

# ZEW

Zentrum für Europäische  
Wirtschaftsforschung GmbH

Centre for European  
Economic Research



## On the Interaction of Policy Instruments:

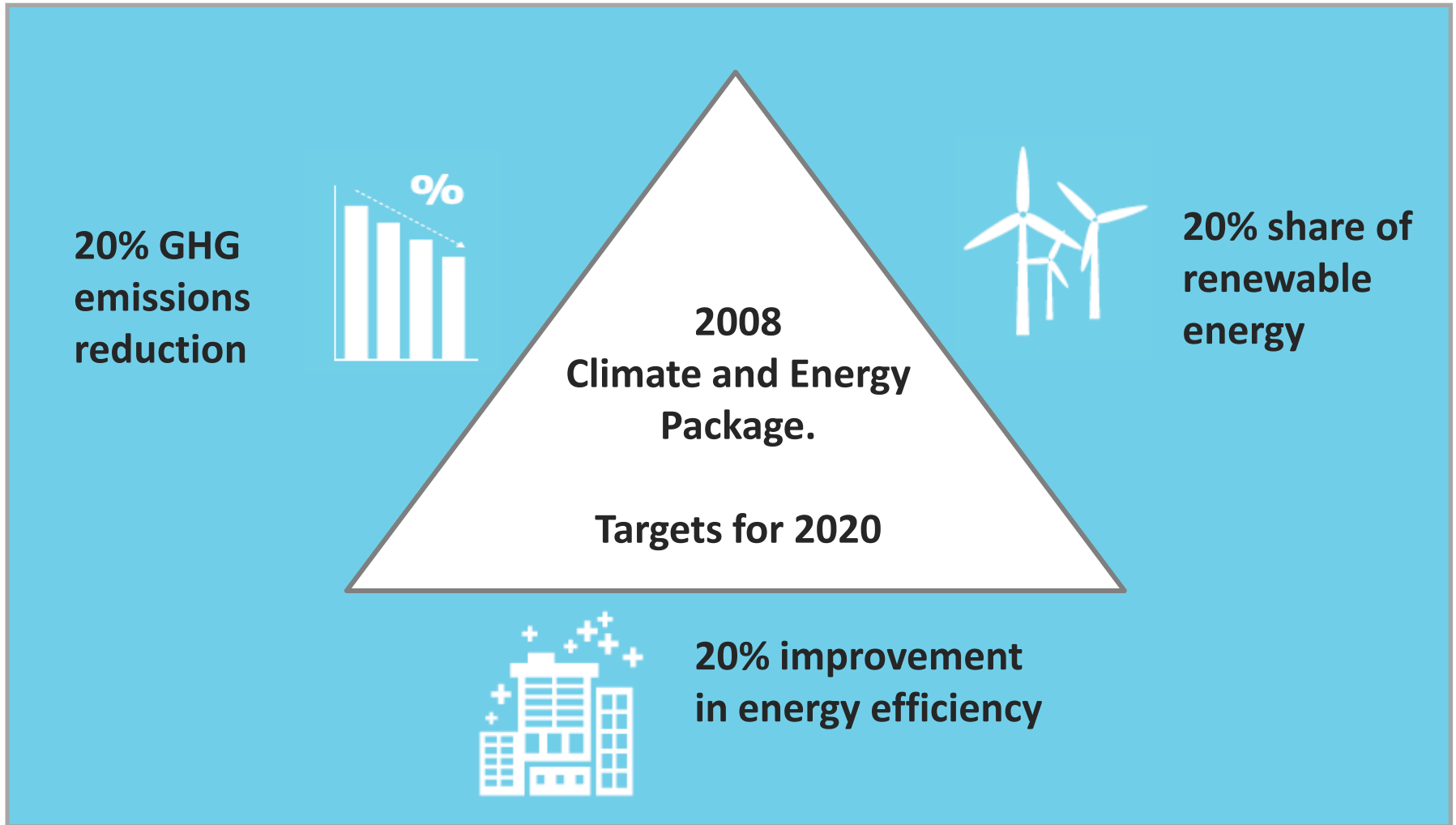
# Implications of Overlapping Regulation under Different Levels of Electricity Demand

