Centre for Energy and Environmental Markets

UNSW THE UNIVERSITY OF NEW SOUTH WALES SYDNEY • AUSTRALIA



Emissions trading: Designing and implementing an effective, efficient and equitable greenhouse gas trading scheme:

Lessons learnt from the European Union

Presented by Dr. Regina Betz © CEEM, 2008

2nd IAEE Asian Conference, Perth

Content

- Evaluation criteria and relevant design parameters
  - Environmental Effectiveness
  - Efficiency
  - Equity/Fairness
- Lessons from the European Union Emissions Trading Scheme (EU ETS)
- Current Australian proposal (Green Paper, Treasury modelling and Garnaut review)

Evaluation criteria

- **Environmental Effectiveness**: the extent to which the environmental objective is achieved.
  - How well the scheme is actually mitigating the dangers of climate change by delivering long-term reductions in greenhouse gases (GHG).
- **Efficiency**: the extent to which the required objective is met at least cost.
  - This includes dynamic efficiency (innovation incentives)
- **Equity aspects**: the extent to which any group is unfairly disadvantaged or favoured.

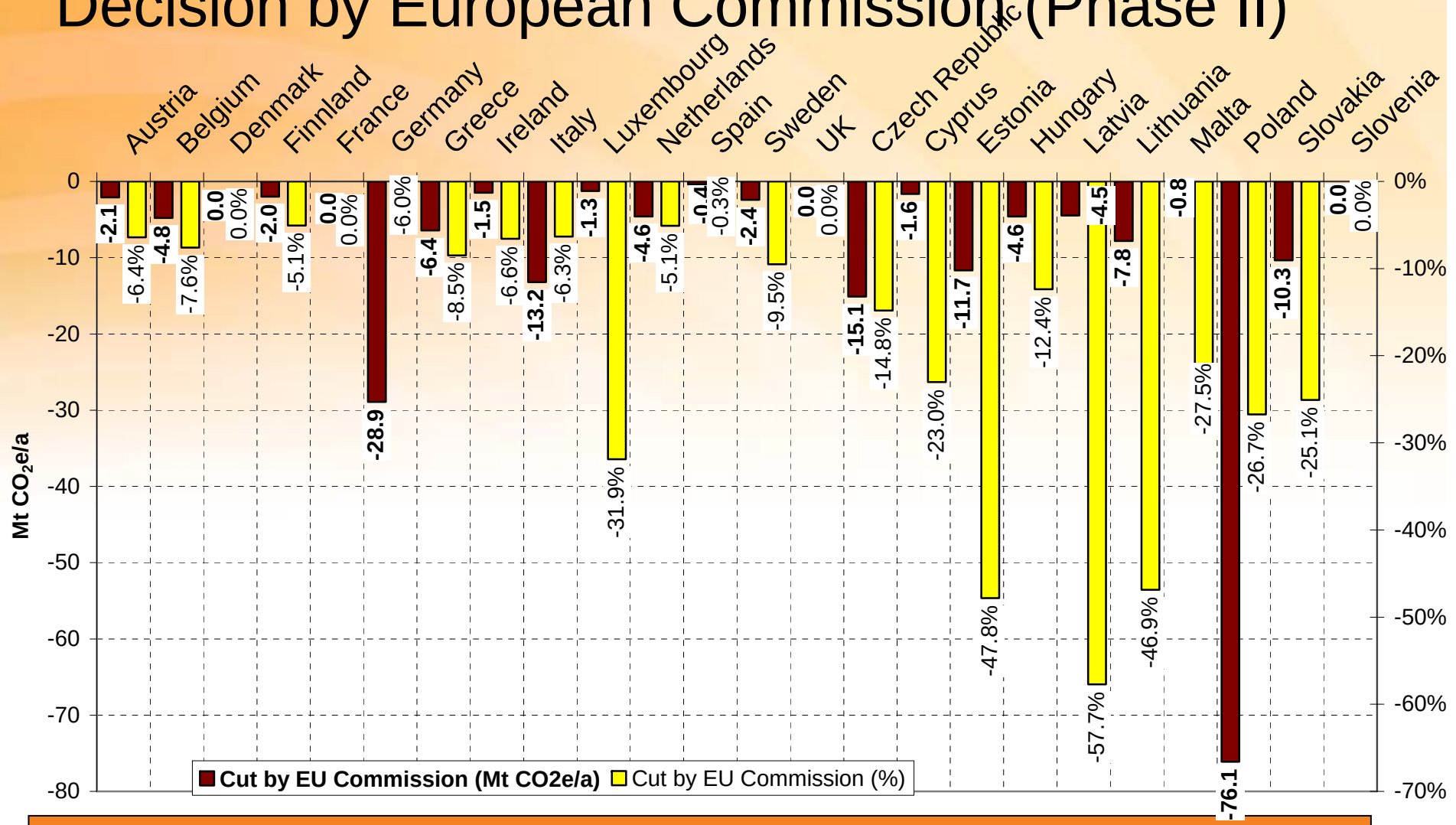
Relevant design elements

- **Environmental Effectiveness**
  - Target
  - Coverage
  - Leakage
  - Price cap
- **Efficiency**
  - Coverage
  - Allocation method
  - Market
- **Equity aspects**
  - Burden sharing between generations: Targets over time
  - Burden Sharing within generations: Allocation method
  - Burden Sharing between nations: Targets and revenue recycling
  - Burden Sharing between sectors: Target for covered and non-covered sectors

How effective is the EU ETS?

