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Dark Clouds Hovering over Steel Production in Germany. Only Temporarily?

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Outline

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Inspiration

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The 'perfect storm' that has brought Britain's steel industry to its knees

Globalisation and international economics are behind a crisis that h
future of Britain's steel industry at risk

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Red flag: China dumping excess production is
Getty Images

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Announcement: Moody's: Chinese, Russian steel imports keep European steelmakers' outlook negative into 2017

Global Credit Research - 26 Oct 2016

London, 26 October 2016 -- Continued competition from cheaper Chinese and Russian imports, price volatility and rising raw material prices all conspire to keep the outlook for the European steel industry negative over the next 12-18 months, says Moody's Investors Service in a report published today.

European Commission

European Commission > Growth > Sectors > Raw materials, metals, minerals and forest-based industries > Industries related to raw materials > Metal industries > The EU steel industry

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Raw materials, metals, minerals and forest-based industries

- Policy and strategy for raw materials
- Areas of specific interest
- Industries related to raw materials
  - Metal industries
    - Non-ferrous metals
    - The EU steel industry
  - Non-metallic minerals

The EU steel industry

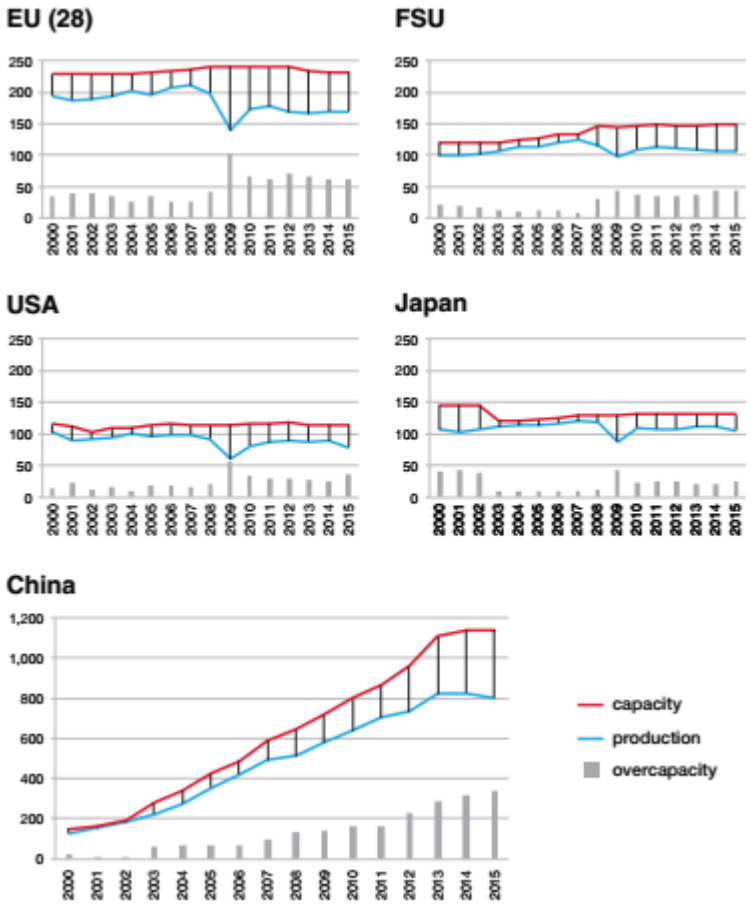
The steel industry has long held a strategic place in the EU economy, fostering innovation, growth, and employment. To face the downturn of steel demand after the economic crisis and ensure a promising future for the sector, the European Commission is working on boosting the industry. Steel is closely linked to numerous industrial sectors such as automotive, construction, electronics and renewable industries.

Why the steel industry is important

- **Production** - the EU is the second largest producer of steel in the world after China. Its output is over 177 million tonnes of steel a year, accounting for 11% of global output.
- **Link to other sectors** – steel-making is closely linked to many downstream industries such as automotive, construction, electronics, and mechanical and electrical engineering. It is vital to the

