



Third meeting of the project

“Monitoring of EU and national energy efficiency targets” (ODYSSEE-MURE 2010)

Warsaw, October 6-7 2011

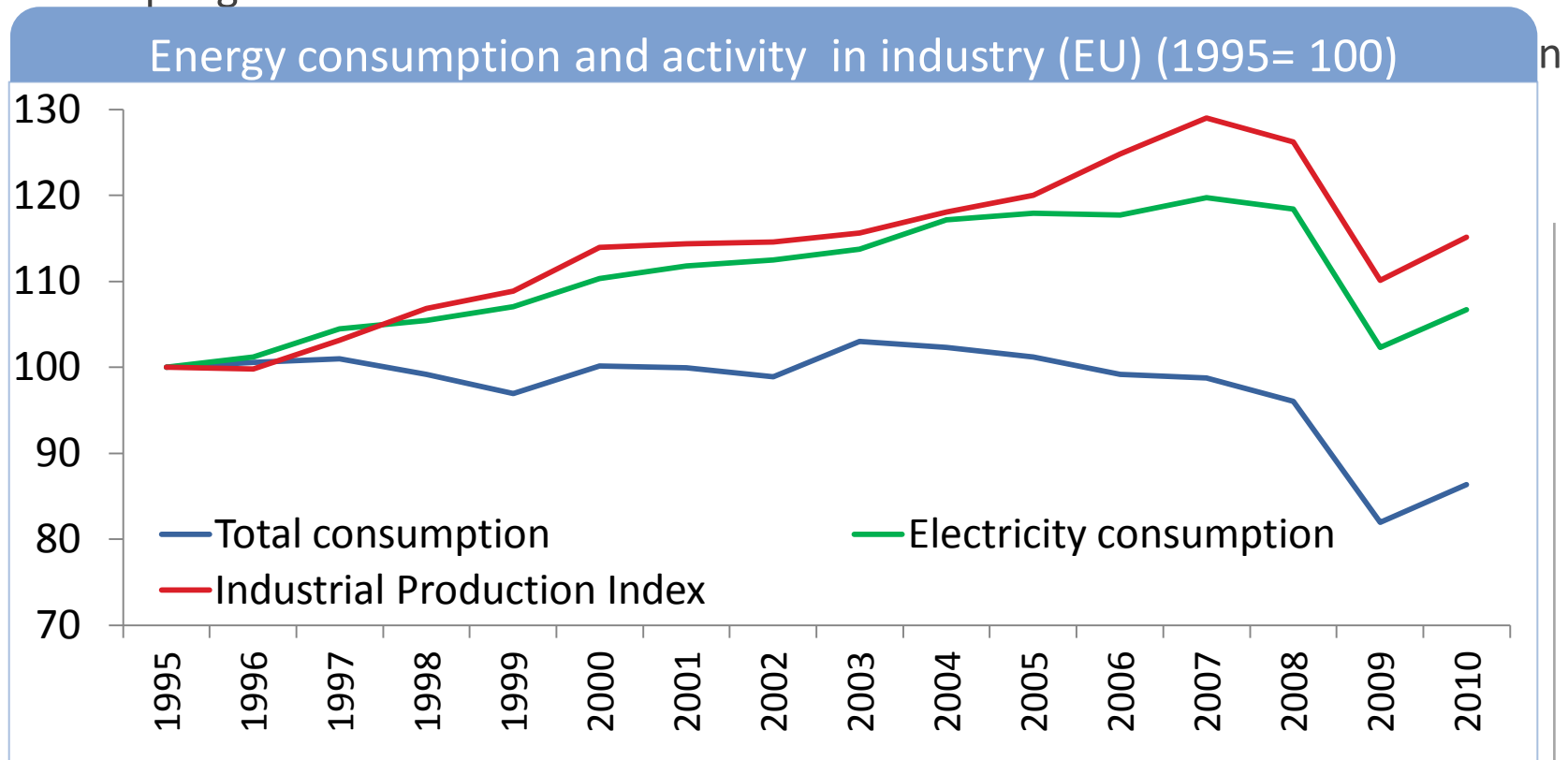
Energy efficiency trends in EU industry

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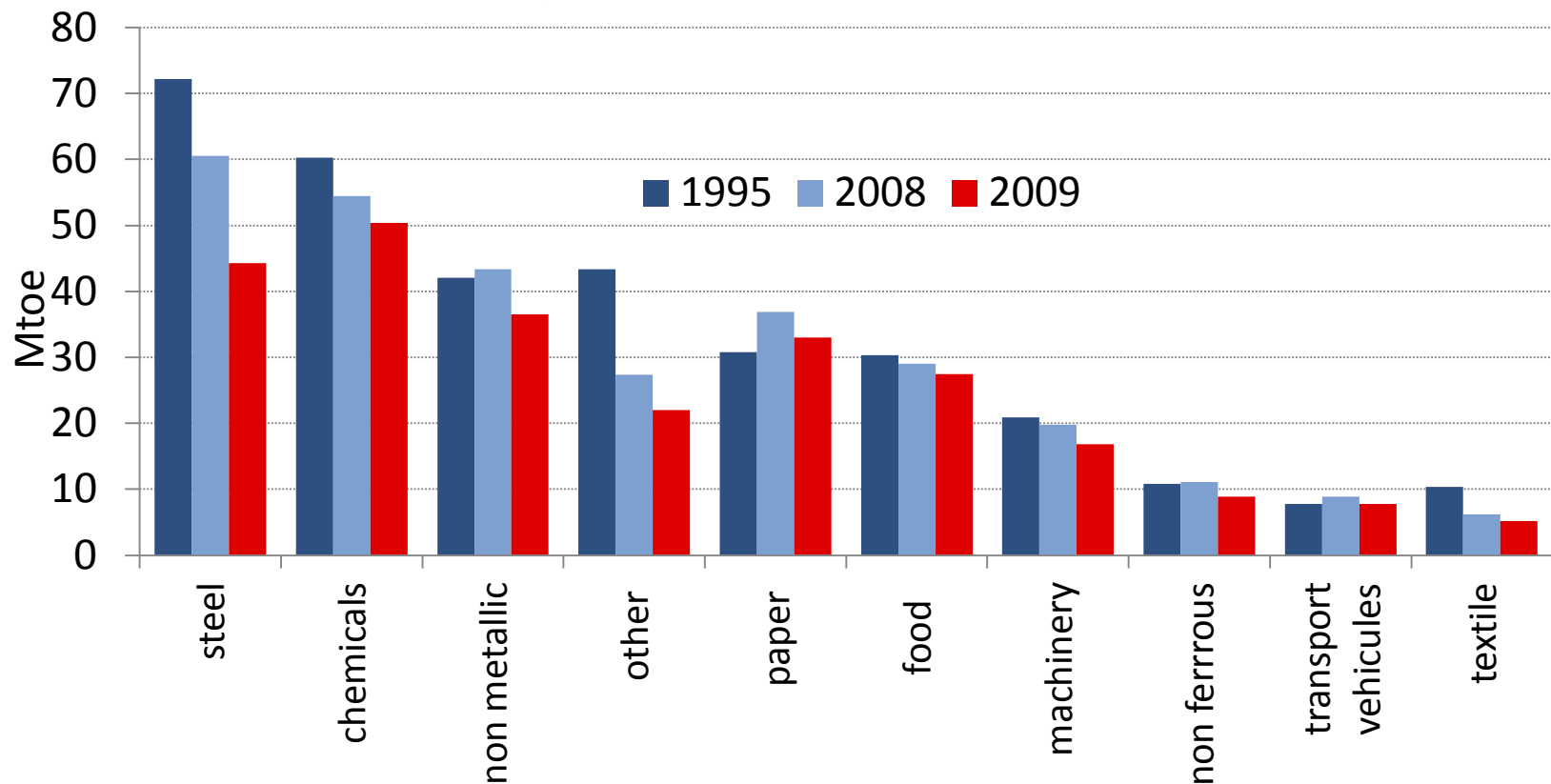
- ▶ **1. Trends in energy consumption**
- 2. Energy intensity trends
- 3. Comparison of energy intensities: adjusted intensities
- 4. Trends and comparison of specific energy consumption
- 5. Energy efficiency trends
- 6. CO2 emissions and indicators

- Deep industrial recession in 2009 (-13%) after - 2% in 2008;
- Higher drop for the energy consumption (- 15% for the total; -14% for electricity) after -3% in 2008 and ~-1%/yr between 2004 and 2007;
- In 2009 industrial consumption 20% below its 1995 level
- Electricity consumption quite correlated with industrial production: no decoupling as for the total.