- **Target**:
  - Phase I: EUAs allocation exceeded 2005 emissions by around 100 Mio. tCO_2
  - Phase II: Substantially improved by EC decision, higher prices for EUAs; signal to other Member States (MS) and carbon markets (see next slide)
  - Phase III Proposal: -21 % compard to 2005 for ETS sector (see slide) und -20% scenario
- **Coverage**:
  - First Phase: Only CO_2 from process and combustion emissions.
  - Second Phase: Some MS cover N_2O emissions
- **Leakage**:
  - Phase I: Free and generous allocation to most sectors, little leakage expected
  - Phase II : Reduced but still free allocation
  - Phase III: Thresholds for EITE under discussion and measures (free allocation...)
- **Price Cap:**
  - No price cap since deterrend penalty and make good provision

Decision by European Commission (Phase II)



Aggregate reduction of ET-budgets for 24 MS 200 million EUA or -9%.

Source: EU Commission

EU ETS Phase III: Targets

GHG Target:

-20% compared to 1990

Already -6.5% against 1990

-14% compared to 2005

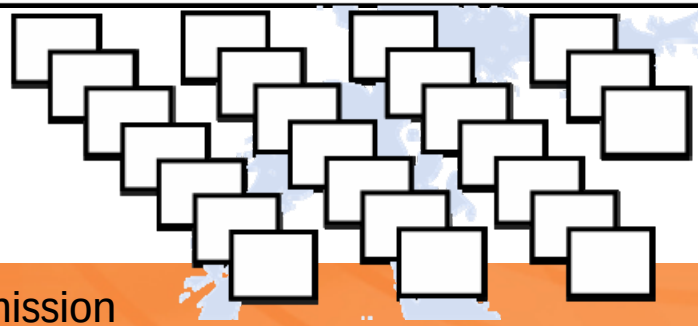
EU ETS

-21% compared to 2005

Non ETS sectors

-10% compared to 2005

27 Member State targets, stretching from -20% to +20%



