GOVERNMENTAL REGULATION OF HEALTH, SAFETY and THE ENVIRONMENT

Perspectives from the Nation State
The US Approach

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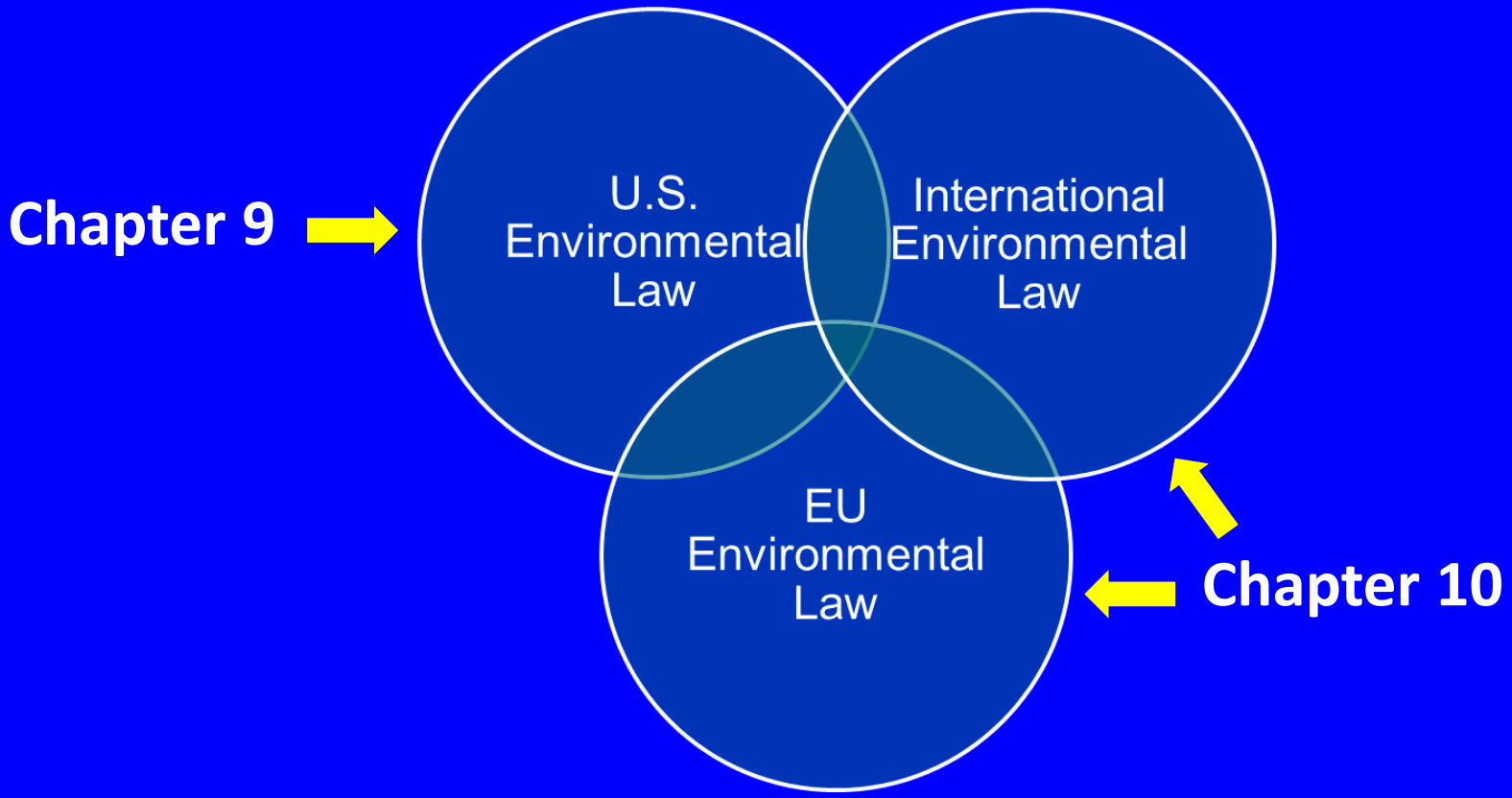
Relationship Between US, EU. and International Environmental Law



