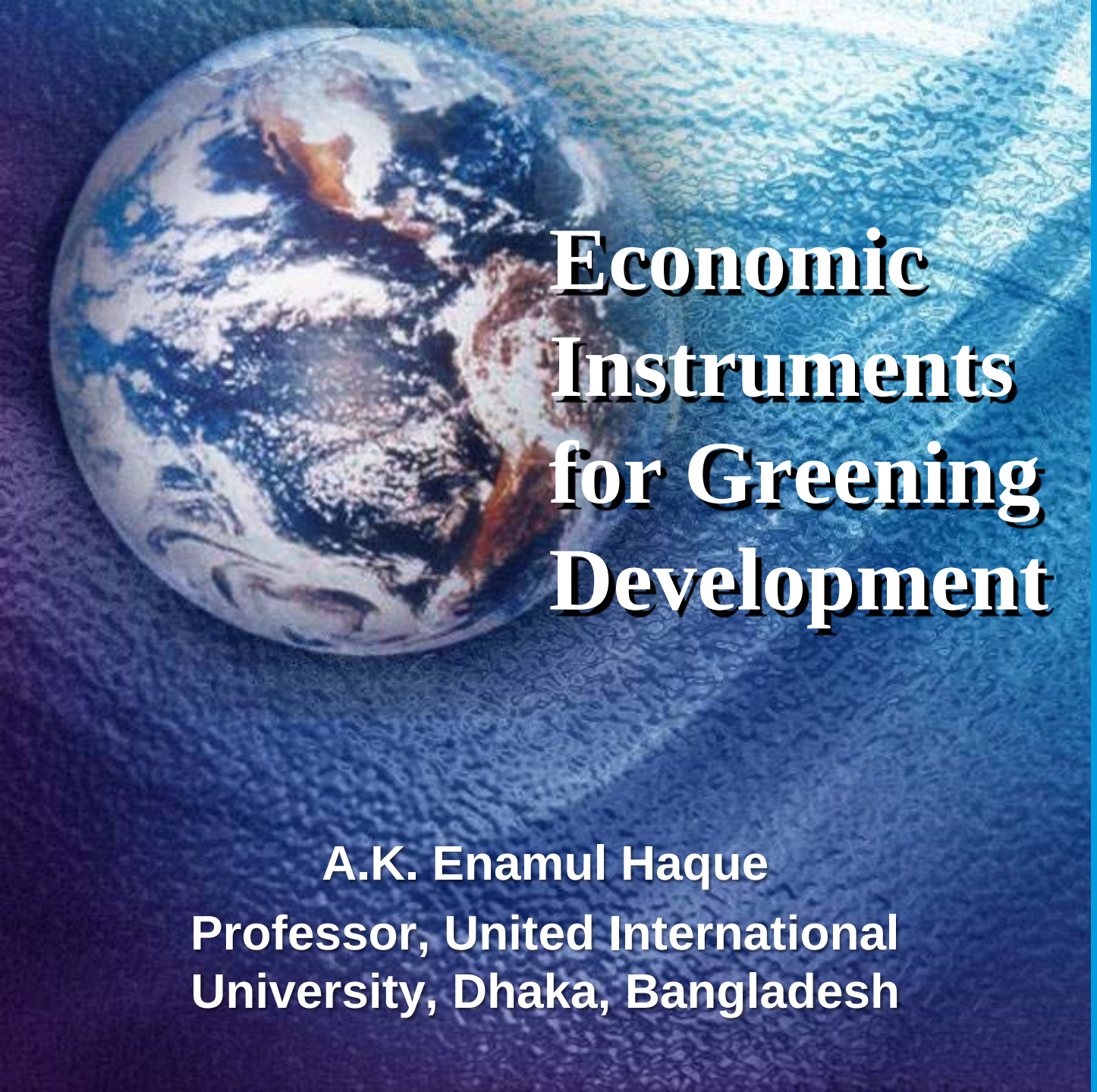

Economic Instruments for Greening Development

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SANDEE

ECONOMICS & THE ENVIRONMENT

Introduction

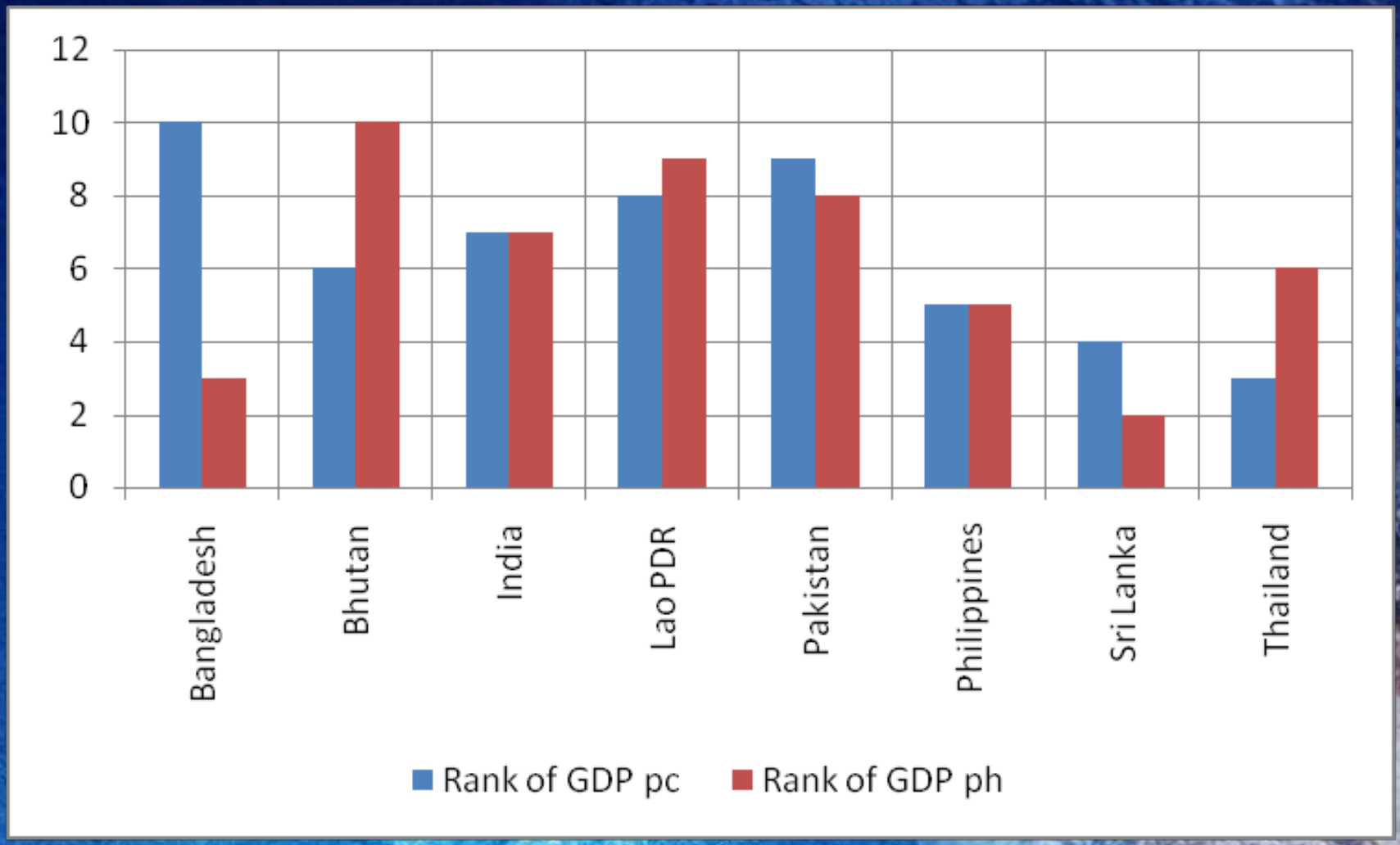
- Economic Development is accompanied with
  - More energy use
  - Higher emission level
  - Pressure on natural resources
  - Depletion of resources
  - Degradation of resources : air, water and soil
  - More urbanization
  - Higher temperature – urban heat island syndrome
  - So on….