Oliver Schenker

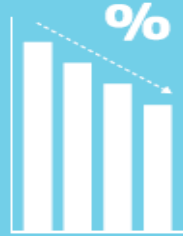
ZEW – Centre for European Economic Research, Mannheim



# European Climate and Energy Policy – Targets for 2020



**20% GHG emissions reduction**



**2008  
Climate and Energy  
Package.**

**Targets for 2020**



**20% share of renewable energy**

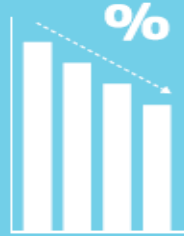


**20% improvement in energy efficiency**

# European Climate and Energy Policy – Achievements



**GHG emissions  
in 2012 18%  
lower than in  
1990**



**Achievements**

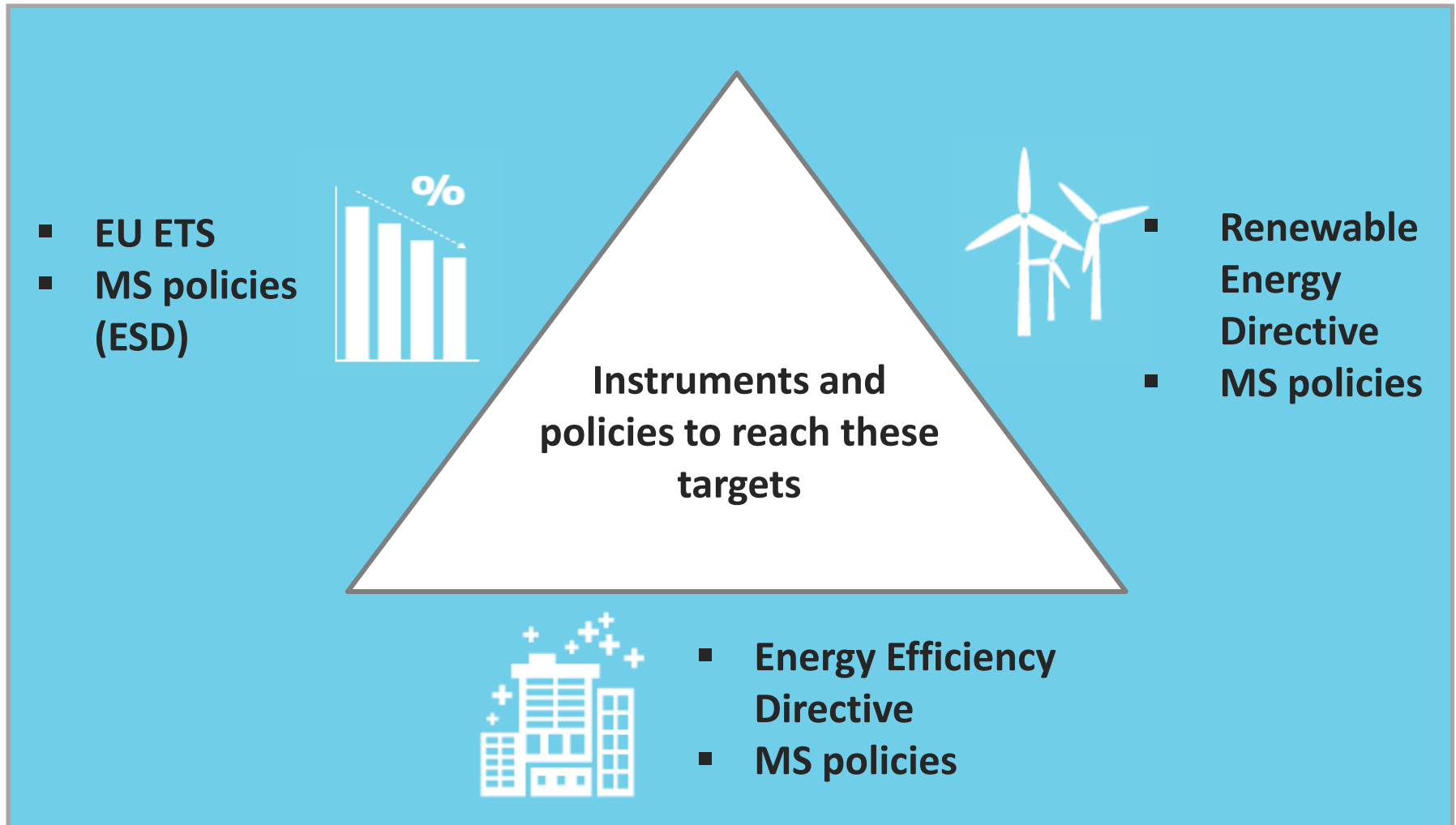


**13% share of  
renewable  
energy in 2012**

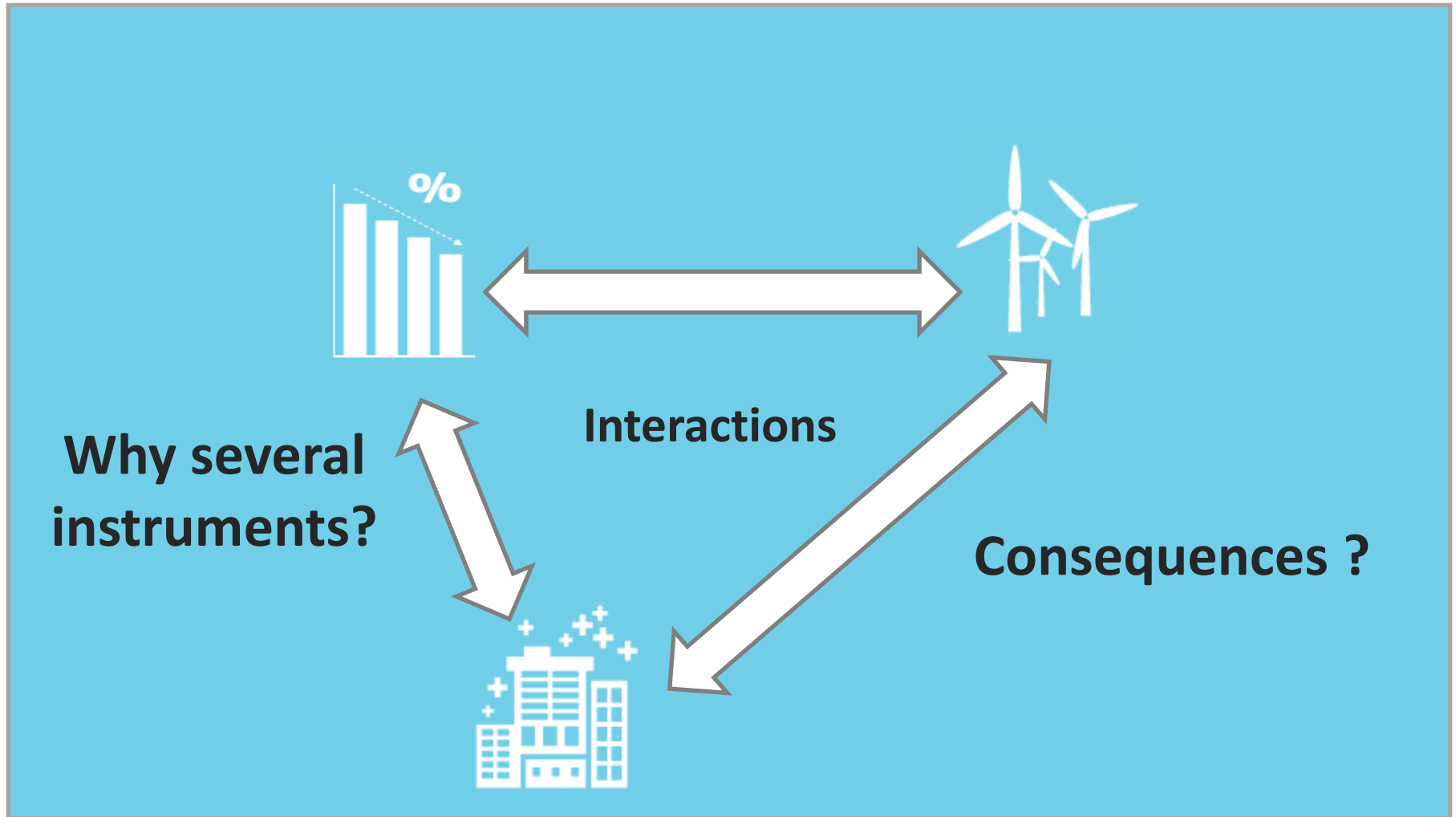


**The energy intensity of the  
EU economy has reduced by  
24% between 1995 and 2011**

# European Climate and Energy Policy – Instruments and policies



# Instruments and Policies Overlap and Interact



# Why several instruments?

- Goal to mitigate GHG is one of many policy goals
  - Reduce air pollution
  - Energy security
  - Create jobs, secure competitiveness
- Tinbergen Rule: # Policy Target = # Policy Instruments
- But also additional market failures beyond climate ext.
  - Market failures in knowledge generation
  - Distorted incentives for energy efficiency measures



# Climate policy has to work in a complex real world



with:

- Significant transaction and enforcement costs
- Complicated innovation and diffusion processes (path dependency, lock-in, long-lasting nature of investments)
- Political and legal constraints. Policies have to be embedded in existing frameworks



# Consequences of interaction:



- Modelling in 2007 indicated EU-ETS price of  $\sim 30$  EUR/tCO<sub>2</sub>.
- In fact, in 2013: 5 EUR/tCO<sub>2</sub> or lower
- Current European climate policy has to work under unforeseen economic crisis
- But another part of the explanation:
  - RE deployment policies reduce fossil fuel use, CO<sub>2</sub> emissions, and thus, demand for allowances
- Several measures proposed to stabilise prices
  - Backloading, Market Stability Reserve, Carbon Market Authority