Outline of Today's Discussion

- Standard Setting for Chemicals and obligations of the employer, manufacturer, and user.
  - » Exposure limitations, product bans, technology requirements
  - » Duty to generate information
  - » Duty to retain information
  - » Duty to provide access to information
  - » Duty to inform affected parties
- Worker and Community Right-to-Know
- Cleaner and Inherently Safer Technology
- Liability for Contamination of Land and Water
- A Technology-based Strategy for a Sustainable Environment
- The Precautionary Principle
- Trade-off Analysis as an alternative to CBA

EVOLUTION OF APPROACHES TO HEALTH, SAFETY, AND ENVIRONMENTAL PROBLEMS

- Dispersion of pollution and waste
  - The “dilution” solution”
  - Often requiring expensive remediation/restoration of land and water

- **‘End-of-pipe’ Pollution Control**
  - *Collecting wastes; workplace ventilation and protective equipment*
  - *No fundamental changes in inputs, final products, or production technology*
  - *Media shifting: air and water pollution=> waste and workplace exposures*
  - *Problem shifting: toxicity => accident potential*

- Industrial Ecology: waste & material exchange and consolidation
  - *No fundamental changes in inputs, final products, or production technology*

- **Pollution prevention and cleaner & inherently safer technology**
  - **Improvements in toxic content, eco-efficiency, and energy efficiency**

- H&S and Environmental Management Systems
  - ISO 8999 and 14,000
  - Environmental Management Audit System (Europe)

- **System changes and Sustainable Development**

US Standard Setting for Chemicals

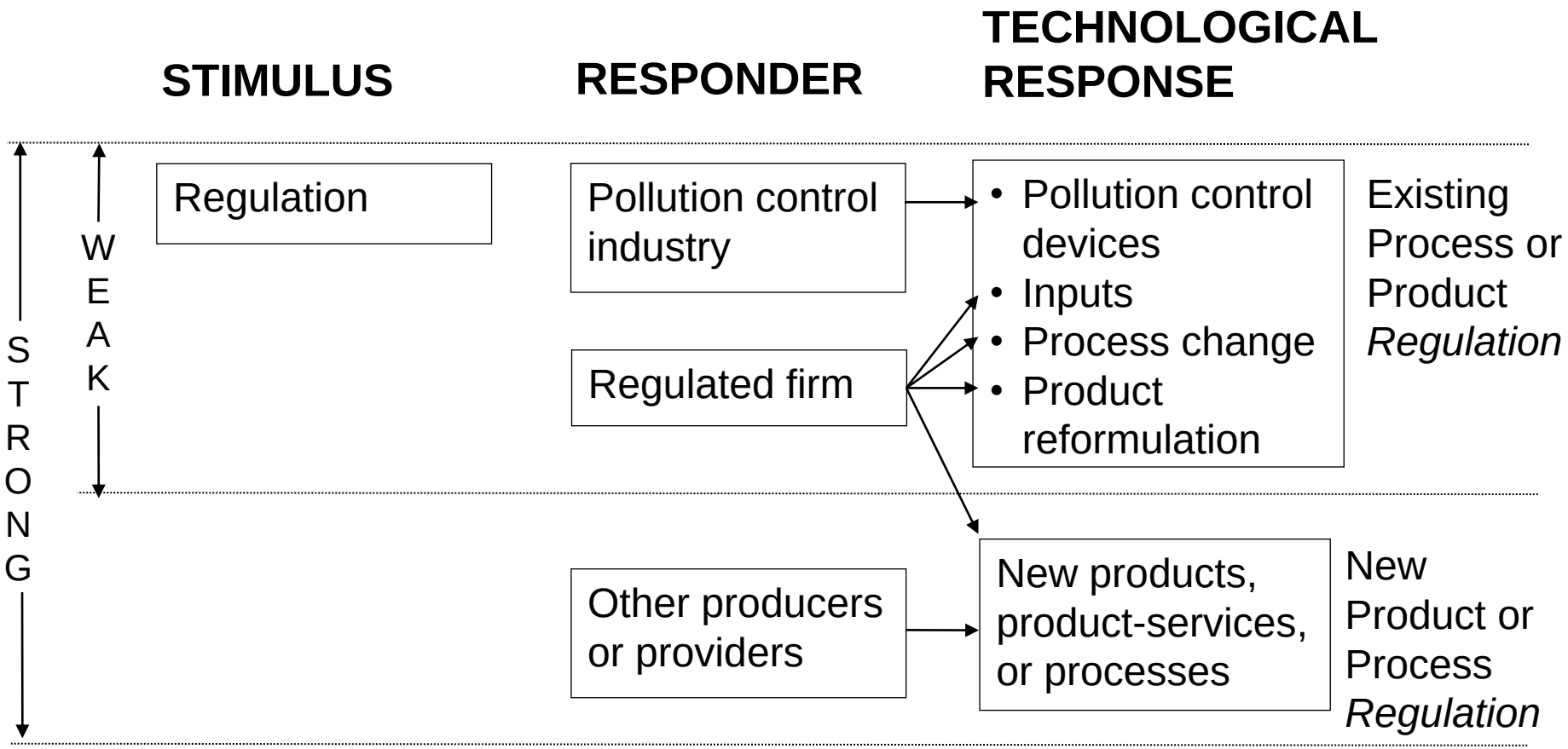
- The Occupational Safety and Health Act of 1970
- The Toxic Substances Control Act of 1976 and 2016 (40 years later)
- The Clean Air Act of 1990
- Water Legislation
  - The Clean Water Act
  - The Safe Drinking Water Act
- Regulation of Hazardous Waste and Environmental Contamination
- Worker and Community Right to Know
- Consumer Product Safety (food, drugs and other products)
- Chemical Safety
- Pollution Prevention and Inherent Safety Legislation

