LECTURE 1 Env Policy 2014

EEU and Dep of Econ Gothenburg

Round of Presentations

Purpose and role of this course

Books, Articles, Schedule, Website, Teachers

TS, JC, Ambec, + guests, CF PB SJ

+ One big Case study + exercises

Exam (/paper)

Thomas Sterner
– University of Gothenburg/EfD

”Building Climate Change Research Capacity in Developing Countries”

Environmental Economics in Gothenburg

4 Professors

15 Dr

12 PhD students

45 Phds 1990-2011

PhDs in Environmental Economics

- Ammon Mbelle 1988
- Ruben Tansini 1989
- Mikael Franzén 1994
- Olof Johansson 1996
- Jorge Rogat 1998
- Mohammed Belhaj 1998
- Alemu Mekonnen 1998
- Gunnar Köhlin 1998
- Fredrik Carlsson 1999
- Tekie Alemu 1999
- Lena Höglund 2000
- Adolf Mkenda 2001
- Henrik Hammar 2001
- Håkan Eggert 2001
- Lena Nerhagen 2001
- Martin Linde-Rahr 2002
- Francisco Alpizar 2002
- Åsa Löfgren 2003
- Susanna Lundström 2003
- Edwin Muchapondwa 2003
- Hala Abou-Ali 2003
- Jessica Andersson 2004
- Mahmud Yesuf 2004
- Eseza Kateregga 2005
- Minhaj Mahmud 2005
- Razack Bakari, 2005
- Johanna Jussila, 2005
- Wilfred Nyangena 2006
- Wisdom Akpalu 2007
- Mintewab Bezabih
- Jorge Garcia 2007
- Martine Visser 2007
- Anders Ekbom 2007
- Marcela Ibanez 2007
- Precious Zhikali 2008
- Ping Qin, 2009
- Jiegen Wei 2009
- Markus Wråke 2009
- Miguel Quiroga 2010
- Haoran He 2010
- Clara Villegas Palacio 2011
- Pham, Khanh Nam 2011
- Yonas Alem 2011
- Kofi Vondolia 2011
- Kristina Mohlin
- Jorge BonillaXiaojun Yang
- Simon Wagurna,
- Hailemariam Teklewold
- Claudine Uwera

Capacity Building

- PhD program Climate
- Specialisation Courses
- Research Collaboration
- Interdisciplinary, FRT, Beijer
- Helpdesk
- Regional networks
- EfD centres: Nairobi, Cape Town, Dar, Addis, Beijing, Costa Rica. + RFF & EEU + Chile

Round of Presentation

- Discounting
- Policy Instruments – REP...
- Gasoline taxes and their effect
- Genetics and fish
- Instrument choice,
- Mexican energy demand

- IPCC, EDF...

Teacher	Date	Time	Topic	Room
	Mon 24/3	14-15	Introduction to the library	Library
JC	Tues 25/3	9-12	Market failures,	D34
JC	Wed 26/3	9-12	Instruments: C&C, Tax,	D34
JC	Thu 27/3	9-12	Tradable Permits, Legal Info	D34
CF	Fri 28/3	10-12	The Green Paradox	C33
CF/TS	Mon 31/3	9-12	REP	F45
PB	Mon 31/3	13-15	US policy making	F45
CF	Tue 1/4	14-17	PI Technology (climate)	D34
TS	Wed 2/4	14-17	Property Rights, CPR	D34
XZ	Thu 3/4	9-12	Tutorial	D31
TS	Thu 3/4	14-17	Political Economy of PI	D31
TS	Fri 4/4	9-12	Distribution in PI + Case Study	D31
SJ	Mon 7/4	9-12	IAM	D34
JC	Tue 8/4	9-12	Monitoring /Enforcement	D34
JC	Wed 9/4	9-12	Imperfect Competition	F45
SA	Thu 10/4	14-17	Asymmetric Information	
JC	Fri 11/4	9-12	GE&Market Structure	B44
TS	Mon 14/4	9-12	IPCC AR5	C33
XZ	Mon 14/4	14-17	Tutorial	D31
SA	Tue 15/4	9-12	Non-Point Source Pollution	D31
SA	Wed 16/4	9-12	International Treaties	F45
TS	Tue 22/4	14-17	Classroom Debate on Case Study	D34
JC	Wed 23/4	9-12	Questions and Overview	D34
XZ	Thu 24/4	9-12	Exam	D32
TS/JC	Tue 29/4	11-13	Excursion + Lunch + Closure	D34

			SEMINARS	
	Fri 28/3	12-13	Mar Reguant	
	Fri 4/4	12-13	Svenn Jensen	
	Fri 11/4	12-13	Stefan Ambec	
	Fri 25/4	12-13	Jonas Eliasson	
			Additional Lect GU students	
TS/JC	Tue 25/4	18.00	Hand in suggested theme for course paper	TS/JC
TS/JC	Thu 27/4	13-17	Discussion of Research Topics	D34
TS/JC	Fri 25/4	12.00	Hand in course paper	TS/JC
TS/JC	Mon 28/4	9-17	Seminars	F45

Handout

Books

Schedule

Articles

Course evaluation

-
- **ENVIRONMENTAL POLICY INSTRUMENTS**
-
- **March - April ’08**
- **1. What is your opinion about the performance of the lecturers?**

- (5 is ”Very good”, …, 1 is ”Very poor”)

Active Class Participation

- Training in how to write papers – formulating and solving problems (Exercises for technical parts)
- ’Harvard’ Case study
- Debates

- READ BOOK FIRST.

This book is an attempt to encourage more widespread and careful use of economic policy instruments. The book compares the accumulated experiences of the use of economic policy instruments in the U.S. and Europe, as well as in rich and poor countries in Asia, Africa, and Latin America. Ambitious in scope, it discusses the design of instruments that can be employed in any country in a wide range of contexts, including transportation, industrial pollution, water pricing, waste, fisheries, forests, and agriculture.

While deeply rooted in economics, *Policy Instruments for Environmental and Natural Resource Management* is informed by political, legal, ecological, and psychological research. The new edition enhances what has already been widely hailed as a highly innovative work. The book includes greatly expanded coverage of climate change, covering aspects related to policy design, international equity and discounting, voluntary carbon markets, permit trading in United States, and the Clean Development Mechanism. Focusing ever more on leading ideas both in theory and policy, the new edition brings experimental economics into the main of its discussions. It features expanded coverage of the monitoring and enforcement of environmental policy, technological change, the choice of policy instruments under imperfect competition, and subjects such as corporate social responsibility, bio-fuels, payments for ecosystem services, and REDD.

Thomas Sterner is a Professor of Environmental Economics at the University of Gothenburg. He is a former president of the European Association of Environmental and Resource Economists. He is also a University Fellow at RFF and he has published widely on the theory and practice of environmental policy making.

Jessica Coria is a postdoc at the University of Gothenburg and Assistant Professor at the Department of Economics, Universidad Diego Portales, Santiago, Chile. Her work lies on the effects of the choice of different environmental policy instruments and modelling of environmental regulations.

Environment and Sustainability

ISBN 978-1-61726-098-8

Cover images: © Shutterstock

Routledge
Taylor & Francis Group

RFF PRESS
RESOURCES FOR THE FUTURE

www.routledge.com

an informa business

Policy Instruments for Environmental and Natural Resource Management
Second Edition
Thomas Sterner and Jessica Coria

RFF

Policy Instruments for Environmental and Natural Resource Management

Second Edition




Thomas Sterner and Jessica Coria

RFF PRESS
RESOURCES FOR THE FUTURE

ROUTLEDGE

Policy Instruments Book

1. The need for policy
2. The menu of instruments
3. Theory of Instrument selection and design
4. Application to Transport
5. Application to industry
6. Application to natural resources

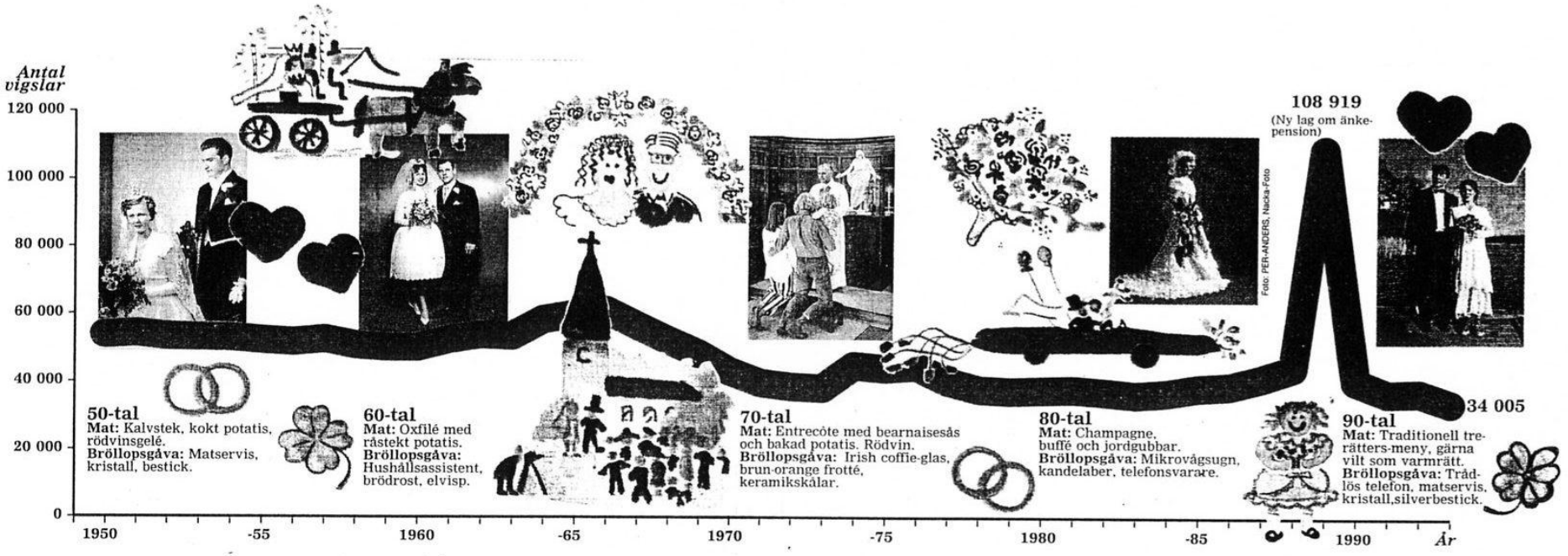
Covers OECD, developing and transitional countries

Purpose

- Consider a complex problem like **climate change**, fisheries or chemicals policy.
- Think of all the technical fixes that clever young engineers can come up with

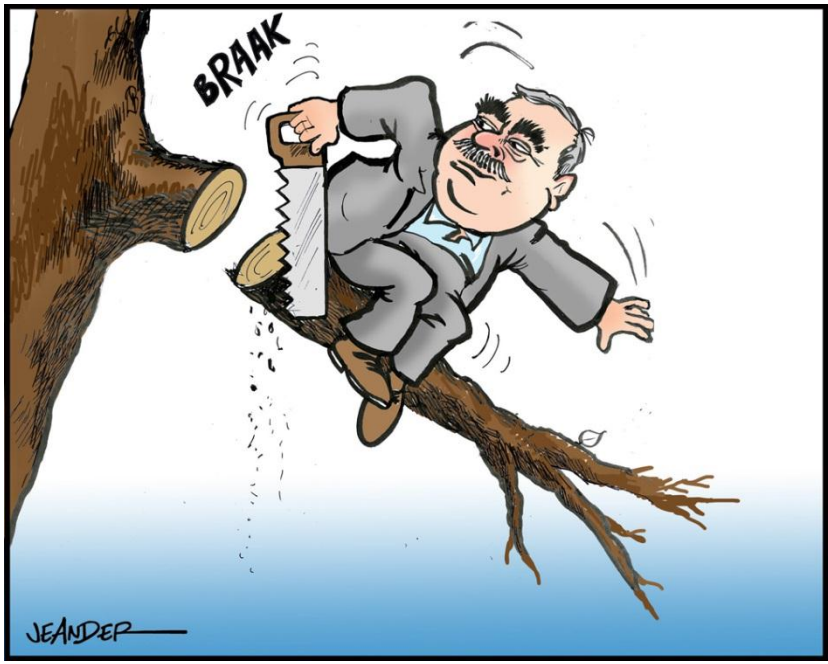
- How do you get society to use them ?

