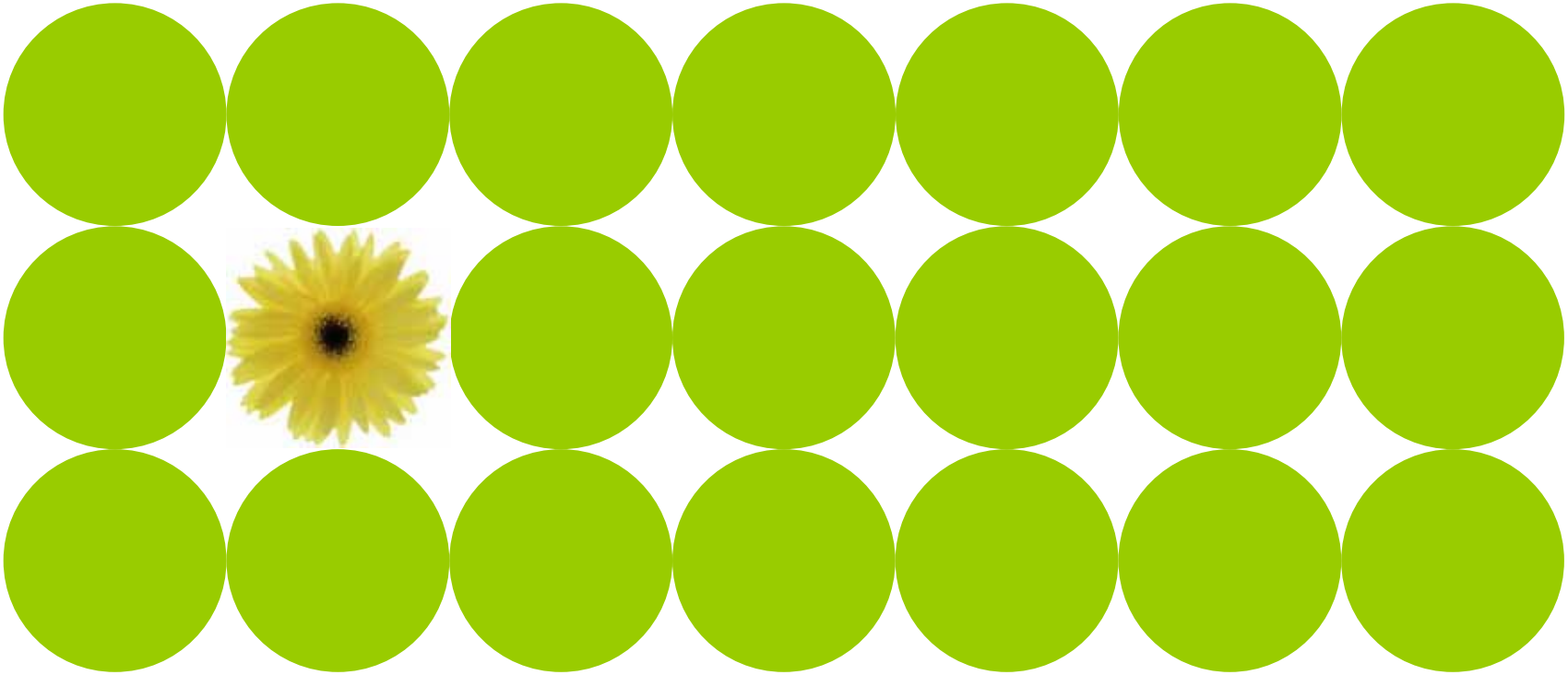
An aluminium perspective on carbon markets, emissions trading and on sectoral approaches.



21PPI International Symposium on Climate Change, Tokyo 11.09.2008

Lasse Nord, SVP Climate Policy

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Presentation outline

- Aluminium in a climate perspective
- Hydro's sustainability/climate strategy
- The EU ETS experience – a Hydro case study
- Hydro's views on sectoral approaches
- Towards a global carbon market – managing the transition phase

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Norsk Hydro
A resourceful aluminium company

22 000 employees

Operations in more than 30 countries

1.8 mill. tonnes of primary aluminium

Turnover NOK 94 billion (USD 19 bill.)

