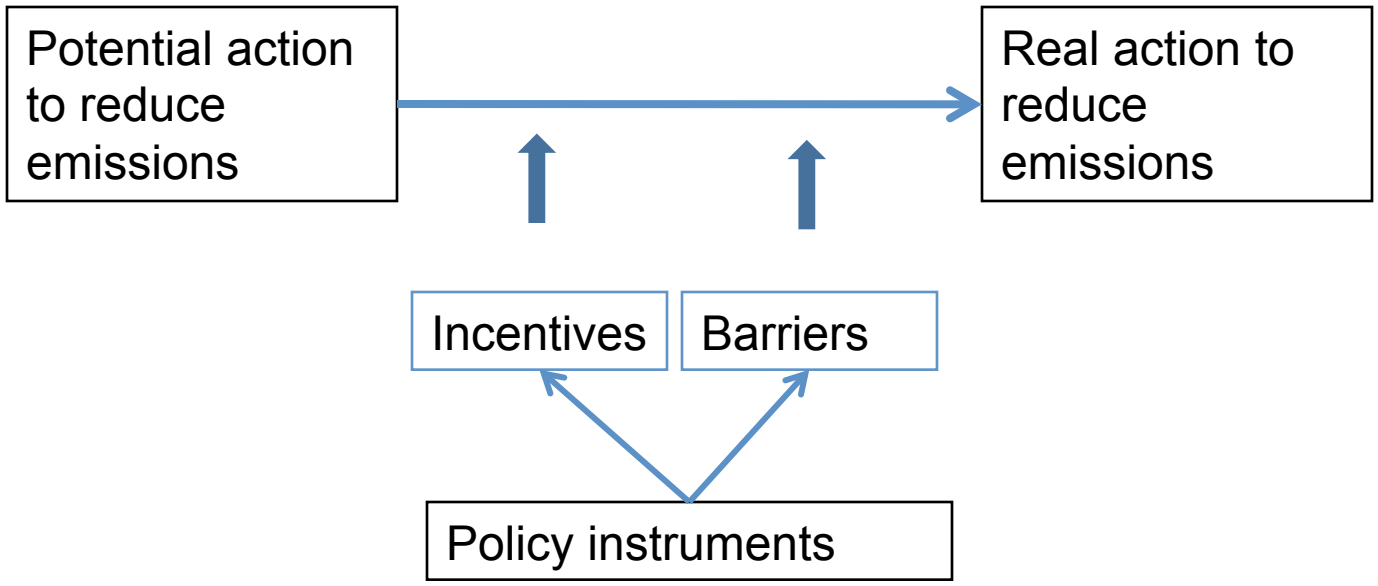
Policies and measures

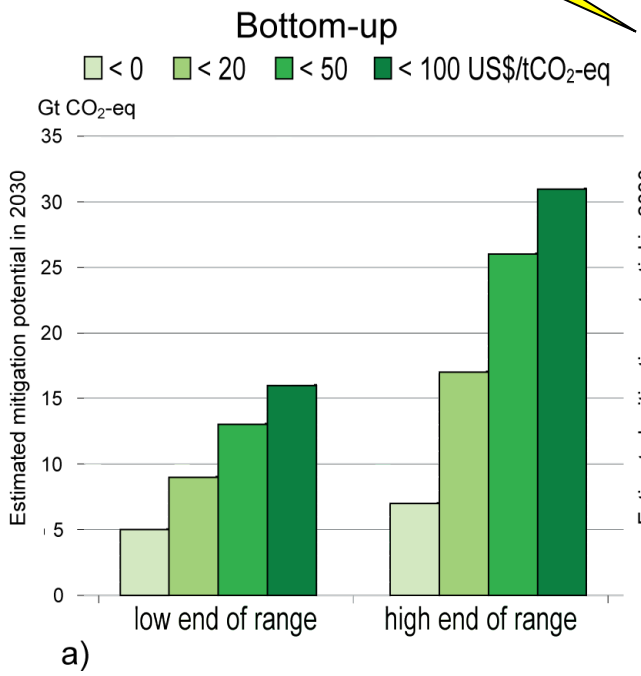
The role of policy

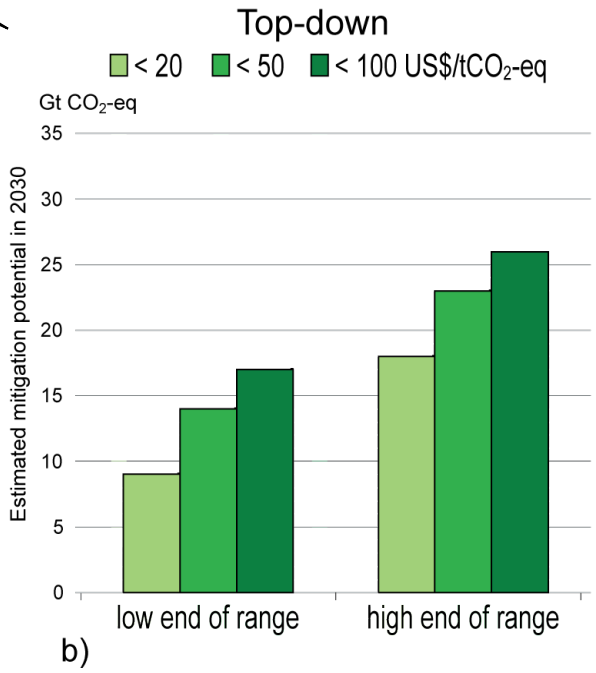


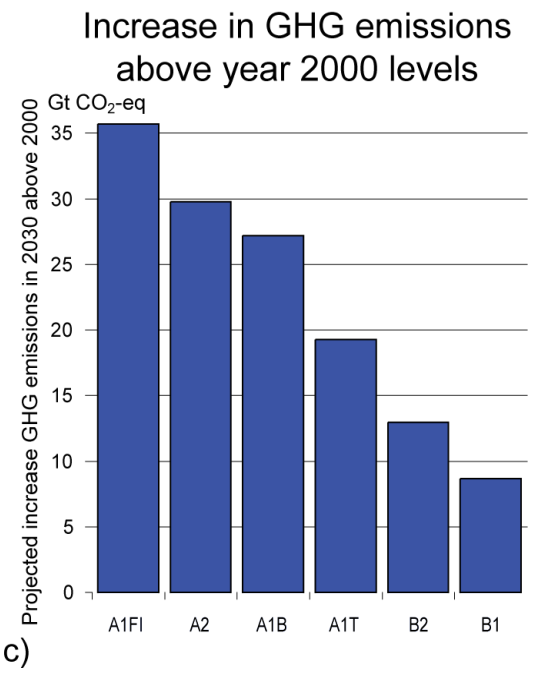
The good news: Economic mitigation potential in 2030 could offset the projected growth of global emissions, or reduce emissions below current levels

