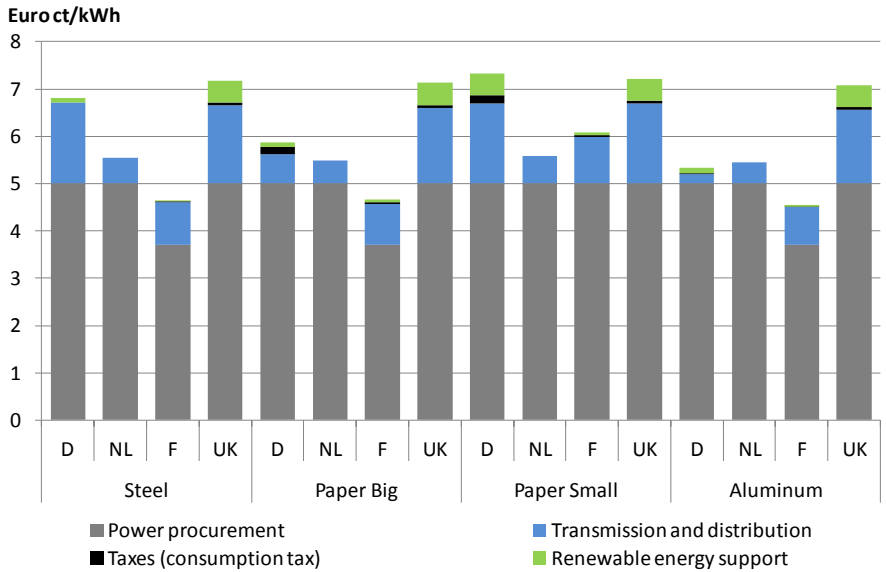
# EFFECTS OF ENERGY AND CLIMATE POLITICAL REGULATIONS ON ELECTRICITY PRICES IN PAPER, STEEL AND ALUMINIUM PRODUCTION

## A comparison for Germany, the Netherlands, the UK and France

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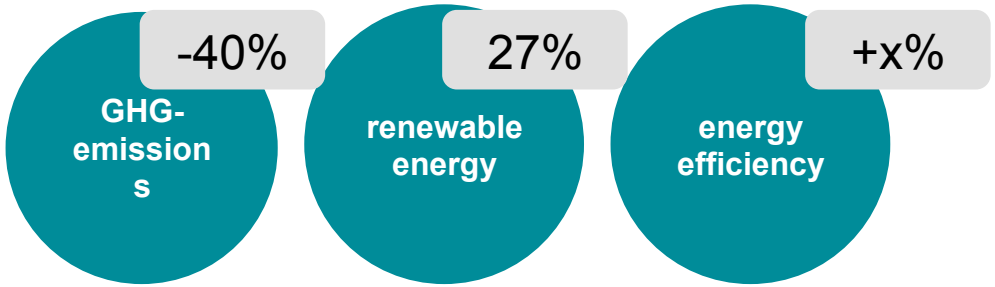
# Motivation

- the 2020 package: EU climate and energy political goals: 20-20-20
- proposal for 2030 framework (decision planned for October 2014)




feed-in tariff

taxation

subsidies/ support programmes

- member states use several instruments to support these goals
- energy political instruments often impact the electricity price
- but, typically exemptions for industry exist (related to international competition)
- potential effects:
  - electricity price divergences across MS, potentially distoring competition
  - potential impact on energy efficiency incentives

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# Focus of the analysis

- energy intensive industry by example of **three industries**
  - paper
  - steel
  - aluminium
- **four European countries**
  - Germany (D)
  - France (F)
  - The Netherlands (NL)
  - UK
- D, F, NL -> leading position in world export share in the selected sectors
- UK: non-continental Europe





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# Methodology

- **definition of stylized companies**
  - annual demand, peak demand, voltage level of connection
  - share of power cost related to gross value added
- **calculation of power price components**
  - focus: policy driven components
  - omitted: spot market power price differences
- **sensitivity Analysis**
  - discontinuation of a core privilege
  - network tariffs
  - effect of increased energy efficiency
- **results**
  - policy driven national power price components
  - for stylized companies from selected industries




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# Selected policy driven power price components

| | |
|---|---|
| transmission and distribution | • Network charges (D, UK, NL, F)<br>• Concession levy (D)<br>• Levy according to §19 of network tariff regulation (D) |
| consumption tax | • Electricity tax (D, NL, F)<br>• Climate Change Levy (UK) |
| renewable energy support and other levies | • Levy according to the renewable energy law (EEG-Umlage) (D)<br>• offshore grid connection liability levy (D)<br>• combined heat and power generation levy (D)<br>• SDE+ (NL)<br>• CSPE (F)<br>• Renewables Obligation (UK)<br>• Carbon Price Floor (UK) |