Market capitalization NOK 87 billion (USD 17 bill.)

Environmental footprint

- **Aluminium Metal** highly energy and emissions intensive
- **Aluminium Products** save emissions in the use phase
- **Energy** strong hydroelectric position

1) Close April 18, 2008

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Primary aluminium production is highly energy intensive and thus emissions intensive

Primary aluminium is produced from alumina (Al_2O_3) by **electrolysis** using **carbon** as the reducing agent. The process emissions and electricity consumption:

Emissions:	2 t CO2e/tonne aluminium
Electricity consumption:	15 MWh/tonne aluminium

Electricity sourced from a **coal-fired power plant**:

Emissions:	0,8t CO2/MWh
Indirect emissions	12 t CO2/tonne aluminium
(Based on hydroelectric power	0 t CO2/tonne aluminium)

Total emissions from primary aluminium production:

Direct emissions	**2 t CO2 / tonne aluminium**
Indirect emissions (coal)	**12 t CO2 / tonne aluminium**

A significant share (~45%) of aluminium production is based on power from coal. This share is growing.

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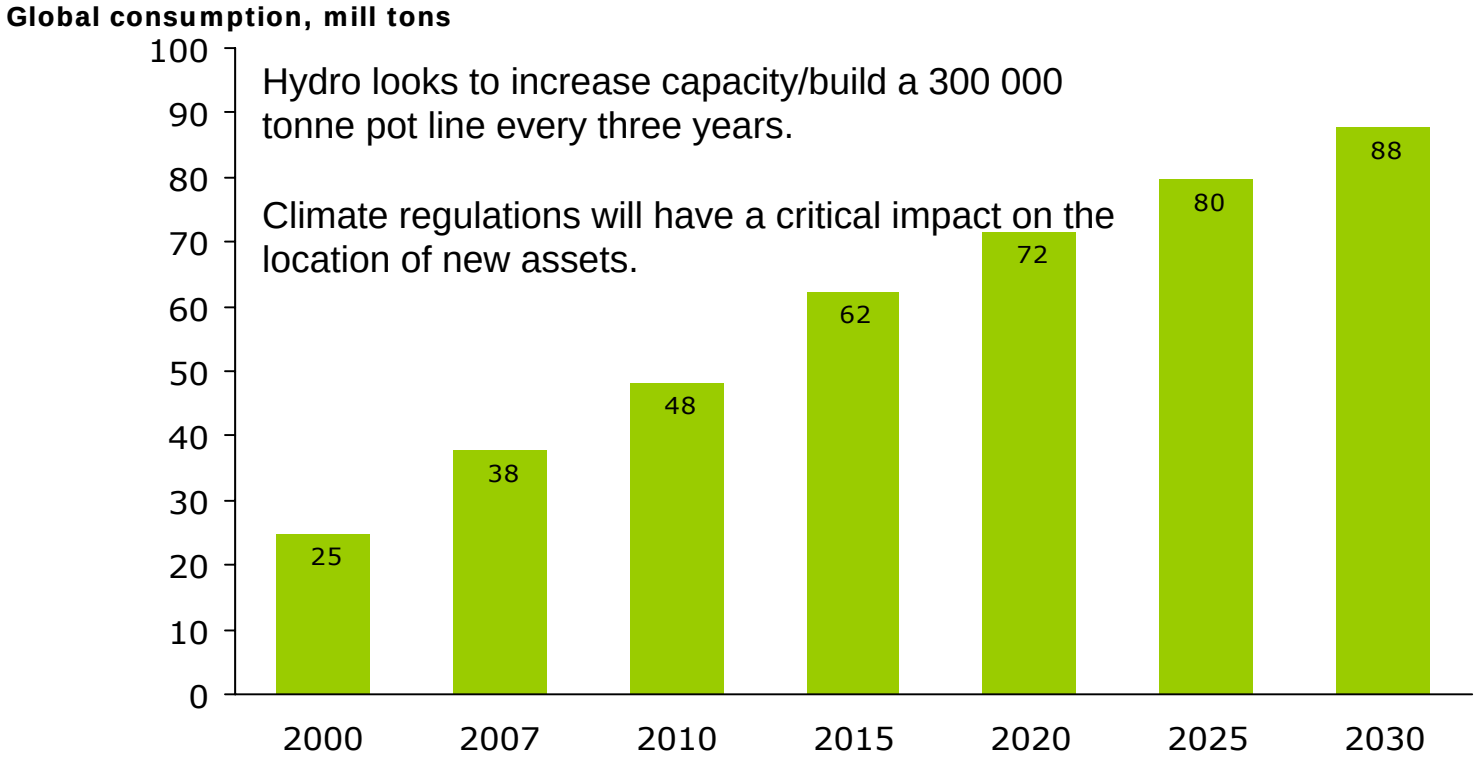
Due to i.a. its strong environmental performance in the use phase, global consumption of primary aluminium will grow at 5 – 6% p.a.



