

GREENHOUSE GASES – CO₂

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- **INNOVATIVE SOLUTIONS**

GREENHOUSE GASES

- https://www.youtube.com/watch?v=oxke_f5iWCI

WHICH ARE THE GREENHOUSE GASES

- Water vapour (H_2O)
- Carbon Dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Ozone (O_3)
- Chlorofluorocarbons (CFCs)

WHERE DO THEY COME FROM

– WHAT CAUSES THEM

- Carbon Dioxide (CO_2) - Comes from power plants, electricity, oil refineries, steel works, burning coal, production of iron, aluminium, metals, cements, glass, ceramics and paper. Transportation in general, aviation and deforestation are also sources of Carbon Dioxide.
- Nitrous oxide (N_2O) – Comes from the production of different acids, and combustion of fossil fuels and solid waste.
- Methane (CH_4) – Comes from industries based on natural gas and petroleum, storage of crud oil, agriculture (animals) , decomposition of organic materials and landfills. In the USA 60% come from human activities.

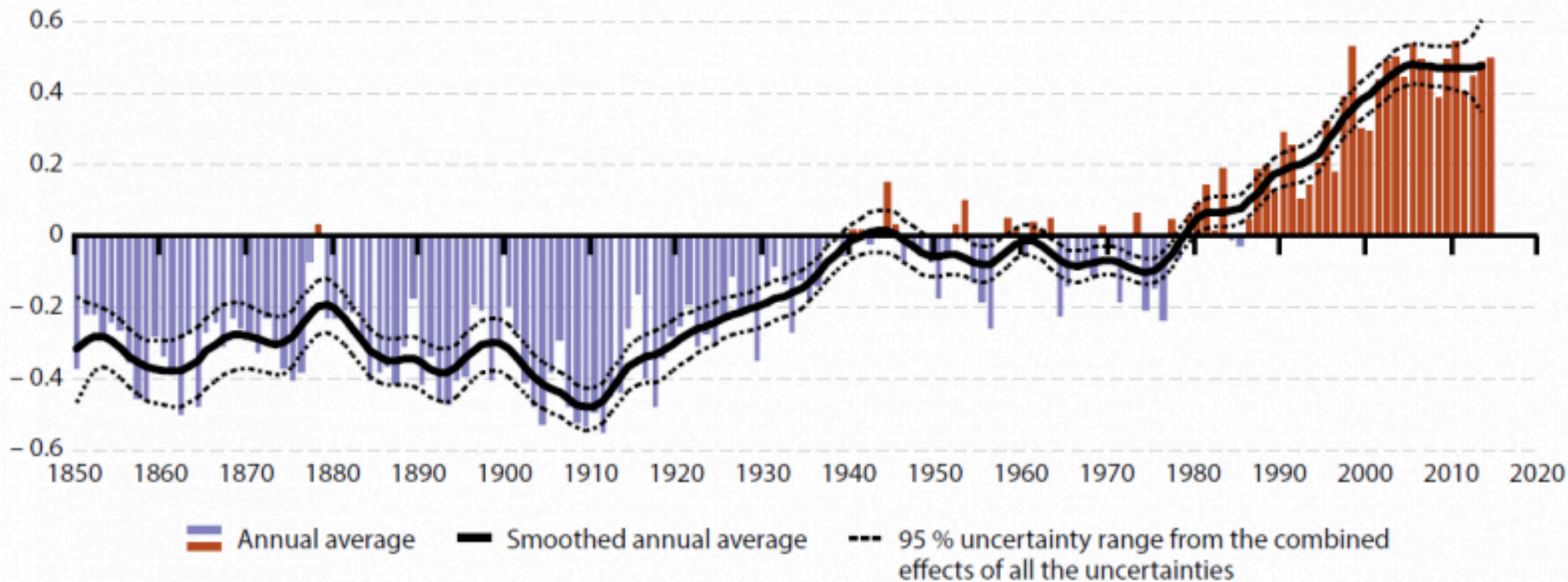
GREENHOUSE GASES AND ANIMAL FLATULENCE

- Domestic livestock such as cattle, buffalo, sheep, goats, and camels produce large amounts of CH₄ as part of their normal digestive process. Also, when animals' manure is stored or managed in lagoons or holding tanks, CH₄ is produced. Because humans raise these animals for food, the emissions are considered human-related. Globally, the Agriculture sector is the primary source of CH₄ emissions.