Potential decrease

Projected increase 25-90% above 2000





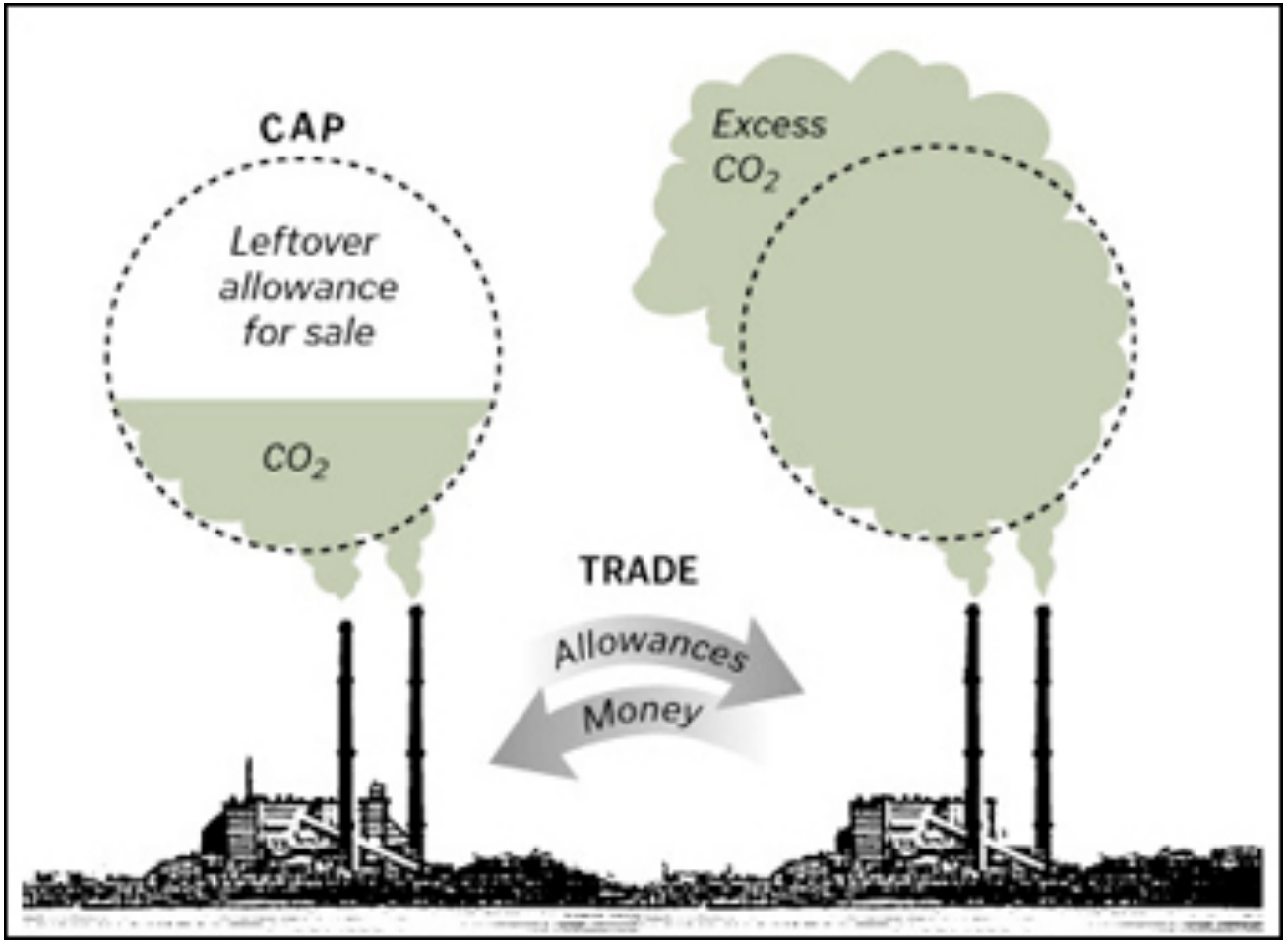


Source: IPCC WG III, 2007

Climate change policies

- Regulations and standards
- Taxes and charges
- Tradable permits / Cap and Trade
- Financial incentives
- Voluntary agreements
- Information instruments
- Research and development

Cap and trade



Source: www.granitegeek.org

Non-climate policies

- *Macro-economic policy*: taxes, subsidies, other fiscal policies, structural adjustment
- *Trade policy: "*embodied carbon", removing barriers for low-carbon products, domestic energy sources
- *Energy security policy :* efficient energy use, domestic energy sources (low-high carbon)
- *Access to modern energy:* bioenergy, poverty tariffs
- *Air quality policy:* clean fuel
- *Bank lending policies*: lending for efficiency/ renewables, avoid lock-in into old technologies in developing countries
- *Insurance policy: d*ifferentiated premiums, liability insurance exclusion, improved conditions for green products

Choice of policy instruments

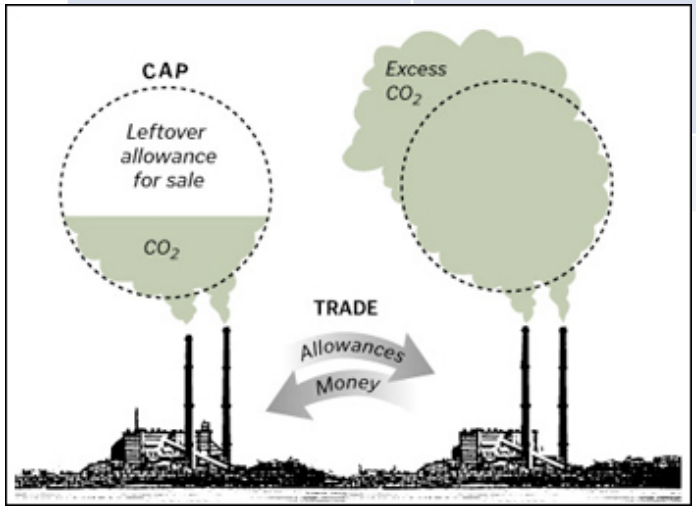
Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Regulation and standards	•Emissions levels more certain •Vulnerable to exceptions •Depends on enforcement •Less dependent on behaviour •Better where financial incentives do not work well	•Depends on design •Lacks specificity and can increase costs	•Depends on level playing field •SME's disadvantaged households disadvantaged	•Depends on technical and enforcement capacaity •Popular if market mechanisms do not function well

Choice of policy instruments

Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Taxes and charges	•Depends on ability to set taxes at high enough level to induce change of behaviour •Less effective where financial incentives are not so effective	•Good if applied broadly (few exceptions) •Depends on existing enforcemnet structure	•Regressive, may require compensation/ revenu recycling	•Politically unpopular •Difficult to enforce in situations with weak tax collection enforcement

Choice of policy instruments

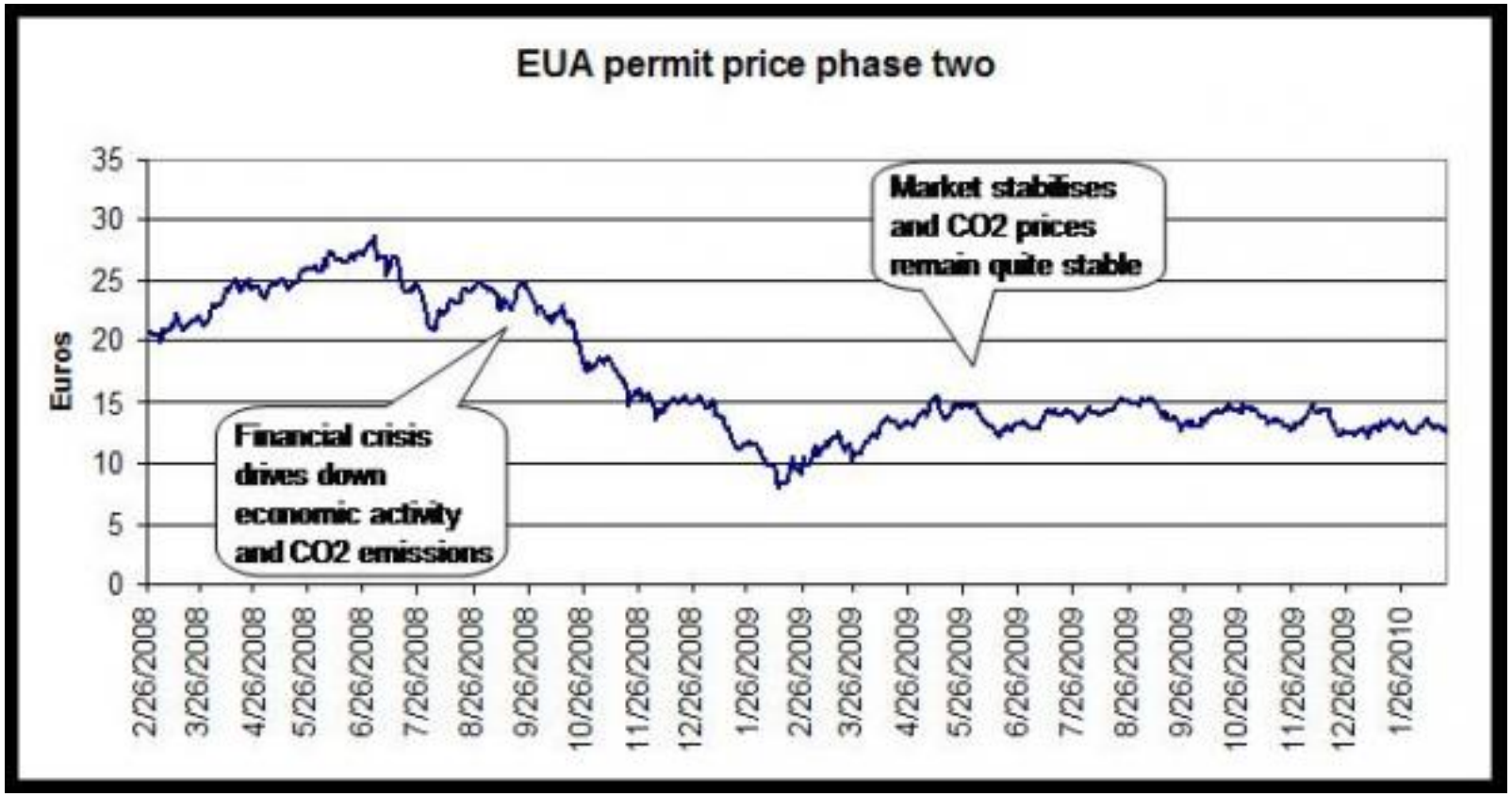
Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Cap and trade systems	•Depends on stringency of cap •Depends on perticipation •Depends on enforcement	•Good, but decreases with limited participation	•Sensitive for inititial permit allocation •Best if permits are auctioned	•Requires well functioning markets and accompanying institutions •Auctioning of permits politically unpopular