A significant share of aluminium production is - and will continue to be - based on power from coal.

Source: CRU Updated LT Outlook, May 2008

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Hydro's strategy has been to be proactive on sustainablity issues since the mid 80s

First FT500 company to publish a comprehensive Corporate Environmental Report (1989) disclosing all emissions from all installations.

Active member of the World Business Council for Sustainable Development (WBCSD) since its start in 1995

- Norsk Hydro CEO Egil Myklebust chairman 1998-1999.

Qualified for the Dow Jones Sustainablity Index every year since its introduction in 1999

- Leader in the Aluminium and Basic Resources sector the last 3 years.

Participates in the International Aluminium Institutes (IAI) voluntary sectoral initiative "Aluminium for Future Generations".

- Has reduced own emissions of GHG per tonne of primary aluminium produced by 60% since 1990.

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Hydro recognises the climate challenge as a main strategic driver in the decades to come.

Market: Actively supports the development of **a global carbon market** as the main regulatory tool to meet the climate challenge through i.a.:

- Board Membership of International Emissions Trading Association (IETA)
- Hydro's CEO is co-chair of WBCSD's Climate and Energy Working Group.

However, for now a main challenge is to manage the **competitiveness issue** through the **transition phase** until a global market.

Technology: "Break through" R&D aimed at a new cell design to facilitate capture of CO2 for delivery into future CO2 pipeline and storage systems. This may allow for near CO2 free production of aluminium post 2020 even with coal as the power source.

Investment policy: *"If a new smelter triggers the construction of a new coal based power plant, we require it to be capture ready and in a location where there is realism over time for Carbon Capture and geological Storage".*

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Although not in the ETS, aluminium is the sector most negatively impacted by the ETS

Aluminium is not in the ETS in phase 1 and 2. However, aluminium will be included in phase 3 (2013 – 2020).

The negative impact is "indirect" and due to the CO2-cost the generators have to pay when producing electricity.

This cost is included in the power pricing and is passed-through to their customers

- This is intentional, the purpose of an ETS is to pass the carbon signal on to the end consumer.

However, aluminium is a global commodity traded on the LME with no possibility to pass-through extra CO2 costs into the aluminium price.

The problem is that the carbon signal "stops at the LME" until key competitor economies have similar CO2 constraints.