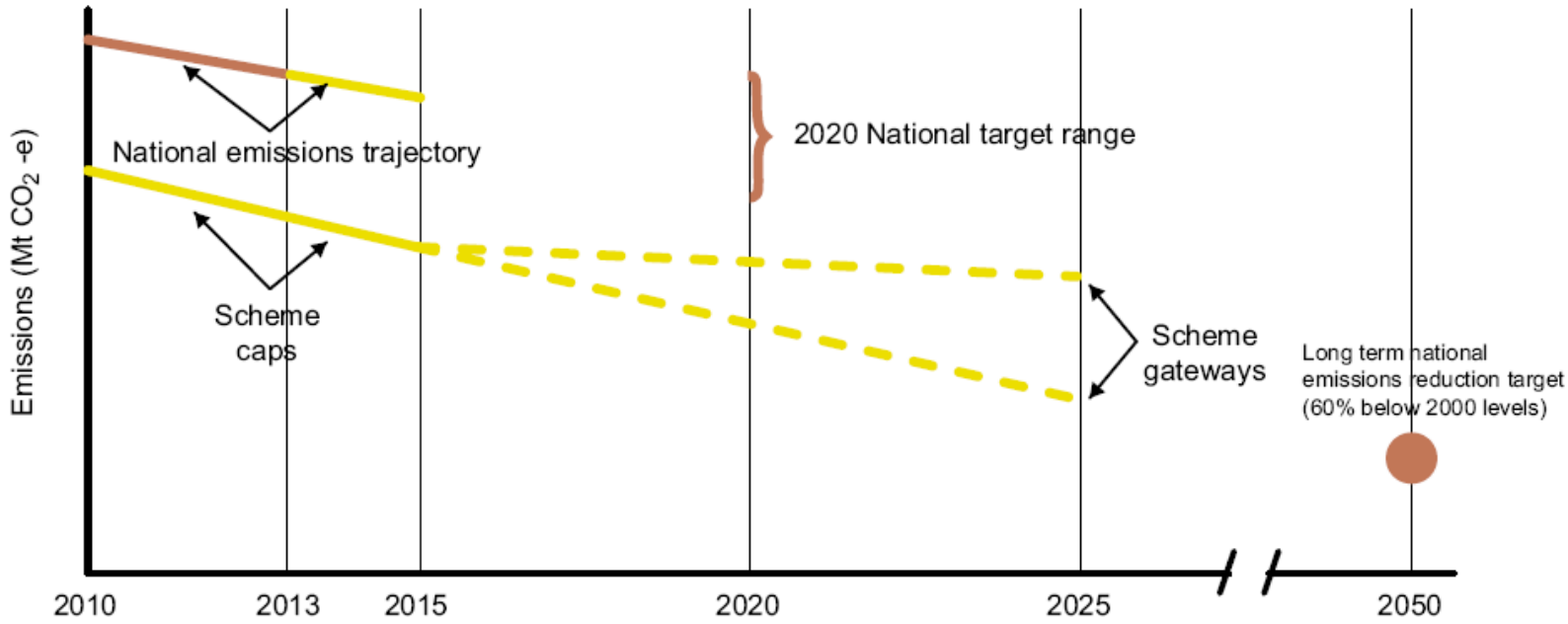
Source: EU Commission

How **effective** is the Australian proposal?

- **Target setting**: long-term target -60% in 2050, with 5 year cap and 10 years of gateways (see next slides)
  - Difficult to assess since no formal adoption of medium target
  - Long term target of 60% seems too low and not in line with latest science
- **Coverage**: Broad coverage based on a mixture of upstream (small emitters) and downstream (big emitters).
  - Only effective if double counting is avoided and GHG can be accounted for with high accuracy from ALL covered sectors
- **Leakage**: Free allocation to emissions-intensive trade-exposed industry (EITE) to avoid industrial relocation of production to countries with no climate policy
  - How real is leakage problem?
- **Price cap**: Efficiency will depend on how the price cap is set:
  - If set too low (below equilibrium price): not effective in achieveing the target
  - If set high enough: works like deterrent penalty and will be effective in achieving the target

Proposed caps and gateways

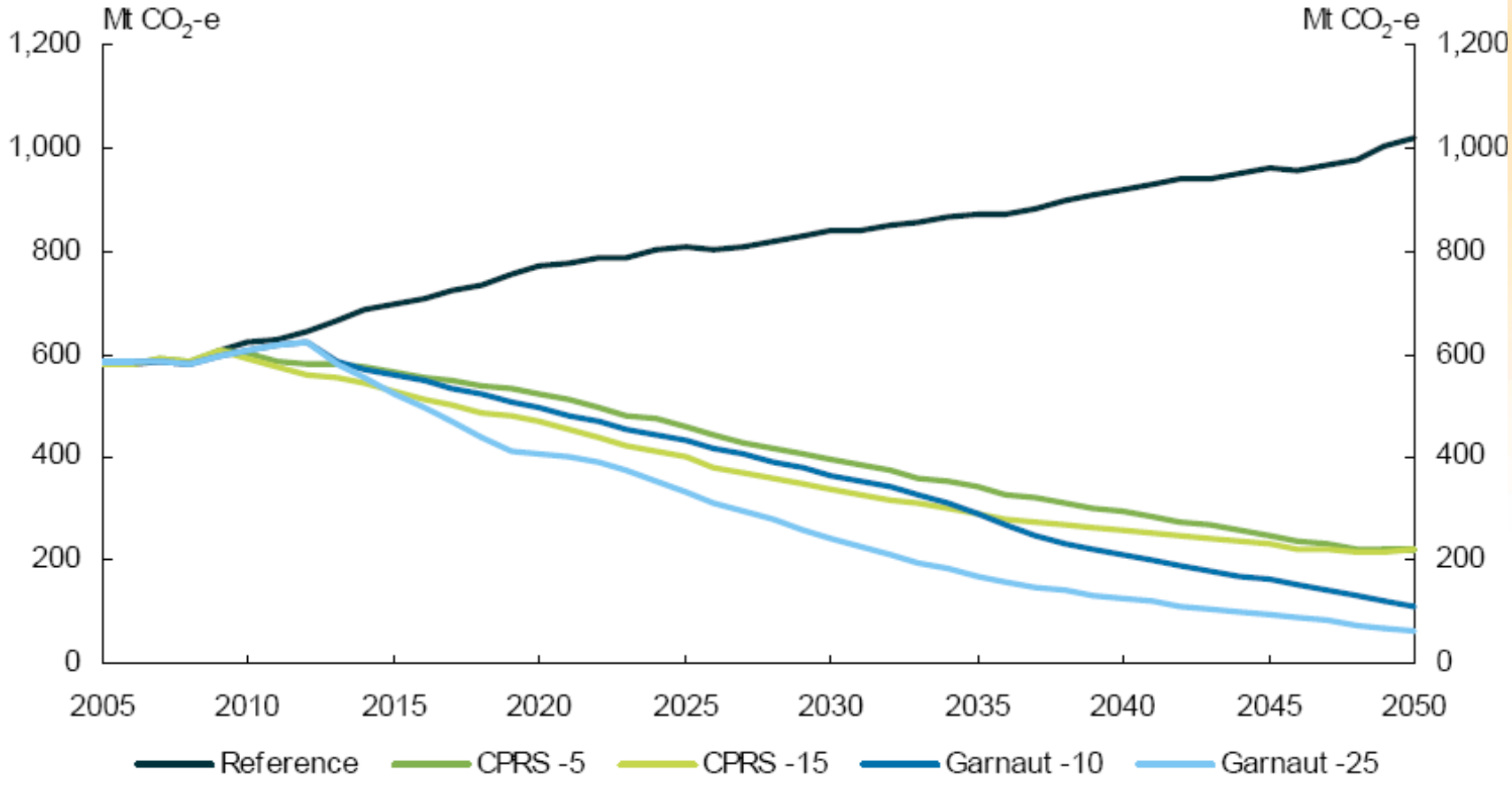
Figure 4.5 2008–2010 Guidance over scheme caps and indicative national emissions trajectory