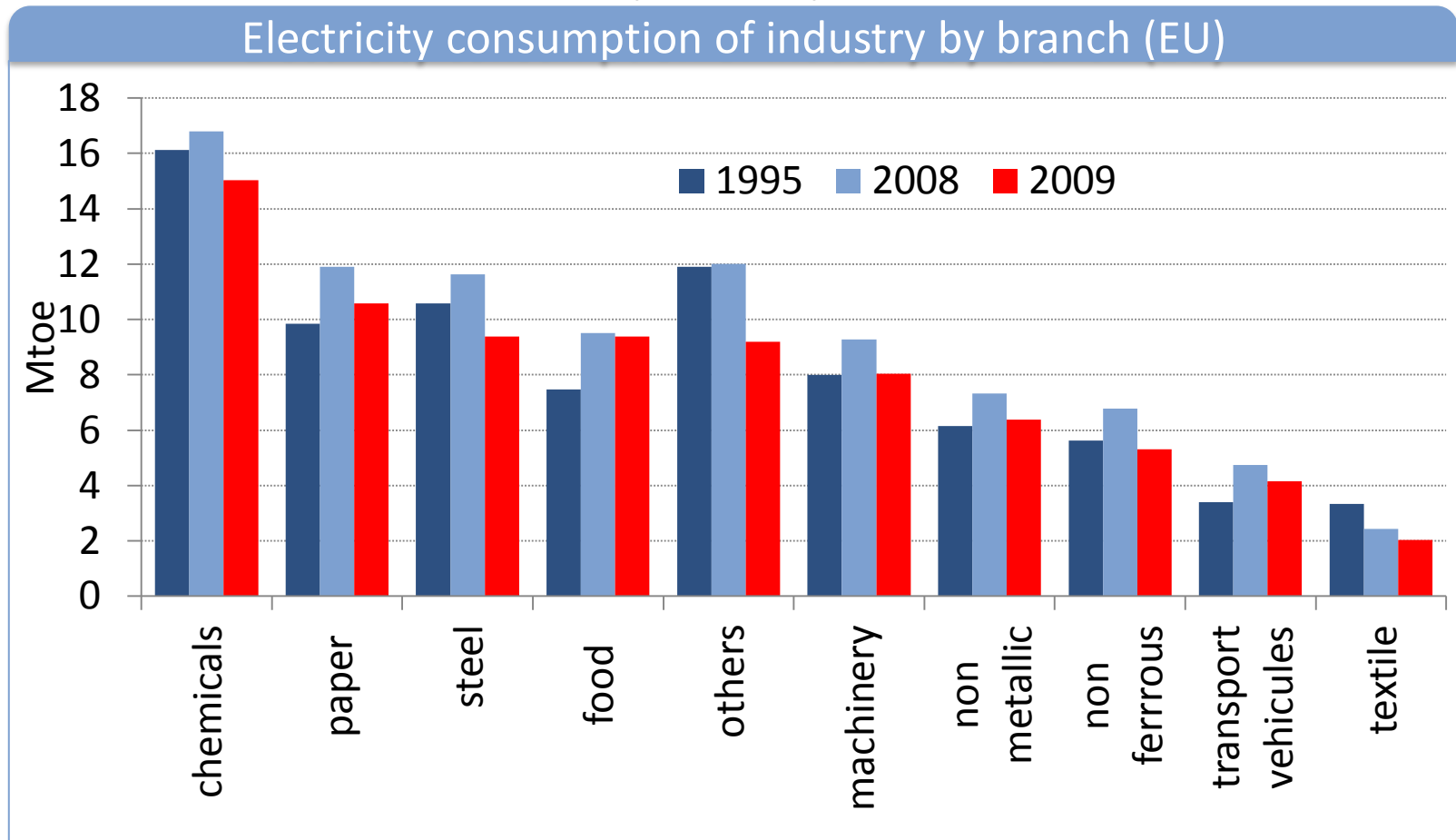
- Stable share of energy intensive branches (steel, non metallic minerals, paper, chemicals & non ferrous) with 2/3 of total consumption
- Steel is no longer the largest energy consumer; its consumption has dropped by 40% since 1995
- Consumption of paper and non metallic has increased until 2008

Change in the energy consumption by industrial branch (EU)



Source: Eurostat ; others include other manufacturing, wood, construction and non energy mining

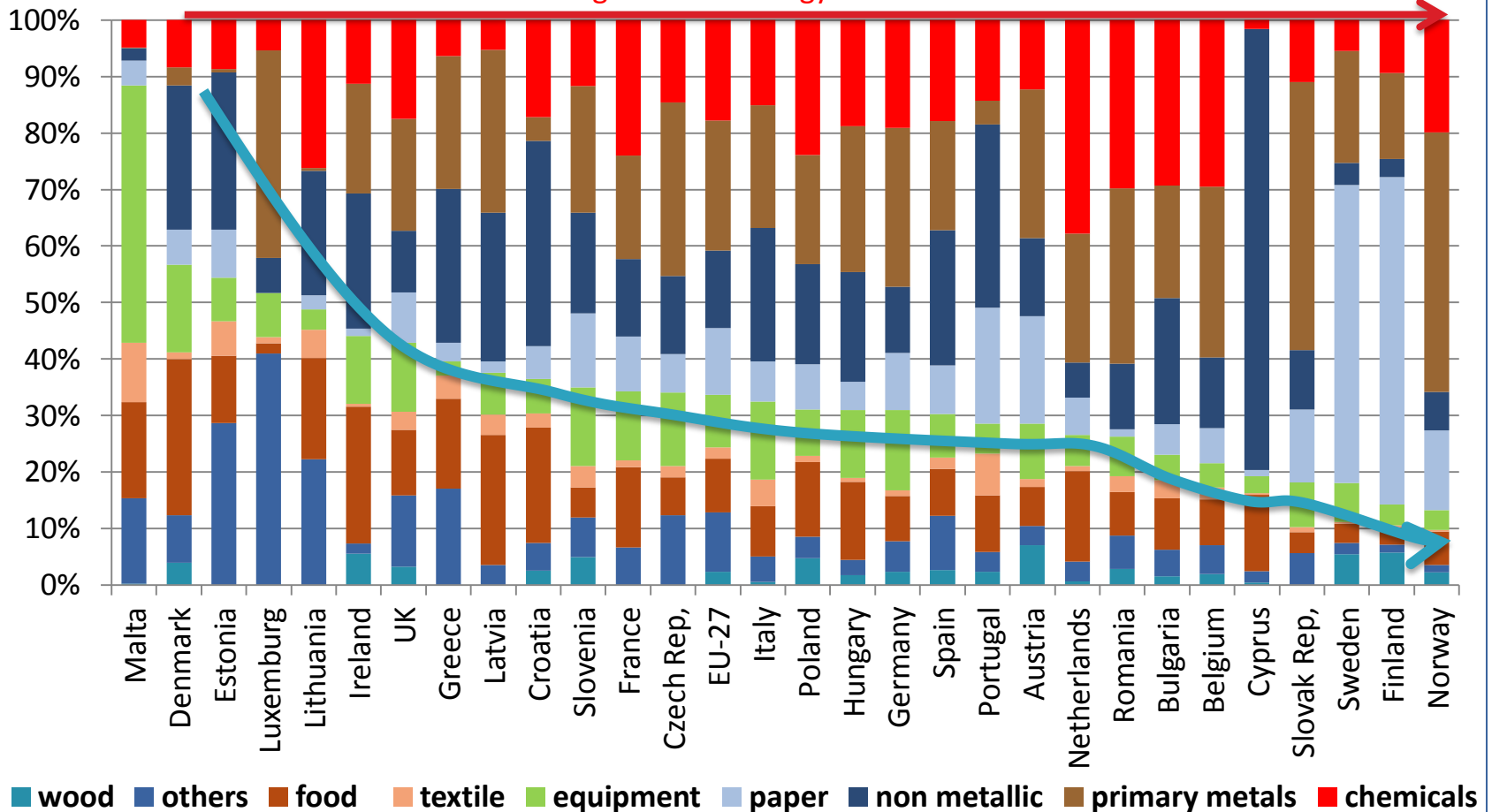
- Increase of the electricity consumption for all branches until 2009, except textiles, partly linked to substitution of electricity for fuels.
- Paper has become the second largest electricity intensive branch after chemicals
- In 2009, decrease of the electricity consumption in all branches.



- More than 70% of the consumption in 4 energy intensive branches in 8 countries and between 70% and 60% in 15 countries

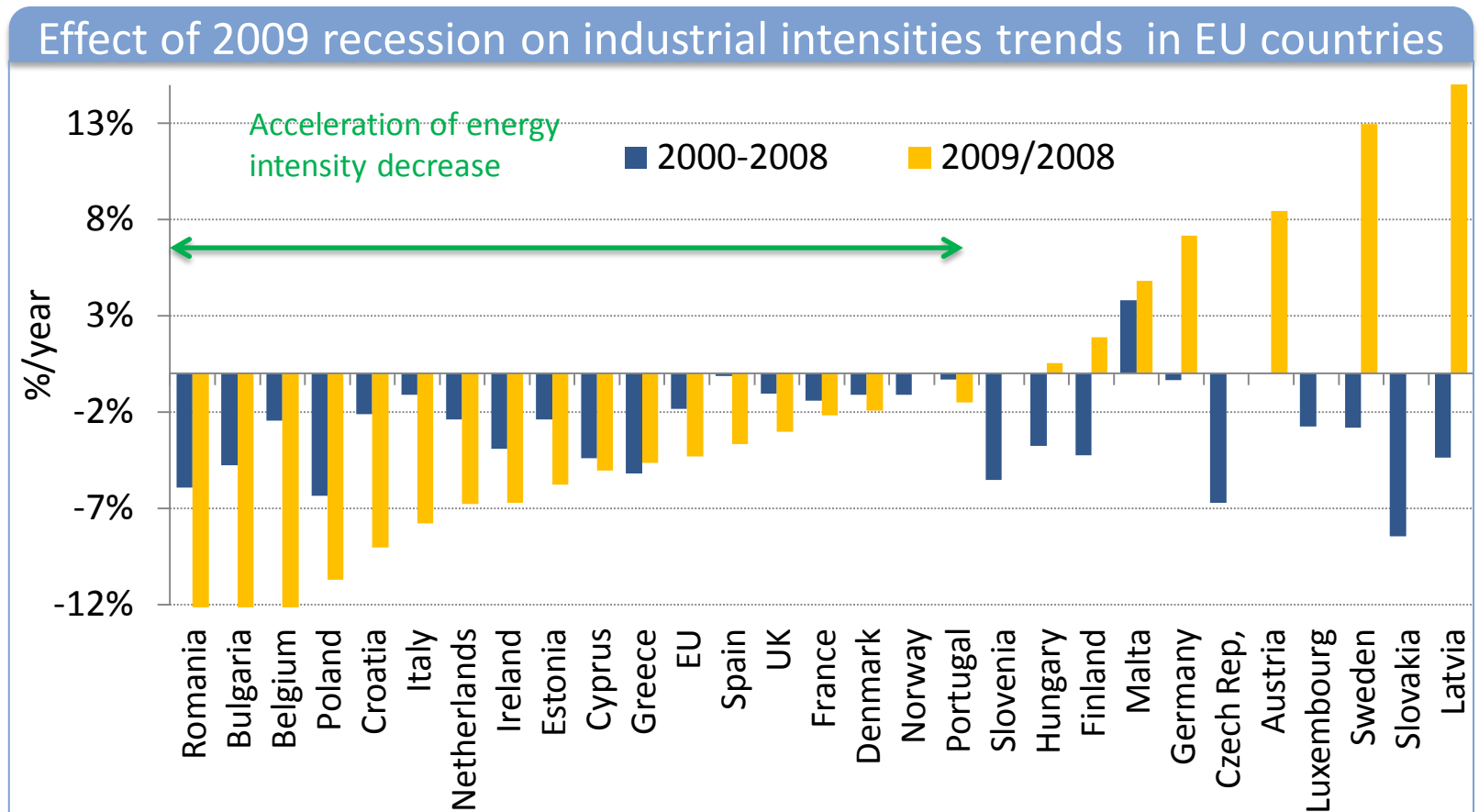
Energy consumption of industry by branch (2008)

