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Making CCS fly

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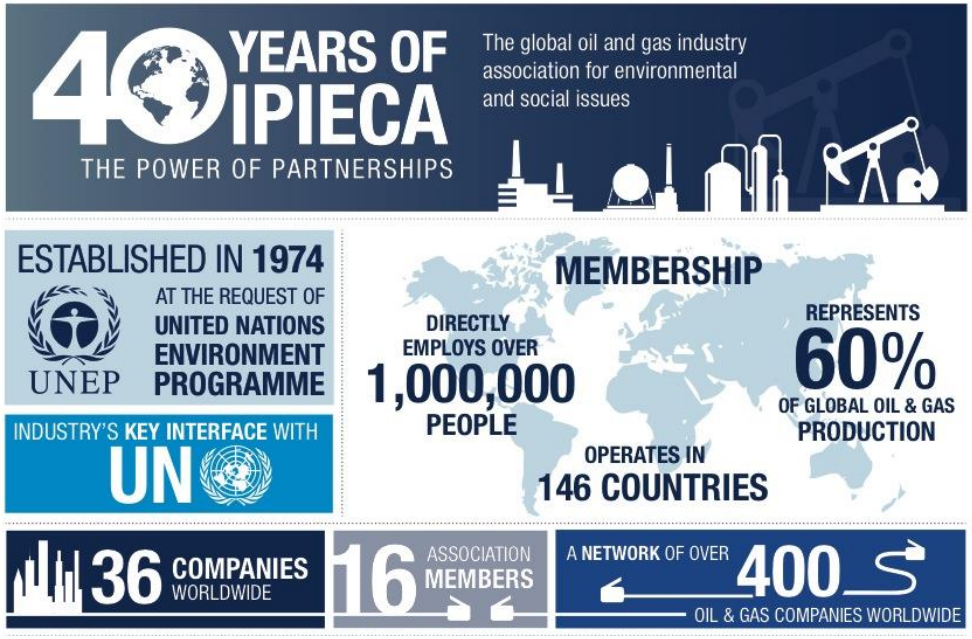
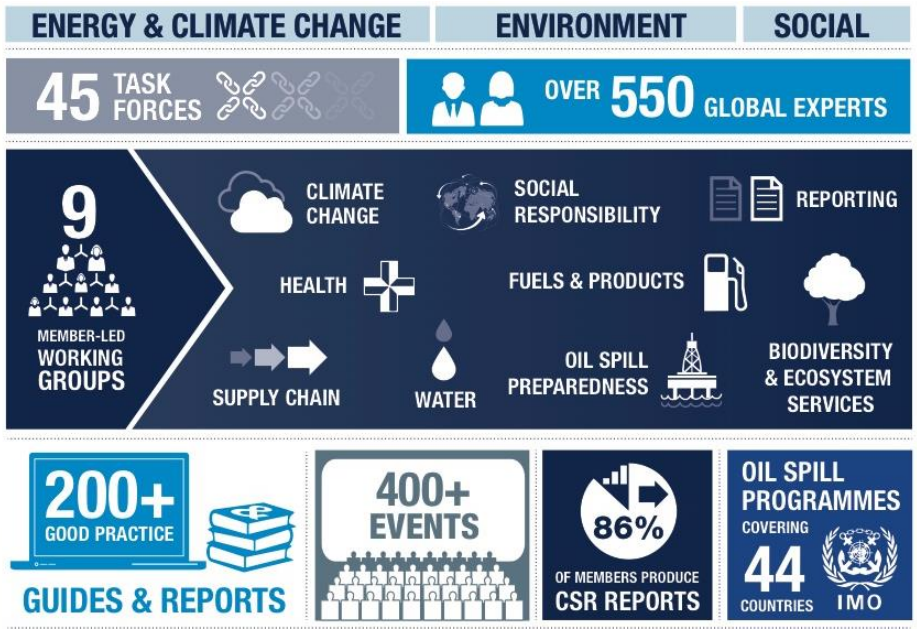
THE GLOBAL OIL AND GAS INDUSTRY ASSOCIATION FOR ENVIRONMENTAL AND SOCIAL ISSUES

www.ipieca.org

What is IPIECA?

