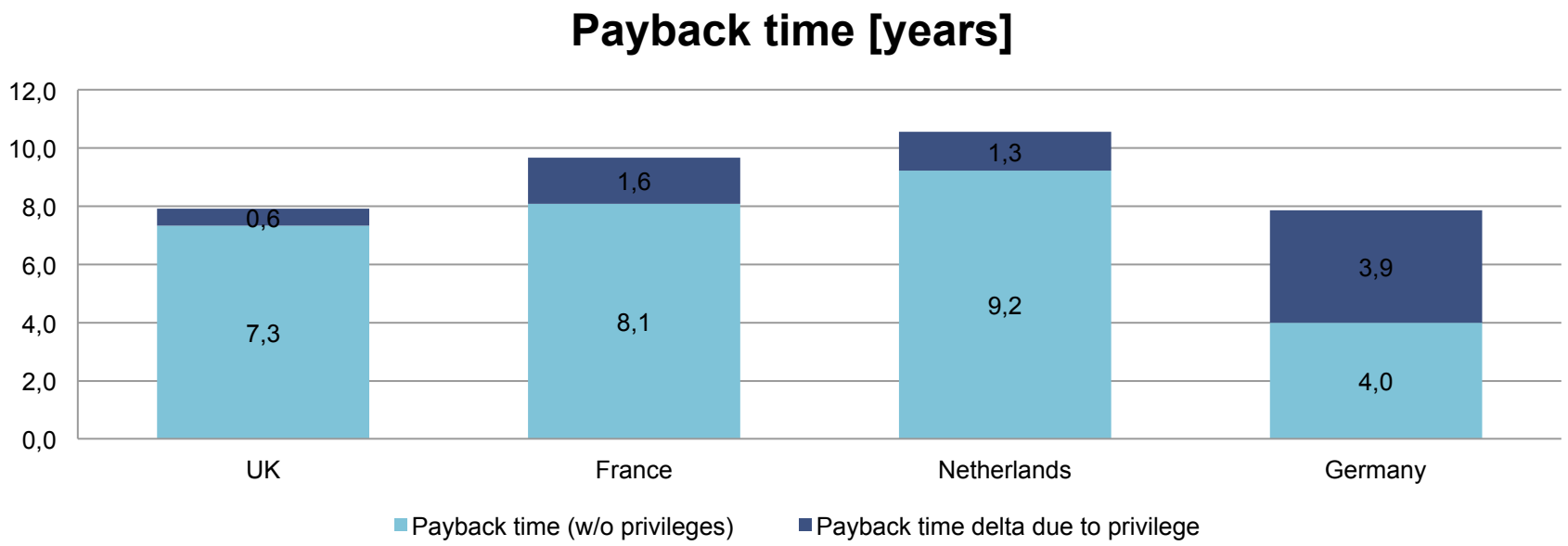
INDIRECT AND UNINTENDED INFLUENCE OF ENERGY POLICY INSTRUMENTS ON ENERGY EFFICIENCY INVESTMENT

An analysis for the pulp and paper industry



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Background & Problem statement

- Policy driven levies (e.g. for renewables)
- Preferential treatment
- Investigation EU-Commission
- How strong is the influence of privileges with regard to policy-driven power price components for industrial electricity consumption on the profitability of energy-efficient investment ?
- How strong does this influence differ between the compared member states?

