ELECTROWATT-EKONO
Jaakko Pöyry Group

ILEX ENERGY CONSULTING

Implications of the EU-ETS for the power sector and electricity prices

Ofgem discussion day

Andrew Nind

22 February 2005

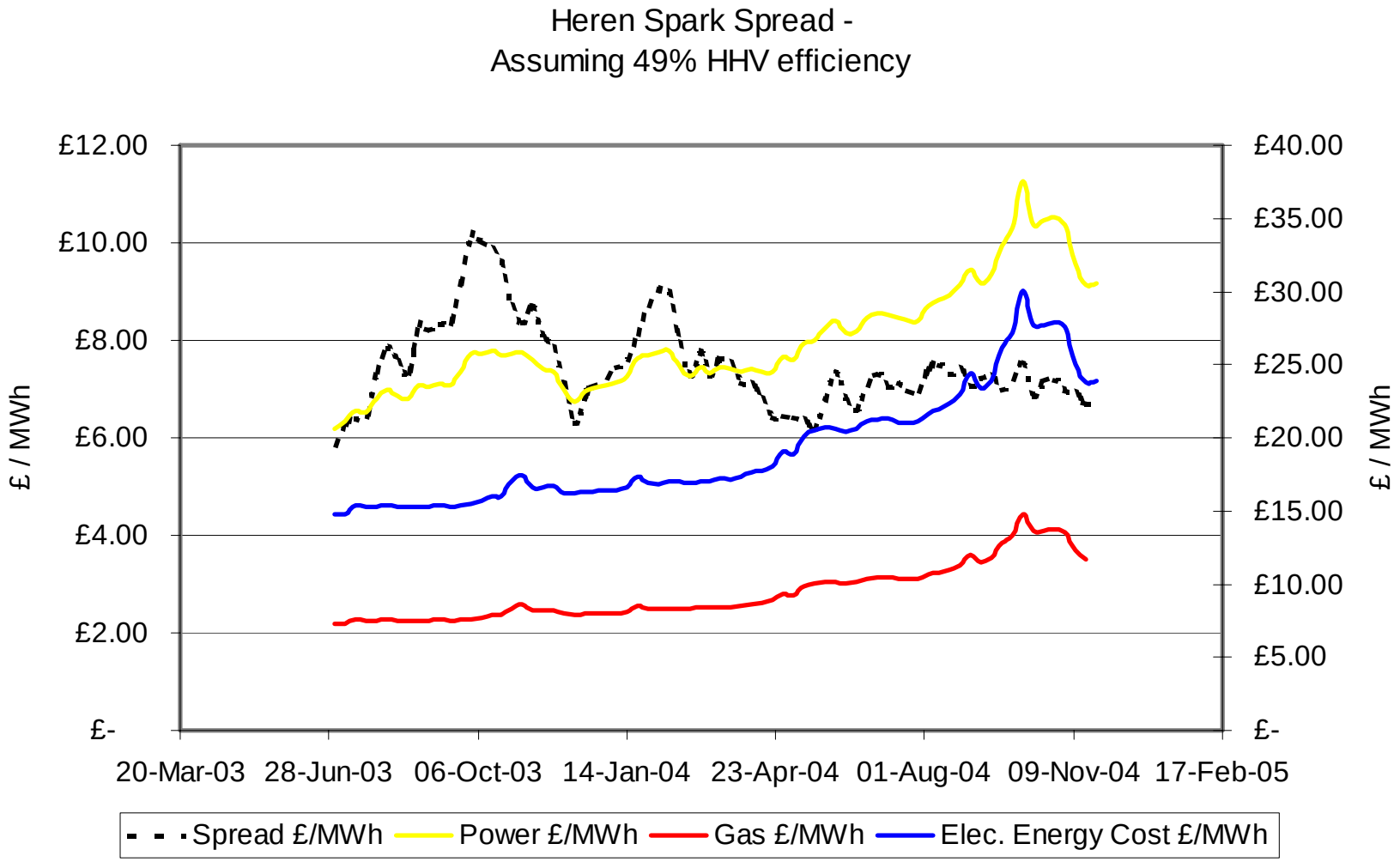
Agenda

1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

Agenda

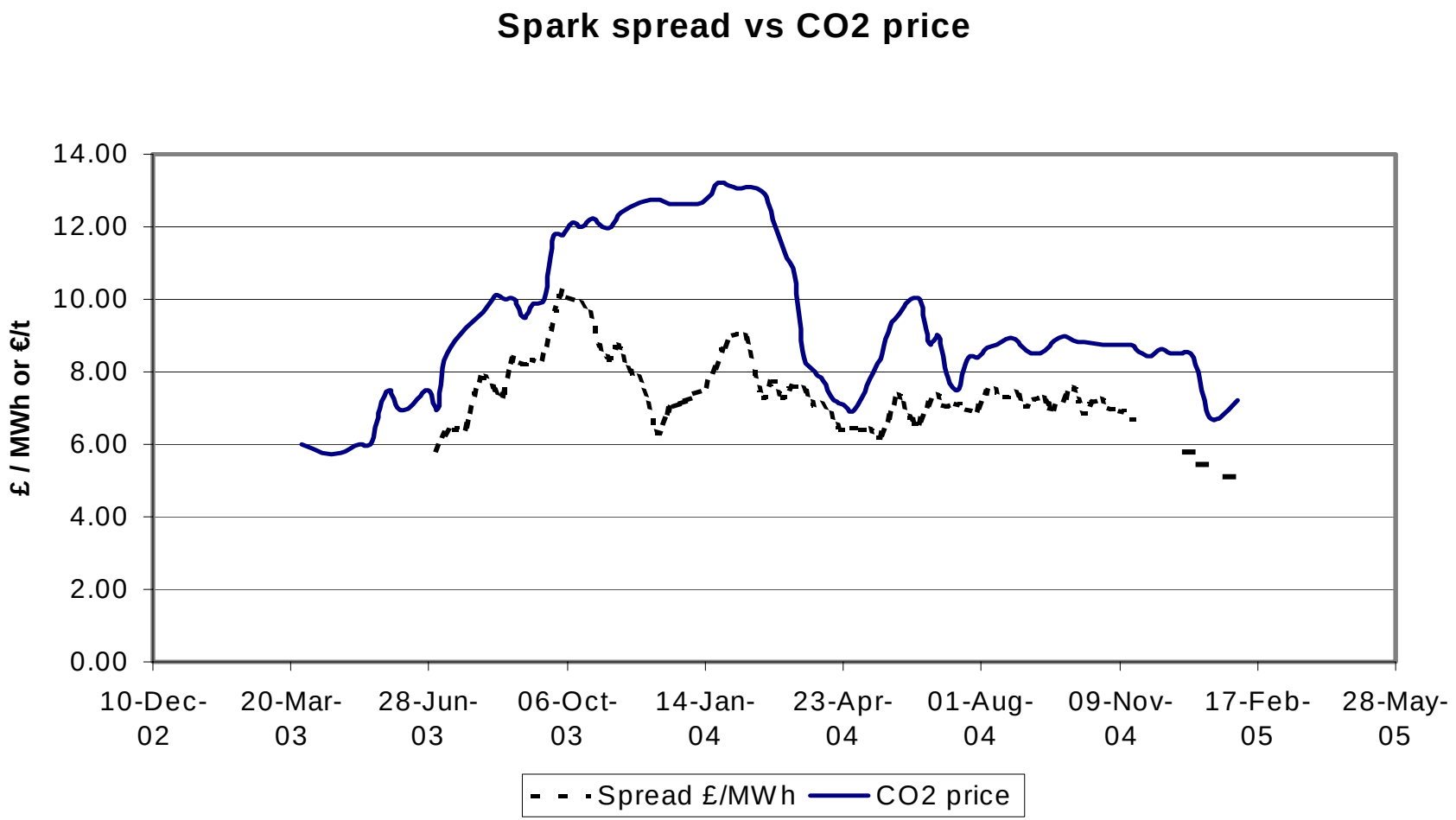
1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

Spark spread analysis (for 2005/06)



- The 'spark spread' depends on the assumed efficiency, which forward products are chosen, and the time of analysis

Impact of carbon to date (UK)



- Spark spread based on forward prices for 2005/06, 49% HHV efficiency
- Little evidence that spark spread is tracking the CO2 price
  - Also true in other countries (Germany, NordPool)

Possible explanations for (lack of) impact

- Carbon is not yet factored into the power curve
- Carbon is factored in, but at a low and barely visible price
- Carbon is factored in, but other factors compensate
- Carbon is factored in, but not day-to-day
  - is it in generators' interests for the link to be obvious?