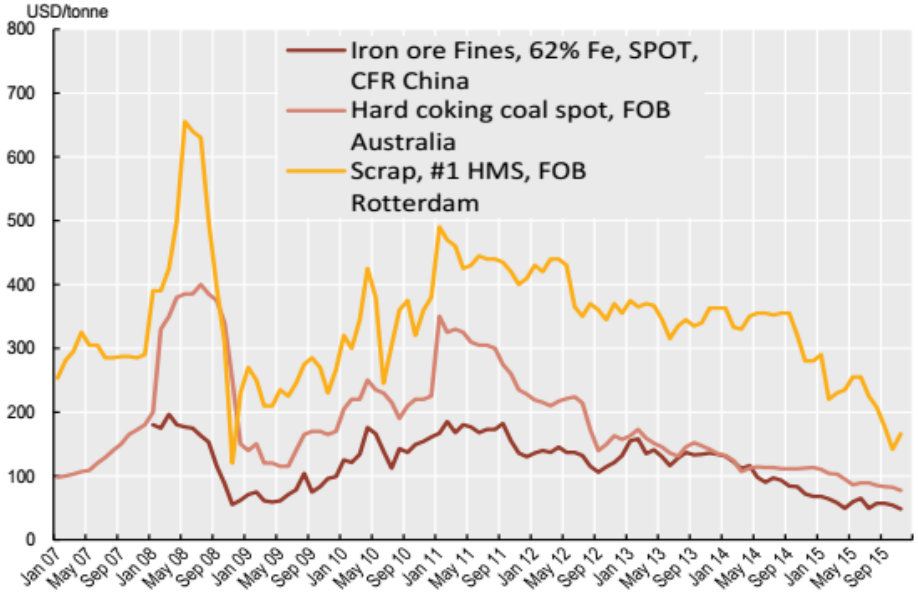
1. Introduction

Regional production, capacity, and overcapacity, in MT



Source: Center on Globalization, Governance & Competitiveness, Duke University 2016