- Global oil and gas association for environmental and social issues
- Formed in 1974 following the launch of UNEP
- The only global association involving both the upstream and downstream oil and gas industry
- Membership covers over half of the world's oil production





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IPIECA Members

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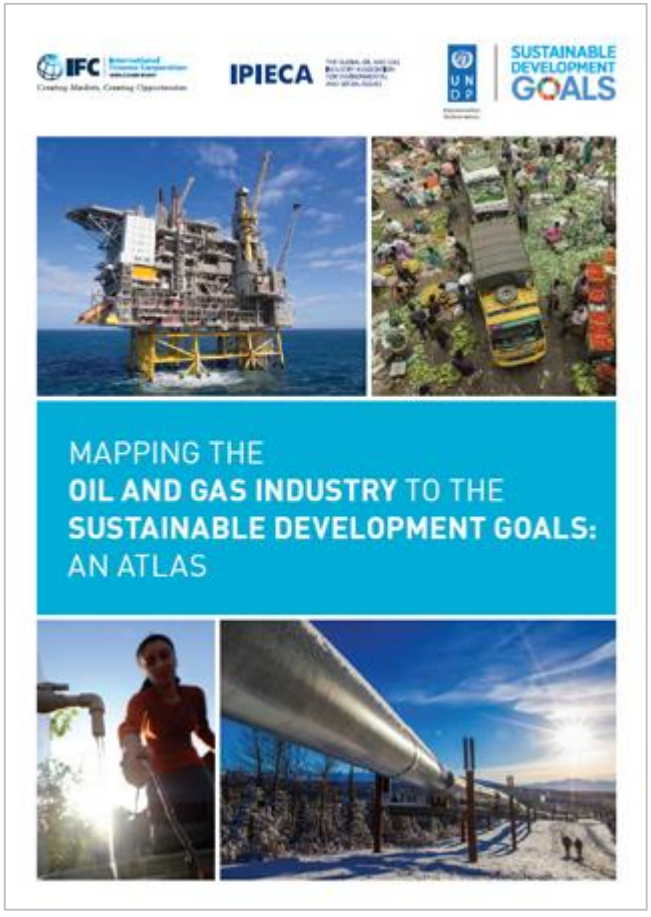
MEETING THE UN SDGs IN THE CONTEXT OF CLIMATE CHANGE

