

# **Energy and Environment**

## **How much does the regulation cost?**

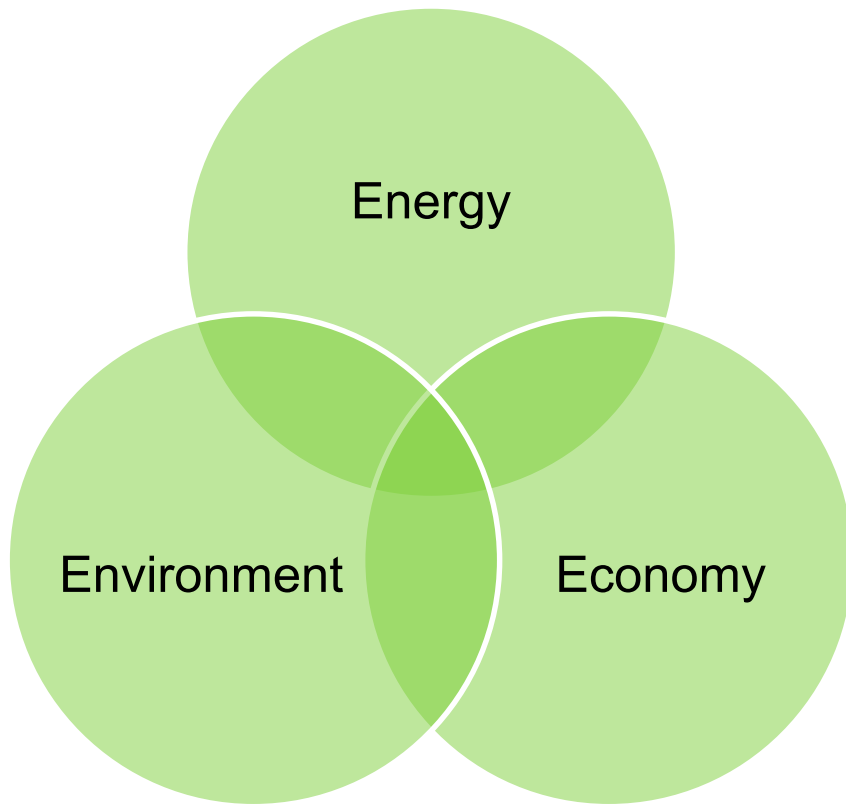
**Prof. Dr. Jiřina Jílková**  
**Dr. Aleř Pecka**

**Summer School The Future of Energy Systems**  
**Prague, June 17, 2020**

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- 1. Energy and climate**
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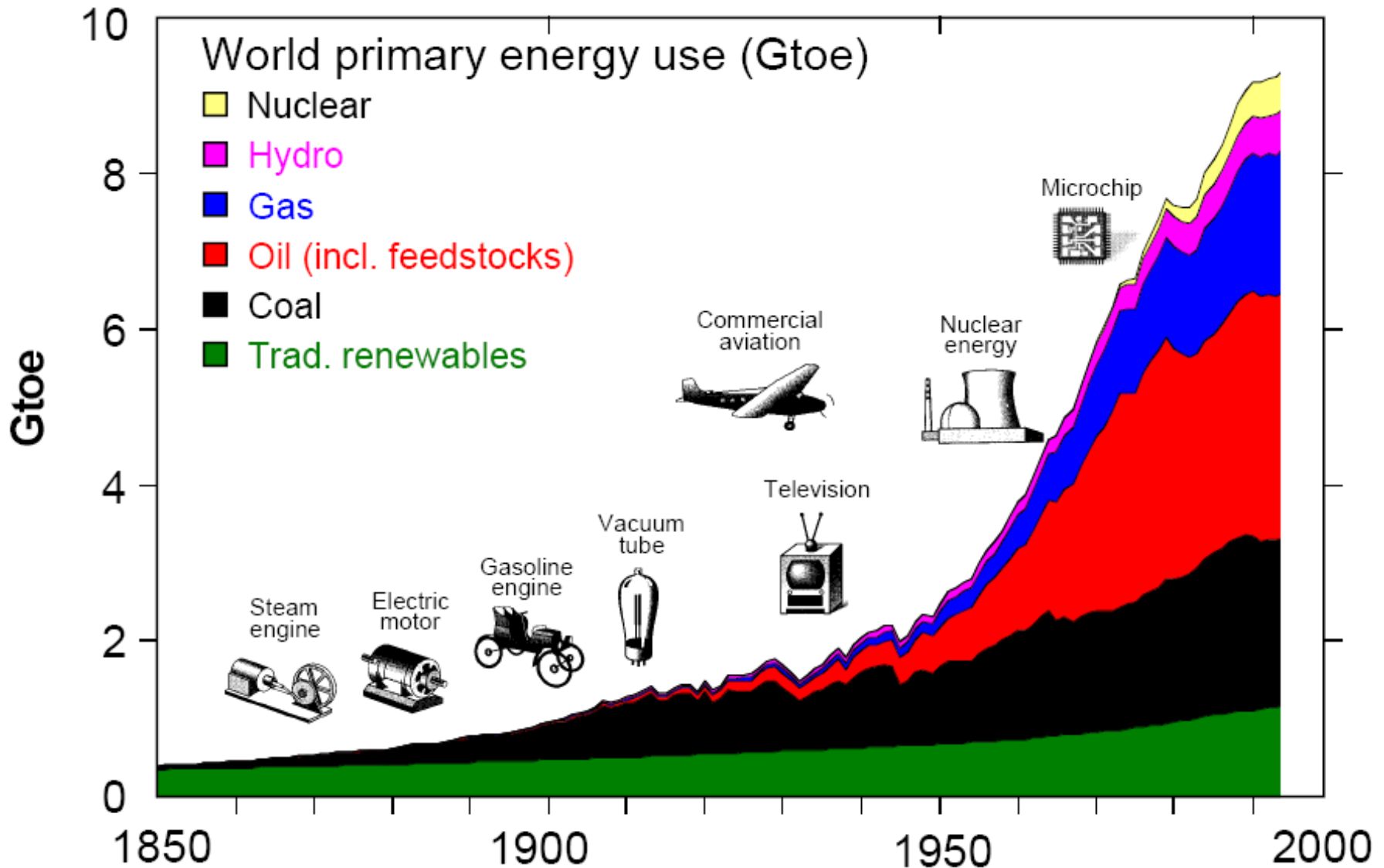
# Energy – Environment - Economy