2008 announcements—Brown
2010 announcements—Yellow

Source: Green paper

Chart 4.1: Australian emission allocations



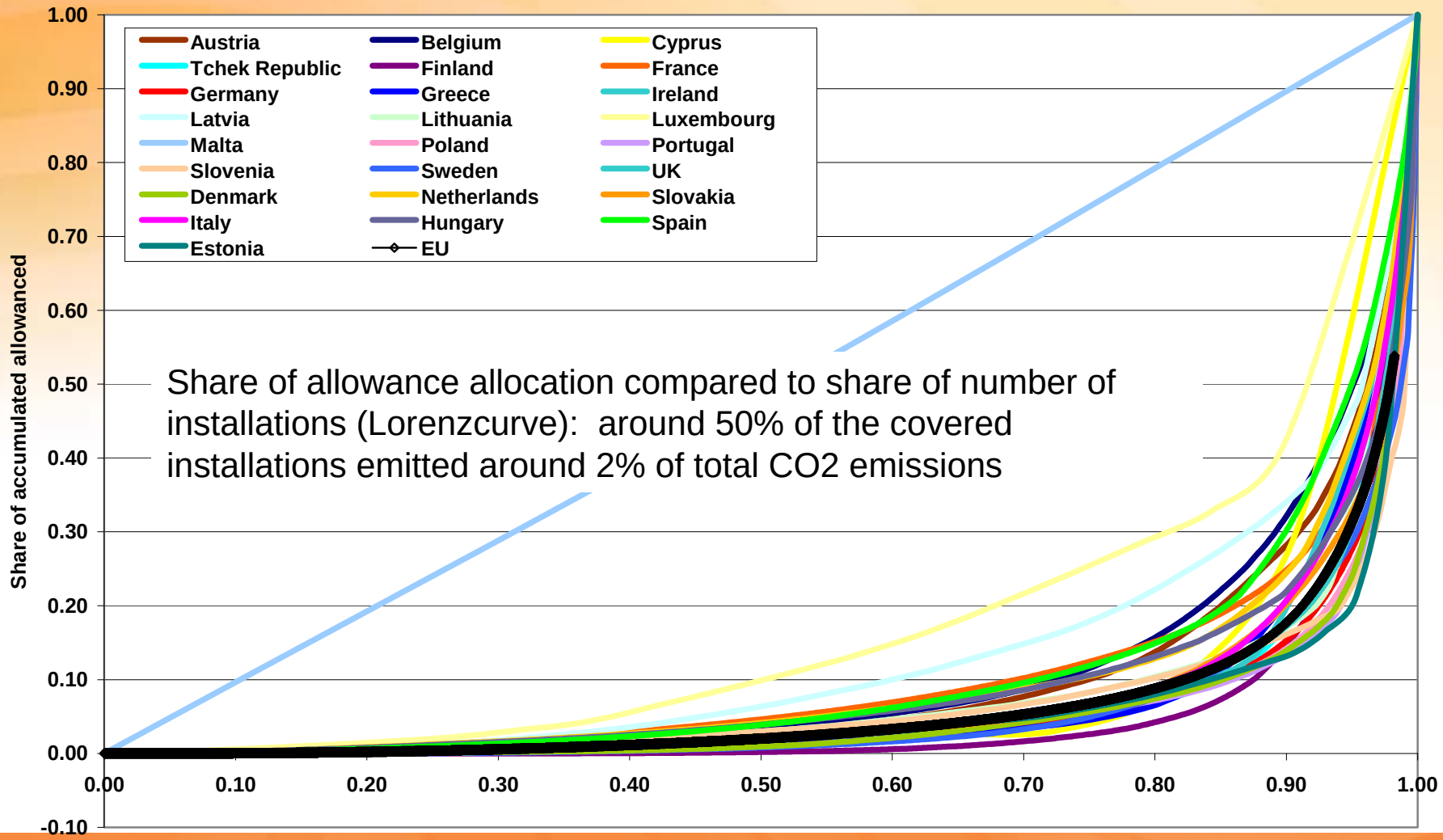
Stabilisation goal (ppm)	550	510	550	450
Emissions change 2000 in 2020/2050 (%)	-5/-60	-15/-60	-10/-80	-25/-90

