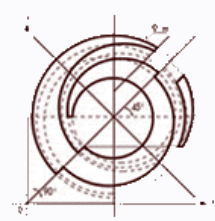


EC "FAST TRACK" Initiatives

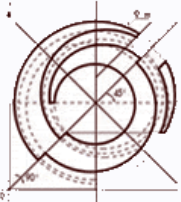
HYPOGEN

HYCOM

Not a fully integrated approach

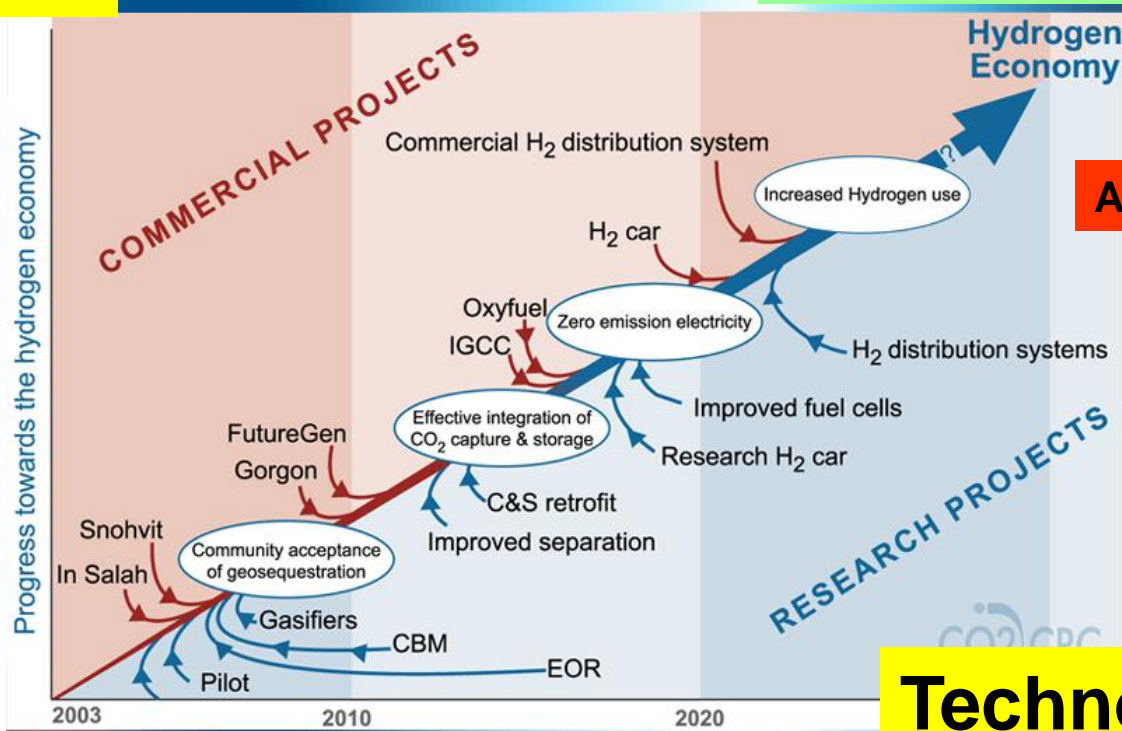


ISSUES and GAPS



Market

Integrated Road Map



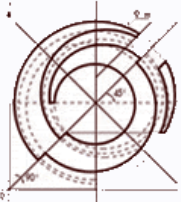
Australian TRM

Technology

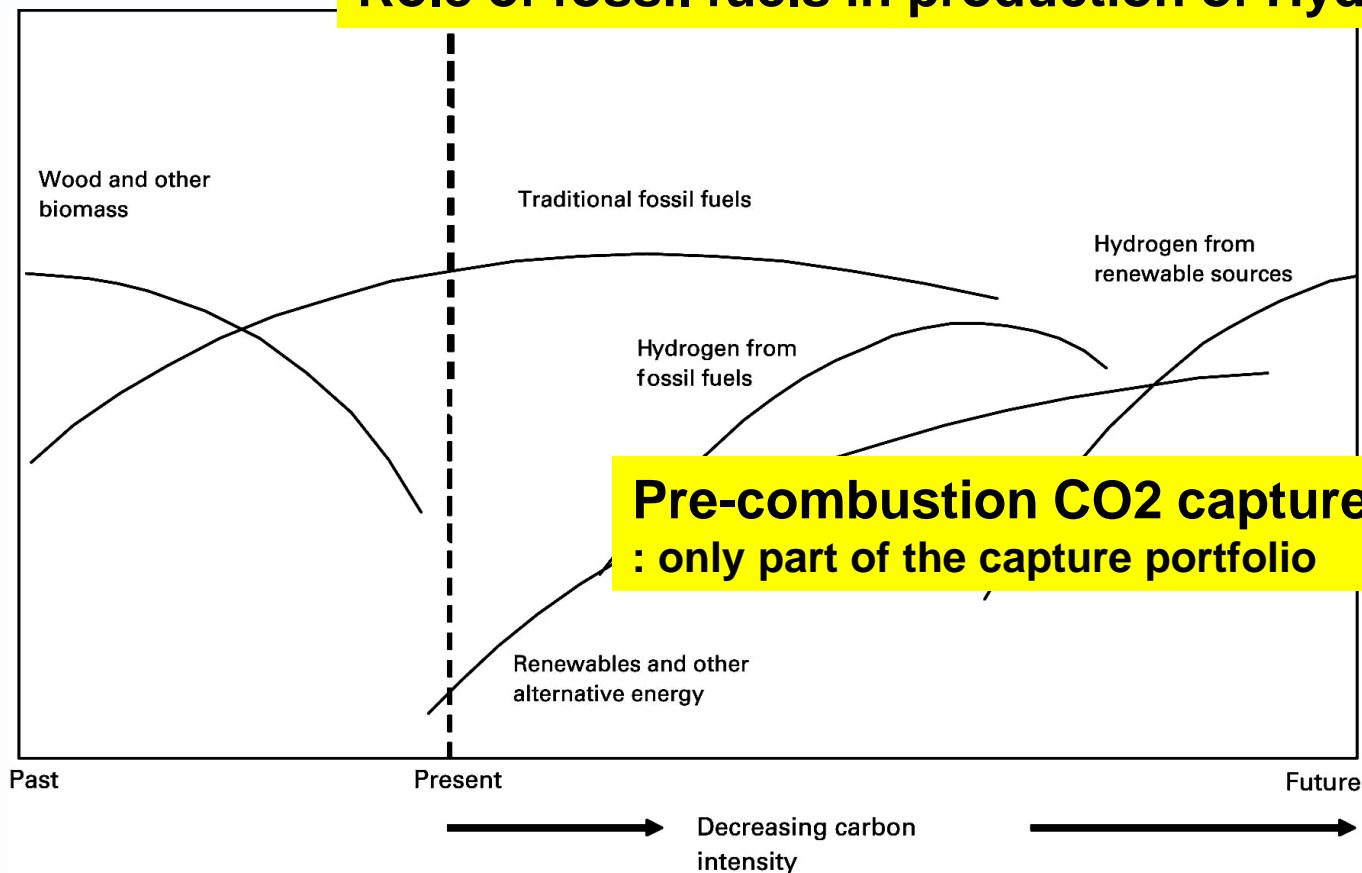