Increasing share of energy intensive branches



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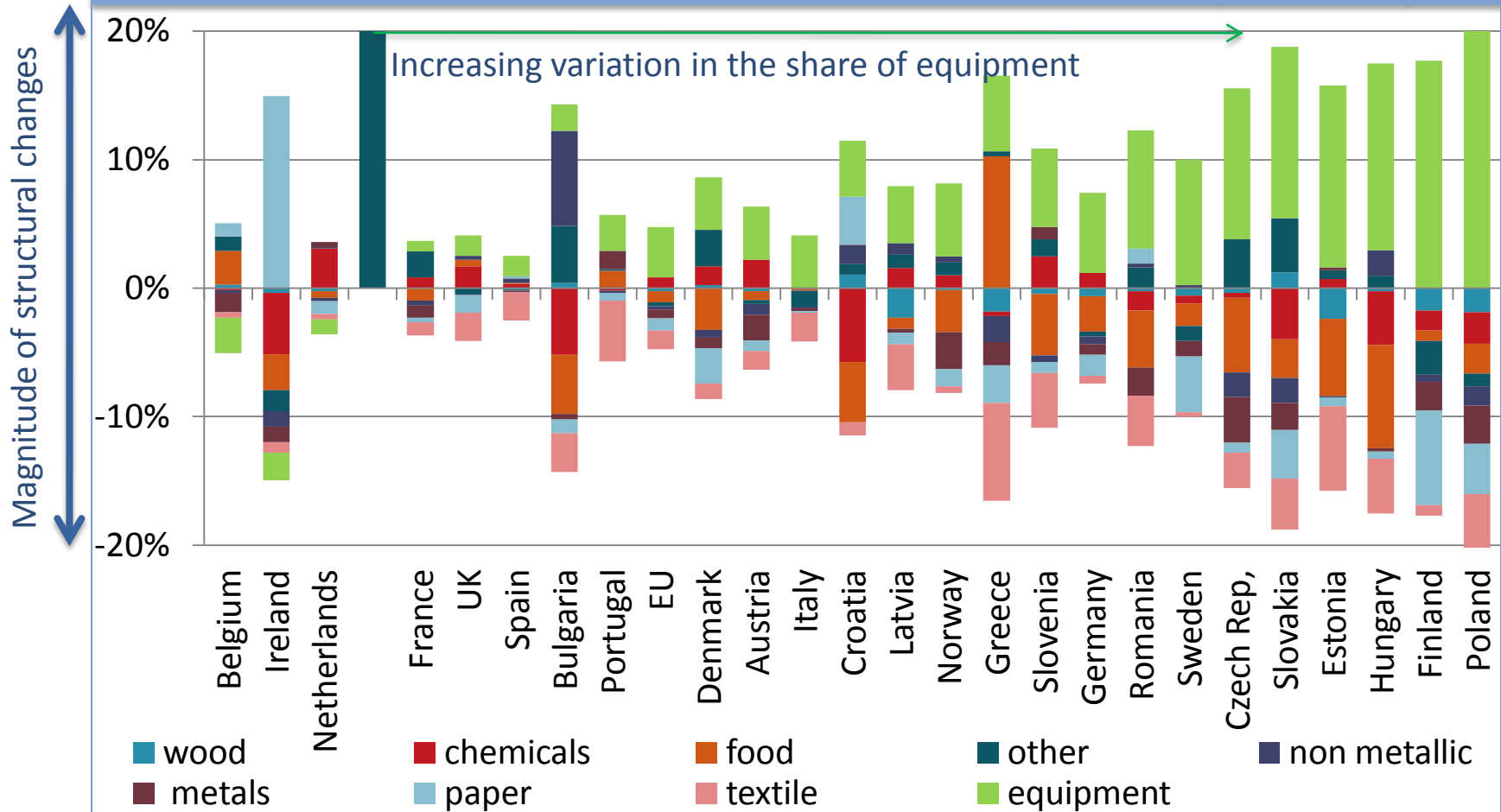
- Diverse reactions to the recession in 2009: acceleration of the energy intensity decrease in 14 countries and in the EU as a whole;
- In other countries, strong increase in the intensity, i.e. the energy consumption did not follow the reduction in the energy consumption, due to lower efficiency



Industry: manufacturing+ construction and mining

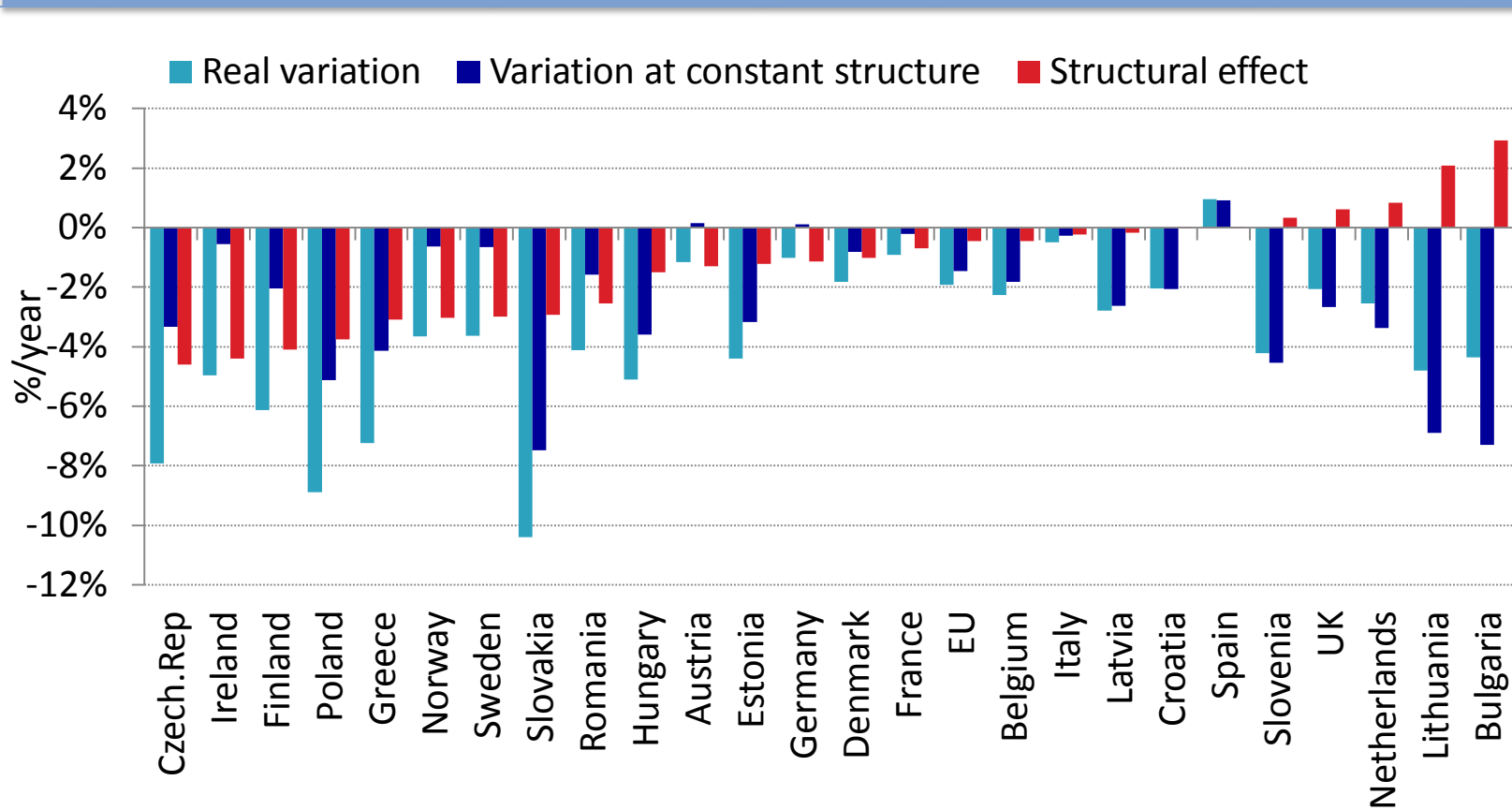
Manufacturing: a growing share of equipment, the less energy intensive branches, in most countries between 2000 and 2008

Variation in the share of each branch in total value added (2000-2008)



- A faster growth of equipment branch contributed to the energy intensity reduction of manufacturing in most countries;
- Structural changes explain most of the reduction (>60%) in 10 countries (Czech Rep, Ireland, Finland, Norway, Sweden, Romania, Austria, Germany, Denmark & France) and about 40% in 3 more countries (Poland, Greece & Italy)