Source: Treasury: Australian Low Pollution Future, 2008

How **efficient** is the EU ETS?

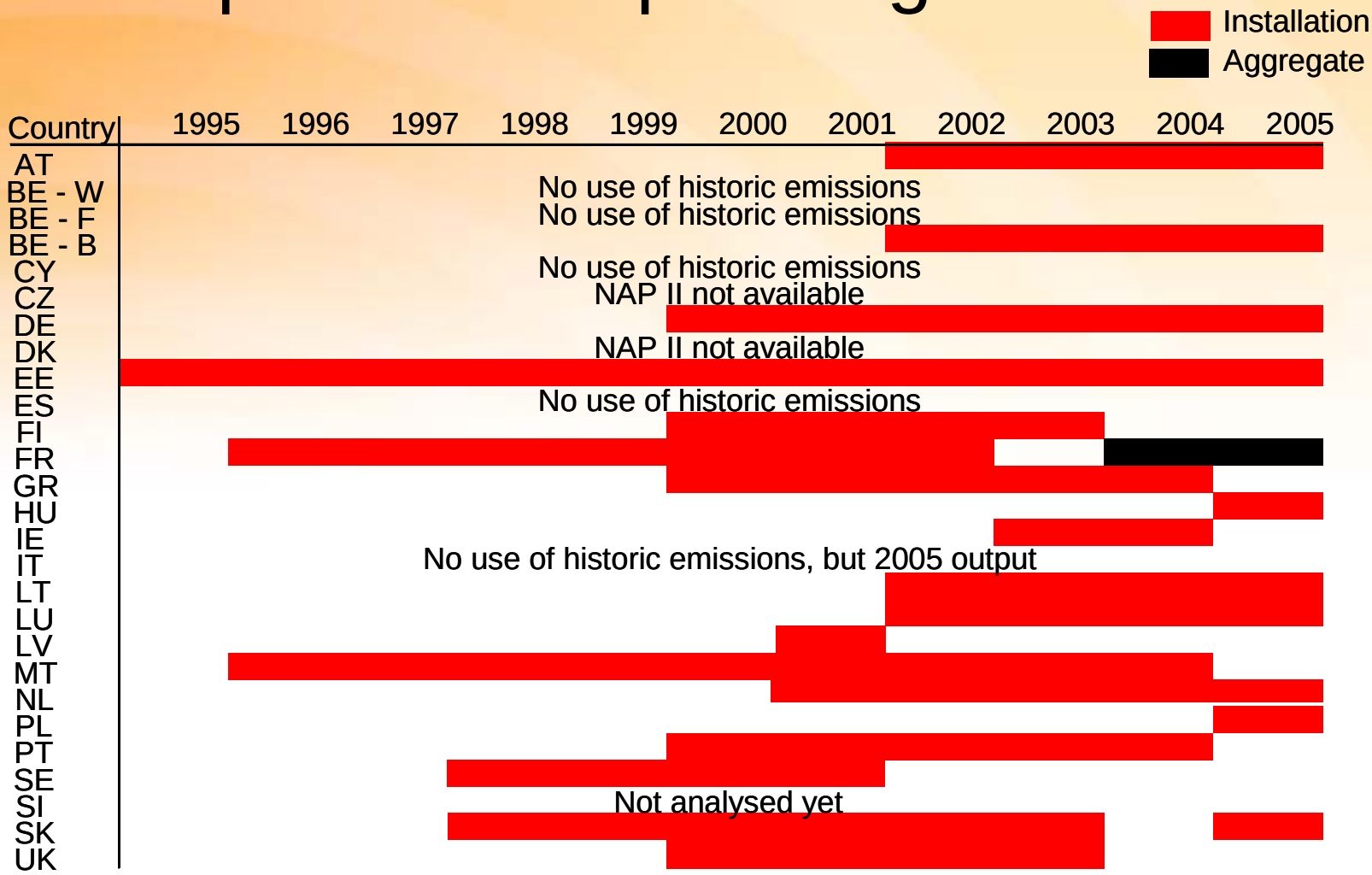
- **Coverage**:
  - Too many small companies included in scheme: Costs outweigh benefits
- **Allocation**:
  - Phase II: Little auctioning (3.4 %) mostly allocation for free (96.6%)
  - Perverse incentives in Phase I and II:
    - Up-dating dilemma (see next slide): If future allocation is a function of today's emissions it provides a perverse incentive for less abatement today in order to receive more permits in the future
    - Free allocation to new entrants coupled with withdrawal of allocation from ceasing installations gives an incentive to keep inefficient plants in operation.
    - Allocation to new entrants based on benchmarks on capacity installed gives perverse incentive to build oversized boilers (Denmark has reduced allocation BAT/benchmark)
- Market
  - Phase I inefficient market: High price volatility and collapse of price at the end
  - Phase II: Market became more efficient (the cost of carry had begun to hold in the futures market from around July 2008)
  - Future prices are leading the price discovery in the spot market (Phase I and II)
  - Future prices reflecting relevant energy information efficiently

