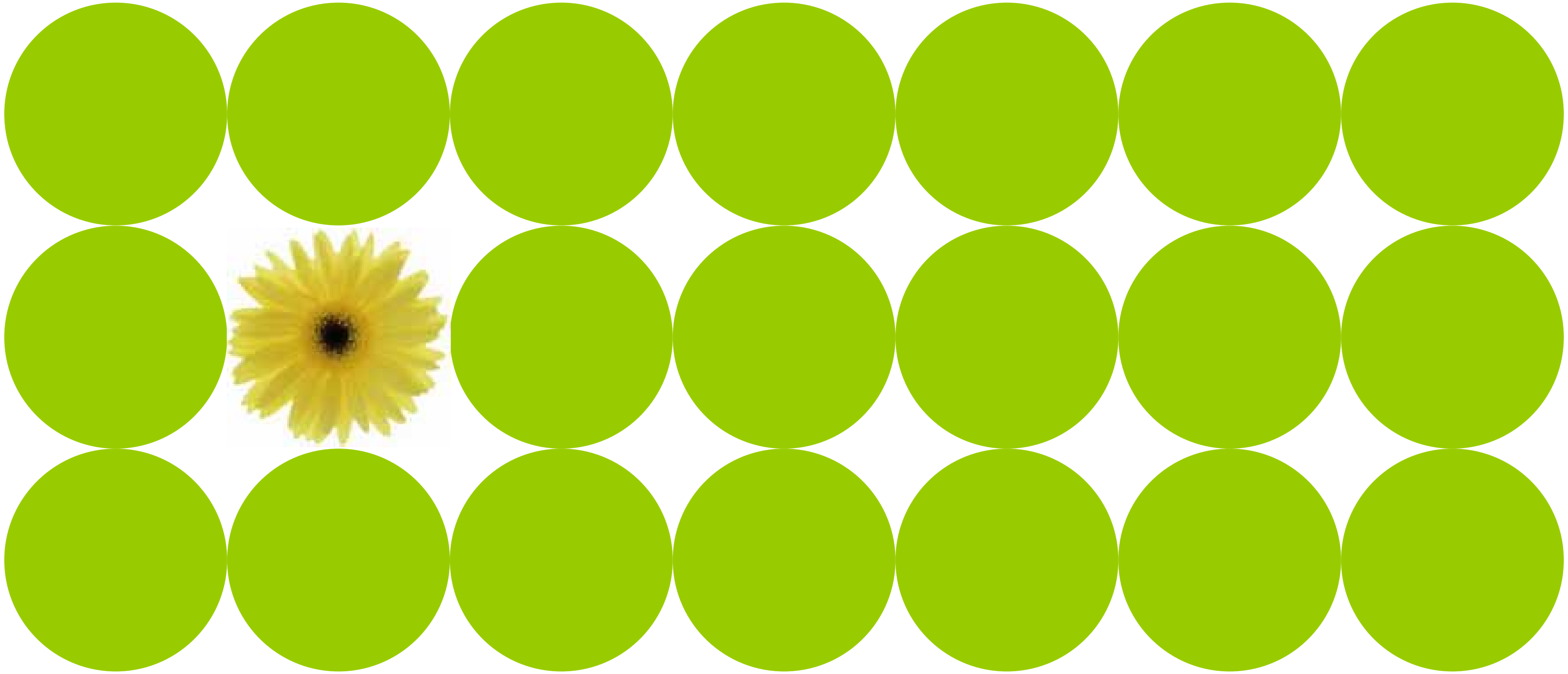
ETS – Experience from Europe



17 June 2008

ETS – Experience from Europe

Torkil Tyvold

International Business Development

Hydro Aluminium Metal

The EU Emission Trading System

Aluminium industry direct emissions not included until 2013

But, the aluminium industry severely affected indirectly by pass-through of carbon cost in electricity price

- **Hydro has closed 2 smelters in Germany (70ktpy and 120ktpy)**
- **Hydro's remaining and largest smelter in Germany also threatened (225 ktpy)**

Measures to prevent "carbon leakage" are now on the table

- **to protect the Energy Intensive Trade Exposed (EITE) industry (e.g. aluminium) that cannot pass through EU ETS costs into product prices, against unintended competitive disadvantages**

Aluminium business operating costs in Germany are heavily impacted by the increasing power price