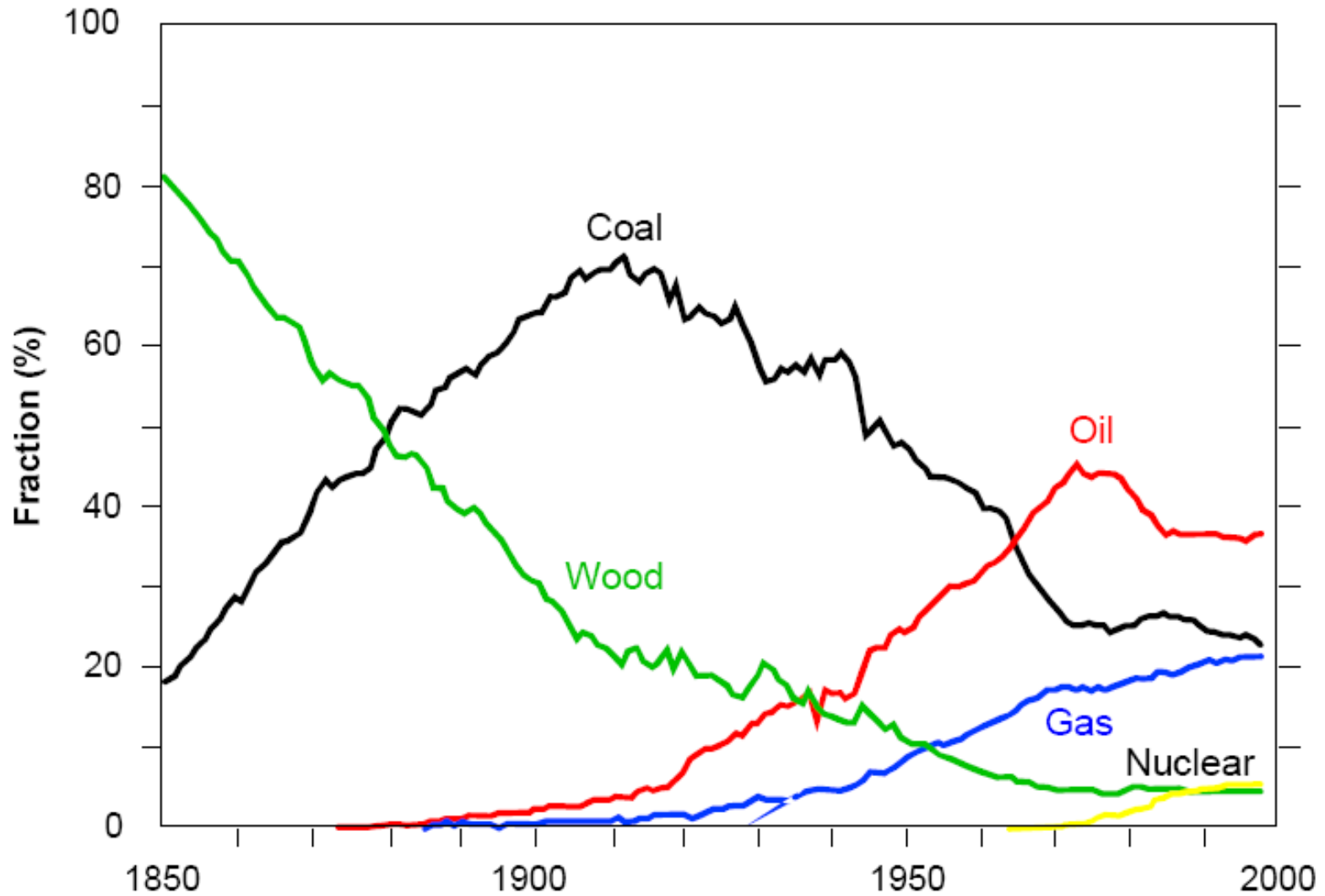
**Energy** is the “oxygen” of the economy and the life-blood of growth, particularly in the mass industrialization phase.