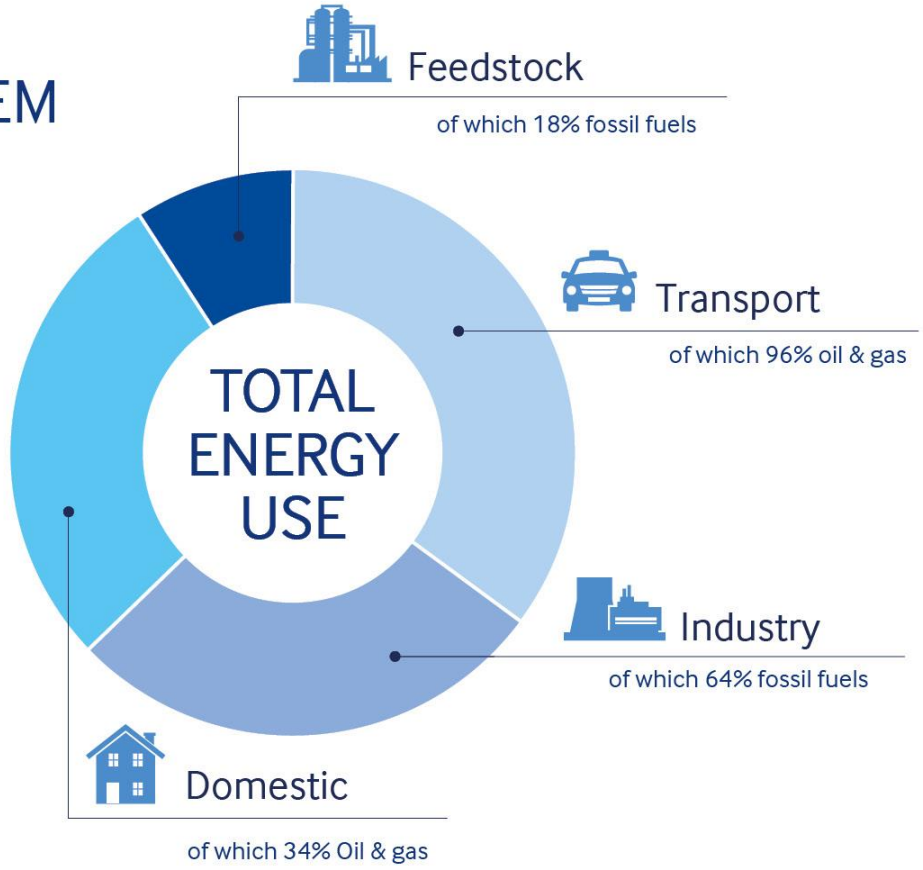


7 – AFFORDABLE AND CLEAN ENERGY

The universal global challenge is to ensure access to affordable, reliable, sustainable and modern energy, including achieving a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century.

