



The role of EIs for the economic development of developed and emerging countries. Growth and geographical trends

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CCUS and EIs Workshop

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Who are we?

Our internationally recognised name is the IEA Greenhouse Gas R&D Programme (IEAGHG). We are a Technology Collaboration Programme (TCP) and are a part of the International Energy Agency's (IEA's) Energy Technology Network.

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What I am going to talk about



- Mentions to our the technical study IEAGHG 2017/07
- CSLF Report : Carbon Capture, Utilisation and Storage (CCUS) and Energy Intensive Industries (EIs). From Energy/Emission Intensive Industries to Low Carbon Industries

IEAGHG 2017/07



- Released in 2017
- Identified the role of CCS within mitigation efforts.
- Industrial applications and developing countries were targeted in this report.
- This study characterized key countries and regions worldwide where CCS could play an important role in mitigation efforts, based on national circumstances and priorities

CSLF Report- Introduction



- EIs (Energy Intensive Industries) are crucial for the current economies and their growth, particularly in emerging countries
- These industries emit significant amount of CO₂
- One of the questions we addressed was: How is it its contribution to the growth of the economies? Where are the main geographical origins and where is the production growth anticipated to be?

CSLF Report



Steel

Cement

Chemicals

Refining

Hydrogen

**Natural
Gas**

**Heavy Oil
(complex)**

Fertilizers

**Waste to
Energy**

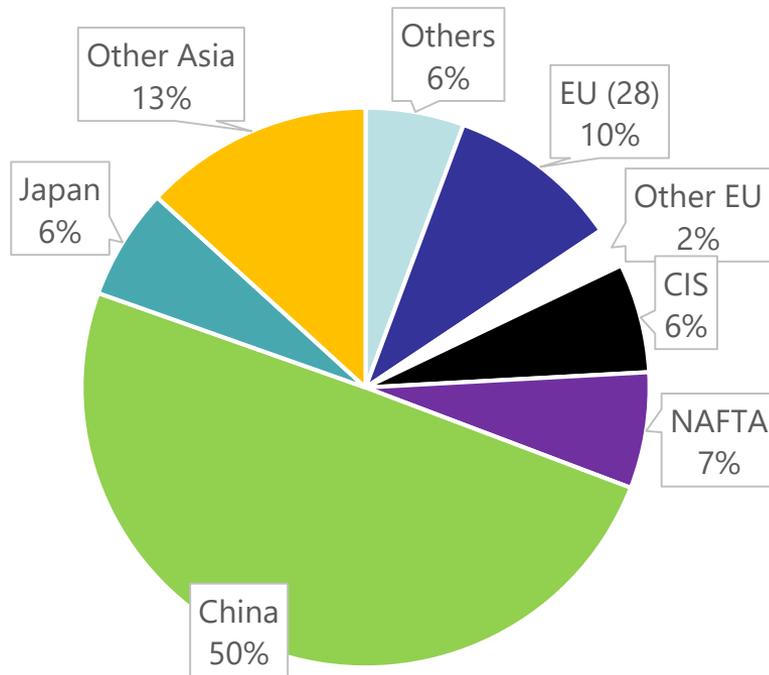
Cutting CO₂ emissions
through EIs

- Providing **materials** to other industries
- Providing products: **interaction/ synergies** between industries
- Low carbon footprint **products**

CSLF Report-Steel



Crude Steel Production (2015)