CONVERSION: OTHER GREENGASES INTO CO₂

- Taking CO₂ as the base to compare the impact of GHGs, we should know that In a period of 100 years the effect of Carbon Dioxide in global warming is considered active for 1 year, but the real effect of it depends on how much time it takes for the ocean and sediments to absorb it.
- Methane has a lifetime of 12 years, but its impact on global warming is 28 into a 100 years cycle. It is 28 times worse than CO₂.
- Nitrous oxide has a lifetime of 121 years, and its effect is 265 times worst that the CO₂'s one.

GLOBAL ANNUAL MEAN TEMPERATURE DEVIATIONS, 1850-2014



(*) 2014 data refer to the first half of the year (until June 2014).

GOAL

- Keep Global Warming below 2°C to prevent dangerous climate change
- **\$700 billion** global investment **needed** per year, according to the World Economic Forum

ECONOMIC CONSEQUENCES

- The estimated economic damage per ton of CO₂:
 - 900\$ in 2010
 - 1500\$ in 2050
- Estimated cost of **36 trillion** for the year's emissions in 2050

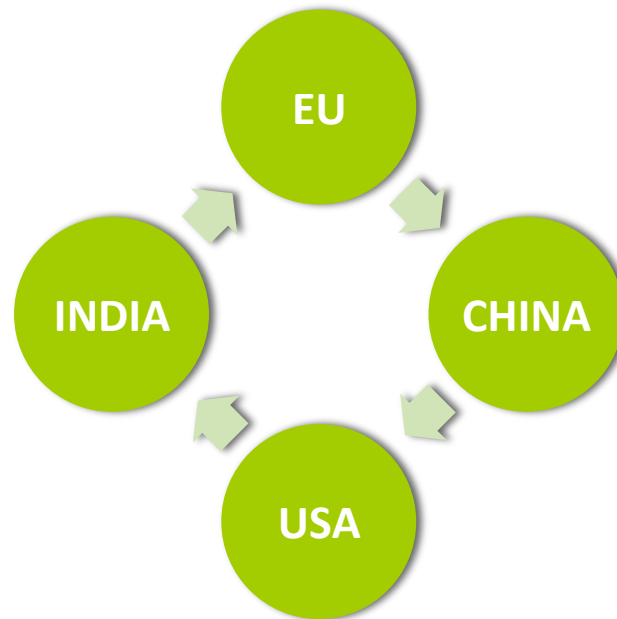
"It is unequivocally less expensive to reduce greenhouse gas emissions than to suffer climate damages."

- Frank Ackerman, Tufts University
- Elizabeth A. Stanton, Stockholm Environmental Institute