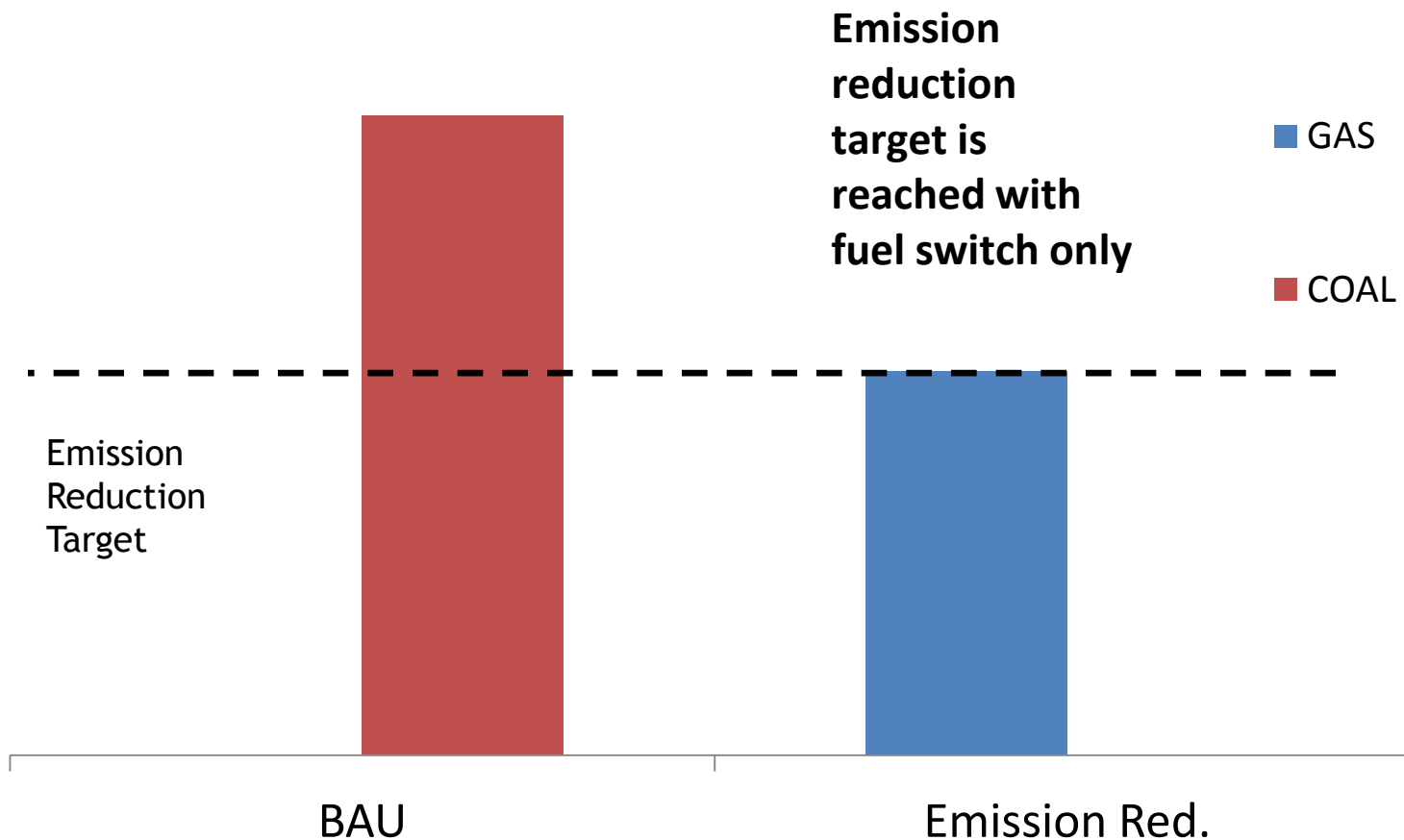


# Economic situation and the interaction between RE target and EU ETS



- Policy targets are set ex-ante. Economic activity in target year is unknown.