Expected growth to 2025 in automotive, construction, and mechanicals industries

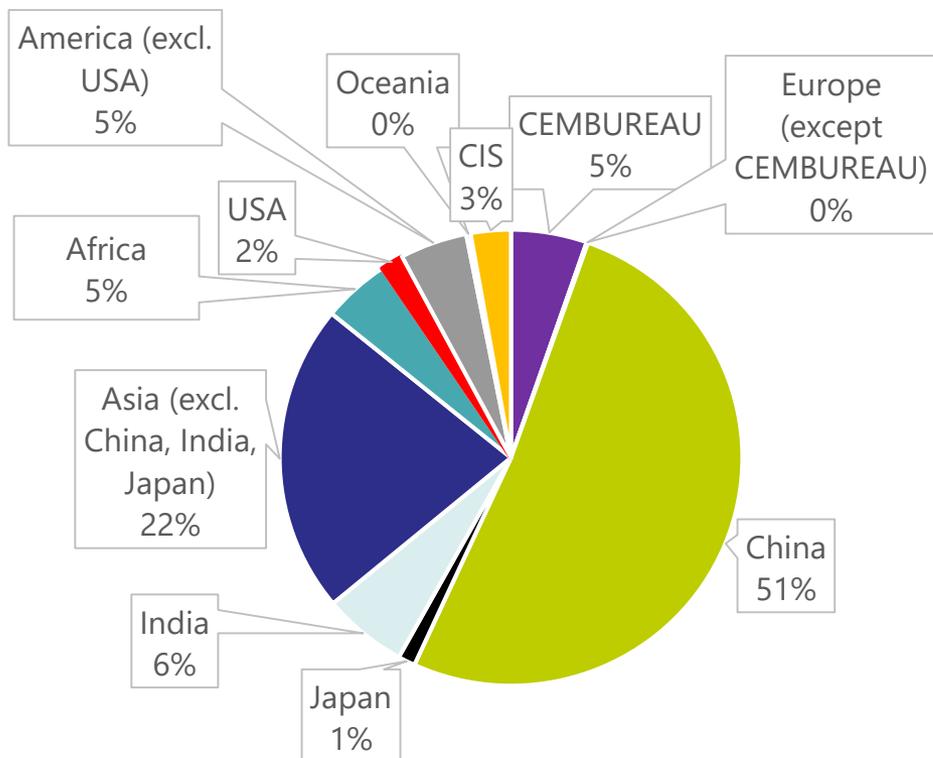
Acceleration in the construction sector (the largest market for steel) in **emerging areas** in Asia, South America, and the Middle-East

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CSLF Report-Cement



Production (2015)



Production of 4.2 Gt in 2014.

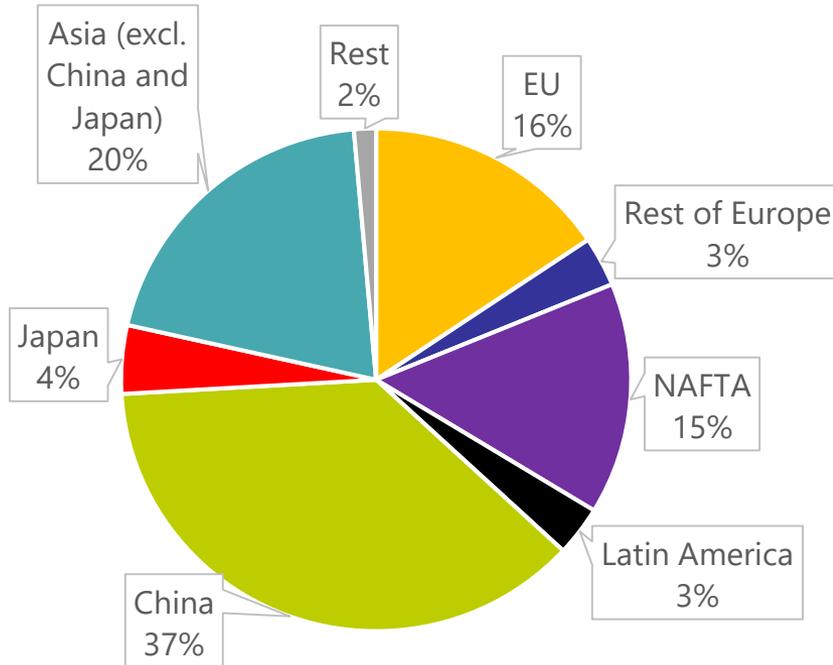
Expected to grow to 5.1 by 2050. America is expected to double, while India and Africa would have the largest growth (tripling 2014 production). Chinese production is expected to decrease

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CSLF Report-Chemicals



Production (2017)



The diversity of chemicals is **COMPLEX** and heterogeneous.