EU ETS

- Large emitters (< 50% of total)
- 3 phases
- Allocation:
  - 2008-2012: national allocation plans
  - >2013: centralised
  - From free permits to auctioning (>2013: ¾)
- Permit price/ volatility
- Import of credits

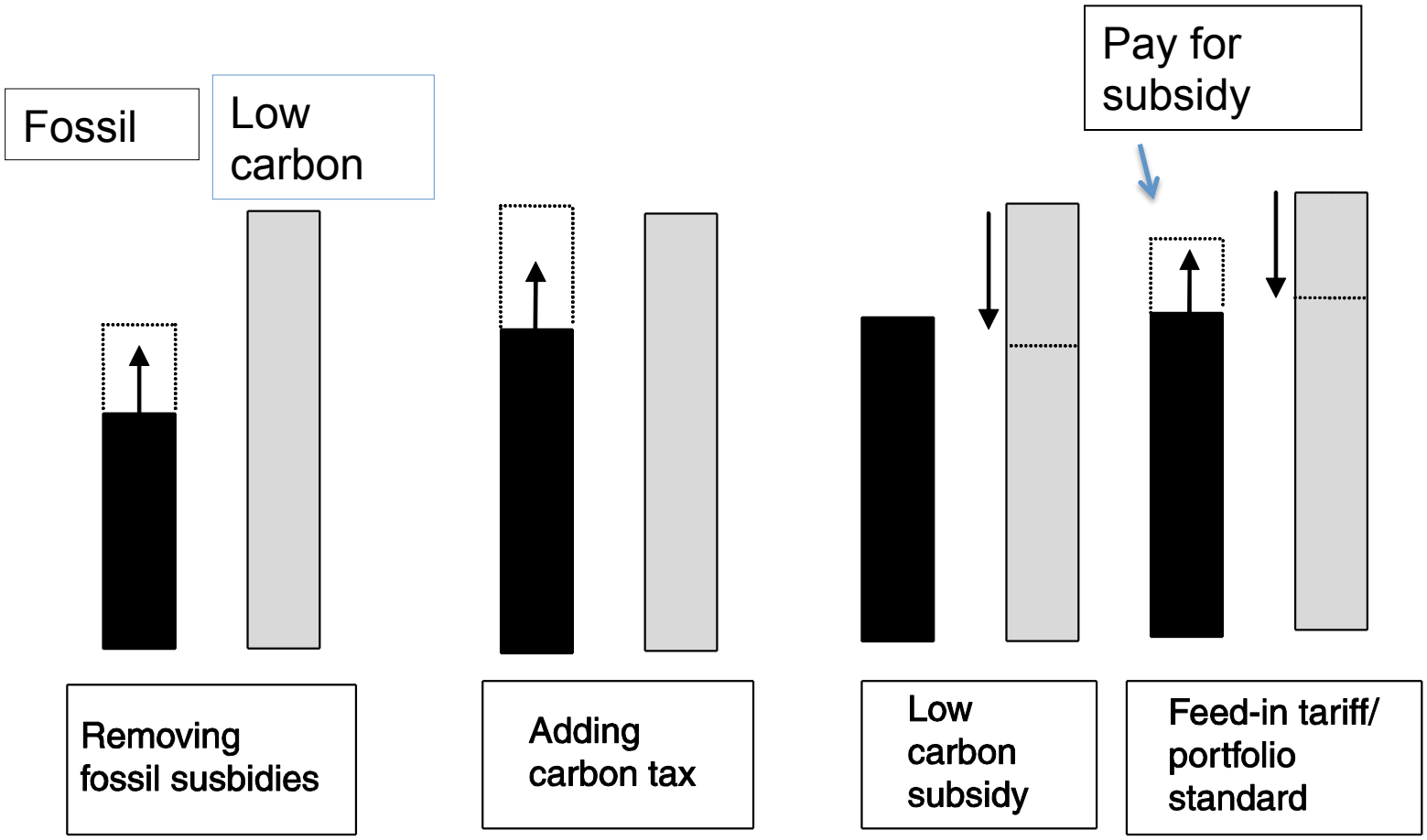
EUETS carbon price



Choice of policy instruments

Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Subsidies and other financial incentives	•Depends a lot on behaviour •Less effective where financial incentives not function well •More efective actions could be left out	•Depends on design: money could get to actors that do not need it •Could distort markets •More efective actions could be left out	•Money could end up with big players •Benefits only sected particpants	•Politically popular •Could generate resistance from vested interests •Difficult to phase out

Subsidy/ tax systems



Choice of policy instruments

Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Voluntary agreements	•Limited due to volunatay nature •Good to capture low hanging fruit •Depends on design and sanctions	•Depends on flexibility , government rewards and enforcement	•Benefits accrue to participants •Voluntary nature problematic if actions ambitious	•Politically popular •Monitoring requires sunstantial effort

Examples of voluntary agreements

- Netherlands VA on energy efficiency
- Australian Greenhouse Gas Challenge
- European Automobile Agreement
- Canadian Automobile Agreement
- Climate Leaders
- Keidanren Voluntary Action Plan