Greening economic development means

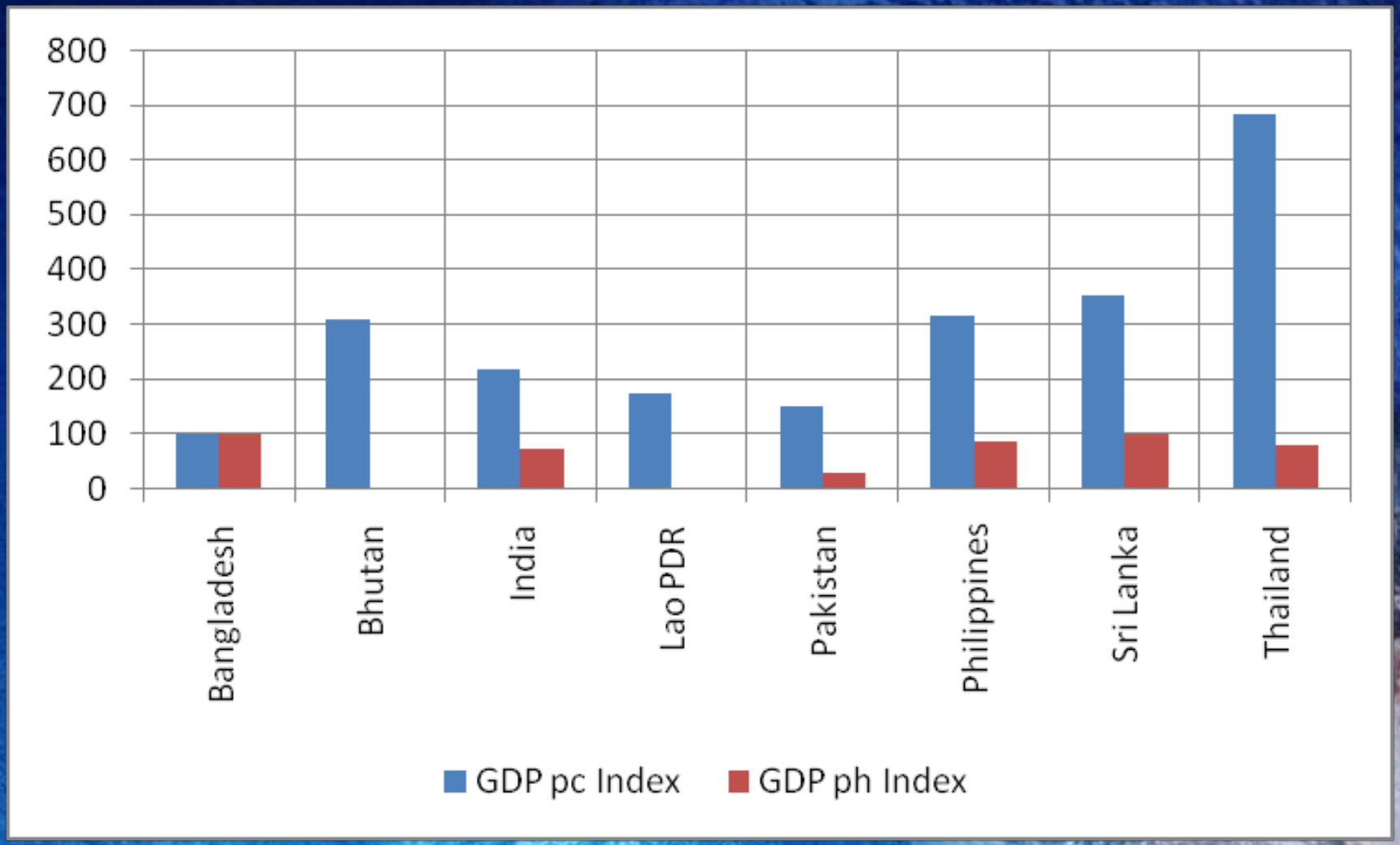
- Reducing pressure on nature and yet continue to grow
  - Cleaner air
  - Cleaner water
  - Better soil

  - Sustainable resource use
  - Cleaner urban environment
  - Sustainable agriculture
  - Cleaner manufacturing sector

Relative position in GDP per capita and per hectare



Pressure on Resources



How to make development ‘green’?

- Two distinct choices
  - Command-and-control
    - Regulation to control pollution – requiring strict monitoring mechanism and an honest civil bureaucracy
    - Setting up of standards
  - Market based incentives
    - Requiring legal set up for imposition of fines, charges
    - Trading of ecological services
    - Trading of pollution rights
    - Reversing incentive to promote clean technology