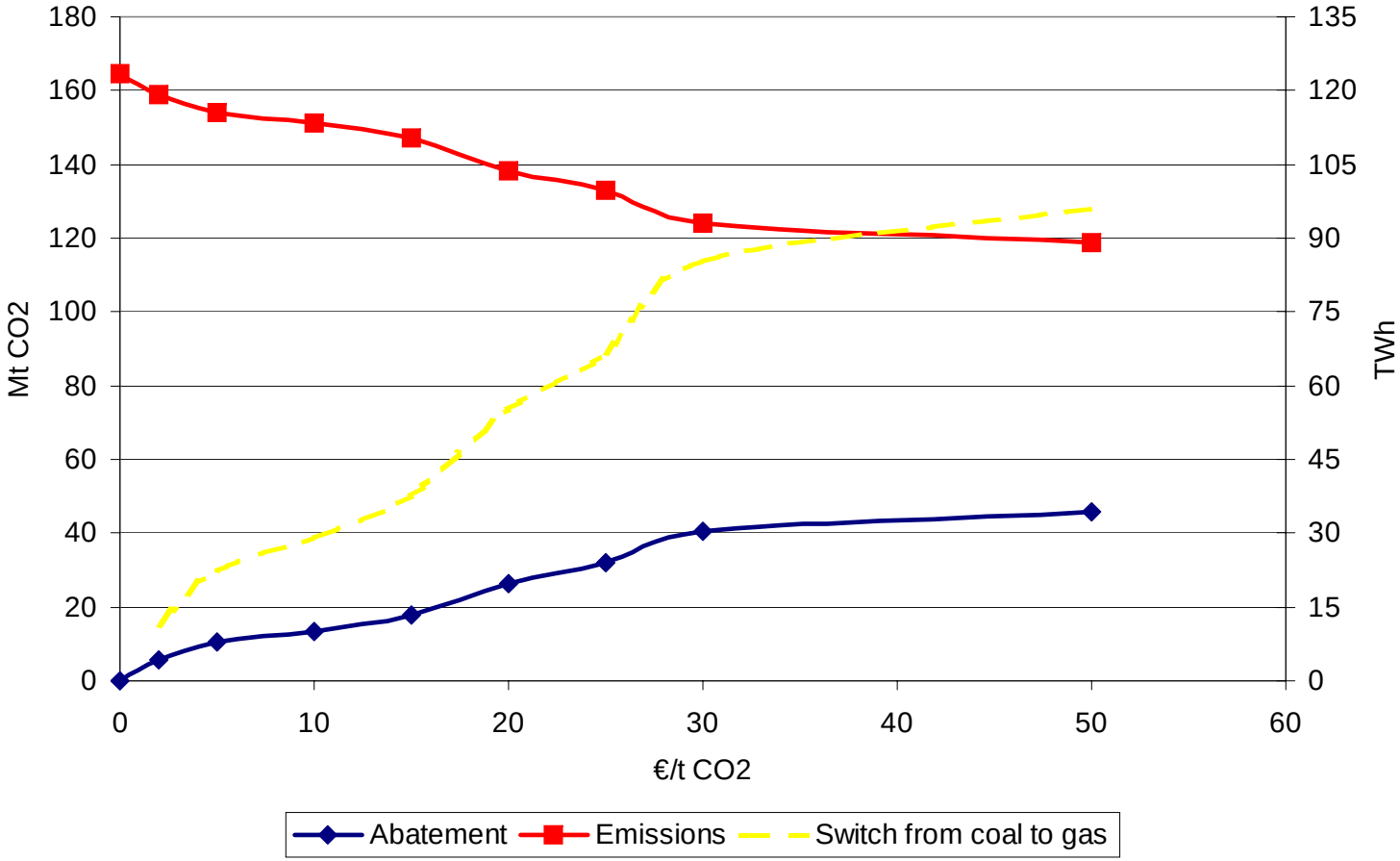
Agenda

1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

First ILEX study on EU ETS for DTI (Jan. 2004)

- EU ETS could yield large reductions in CO2 emissions from the generation sector
- Largely positive for generators, with potential for windfall gains
  - Impact could be positive even with full auctioning
- Possible incentives not to pass through full opportunity costs
- Loose allocations might reduce effectiveness of the scheme
- Generators could be better off under a tight target
- New entry and closure decisions could impact on carbon emissions, prices and profitability

Impact of carbon on power emissions and output in 2005 (ILEX modelling, UK only)



- In EU25, our modelling suggests the switch to gas-fired generation could be up to 200 TWh and the reduction in CO2 emissions could be up to 150 MtCO2, depending on the price of carbon

Conflicting pressures on new entry

- New entrants might be encouraged by:
  - Rising electricity prices, particularly if carbon pass-through in market prices exceeds carbon cost of new technology
  - Free allowances, which constitute a fixed cost subsidy
- New entrants might be discouraged by:
  - A squeeze on new entrant reserves (e.g. the UK?)
  - Re-basing, if allowances continue to be based on historical emissions
  - Delays on closure decisions by players not wanting to relinquish allowances
  - General uncertainty for Phase 2

Other key issues for generators

- Current NAP uncertainty
  - particularly in the UK, with ongoing discussions between DEFRA and the European Commission
- Cross EU-ownership
  - Allocations have been at the national level
  - Scope for major differences in impact on pan-European generators
- Will profits rise enough to make nuclear profitable?