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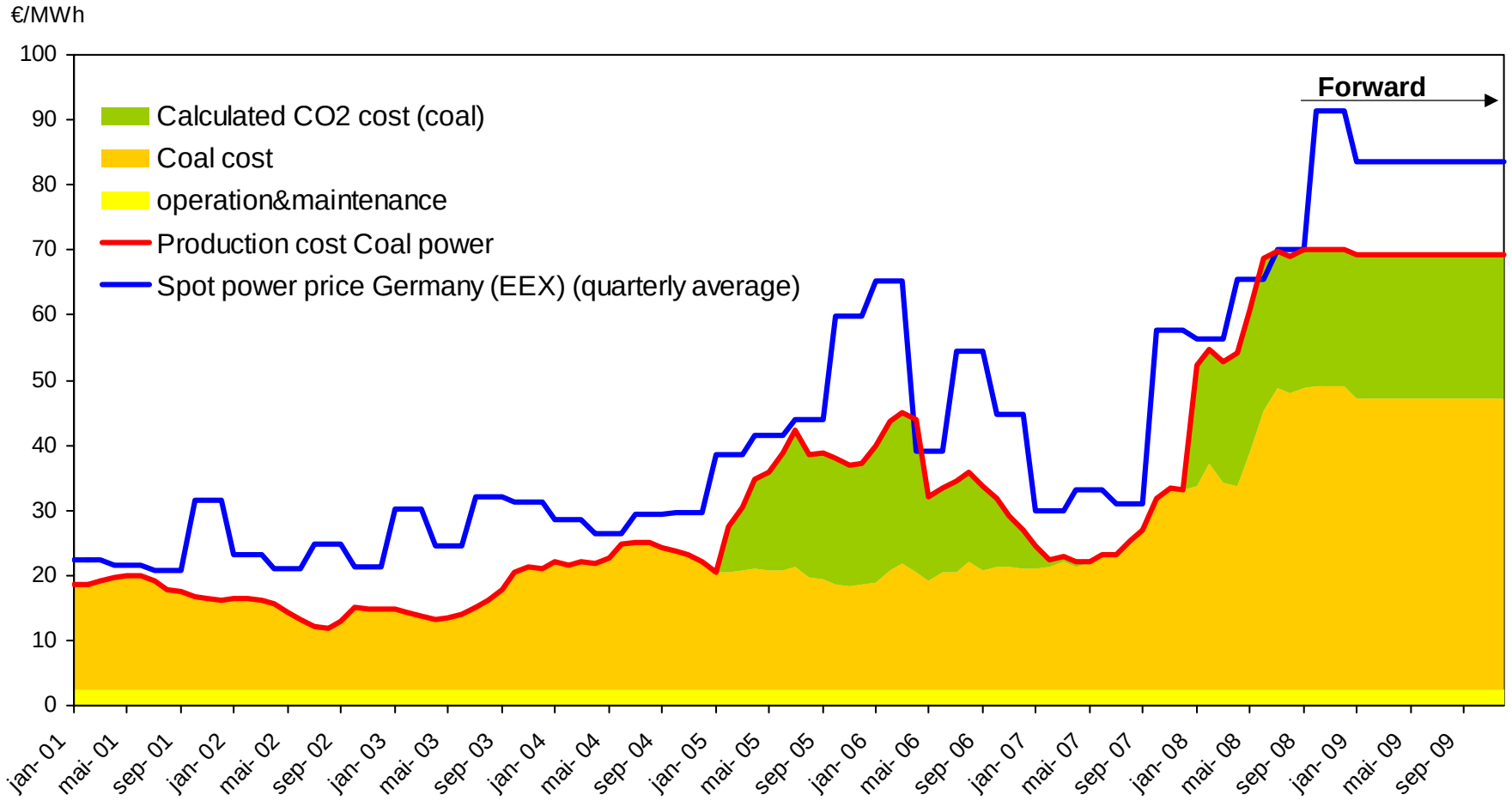
The cost of CO2 contributes to the high power price in Europe. Case: the German power market



Coal power plant 40% efficiency. Coal cost based on CIF ARA coal price and CO2 cost based on EUA-price (0,85 ton CO2/MWh).