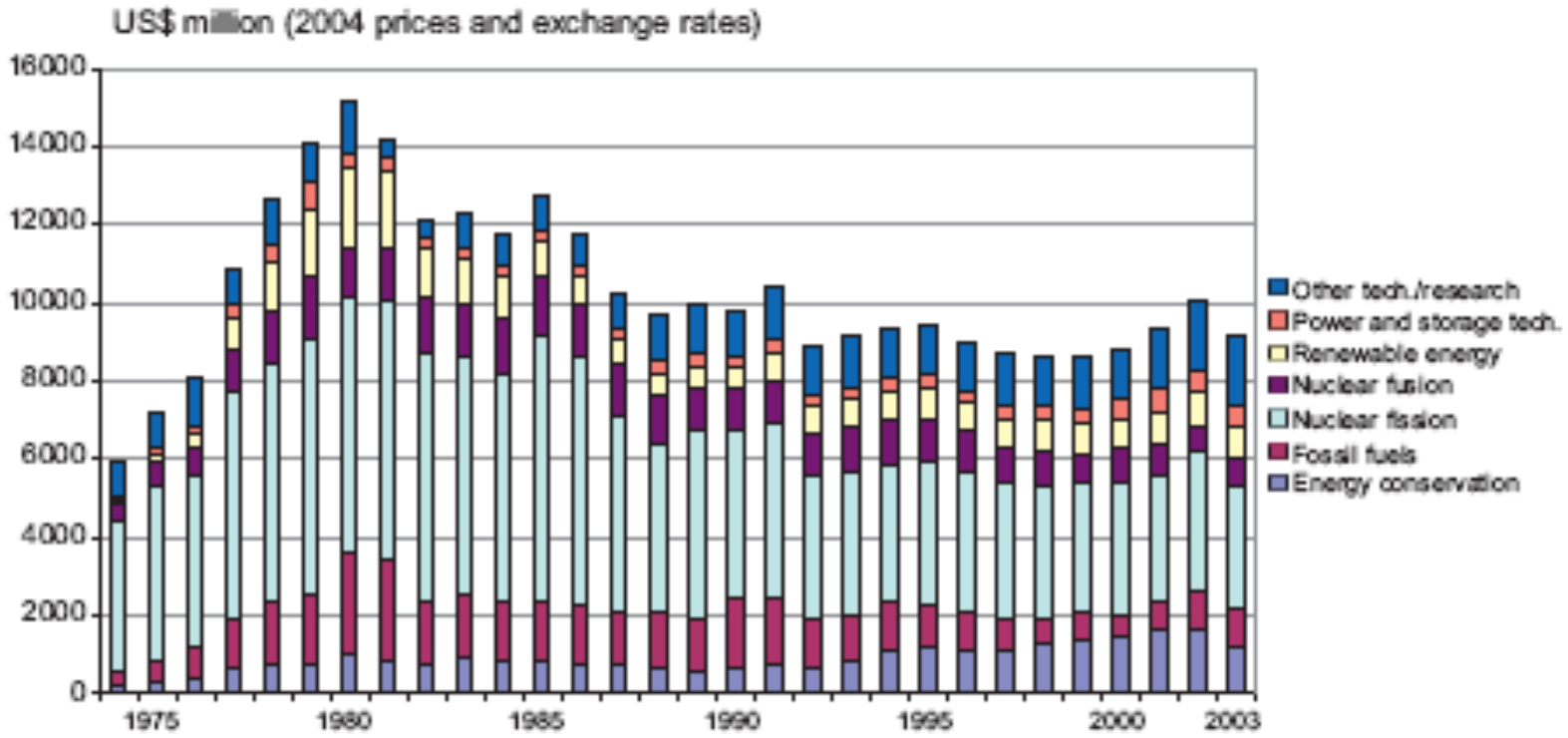
Choice of policy instruments

Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Information policies	•Limited on its own •Better in combination with other instruments •Depends very much on how actors use the information	•Generally low cost, but limited effect	•May not reach certain groups in society	•Relatively easy, but depends on cooperation of interest groups

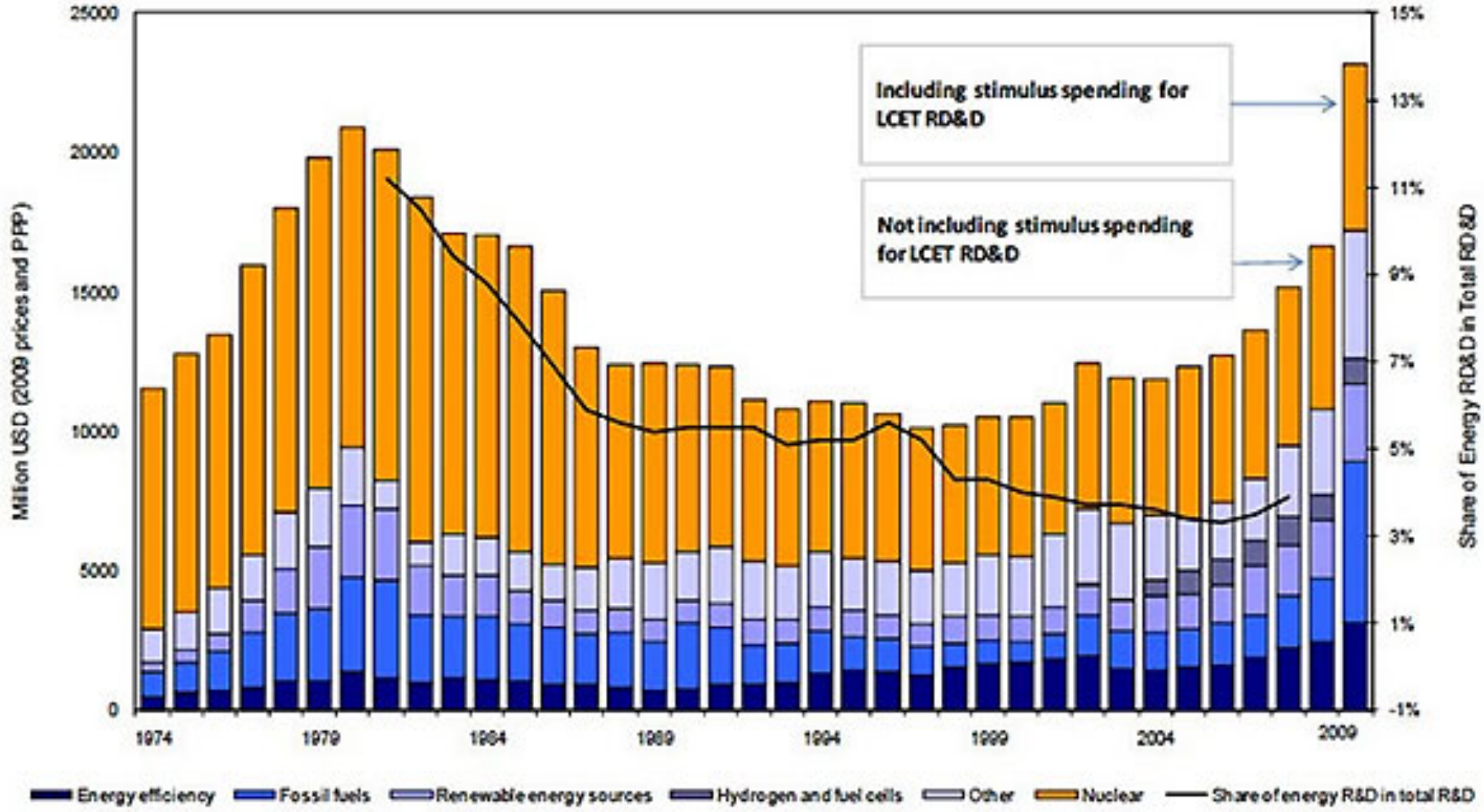
Choice of policy instruments

Policy instrument	Environmental effectiveness	Cost effectiveness	Distributional effects	Institutional and political feasibility
Research and development (funding)	•Effective in long term •Depends on cosistency of funding •Depends on effectie bridge between development and market	•Cost-effective from social point of view •Often not cost effective from private sector point of view •Varies with technology	•Money may end up with big players •More promising R&D may be ignored	•Politically popular •Requires esphisticated institutions for effective allocation of funding