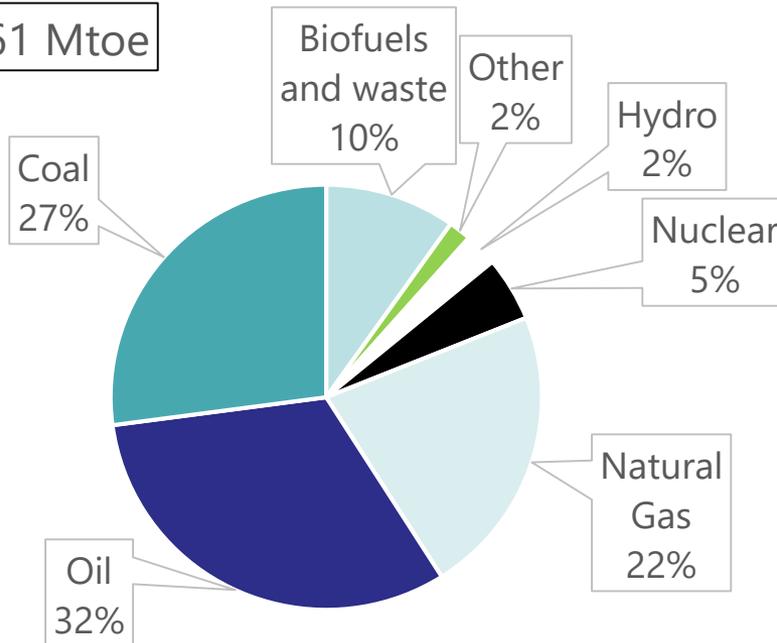
Chemicals production is expected to grow from 3.47 to 6.6 trillion in 2030. Largest growth is expected in China

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CSLF Report- Refining

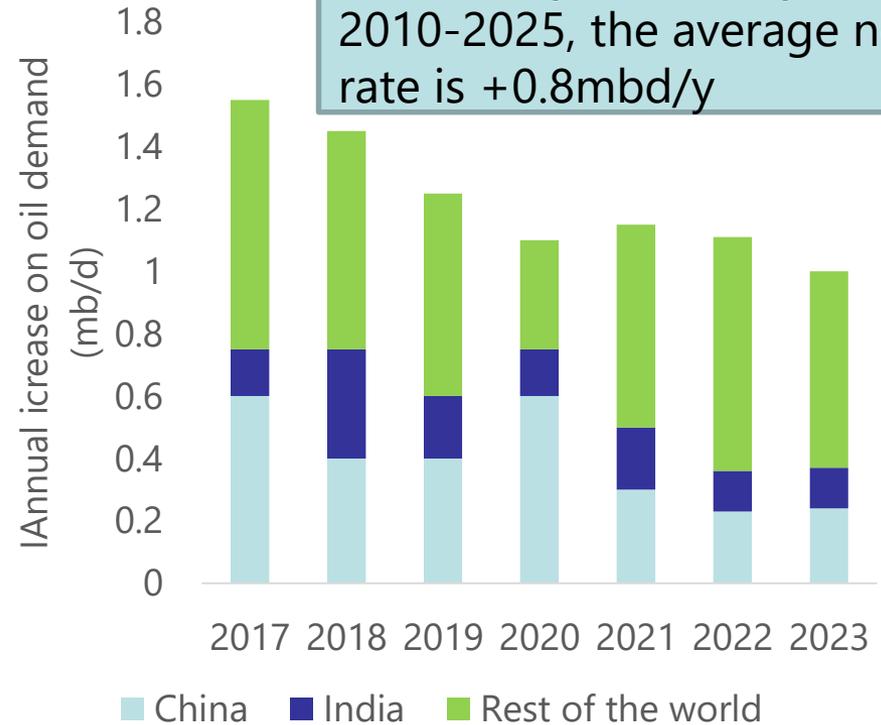


13761 Mtoe



World fuel shares in 2016 ,
based on data from IEA (2018b)