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# Assumptions for Stylized Companies from the Paper, Steel and Aluminum Sector

| | | Pulp and Paper | | Steel | Aluminum |
|---|---|---|---|---|---|
| | | **small paper company** | **big paper company** | **electro steel** | **primary smelter** |
| **production volume:** | t/a | 20,000 | 500,000 | 1,000,000 | 150,000 |
| **electricity intensity** | kWh/t | 1,300 | 1,300 | 792 | 15,000 |
| **electricity demand:** | GWh/a | 26 | 650 | 792 | 2,250 |
| **peak demand/ connection capacity:** | MW | 4,3 | 87 | 120 | 265 |
| **full load hours** | h/a | 6,000 | 7,500 | 6,600 | 8,500 |
| **share of electricity cost in gross value added** | | > 20% | > 20% | 15%< x<20% | > 20% |
| **share electricity cost in turnover:** | | >5% | >5% | >5% | > 5% |
| **turnover per ton*** | euro/t | 691 | | 846 | 8,086 |
| **value added per ton*** | euro/t | 139 | | 137 | 1417 |

* based on EUROSTAT for turnover and value added and VDP for paper production, wordsteel.com for raw steel production and metalstatistics 2010 for aluminum production (primary and secondary).




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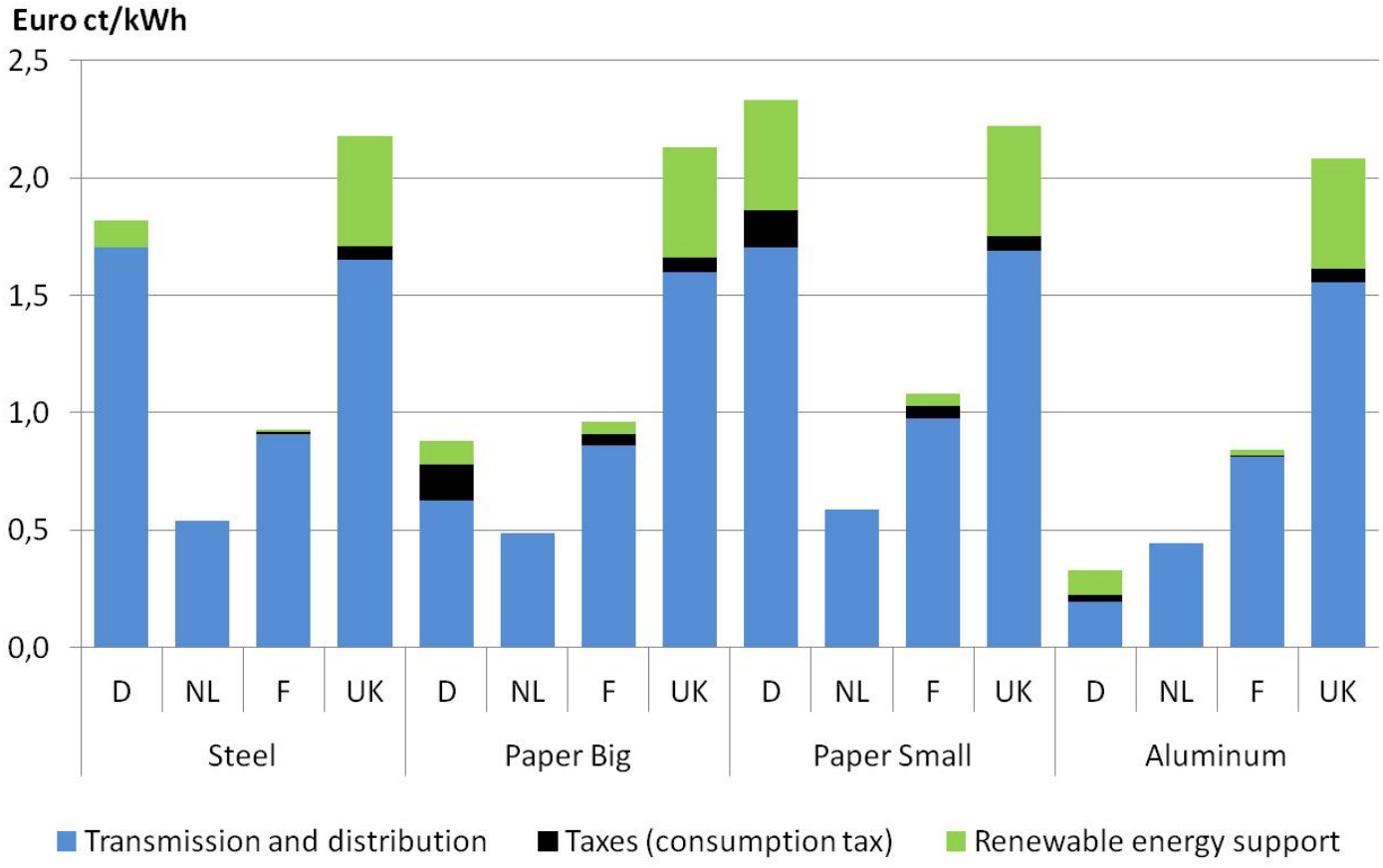
# Results – Base Case