Publicly funded energy R&D expenditures

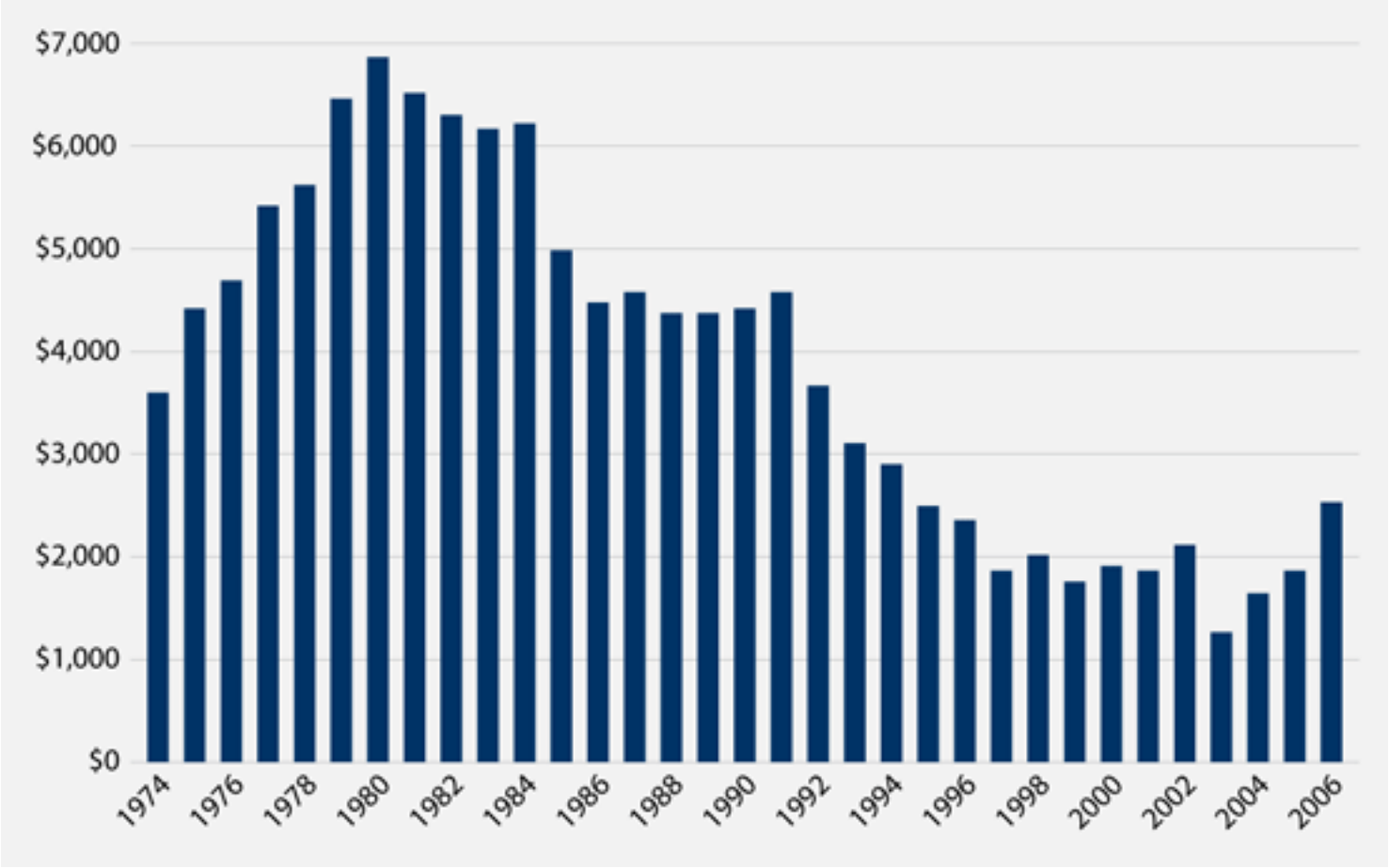


IEA countries government energy R&D



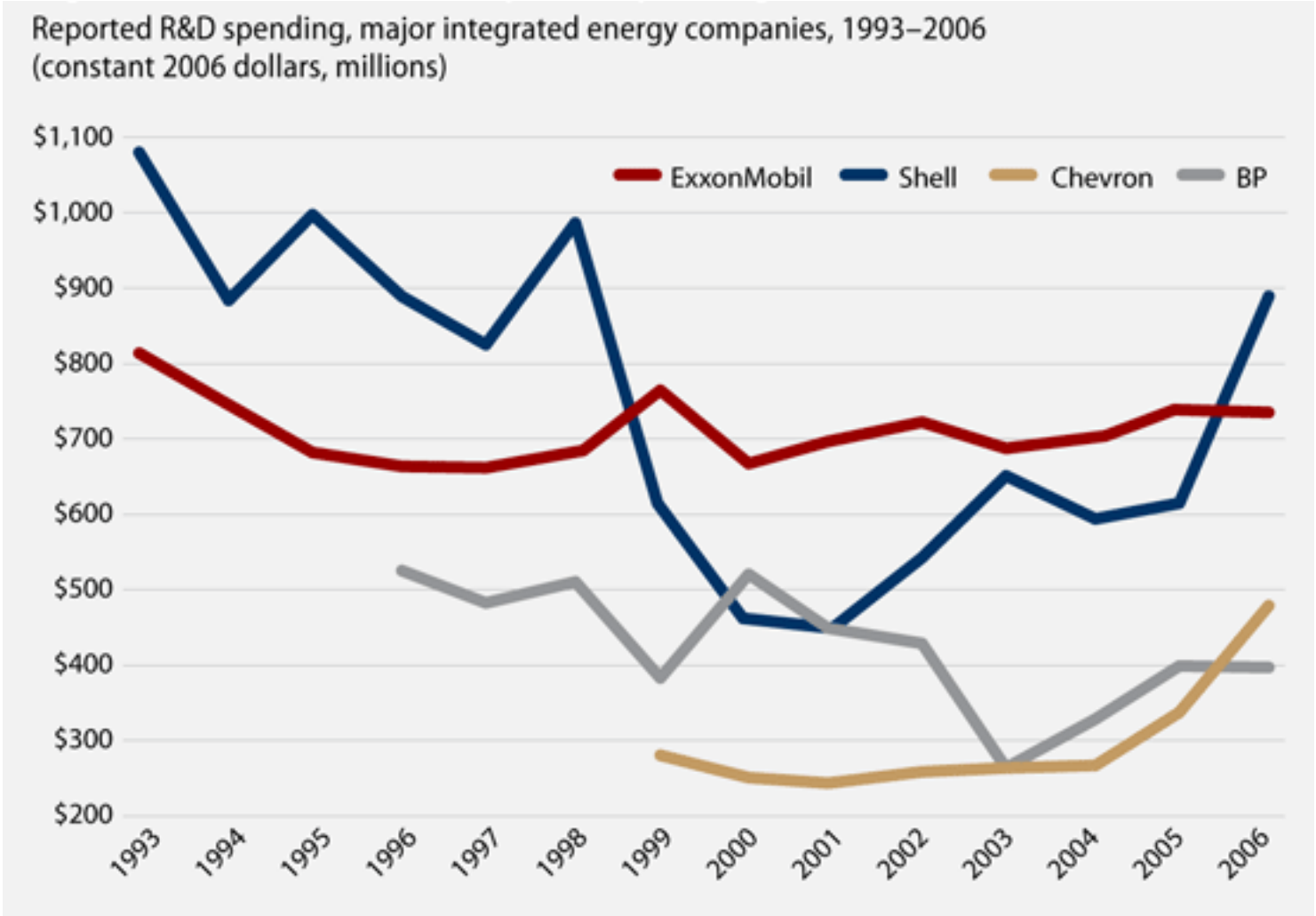
Private sector energy R&D

MUS$



http://www.americanprogress.org/issues/2010/10/big_oil.html

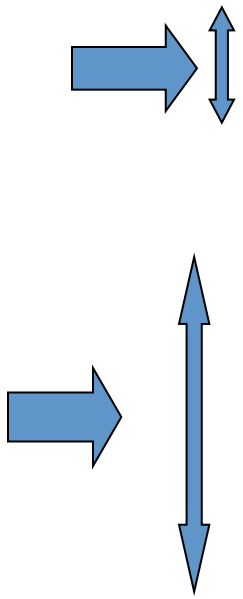
Big Oil R&D



MUS$

http://www.americanprogress.org/issues/2010/10/big_oil.html

Selected energy supply sector policies, measures and instruments that have shown to be environmentally effective

Sector	Policies[1], measures and instruments shown to be environmentally effective	Key constraints or *opportunities*
Energy supply 	Reduction of fossil fuel subsidies	Resistance by vested interests may make them difficult to implement
	Taxes or carbon charges on fossil fuels	
	Cap and trade systems	Free allocation can create windfall profits
	Feed-in tariffs for renewable energy technologies	• *Appropriate to create markets for low emissions technologies* • Subsidy schemes often volatile
	Renewable energy obligations	
	Producer/consumer subsidies	

[1] Public RD&D investment in low emission technologies have proven to be effective in all sectors.

Table R10. Cumulative Number of Countries/States/Provinces Enacting Feed-in Policies

Year	Cumulative Number	Countries/States/Provinces Added That Year
1978	1	United States
1990	2	Germany
1991	3	Switzerland
1992	4	Italy
1993	6	Denmark, India
1994	8	Spain, Greece
1997	9	Sri Lanka
1998	10	Sweden
1999	13	Portugal, Norway, Slovenia
2000	13	—
2001	15	France, Latvia
2002	21	Algeria, Austria, Brazil, Czech Republic, Indonesia, Lithuania
2003	28	Cyprus, Estonia, Hungary, South Korea, Slovak Republic, Maharashtra (India)
2004	33	Israel, Nicaragua, Prince Edward Island (Canada), Andhra Pradesh and Madhya Pradesh (India)
2005	40	Karnataka, Uttaranchal, and Uttar Pradesh (India); China, Turkey, Ecuador, Ireland
2006	43	Ontario (Canada), Argentina, Thailand
2007	49	South Australia (Australia), Albania, Bulgaria, Croatia, Macedonia, Uganda
2008	61	Queensland (Australia); California (USA); Gujarat, Haryana, Punjab, Rajasthan, Tamil Nadu, and West Bengal (India); Kenya, the Philippines, Poland, Ukraine
2009 (early)	63	Australian Capital Territory (Australia); South Africa

Note: Cumulative number refers to number of jurisdictions that had enacted feed-in policies as of the given year. A few feed-in policies shown have been discontinued. Many policies have been revised or reformulated in years subsequent to the initial year shown. India's national feed-in tariff from 1993 was substantially discontinued but new national feed-in tariffs were enacted in 2008. Three countries with feed-in tariffs are not shown because year of enactment is unknown: Costa Rica, Mauritius, and Pakistan. *Source*: All available policy references, including the IEA online Global Renewable Energy Policies and Measures database and submissions from report contributors. See also Endnote 35.