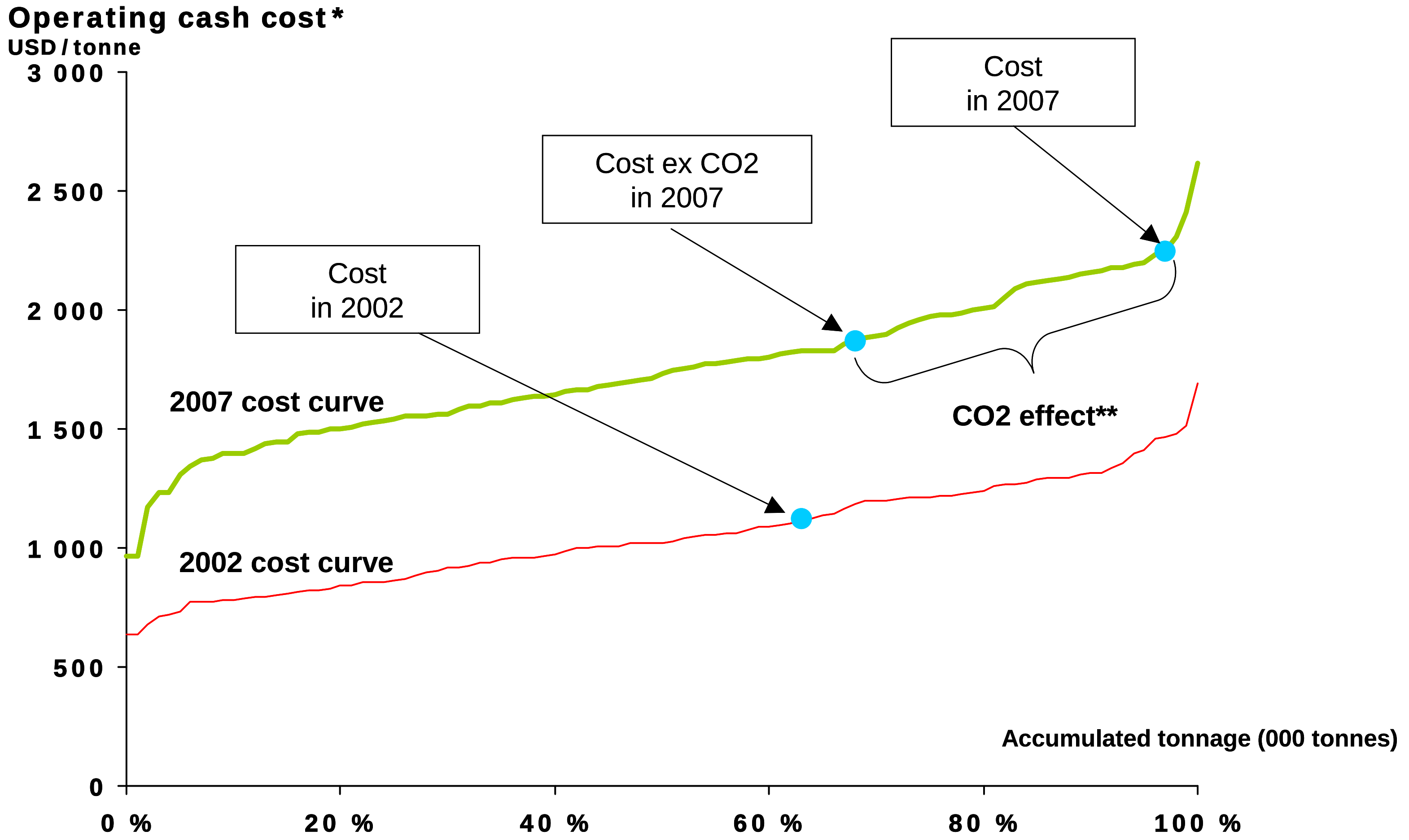
Costs per ton produced	Actual 2002	Actual 2007
Power	31%	47%
Alumina	32%	33%
Coke & Pitch	12%	11%
Other	25%	9%
Business Operating Cost, (2002=100)	**100**	**201**
Power price USD/MWh	25	75
Est. CO2 costs in Power* (USD/t Al)	0	380

Power and CO2 costs are large cost elements which are not competitively priced in global markets. Prices are very different between locations. Europe has become a high cost area.

*Assumed CO2 cost: 23.5 EUR/t CO2 * 0,8 (factor used by PIRA for conversion from CO2 price to power price) = ~19 EUR/MWh (~27 USD/MWh)
* power consumption of ~14 MWh/t metal = ~380 USD/t Al, 2007 contract negotiated during 2006 when CO2 had such price
**ex. Grid fees

HYDRO

Hydro's remaining smelter in Germany has moved into a high cost position following the power price development



***Source: CRU, 2007**

**** 380 USD / t Al**

HYDRO

Existing EU Renewable schemes: EITE are to a large extent exempt

Feed-in tariff system chosen by 18 member states in EU

Germany has the largest growth of renewable energy in the EU

- **Renewable electricity target of 30% by 2020**
- **Cost to general consumer is 16-19 AUD/MWh**
- **Cost to energy intensive industry fixed at 0,8 AUD/MWh**