**network tariffs, electricity tax, and renewable energy apportionments in the electricity price for the stylized companies across countries**







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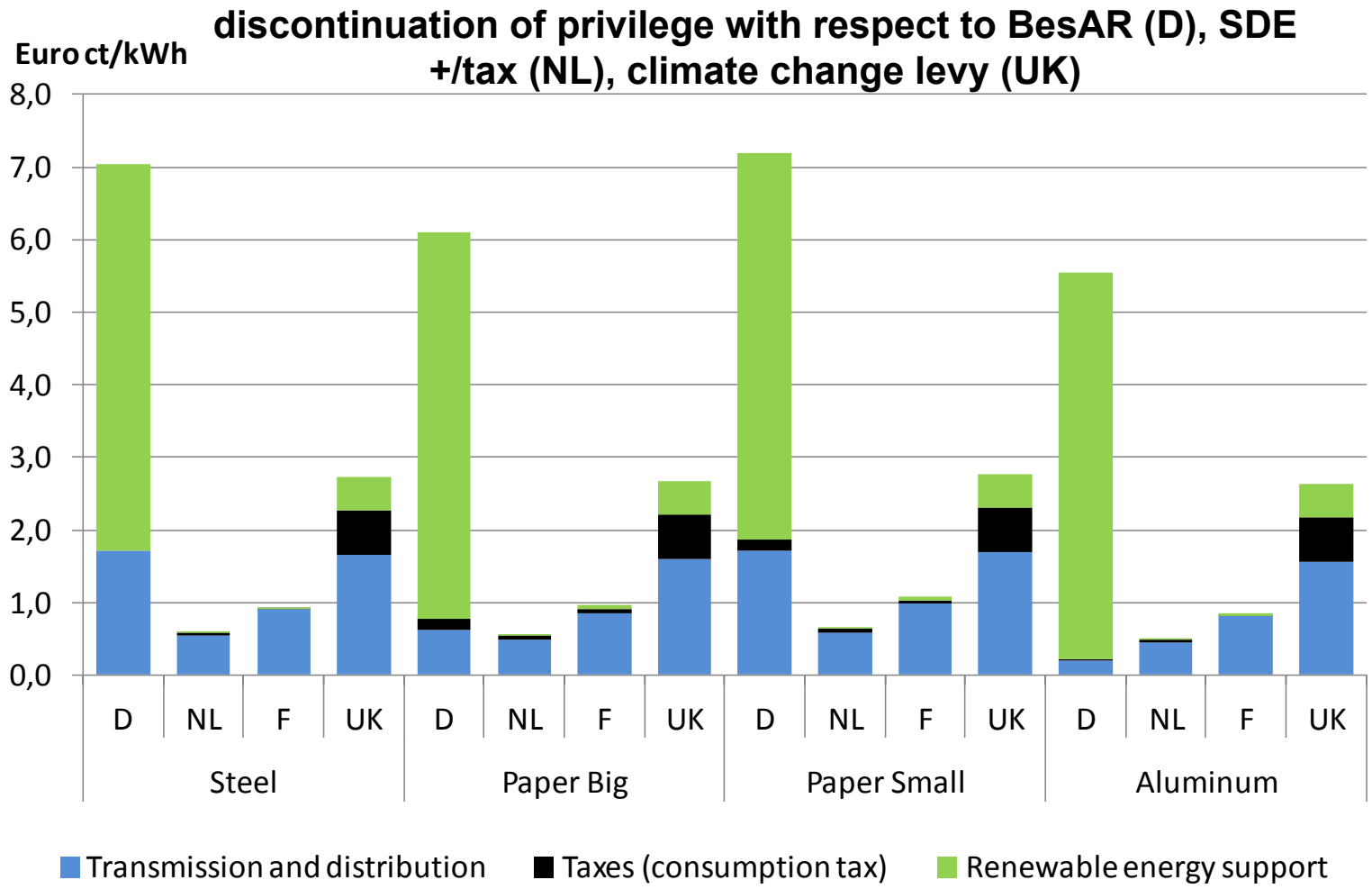
# Results – Sensitivity Analysis