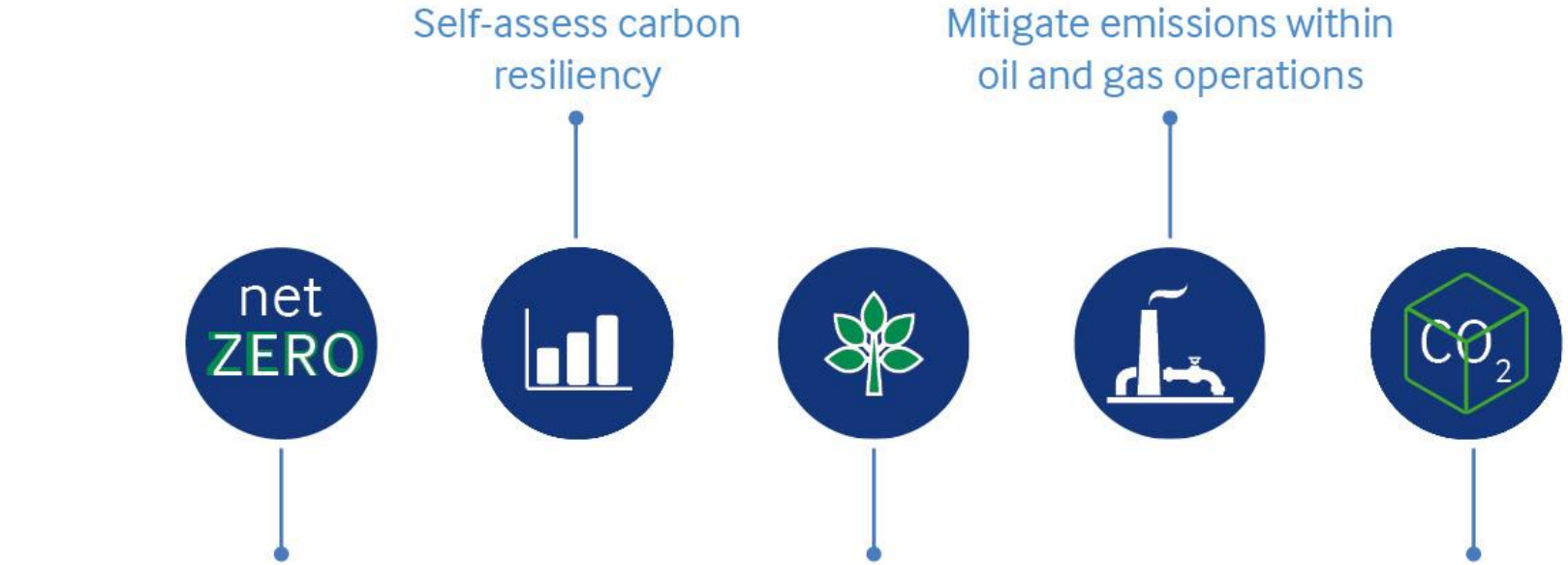
CURRENT ENERGY SYSTEM

1.1 billion have no access to electricity



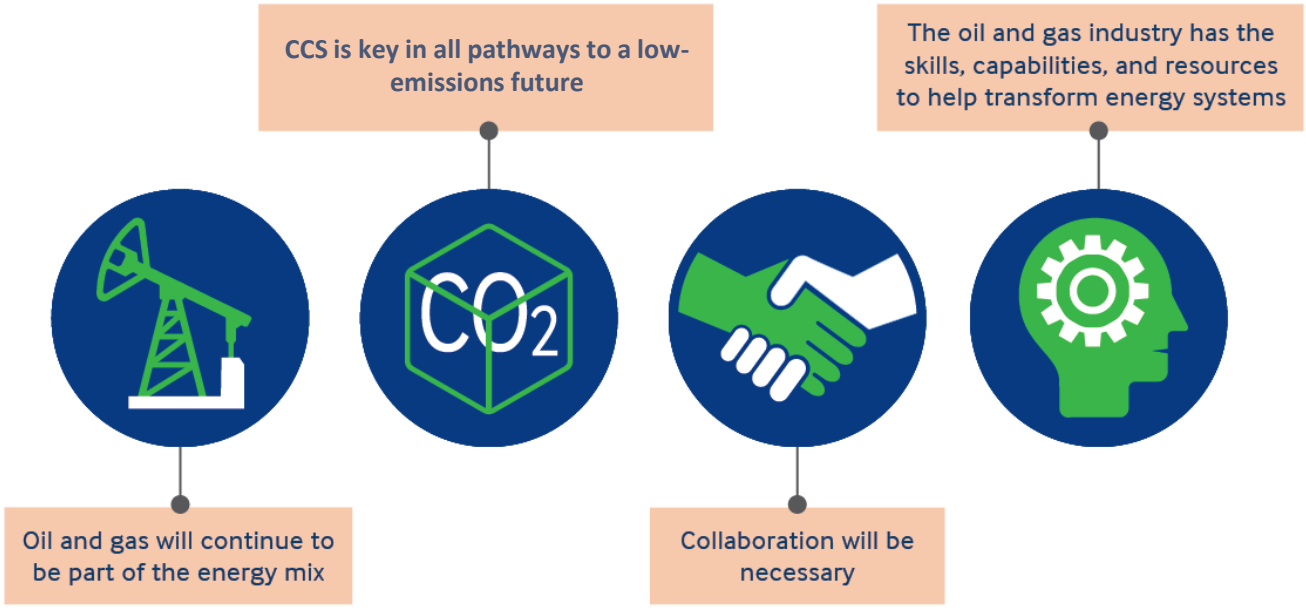
13 – CLIMATE ACTION

We believe that it is possible to address climate change risks while also meeting global energy demand and supporting economic development.



CCS – Key technology with unique solutions

IPIECA believes that significant policy action, technology development, and business response will be needed to meet the long-term aims of the Paris Agreement. CCS offers solutions across many sectors and almost uniquely offers the opportunity for negative emissions.