BRIEF REMARK ON COP 21

↓ 40% compared to 1990 levels by 2030

40% of its energy from renewables by 2030



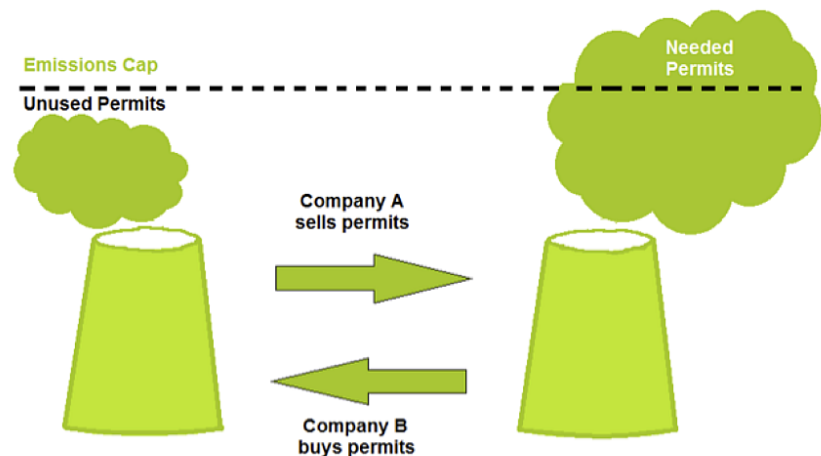
Reach the peak of emissions by 2030

↓ 26-28% compared to 2005 levels by 2025

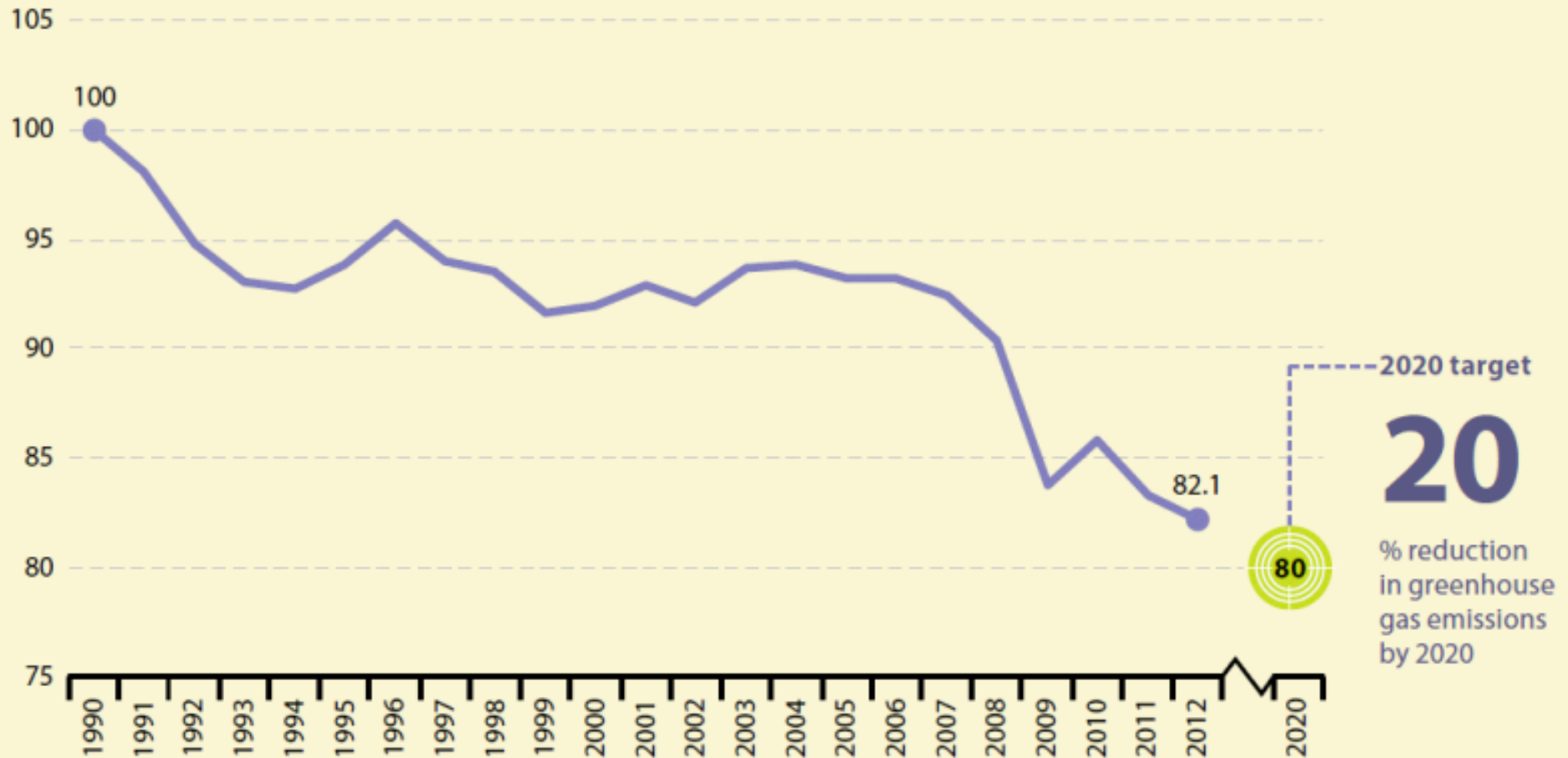
EU 2020 TARGET: REDUCE GHG EMISSIONS BY 20% COMPARED WITH 1990 LEVELS

Main policy instruments:

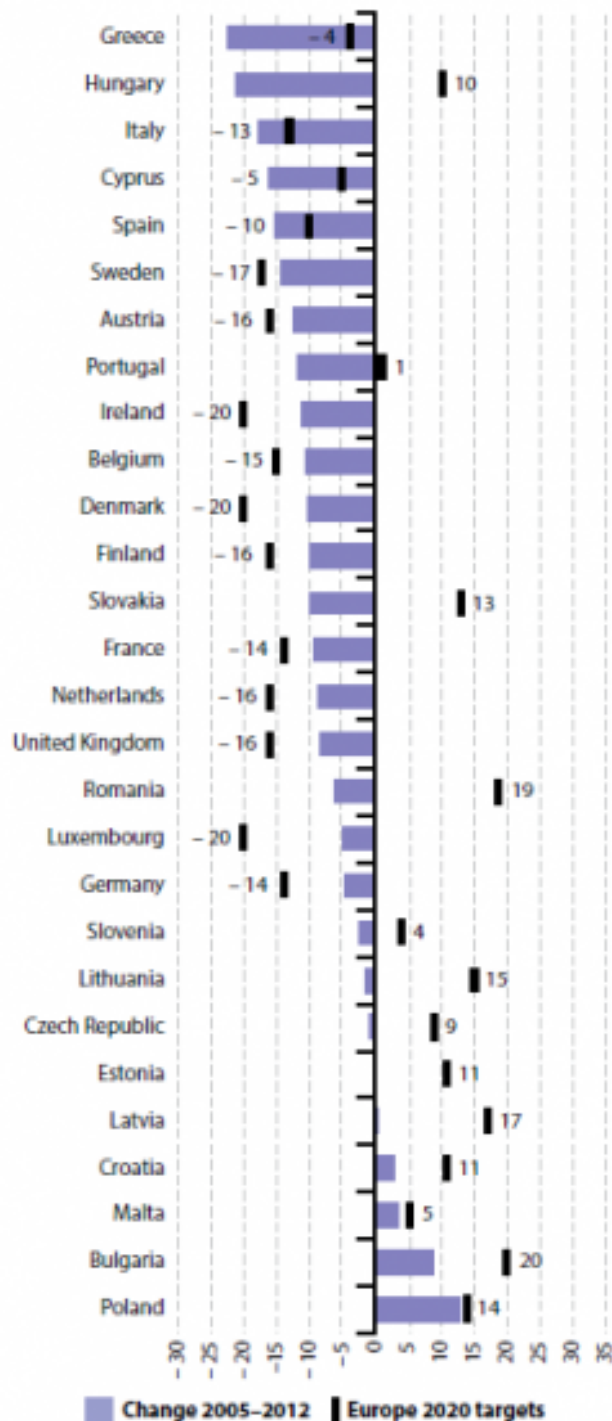
- Emissions trading system
- The Efforts Sharing Decision