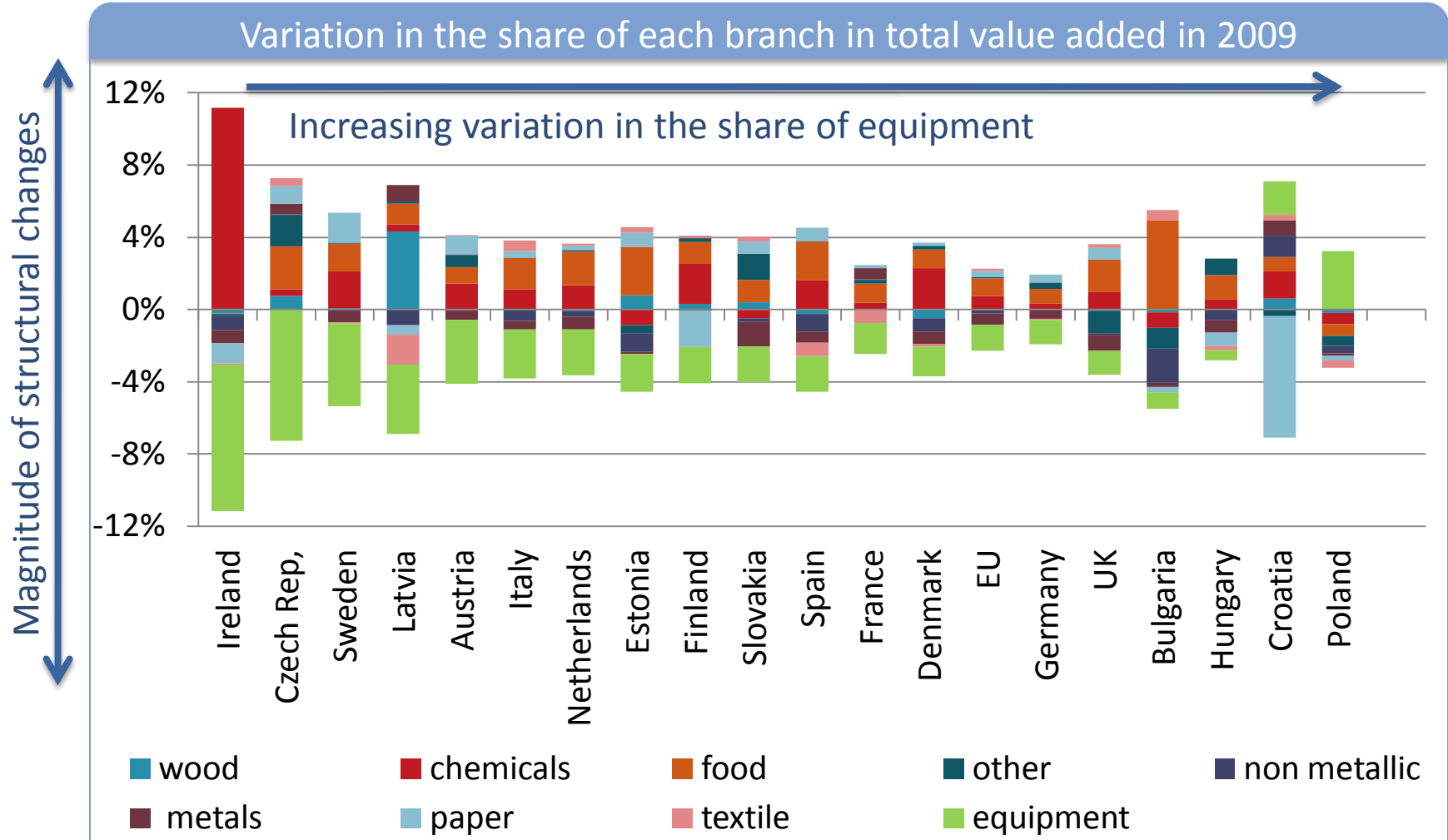
Impact of structural changes on the energy intensity of manufacturing (2000-2008)



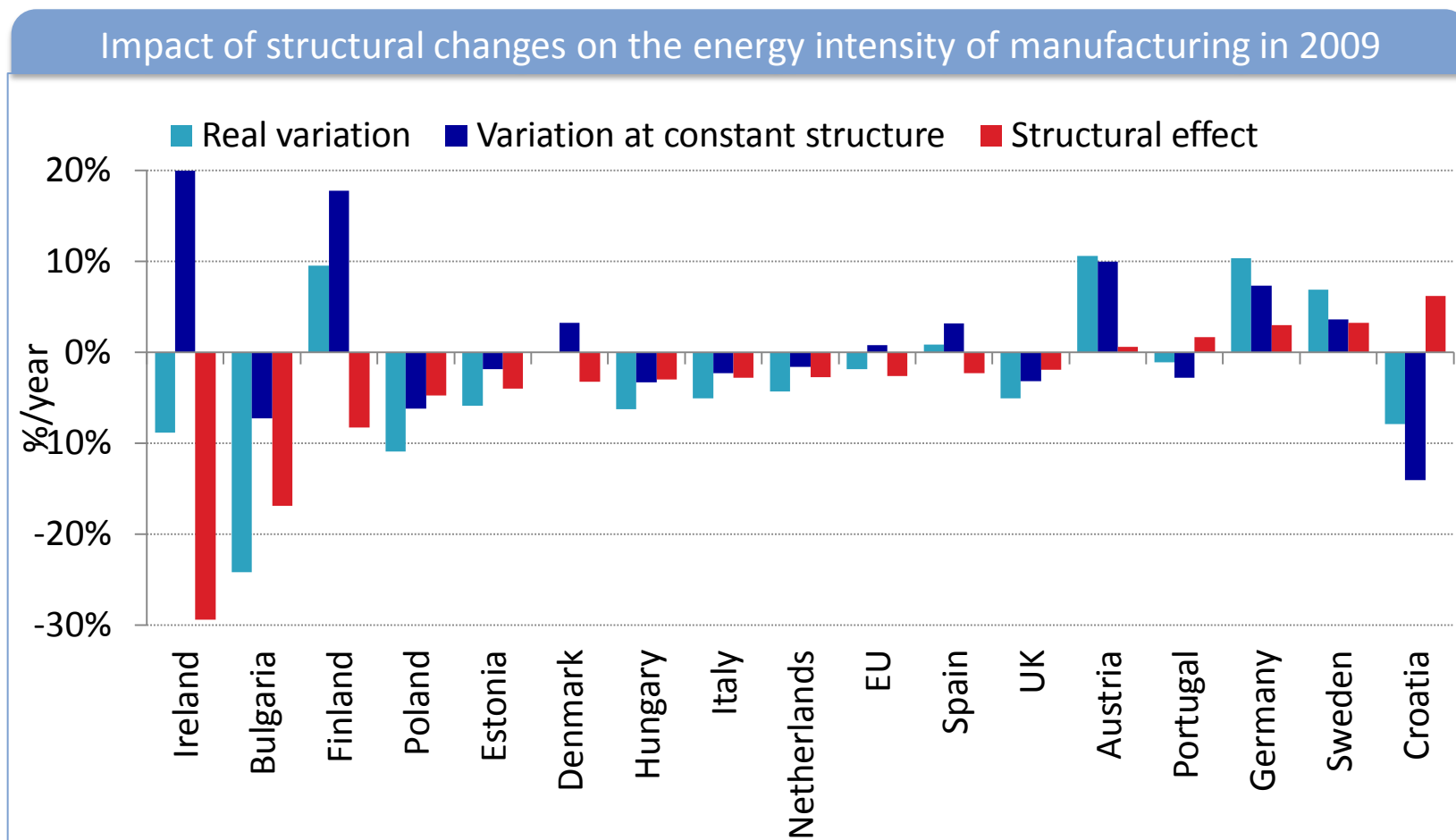
Focus on 2009: what happens in a recession?

- At branch level, usually a loss of efficiency: the consumption does not follow the reduction of activity, for two reasons:
 - Equipment do not operate at full capacity → they are less efficient
 - Part of the consumption is not linked to the level of production
- At industry level, all branches are not hit the same way by the recession and there are strong structural changes

- In 2009, increasing share of chemicals and food in manufacturing value added and decreasing share of equipment in almost all countries, except for Croatia and Poland, and metals in many countries



- In 2009, structural changes contributed to decrease the energy intensity of manufacturing in most countries; and in the EU as a whole.
- They even offset the effect of an increase in sectoral intensities in 3 countries (Czech Rep, Ireland, Finland & Denmark)



Overview of the impact of the 2009 crisis on industrial energy intensities: no simple answer!

Decrease in the energy intensity

Countries

Very strong reduction (>10%)

Romania, Belgium, Bulgaria, Poland

Above 4% reduction

Croatia, Italy, Netherlands, Ireland, Estonia, Greece, EU

Reduction below 4%

Spain, UK, France, Denmark, Portugal

In red: main driver are structural changes to less intensive branches

In green: decrease in intensity driven by a decrease in sectoral intensities

Increase in the energy intensity

Hungary, Finland, Germany, Austria, Sweden, Latvia

In purple: intensity increase driven both by structural change to more intensive branches and an increase in sectoral intensities