Pollution Prevention (PP) and Inherently Safer Production (ISP) have common elements

- **Input Substitution**
- **Final Product Reformulation**
- **Process Changes and Redesign**
- **Organizational Change**
- **Managerial Change**
- **Changes in Work Practices**

However, technologies that improve PP may not be the same as those required by ISP, and vice versa.

A Model for 'Weak' (Porter) and 'Strong' (MIT) Forms of the Regulation-induced Innovation Hypothesis



Reasons why firms *are* adopting cleaner production/pollution prevention:

- the costs of waste transport/treatment and pollution control can be high, and
- there is increased liability for environmental damage =>
- there is a ready calculus for risk avoidance; it is economically rationale to avoid gradual pollution and contaminated products
- there is increased transparency of toxic releases (through the TRI) and public awareness
- the Pollution Prevention Act (in the EU the IPPC Directive, EMAS, and ISO 14000) all provide pressure for a search for solutions

Reasons why firms are *not* adopting inherently safer technology:

- the costs of [rare] accidents are not apparent until after the event, and
- the probabilities/risk assessments for sudden and accidental releases are problematic (worst-case scenarios are not believed, and perhaps are not believable) =>

- there is *no* ready calculus for risk avoidance decisions; it may not seem economically rationale to prevent accidents
- chemical engineers have a simplistic view of 'root causes'.
- Section 112r of the Clean Air Act was minimally implemented; requiring technology options analysis was rejected by the Clinton Administration.
- Inherent safety not given prominence; compare Seveso II
- there has been limited public awareness of the risk …but 9/11 is changing all that

Increasing awareness of inherent safety through requiring firms to undertake

- An *inherent safety opportunity audit* (ISOA)
  - that identifies *where* in a specific facility inherently safer technology is needed.

- A *technology options analysis* (TOA)
  - that identifies *specific inherently safer options* that will advance the primary prevention, i.e., that will alter production systems and final products so that there are less inherently unsafe risks.
  - Both the *adoption*, and the *development*, of inherently safer options need to be considered

Strategic Questions leading to Technological Change

- What technology is causing the environmental or public health problem?
- What characteristics of the problematic technology are responsible the hazard?
- What technological response* is desirable?
- Which industrial sector is most likely to diffuse or to develop the desired technology?
- What kinds of regulation and incentives will most likely elicit the desired response?

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* Choose, for example, whether a product or a process change; pollution control or prevention? and, further, the diffusion of existing technology, simple adaptation, accelerated development of innovation already in progress, or radical (i.e., disrupting) innovation?