Source: REN21, Renewables Global Status Report: 2009 Update

Table R11. Cumulative Number of Countries/States/Provinces Enacting RPS Policies

Year	Cumulative Number	Countries/States/Provinces Added That Year
1983	1	Iowa (USA)
1994	2	Minnesota (USA)
1996	3	Arizona (USA)
1997	6	Maine, Massachusetts, Nevada (USA)
1998	9	Connecticut, Pennsylvania, Wisconsin (USA)
1999	12	New Jersey, Texas (USA); Italy
2000	13	New Mexico (USA)
2001	15	Flanders (Belgium); Australia
2002	18	California (USA); Wallonia (Belgium); United Kingdom
2003	19	Japan; Sweden; Maharashtra (India)
2004	34	Colorado, Hawaii, Maryland, New York, Rhode Island (USA); Nova Scotia, Ontario, Prince Edward Island (Canada); Andhra Pradesh, Karnataka, Madhya Pradesh, Orissa (India); Poland
2005	38	District of Columbia, Delaware, Montana (USA); Gujarat (India)
2006	39	Washington State (USA)
2007	44	Illinois, New Hampshire, North Carolina, Oregon (USA); China
2008	49	Michigan, Missouri, Ohio (USA); Chile; India

Note: Cumulative number refers to number of jurisdictions that had enacted RPS policies as of the given year. Jurisdictions listed under year of first policy enactment; many policies are revised in subsequent years. *Source*: All available policy references, including the IEA online Global Renewable Energy Policies and Measures database, published sources as given in the endnotes and the 2007 report edition, and submissions from report contributors.

Source: REN21, Renewables Global Status Report: 2009 Update

Segment	Effective policy approaches in industrialised countries	Effective policy approaches in developing countries
Reducing passenger transport demand	• Teleworking • City gentrification • Tax air travel	• City planning • Tax air travel
Reducing freight transport demand	• Increase cost of freight transport (taxes, road fees) • Truck road use restriction	• Industrial zoning • Increase cost of freight transport (taxes, road fees) • Truck road use restriction
Modal shift passenger transport	• Make driving and parking more expensive and time consuming (congestion charges, fuel tax, restricted areas, parking charges) • Pay-as-you-drive for road taxes (shift costs from one-time to operational) • Provide good public transport	• Maintain bicycle/ walking provisions • Provide efficient, clean and affordable public transport (e.g. Bus Rapid Transit Systems; intercity bus systems)
Modal shift freight transport	• Develop rail/ water infrastructure	• Maintain/develop rail/ water infrastructure

Segment	Effective policy approaches in industrialised countries	Effective policy approaches in developing countries
Fuel efficiency improvement	• Set fuel efficiency standards • Make road / vehicle taxes dependent on CO2 emissions • Subsidise hybrid vehicles • Scrap old vehicles	• Set fuel efficiency standards • Make road / vehicle taxes dependent on CO2 emissions • Ban inefficient second hand car imports • Subsidise hybrid vehicles • Scrap old vehicles
Biofuel	• Set quota • Mandate sustainability certification • Support R&D second generation biofuels, incl for jet fuel	• Set quota • Mandate sustainability certification • Support R&D second generation biofuels
Electric/ Hydrogen Fuel cell vehicles	• Provide hydrogen/ electric loading infrastructure • Support R&D (fuel cell vehicles)	• Promote e-bikes (allowing them on the road, maintaining bicycle facilities, subsidies) • Support R&D (fuel cell bikes)