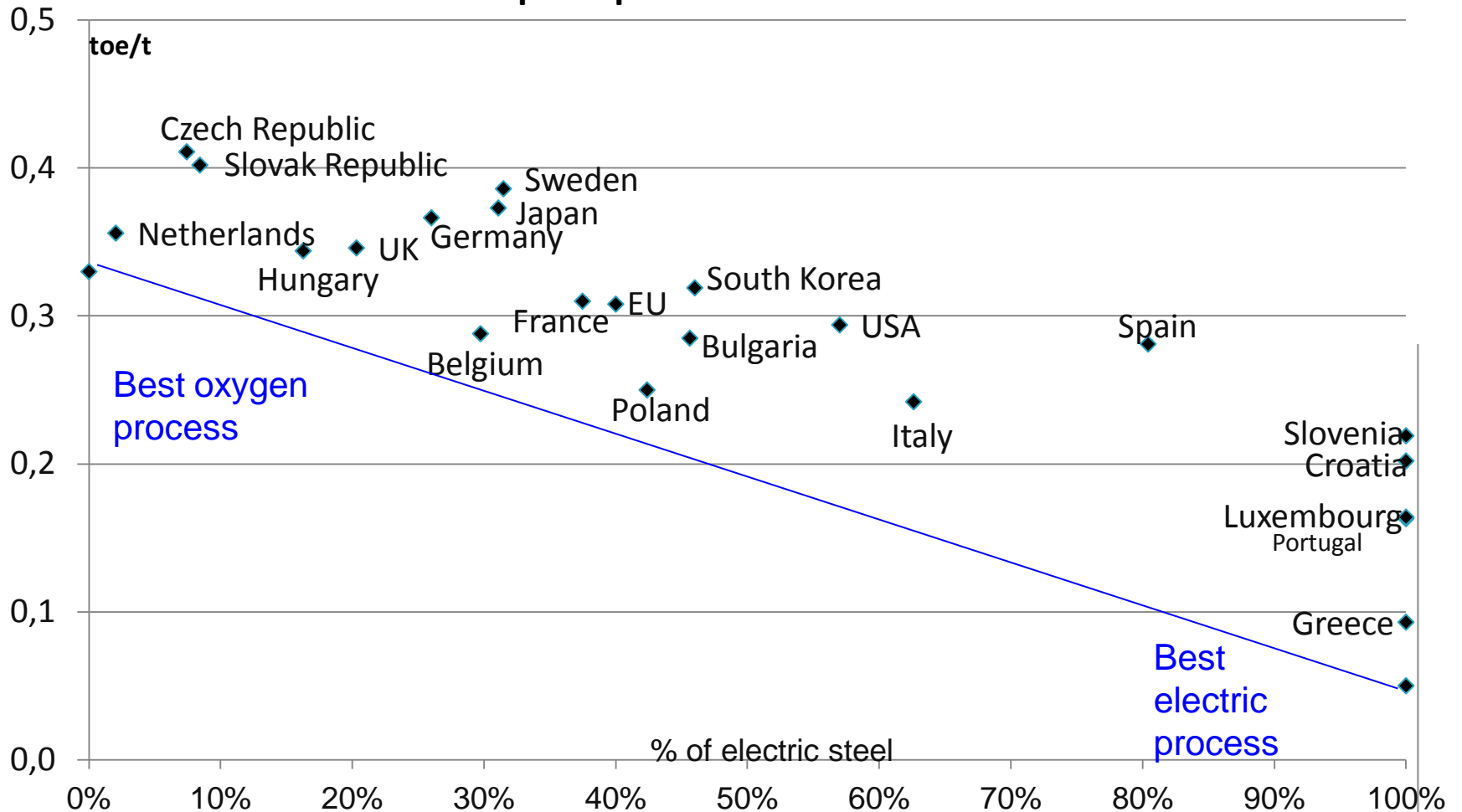
In orange: main driver : increase in sectoral intensities

In italics: data by branch not available → impossibility to assess structural changes

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- ▶ 3. Comparison of energy performances
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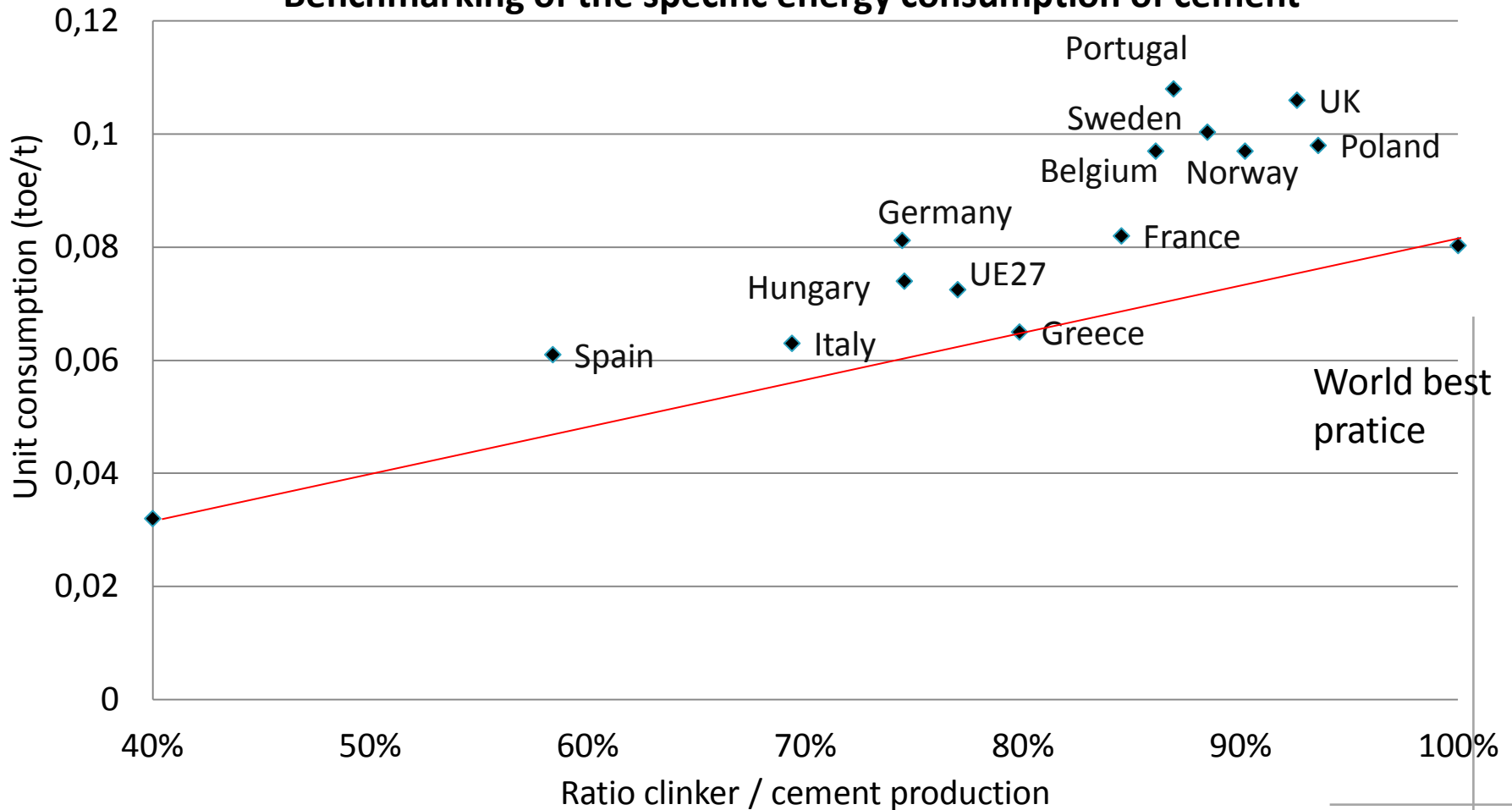
Difference in specific consumption partly explained by differences in process mix; distance to blue line shows possible potential of energy efficiency gains

Consumption per tonne of crude steel



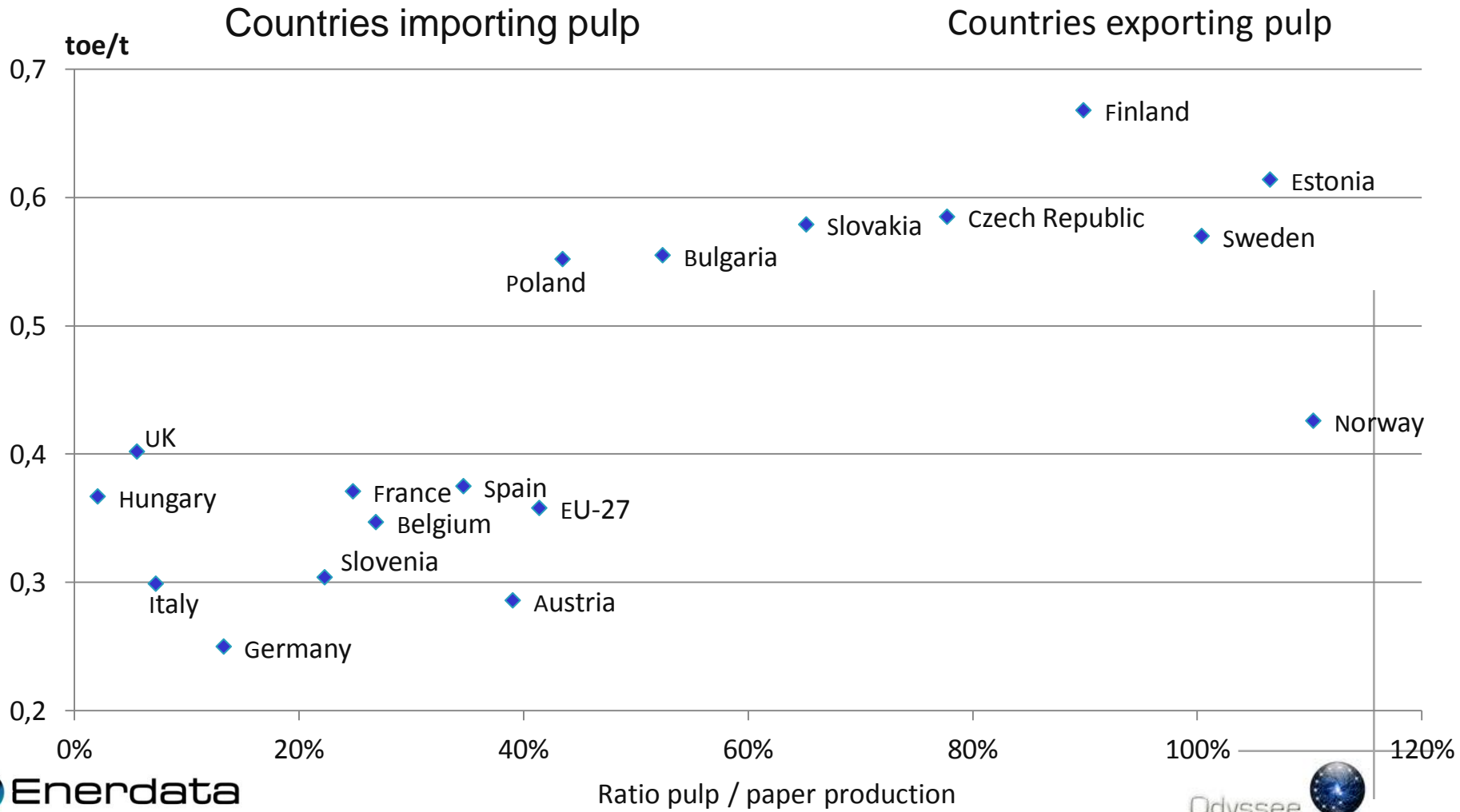
The energy performance of cement production is linked to the share of clinker produced in the country in relation to the cement production: the higher this ratio, the higher the specific energy consumption. Distance to the red line (best practice) indicates the potential of energy saving