Incentives: Marriage



Problems

- Why is there pollution ?
- Externalities (POS,neg)
- Public Goods
- Assymetric information
- Incomplete Assignment of property rights
- Variation in risk tolerance



Columbia River Dams (Krutilla)

Problems

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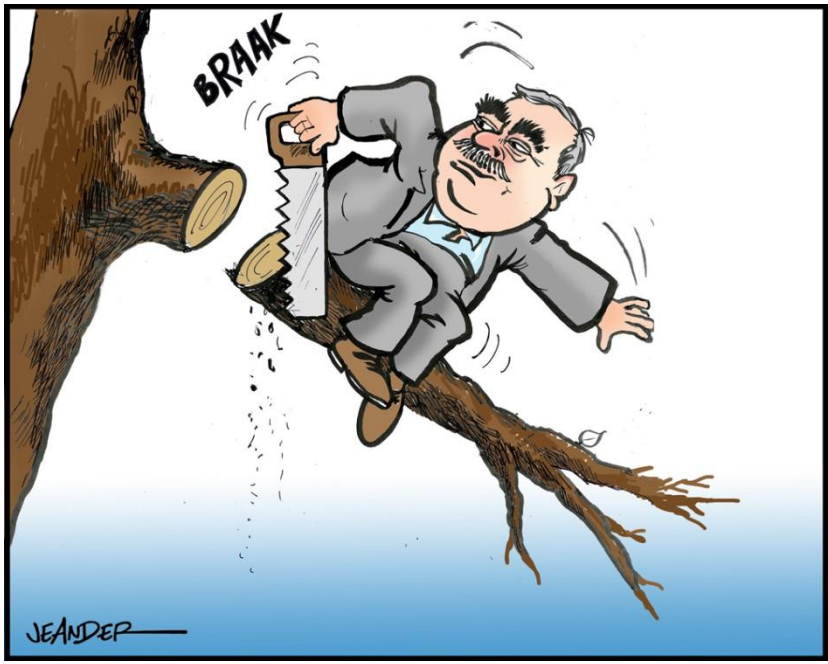
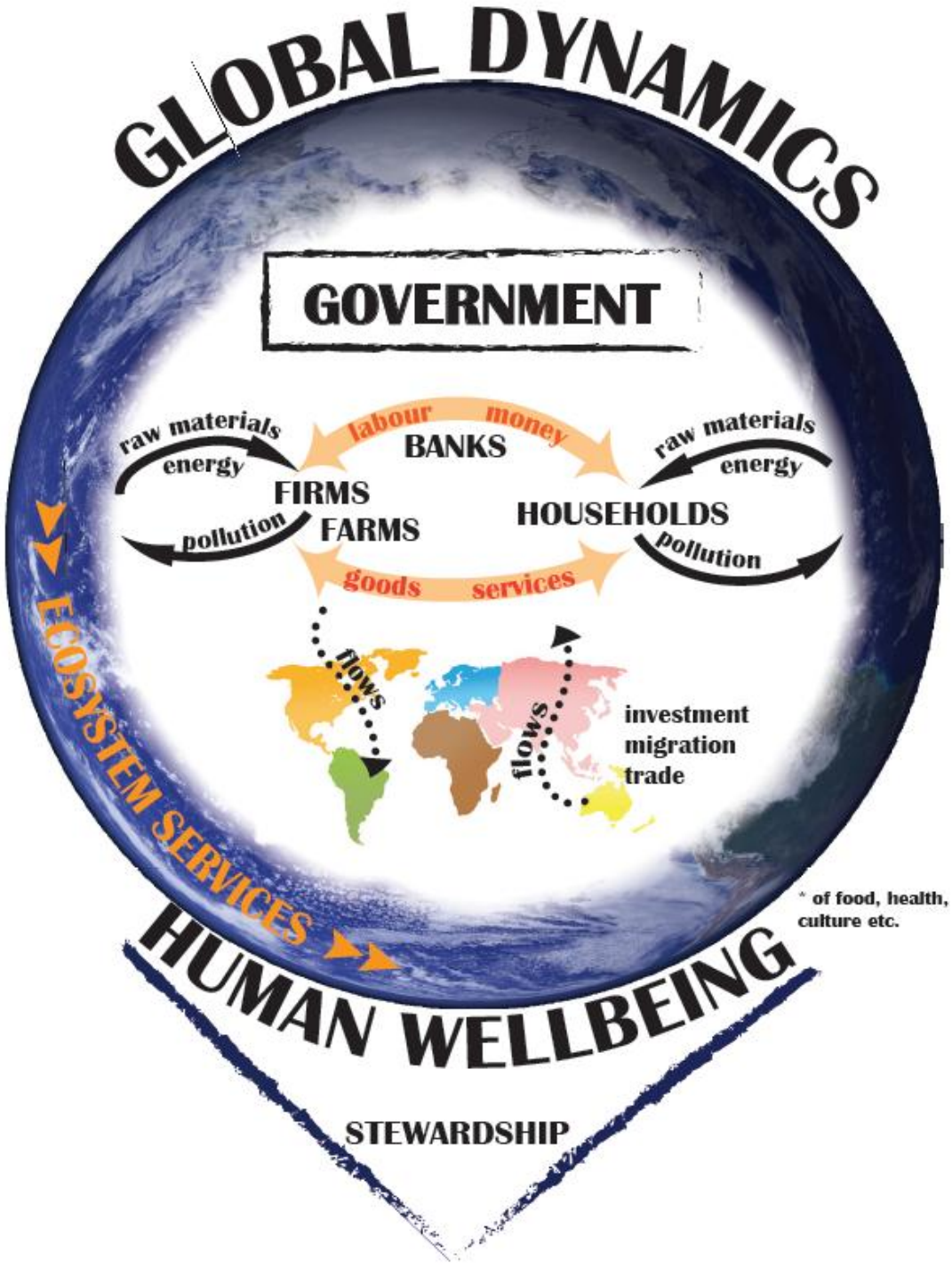
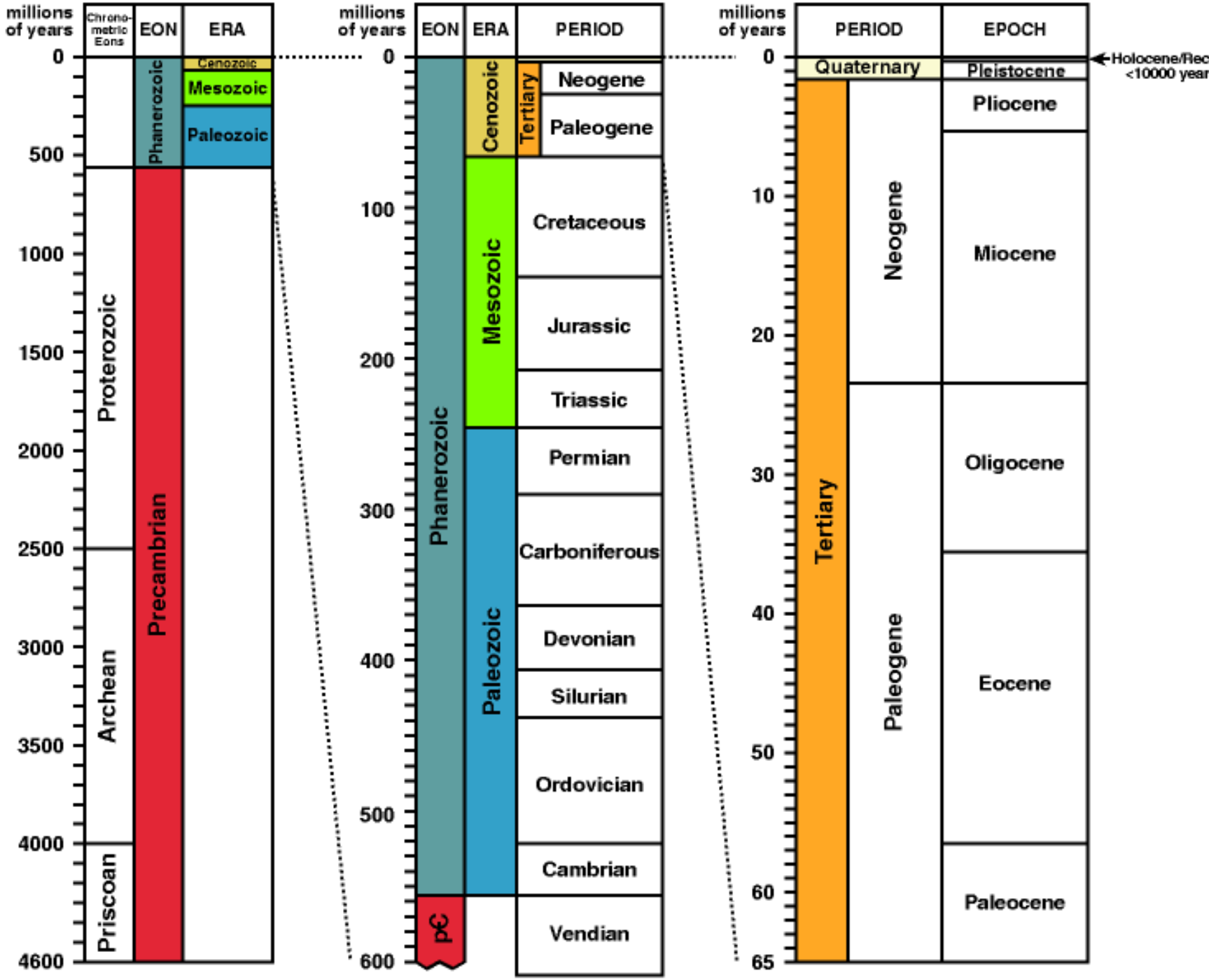


Not just a nice view…

But fundamental aspect of Mans modern role in Nature

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Phanerozoic
Precambrian
Cenozoic
Mesozoic
Paleozoic
Proterozoic
Archean
Priscoan
millions of years
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Mesozoic
Paleozoic
Tertiary
Neogene
Paleogene
Cretaceous
Jurassic
Triassic
Permian
Carboniferous
Devonian
Silurian
Ordovician
Cambrian
Vendian
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Neogene
Paleogene
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Miocene
Oligocene
Eocene
Paleocene
Holocene/Rec
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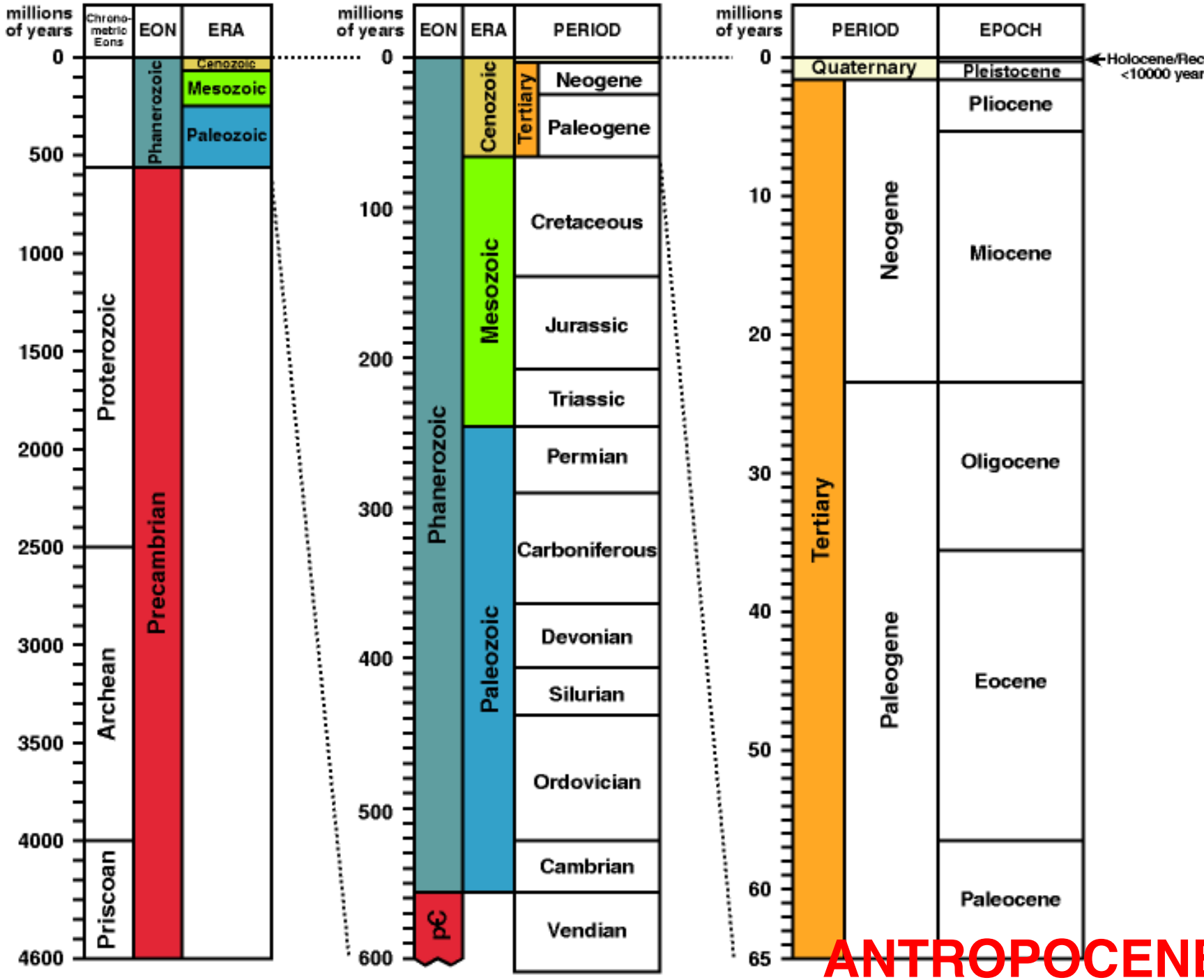
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Pleistocene
Pliocene
Miocene
Oligocene
Eocene
Paleocene
ANTROPOCENE

A LA CARTE

To Start:

Today's Soup
with House Bread Basket

Smoked Salmon
Served with Mixed Leaves, Fresh Herbs & Capers

Irish Goats Cheese
served on Bed of Mixed Leaves with Pesto Dressing

Prawn Cocktail
Served with Chilli Marie Rose Sauce & Salad

The Vaults' Chef Salad
Served with Bacon, Croutons, Parmesan Shavings & Caesar Salad

Main Courses:

Warm Chicken Salad
Seasoned Chicken served on a Bed of Crispy Salad,

Fillet of Irish Salmon
served with a White Wine Sauce, Pesto, Chefs Potatoes & Vegetables

Beef & Guinness Casserole
Chef's Potatoes & Seasonal Vegetables in a Guinness and Red Wine Reduction

Bangers and Mash
Irish Pork Sausages served on a Bed of Mash Potato and Topped with a Savoury Onion Gravy

Portobello Mushroom (V)
served with a Cream Sauce, Chef's Potatoes & Vegetables

Turkey & Ham
Served with Gravy, Chef's potatoes & Vegetables

A LA CARTE

From The Grill:

Chargrilled Breast of Irish Chicken
with Pepper Sauce, Sauteed Mushrooms, Onions, & French Fries

10oz Sirloin Steak & Chips
served with Pepper Sauce,, Sautéed Onions and French Fries

Steak Sandwitch
6oz Sirloin Steak Served on a Warm Crusty Ciabatta Bread with Pepper Sauce, Garnish and French Fries

Desserts:

Bailey's Mousse
Served with Chocolate Sauce

Fruit Crumble
Served Heated with Vanilla Ice Cream & a Raspberry Coulis

Pear & Almond Tart
Served with Vanilla Ice Cream

Chocolate Fudge Brownie
Served Heated with Ice Cream & Chocolate Sauce

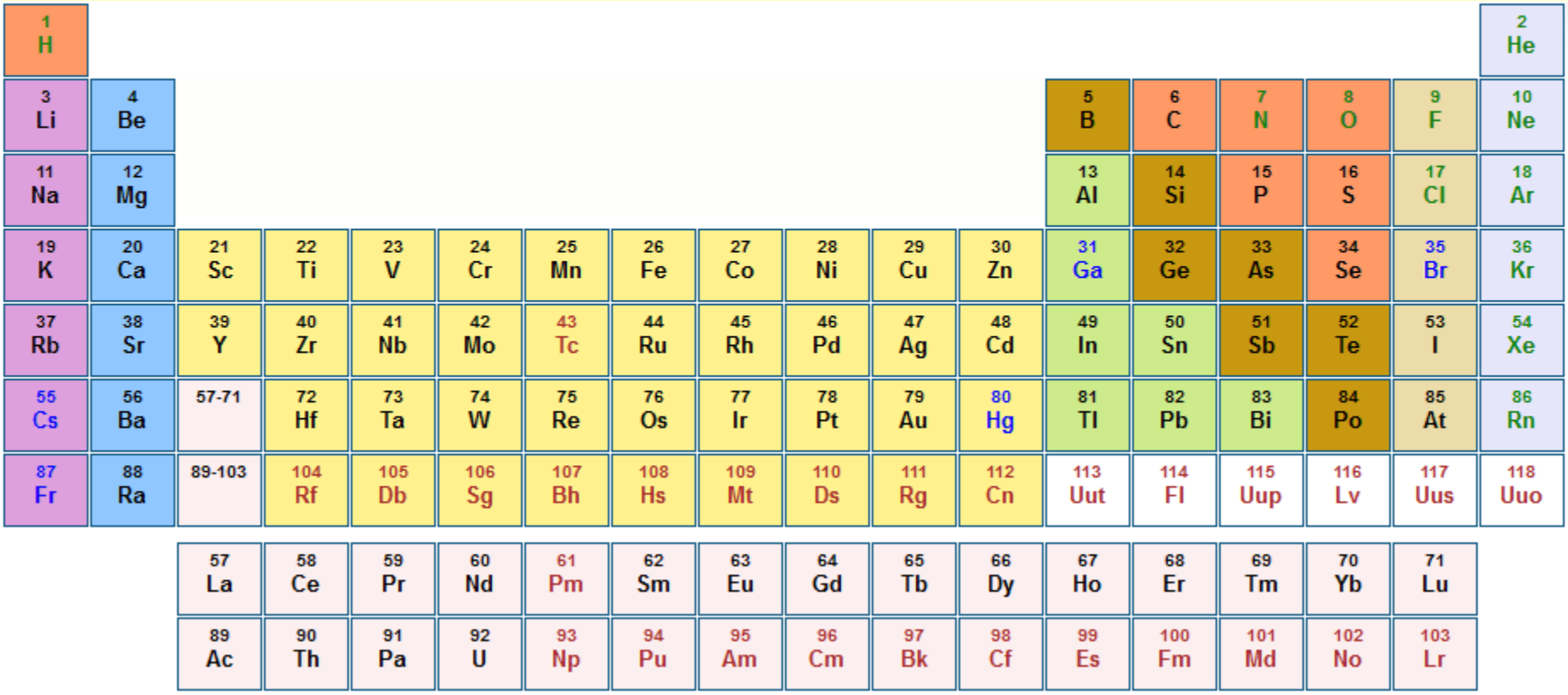
Selection of Ice Cream
Vanilla, Strawberry and Chocolate Ice Cream served with Chocolate Sauce

Policy Instrument Menu

PRICE-TYPE	RIGHTS	REGULATION	INFO/LEGAL
Taxes	Property rights	Technological Standard	Public participation
Subsidy (Reduct.)	Tradable permits	Performance Standard	Information disclosure
Charge, Fee/Tariff	Tradable Quotas	Ban	Voluntary Agreement
Deposit-refund	Certificate	Permit	Liability
Refunded Charge	CPR	Zoning	

MECE principle ??

The Periodic Table



Policy Instrument Menu

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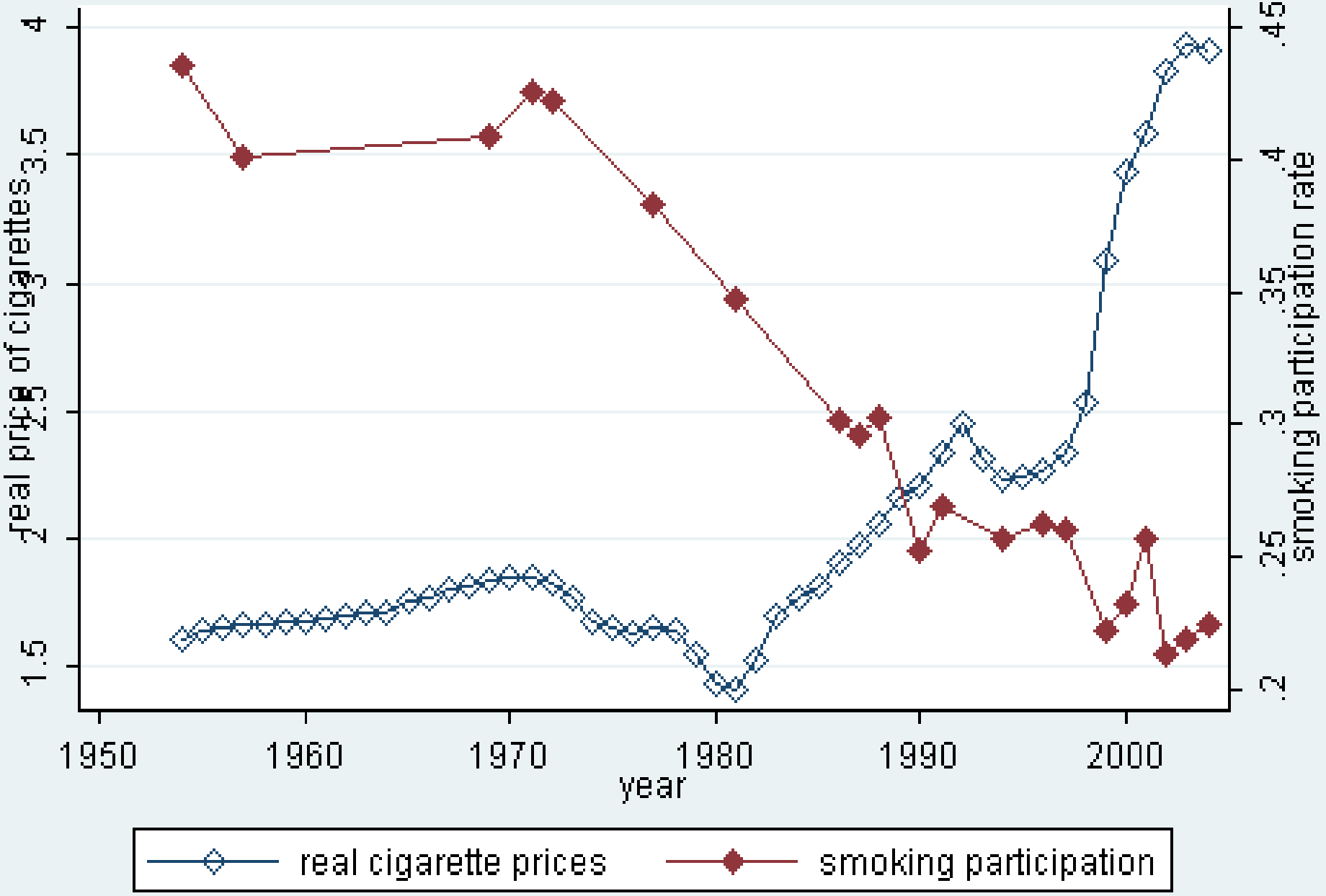
U.S. Cigarette Demand: 1944-2004

Kai-Wen Cheng, Don S. Kenkely

The B.E. Journal of Economic
Analysis & Policy
Volume 10, Issue 1 2010

Figure 2:Smoking Participation and Cigarette Prices,1954-2004



From 1944 to 2004

- Smoking participation falls from 50 to 22%
- N of cigarettes per person falls very slightly
- the gender difference in smoking rates
- almost disappears; the Black-white difference reverses; and a strong gradient with
- schooling emerges.
- Price elasticity may be negative part of time
- Income elasticity appears to be negative
- Is it right to tax cigarettes?

Criteria

- Effectiveness
- Static Efficiency
- Dynamic Efficiency
- Fairness (Distrib. of costs/benefits)
- Political feasability
- Instrument costs
- Information needs

Criteria

- Effectiveness
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Conditions (Ecol/economic)

- Heterogeneity in abatement costs
- Heterogeneity in damage
- Uncertainty/Risk
- Asymmetric information
- Monopoly or oligopoly
- Synergies or ecological thresholds
- Non-point pollution

Property Rights Fundamental

- Property is a bundle of rights: Access, productive use, exclusion, lease, sale, destruction.
- ”Real” Property from King
  - Feudalism
- Enclosure and Common Property

Phase out of Trichloroethylene

- (C_2HCl_3) Degreaser. Good Fat solvent…
- Working Environment hazard
- Phase out of CFCs lead to
- Sweden Forbidden 1991
- Very heavily regulated
  in Germany.

Till regeringen Carlsson

Vi protesterar !

Vi är några av flera hundra industriföretag som dagligen använder trikloretylen för att rengöra och avfetta våra produkter.

Efter en proposition av dåvarande miljöminister Birgitta Dahl beslöt riksdagen 1991 att Sverige, som enda land i världen, förbjuder användning av trikloretylen från januari 1996. Detta utan att uppnå någon som helst miljövinst och trots att likvärdigt medel saknas.

Avfettning med vattenbaserade medel, som påstås vara ett alternativ, kräver miljoninvesteringar i byggnader och maskiner, förbrukar upp till sex gånger mer elenergi och medför risk för nu okända problem även med arbetsmiljön.

I regeringsförklaringen från oktober i år säger Ni att: " Det gäller att stärka Sveriges produktionsförmåga och ta tillvara vårt lands främsta tillgång, människors vilja till arbete och skapande."

Vi anser i så fall att det är jämförbart med harakiri och att det står i direkt strid med den i regeringsförklaringen uttalade ambitionen, när Ni på enbart politiska grunder förbjuder en effektiv och ekonomisk rengöringsmetod, som fungerat väl under många år.

Vi accepterar inte en näringspolitik, som medför att vi ej kan konkurrera med utländska företag på lika villkor och motsäger oss därför även att förbrukningen av trikloretylen beläggs med eventuell miljöavgift.

I en nyligen genomförd enkätundersökning, svarar över hälften av företagen, att produktionen riskerar att flyttas utomlands eller läggas ner om beslutet från 1991 fullföljs.

Mot bakgrund av ovan sagda kräver vi att beslutet rivs upp.

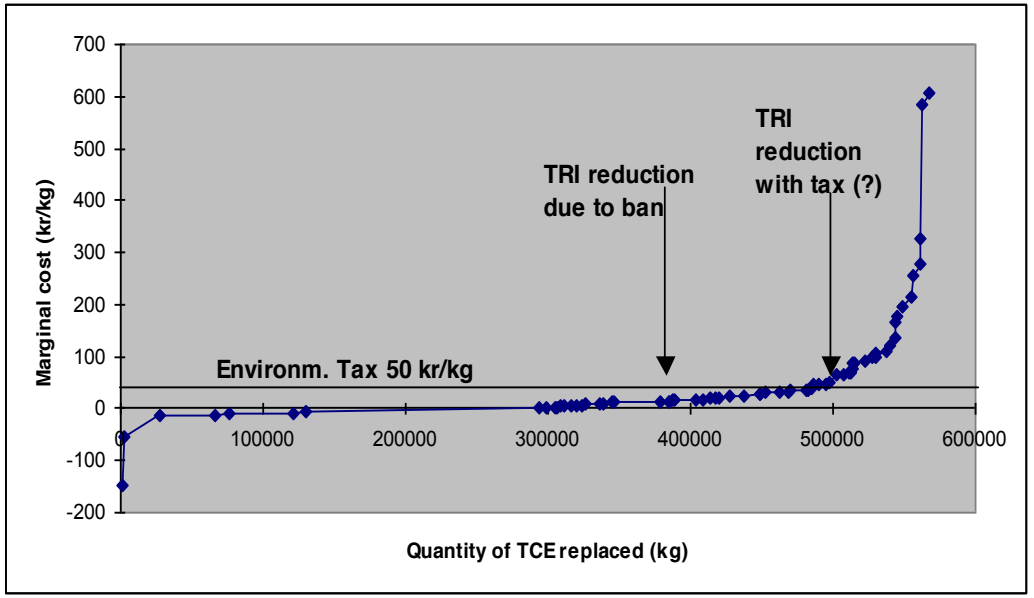
Vi kräver också ett besked före årets slut.