Agenda

1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

Key factors for the impact of carbon on electricity prices

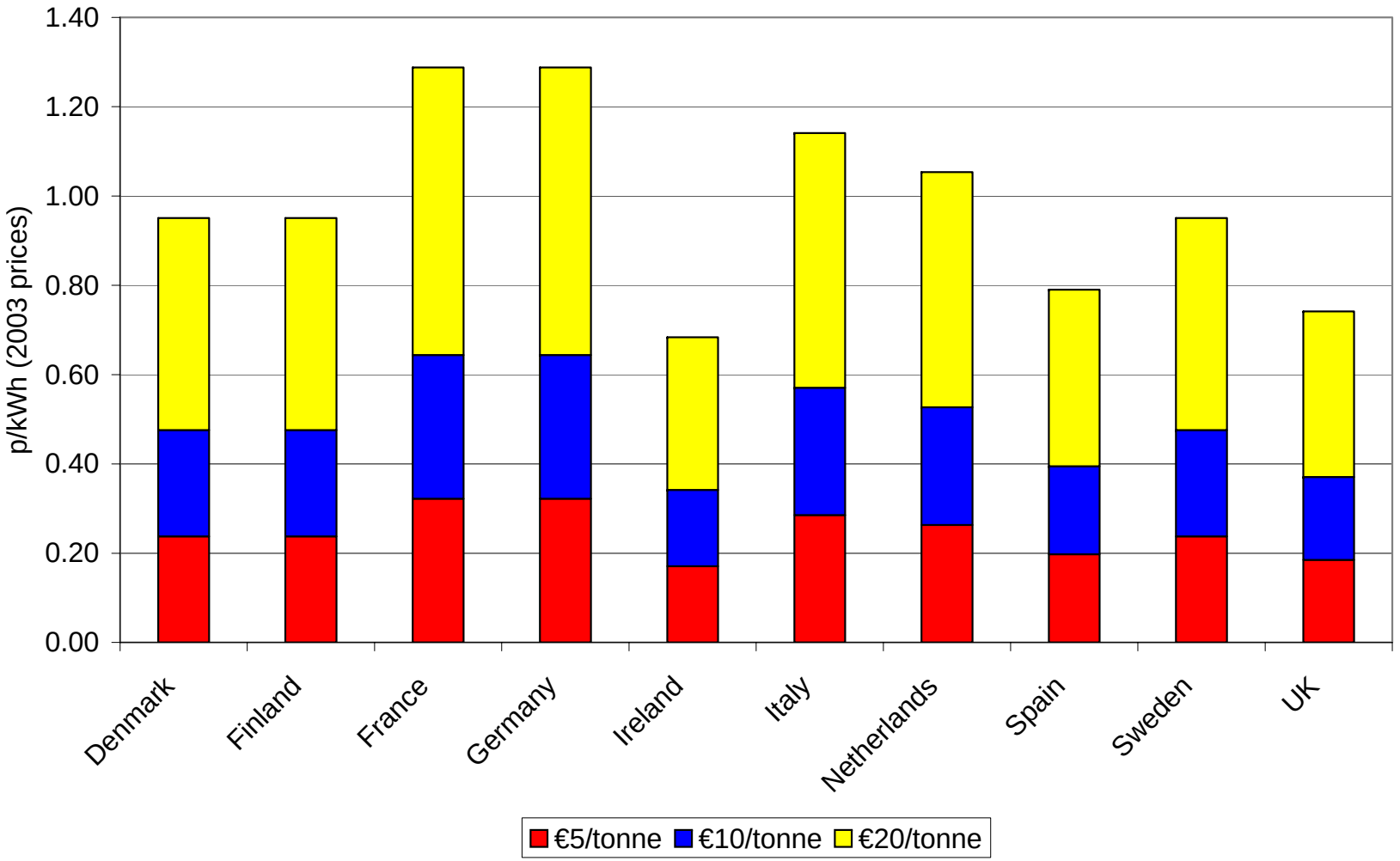
- The price of CO2 that emerges from the scheme
  - may be different in Phase 2
- Carbon emission factors for price-setting plant
  - marginal or average?
- The level of pass-through of the value of carbon into wholesale and retail prices
- Demand-side response
  - not considered by ILEX

Carbon emission factors (power generation)

Average		
	Europe	0.39 tCO2/MWh (IEA, 2003)
	UK	0.68 tCO2/MWh
Marginal		
	Coal	0.92 tCO2/MWh
	Gas CCGT	0.41 tCO2/MWh