2018-2023: the net global crude unit capacity will increase by 1.2 mbd/year.
2010-2025, the average net rate is +0.8mbd/y



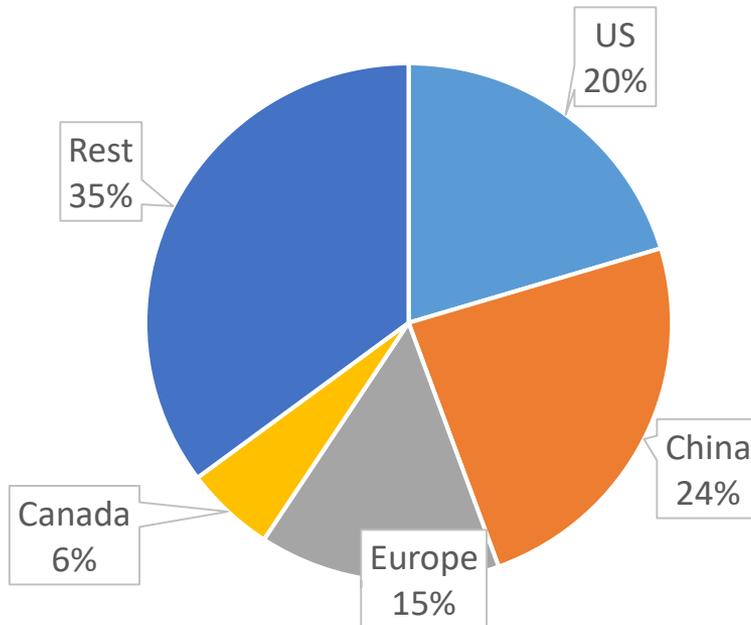
World oil demand growth,
based on data from IEA (2018)



CSLF Report- Hydrogen



Production (Mt)



Globally, around 60 million tonnes of hydrogen were produced in 2015.

Biggest producers: china and USA

Invested in ammonia-fertilizers (53%), other applications (20%), refining (20%), and methanol production (7%).

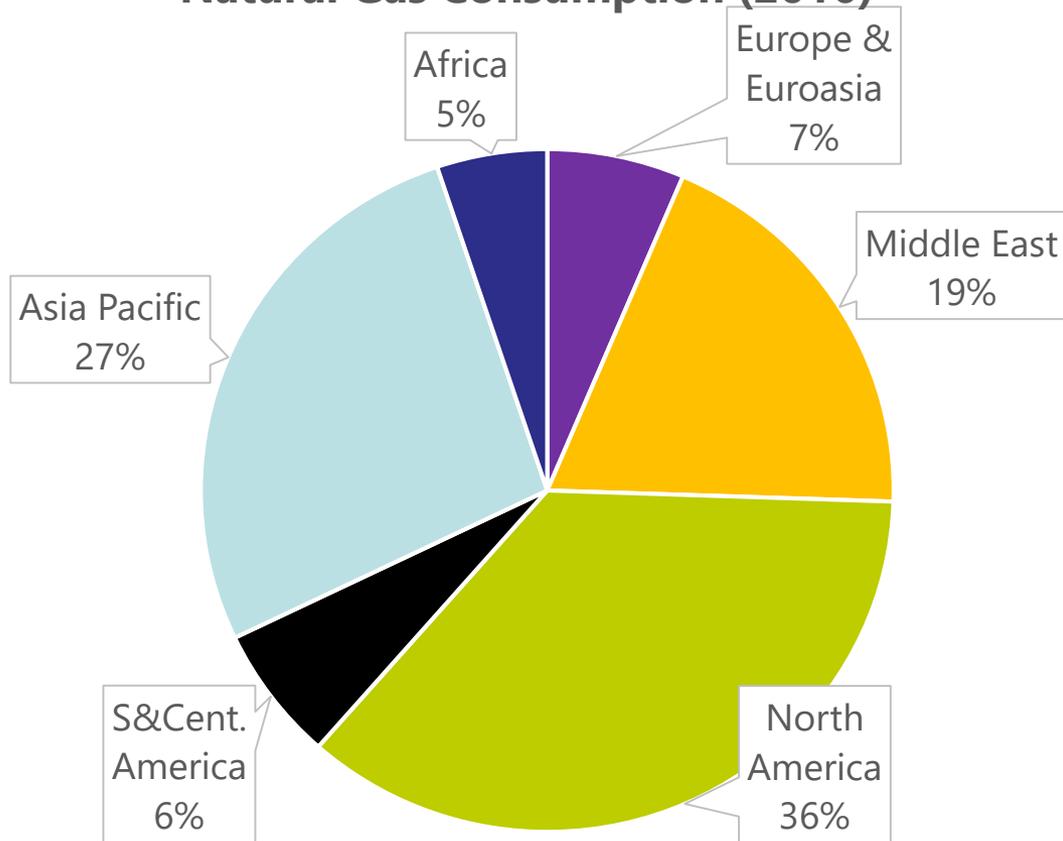
The prediction of production is uncertain but it is expected to grow. Geographically, it could be similar distribution as it is today