Anti-Corr AB - Assars Industri AB - Boråsverken AB - Br. Lann Metallfabrik AB - Bjärnum Stålprodukter AB - Bulten i Kalix AB - Danbolack AB - Ekets Mekaniska AB - Elenco Lighting AB - Erlandsons Metallfabrik Emab AB - EZZE AB - Fimek AB - Gnosjö Interiör AB - GS Industri AB - Hallberg-Sekrom Fabriks AB - HGL Industrier AB - AB Indexor Automatsvarvning - HT Svarv AB - Konsthantverk i Tyringe AB - Isaxons Industrilackering AB - Leba Industriservice AB - LG Beslag AB - AB Markaryds Metallarmatur - Mekanoverken AB - Metall Göte AB - Nikro-Galvano i Göteborg AB - AB Posto - AB Prinsfors Metallfabrik - AB Solna Pressgjuteri - Stacke AB - Söderlunds Metall AB - Tranås Skinnberedning AB - Troax Axo AB - Torsten Ullman AB - Töreboda Ur AB - Ulvsunda Industrilackering AB Witte Industrier AB - Värnamo Härd AB - AB Västsvenska Plast

Info 033-102465

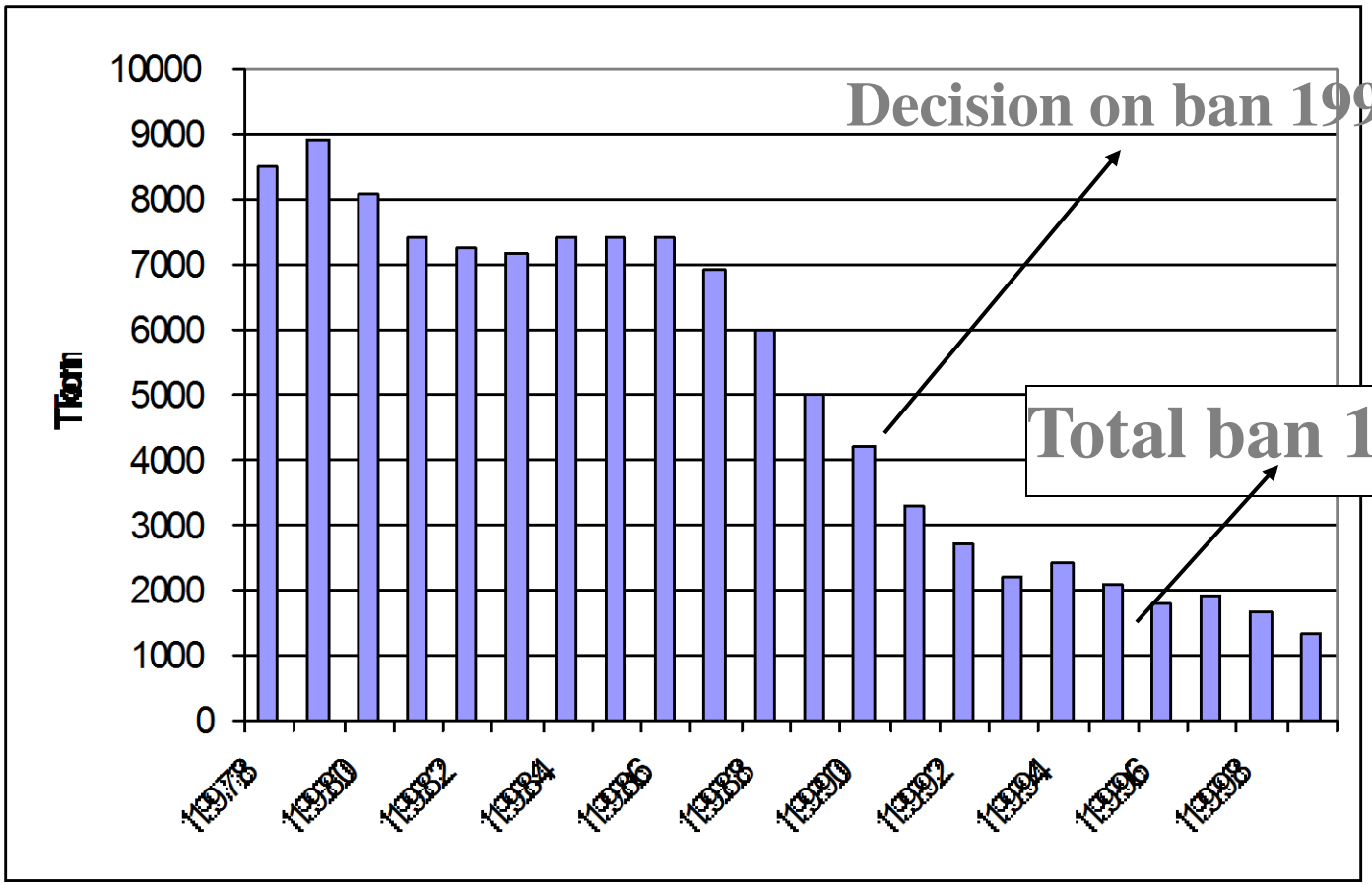
move
ABROAD!

Phase out of Trichloroethylene



- MC of abatement very flat
- Most firms substitute
- Some firms find it impossible & litigate
- Why not use P instrument
- Norway did!

TCE prohibition in Sweden



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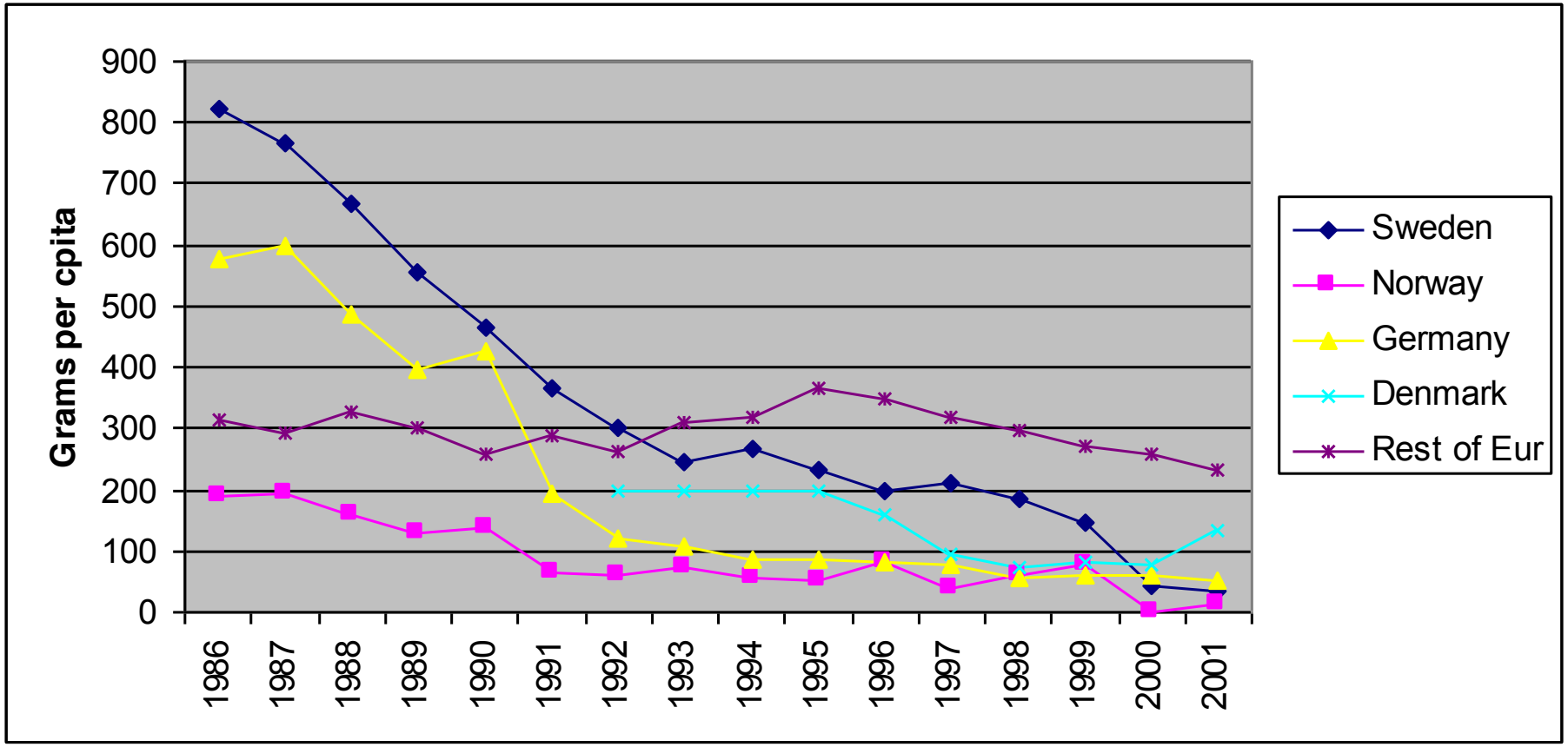
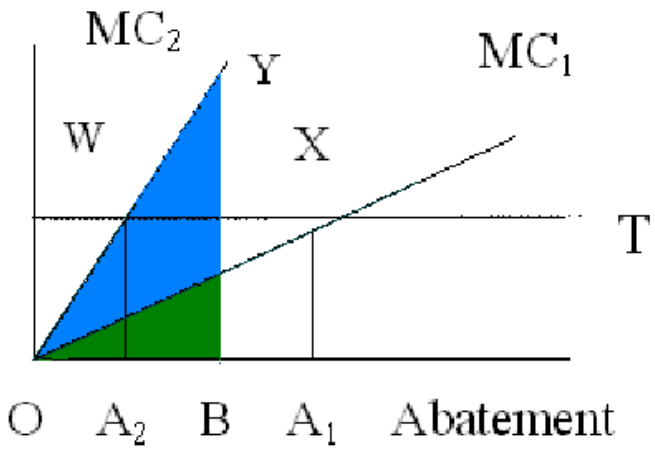
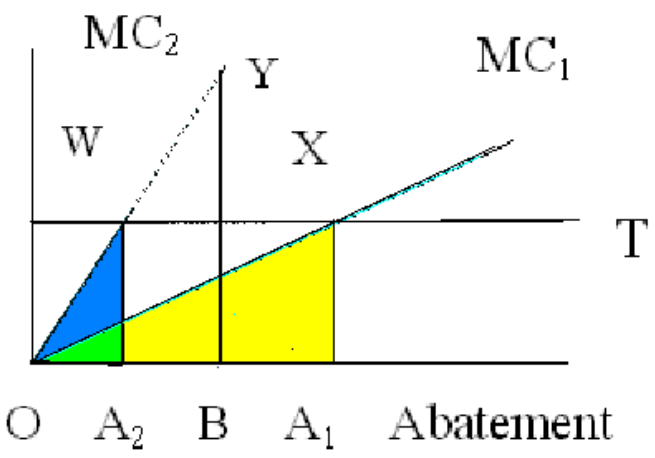


Cost savings due to equal MC

- Equal abatement



- Efficient abatement



Heterogenous Damage

- MBI less relevant: The idea of equalizing MC makes no sense with hot spots
- **Zoning** is an appropriate instrument
- Similarly the creation of natural reserves
- However note that MBIs can be made to vary geographically (and temporally)

2,667

Acid Rain Retirement Fund

2,667

Clean Air Certificate

This certifies that the Acid Rain Retirement Fund will purchase and retire approximately 2,667 pounds of air pollution on behalf of

Thomas Sterner

The Acid Rain Retirement Fund is dedicated to increasing environmental education and reducing acid rain to improve our environment.

Brian Howard

Acid Rain Retirement Fund
P.O. Box 10272
Portland, Maine 04104

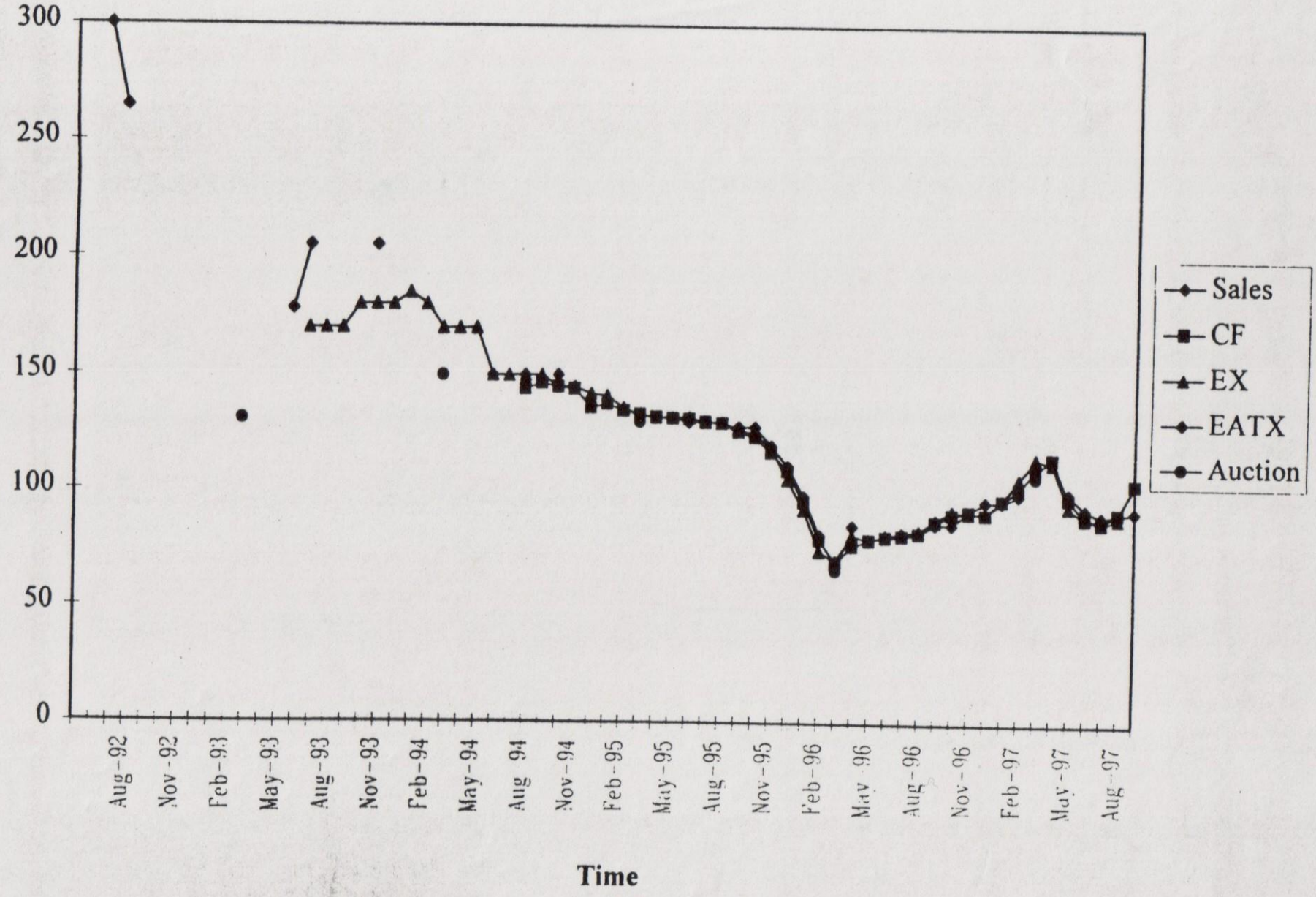


FIGURE 1. ALLOWANCE PRICE MATRIX (1995 OR CURRENT VINTAGE)