Coverage: Emissions – Installation relation



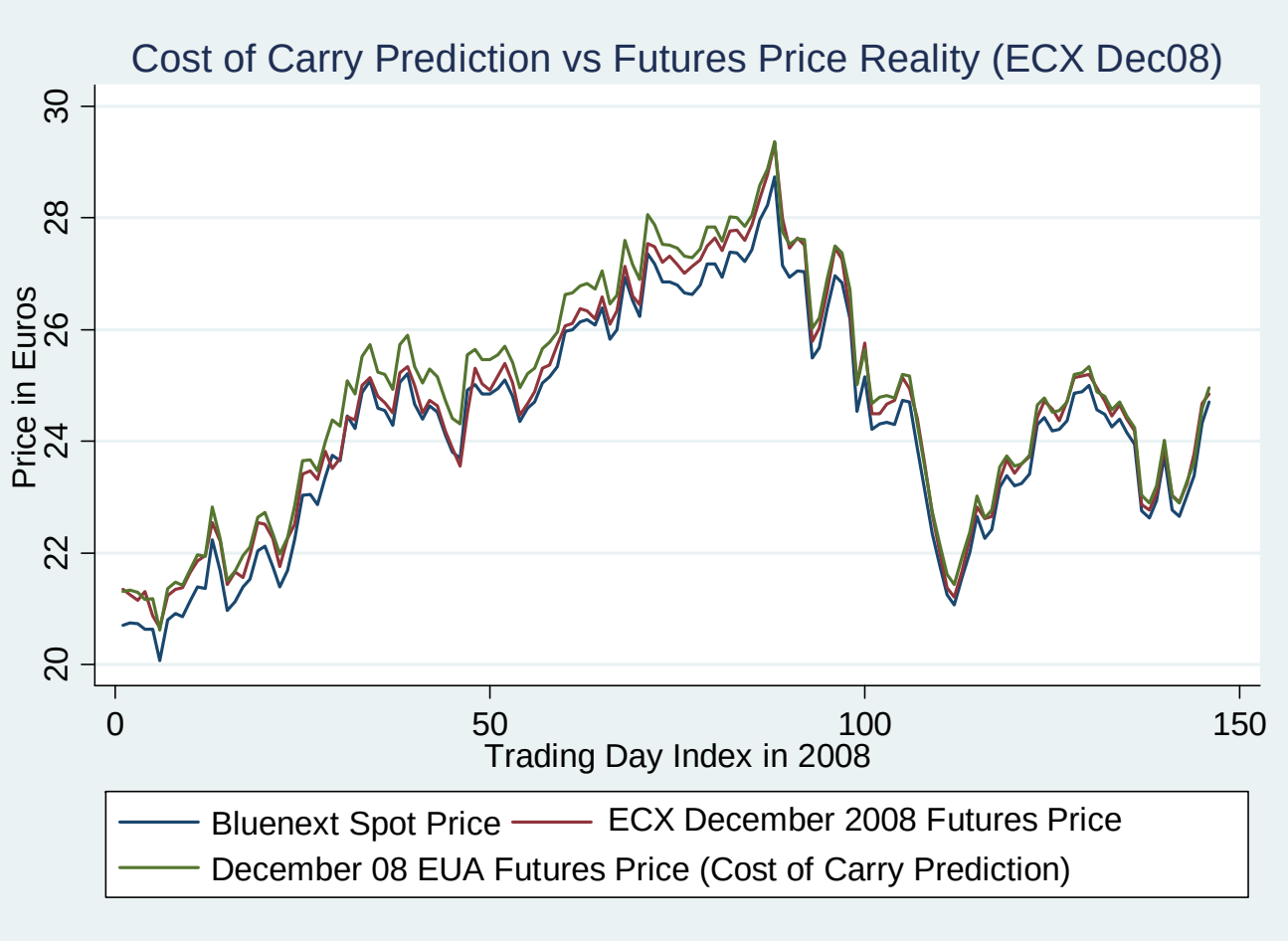
Share of allowance allocation compared to share of number of installations (Lorenzcurve): around 50% of the covered installations emitted around 2% of total CO2 emissions

Base periods – Up-dating



Source: Neuhoff et al. Climate Policy 2006

EU ETS Market Efficiency Phase II



Source: Sartor 2008

How **efficient** is the Australian proposal?