Peter Voser, CEO, Royal Dutch Shell, 2011

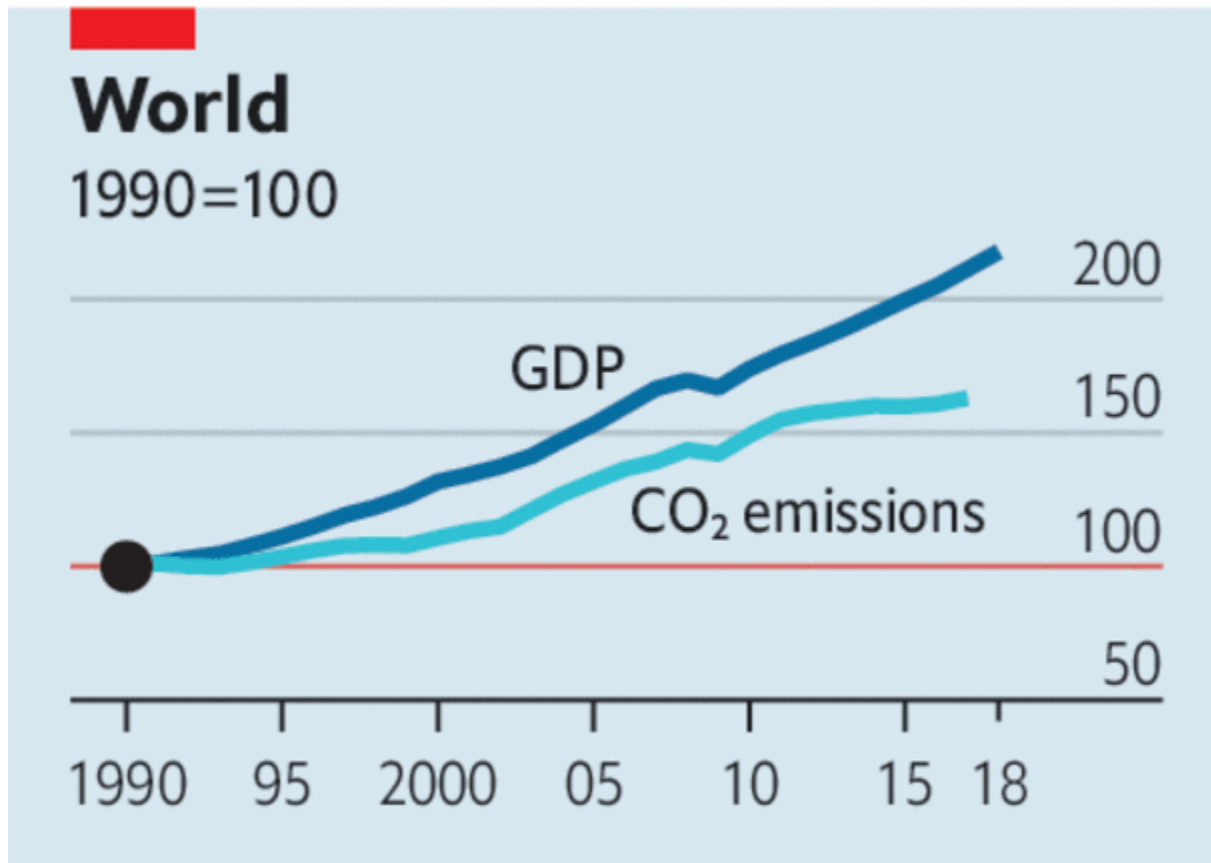
# World Primary Energy Use



# Primary Energy Substitution

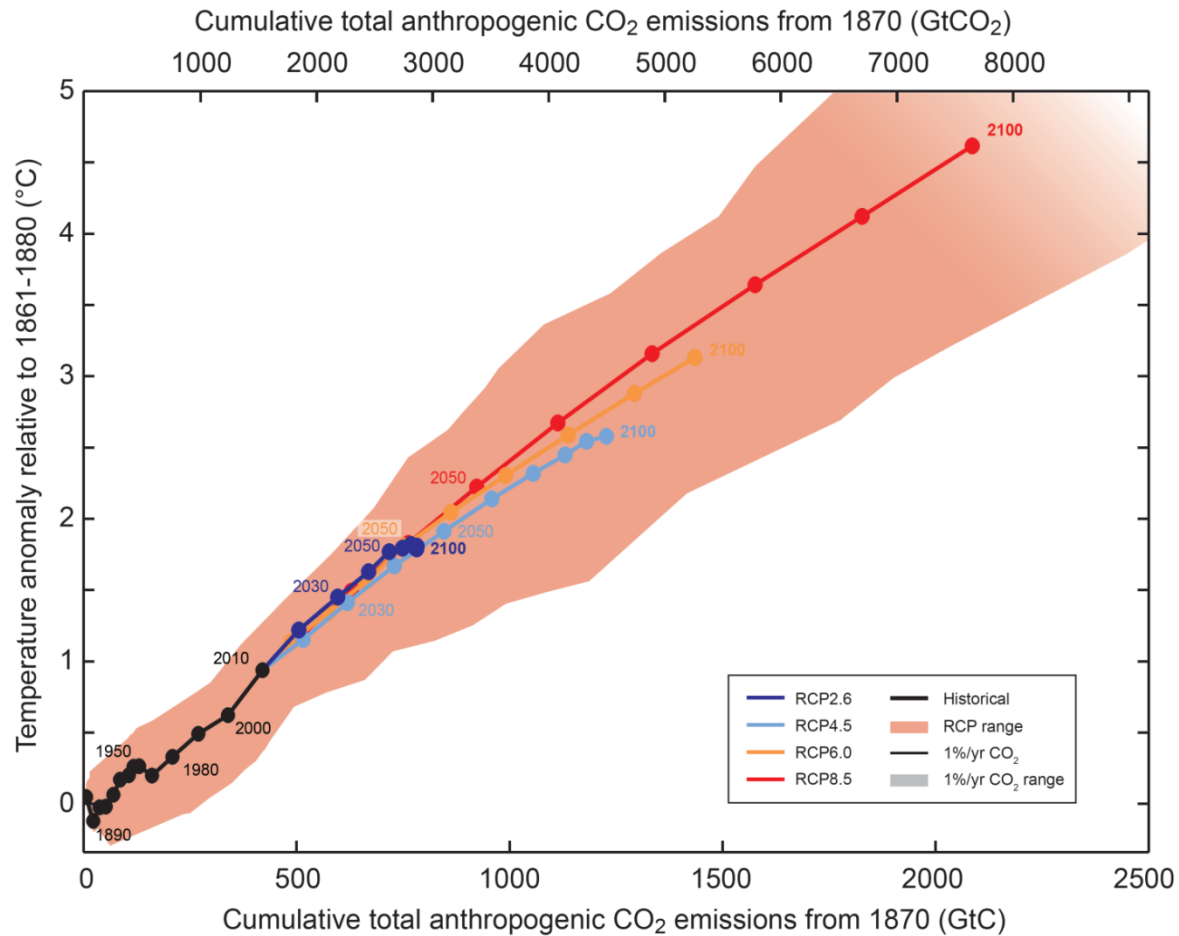


# Economic growth and CO2 emissions



The Economist

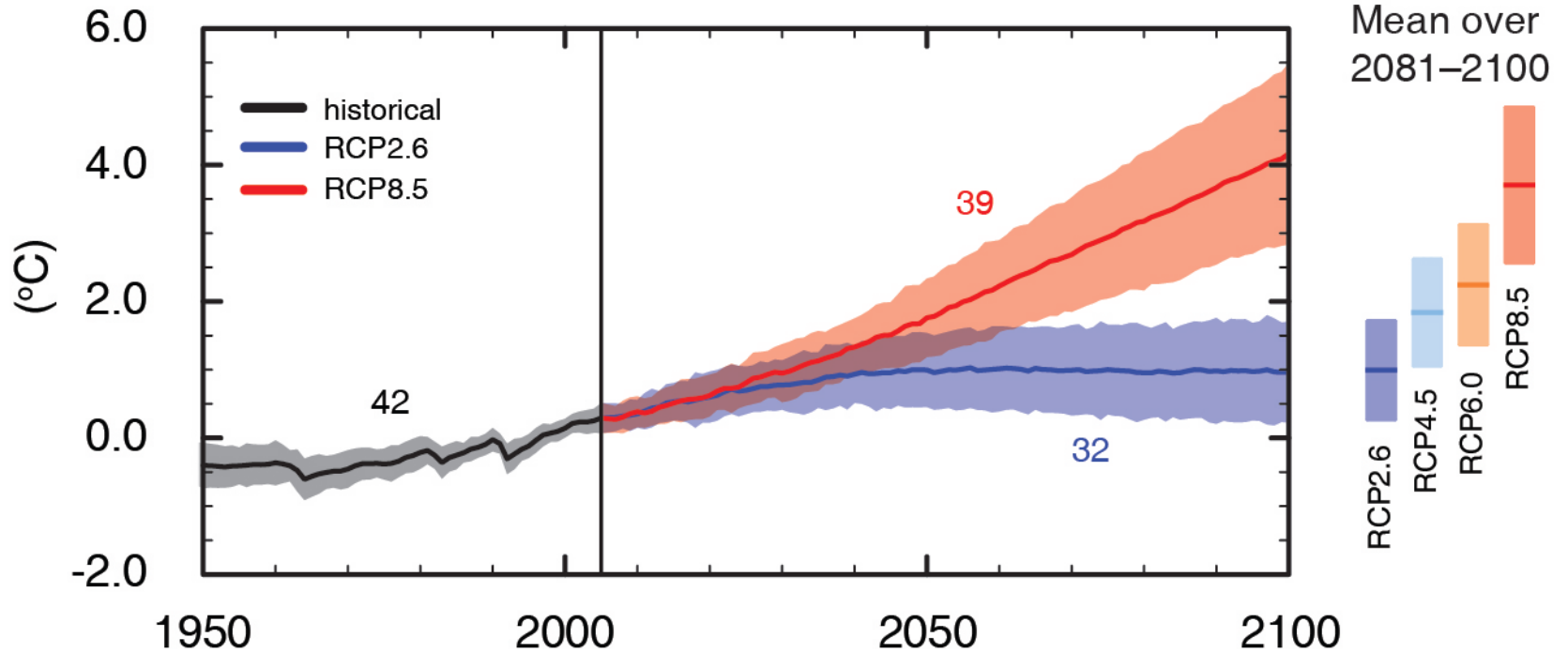
# Anthropogenic CO<sub>2</sub> emissions