Comparing taxes and permits

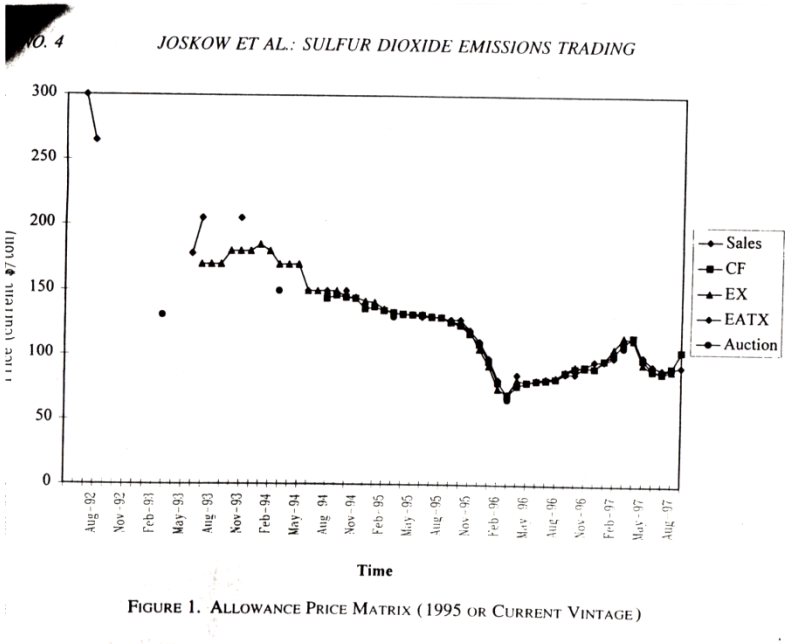
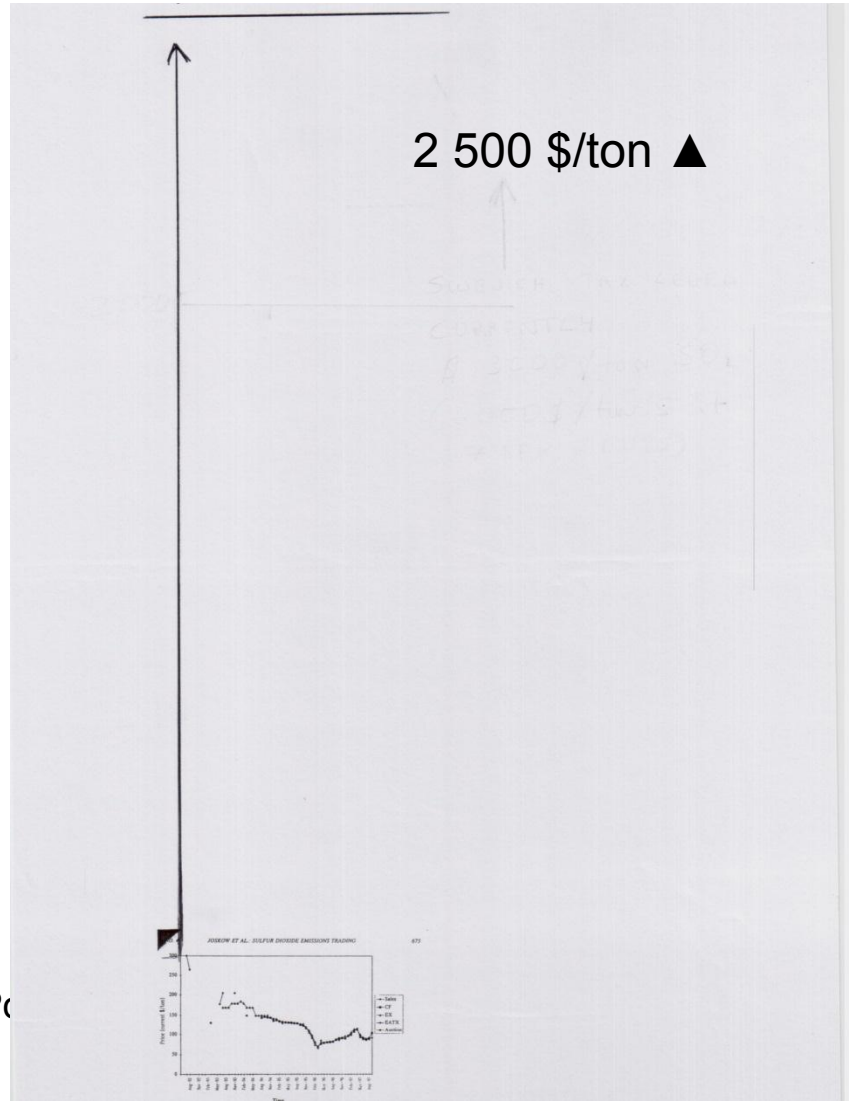


FIGURE 1. ALLOWANCE PRICE MATRIX (1995 OR CURRENT VINTAGE)

- Current Swedish tax is SEK 30 Kg S
- Or 15 SEK/Kg SO2
- About 2500 $/ton at current exchange rate



Industrial Pollution: Permits vs Taxes

- Just like ITQs – permits have been very successful in abatement of Sulfur in the US
- Reduction by 50% in CAAA. 19-10 Gtons
- Estimated costs 600-1000 $/t.
- Actual prices per permit around 100-150!
- Marvels of the market…
- In Sweden tax works well too. T=2500 $/t

Different types of Permit

- The original add-on to regulation: Make regulations into rights and then let people trade in over-fullfilment (Emission Reduction Credits).
- Cap and Trade. Decide a maximum (CAP) for pollution and then let the market work on its own. Less transaction costs.
- Ambient permits, certificate schemes etc

Allocation of permits

- Permits can be allocated in proportion to:
- Historical pollution: Grandfathering
- (Historical/)current production: Output allocation or benchmarking.
- Equally
- By WTP ie through an auction
- NB Duration, bankability, updating…

Properties of Permits

- $L = pq_i – c_i(q_i, a_i) + P_e(\hat{e}_{i0} - e_i(q_i, a_i))$
- Kuhn-Tucker conditions are:
- $c'_a = - P_e e'_a$ MC Abatement is optimal
- $P = c'_q + P_e e'_q$ Output price is optimal
- If number of permits is related to output then second condition does not hold

Weitzman P vs Q

If **uncertainty** re MC abatement and

- M Damage of pollution is steep (thresholds) **QUANTITY-type Instr**
- M costs are steeper (risk of bankrupcy) but damage is flat (eg stock pollutants) then **USE PRICE-type** instruments.

Moral Hazard/Adverse Selectíon

- The very poor are very risk averse
- They would need savings or insurance
- Banks not available due to transaction costs and lack of collateral (tenure issues)
- Insurance not available: Moral Hazard + Adverse Selection
- Inequitable contracts and
- Unsustainable use of resources

Taxing cows

- Overgrazing is a major problem with a stock externality:
- More cows □ lower survival Farmers put more cattle on common grazing to be sure some survive.
- Should we tax cows?

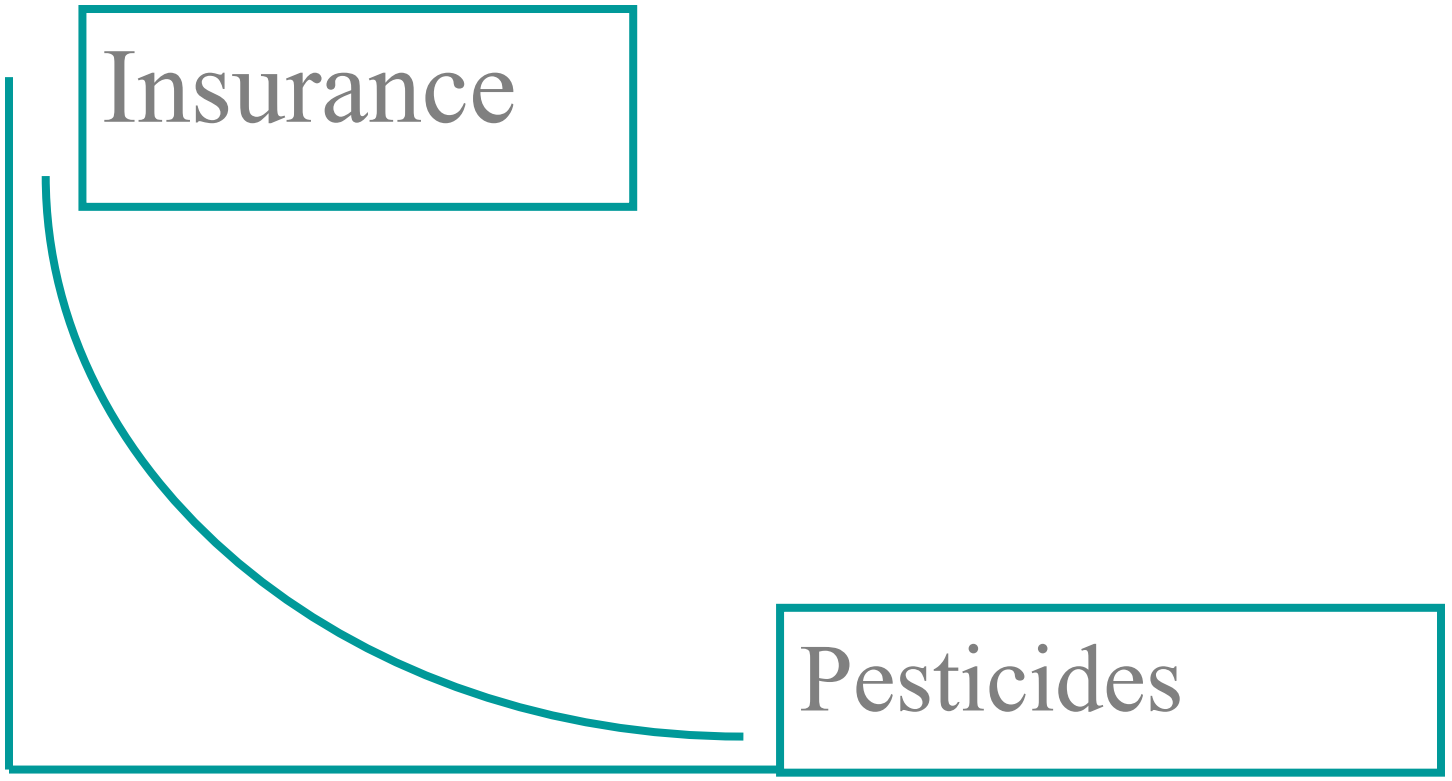
Taxing cows ?

- NO! Lack of markets for saving (banks) is real cause. It leads to other saving forms such as cattle Don’t tax cows.
- **Provide banks!**
- Such as Grameen

Risk and environmental management

- Lack of insurance makes poor farmers very risk averse.
- Risk of pests (locust) unacceptable even if average damage small.
- Don’t provide pesticide spray. **Provide insurance!**

The important role of financial institutions



Some other rules of Instrument selection and design 1

- If abatement possibilities limited then a higher product price caused by a tax will lower consumption to socially optimal level. This **OUTPUT** effect is desirable. Except for small open economies where the products will just be imported
- Monopolies: taxes perverse because prices already too high and output too low.

Some other rules of Instrument selection and design 2

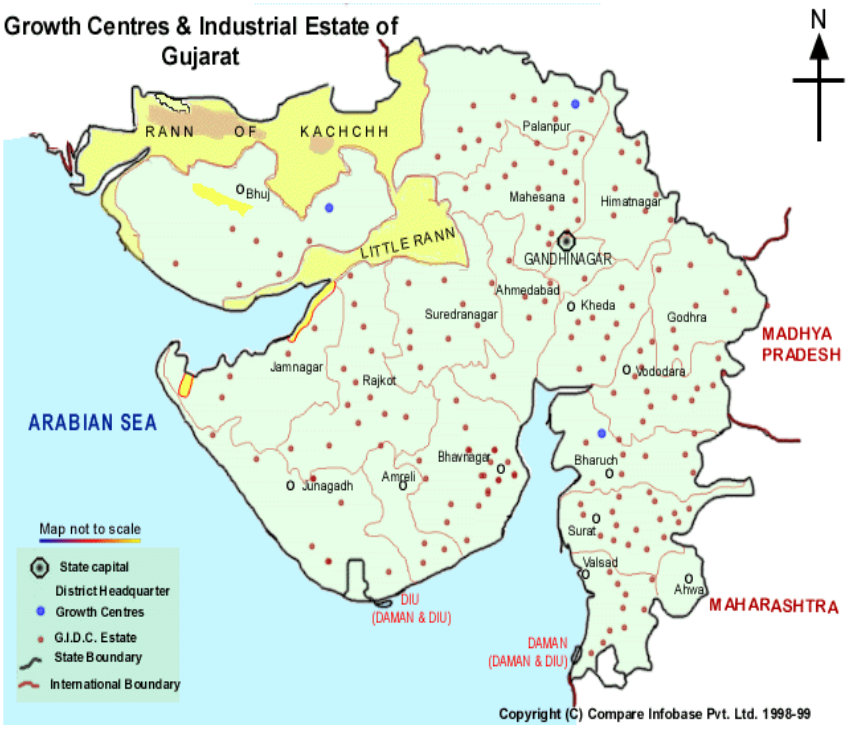
- For some pollutants (related to energy/transport) tax revenues are substantial. In this case the revenue-recycling effect of tax implies other taxes can be lowered which decreases the cost of the instrument. This effect is lost if regulation or (free) permits are used.