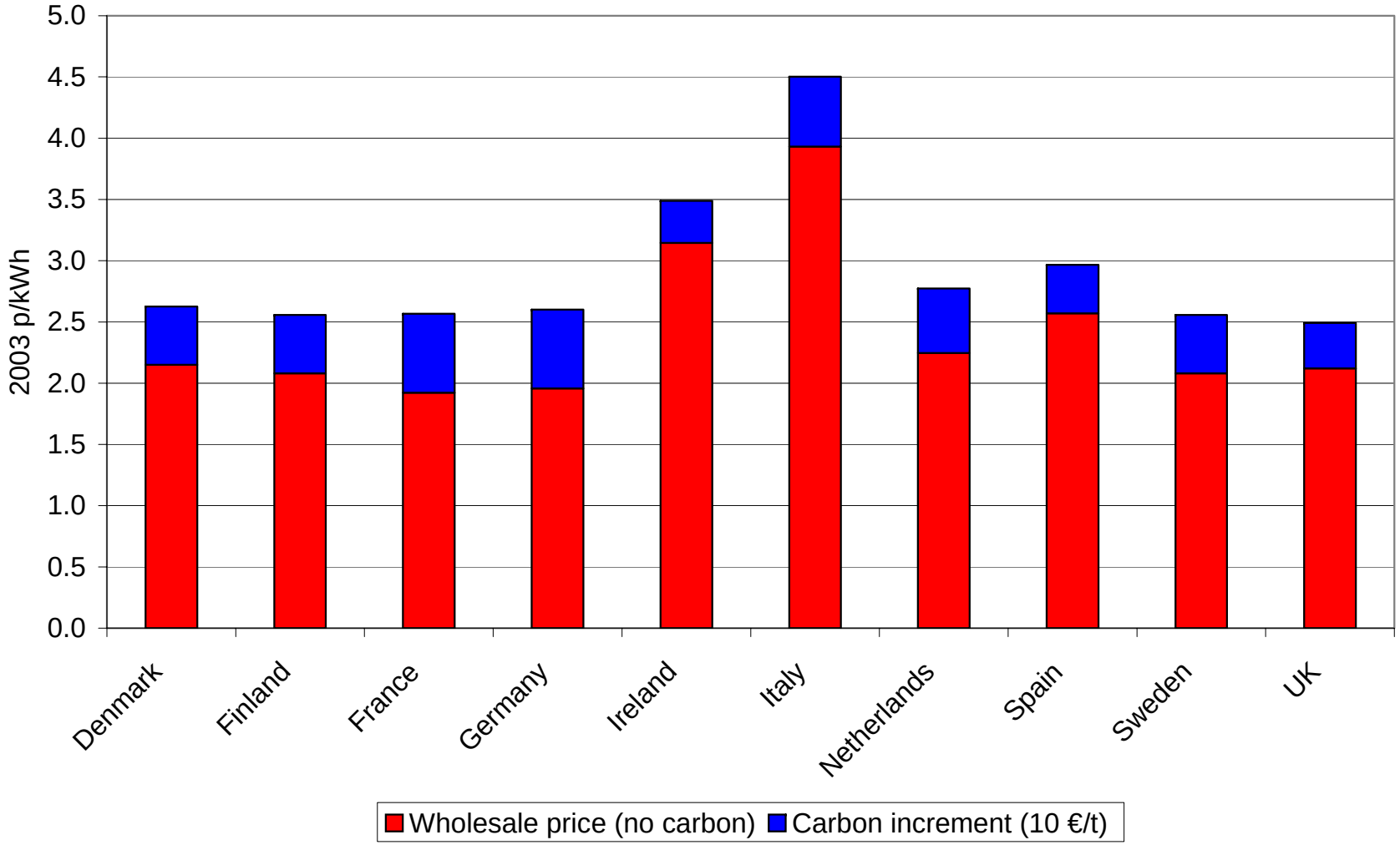
- Studies give wide-ranging results, for the impact on power prices, simply by using different carbon emission factors

Impact of carbon on electricity prices in Europe in 2005 (carbon at €5,10,20/tCO2)



- Assumes full marginal opportunity cost pass-through, ILEX fuel price projections
- Before demand-side response

Projected wholesale prices with full carbon impact in 2005 (10 €/t)



Key factors for pass-through

- Generation market structure
  - Vertical integration a key factor
- Regulatory intervention
  - Price caps, windfall tax, enforced cross-subsidy
- Stringency of NAPs
- Treatment of new entry and closure
- Rebasing

Agenda

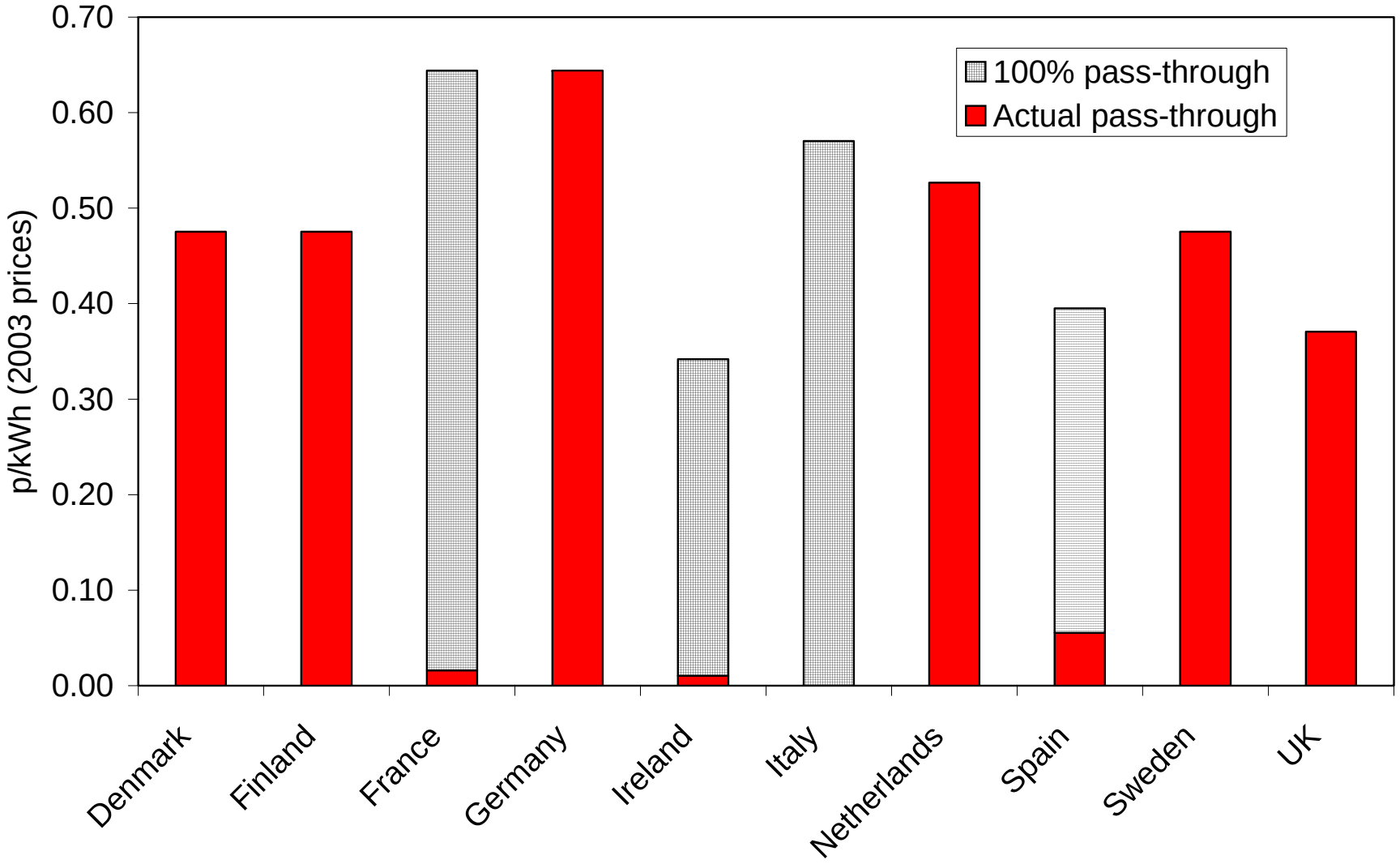
1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