Fuel efficiency standards are driving innovation

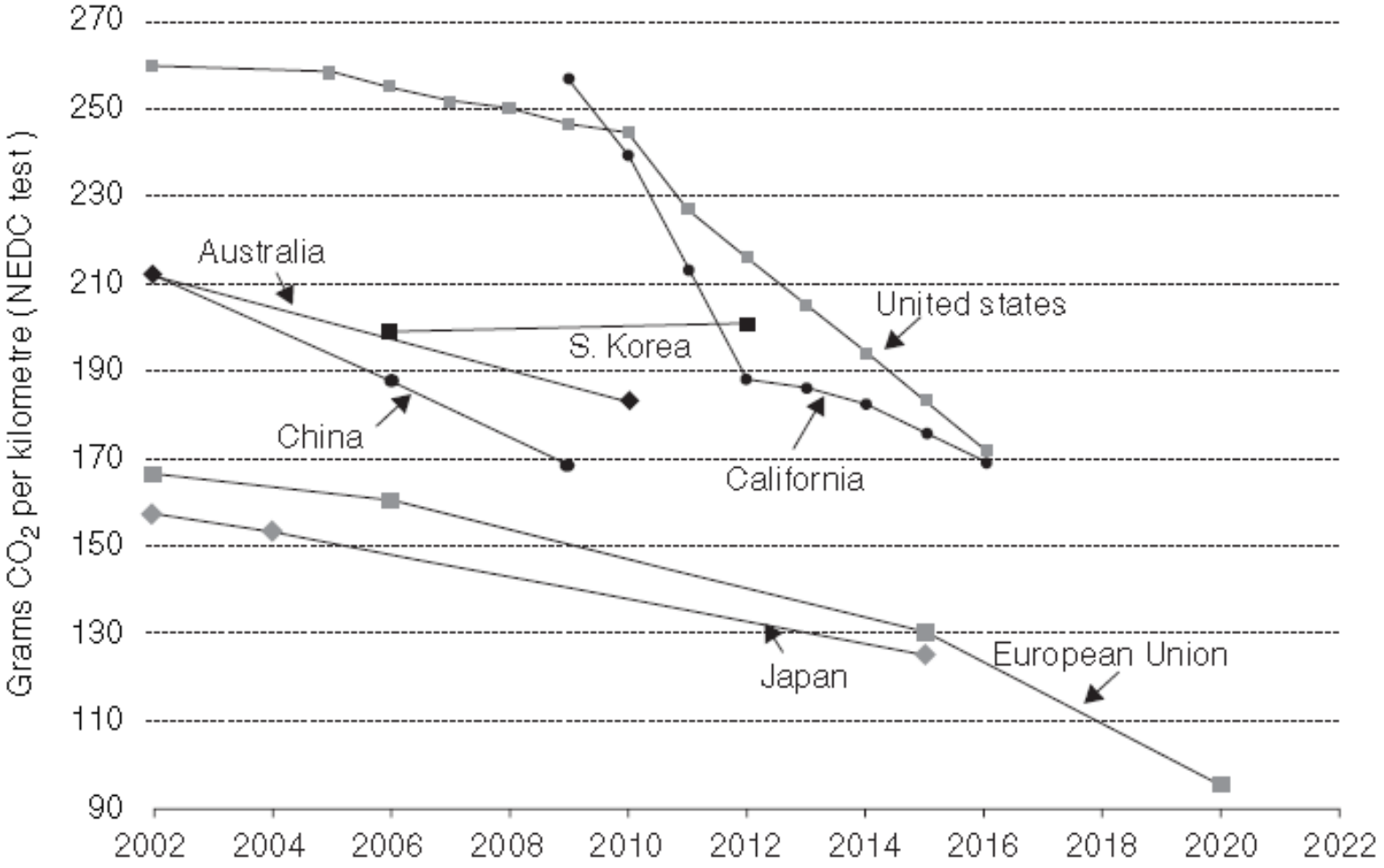


Table R12. Biofuels Blending Mandates

Country	Mandate
Australia	E2 in New South Wales, increasing to E10 by 2011; E5 in Queensland by 2010
Argentina	E5 and B5 by 2010
Bolivia	B2.5 by 2007 and B20 by 2015
Brazil	E22 to E25 existing (slight variation over time); B3 by 2008 and B5 by 2013
Canada	E5 by 2010 and B2 by 2012; E7.5 in Saskatchewan and Manitoba; E5 by 2007 in Ontario
Chile	E5 and B5 by 2008 (voluntary)
China	E10 in 9 provinces
Colombia	E10 and B10 existing
Dominican Republic	E15 and B2 by 2015
Germany	E5.25 and B5.25 in 2009; E6.25 and B6.25 from 2010 through 2014
India	E5 by 2008 and E20 by 2018; E10 in 13 states/territories
Italy	E1 and B1
Jamaica	E10 by 2009
Korea	B3 by 2012
Malaysia	B5 by 2008
Paraguay	B1 by 2007, B3 by 2008, and B5 by 2009; E18 (or higher) existing
Peru	B2 in 2009; B5 by 2011; E7.8 by 2010
Philippines	B1 and E5 by 2008; B2 and E10 by 2011
South Africa	E8–E10 and B2–B5 (proposed)
Thailand	E10 by 2007 and B10 by 2012; 3 percent biodiesel share by 2011
United Kingdom	E2.5/B2.5 by 2008; E5/B5 by 2010
United States	Nationally, 130 billion liters/year by 2022 (36 billion gallons); E10 in Iowa, Hawaii, Missouri, and Montana; E20 in Minnesota; B5 in New Mexico; E2 and B2 in Louisiana and Washington State; Pennsylvania 3.4 billion liters/year biofuels by 2017 (0.9 billion gallons)
Uruguay	E5 by 2014; B2 from 2008–11 and B5 by 2012

Note: Table shows binding obligations on fuel suppliers; there are other countries with future indicative targets that are not shown here; see the Biofuels Policies section. Some mandates shown may be delayed by market issues. Mandates in some U.S. states only take effect in future years or under certain future conditions, or apply only to portions of gasoline sold. *Source*: All available policy references, including the IEA online Global Renewable Energy Policies and Measures database and submissions from report contributors.

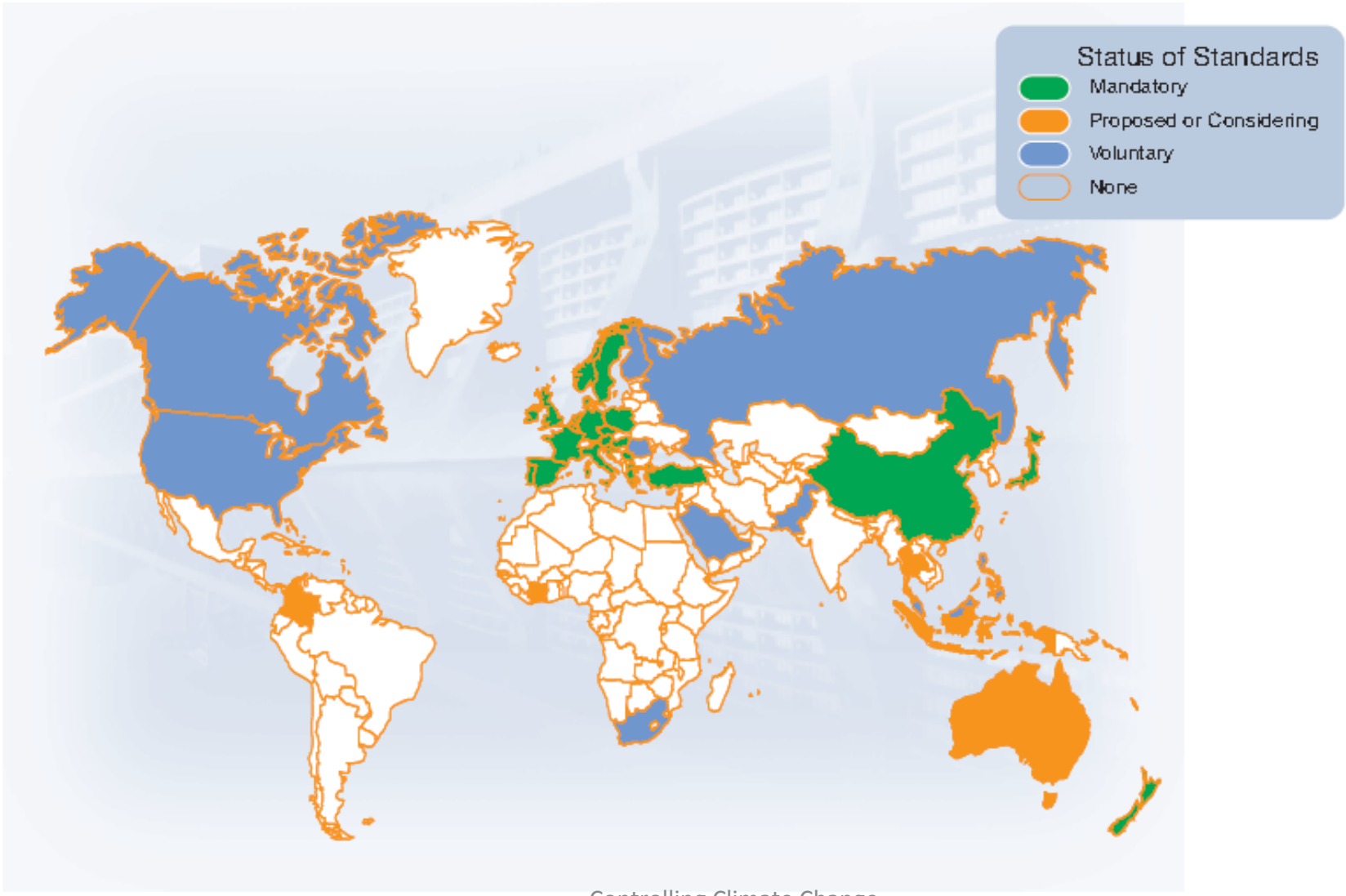
Source: REN21, Renewables Global Status Report: 2009 Update

Selected building sector policies, measures and instruments that have shown to be environmentally effective

Sector	Policies, measures and instruments shown to be environmentally effective	Key constraints or opportunities
Buildings	Appliance standards and labelling	Periodic revision of standards needed; affects ~30% of residential energy use
	Building codes and certification	*Attractive for new buildings.* Enforcement can be difficult
	Demand-side management programmes	Need for regulations so that utilities may profit *Attractive for existing buildings*
	Public sector procurement	*Government purchasing can expand demand for energy-efficient products*
	Incentives for energy service companies (ESCOs)	*Success factor: Access to third party financing*

[1] Public RD&D investment in low emission technologies have proven to be effective in all sectors.