Benchmarking of the specific energy consumption of cement

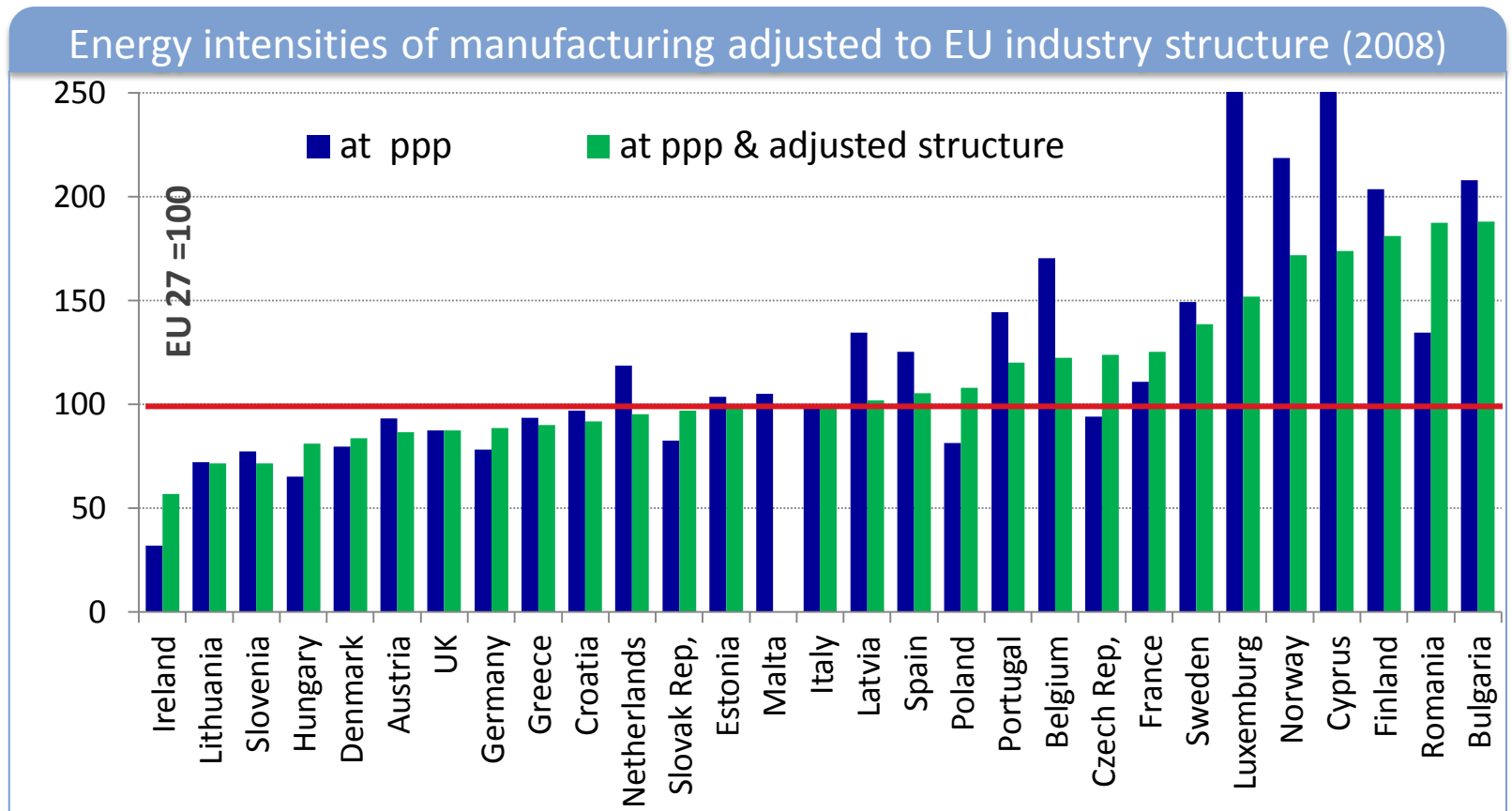


The energy performance of the paper industry is linked to the share of pulp produced in the country in relation to the paper production: the higher this ratio, the higher the unit consumption

Specific consumption per ton of paper

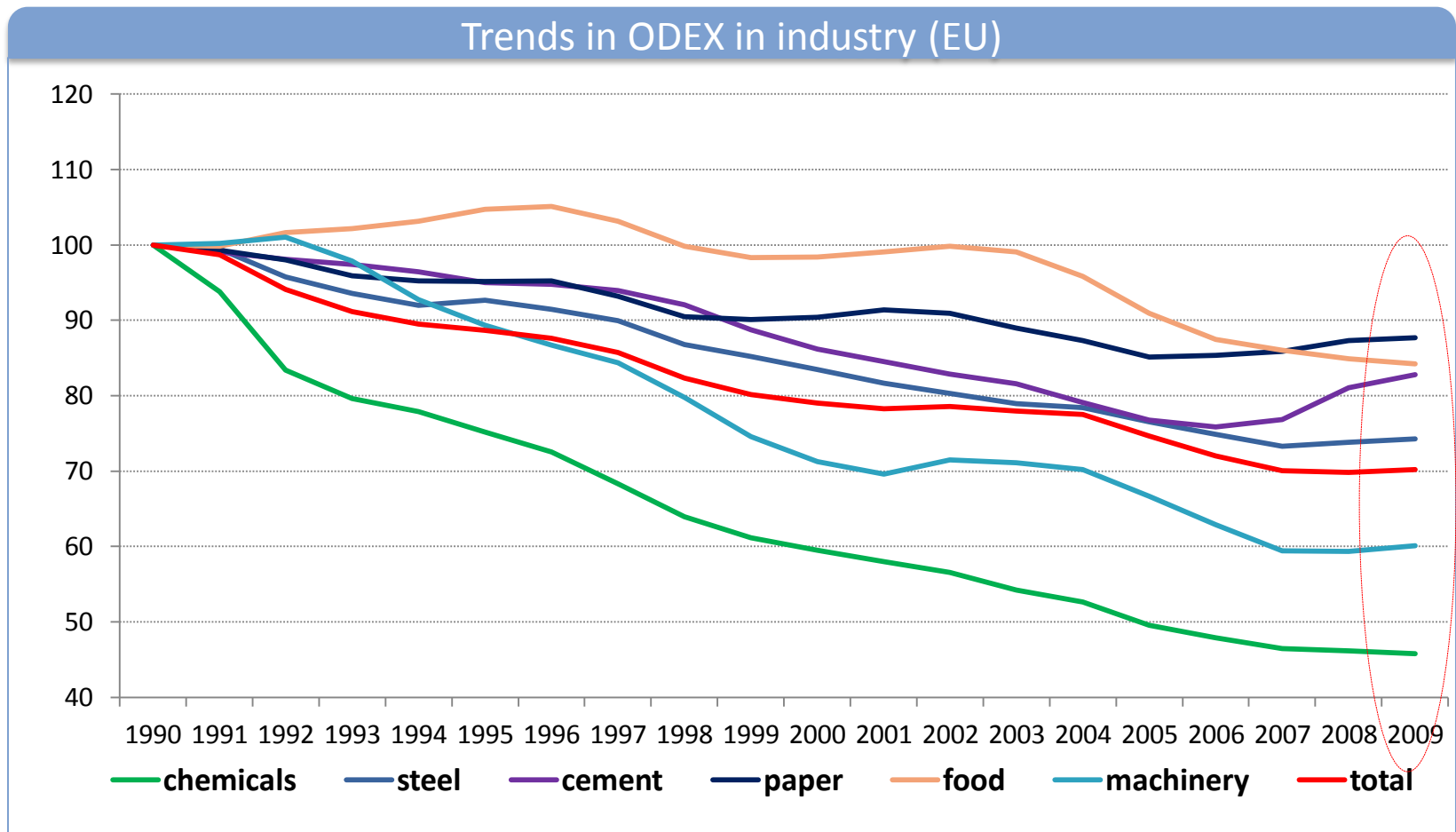


- Comparisons of energy intensity are more relevant with energy intensities adjusted to the same value added structure
- For countries with a share of energy intensive branches lower than the EU average, the adjusted intensity is higher (e.g. Ireland, France, Germany, Slovakia, Hungary, Poland, Czech Rep, Romania); for countries with a higher share of energy intensive branches, the adjustment reduces the intensity