Summary of determinants affecting pass-through (second ILEX report to DTI, Aug. 2004)

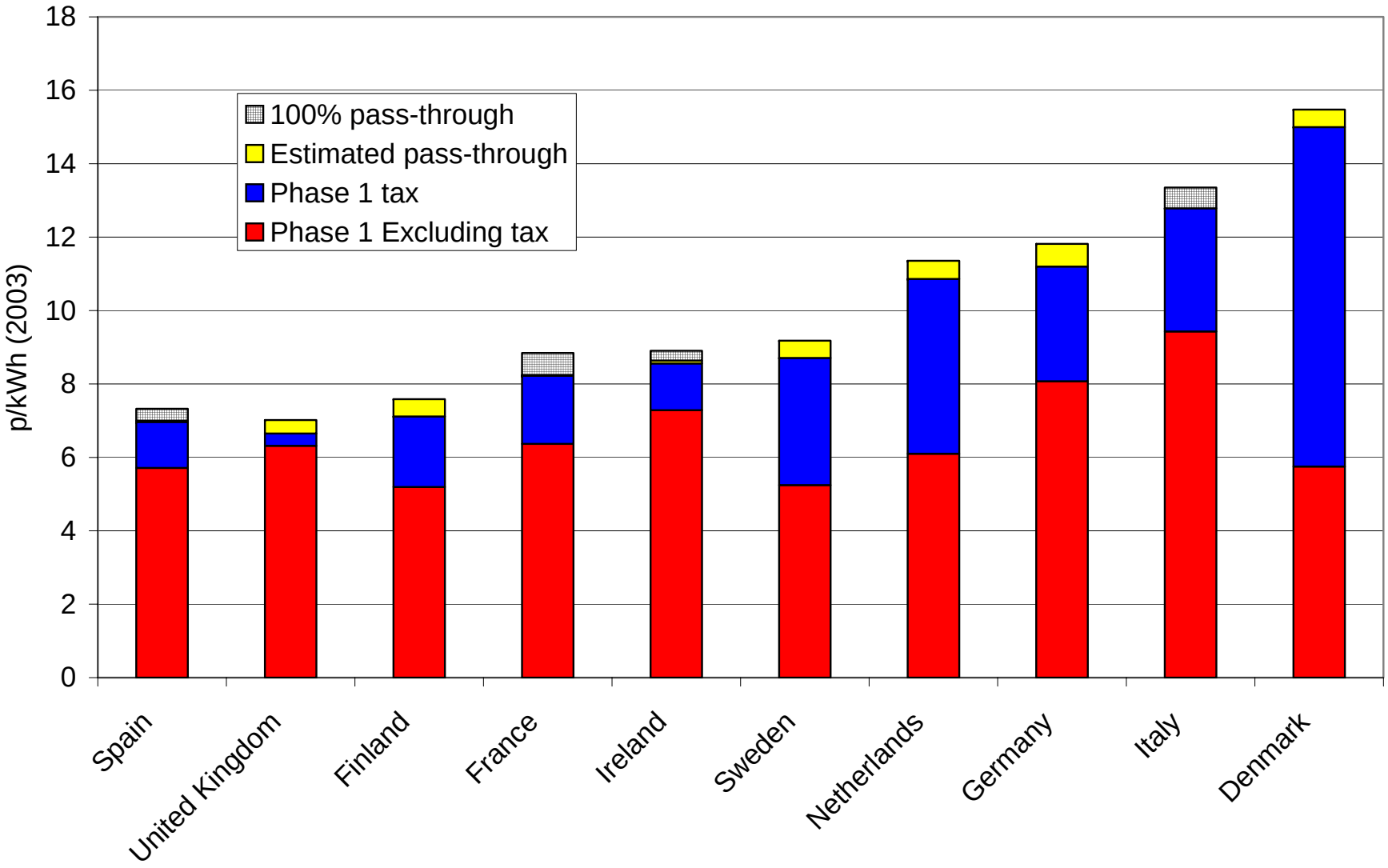
Country/ Region	Pass-through (wholesale)	Pass-through (retail)	Determinants	Confidence level
NordPool	100%	100%	NAP-T	3
Germany	100%	100%	RP, MS, NAP-L	1
Netherlands	100%	100%	MS, NAP-T	2
France	100%	2.5%	RP	2
Spain	8%	8%	RP	3
Italy	0%	0%	RP, NAP-L	2
Ireland	23% (2005), 100%	23%	RP	3
UK	100%	100%	MS	2