Some other rules of Instrument selection and design 3

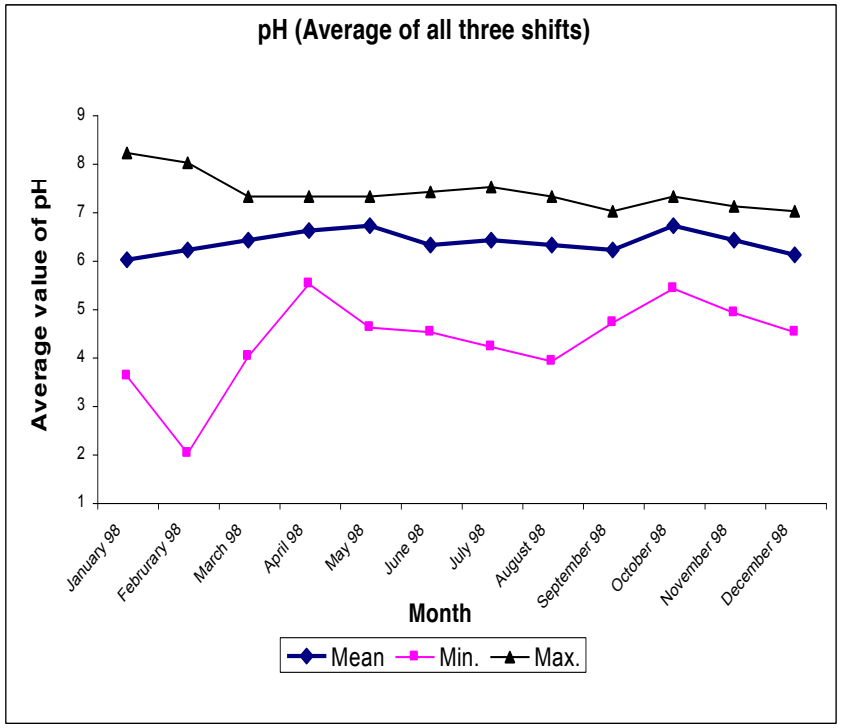
- Subsidies work ***roughly*** like taxes
- But have perverse output effect encourage entry (delay exit from) industry
- Reduction of Perverse subsidies important
- Deposit Refund schemes superior to taxes when monitoring of pollution is expensive
- Fines or liability also important complement

Ankleshwar Indust Estate Gujarat

- One of largest in India
- 400 plants in 1605 Ha
- 5% India's chem. output
- 250 M litres effluent/day
- Common Effluent Treatm.
- Common Waste Mgt.
- Two-tier Management
- Peer monitoring
- Graduated Sanctions



Peer monitoring & graduated fines

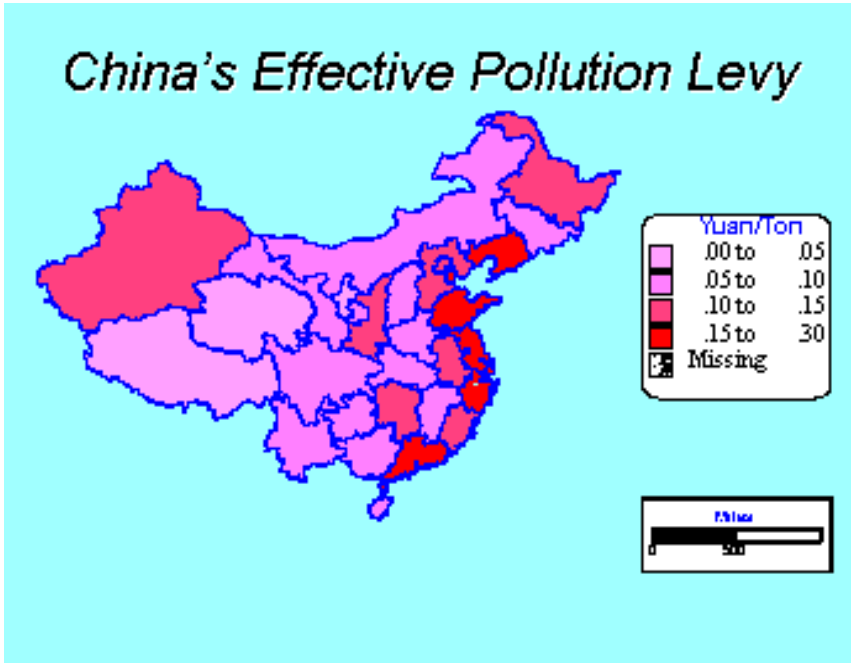


- Rain -
- Penalty -
- First Shift +

- Holliday 0
- Time (neg)

Chinese industries pay fees

- 1979 Environm. Law
- Hundreds of thousands of factories eligible for fee.
- 70-80% of fees finance abatement
- Enforcement varies regionally



Columbian firms pay charges

- 1993 creation of MINAMBIENTE + local EPAs
- Pollution Charges
- Example: CORNARE
- Rio Negro Watershed (near Medellin)

- <u>Allocation of Funds</u>

1. Waste treatm pl 50%
2. Clean Tech Inv 30%
3. Research 10%
4. Administration 5%
5. Education 5%

28% reduced BOD first year

PROPER Labelling in Indonesia

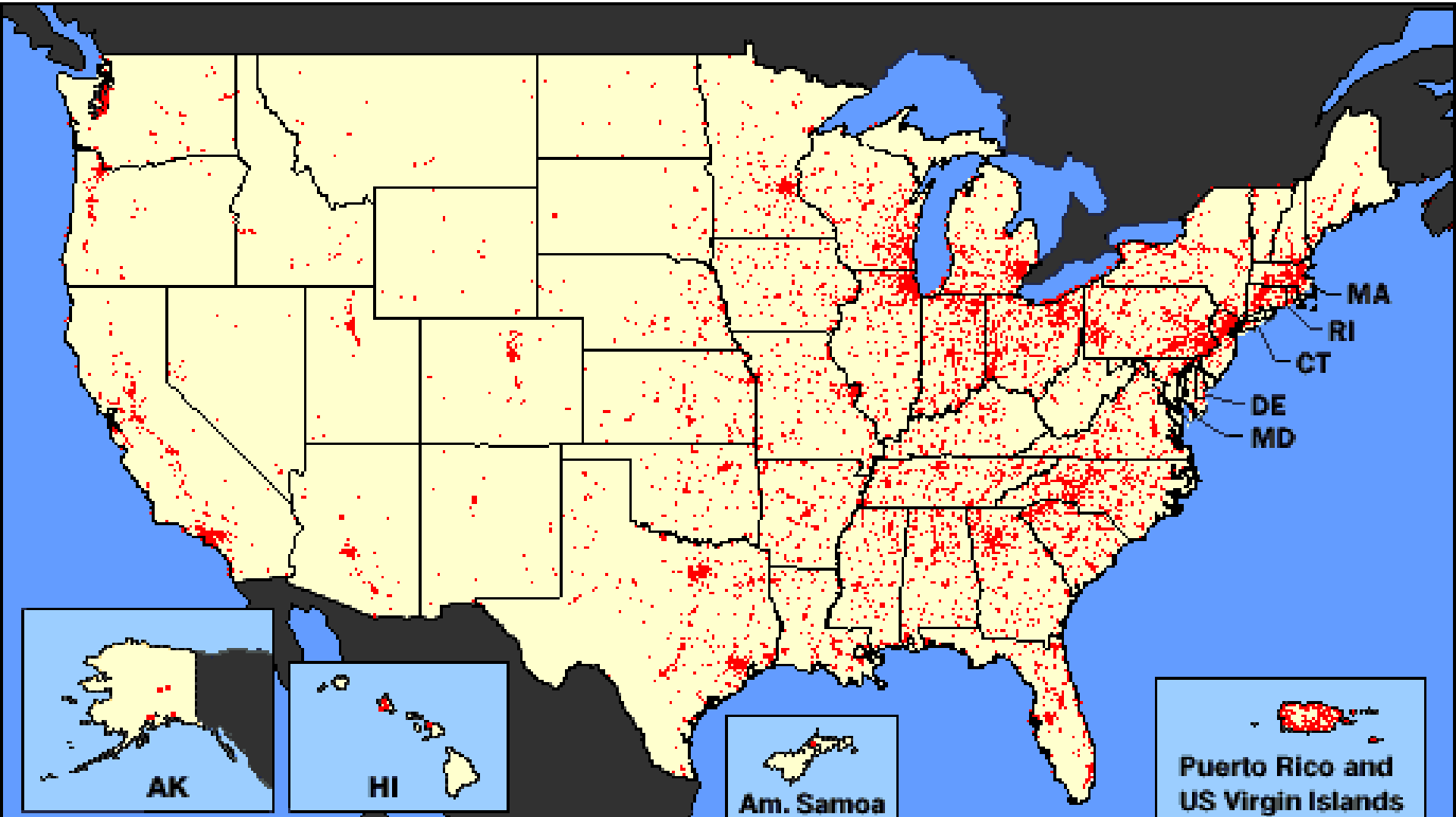
	June 1995	Dec 1996	Change
Gold	0	0	0
Green	5	5	0
Blue	61	94	33
Red	115	87	-28
Black	6	1	-5

Source: BAPEDAL

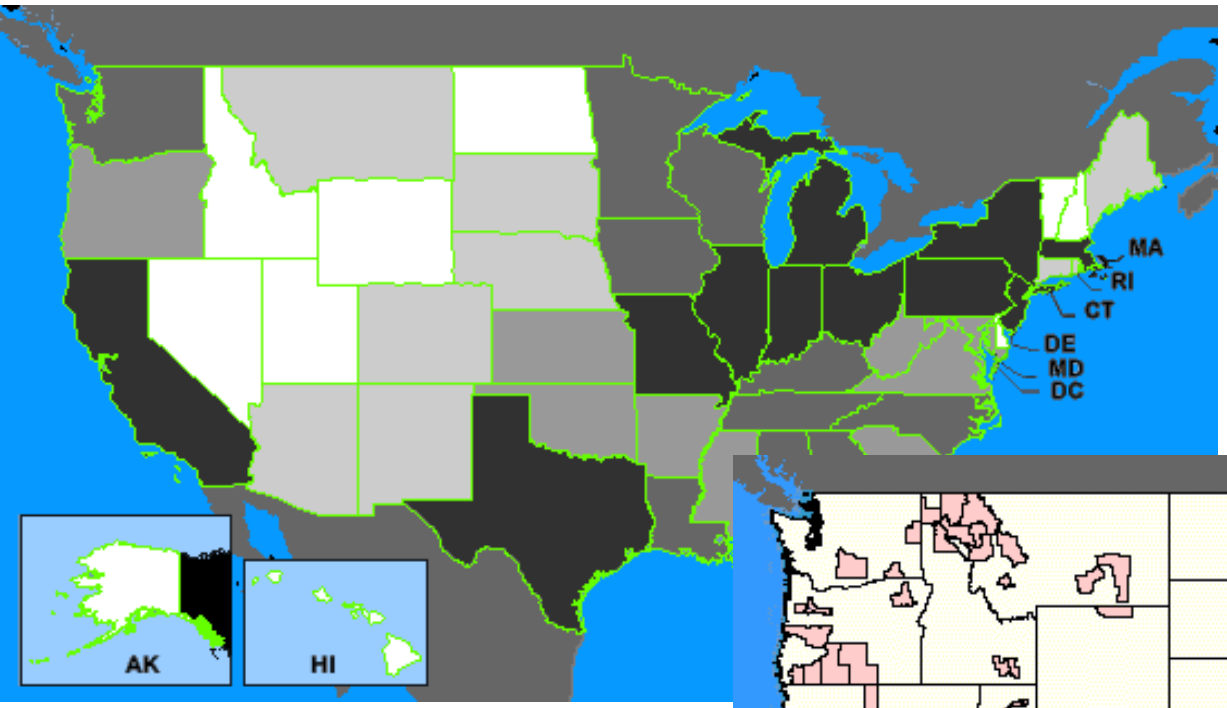
Total Releases in TRI

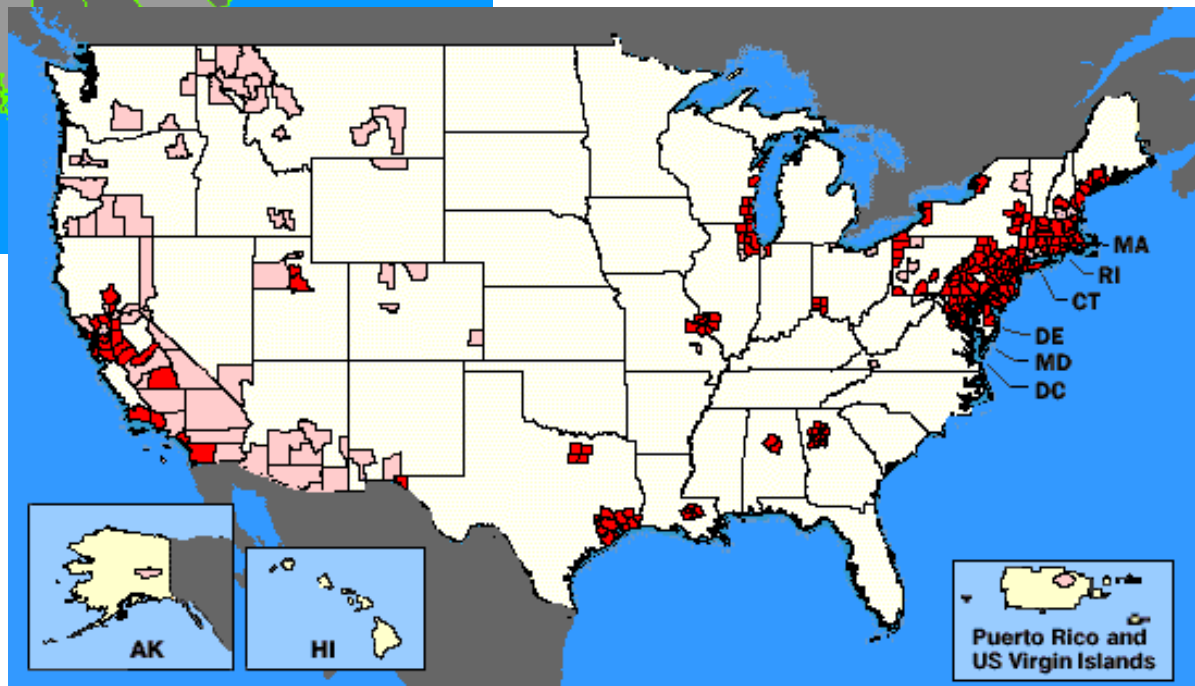
	Total releases (millions of pounds)			*Reduction (%)*
	1988	*1995*	*1998*	*1988-98*
N of facilities	20,470	20,783	19,610	4.2
Air emissions	2,183	1,201	921	57.8
Surface water	165	37	45	72.9
Underground injection	162	143	115	29.3
Total on-site releases	2,968	1,688	1,427	51.9
Total releases	3,396	1,977	1,857	45.3