# Climate Change

(a)

Global average surface temperature change





# EU vision

## **The EU's international ambition**

- Limiting global average temperature increase to 2 degrees Celsius compared to pre-industrial levels

## **Paris agreement 2015**

limit the temperature increase even further to 1.5 degrees Celsius

# Cost and benefits of regulation

- **How much does the regulation really cost?**
  - Strategic documents are transformed into regulatory interventions – laws
  - Debate regarding the technical and economic feasibility of different target levels
  - (marginal) abatement cost – cost of reducing pollutants

# Theory: impacts of environmental regulation on competitiveness

two different views in the environmental economics literature on the effects of asymmetric policies on the performance of companies competing in the same market:

- the pollution heaven hypothesis
- the Porter hypothesis

# Pollution heaven hypothesis

- predicts that more stringent environmental policies will increase compliance costs and, over time, shift pollution-intensive production toward low abatement cost regions, creating pollution havens and causing policy-induced **pollution leakage**

# Porter hypothesis

- Porter and van der Linde (1995) argues that more stringent environmental policies can actually have a net positive effect on the competitiveness of regulated firms because
  - such policies promote cost-cutting efficiency improvements,
  - which in turn reduce or completely offset regulatory costs,
  - foster innovation in new technologies that may help firms achieve international technological leadership and expand market share.

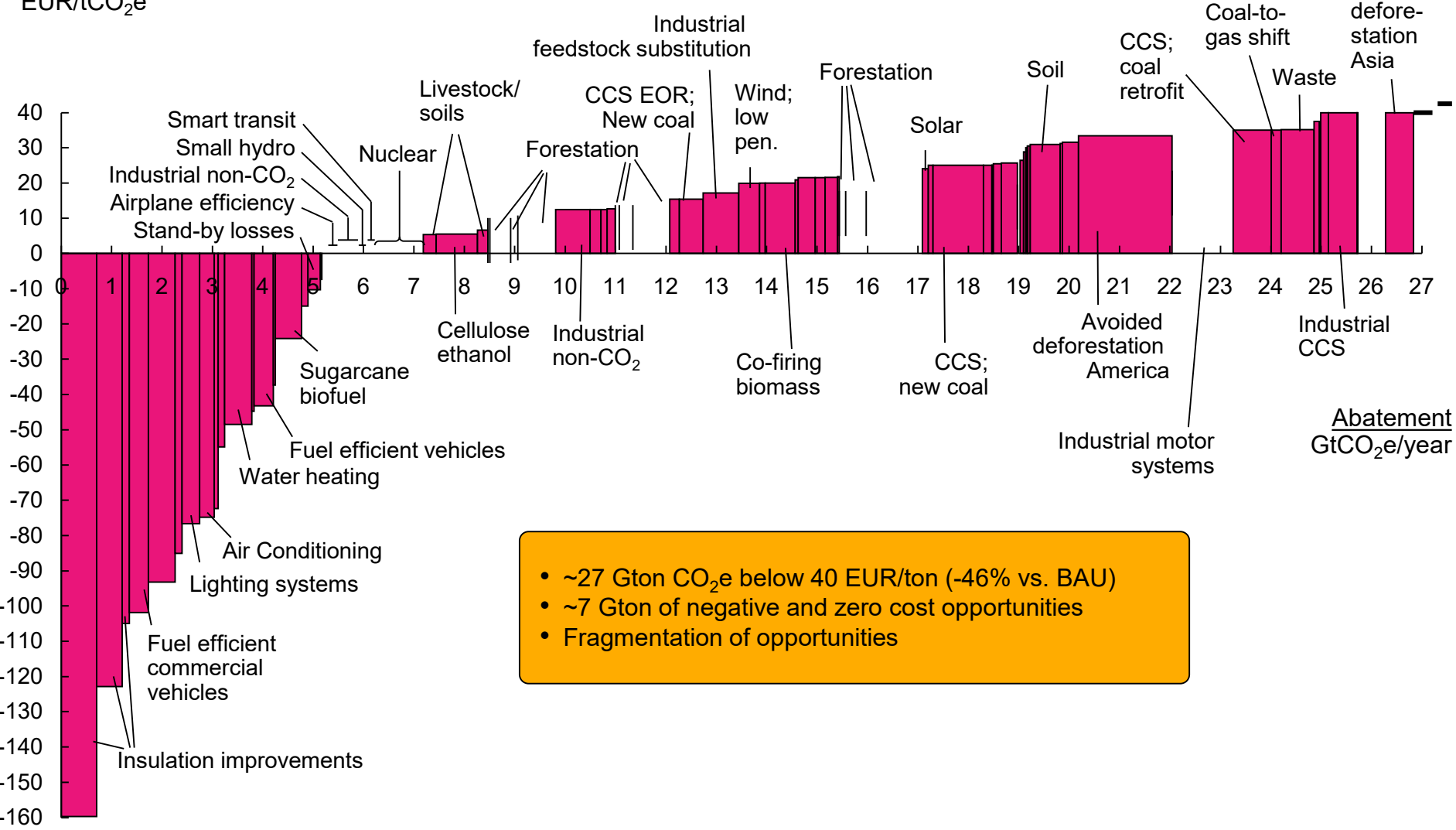
# Abatement cost curves

- Abatement or mitigation costs
  - Compliance costs + administrative costs
- Mc Kinsey study published in 2008, further updates
- Economic impacts of GHG reduction scenarios based on abatement cost curves
- More than 200 GHG abatement opportunities across 10 major sectors and 21 world regions between now and 2030 assessed
- <https://www.mckinsey.com/business-functions/sustainability/our-insights/pathways-to-a-low-carbon-economy>