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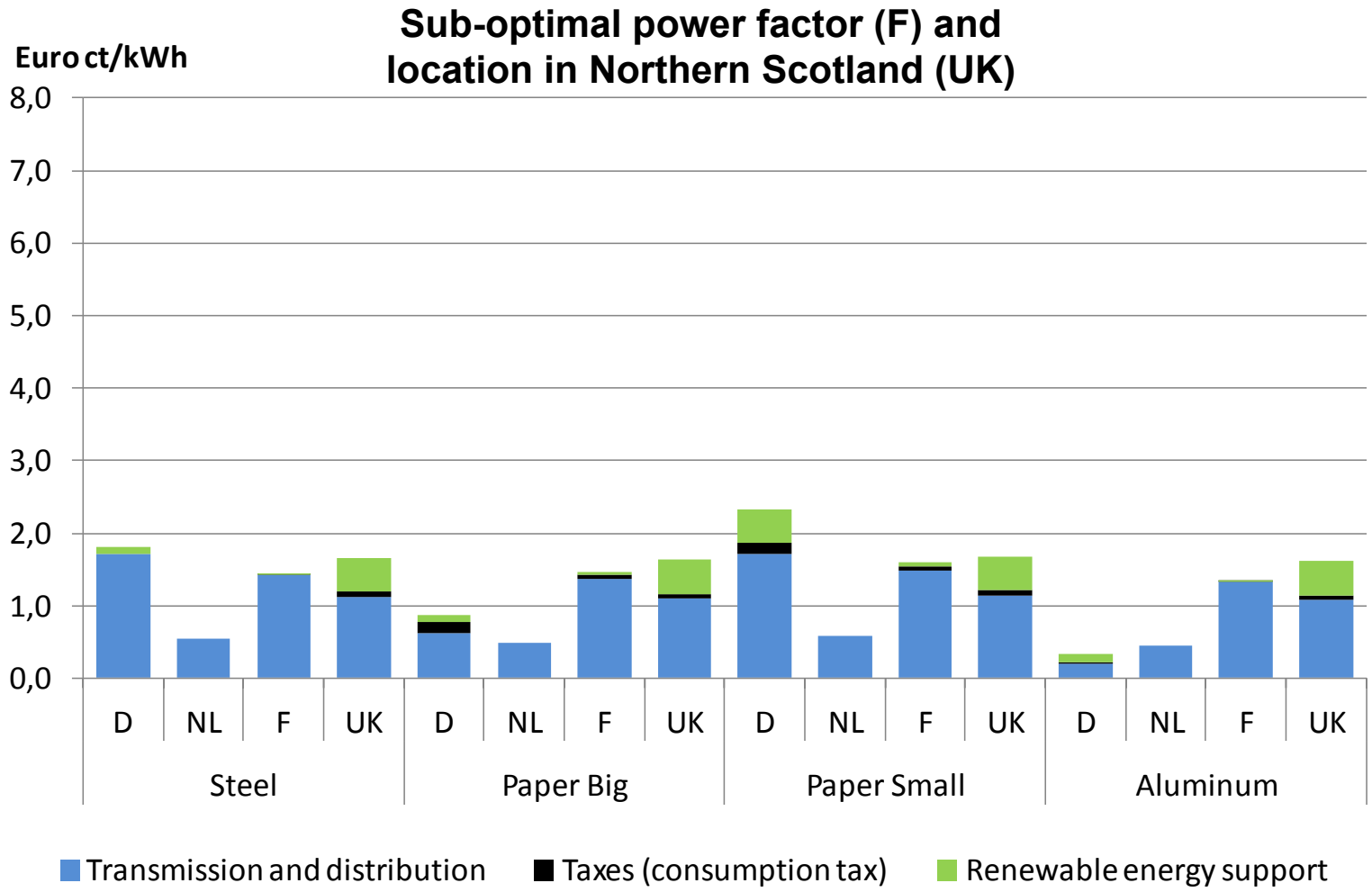
# Results – Sensitivity Analysis (cont‘d)