- **Coverage**:
  - Threshold and combination of upstream / downstream approach should avoid having small companies directly liable - they will be covered upstream
  - Wide coverage will reduce costs but some are de facto shielded such as transport, EITE industry... Accurate measurement needs to be ensured.
  - International linking will improve efficiency but some of current design elements likely not to be compatible (e.g. price cap, forestry inclusion)
- **Allocation**:
  - Free allocation to EITE industry will eliminate internal price signal and increase costs to rest of economy. Output (benchmark * output) on which free allocation to EITE is based will function as a subsidy of output.
  - Not sure what happens to strongly affected industry yet
- **Market**
  - Auctioning may have positive impacts on market efficiency. However, free permit allocation may increase lobbying and withdraw resources from mitigation.
  - Price cap may have negative impacts on price discovery since it may function as focal point and may prevent international linking.

CEEM is launching a prediction market to achieve early price discovery

Is the EU ETS fair?

- Burden sharing **between generations: Target**
  - Equity with regard to future generations is questionable for Phase I, Phase II targets improve and Phase III proposal with international agreement seems fair
- Burden Sharing **within generation: Allocation method**
  - Companies pass through the carbon opportunity costs to their customers with a regressive impact (low income households will have higher impact compared to high income households)
  - Free allocation leads to high windfall profits for emitters and high income households profit more from increase in share values
  - Rough estimate (Sijm) of windfall profits for phase II (reduced to phase I, since free allocation to electricity generators was reduced): non-fossil: EUR 8-11 bn + fossil : EUR 8-12 bn
- Burden Sharing **between nations: Targets and revenue recycling**
  - Phase III: Proposal to use part of auction revenue for mitigation and adaptation in developing countries (e.g. Reduction in Deforestation)
- Burden Sharing **between sectors: Target for covered and non-covered sectors**
  - Phase I: unfair
  - Phase II: EU commission has improved burden sharing when cutting back NAPs
  - Phase III proposal seems fair

Are the Australian proposals fair?

- Burden sharing **between generations: Target**
  - Difficult to assess since no medium targets approved yet, but low initial reductions seem unfair
- Burden Sharing **within generation/ covered sectors: Allocation method**
  - Free allocation approach with thresholds for EITE potentially unfair
  - CPRS will have a higher impact on low income households (see slide), however auction revenue will be used to lower regressive impact
  - Free permits to EITE industry and potentially to strongly affected industries will reinfoce regressive impact since high income households tend to benefit more from higher share values (Pezzey 2008):
    - the wealthiest 1/5 of households own 2/3 of Australian shares
    - 1/3 of listed Aus shares are owned by foreigners
  - Garnaut proposal: auction revenue will be used for energy efficiency measures (low income will directly benefit and everybody else will indirectly benefit through lower prices)
- Burden Sharing **between nations: Targets and revenue recycling**
  - Targets so far seem unfair since Australians will have highste per capita emissions allocation for next 42 years (see next slide)
  - No auction revenue foreseen to compansate developing countries for lower per capita emissions
- Burden Sharing **between sectors: Target for covered and non-covered sectors:** Wide coverage should reduce unfair burden sharing