- **Question: How does the economic situation affect the interaction between RE target and EU ETS?**

# Basic Intuition – Power Sector Abatement if Demand is Low



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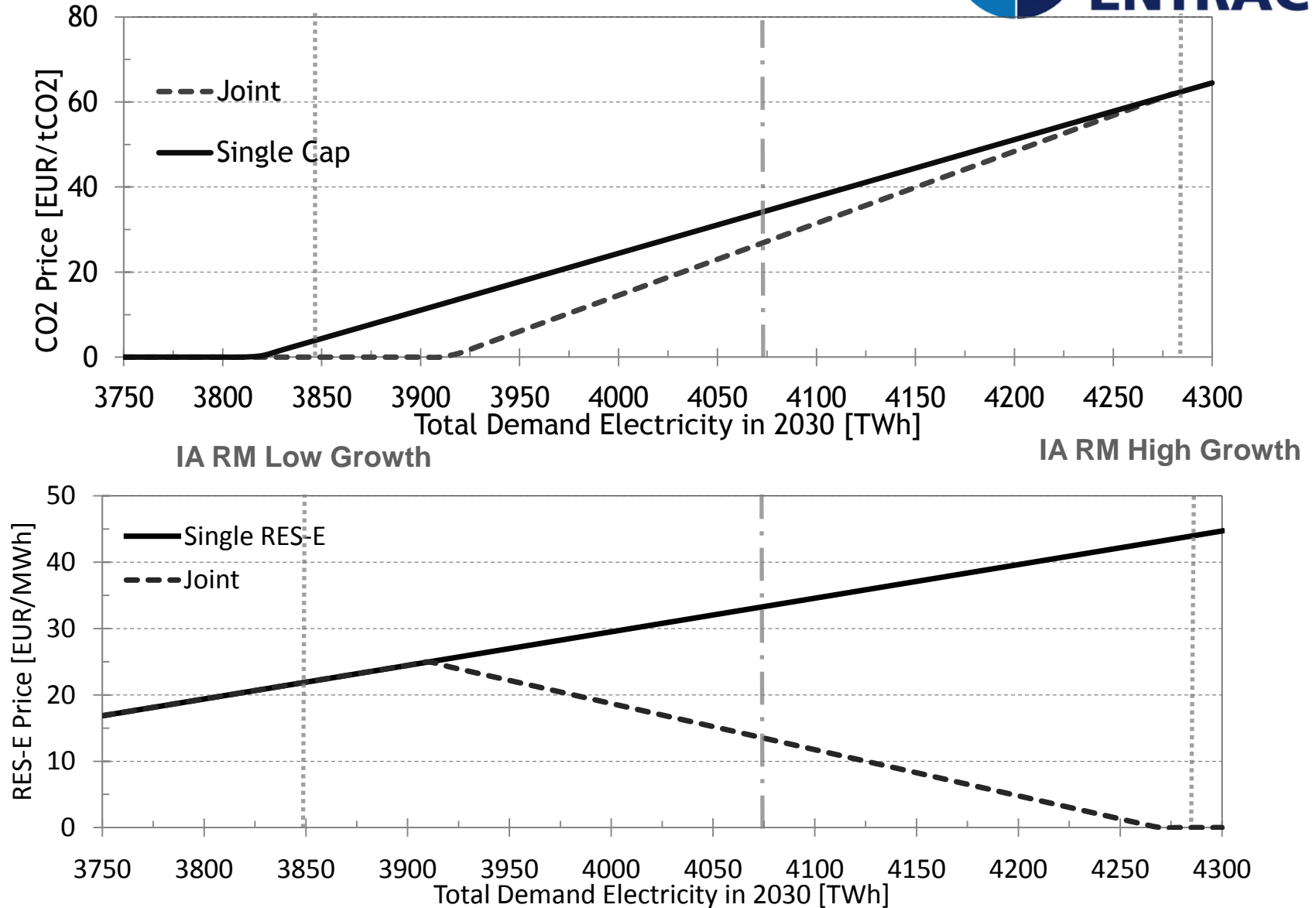


