



EuChemS

European Chemical Society

Short Introduction

Framing the decarbonization challenge with a few numbers

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EU GREENHOUSE GAS EMISSION TARGETS



European Commission | English EN | Search

Home > Press corner > State of the Union: Commission raises climate ambition

Available languages: English

Press release | 17 September 2020 | Brussels

State of the Union: Commission raises climate ambition and proposes 55% cut in emissions by 2030

2030
GHG -55%
RELATIVE TO 1990



European Commission | English EN | Search

Home > Press corner > Making the EU climate-neutral by 2050

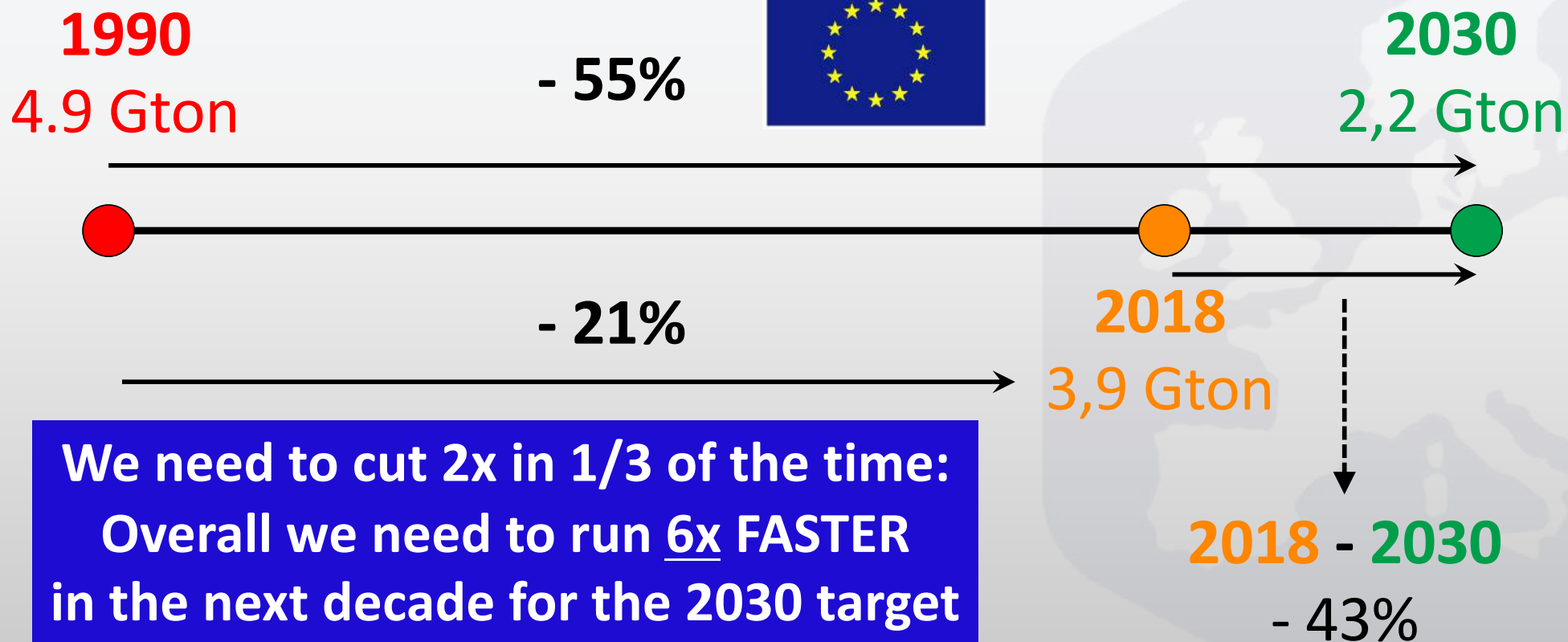
Available languages: English

Press release | 4 March 2020 | Brussels

Committing to climate-neutrality by 2050: Commission proposes European Climate Law and consults on the European Climate Pact

2050
CLIMATE
NEUTRALITY

GREENHOUSE GAS EMISSIONS*, EU-27



*EUROSTAT - Greenhouse gas emission statistics, 2021

A HUGE CHALLENGE



INTERNATIONAL SHIPPING



220,000 tons

Average trip China-Europe: 30 days



*An additional 50 GWh would be needed for the liquefaction process and for temperature maintenance along the journey

@Conversion would be technically complex, see e.g. *Energy Environ. Sci.* **2021**, *14*. 815-843

This estimate is intended only to give an idea of the huge scale of the effort required

1 trip
9000 ton “bunker fuel”



About 3000 ton H₂
(LIQUID!)@



Green H₂

150 GWh electricity*

FUKUSHIMA HYDROGEN RESEARCH FIELD



Alkaline electrolyzer

Electrolyzer: **10 MW**

PV plant: **20 MW**

18 ha

(**26** football fields)

H₂ produced:

900 ton/y

**This facility should work
3 YEARS continuously for
ONE refill of a supercargo**

IN SHORT ...

Decarbonization means

1) A dramatic **ACCELERATION**

2) A process on a **GARGANTUAN SCALE**

A standard videoconferencing service uses about 2.5 GB/hr
and has a carbon footprint of **157 g CO₂e/hr***

TODAY WEBINAR

$157\text{g} \times 5\text{h} \times 250\text{ people} \approx 0.2\text{ tons of CO}_2\text{eq}$

By flight (90 kg/hr CO₂ per passenger)

$90\text{ kg} \times 2\text{h (round trip)}^\# \times 250\text{ people} = 45\text{ tons of CO}_2$

**We have emitted > 200 TIMES less CO₂ than flying to Brussels!
(considering only flying ...)**



[#]Assuming 1h flight to Brussels

*Obringer et al.

Resour. Conserv. Recy. **2021**, 167, 105389

doi: 10.1016/j.resconrec.2020.105389