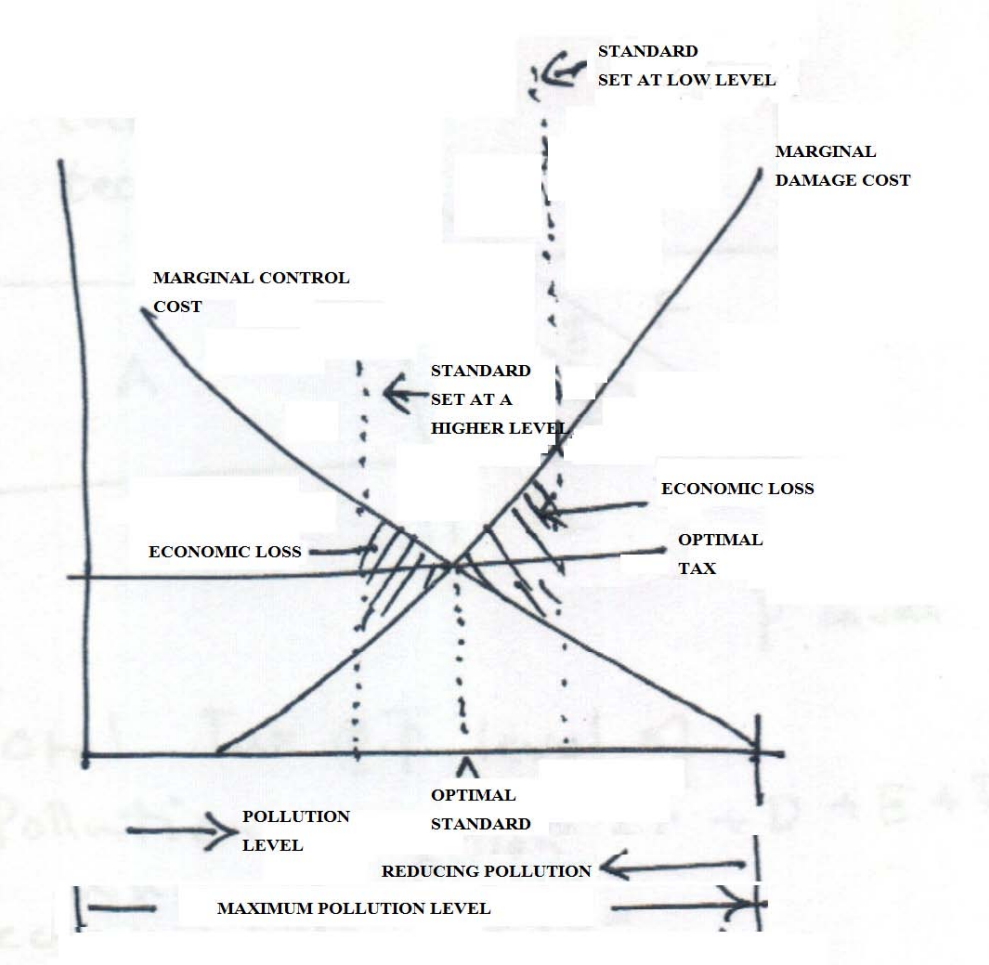
Policy Instruments can be also classified as

- Using Markets
  - Subsidy, taxes, charges, deposit-refund
- Creating Markets
  - Property rights, tradable permits, international offsets (CDM)
- Environmental Regulation
  - Standards, bans, permits, quotas, zoning, liabilities
- Engaging Public
  - Public participation, disclosure rules

Economic instruments

- Taxing the polluters instead of ban or ‘demolition’
  - Under this polluters could be taxed based on estimates of
    - annual pollution load
    - annual production units
  - It requires no ‘standards’
  - It also incentivize adoption of cleaner technologies in the process of production