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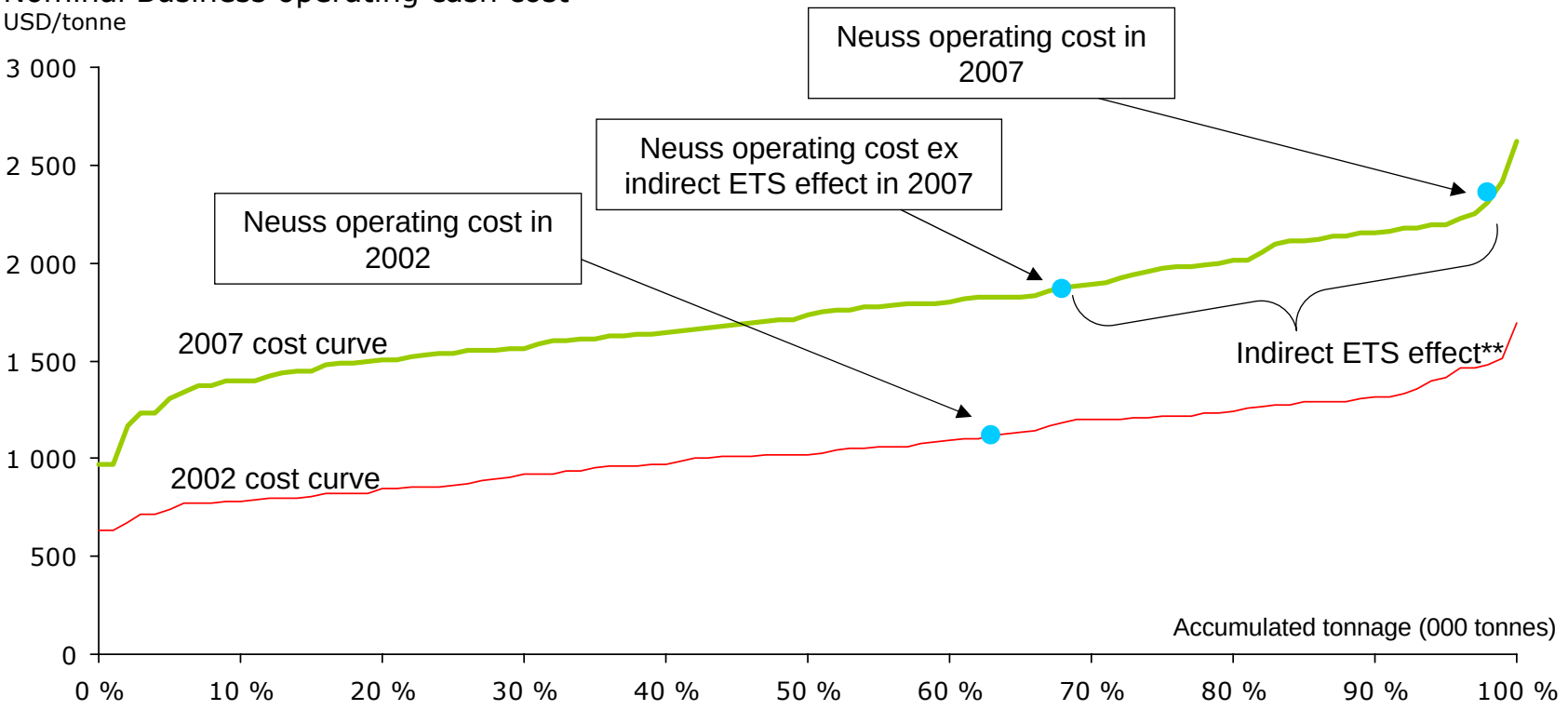
Neuss has moved into a high cost position following the power price development, and is currently at risk

Neuss smelter on cash cost basis

Nominal Business operating cash cost*

USD/tonne



Source: CRU, 2007

*** 380 USD/t Al as explained in Neuss cost table*

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As the power contracts for EU smelters expire, they are no longer viable and production moves away

Smelter	Country	Production 2006 (tons)	Ownership %	Hydro's share (tons)	Comment
Neuss	Germany	226 000	100	226 000	Power contract through 2008
Stade	"	54 000	100	54 000	Closed 2006
Hamburg	"	(2005) 120 000	33,33		Closed 2005
Slovalco	Slovakia	158 000	55	158 000*	Power contract to 2013
Karmøy	Norway	288 000	100	288 000	
Årdal	"	232 000	100	232 000	
Sunndalsøra	"	357 000	100	357 000	
Høyanger	"	60 000	100	60 000	
Søral	"	164 000	49,9	82 000	
Alouette	Canada	570 000	20	114 000	
Kurri Kurri	Australia	164 000	100	164 000	
Tomago	"	516 000	12,4	64 000	
Total				**1 799 000**	
Qatalum	Qatar	585 000	50%	292 500	Start 2009
NEXT SMELTER	?	?	?	?	Start 2012

*100% consolidated in Hydro accounts

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Aluminium and sectoral approaches. The IAI initiative "Aluminium for Future Generations"

The global aluminium industry is a concentrated industry with a limited number of players. It is well organised on the global level in the International Aluminium Institute (IAI), and performance is monitored:

- Regular survey of member companies' performance
- Data from 110 smelters producing 65% of global production of primary aluminium.