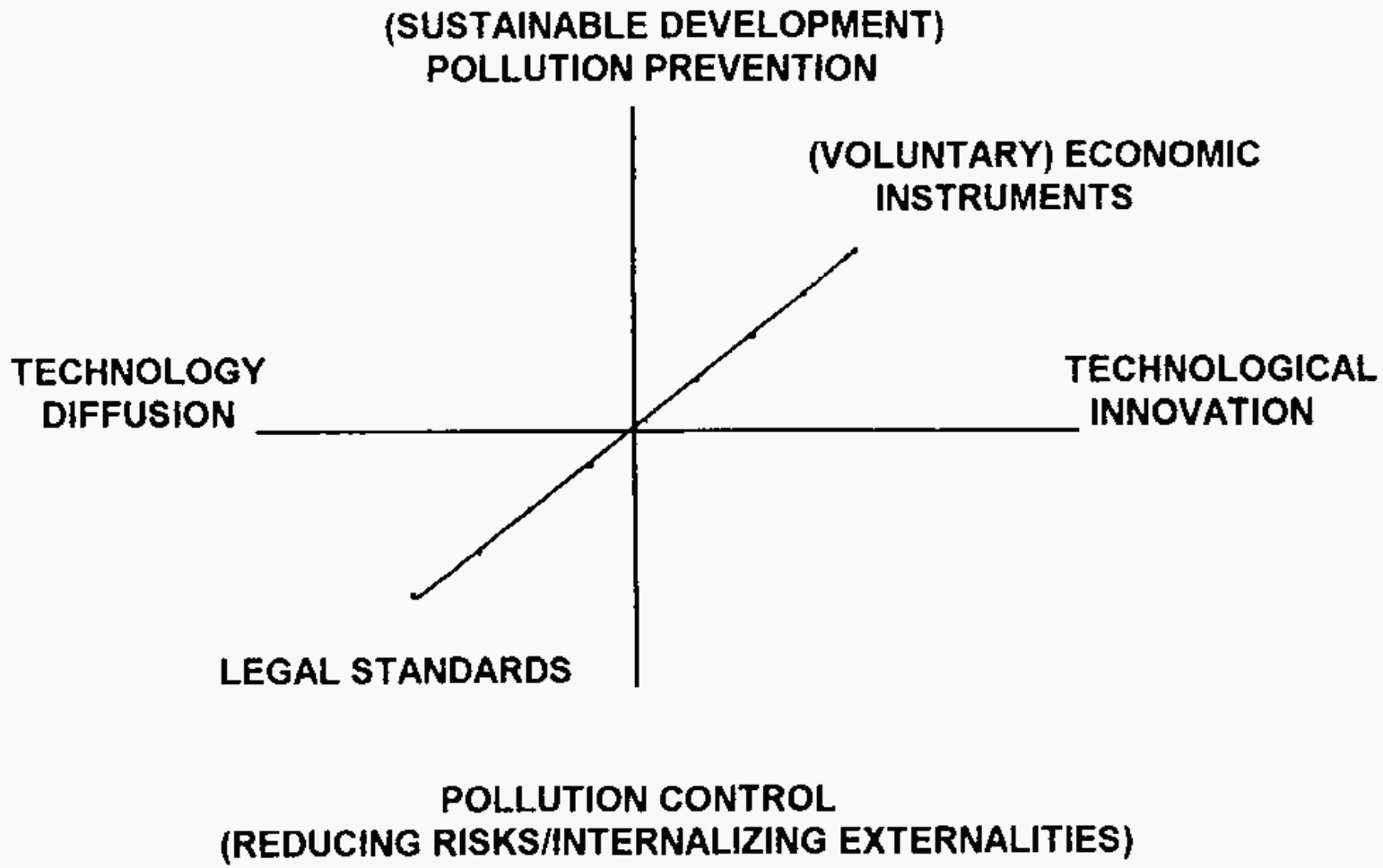

Figure 1. STRATEGIC CHOICES

Assessing the Effects of Decisions Affecting Health, Safety, and the Environment

EFFECTS Group	Economic Effects	Health/Safety Effects	Environmental Effects
Producers	$C_{\$}$		
Workers	$C_{\$}$	$B_{H/S}$	
Consumers	$C_{\$}$	$B_{H/S}$	
Others	$C_{\$}$	$B_{H/S}$	$B_{ENVIRONMENT}$

The Precautionary Principle
(two formulations)

- Where there are possibilities of large or irreversible serious effects, scientific uncertainty should not prevent preventative actions from being taken (Brundtland).