Scorecard.org organises data

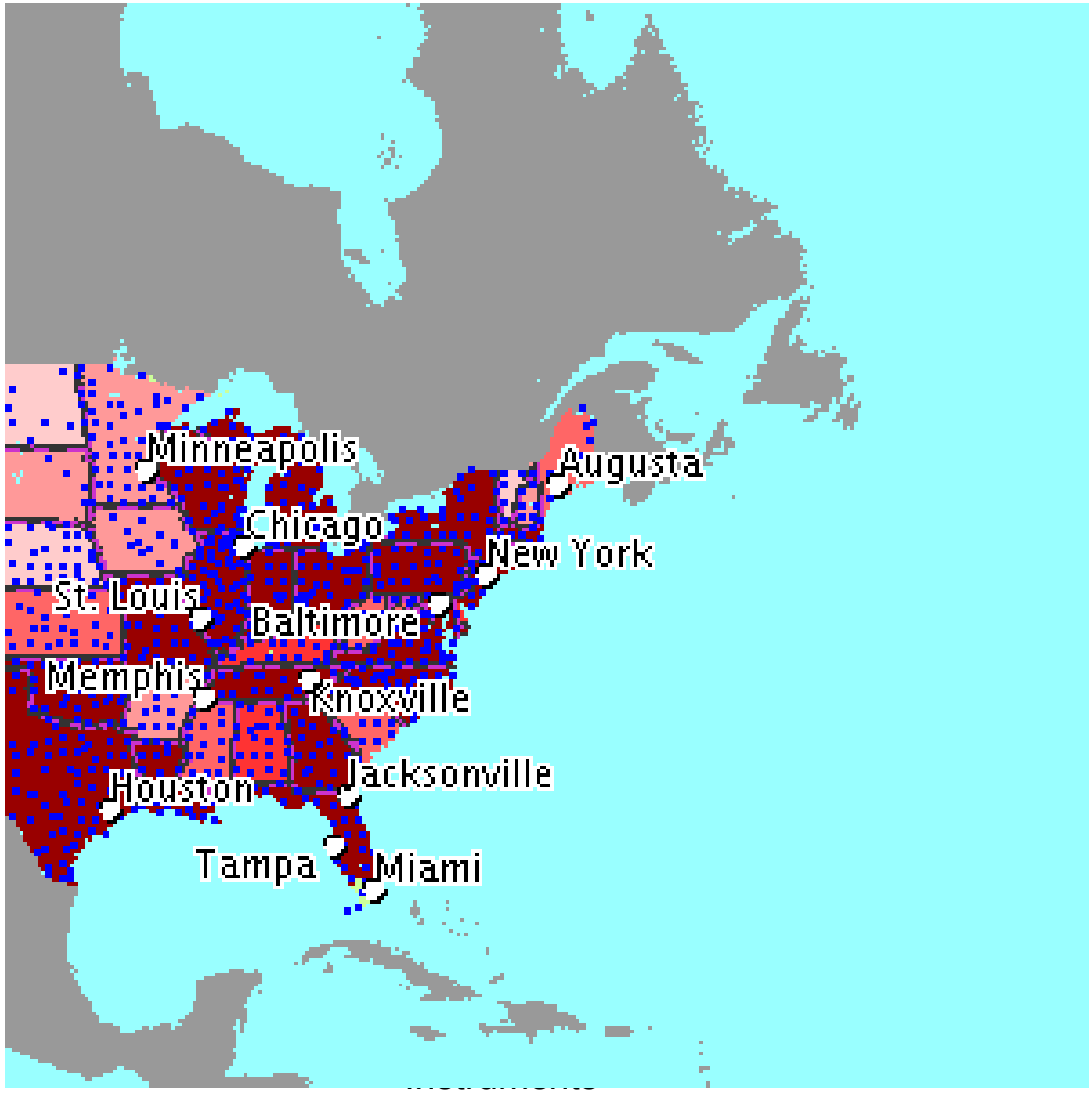


Total, Lead or water exposure

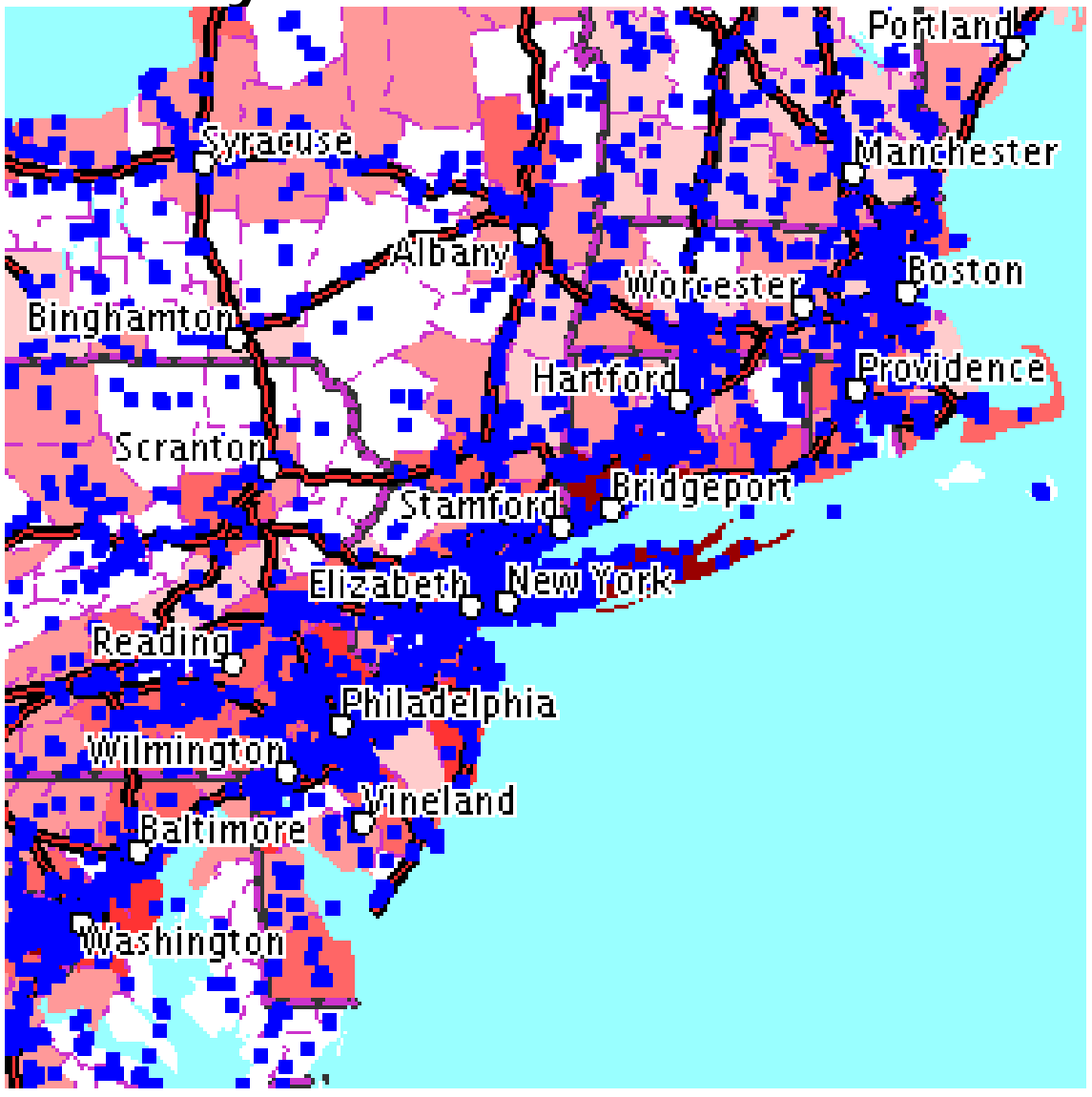




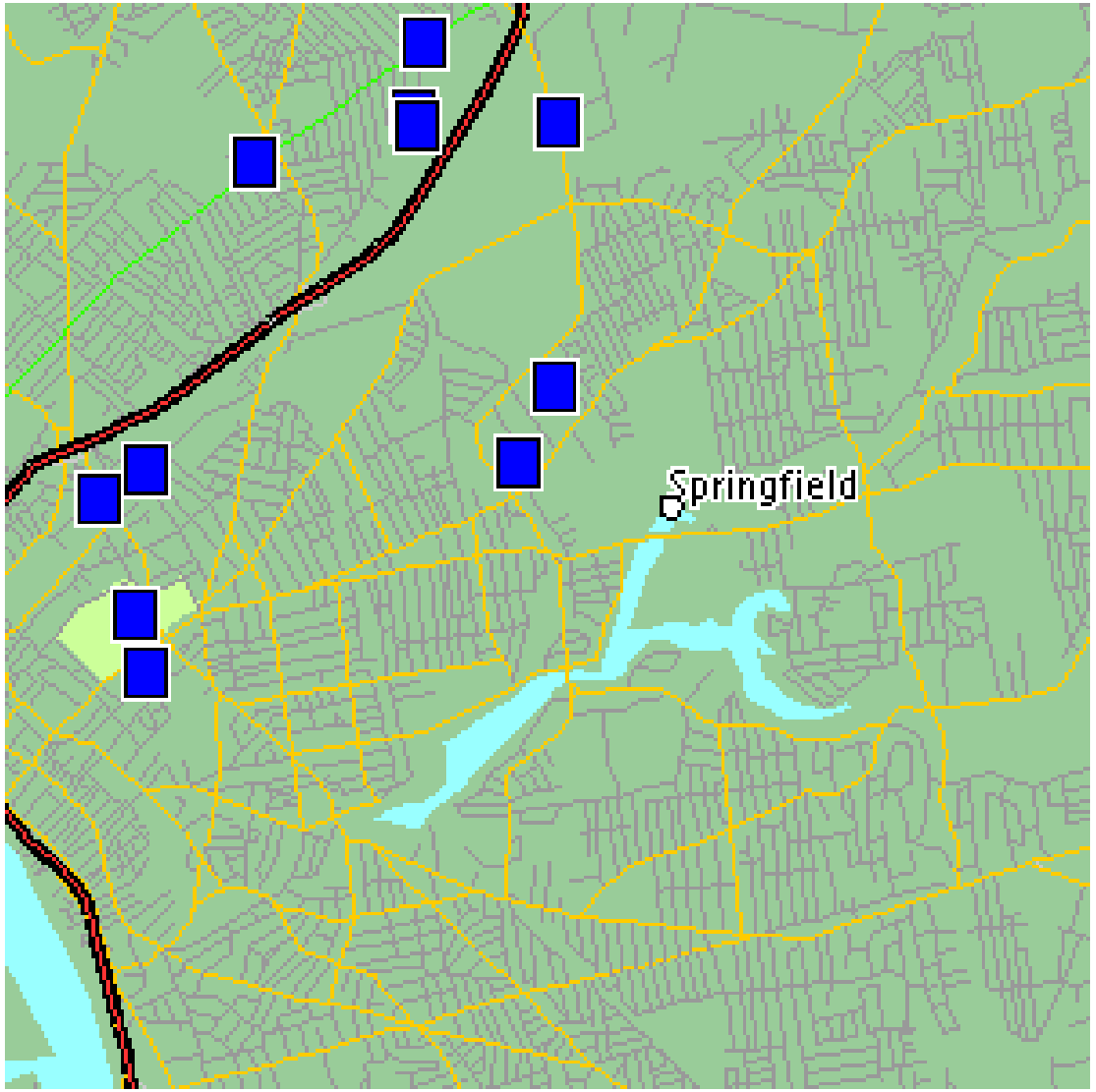
You can check out a region before you move…



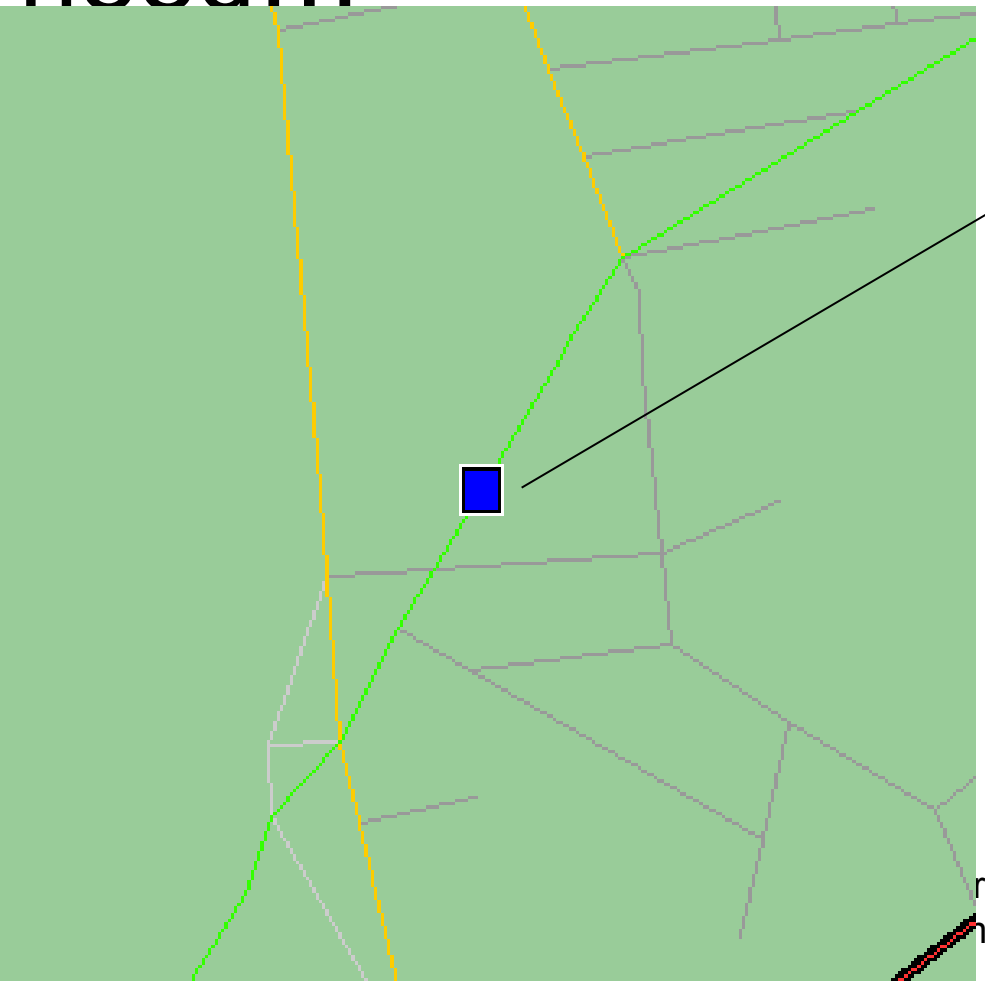
You can check out a state before you move…



