

Charting a transition for the Chemical Industry

IEA / ICCA / DECHEMA

Webinar launch, 17 June 2013

Technology Roadmap

Energy and GHG Reductions in the Chemical Industry via Catalytic Processes



Key technologies for reducing global CO₂ emissions



- 6°C Scenario business-as-usual; no adoption of new energy and climate policies
- ^{2°}C Scenario energy-related CO₂-emissions halved by 2050 through CO₂-price and strong policies



Energy technology roadmaps



Energy Technology

Perspectives 2012

Technology roadmaps status





Low-carbon energy technology roadmaps



Overview of IEA roadmap process

- Engage cross-section of stakeholders
- Identify a baseline:
 - > Where is technology today?
- Establish a vision:



- > What is the deployment path needed to achieve 2050 goals?
- Identify technical, regulatory, policy, financial, public acceptance barriers
 - What are the near term action items?
- Develop implementation action items for stakeholders





Global industrial energy consumption by sector



Note: Includes feedstocks and energy use in coke ovens and blast furnaces Source: IEA



Energy technology roadmaps



Technical energy savings potential in the chemical industry



Note: Energy savings potential based on 2010 production levels. Source: IEA.



Options for reducing CO₂ in the chemical industry



 CO_2 emissions reduction of 1.6 to 1.8 Gt CO_2 possible through a combination of energy efficiency, energy recovery, fuel switching and CCS



Chemical Roadmap Messages

- Catalysis and related improvements could reduce energy intensity 20% to 40% by 2050. Saving 13 EJ and 1 Gt of CO₂-eq in 2050
- To 2025 incremental improvements and deploying BPTs could provide substantial energy and emissions savings
- Deeper energy & emissions cuts will require development and deployment of emerging technologies that exceed current BPTs
- "Game changer" technologies, such as sustainable biomass feedstocks and low carbon hydrogen, are needed for deeper emissions reduction (additional 0.5 Gt CO₂-eq)





















Evolution of energy intensity in the chemical industry via catalysis



Note: Energy consumption for olefins in this figure is based on deployment of catalytic cracking process. Source: DECHEMA.



Energy savings potential in the chemical industry via catalysis





Total energy consumption in the chemical industry



Reason for increased energy consumption: Chemical production is expected to increase by factor of 2-3



Regional savings potential





Policy recommendations

- Enable framework for improved research & development effectiveness
- Secure financing, including cost effective incentives
- Promote international collaboration, sharing of information, best practices and R&D
- Integrate legislation for more coherent policies
- Encourage collaboration public/ private partnerships







Key actions in the next 10 years

Policymakers

- Develop policies that more highly reward energy efficiency investments.
- Create long term policy that reinvigorates catalyst/ process improvement for high-energy-consuming processes.
- Enable policies for best practices where new facilities are built.
- Eliminate barriers to the use of more energy efficient technology





Key actions in the next 10 years

- **Chemical industry**
- Identify top opportunities to accelerate R&D and investments.
- Facilitate R&D on game changers to lower barriers and costs.
- Promote cooperation on reducing energy and emissions.
- Academia and research organisations
- Stimulate research on large-volume/high-energy use processes.
- Collaborate to identify top prospects & reduce technical barriers.
 Financial institutions
- Work to better understand funding requirements and opportunities for lower carbon chemical sector transition.



Global Chemical Industry Plans

- ICCA acts as voice of global chemical industry leveraging multiple national association
- Chemicals represent largest industrial energy user but even larger solution provider in terms of energy and GHG savings
- Roadmap helps to address the dual challenge of improving our own operations while continuing work on energy and GHG savings technologies in our value chains







Next Steps and Regional Aspects

- Large variations in regional efficiency potential
 - Age of plants & growth outlook of local market
 - Feedstock and technology choices for new investments

NEEDS policy approaches tailored to each regions challenges

- Roadmap is first step in providing information that encourages better future investment choices
 - multiple launches and workshops planned regionally to make this a locally driven continuous improvement process

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DOWNLOAD THE ROADMAP AND ANNEXES AT:

http://www.iea.org/publications/freepublications/publication/name,36970,en.html

www.icca-chem.org/en/Home/ICCA-initiatives/Energy--Climate-Change-/

www.dechema.de/industrialcatalysis

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Questions?