Timeframe

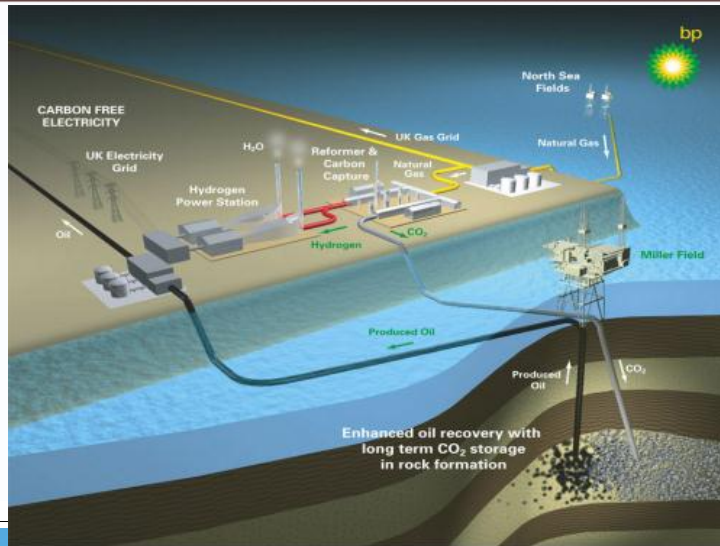
Sustainable Vision



Role of fossil fuels in production of Hydrogen



Pre-combustion CO₂ capture systems : only part of the capture portfolio

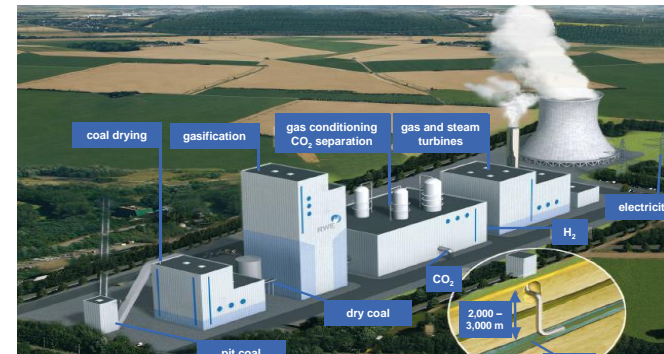


mostly focussed on
 “zero emission”
 power generation
 from fossil fuels

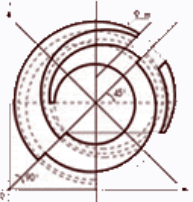
 a step on the way?