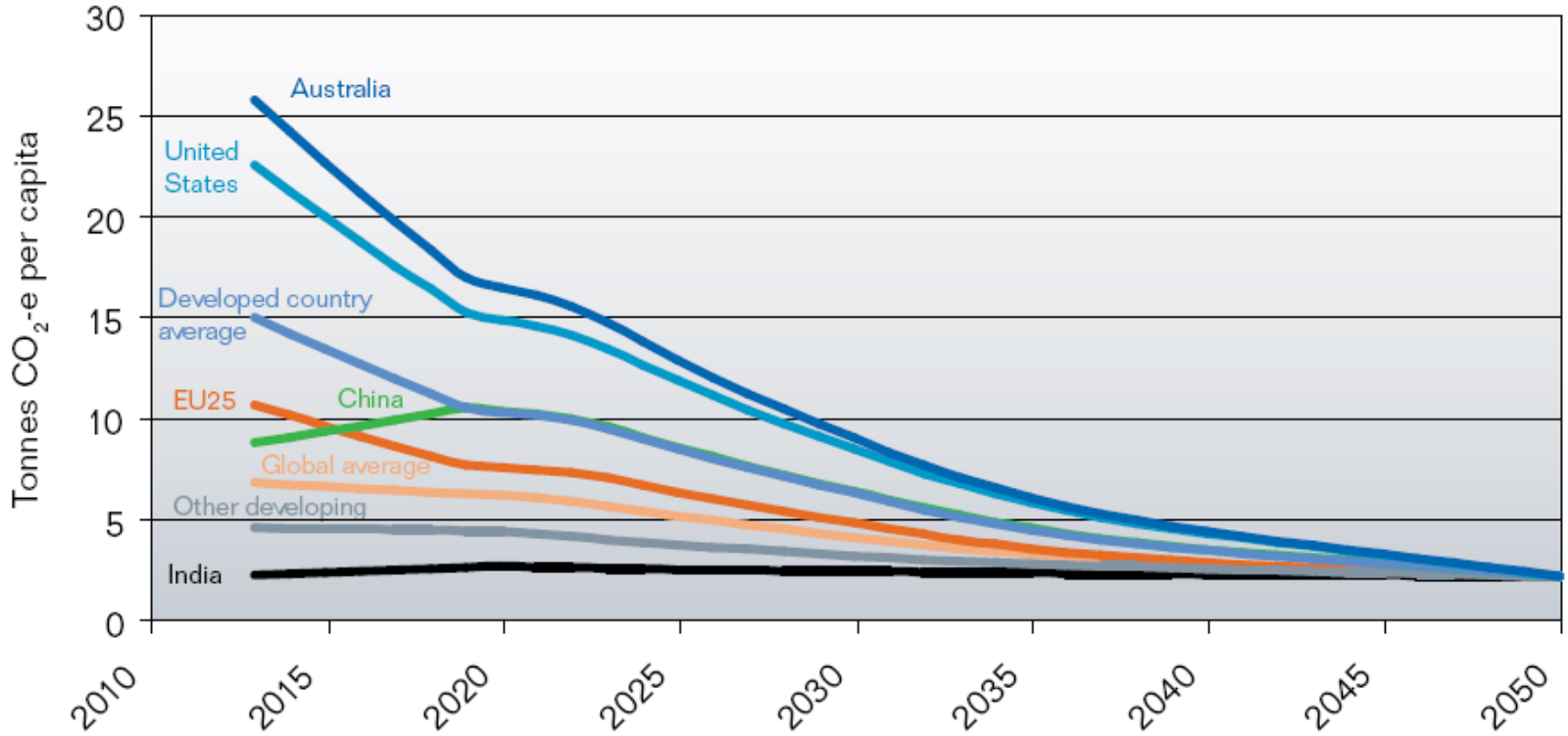
Regressive impact of carbon price

Household Type	% Pop.	Modeling Treasury in 2010 Price impact in %		Brotherhood of St. Laurence utility adjusted carbon costs % of annual expenditure	
Carbon Price		**CPRS-5 US$23**	**CPRS-15 US$32**	**$25**	**$50**
Poor family households	*6.6*	1.2	1.6	2.3	4.6
Age pension households	24.9	1.3	1.8	0.8	1.6
High income tertiary educated households	7.4	0.8	1.2	0.4	0.7
Average		1.0	1.4	0.7	1.4

Some difference can be explained by difference in data, difference what is included (CPRS only direct energy costs, BSL also cost of goods consumed), carbon price...

Garnaut: Global agreement scenario

Figure 9.5 Per capita emissions entitlements for the 450 scenario, 2012–2050



Note: The graph starts in 2012. Australia's 2012 starting value assumes Kyoto compliance, as do those for the EU25. Other countries start at their emissions level given by the reference case (the no-mitigation scenario) in 2012.

Source: Garnaut 2008

Conclusions

- EU ETS:
  Many lessons learnt in Phase I and II on how effectiveness, efficiency and equity were compromised
  Phase III seems to achieve higher effectiveness, efficiency and equity
- Australia's CPRS:
  - Effectiveness will depend mainly on medium target and revision of long term target to reflect science and level of price cap
  - Efficiency:
    - Ambitious coverage improves efficiency but is challenging with regard to measuring emissions
    - For market size and liquidity international linking important (with EU ETS problems due to price-cap and forestry inclusion)
  - Equity:
    - High share of auctioning important – government needs to resist industry lobbying
    - Auction revenue should be spend to achieve double benefits (e.g. on energy efficiency in low income households)
    - Auction revenue needs to be spend on international mitigation & adaptation for developing countries to get their support for an effective international agreement

CEEM Annual Conference: The emerging challenges for Australian Energy and Climate Policy
12.12.2008 in Sydney

CEEM Short courses: Climate change and Emissions trading and Clean Development Mechanism

Next: 4-6 February 2008 in Sydney

Centre for Energy and Environmental Markets

UNSW
THE UNIVERSITY OF NEW SOUTH WALES
SYDNEY • AUSTRALIA

Many of our publications are available at:
www.ceem.unsw.edu.au