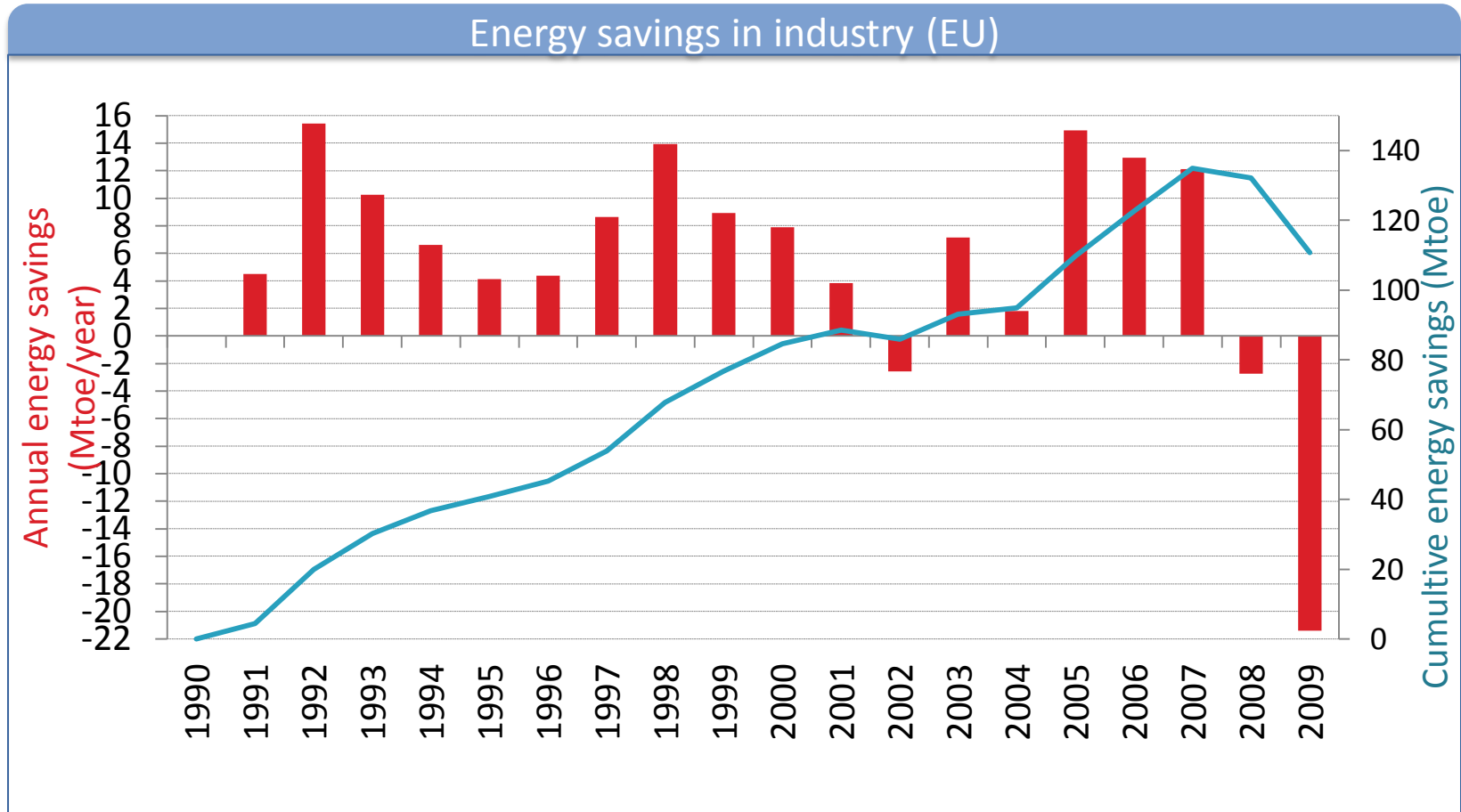
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Around 30% progress in energy efficiency in industry in the EU since 1990. Slower progression from 1998 to 2007 (1,8 %/yr compared to 2.4%/year from 1990 to 1998). No progress since 2008 with even a reverse trend in 2009 (+ 0.5% for the index after a stability in 2008)



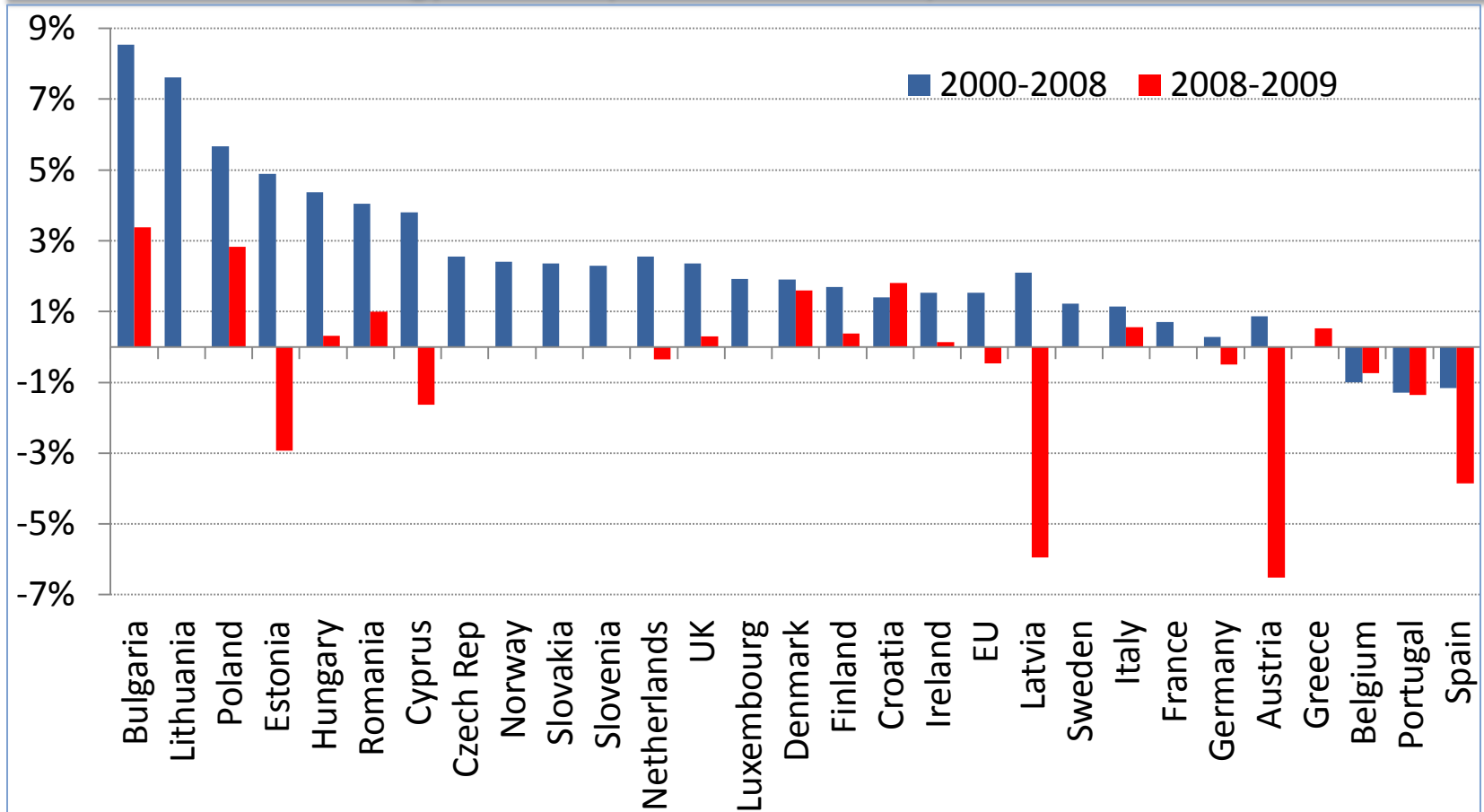
- In 2009, energy savings in industry almost reached 110 Mtoe: without energy efficiency improvement in industrial branches, the energy consumption would have been higher by 110 Mtoe

Negative energy savings in 2008 and mainly in 2009 due to the economic recession



- Energy efficiency improved on average by 1.5 % per year in industry in the EU as a whole from 2000 to 2008, but quite unevenly across the countries
- In 2009 the crisis had a negative impact on energy efficiency with a reverse trends in several countries (e.g. Germany, Spain, Austria, Baltic countries)

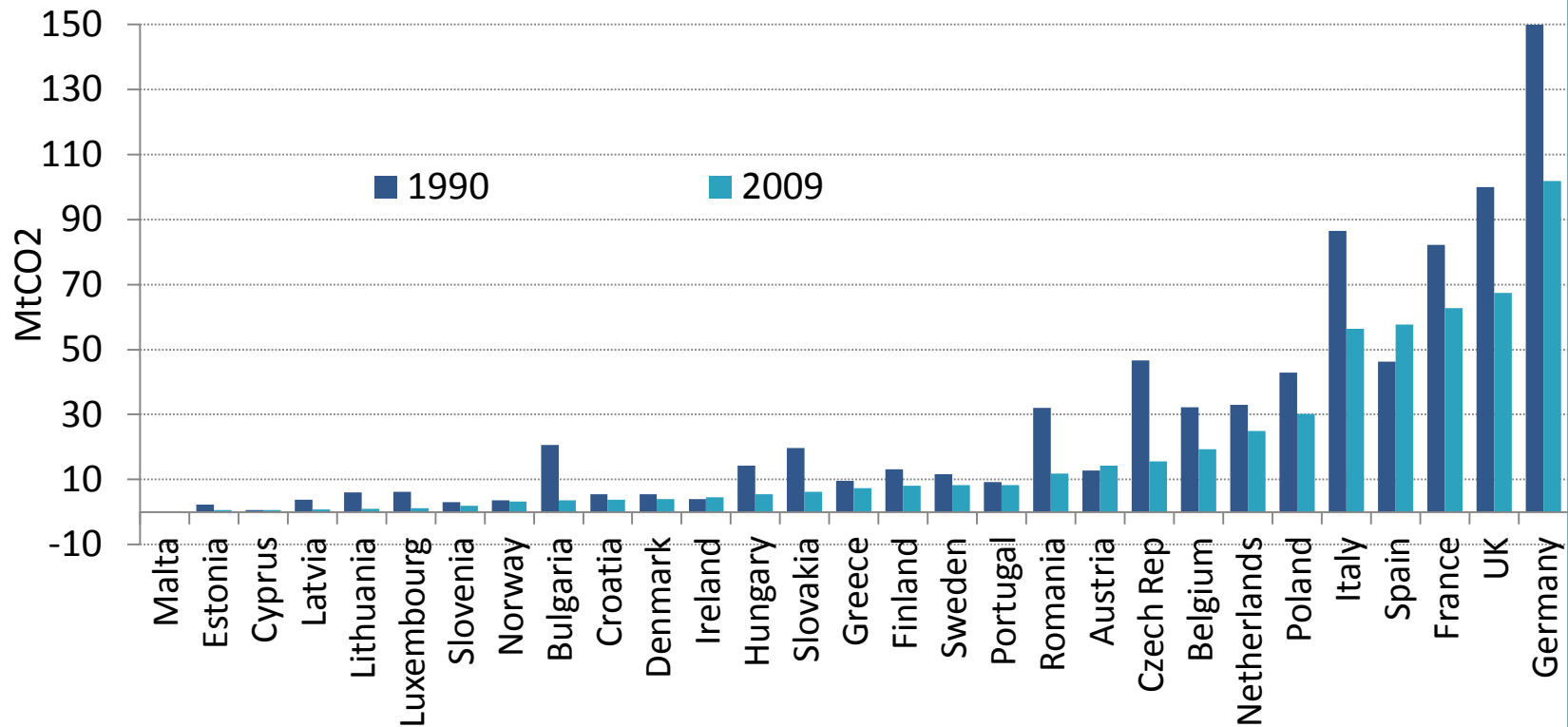
Energy efficiency trends in industry in EU countries