Building codes



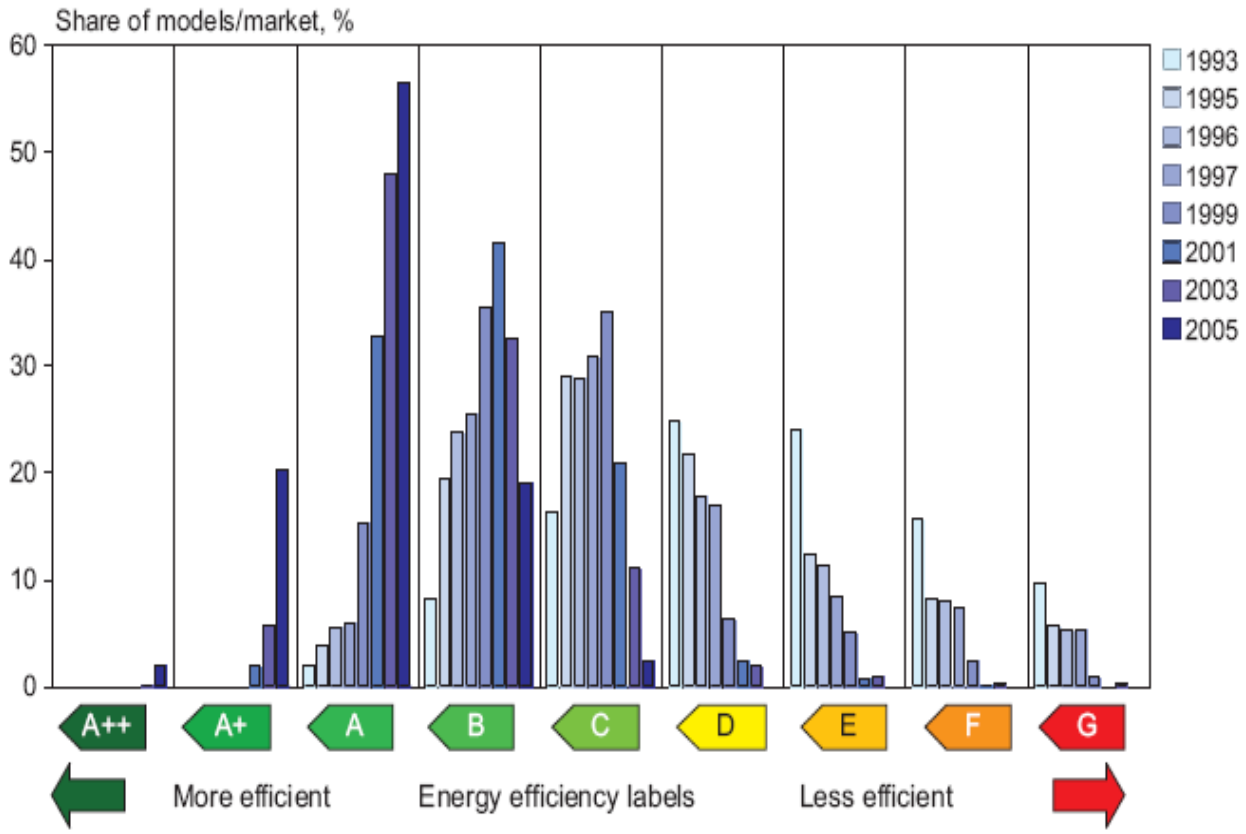
Demand side management

- Utility requirement to first invest in efficiency of consumption before investing in new supply
- Key role of public utility regulators
- Popular in US at state level
- Spreading to other countries
- UK Energy Efficiency Commitment law (now: Carbon Emission Reduction Target CERT)

Appliance standards

- US:
  - Applies to 39 products
  - Effect: 10% reduction of energy use by 2020, compared to BaU
- Japan:
  - Top runner programme
  - Moving standard, triggered by best performers
- EU:

Efficiency labelling in EU



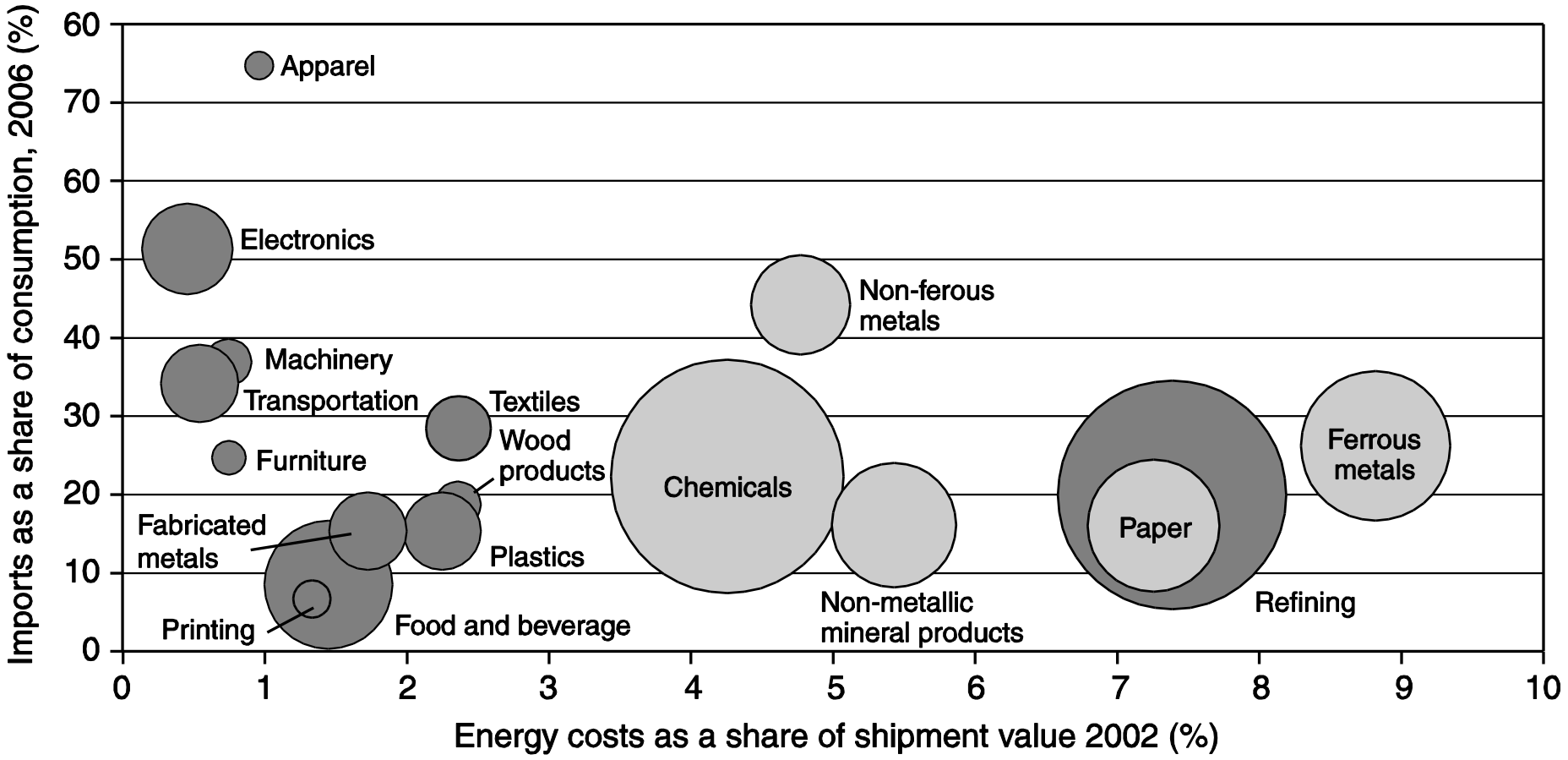
Selected industry sector policies, measures and instruments that have shown to be environmentally effective

Sector	Policy instrument	Key constraint or *opportunity*
Industry	Provision of benchmark information; Performance standards; Subsidies, tax credits	*May be appropriate to stimulate technology uptake.* Stability of national policy important in view of international competitiveness
	Tradable permits	Predictable allocation mechanisms and stable price signals important for investments Competitiveness
	[Voluntary agreements]	Success factors include: clear targets, a baseline scenario, third party involvement in design and review and formal provisions of monitoring, close cooperation between government and industry

Energy Service Companies (ESCO's)

- Energy savings are contracted out
- "No cure no pay"
- Useful for SME's

Sensitivity for unfair competition



EU ETS criteria for free allocation of permits

- **Quantitative assessment at NACE-4 level (*Article 10a Paragraphs 14-15-16):***
  - Additional costs per gross value added
  - Trade intensity with 3rd countries

- Trade Intensity over 30% **OR**
- Additional CO2 cost over 30% of GVA **OR**
- Trade Intensity over 10% **AND** additional CO2 cost over 5% of GVA

EU ETS result of industry vulnerability analysis

- **Results :** out of 258 sectors, 146 meet the criteria at NACE 4-digit level

- 117 sectors show a trade intensity above 30%
- 27 sectors have both CO2 cost above 5% and trade intensity above 10%
- Two sectors have CO2 cost above 30% with trade intensity below 10%

77% of industry exposed > free allowance
25% of total allowances allocated freely

Selected waste management sector policies, measures and instruments that have shown to be environmentally effective

Sector	Policy instrument	Key constraint or *opportunity*
Waste management	Financial incentives for improved waste and wastewater management	Financial incentives need to be high enough to change behaviour *Co-benefits*
	Renewable energy incentives or obligations	Local availability of suitable waste material
	Waste management regulations	Most effectively applied at national level Needs enforcement *Co-benefits*