# A Stylized Model of the European Power Sector

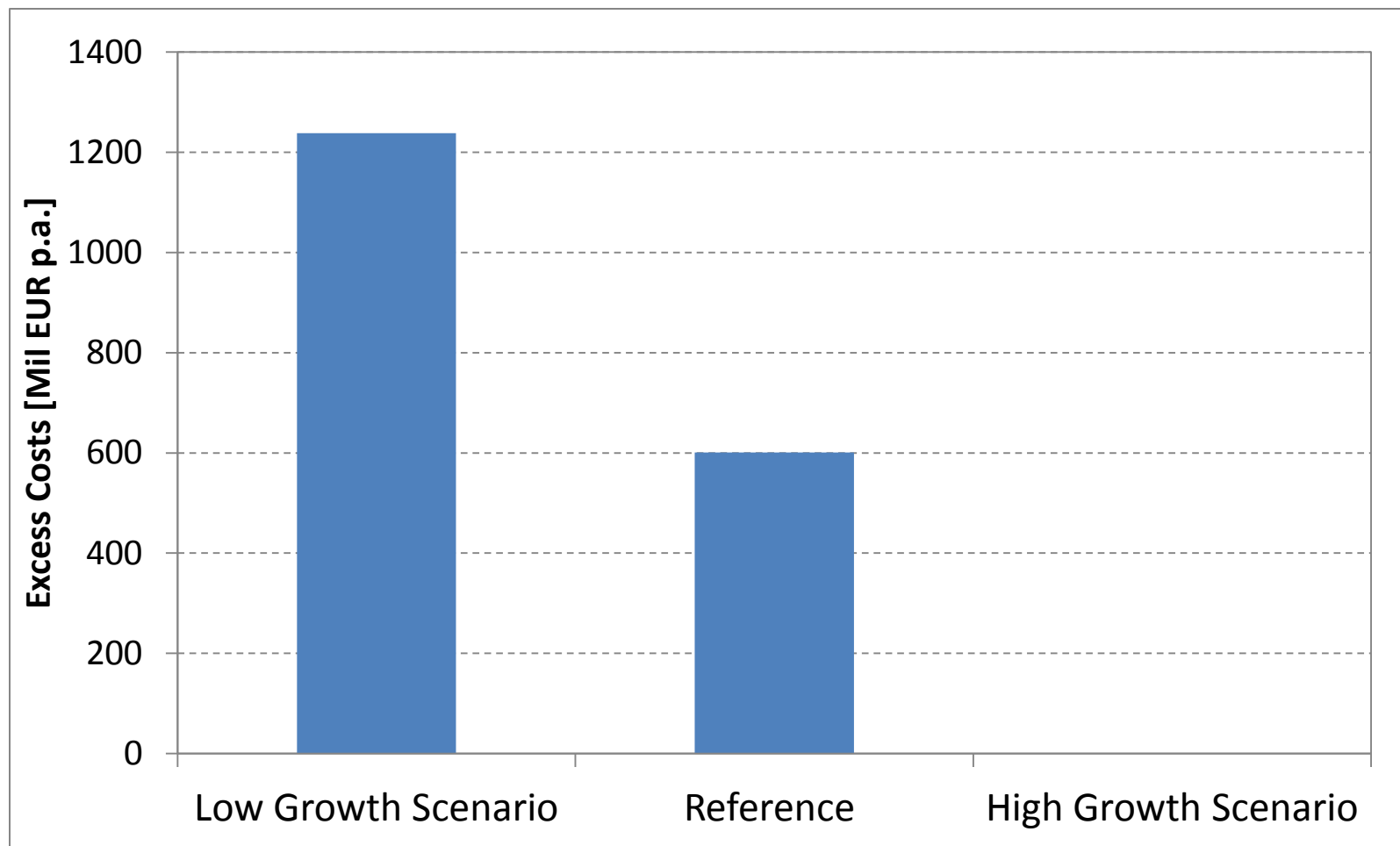


- Distinguish between 6 generation technologies: Nuclear, Coal, Gas, Wind (R), Solar (R) , Rest
- Technologies differ in their carbon intensity
- Calibrated to the European electricity market of 2030 as in the Reference Scenario of „EU energy trends for 2030“. Outcome of PRIMES Model
- 3 policy scenarios:
  - I. Single Emissions Cap (CO2 Reduction -40%)
  - II. Single Renewable Share (30%)
  - III. Joint Emissions Cap and Renewable Share
- Economic growth scenarios and respective electricity demand: IA Energy Roadmap 2050

# Carbon and RES Prices



# Excess Costs in 2030



$$EXC = p_r^{joint} (q_r(a)^{joint} - q_r(a)^{ets}) - p_c^{joint} \mu_g (q_g(a)^{ets} - q_g(a)^{joint})$$

- If there are additional market failures,
  - e.g., because firms are unable to appropriate the full benefits from innovation, thus underinvest
- Additional instruments are necessary to correct for these additional market failures
- Optimal policy involves a policy portfolio
- Criteria: Benefit of additional instrument vs. cost of overlap

Policy interactions might have unintended consequences:

- When properties of targets are related
- Crowding out of less emission-intensive tech by more intensive tech
- May make carbon price more sensitive to energy demand changes
- Causes excess costs, in particular when electricity demand is low

But there are good arguments for policy portfolios:

- Additional market failures
  - Additional policy goals
- Instruments have to work in the real world, not a sandbox!



**Thank you for your attention**

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**[http://www.entracte-  
project.eu](http://www.entracte-project.eu)**