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Background & Problem statement

- Energy intensive industry
- Paper Production
- Market situation
- 4 countries
- Exemplary analysis for a sample paper mill
- Refining
  - only stock preparation (no pulp production)
  - exchange of the refiner into a more energy efficient one

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Assumptions

Production volume:	20.000t/a
Electricity intensity:	1.300 kWh/t
Electricity demand:	26 GWh/a
Peak demand/ connection capacity:	3 MW
Full load hours:	6.000
Share of electricity cost in gross value added:	> 20%
Share electricity cost in turnover:	> 5%
Share of electricity cost on product cost:	< 50%
Grid connection	> 250 kVA

- Electricity price components
- **Transmission and distribution**
  - No privileges considered
- **Taxes (consumption tax)**
  - Tax reductions in Germany, Netherlands and the UK
- **Renewable energy support**
  - Privileges applied in Germany, France, Netherlands
- **Outcome:** privileged and non privileged electricity prices

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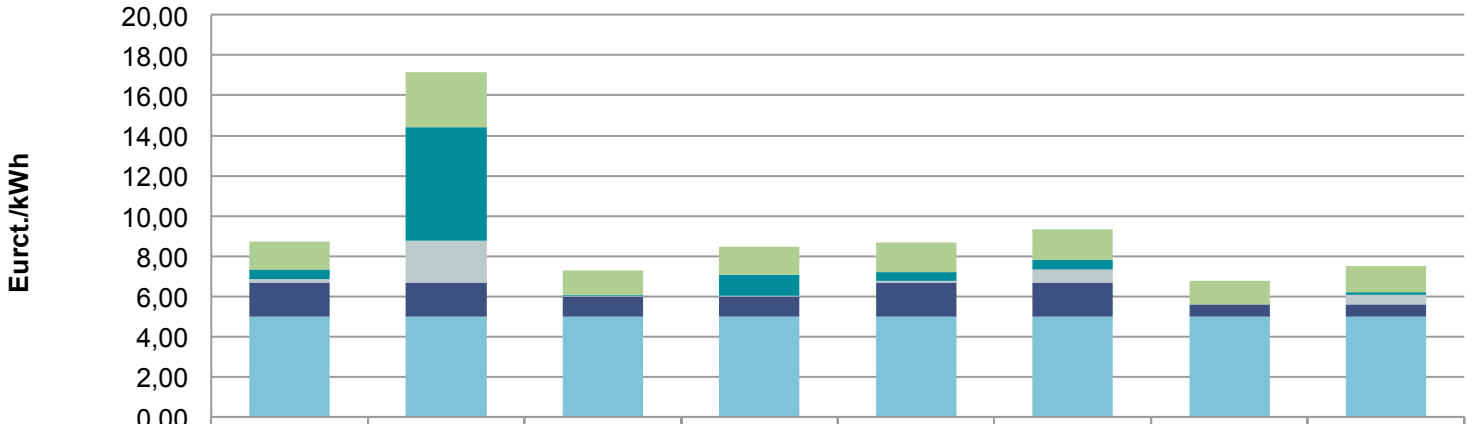
Assumptions

Electricity price assumption



	with privilegs	without privileges	with privilegs	without privileges	with privilegs	without privileges	with privilegs	without privileges
	Germany		France		UK		Netherlands	
Value added tax	1,39	2,74	1,20	1,39	1,44	1,56	1,17	1,30
Renewable energy support	0,47	5,65	0,05	1,05	0,47	0,47	0,00	0,14
Taxes (consumption tax)	0,16	2,05	0,05	0,05	0,06	0,64	0,00	0,47
Transmission and distribution	1,70	1,70	0,98	0,98	1,69	1,69	0,59	0,59
Power procurement	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00
Gross electricity price	8,72	17,15	7,28	8,47	8,66	9,35	6,76	7,50

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Assumptions

Technical Assumptions for the change of the refiner	
Saving potential [MWh/t]	0.03
Annual increase of electricity price [%]	1.00
Minor overhaul (every year, % of total investment)	0.5
Major overhaul (after 10 years, % of total investment)	5

Financial Assumptions	
First year of operation	2015
Depreciation years	20
Initial project costs	
Specific project hardware cost [euro/t of capacity]	15.7
Project development cost (% of hardware cost)	5
Project implementation cost (% of hardware cost)	10
Origin of funds	
Shareholders' equity (equity ratio) [%]	100