# Global cost curve of GHG abatement opportunities beyond business as usual

Cost of abatement  
EUR/tCO<sub>2</sub>e

2030



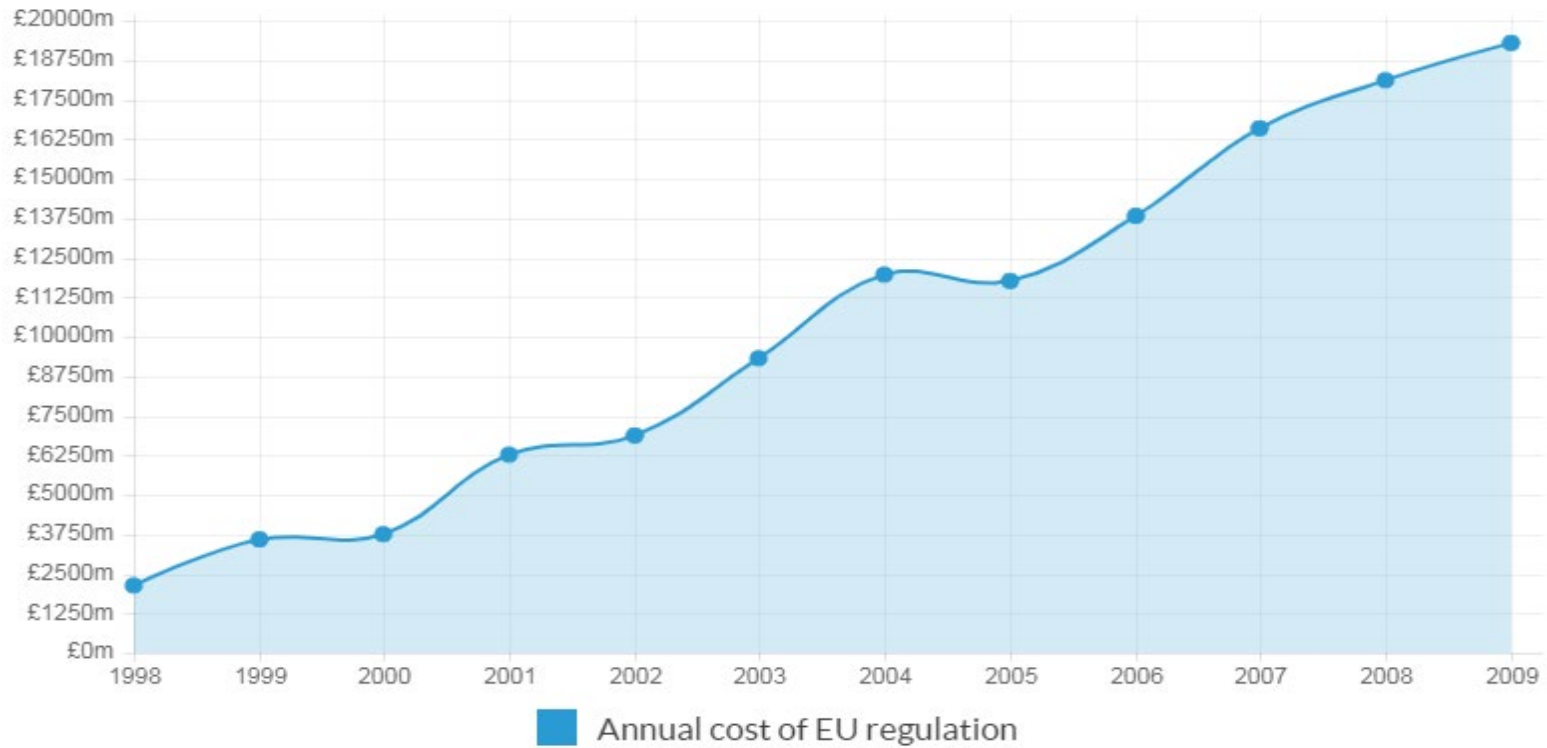
- ~27 Gton CO<sub>2</sub>e below 40 EUR/ton (-46% vs. BAU)
- ~7 Gton of negative and zero cost opportunities
- Fragmentation of opportunities

# Myths and realities about GHG abatement

Myths	Realities
<ul style="list-style-type: none"><li>• Abatement opportunities are concentrated in the industry and power sectors</li><li>• Limited amount of low-cost opportunities in industrialized countries</li><li>• Abatement opportunities are concentrated in industrialized countries and China</li><li>• We can only achieve the required abatement through new technology</li><li>• Addressing GHG emissions will severely strain the global economy</li></ul>	<ul style="list-style-type: none"><li>• Industry and power represent &lt;45% of the total 2030 abatement potential*</li><li>• Negative cost abatement potential represents 35–45% of the total in industrialized countries</li><li>• Developing world excluding China represents &gt;40% of the total 2030 abatement potential*</li><li>• 70% of the total 2030 abatement potential* not dependent on new technology</li><li>• Reaching 450 ppm could cost as little as 0.6% of GDP if all low-cost opportunities are addressed but will require wealth redistribution</li></ul>