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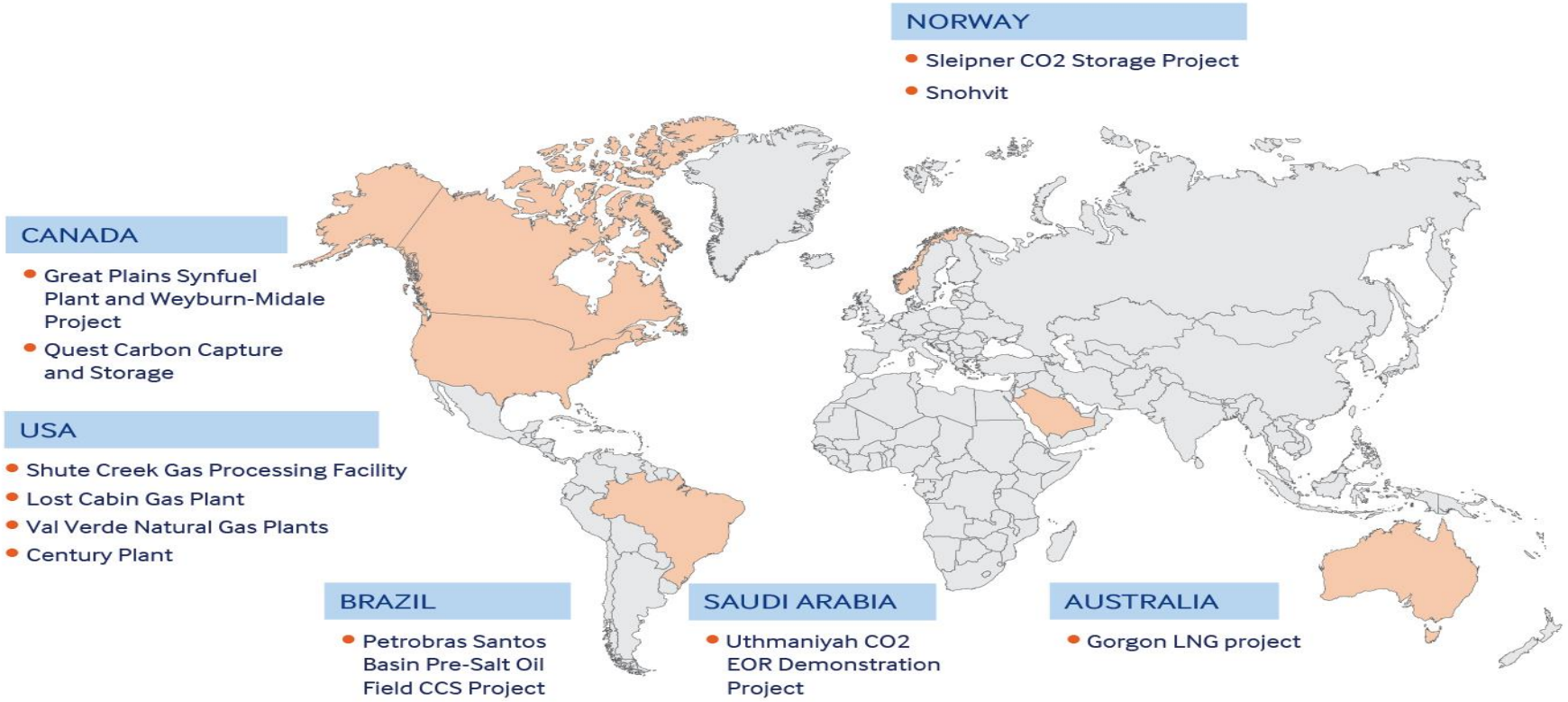
CCS – Already deployed globally

11 out of 17 CCS projects now in operation are related to oil and gas production and processing.