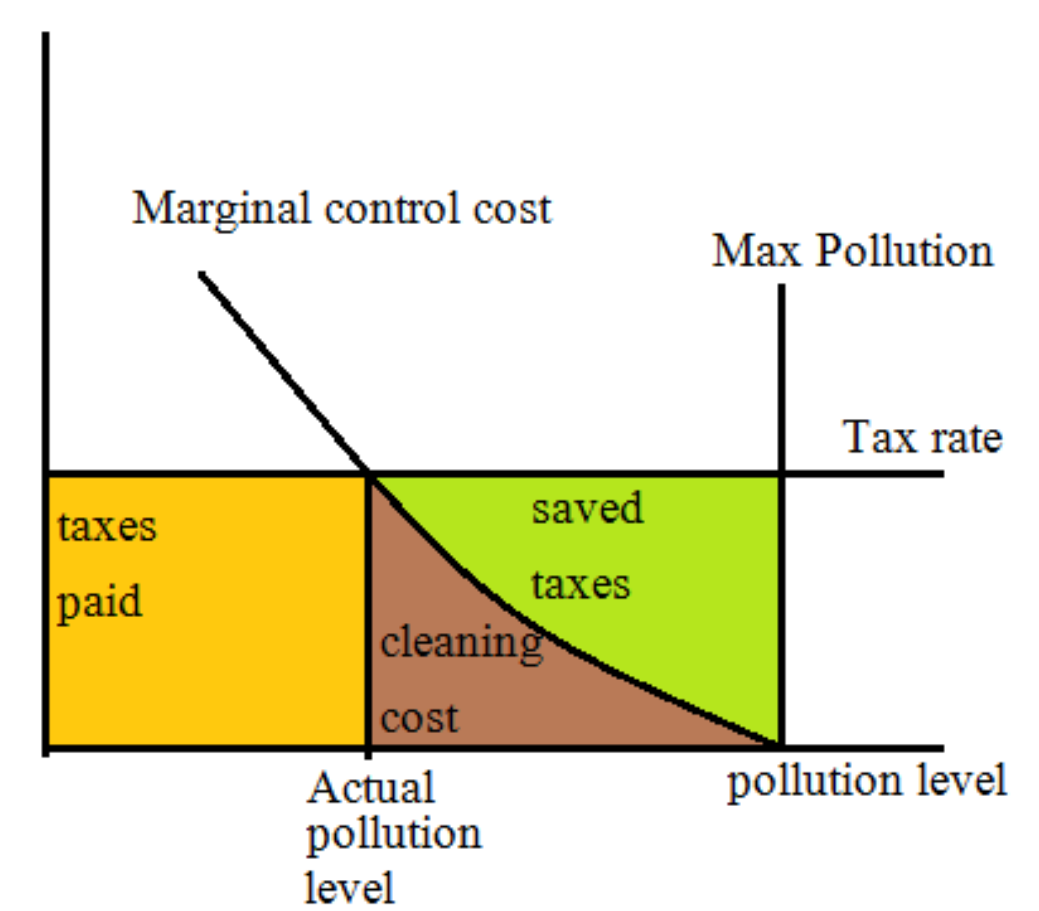
Standards



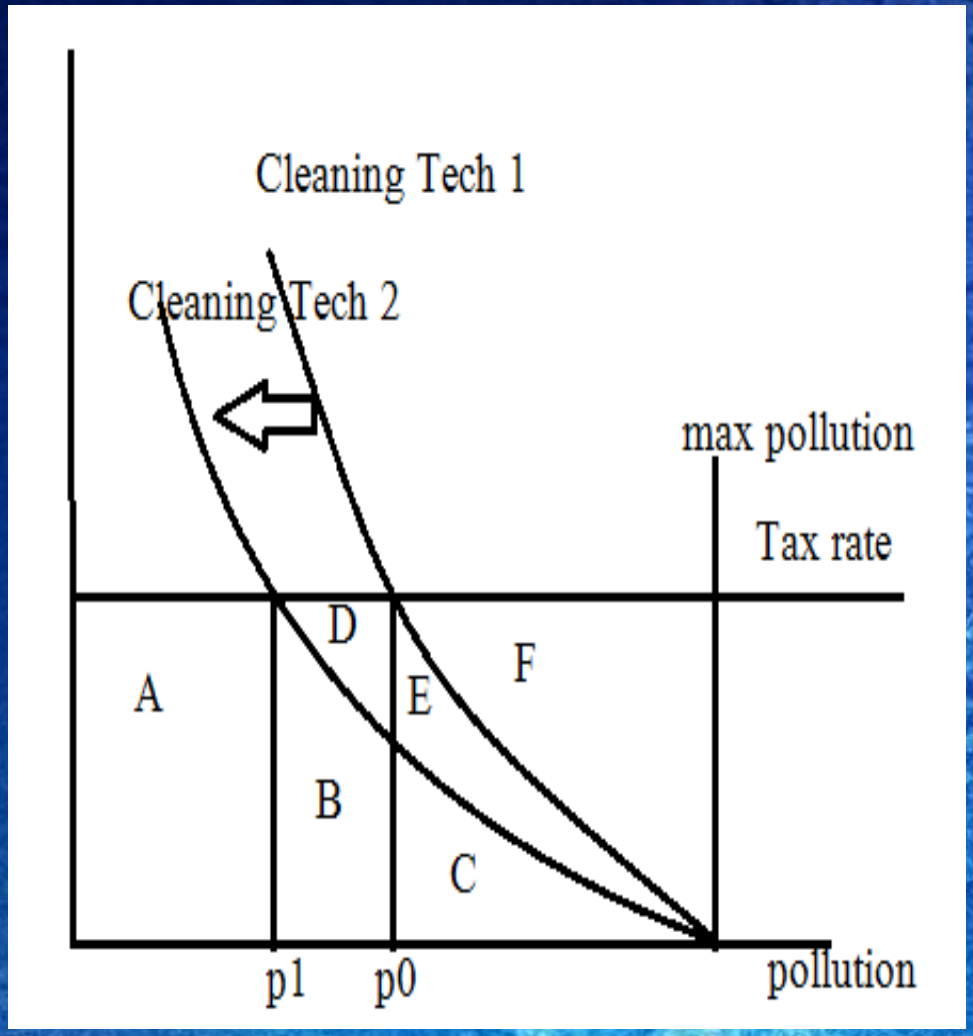
Problems in standard

- Driven by technology
- Regulator fully informed on the technological innovation
- Economic cost of 'wrong standard'

Introducing Tax – creating incentives



Moving towards cleaner technology



Maximum Pollution remains same but industries clean up with taxes

Cleanup Technology 1

Tax = A + B + C + D + E + F
Cleanup cost = C + E
Pollution level = p0 Tax paid = A + B+ D
Tax saved = F

Cleanup Technology 2

Cleanup cost = B + C, Pollution level = p1
Tax paid = A, Tax saved = D + E + F

GO FOR TECHNOLOGY 2

Tradable Permits: ERC

- Emission reduction credits
  - To give flexibility to firms to use cost-effective technology of emission reduction
  - Allow industries to build new plants without increasing emissions
- Offset policy
  - Buy old plants
- Bubble policy
  - Allowing exchange of emission between two locations

Tradable Permits: ERC

- Netting
  - Allow firms to expand or modify plants as long as net increase in emission is below the threshold level
- Banking
  - Allowing firms to store ‘saved’ credit for later use in bubbles, netting, or offsets.

Tradable permits : Ambient Permit Trading

- Used to control emission in a geographical area
- Used when differential costs exist between polluters
- Best used in case of zero transaction costs
- Need institutional structure – exchange mechanism to reduce transaction costs