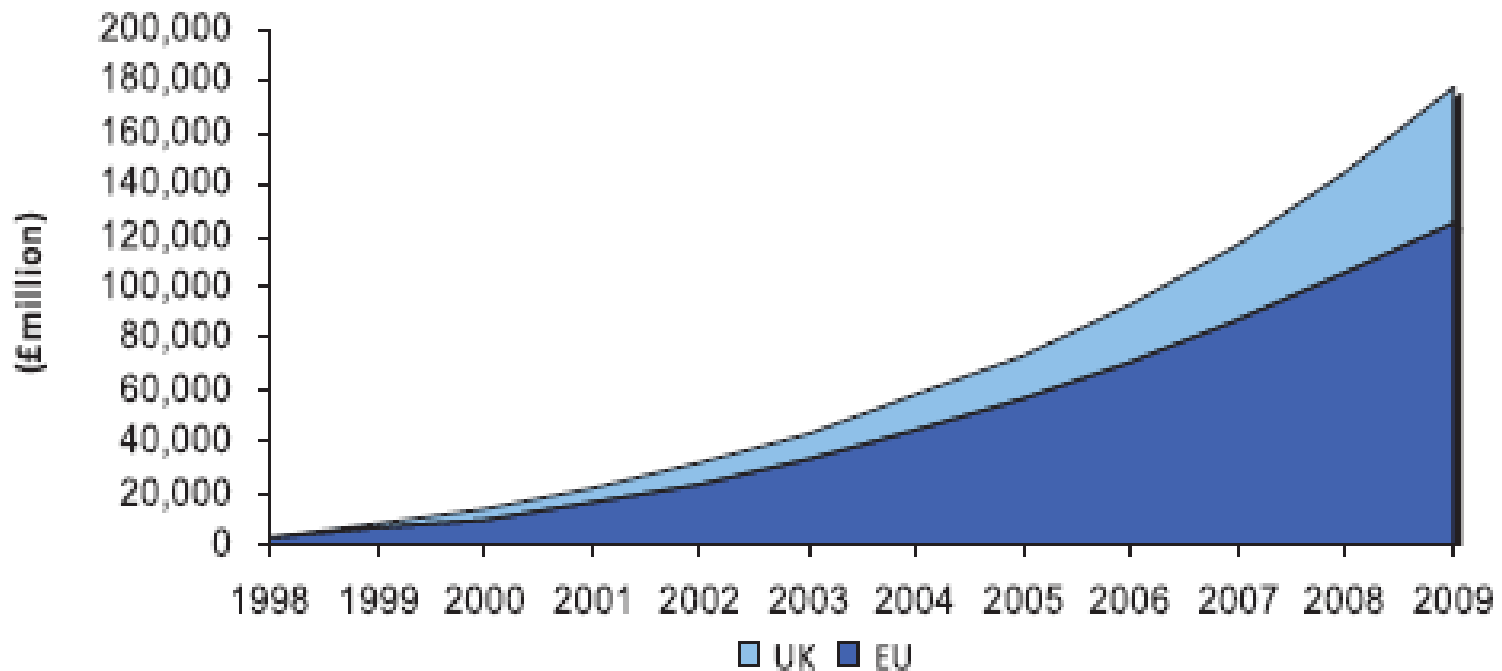


# Annual cost of EU regulation in the EU



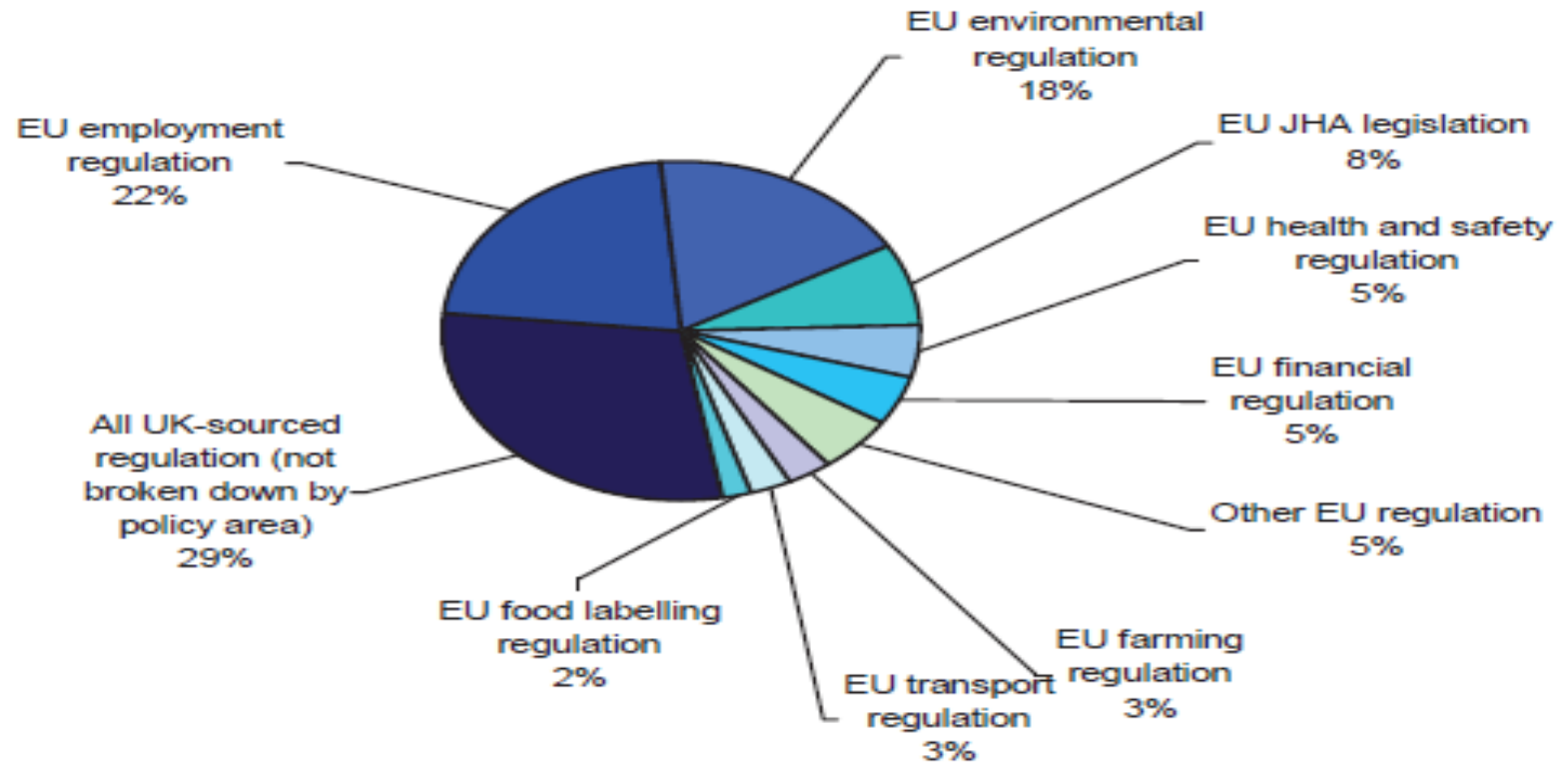
Source: Open Europe, UK Government, 2010

