Instruments

- Institutional approaches
- Command and Control
- Economic incentive (Market-based)

Evaluative Criteria

- Cost effectiveness
- Long-run effects
- Dynamic efficiency
- Ancillary benefits
- Equity
- Flexibility
- Costs of use under uncertainty
- Information Requirements
Flexibility

- Agency flexibility
- Farm or firm flexibility
- Processor and contractor flexibility
- Tradeoffs

Ideally—environmental policy

- Minimize the environmental costs of the residuals
- Minimize the abatement costs to regulated parties
- Minimize the administrative costs of monitoring and enforcement

Additional Criteria (Russell and Powell)

- Static efficiency: heavy institutional demands
- Low political problems and institutional demands: not cost effective
Static Concerns

- Efficiency
- Information and computational demands
- Relative ease of monitoring and enforcement

Dynamic Concerns

- Flexibility in the face of exogenous changes
- Incentives for environment-saving technical change

General Institutional Demands

- Agency: honesty, technical capabilities
- Regulated parties: experience in markets, technical skills
Political Dimensions

- Distributional implications
- Perceived ethical message
- Perceived fairness

Perceived a priori risks

- To agency: failure to achieve goals, freezing current technology too long
- To regulated parties: false convictions, ratcheting down of requirements

Institutional Approaches

- Facilitate the market
- Facilitation of bargaining
- Specification of liability
- Development of Social Responsibility (Moral Suasion; Provision of Information)
Facilitation of Bargaining—
Disclosure of Information Strategies

- Establish mechanisms for discovering environmental risks
- Assure the reliability of the information
- Publicize the information
- Act on the information

Examples

- The Toxic Release Inventory
- Drinking Water Consumer Confidence Reports
- Indonesia’s Public Disclosure Program

Facilitation of Bargaining

- Change Property Rights
- Bundle of Sticks analogy
- Selling conservation easements, water markets, change PR so owner can benefit from conservation
Liability
- Negligence
- Strict Liability
- Japan—extensive liability law
- Cradle-to-Grave responsibility

Development of Social Responsibility
- Moral Suasion
- Conservation Campaigns
- Good stewards awards (e.g. The Great Printers Project)
- Environmental labeling

Institutional Approaches
- Score well on some criteria but not others.
**Command and Control Instruments**
- Replace the Market
- Input Restrictions
- Technology Controls
- Output Quotas
- Emission or Residual Requirements
- Ambient Requirements
- Spatial or Vocational Requirements

**Input, Restrictions**
- Prohibit inputs
- E.g., Prohibit the use of certain chemicals
- E.g., Prohibit the use of certain sources of water
- E.g., Asbestos in school construction

**Technology Controls**
- Technology-specification (for production, recycling, or waste treatment)
- Design Standards
- Best Management Practices
- Best Practicable Means
- Best Available Technology
- Process Controls or Prohibitions
Technology Controls

- Not usually cost-effective
- Why?
- Because least cost abaters not abating the most

Technology Controls

- Tend to be favored in nonpoint source policies
- Why?
- Because of TC and uncertainty
- Because missing science about links between individual farm/firm behavior and ambient pollution

Output Quotas

- Product Prohibitions (PCBs)
Emission or Residual Requirements

- Technology-based standards
- Non-transferable licenses, permits or quotas for total allowable quantity

Penalties need to be low relative to cost of enforcement

Probability of being observed out of compliance needs to be high.

Efficiency means that MC of emissions abatement be equal over all abaters, requires regulator information on each of firms’ MC.

What if regulator has to guess about MC?
Location
- Zoning
- Relocating

Economic Incentive Instruments
- Facilitate the market
- Emission charges (taxes) or Subsidies
- Idea: Raise the costs of polluting or reduce the costs of pollution control

Emission Charges (Taxes) and Subsidies
- Taxes on emissions do not have the same effect as taxes on outputs or inputs
- Can be more expensive for firms than regulation
- Measurement of individual emissions at least cost is a precondition
- Political acceptability tends to be low in U.S.
Emission Charges (Taxes) and Subsidies

- Advocated by economists to achieve a pollution target
- Can lower emission to where MC = MD
- Minimizes aggregate costs by **Internalizing the externality**
- Gives Incentive to Develop New Technologies
- Encourages substitutions (e.g. natural gas for coal)

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Emission Charges (Taxes) and Subsidies

- Tax or price = MD at the efficient level of pollution
- Change overtime if abatement costs change overtime
- Uniform over all polluters (i.e., All have same cost at the margin)
- Assumes damage is independent of time and place and is uniformly mixed pollutants
- If not, then a tax for each firm
Emission Charges (Taxes) and Subsidies

- Subsidies – Receive Revenue for each unit of emission reduce from baseline
- Moral hazard
- Distribution of gains and loses differ from a tax
- Political acceptability?

Emission Charges (Taxes) and Subsidies

- Information requirements to do perfectly are immense
- MC and MB
- Environmental fate
- Transport
- Asymmetric information between regulator and regulated party
- Monitoring and enforcement (without there can be shirking)

What if Regulator has to guess at what is the appropriate price (tax)?

- Knows the MB of pollution control (i.e., the MC of pollution) and has to guess at the MC of pollution control (i.e., The MB of pollution)
- OR, Knows the MC of pollution control but not the MB