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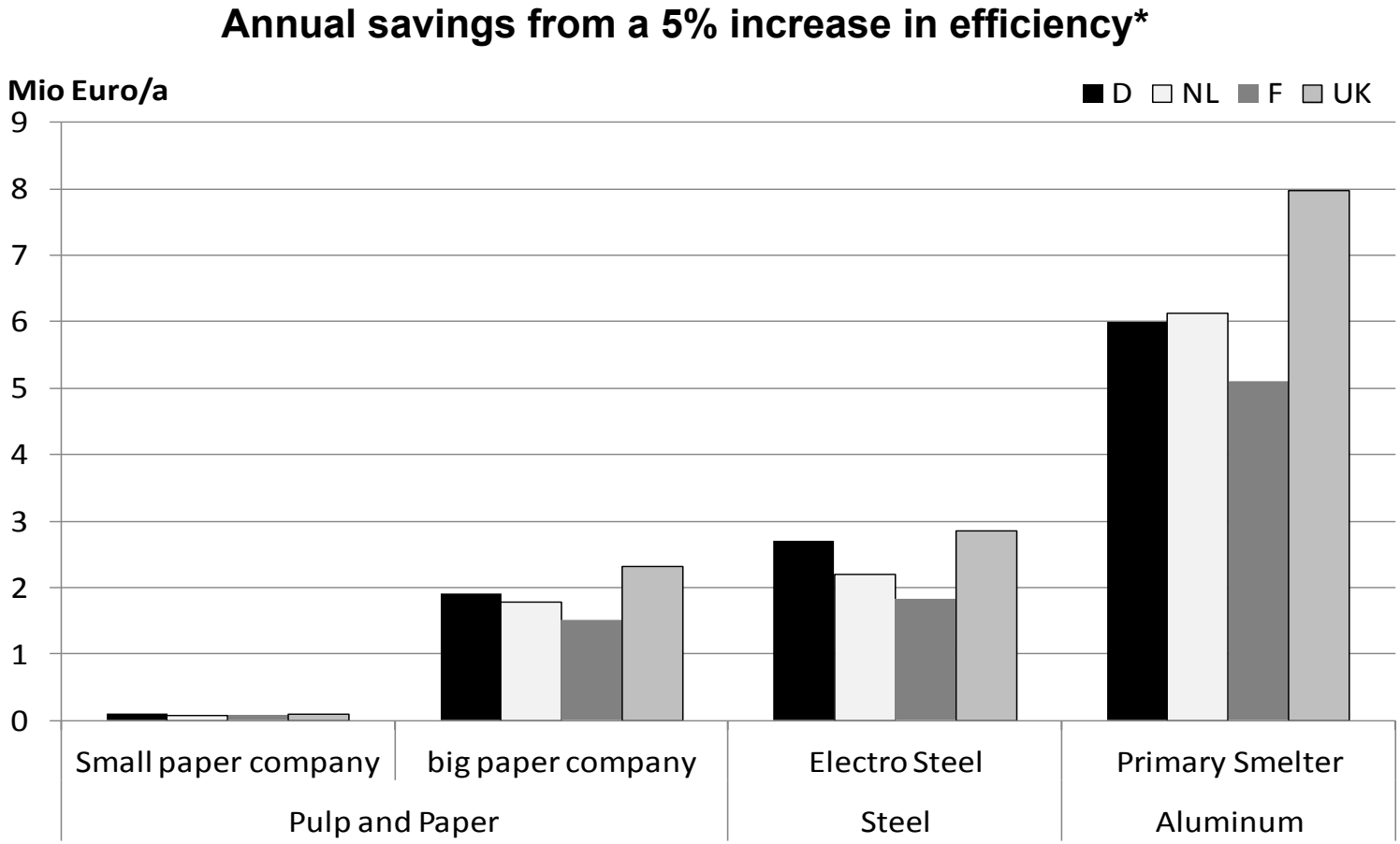
# Results – Impact of Energy Efficiency




* Related to the specific electricity consumption per ton of product
based on net power prices assuming procurement cost of 5ct/kWh