# The cumulative cost of regulation 1998-2009 (2009 prices)



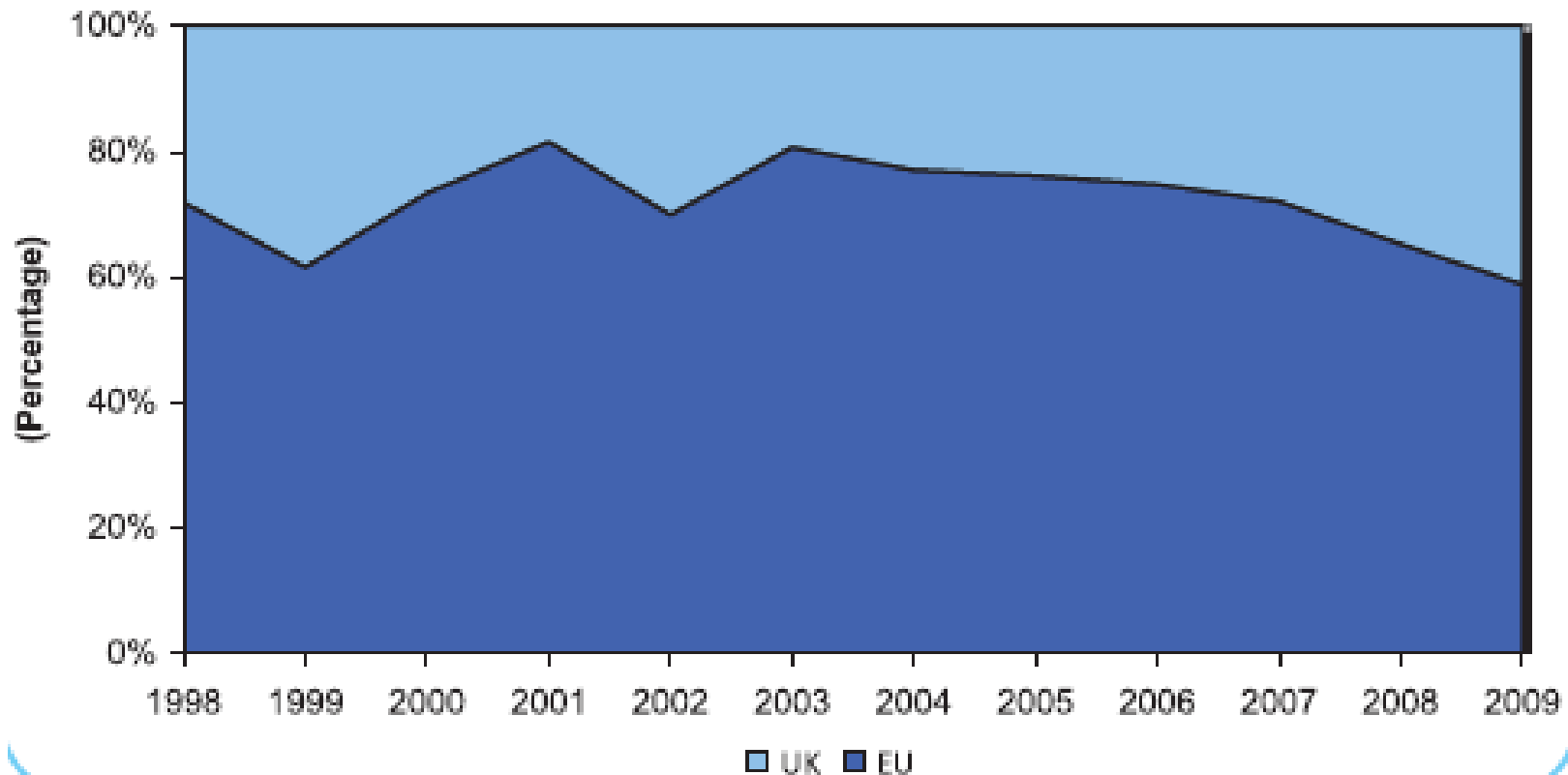
*Source: Open Europe's Regulation Database*

# Cost of regulation by policy area 1998-2009



Source: Open Europe's Regulation Database

# Who's responsible: Annual cost of regulations introduced 1998-2009



*Source: Open Europe's Regulation Database*

# Cost of non-compliance

[https://ec.europa.eu/environment/eir/pdf/study\\_costs\\_not\\_implementing\\_env\\_law.pdf](https://ec.europa.eu/environment/eir/pdf/study_costs_not_implementing_env_law.pdf)

*Cost of not implementing EU environmental law, EUR bn per year, 2018*

Policy area	Range estimate	Central estimate
Air	8.7 - 40.4	24.6
Nature and biodiversity	10.5 - 15.7	13.1
Water	4.3 - 14.3	9.3
Waste	3.2 - 4.8	4.0
Chemicals	0 - 0	0
Industrial emissions and major accident hazards	3.0 - 4.4	3.7
Horizontal instruments	-	-
<b>Total</b>	<b>29.7-79.6</b>	<b>54.7</b>

Source: COWI/Eunomia.

# Impact Assessment (IA)

- RIA – Regulatory Impact Assessment
- Formal rules applied to the process and documents prepared before (or along the process) a new draft government regulation is introduced – *ex-ante IA*
- Ex-post evaluation or fitness–check (usually applied to stock of legislation in a given area)
- Regulation commonly has numerous impacts and these are often difficult to foresee without detailed study and consultation with affected parties (stakeholders)
- **Cost-Benefit-Analysis (CBA)** as a core concept

# Implementation of RIA

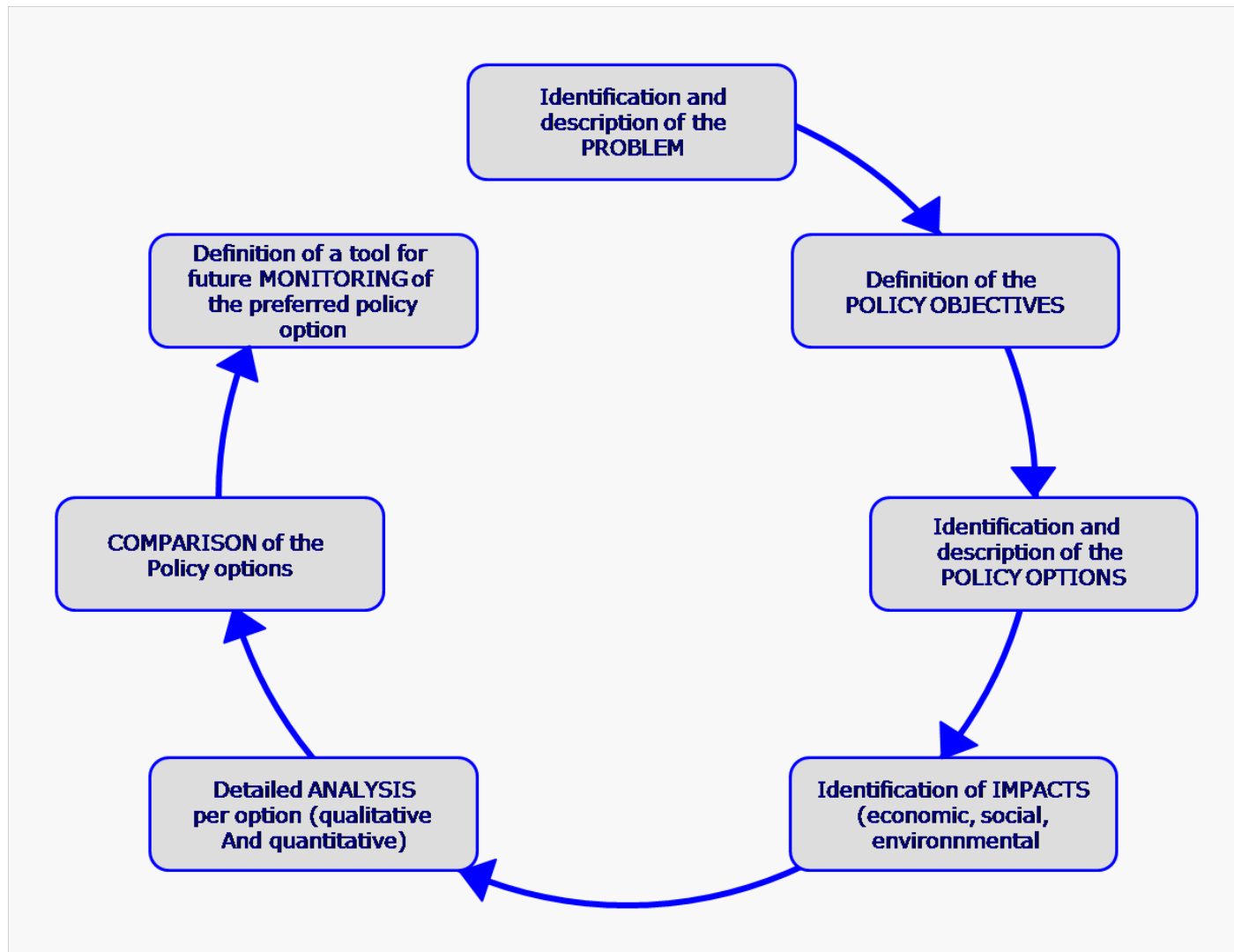
- 1986 – USA: Business Impact Assessment
- All OECD countries have implemented RIA
- EU: member states are encouraged, but not obliged to implement RIA system