GREENHOUSE GAS EMISSIONS, EU-28, 1990-2012

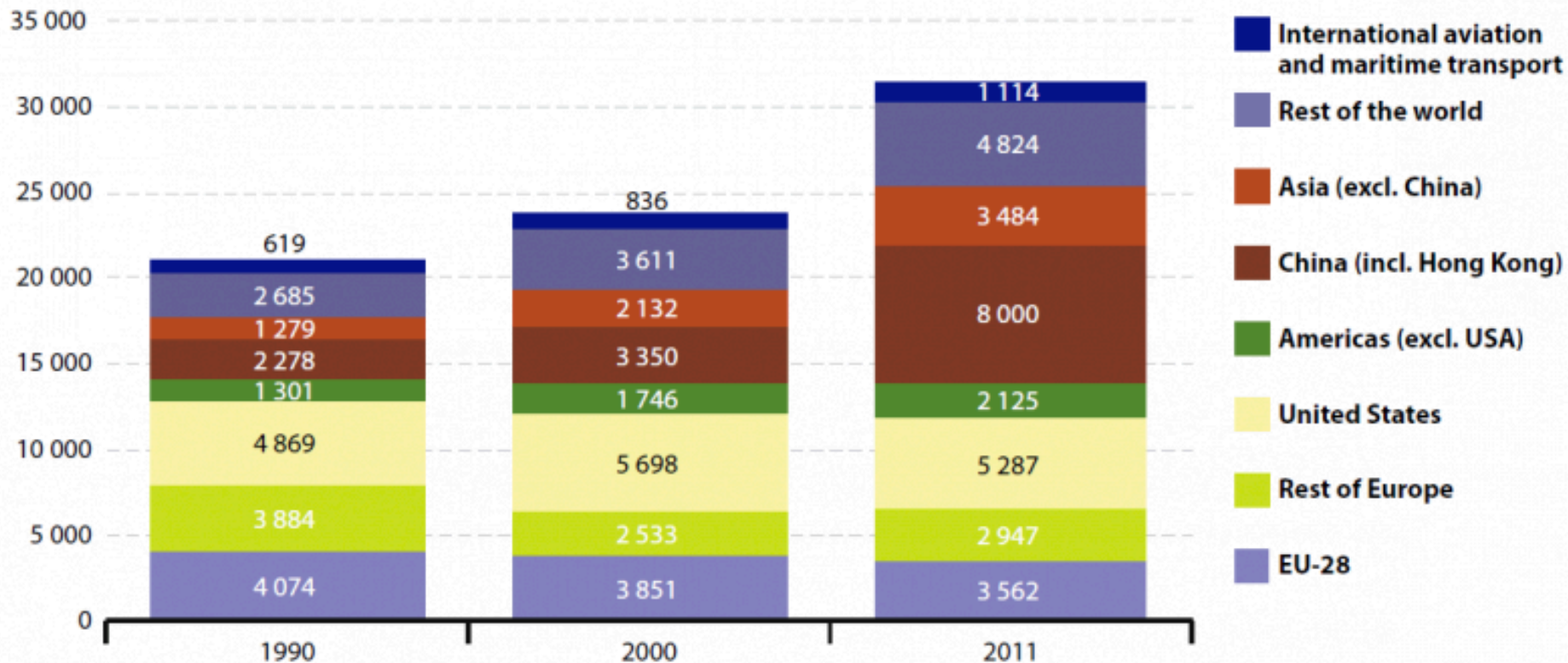


(*) Total emissions, including international aviation, but excluding emissions from land use, land use change and forestry (LULUCF).



- **12** member states have **reduced** their emissions and **already met their national targets**
- **5** member states **increased emissions** but the rise was **below their national targets** for 2020
- **The other 11 member states have not yet reached their national reduction targets.**
- **Countries furthest from their targets are:**
 - 1. Luxembourg**
 - 2. Denmark**
 - 3. Germany**
 - 4. Ireland**

THE EU'S SHARE OF GLOBAL CO2 EMISSIONS



PERMAFROST: THE HIDDEN CLIMATE TIME BOMB

- “There is **twice** as much carbon in permafrost than in the atmosphere” - Florent Domine, a researcher with France’s National Centre for Scientific Research (CNRS).
- 1.7 trillion tons of carbon in the form of frozen organic matter in the Northern Hemisphere, which escapes as carbon dioxide (CO₂) and methane as it warms and decomposes.
- “So if we transformed all the carbon in the permafrost into CO₂, we would triple the concentration of CO₂ in the atmosphere, and that would mean the end of the world as we know it.”
- Future of Permafrost remains uncertain

FUTURE SOLUTIONS

(2015 – onwards)

THE IMPORTANCE OF PLANTING TREES

- Why? Trees take in carbon dioxide from the atmosphere that would otherwise have remained there contributing to global warming.

LOOK,
This is
BURKINA FASO




*We like to call it
BF, it's cooler.*


AND THIS
is how BF would look if
you filled it with trees:



IF WE PLANTED
An area of 1,3 times BF,
like this:



+



every year until 2030

THIS WOULD HELP US

Stay under the
450 ppm of CO₂

&

Limit global
warming to +2°C

THE EU'S ETS (EMISSIONS TRADING SCHEME)

- Central element of the Kyoto protocol – ‘Cap and trade system’
- The European Union's Emissions Trading System (ETS) is the world's biggest scheme for trading greenhouse gas emissions allowances. Launched in 2005, it covers some 11,000 power stations and industrial plants in 30 countries, whose carbon emissions make up almost 50% of Europe's total.
- Europe has a price on carbon and a working mechanism to limit and reduce climate pollution, which puts it further ahead than other major regions in the world.

SUCCESS OF THESE SCHEMES

- Yes, but with flaws. It has set a cap on half of Europe's carbon emissions, which were previously unregulated, and the companies covered by the scheme are no longer free to pollute. Carbon has a price and this influences the economics of burning fossil fuels.
- EU remains successful in meeting and exceeding their Kyoto goals through the ETS. However, climate change remains an imminent threat due to the two biggest emitters – the US and China.

**THANK YOU FOR YOUR
ATTENTION**