Key: RP=regulatory/political, MS=market structure, NAP-T/L=tight/loose NAP
Confidence 1= low confidence, 3 = high confidence

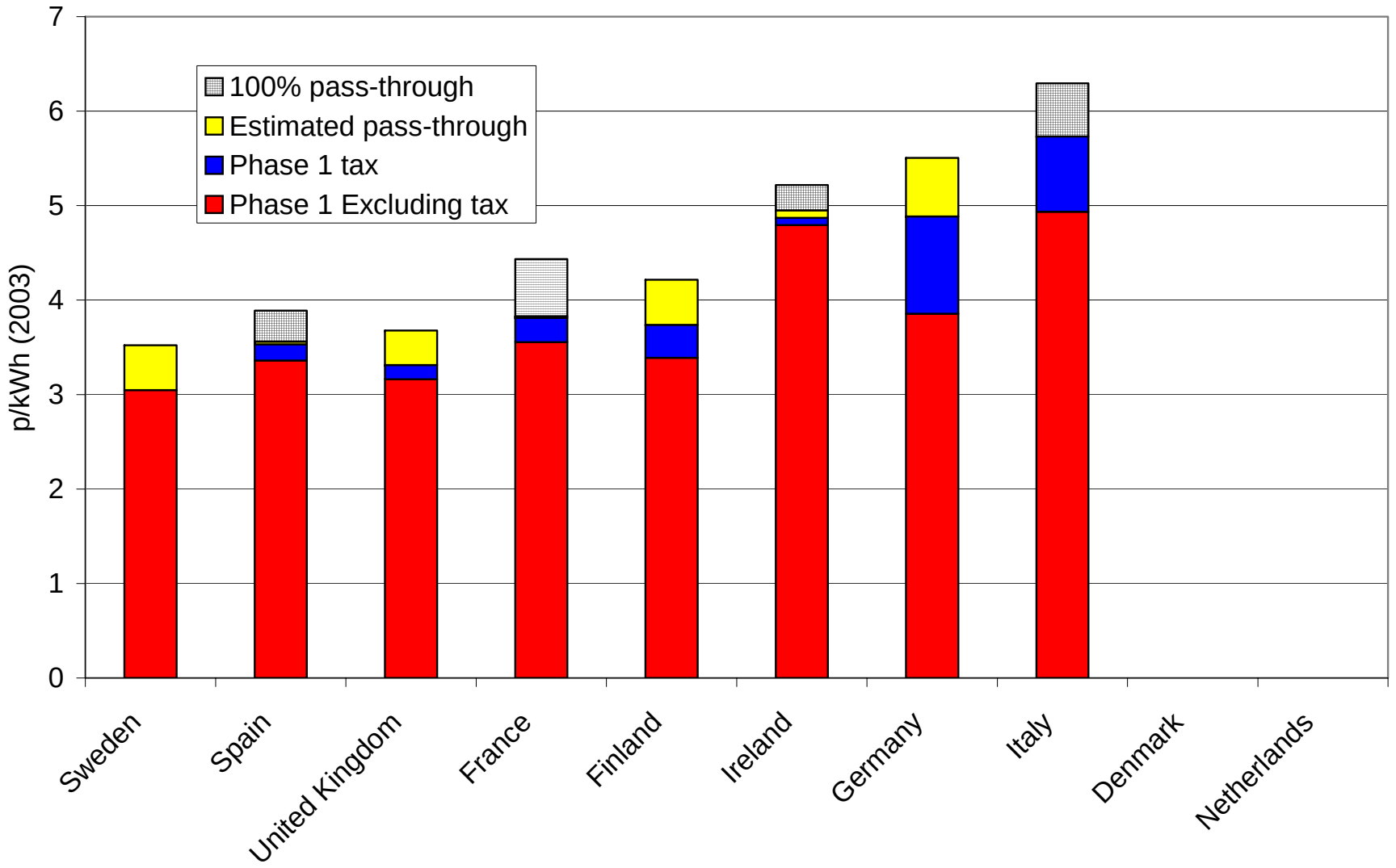
Retail pass-through levels in 2005 (second ILEX report to DTI)