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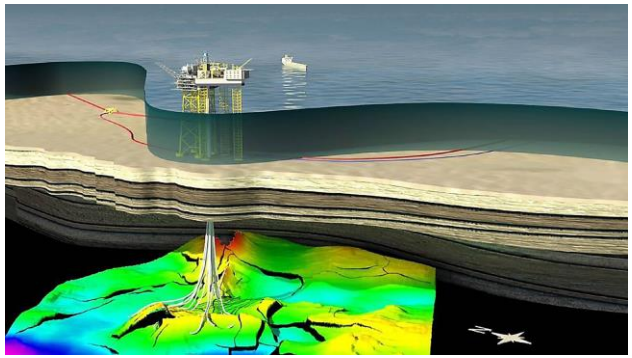
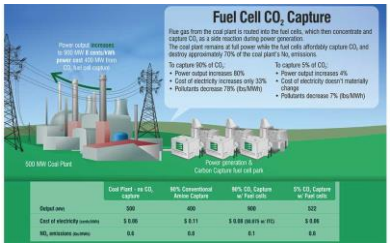
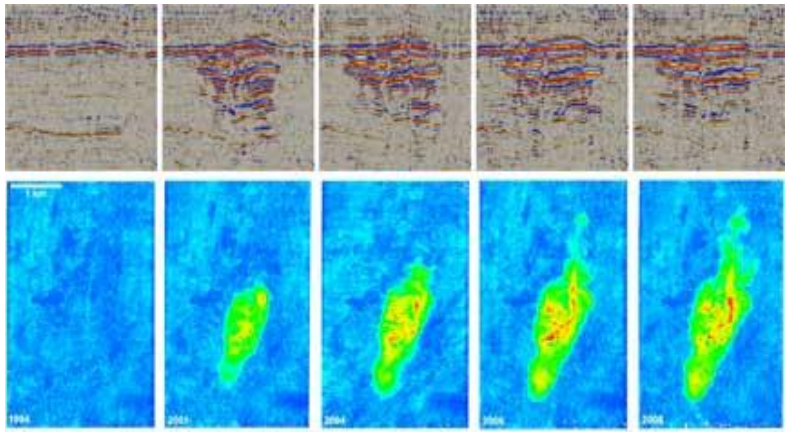
The Oil & Gas sector is most knowledgeable about CCS



- Captures for EOR and/or geologic storage
- Operates CCS both onshore and offshore; including ~7000 km of CO2 pipelines , mainly in the US
- Has more than 20 years' experience characterizing CO2 in the sub-surface using sophisticated monitoring and modelling techniques
- Pioneered advances in subsea technology that may allow for more cost effective injection offshore





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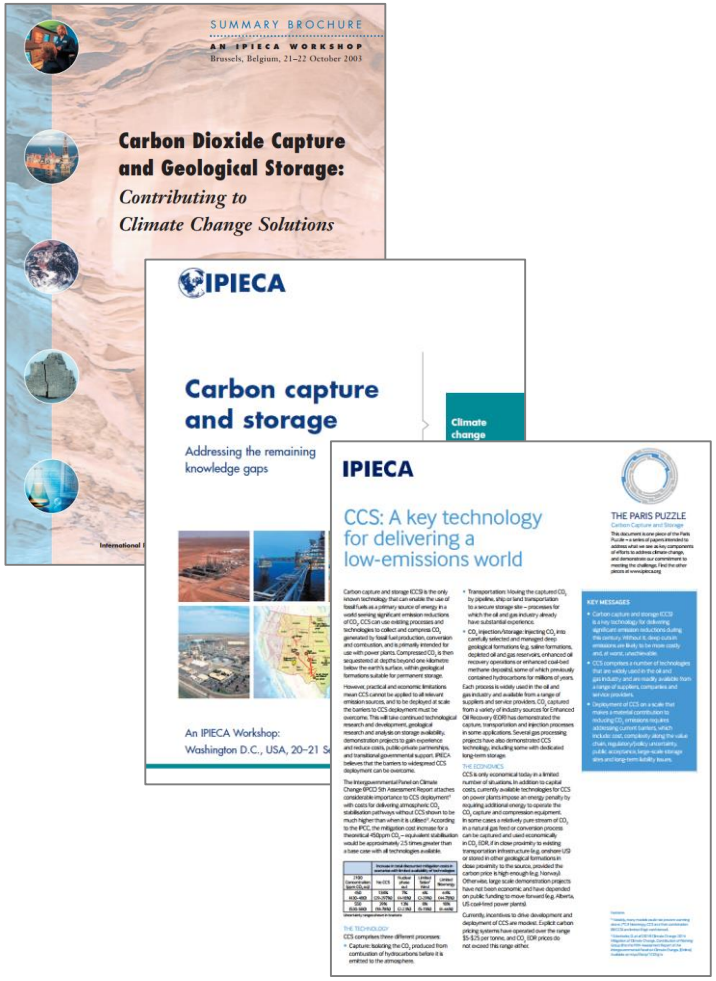
IPIECA's history on CCS