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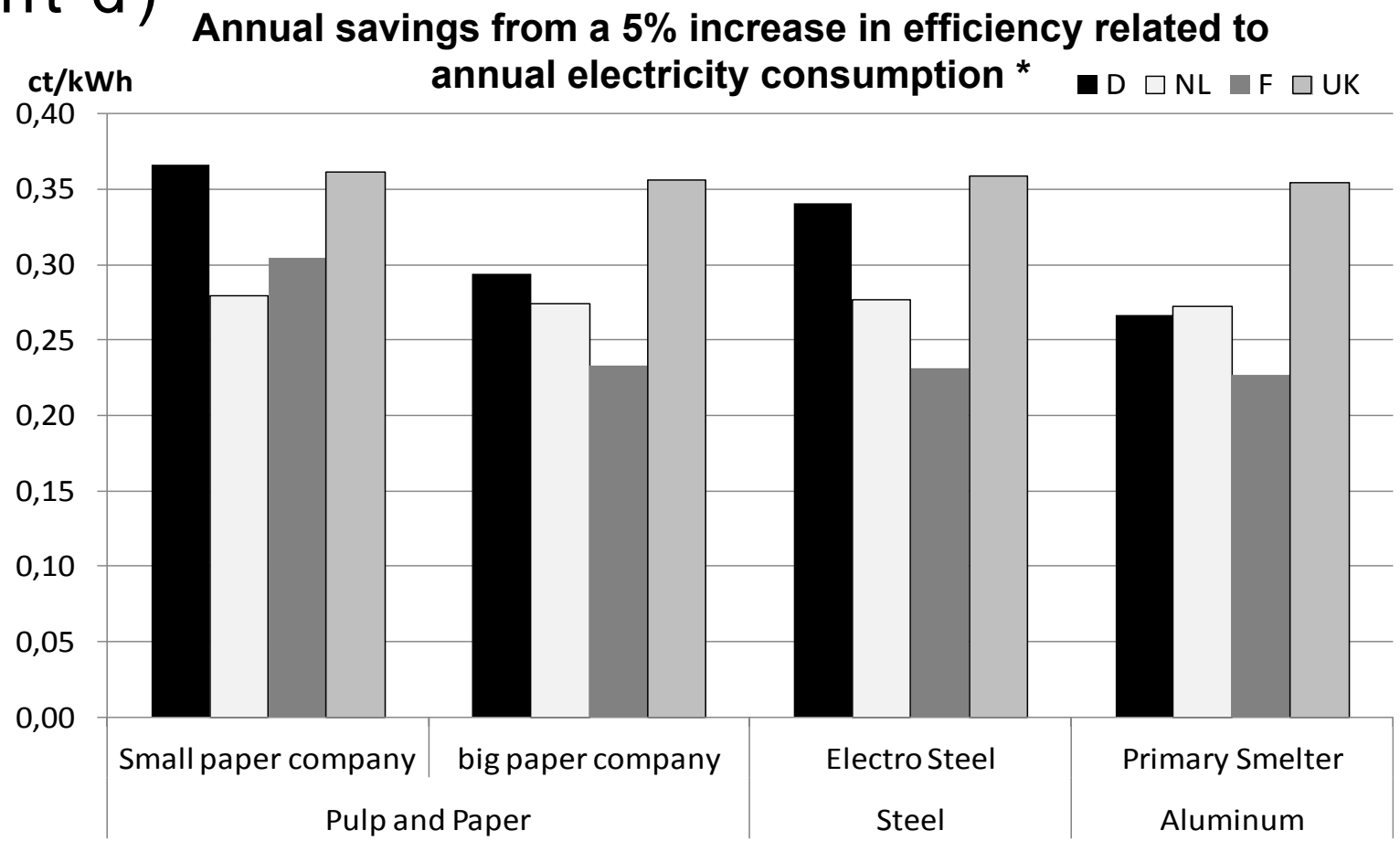
# Results – Impact of Energy Efficiency (cont'd)




* Related to electricity consumption before the efficiency improvement based on net power prices assuming procurement cost of 5ct/kWh

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# Conclusions

- Prices are relatively homogenous within countries, but differ  by 1.7 ct/kWh to 2.6 ct/ kWh for the same companies across countries
- Germany has the highest reductions, but also the largest potential burden
- In Germany, size matters (via the threshold values for BesAR)
- UK and Germany have the highest burdens for the examined companies in the base case

- Consumption dependent privileges and the price reduction could potentially mitigate incentives for energy efficiency
- But: UK, Germany and the Netherlands couple the exemptions on measures to improve energy efficiency
- Furthermore, other barriers to energy efficiency than profitability are likely more important
- Coupling privileges with energy efficiency improvements seems a promising way forward




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Thanks for your attention. Do you have questions?

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