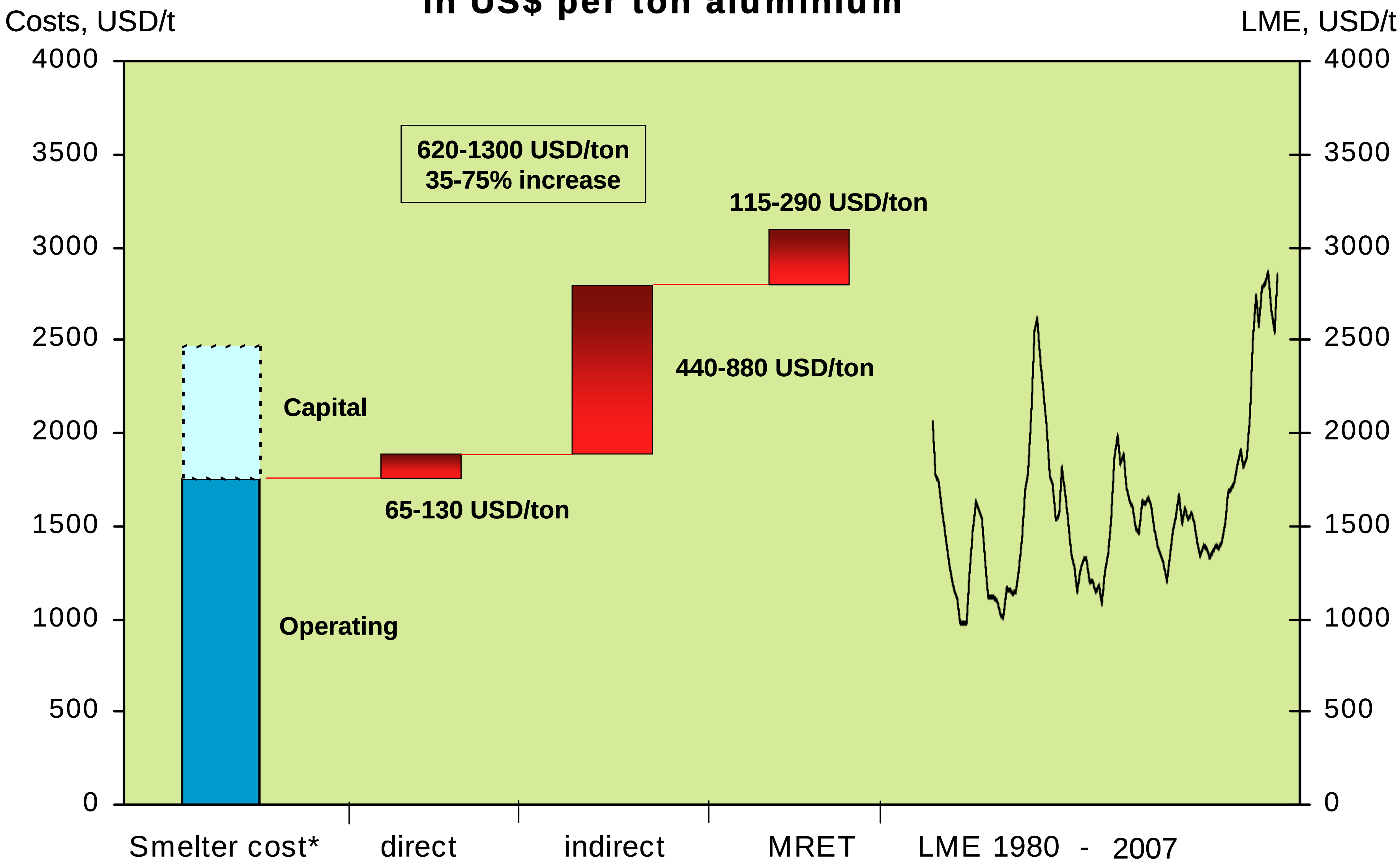
Seven EU member states have Renewable Certificate systems

Sweden has the highest renewable energy share (40%) in EU and a target of 49% by 2020

- **Target for new renewable is 17 TWh.**
- **Cost to general consumer is approximately 6,5 AUD/MWh**
- **Energy intensive industry (aluminium among them) is exempt**

- **independent of chosen system, EITE are (partly) exempt in EU**

Cost implication of Australian policy measures
in US$ per ton aluminium



Assumptions:; credit price AUD 30-60 ; MRET 20% cap @ AUD40-100, nominal values

* Source: CRU, Business Operating Cost World average 2007, Indicative capital cost new smelter

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