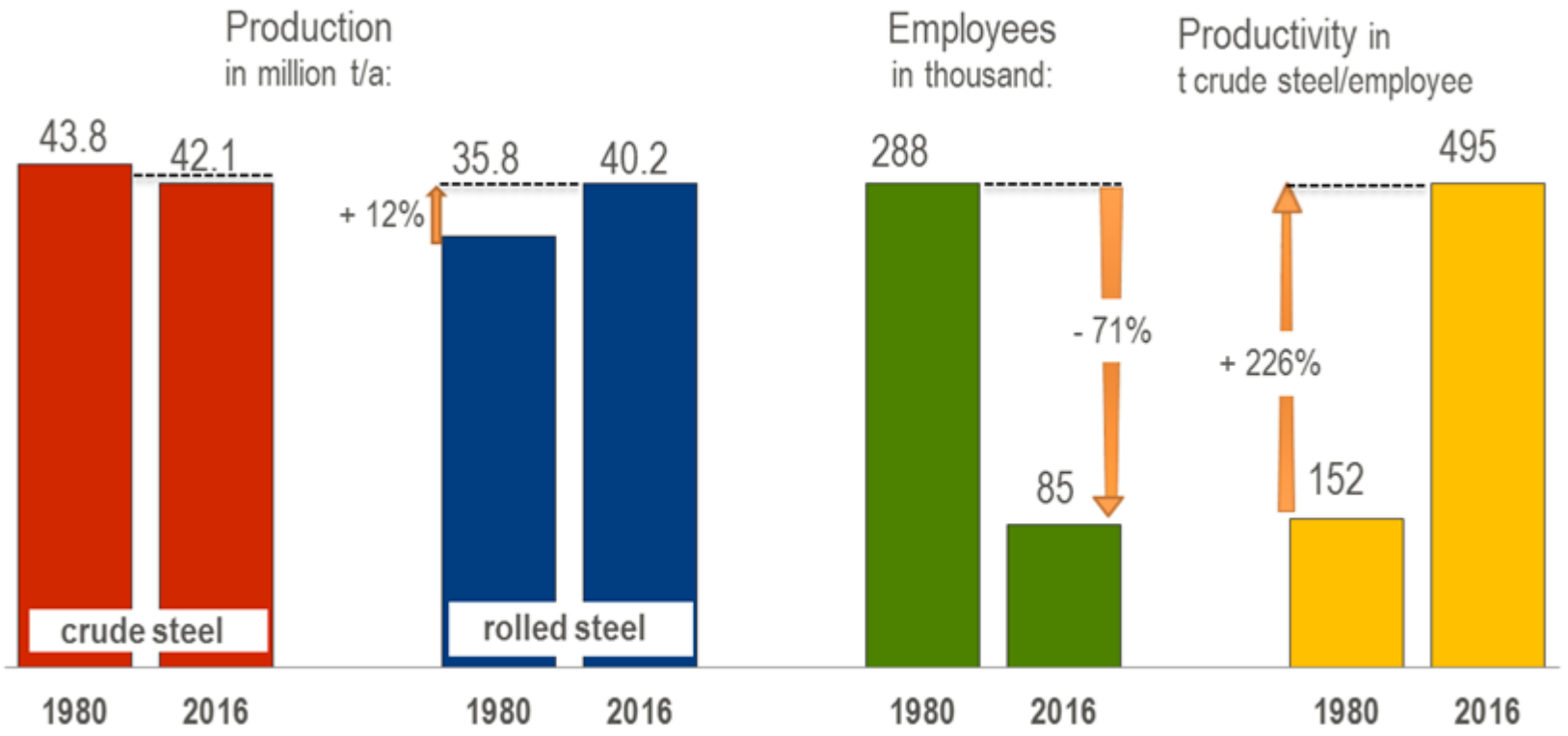
Price for Raw Materials



Source: OECD 2015

1. Introduction

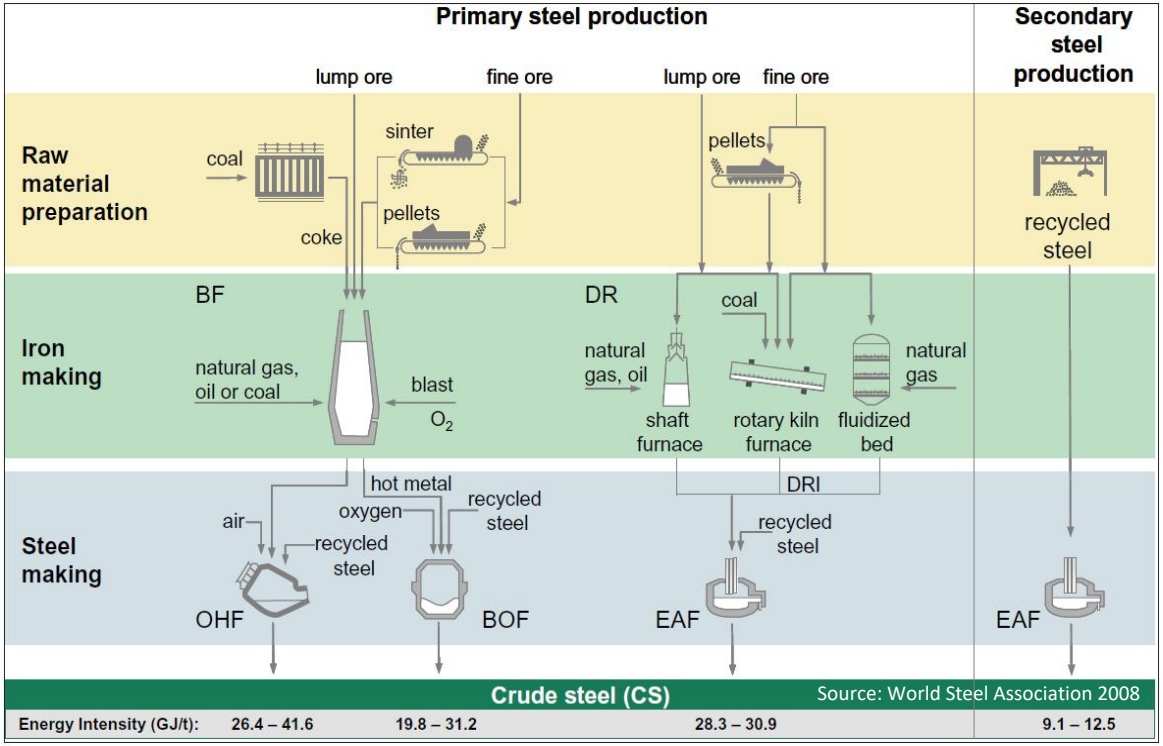
Steel Industry in Germany: Production, Employment and Productivity



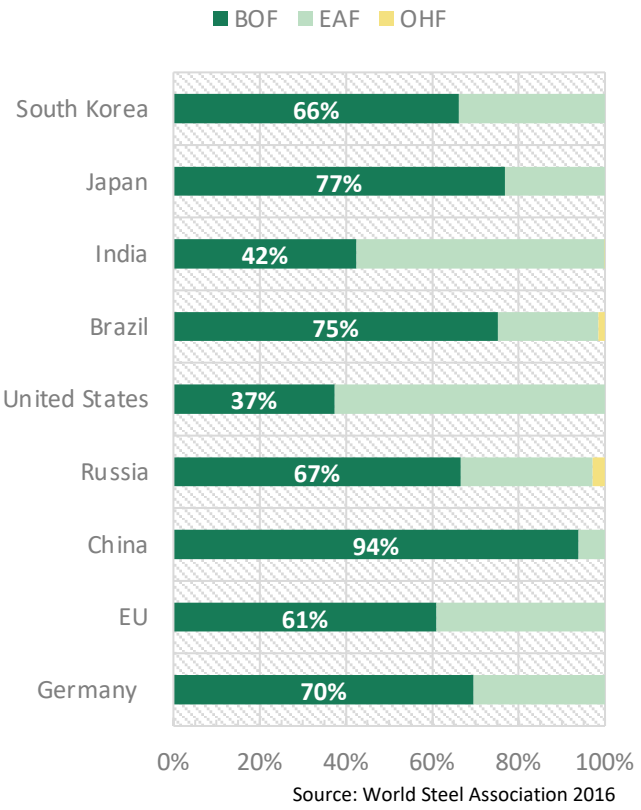
Source: Statistisches Bundesamt; WV Stahl

2. Technological options and cost

Production Lines (BOF/EAF)



Continuous casting	Hot direct rolling (HDR): Billet, Bloom, Slab
Rolling	Section mill, Wire rod, Plate mill, Hot strip mill, Hot rolling, Welded pipe, Seamless pipe
Final products	Roll, Bar, Wire rod, Hot and Cold rolled coil and sheet, etc.

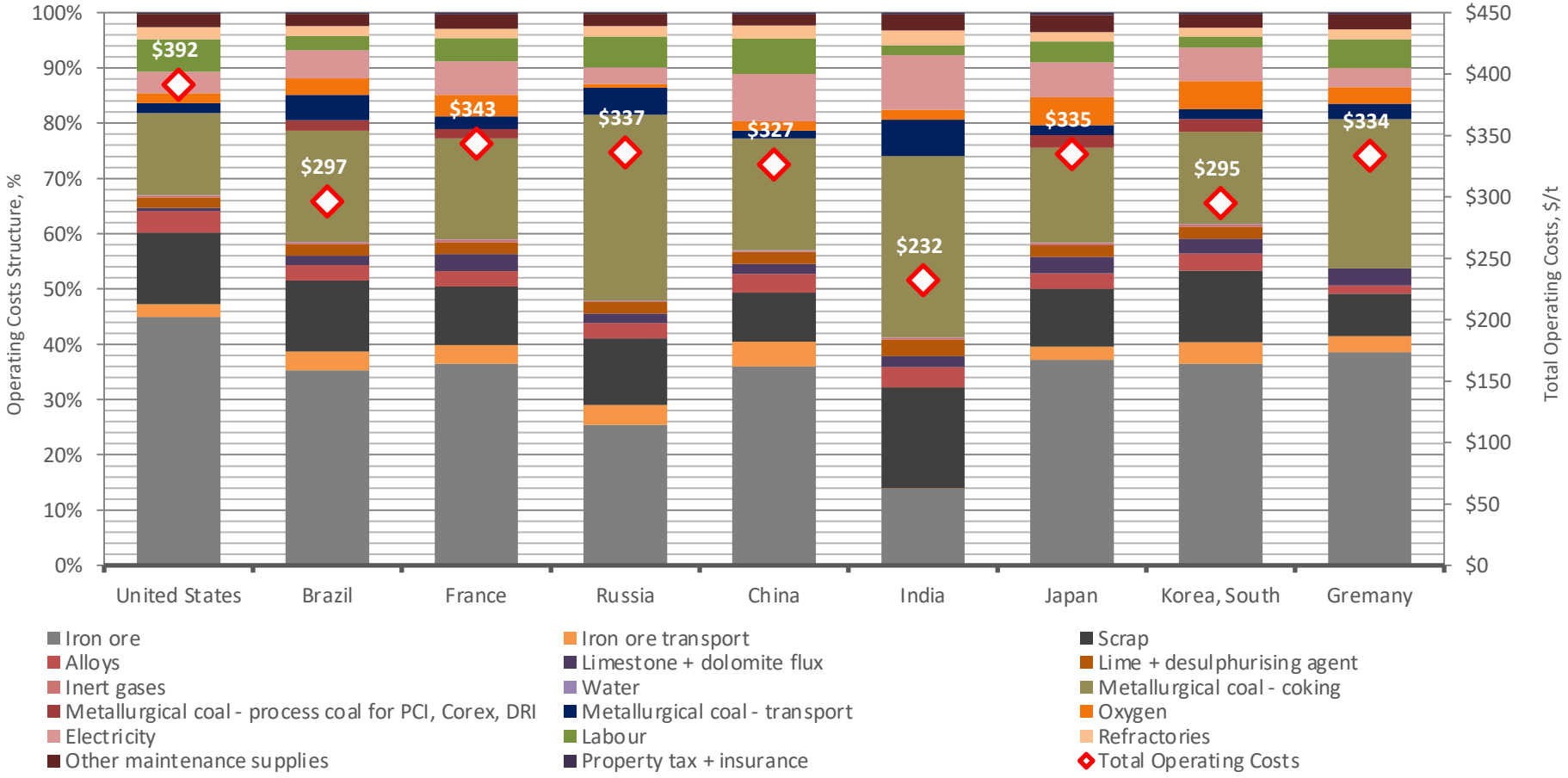


Source: World Steel Association 2016

2. Technological options and cost

Comparison of Production costs (BOF)

General cost structure (including raw materials transport cost)



Source: Own calculations, Steelonthenet 2017
Base year 2014

Research questions

- To what extend additional efficiency measures are necessary to ensure that Germany can compete with China on the European crude steel market?

- How can uncertainties in the initial data and in the development of prices taken into account and what are the consequences of these uncertainties?

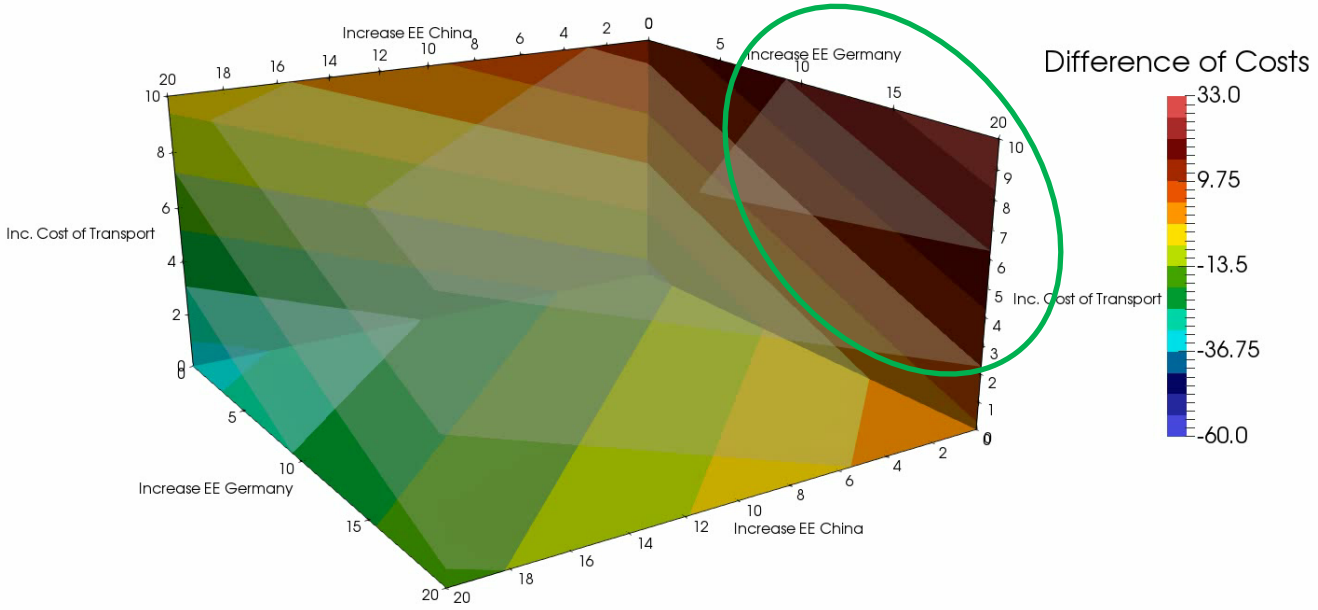
2. Technological options and cost

Method: (Crude) Steel Production Simulation Model CESTEM

- Specific focus on the cost structure:
  - Transport cost (incl. in transportation of raw materials and transportation of steel product)
  - Operating costs of steel production (18 categories, with particular focus on the inclusion of 3 key raw material costs: iron ore, coking coal, scrap)
- **Base year**: 2014
- **Steel producers**: Germany, China, USA, Japan, South Korea, Russia, Brazil, India.
- **Coking coal exporting countries**: Europe, China, Japan, Australia, USA, South America, Indonesia, South Africa, Canada, Russian Federation.
- **Iron ore exporting countries**: Europe, China, Japan, Australia, USA, South America, Indonesia, South Africa, Canada, Russian Federation, Rep. of Korea, India, Central America, Middle East, Brazil.

3. Results

Exploring changes from an increase in raw material prices



Parameter	Steps
Improvement of energy efficiency (EE) in China	up to 20% 20 steps
Improvement of energy efficiency (EE) in Germany	up to 20% 20 steps
Increase in transport costs	up to 200% 10 steps
Market in focus	Europe

Cost difference K reflects by how much the cost of Chinese steel C_{CN} delivered for sale on the European market differs from the cost of German steel C_{DE} sold on the European market:

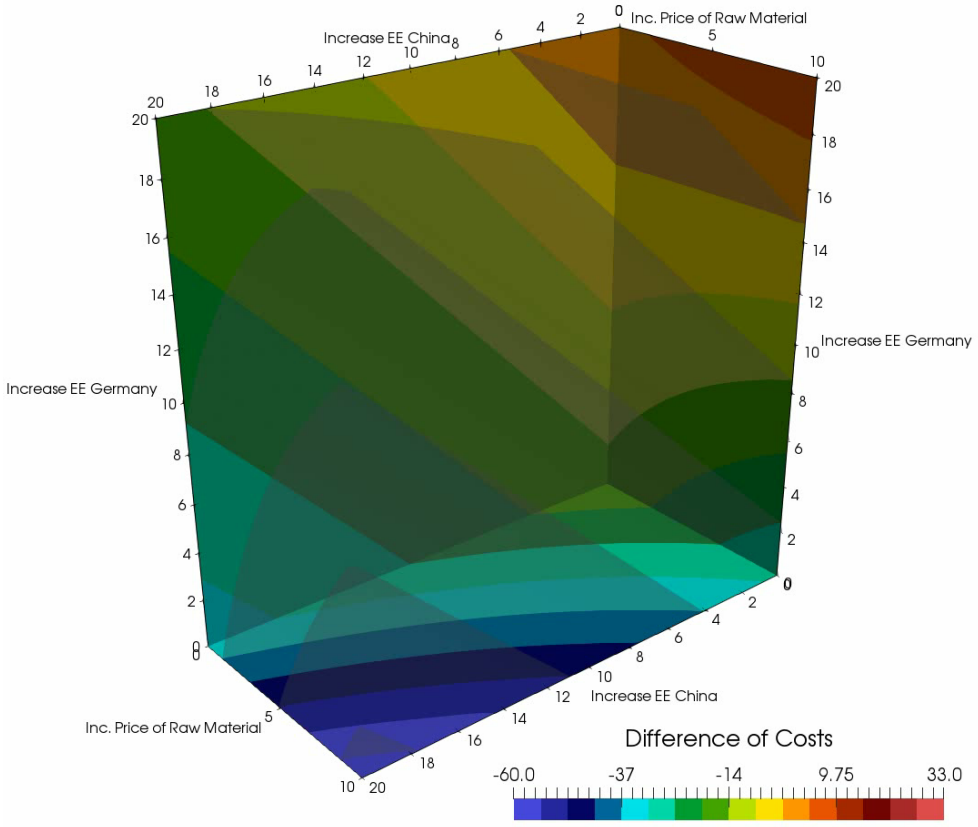
$$K(x, y, z, t) = C_{CN} - C_{DE} = a(z) + b(z)x + c(z)y + d(z)t,$$

where t is transport costs, x is EE China, y is EE Germany and z stands for raw material prices.

From the animation it is seen that combination of **high** transport costs, **low** growth of EE in China, **high** growth of EE in Germany combined with **increasing** raw material prices results in the **highest positive** value of K.

3. Results

Exploring changes from an increase in transport prices



Parameter	Steps
Improvement of energy efficiency (EE) in China	up to 20% in 20 steps
Improvement of energy efficiency (EE) in Germany	up to 20% in 20 steps
Increase in steel making raw materials costs	up to 200% in 10 steps
Market in focus	Europe

The animation indicates that the cost difference is linearly related to the increase of EE in metallurgical sector of Germany and China, as well as to the increase in the transport costs. The cost difference has a non-linear relation to the change in raw material prices.

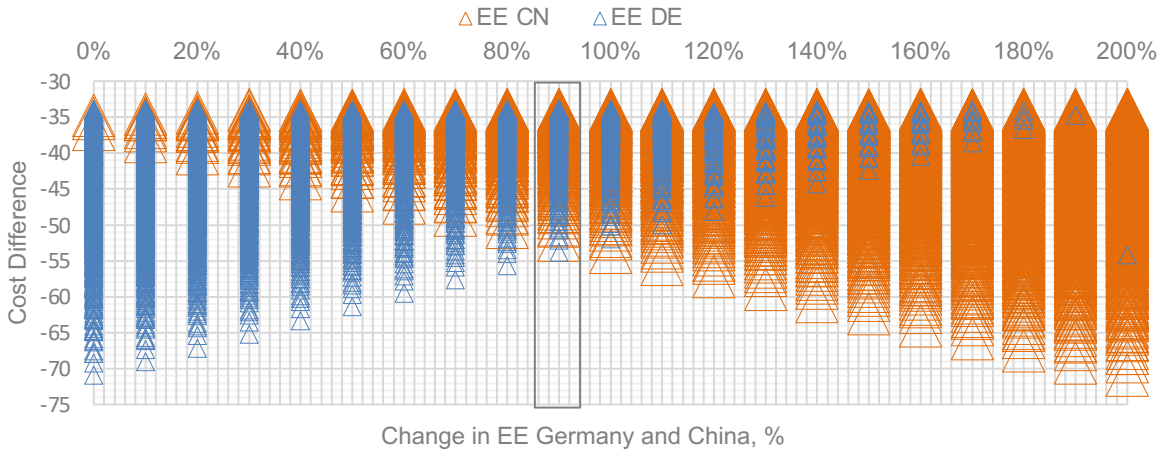
Combination of **low** transport costs, **high** EE in China and **low** EE in Germany gives **highest negative** difference of costs $C_{CN} < C_{DE}$.

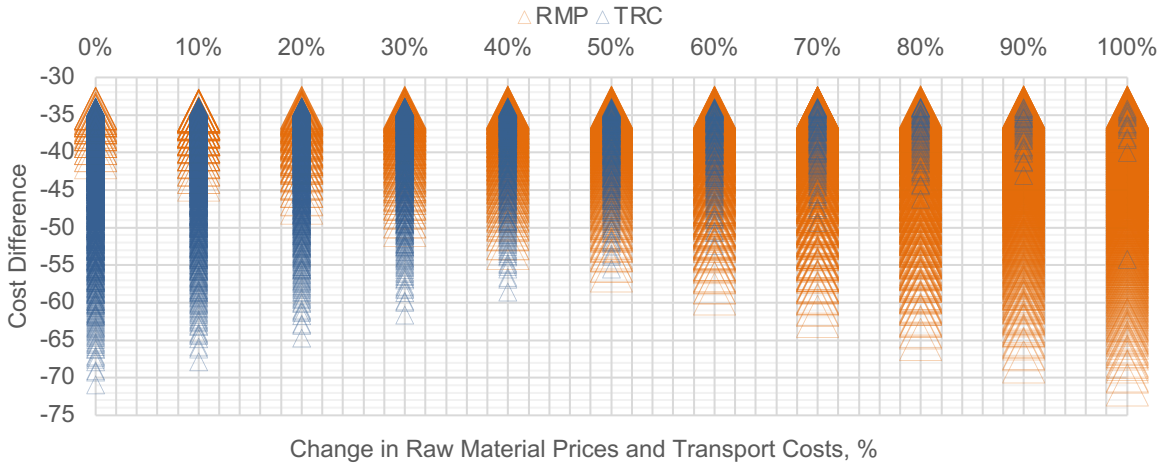
The key message:

If Germany isn't investing in efficiency measures, China (with its high dynamics) will have cost advantages in the long term.

3. Results

Exploring extreme conditions – 5% lowest negative cost difference values





The pace of EE increase in China has a decisive role on the future of the German steel industry:

- high EE growth in China comparative to Germany would result in negative cost differences.

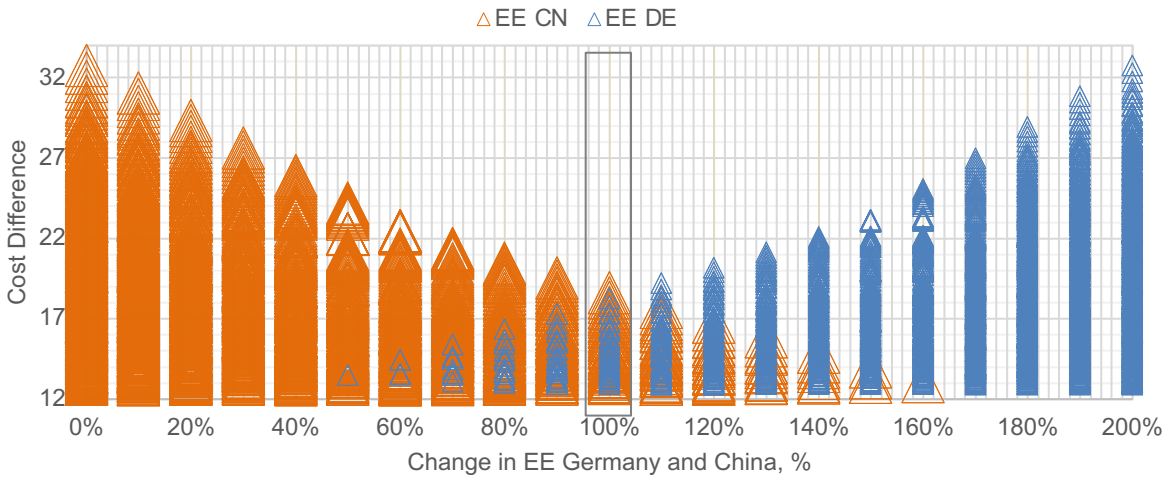
Increase in raw material prices results in negative effect on the cost difference.

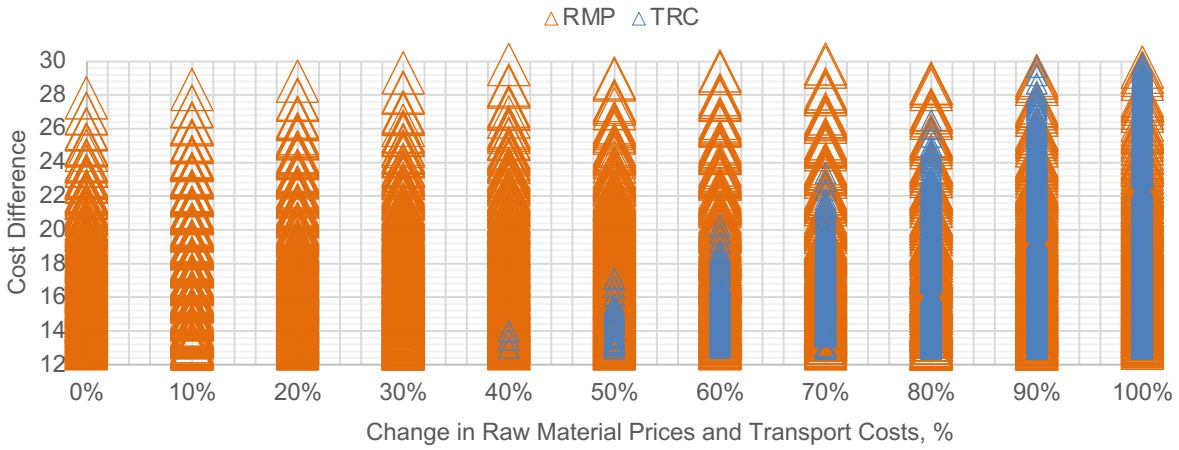
Increase in transport costs has an opposite effect on the cost difference.

Negative cost difference ➔ $P_{CN} < P_{DE}$

3. Results

Exploring extreme conditions – 10% highest positive cost difference values





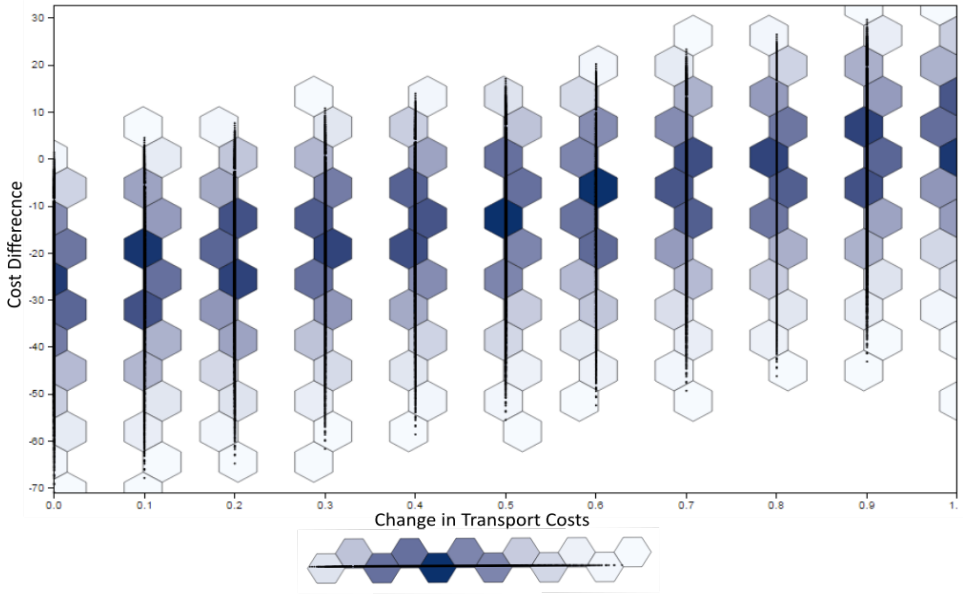
Positive cost difference ➔ $P_{CN} > P_{DE}$

And again, the speed of EE increase in China has a decisive role on the future of the German steel industry:
- low investment in EE measures in China would result in most favorable conditions to Germany.

Increase in raw material prices is not significantly pronounced.

Increase in transport costs at the same time has a clear effect, adding to the opportunity of maintaining positive cost differences at higher growth rates.

3. Results

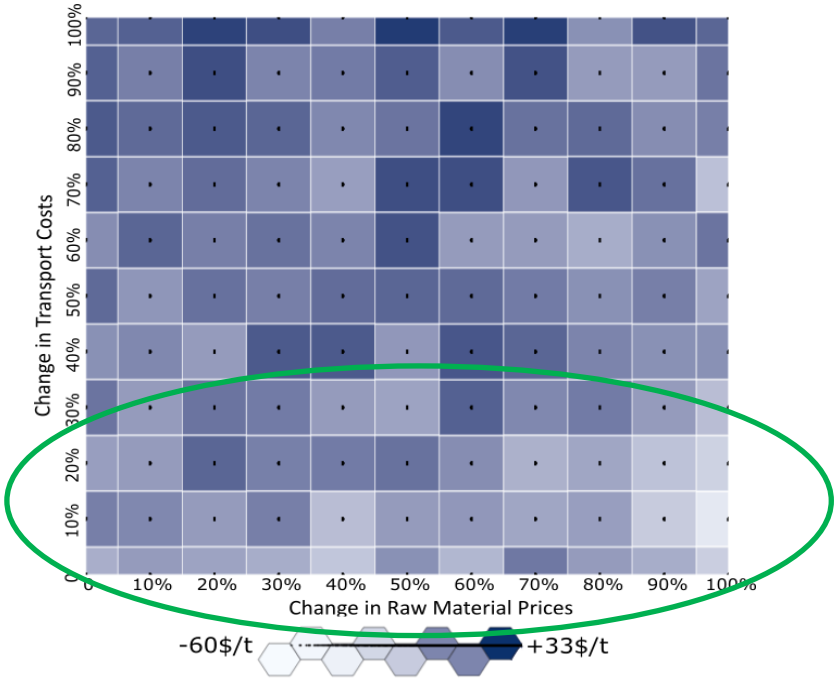


Density of sample points (cost differences) per particular level

Growth of raw material prices has an ambiguous effect:

- growth of transport cost steadily adds to the positive cost difference K,
- while increase in raw material prices has no clear strong negative or positive effect on K.

Consequences of the increase in transport costs can be more clearly seen here: having all other parameters vary, growth of transport cost steadily adds to the positive cost difference K.



Cost differences per particular level

4. Conclusions

- Cost advantage for Germany on the European market is ensured:
  - under the low growth of raw material prices
  - under charter rates increases (both keeping all other parameters fixed and varying)
  - under condition that Chinese energy efficiency increase is considerably less than in Germany.

- However, factors can change simultaneously ➔ therefore an assessment of cost advantages is a complex task:
  - example: If the raw material prices decrease, less increase in the efficiency of German steel making process is needed to compensate efficiency increases in China.

4. Conclusions

- Selected approach can help to assess the impacts of uncertainties in prices for raw materials, etc. on the resulting production cost.

- Next steps:
  - Extension of the analysis by taking more sales markets and more suppliers into consideration.
  - More detailed elaboration of the cost of complete steel production routes (adding elasticities of substitution of main inputs to have a more realistic picture of efficiency changes).
  - Inclusion of steel products down the value added chain.

Thank you