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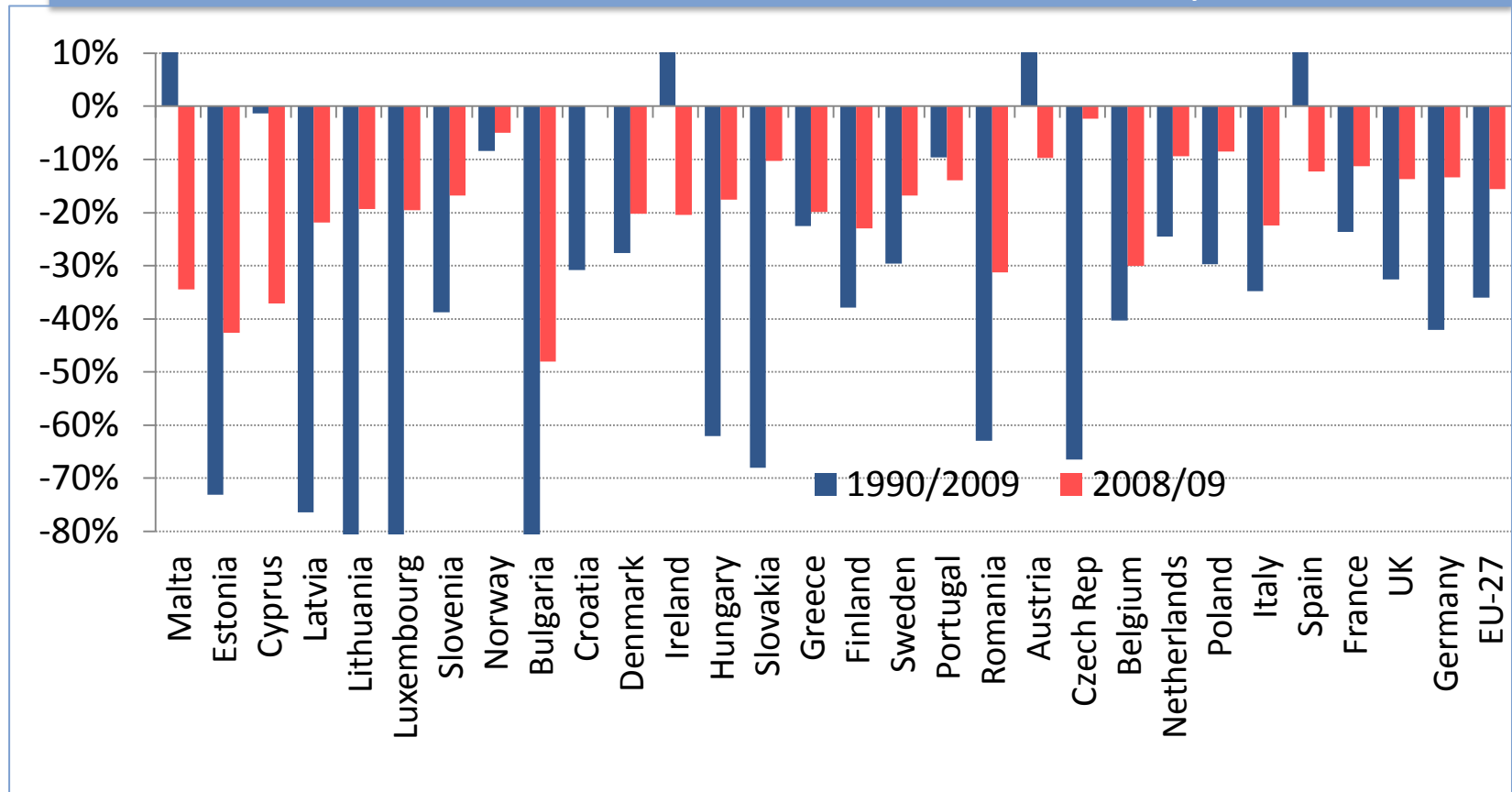
- Decreasing CO2 emissions from fuel combustion in all countries except Malta, Ireland, Austria and Spain
- Strong reduction (-60-80%) in most new member countries (except Poland, Slovenia, Cyprus and Malta) and in Luxembourg
- -40% for the EU as a whole

CO2 emissions from fuel combustion in industry

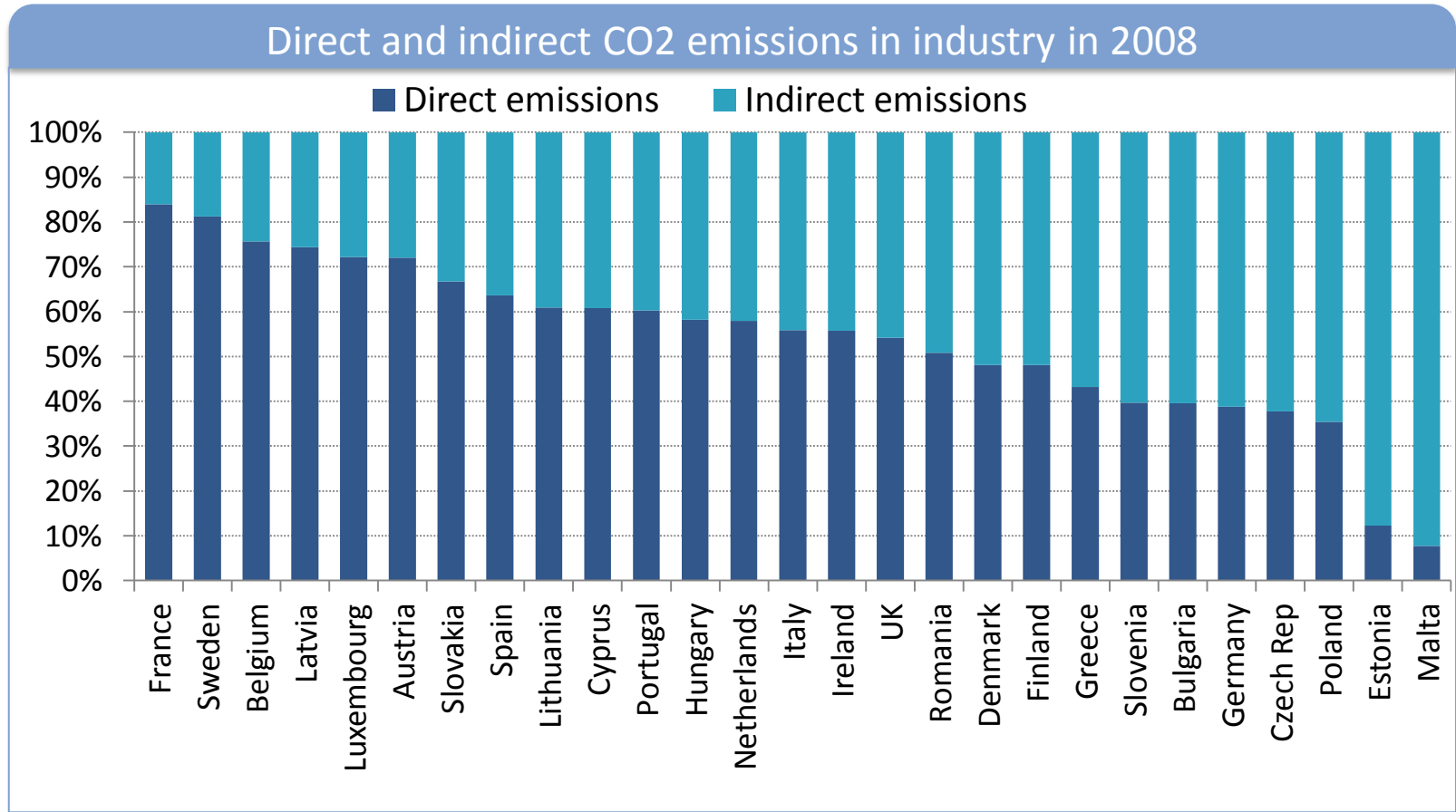


- Strong reduction in 2009: -16% in 2009 at EU level, ie 40% of the whole variation between 1990 and 2009
- In several countries, most of the reduction achieved in 2009 compared to 1990 took place in 2009 (above 60%) (e.g. Portugal, Greece, Belgium, Estonia, Bulgaria, Norway, Denmark, & Italy)

CO2 emissions from fuel combustion in industry



- Indirect CO2 emissions of industry are of the same magnitude as direct emissions in the EU in 2008; large discrepancies between countries depending on energy mix for public power generation (16% in France, 61% in Germany)



Indirect emissions: emissions induced by electricity purchased ; emissions of electricity sector allocated to industry in proportion of its share in electricity consumption

*2006 for Estonia, Lithuania, Portugal and Malta

Conclusions

- Severe drop in industrial energy consumption of industry in 2009 (-15%)
- Diverse reactions to the economic recession of 2009:
 - acceleration of the energy intensity decrease in 14 countries and in the EU as a whole, mainly because of a stronger recession in energy intensive branches (i.e. structural effect);
 - strong increase in the intensity, i.e. the energy consumption did not follow the reduction in the energy consumption, due to lower efficiency
- Around 25% progress in energy efficiency in industry in the EU since 1990; however no progress since 2008 with even a reverse trend in 2009 (+ 1.4% for the index after a stability in 2008)
- Strong reduction of CO₂ emissions from energy combustion in 2009: -16% at EU level, i.e. 40% of the whole variation between 1990 and 2009