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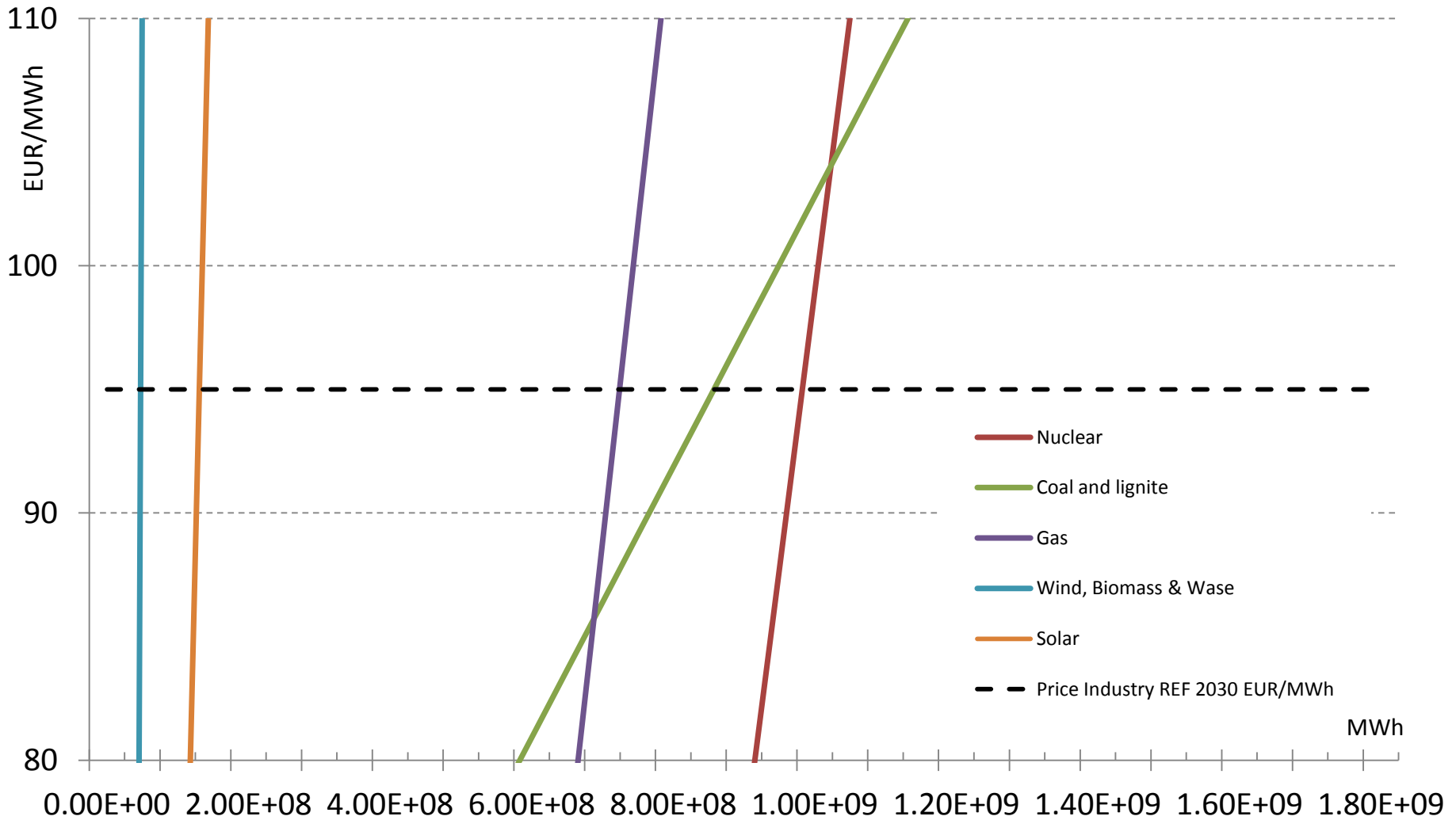
**ZEW Lunch Debate: The 2030  
Climate and Energy Framework**

**Tuesday, 18. March 2014, 12-2 pm**

**at the Representation of the State of  
Baden-Württemberg to the EU**

- **Günther H. Oettinger**, European  
Commissioner for Energy
- Prof. Andreas **Löschel**, ZEW
- Prof. Vittorio **Prodi**, MEP
- Sir Graham **Watson**, MEP

# Calibrated Supply Curves



# Power Mix in 2030



# Objectives of ENTRACTE



- I. Coherently assess climate policy instruments with the full range of economic research methods
- II. Understand interactions between multiple climate policy instruments
- III. Take into account the barriers to implementation
- IV. Identify mixes of instruments that provide an effective, efficient, and feasible overall EU climate policy to achieve legislated and aspirational targets of GHG emission reductions

# Structural facts about ENTRACTE



- Duration: 36 months (01/09/2012 – 31/08/2015)
- Requested EU Contribution: 2,935,276 €
- 9 Partners from 6 countries:

