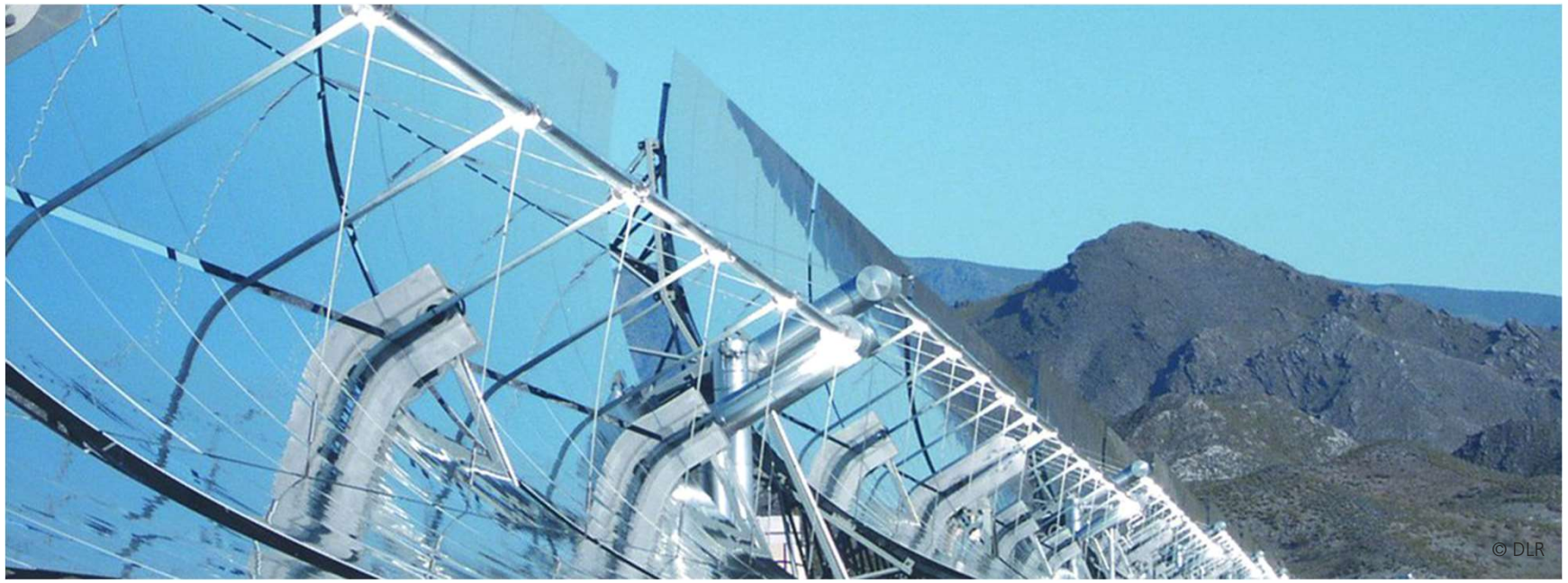
EFFICIENCY VS POWER PRICES TO MAINTAIN COMPETITIVENESS

IAEE Conference Presentation,
4. September 2017, Vienna, by Barbara Breitschopf, co-authored by Vicki Duscha and Jose Ordonnez, Fraunhofer Institute for Systems and Innovation Research,



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The framework of the study

- EU Energy Union
  - sustainable and secure energy supply
  - competitive and affordable prices
  - → 2020/30 targets: GHG, efficiency and renewables, interconnectors
- Options
  - low carbon: efficiency, renewables, carbon capture, fuel switches, innovations, internalisation
  - prices: internal market (infrastructure, market regulations)
- Impacts
  - additional costs → competitiveness of industry
  - distribution of burdens and benefits of of low carbon „energy“
  - → economic growth

- **Focus**: → effects of policies, strategies and impacts of energy intensive industry

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Approach

- Level of analysis:
  - sector (non-ferrous industry)
  - firm (non-ferrous industry)
  - product (steel industry)
- Methods:
  - accounting approach for products and firm: cash-flow of firm, product costs vs price
  - modelling approach for sector: combination of price and quantity IO-model with trade module
- Assumption:
  - low carbon policies increase costs for energy: example RE levy of which energy intensive industry is exempted by a large share → compare situation with and without exemption
  - industries strive to avoid rising costs or decrease in profitability → strategies to mitigate impact of policies

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Strategies of industry

- **short-term**: two extrems, in non-ferrous industry
  - no pass through of higher costs → expected profit → shareholder value
  - pass through of costs → demand of downstream sectors → impact on upstream sectors along value added chain
- **medium-term**: efficiency, in non-ferrous and steel industry
  - increase in production efficiency
  - increase in „system efficiency“
- **long-term:** changes in structures, products and production
  - use of side products or waste material (CO2)
  - new products
  - new processes
  - exits

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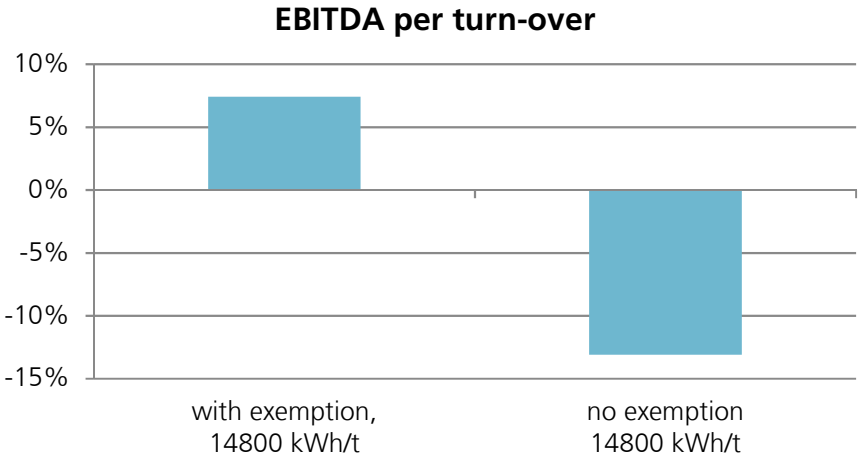
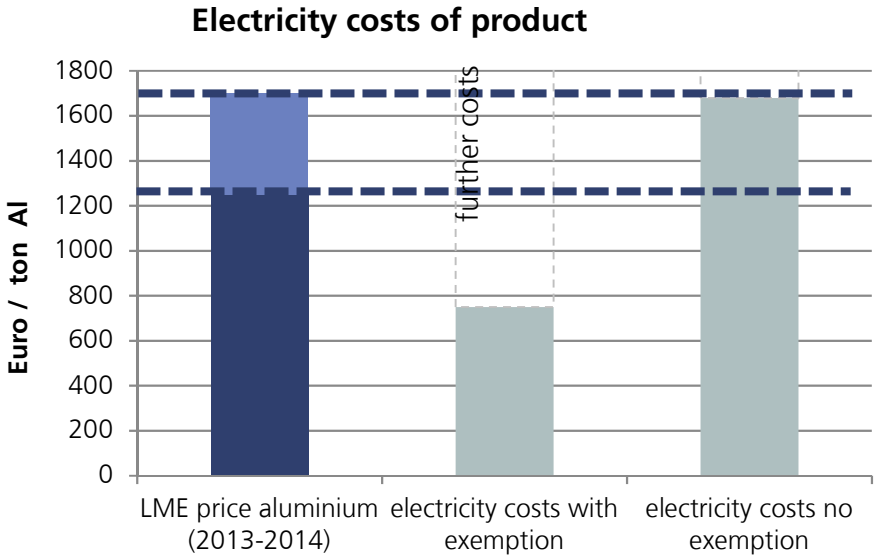
Short-term strategy: no pass through of higher energy costs

- firm and product level:
  impact of higher energy costs on EBITDA, example of Germany, full payment of RE levy in energy intensive industry, analysis based on cash-flow data of a firm, other sources





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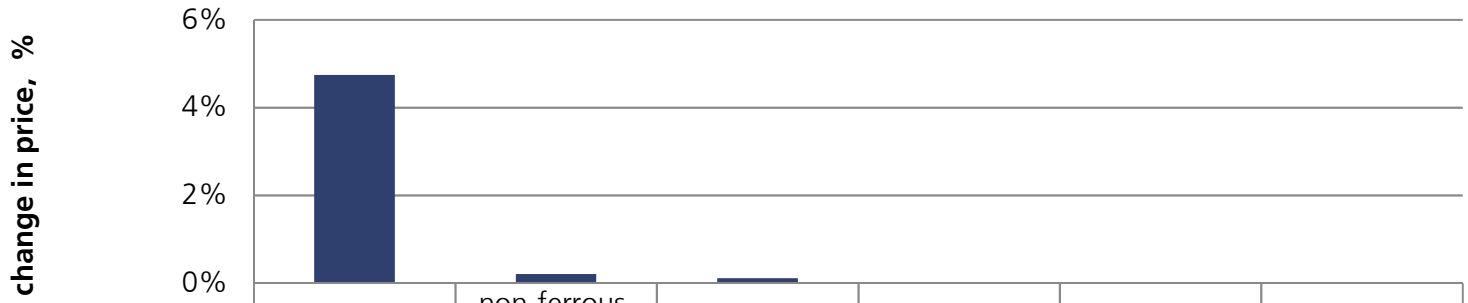
Short-term strategy: cost pass through

- sector level
  IO price model: higher product prices in non-ferrous industry (electricity intensive) and downstream sectors

Change in product prices no exemption for non-ferrous industry



	non-ferrous, electricity-intensive	non-ferrous, electricity non-intensive	foundry products	metal products	other automobile	electrical equipment
average change	4,74%	0,20%	0,11%	0,01%	0,01%	0,01%

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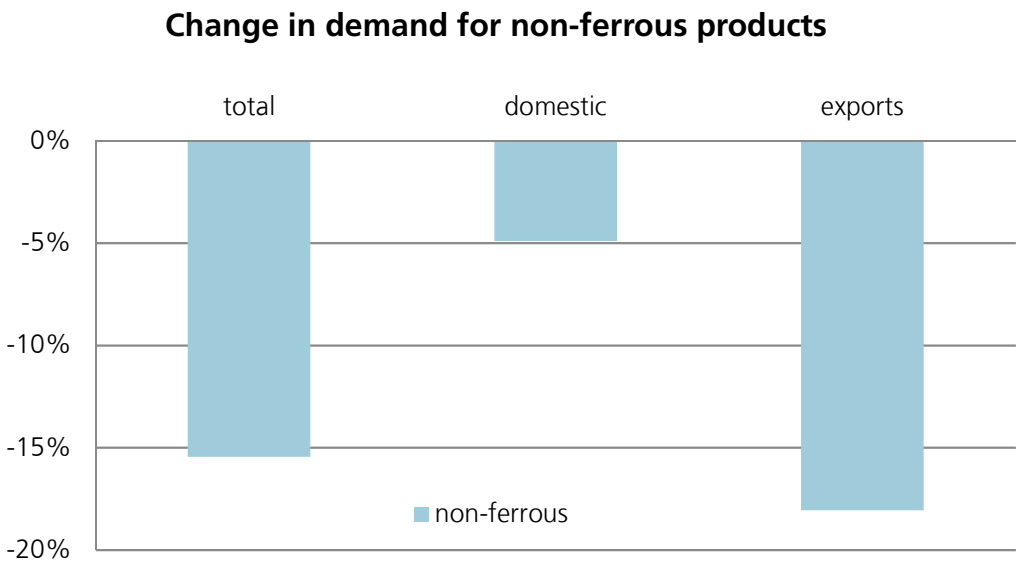
Short-term strategy: cost pass through

- sector level
  trade model: decrease in demand (abroad and domestic) for non-ferrous metal products under cost pass through (no exemption for non-ferrous, energy intensive industry)



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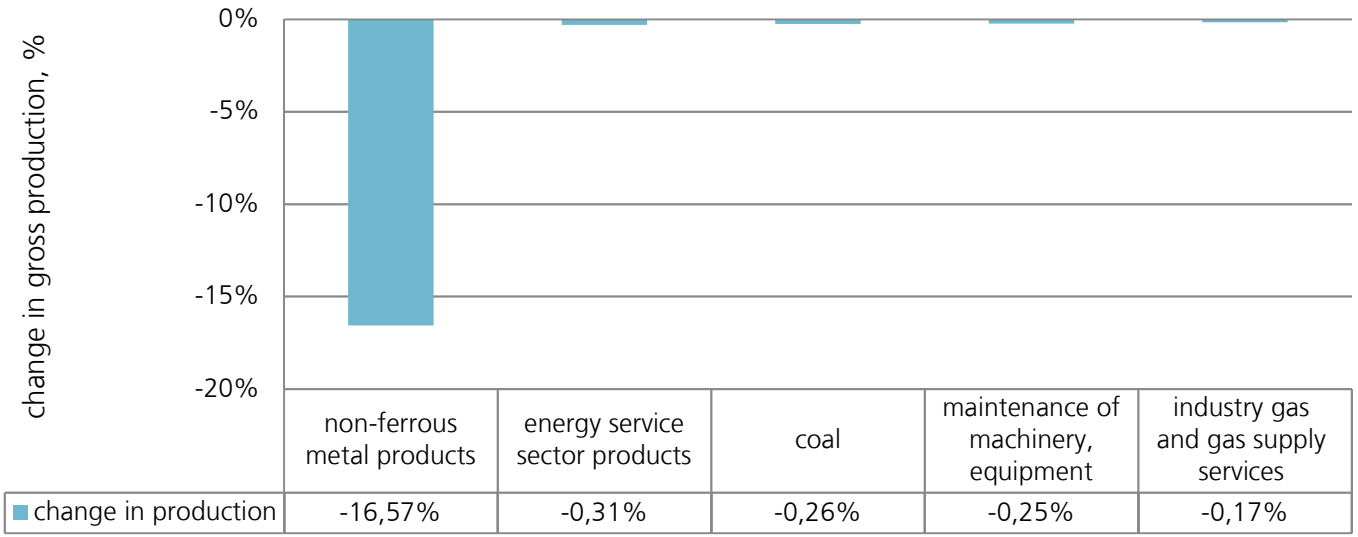
Short-term strategy: cost pass through

- sector level
  IO quantity model: decrease in production of non-ferrous metals in upstream industries

Change in gross production, no exemption in non-ferrous energy-intensive industry



	non-ferrous metal products	energy service sector products	coal	maintenance of machinery, equipment	industry gas and gas supply services
change in production	-16,57%	-0,31%	-0,26%	-0,25%	-0,17%

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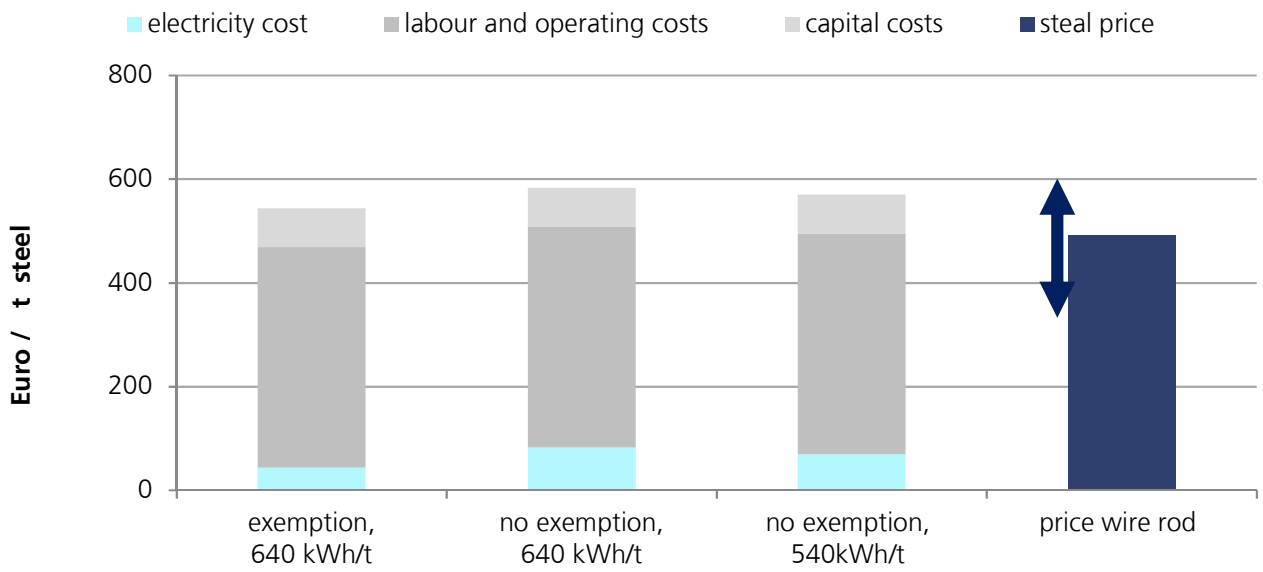
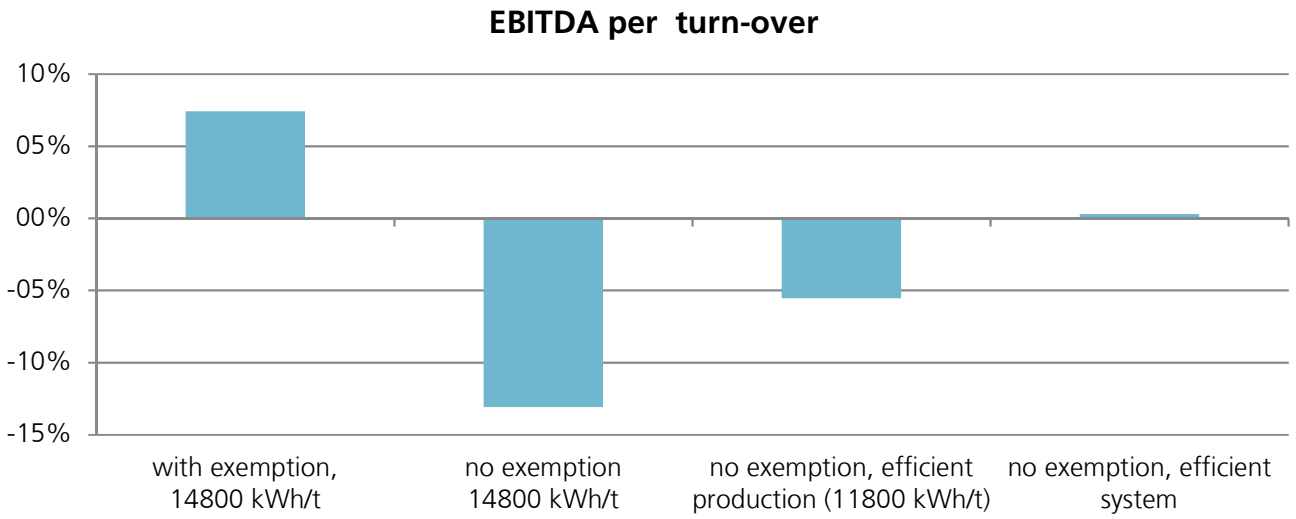
Medium-term: production efficiency at product level

- Cost based analysis, product level: cost per tonne of steel under exemption, energy efficient production



Medium-term: production vs system efficiency at firm level

- Cash-flow based analysis, firm level: flexible consumption (flexibilty) reduces production efficiency, flexiblity requires a certain share of annual consumption to be shifted (capital cost excluded – EBITDA) to compensate high costs



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Critical reflection

- sector level:
  - disaggregation of industries into energy intensive and non-intensive products or industries/branches, static
  - no long- or medium-term perspective
  - further factors neglected: very important is close location to clients to further develop products and human capital
- firm level
  - cases are very specific as high diversity in firms and development over time
  - investment costs excluded
  - no long-term strategy applicable
- product level
  - only short/medium-term perspective
  - volatile prices and differing production costs
- overall results:
  - short-term impact of higher energy costs, but long-term potentials !
  - trade off between efficiency (production) and flexibility (system)

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Thank you for your attention

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