- Internal rate of return (IRR) &
- Static payback time for each country

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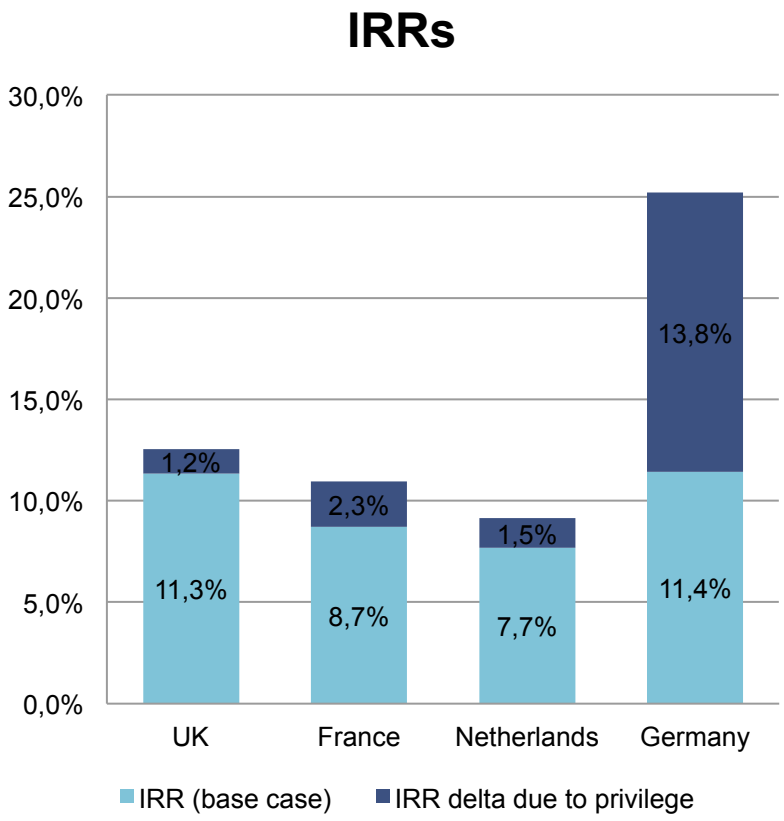
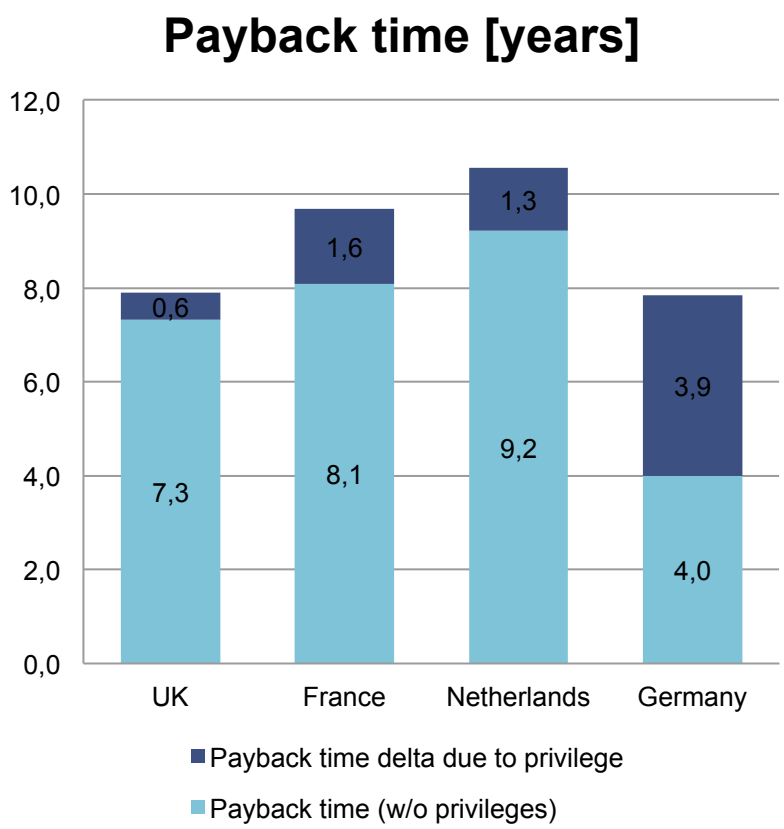
Results