List of workshops and reports published

- IPIECA CCS Workshop (2003)
- IPIECA contributions to preparation of the IPCC SR CCS (-2005)
- CCS Roundtable: Policy and Regulatory Development (2006)
- API/IPIECA Guidelines for CCS Emission Reduction Projects (2007)
- CCS Roundtable: Business Models (2007)
- IPIECA CCS Workshop Remaining Gaps (2011)
- IPIECA Paris Puzzle (2015)
- IPIECA CCS Workshop (2017)



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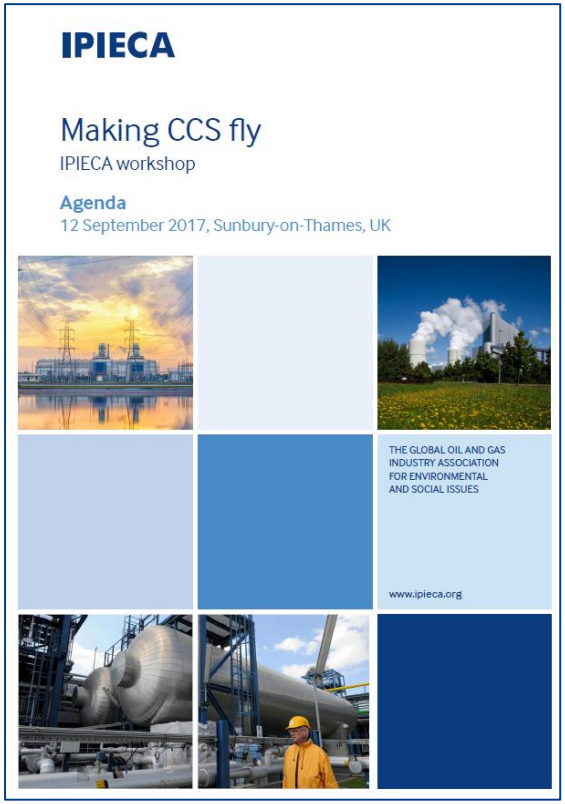
CCS workshop – Making CCS fly

Agenda

1. Introduction and context
2. What are the cost and technical issues?
3. What are the policies and public issues?
4. What are the regional issues on CCS?
5. What is the business model, potential roles and opportunities for collaboration?
6. What is the role for IPIECA?
   - IPIECA discussed key messages learned and potential roles and actions for IPIECA going forward



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CCS workshop – Making CCS fly

Key topics highlighted during the discussions

- Scale-up needs to be accelerated to meet the Paris Agreement goals.
- Potential for Negative Emissions
- Support, Collaboration, and Continuous Improvement to Lower Costs and More Flexible Technologies
- Information and Collaboration
- CCS in different regions
- Business Models

CCS workshop – Making CCS fly

Messages by topic heard during the session

Information and Collaboration

- Groups that support CCS need to be collaborative and avoid duplication.
- CCS needs to have a key position within Government Strategies.
  - How can we help governments think about CCS in their Mid-Century Strategies to the Paris Agreement?
- IPIECA and industry associations can play a positive role to engage with governments to address challenges in implementing the needed scale of CCS applications.
- Support and collaboration will be important to improve technology across the portfolio of CCS applications including heavy industry and natural gas power generation.
- CCS is proven and available but there is still scope for continuous improvement based on shared learning from projectsand capital cost needs to be lower and more flexible technologies needed.

CCS workshop – Making CCS fly

Messages by topic heard during the session

Business Models

- CCS success is achievable but business models are complex with many parts, and economics remain challenging even with current government support.

- An alternative approach to infrastructure planning could be better, such as spoke and hub models. Separation of capture and storage into different businesses may have advantages.

Thank you!

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