You can search the town for specific pollutants or plants…



check out the local plant on the street before you buy a house. There is all the information you would ever need…



Criteria Air Pollutant Emissions Report: L.E. BELCHER, INC

Map(s) Locating this Facility

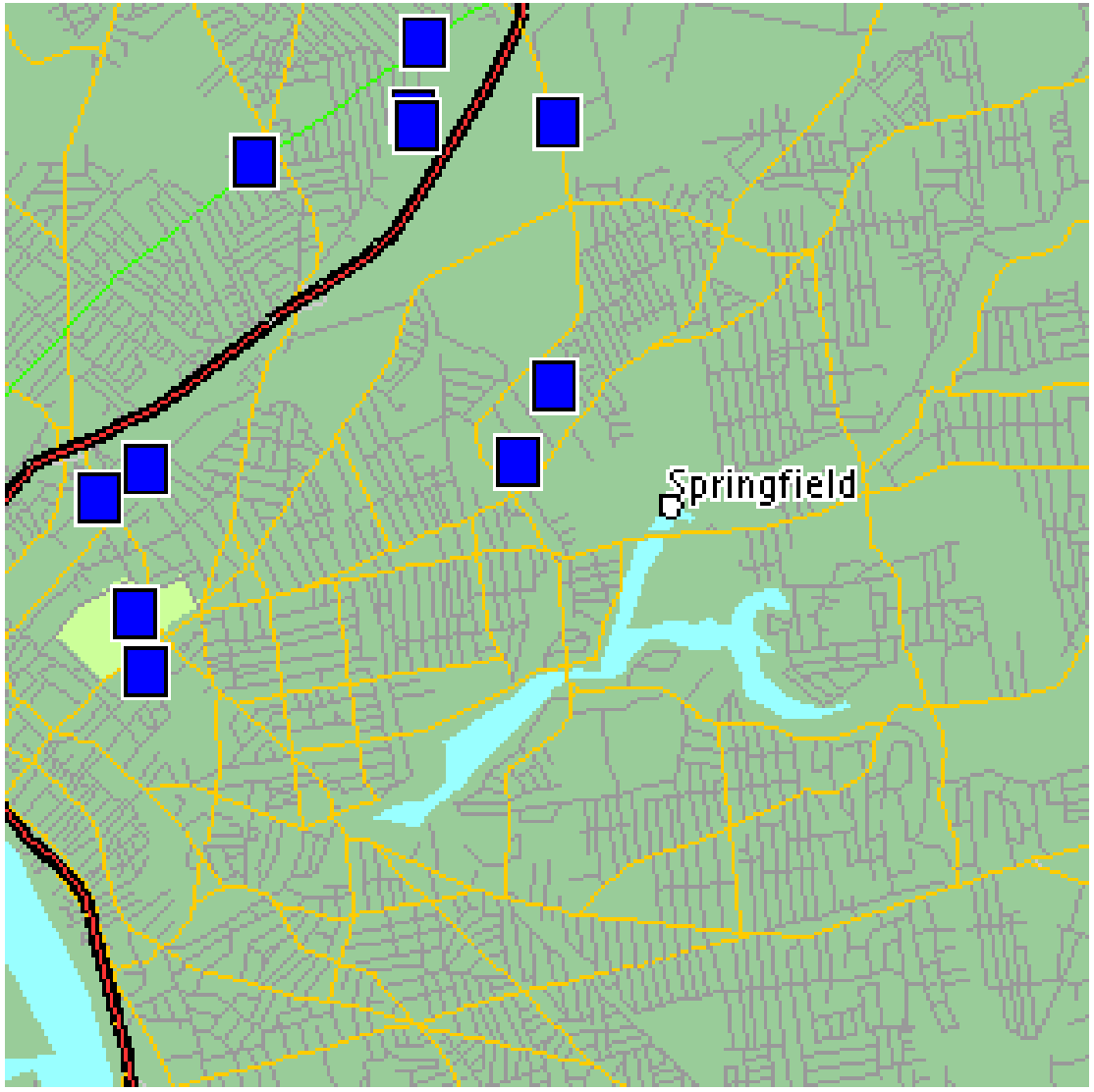
Rankings for this Facility

1999 Emissions Summary

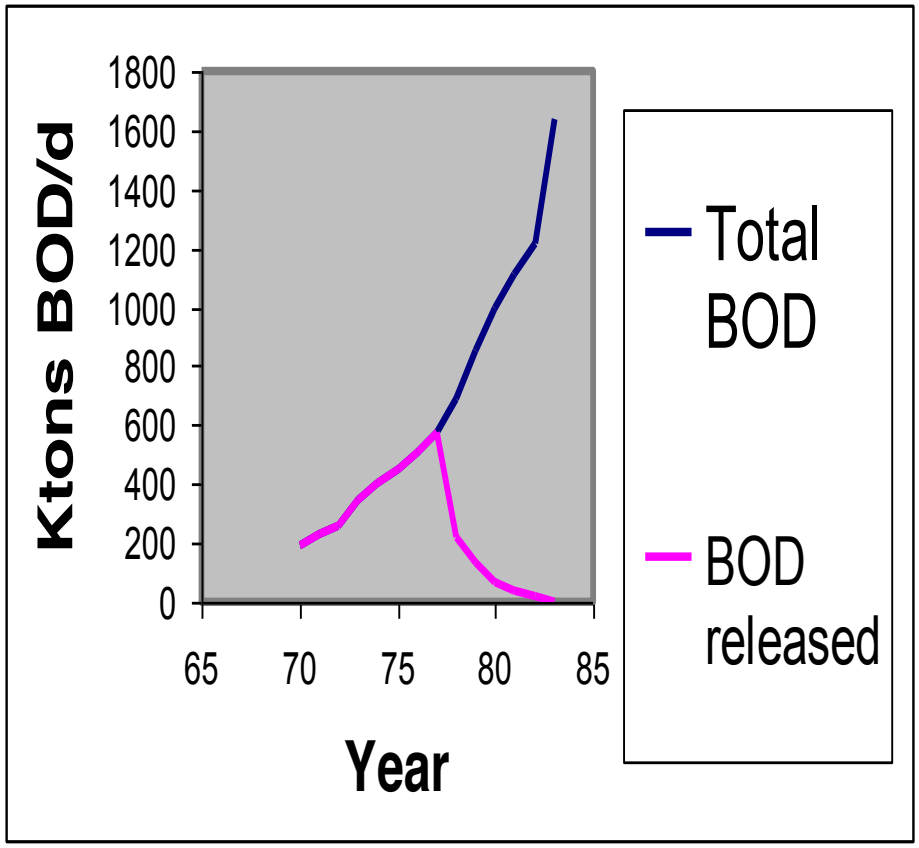
Facility Information

rner Policy
nents

You can search the town for specific pollutants or plants…



Taxes and Regulation of Palm Oil industries in Malaysia



<1977 25000 ppm BOD

1978 5000

1979 2000

1980 1000

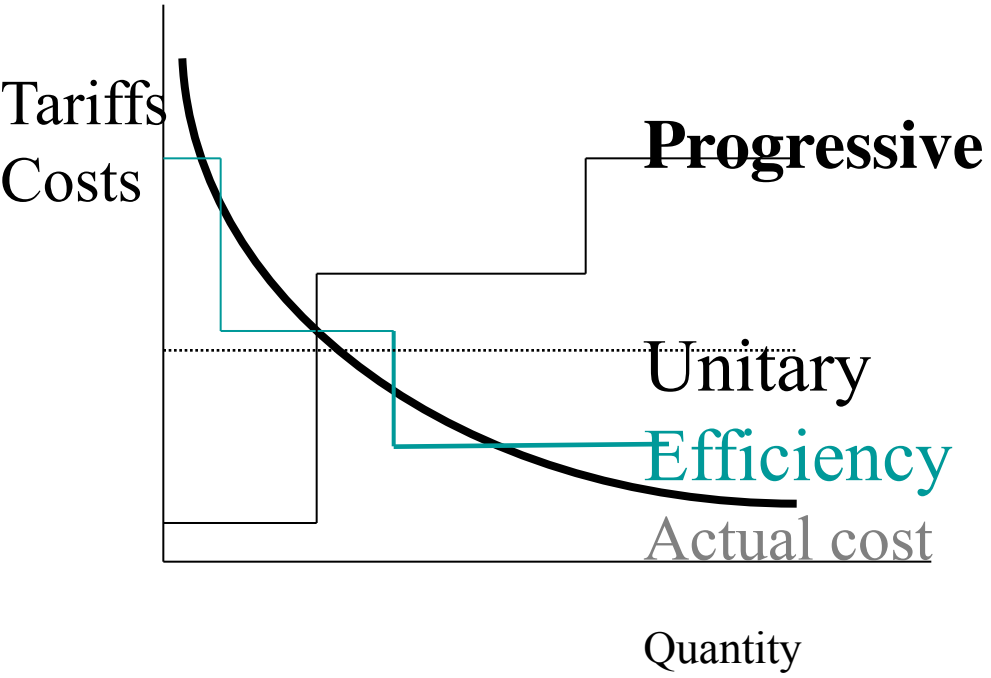
1981 500

1982 250, 1984: 100 etc

$T = T_0 + T_1 \hat{e} + T_2(e-\hat{e})$

$T_1 = 10\ T_2$

Tariff structure is a policy instrument



- Some tariffs in Mexico 1993 $/kWh
- Small Resid 0.06
- Big Resid 0.47
- Irrigation 0.10
- Big Indust 0.22
- The poor who are supposed to benefit get nothing

Water management in S Afr

Kader Asmal, ex-minister of water & forestry in S Africa and chairman of World Commission on Dams, awarded 2000 Stockholm Water Prize for water management in S A.

- 1994 >16 million S Africans lacked water.
- Water Policies include:
- Removal of invasive, species, rob 7% of water.
- Control planting of trees. License required for "stream flow reduction activity."
- Consider how "easy" is LDC carbon sequestration
- >7 million people served

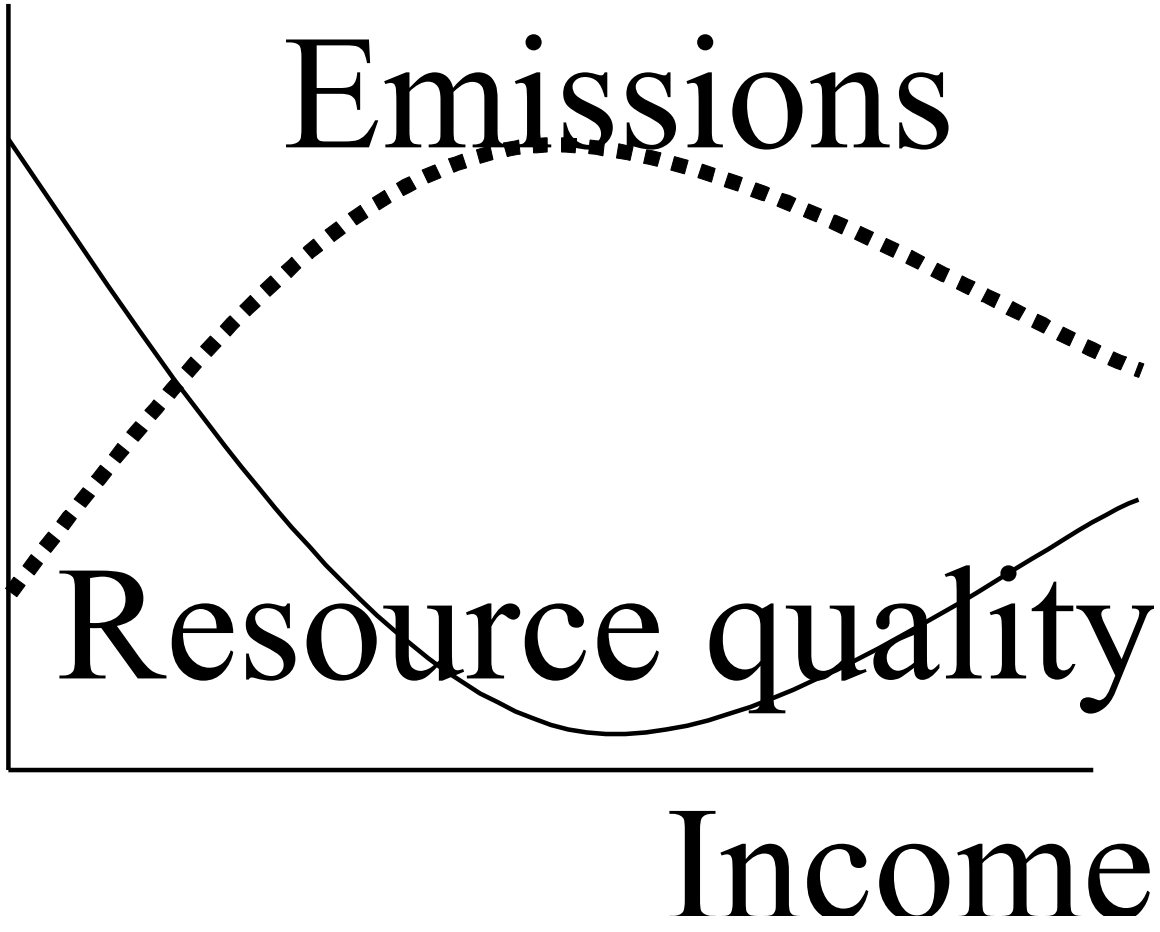
Personal Resposbility

Some Conclusions

- For the poor: Risks, Ecosystem resources and thus Distribution of costs important
- Institutions needed. Capacity building
- Lack of capacity may favor some instruments but does not exclude taxes
- Environmental funds & building partnerships
- Global funds (eg GEF) may be beneficial.

Growth & Environment

Rome Club
EKC



The Grand View of The Future

- The Rome Club
- Herman Kahn
- Measuring Welfare – Net Econ Welfare

“Let them eat Pollution!”

- Internal memo from Larry Summers:
- *Just between you and me, shouldn’t the Bank be encouraging more migration of dirty industries to the LDCs?”*

1. *Cost of health damage =f(wages)*
2. *Costs of pollution low in clean environm.*
3. *Demand for clean env. has high income elasticity*