# EU

- 2001 – Mandelkern Report
- 2002 – Action Plan and guidelines – integrated method of impact assessment
- 2005 and 2006 – new guidelines with introduction of EU Standard Cost Model for calculation of administrative costs
- 2006 – Impact Assessment Board
- 2009 – Impact Assessment Guidelines
- 2015 – Better Regulation Package



# Regulatory impact assessment - RIA



# EU Energy and Climate Policy

**Artur Runge-Metzger | The European Union's Climate and Energy Policy**

[https://www.youtube.com/watch?v=UySX9\\_KOPTQ](https://www.youtube.com/watch?v=UySX9_KOPTQ)

# EU Climate and Energy framework

- The climate and energy package is a **set of binding legislation which aims to ensure the European Union meets its ambitious climate and energy targets**
- The framework also takes into account **the long-term perspectives** set out by the Commission in 2011 in the Roadmap for moving to a competitive low carbon economy in 2050, the **Energy Roadmap 2050** and the **Transport White Paper**.

**2030  
targets**

**min. 32 % share of  
RES**  
on final gross energy  
consumption

**min. 40 %  
decrease of emission**  
*compared to 1990*

**min. 32,5 %  
of energy savings**  
*comparing to prediction  
from 2007*

**EU ETS**

**min. 32 % share of  
RES**  
on final gross energy  
consumption

**min. 32,5 %  
of energy savings**  
*comparing to prediction  
from 2007*

# Green Deal (1)

- EC Communication published in December 2019
- A programme to make Europe the *first climate-neutral continent by 2050*, while EU responsible for less than 10% of global greenhouse gas emissions (GHG)
- Aligned with a new industrial strategy to make the EU a world leader in the circular economy and clean technologies, and to decarbonise energy-intensive industries
- It should at the same time boost the competitiveness of European industry and ensure a just transition for the (especially coal mining and production dependent) regions and workers affected

# Green Deal (2)

- **Legislative proposals announced in the context of Green Deal (GD):**
- European Climate Law, **enshrining the 2050 climate-neutrality target in law**
- Commission should assess and make proposals for increasing the Union's GHG emissions reduction target for 2030 to ensure its consistency with the climate-neutrality objective for 2050
- To fulfill the objective, Commission will publish by September 2020 impact assessed plan to increase the EU GHG reduction target for 2030 to **at least 50%** and towards 55% compared with 1990 levels

# Green Deal (3) – leg. proposals

- A proposal to extend the EU Emissions Trading System (ETS) to the maritime sector and to reduce the free allowances allocated to airlines over time;
- Furthermore, plans to extend it to cover traffic and construction
- **Carbon Border Tax (a tool against the leakage of the carbon intensive production outside EU to countries with less stringent environmental rules) – see next slide**
- Review of the Energy Taxation Directive

## GD: Carbon border adjustment mechanism (2021)

- The Paris Agreement on climate is to achieve higher climate ambition globally, however, many international partners do not share the same climate ambition as the EU => a risk of *carbon leakage* (= means carbon intensive production transferred outside EU and/or when EU product replaced by more more carbon-intensive imports)
- Since 2013, carbon leakage addressed effectively in carbon intensive sectors (such as steel industry) via *EU ETS system* by granting free allowances
- Remaining problems for imports: here *carbon border adjustment mechanism* would ensure price of imports reflect more accurately their carbon content (while need to design it to comply with World Trade Organization (WTO) rules and other international obligations of the EU)
- Considered options so far: a carbon tax on selected products – both on imported and domestic products, a new carbon customs duty or tax on imports, or the extension of the EU ETS to imports



# Energy Roadmap 2050



Source: Energy Roadmap 2050

# EU 2015 Energy Roadmap

- Long-term regulatory framework
- Published 2011 - 20 pages
- Final decision of the European Council – October 2014
  - [http://ec.europa.eu/clima/policies/2030/index\\_en.htm](http://ec.europa.eu/clima/policies/2030/index_en.htm)
- Impact assessment
  - 192 pages
- The Commission has been preparing sectoral roadmaps with sectoral objectives

# EU Energy Roadmap 2050

## Impact assessment

COMMISSION STAFF WORKING PAPER

Impact Assessment Accompanying the document COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

Energy Roadmap 2050

{COM(2011) 885} {SEC(2011) 1566} {SEC(2011) 1569}

<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52014SC0015>

# Energy Roadmap 2050

1. Methodology
2. Problem definition
3. Objectives
4. Policy options
5. Analysis of impacts
6. Comparing the options

Impacts on national states ?

# Questions

1. Which is the only sector where the GHG emissions in 2017 has actually grown in the EU?
2. What is the % share (latest data available) of this sector on the overall EU GHG emissions?
3. Which country has the higher GHG emissions *per capita*, Austria or the Czech Republic? (data available for 2018)?
4. In 2017, the total GHG emissions (in millions tons CO2 equivalent) were higher in the Czech republic or the Netherlands?

# Sources for answers

- Source: data available on the webpage of European Environment Agency (EEA)
- Qs 1+2:
  - <https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-12>
- Qs 3+4:
  - <https://www.eea.europa.eu/themes/climate/trends-and-projections-in-europe/climate-and-energy-country-profiles>

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