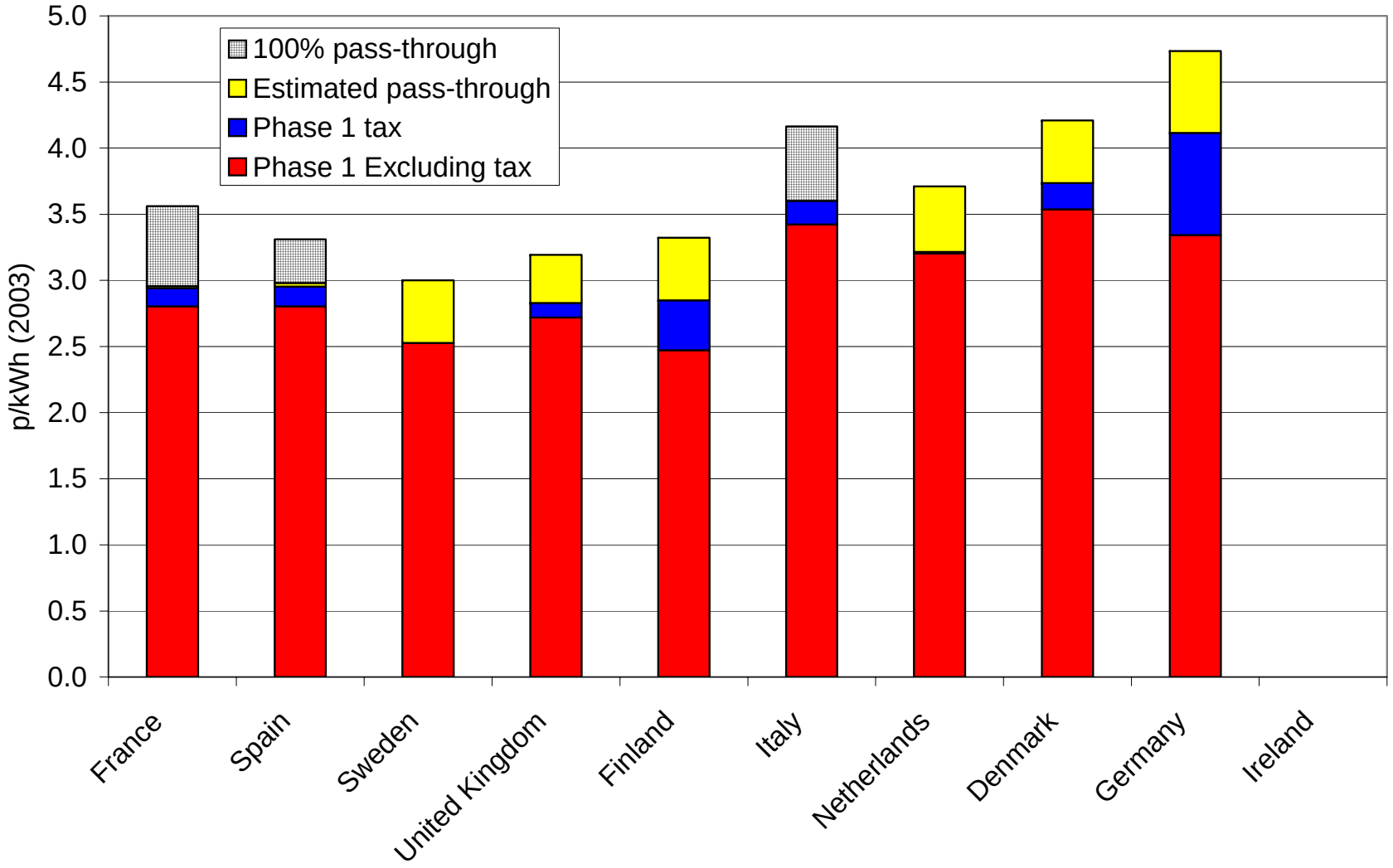
Projections for medium domestic retail prices in Phase 1



Projections for medium sized industrial prices in Phase 1



Projections for extra large industrial prices in Phase 1



Agenda

1. Has carbon already had an impact?
2. The impact on generators
3. The impact on wholesale electricity prices
4. The impact on retail electricity prices
5. Conclusions

Conclusions

- Carbon does not appear to have had much effect (yet) on power prices or generation patterns
- When it does, generators are likely to benefit overall
- Depending on the CO2 price, EU25 power generation could witness (annually):
  - a switch from coal/lignite to gas of 0-200 TWh
  - a reduction of 0-150 MtCO2
- The impact on electricity wholesale prices is:
  - broadly linear in the CO2 price
  - crucially dependent on price-setting plant and pass-through %
- The impact on relative retail prices is likely to be modest, unless the carbon price rises significantly

ELECTROWATT-EKONO
Jaakko Pöyry Group

Contact: andrew.nind@ilexenergy.com

ILEX Energy Consulting Ltd

King Charles House, Park End Street, Oxford, OX1 1JD

Tel: +44 (0)1865 722660

www.ilexenergy.com

www.ewe.ch