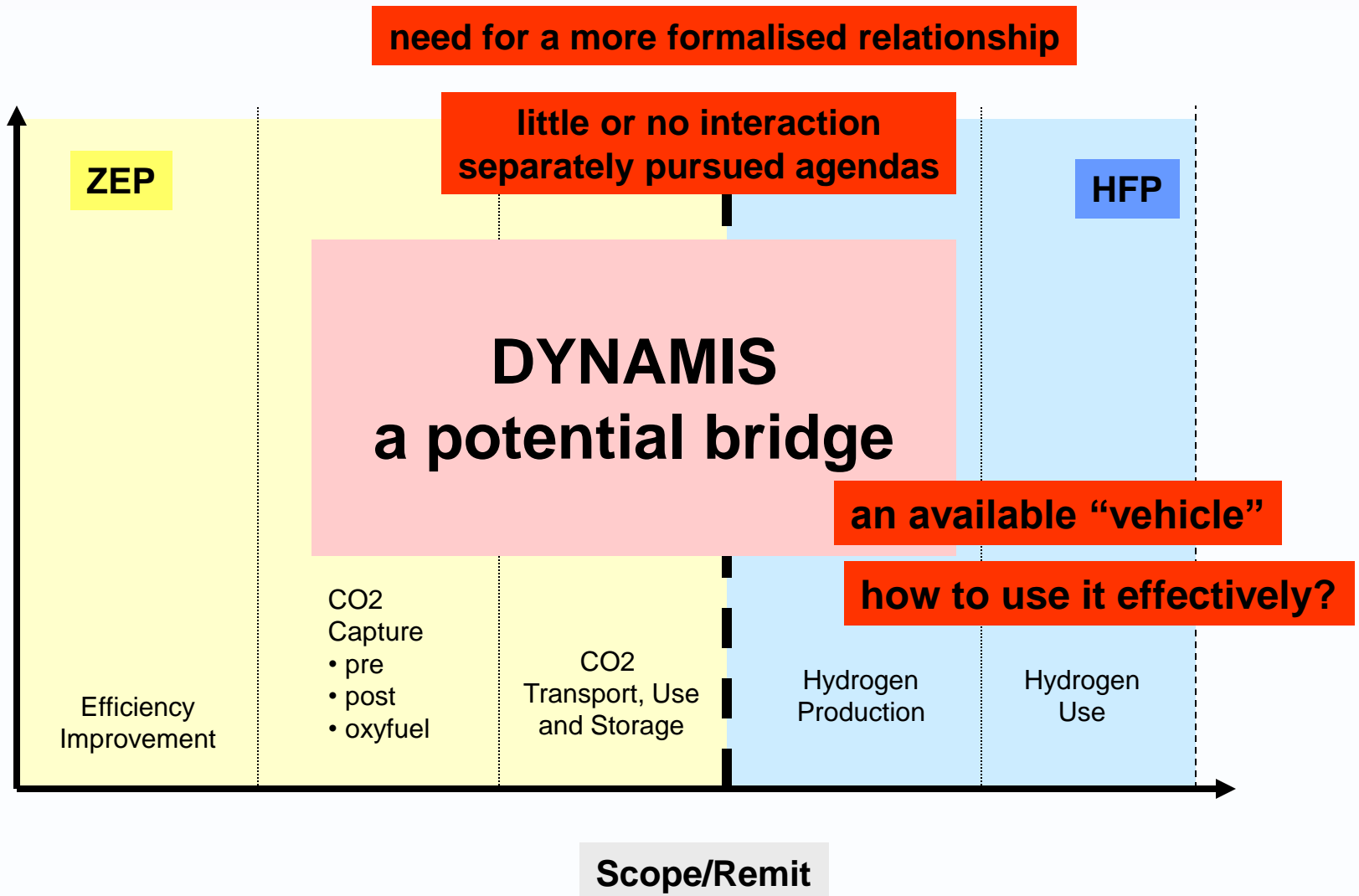
RWE Power
 Lighthouse Project of RWE’s Climate Strategy:
 The zero-CO₂ power plant



Emergence of commercial size projects : need for 10-12 in Europe as recommended by ETP ZEP



Bridging the Gaps



- SRA and SDD published September 2006
- 2007 all about implementation
- 4 Task forces being formed :
 - Technology
 - Demonstration and Implementation
 - Policy and Regulation
 - Public Communication

- **“Demonstration and Implementation” is obvious area for developing interaction on ZEP/H2**
- **Next 6 months will be critical : so time is now to initiate such interactions**

The ALSTOM logo is centered on a white semi-circular background. The word "ALSTOM" is written in a bold, sans-serif font. The letters "A", "L", "S", "T", and "M" are dark blue, while the letter "O" is red and stylized as a circle with three concentric arcs on its right side. A thick red curved bar arches over the top of the white semi-circle. The background of the entire image consists of vertical blue stripes of varying shades and some faint white curved lines.

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