The IAI initiative "Aluminium for Future Generations" has set up voluntary objectives for 2010 and the industry is delivering on its objectives:

- The PFC emissions have been reduced by over 86% from 5.0 to 0,7 t CO2e/t aluminium (1990 ->2006)
  - 75% reduction in total PFCs despite 80% growth in primary aluminium production
- 14% reduction in total GHG emissions from 2000 -> 2005 despite 20% increase in production.

The industry intends to continue the voluntary initiative and set up new objectives for 2020.

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The role of sectoral approaches / agreements in the global climate framework discussions

A lot of confusion ref. IISD's summary of the Accra meetings *" … many parties remain frustrated with the lack of a clear definition of sectoral approaches".*

There are different "types" with widely varying focus/objective. First we need to define their objectives and the concerns they intend to address:

Abatement potentials. Bottom-up sectorwise approach to determine a country's abatement potentials to inform the setting of national targets/caps;

Sector crediting. The objective is to **engage developing countries** by offering credits beyond an agreed baseline;

Technology development. Pooling of resources to speed up development and deployment of new technology;

Mitigating competitiveness concerns. Level the playing field by having "all" competitors subject similar carbon constraints.

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Sectoral approaches / agreements – Hydro's position

The global aluminium industry's **voluntary approach** has delivered and will continue to deliver. However, this is **a complement** and **not an alternative to mandatory regulations** at the domestic level.

The IAI data are continuously improved and coverage is expanded. Constitutes a valuable source of data for estimating **abatement potentials.**

Sector crediting using no lose targets may – in a **transition period** - be a good way of engaging developing countries as long as the baseline isn't too lax (subsidy) and the period is not too long. Also here the IAI data are a valuable source of data.

Technology. Not applicable for aluminium. The aluminium companies develop their own technology and they compete also in this area.

Competitiveness. Opposed to transnational mandatory sectoral agreements. Impact on competitiveness can better mitigated within the jurisdiction that imposes the carbon constraint in the first place.

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Australia will start emissions trading in 2010

An economy wide scheme covering app. 75% of emissions (all Kyoto gases, transport, CCS). Agriculture may be included in 2015.

Well designed having learned from the mistakes made in Europe. Could serve as a model for other domestic trading schemes.

This will facilitate future linking between domestic/regional schemes and thereby building a global carbon market bottom-up.

However, the concern of the EITE-industries is the **competitiveness impacts** of the introduction of an ETS in the transition phase until broadly comparable global carbon constraints.

While inherently a sound design, the devil lies in the detail: the concrete value of the design parameters in the compensation measures.

EITE: Emissions Intensive Trade Exposed

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Mitigating “unfair” competitiveness impacts is an integral part of the Australian proposal

Compensation based on: **CO2 impact** (tonnes of CO2 pr million AUD revenue) and **ability to pass-through CO2 costs** in the product price.

Compensation is given in the form of **free allowances**. The share set aside is estimated to 20% for industry and 10% for agriculture.

Two-tiers compensation proposed: 90% for most impacted industries and 60% for medium impact.

Covers both **direct emissions** and “**indirect emissions**”

- “Indirect” based on an estimated CO2 rate in power production (t CO2/MWh) .

Same treatment of **existing assets** and **new investments**.

However, **serious concern** about the reduction of the volume of free allowances as the economy grows and the total amount of allowances decreases.

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Towards a global carbon market

Hydro supports the development of a **global carbon market** as the main regulatory tool to meet the climate challenge.

This will be driven by countries taking on cap'ed commitments as their economies develop, using domestic ETS to meet their obligations, and (eventually) linking these domestic/ regional ETS "bottom-up".

As long as the **competitiveness issues** are satisfactorily dealt with, Hydro welcomes the introduction of domestic/regional emission trading schemes.

Sectoral approaches may have a role to play in a **transition period** in **engaging developing countries** (sector crediting, no-lose targets)

- However, the supply of credits has to be matched by a demand in the cap'ed schemes.

A binding transnational sectoral agreement is **not the right answer to the competitiveness concerns** in the aluminium industry.

- Better mitigated in the jurisdiction that imposes the carbon constraint.

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Thank you for your attention

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