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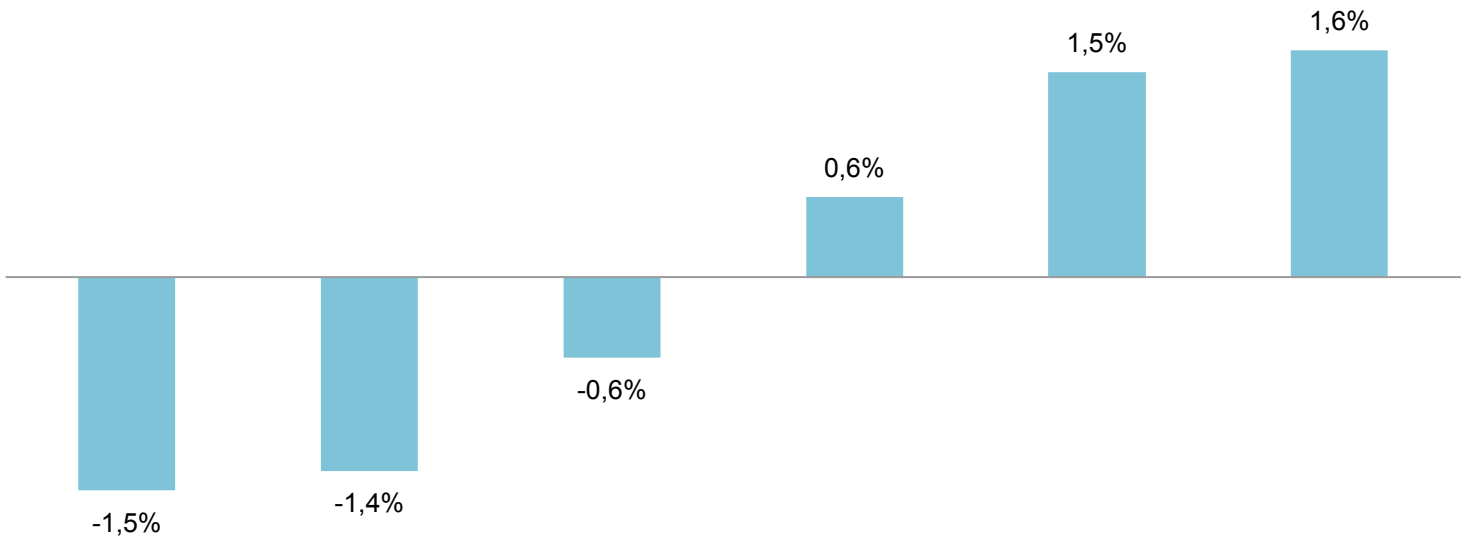
Results



	Electricity savings -10%	Investment cost +10%	Electricity price increase -50% per year (0,5% instead of 1%)	Electricity price increase +50% per year (1,5% instead of 1%)	Electricity savings +10%	Investment cost -10%
Delta in IRR	-1,5%	-1,4%	-0,6%	0,6%	1,5%	1,6%

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Conclusions

- IRR deviates up to 3.7% among compared countries
- IRR deviation due to privileges up to 2.3% in the UK, France and Netherlands
- IRR is in Germany 13.8% lower due to privileges compared to the unprivileged case
- IRR is highest in Germany
- High privileges may cause uncertainty
- Answering with efficiency ?
  - Comparing the highest and lowest price (30%difference)
  - Increase of 23% in electrical efficiency necessary
  - No other benefits are benchmarked

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