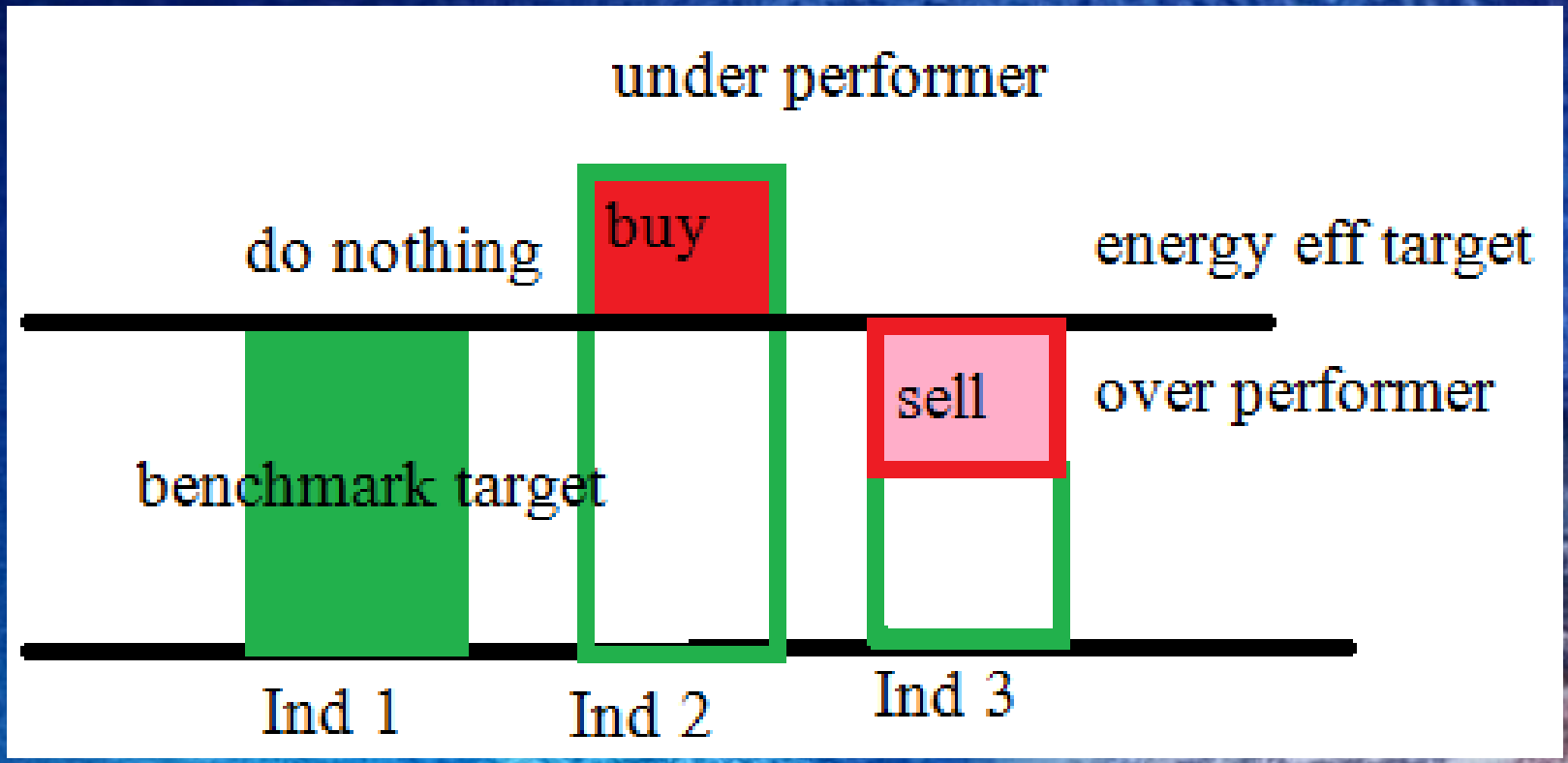
Output-based allocation of pollution

- Tying permit allocation to its output using best industry standard.
- Use benchmarking to set pollution permit
- Often favors newer firms
- With fixed permits, it incentivize firms to increase output only with better abatement method.
- Does not work if want to reduce output

Cap-and-Trade Program

- A mixed system
  - First allocate a CAP on emission level by firm
  - Second – allow them to trade freely
- Benefits existing firms by creating value to their pollution
- India's PAT program – perform – achieve – trade

PAT and incentives



Resource based permits

- Transferable grazing rights
- Fishing permits
- Water rights to riparian communities
- Transferable development rights
  - Allowing an area to be converted into parks in exchange for industrial development in other areas

Countries using some of these instruments – some examples

- US – sulfur, NOx,
- Chile – air pollution (PM10 emission at the industrial units).
- Europe – Carbon trading
- Clean Development Mechanism
- Voluntary Carbon Market
- GEF – transfer fund for market creation

Taxing polluting output or input

- Carbon Tax
- Product tax for using harmful chemicals or gases
  - Organic vs other crops
  - Normal lights vs CFL lights
  - Water-saving gadgets vs normal water gadgets
  - Energy saving motors vs other motors

Other taxes or fees

- Royalties for mining, user fee, stumpage fee, land tax
- Taxes on use of plastic
- Deposit-refund system
  - Promotes recycle, reuse of resources

Rights and Liability rules

- Creating property rights on common property resource to control access or to convert open access resources into a common property resources
  - Community Forests (Nepal), JFM (India)
  - REDD, REDD+
- Forest Stewardship Certificates
  - 4.9 million ha of forest under this program in Asia
  - China, Indonesia (Teak), Nepal (hand made paper, 24 NTFPs)

Rights and Liabilities

- Using tort rules for compensation, fines.
- Using PIL for reducing pollutions or degradation
  - Landfill for housing (Bangladesh)
- Reducing transaction costs for liability suites
  - Specialized courts

Payment for Ecosystem Services

- Polluter pay principle
- Beneficiaries pay principle
- Users pay principles
- Compensation to the protectors
- Property rights reallocation

- Compensation rule
  - Damage costs
  - Rehabilitation costs
  - Value of ecosystem services
  - Gain of the beneficiaries
- Government Pays or Market Pays

PES in China

- Watershed protection
- Water use rights
- Forest compensation fund of the government
- Nature forest protection fund
- Eco-agriculture program

Issues for efficient instrument choice

- Heterogeneity in abatement costs
- Heterogeneity in damage costs
- Technological progress
- Growth and inflation
- Non-convexity in nature – protecting irreversible damages