- Action should (must) be taken where there are possibilities of large or irreversible serious effects (~ risk averseness) e.g., climate disruption, cancer, reproductive system damage

Limiting the reach of the precautionary principle will limit societal protection/environmental restoration because scientific uncertainties can be trumped by potentially large costs for protection and restoration/remediation costs.

The Precautionary Principle: Essential Elements

- Trade-off analysis vs. CBA
  - » Accountability versus accounting
- Technology Options (Alternatives) Analysis
- A *sliding scale* for the *burden of proof* , i.e., the strength of data/information needed to justify taking (or stopping) action, depending on the hazard, extent of protection desired, and action taken (notification, regulation, compensation, etc.)

  ~ *linking causality to level of desired protection*
- Presumptions and shifts in the *burden of persuasion*
- Linked with the Polluter Pays Principle
- Going beyond risk reduction to sustainable development

Elements of the Precautionary Principle, cont'd

- Minimizing Uncertainty
  - » through refinement of (comparative) Risk Analysis
  - » through undertaking (comparative) Technology Options Analysis
    - – Safer inputs, production methods, and final products
- Attitudes towards Error Avoidance (*whether and to what extent to intervene)*
  - » Risk avoidance (Type I vs. Type II errors regarding requirements for the reduction of risk)
  - » Cost avoidance (Type I vs. Type II errors regarding requirements for changes in technology)

COMPARISON OF ENVIRONMENTAL & OCCUPATIONAL HEALTH & SAFETY REGULATION IN THE US & EU

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US & EU Regulatory Systems

- **The Occupational Safety and Health Act of 1970** — **OHS Directives**
- **The Toxic Substances Control Act of 1976** — **REACH**
  - **assessment and regulation of chemicals**

- **The Clean Air Act of 1990** — **Air Directive**
- **Water Legislation** — **Water Directive**
  - **The Clean Water Act**
  - **The Safe Drinking Water Act**
- **Regulation of Hazardous Waste (RCRA)** — **Waste/WEEE**
- **Clean-up of Contamination to Land and Water** — **Liability Directive**
  - **Remediation and Restoration (CERCLA) [Polluter Pays]**

- **Pollution Prevention and Inherent Safety** — **IPPC Directive (IED) (industrial emissions)**

- **Chemical Safety: workers (OSHA) and community (EPA)** — **Seveso Directives**

- **Consumer Products (food, drugs, & other products)** — **Product Safety and Product Liability Directives; Integrated Product Policy**

- **Worker and Community Right-to-Know** — **Aarhus Convention**

US & EU Regulatory Systems

- The Occupational Safety and Health Act of 1970 — OHS Directives
- The Toxic Substances Control Act 1976, 2016 — REACH 2003
  - » assessment and regulation of chemicals

- The Clean Air Act 1990, 1997, 1990 — Air Directives (1996, 2008, and related directives)
- Water Legislation — The Water Framework Directive 2000
  - » The Clean Water Act 1972, 1977, 1987
  - » The Safe Drinking Water Act 1974, 1986, 1996
- Regulation of Hazardous Waste (RCRA) 1970,1976,1984 — Hazardous Waste/WEEE 1971
- Clean-up of Contamination to Land and Water — Liability Directive 2004
  - » Remediation & Restoration (CERCLA 1986) [Polluter Pays]

- Pollution Prevention and Inherent Safety — IPPC Directive 1996 as amended by the Industrial Emissions Directive 2010
  - » PPAct 1990; OSHAct 1990; CAA 1990 — Seveso Directives 1982, 1996, 2012

- Consumer Products (food, drugs, & other products) — Product, drug & food safety directives; Integrated Product Policy

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- Worker and Community Right-to-Know — Incorporation of Aarhus Convention into EU Law 2006
  - OSHA Communication std 1983
  - EPCRA Community Right-to Know 1986