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CSLF Report- Natural Gas



Natural Gas Consumption (2016)



The global production was 3,765 bcm in 2017 and is expected to grow to 4,400 bcm by 2035

High growth production is expected in USA, Iran, Qatar, by 2050

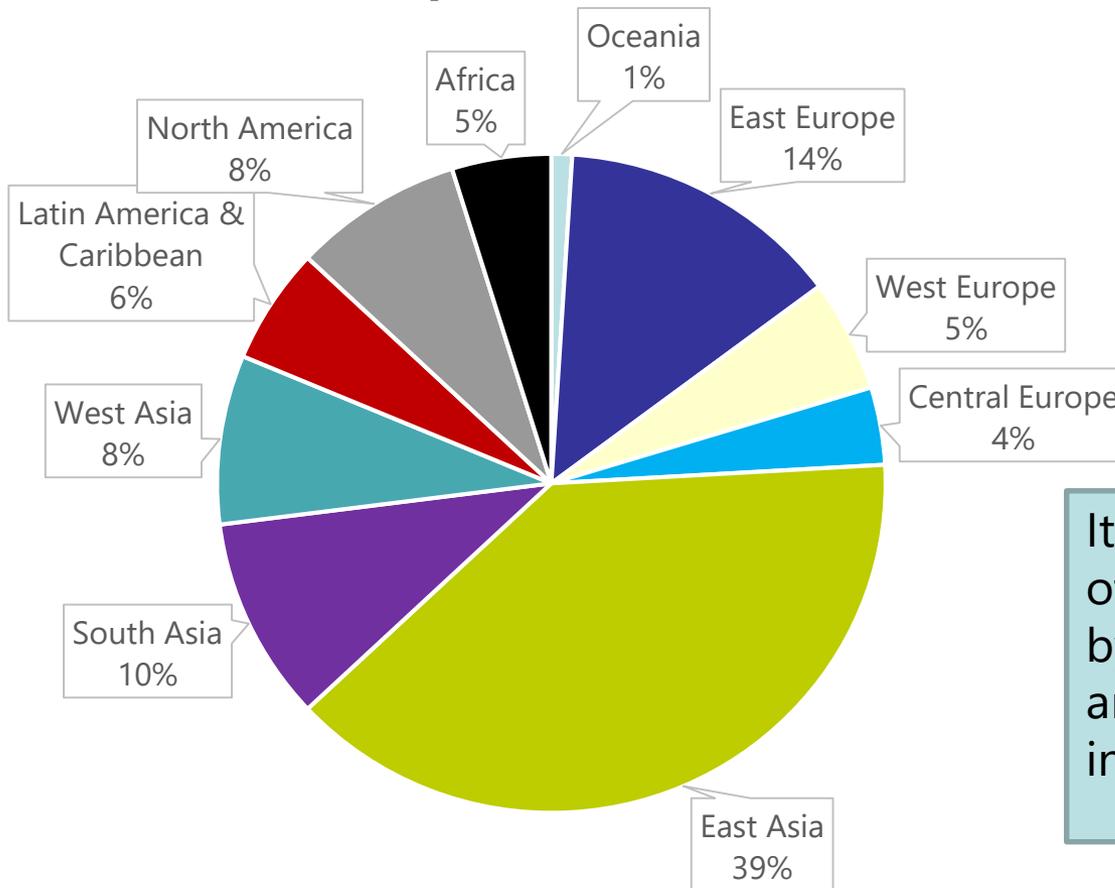
bcm: billion cubic meters

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CSLF Report-Fertilizers



Fertilizers production (2015)



It is expected that the global sales of nutrient fertilizers will increase by 1.3%/ year towards 2021. The annual global production might increase by 90 million tonnes

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CSLF Report- WtE



The WtE market was estimated to be 25 billion US dollars in 2013, with Europe having the largest share (49%). The Asia-Pacific market is dominated by Japan

The global market is expected to grow to US \$40 billion by 2023

IEAGHG is working in a report on WtE+CCS (commissioned by WOOD- Italy)

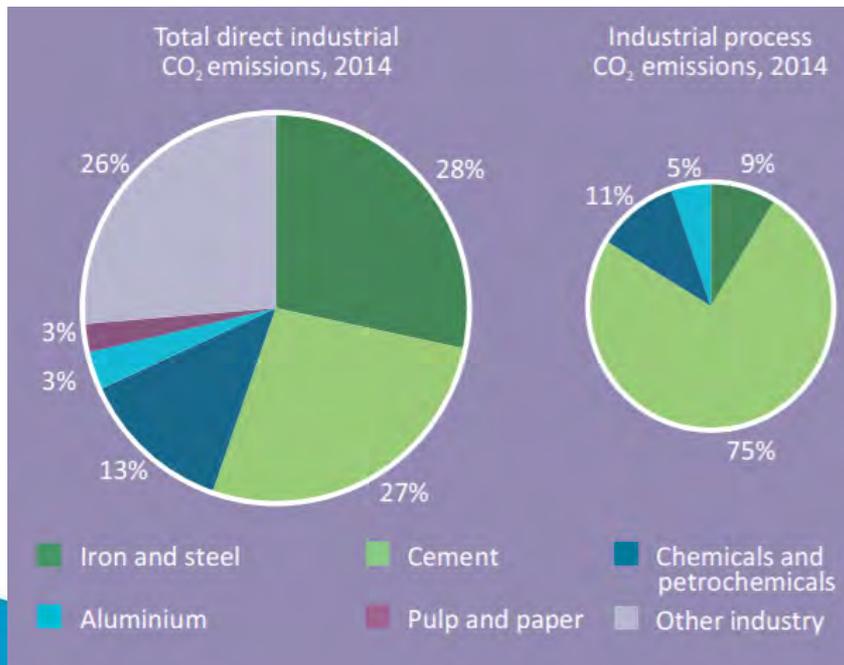
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Potential Global CO₂ emissions from those industries



- The industry sector is a MAJOR contributor to CO₂ emissions.
- 2014: 8.3 Gt CO₂/year were direct emissions from industry: 25% of total CO₂ emissions



Some industries are prime to apply CCUS

CCUS can dramatically decrease the industrial process CO₂ emissions

Conclusions



- Ells are essential in today's economies
 - Build infrastructures
 - Supply a range of commodities and consumer goods: enhance living standards
- Studied: cement, steel, hydrogen, natural gas, heavy oil, WtE, fertilizers, refining, chemicals,
- Most of Ells are expected to grow, linked to the economic growth. The highest growth is expected in countries on development
- The role of CCUS organisations will be to highlight the importance of developing CCUS in EEIS in order to meet the challenge of climate change mitigation



THANK YOU

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