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Balancing trade and the environment

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the use of new technologies than regulatory tinkering.

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What R. Darryl Banks and George Heaton, Jr., propose amounts to tweaking the current regulatory system to move it in the direction of innovation rather than fundamentally changing it. They seem to assume that industry, which will really do the relevant innovation, is only a target for environmental policy rather than a partner in formulating policy.

Society invests a lot of energy, money, capital, and labor to extract metals from the ground, to grow and process materials, to synthesize organic materials from crude oil and gas, and to create products from these materials. This is an investment in materials, "negentropy," and embodied energy. The materials used in production or incorporated into the final product eventually become "wastes." Some are recycled and reused, but most are thrown away, buried in the ground, or otherwise lost to human use, even though they still carry the dearly won negentropy and embodied energy with them.

This strikes me as a technological and economic innovation issue. We are throwing away things of value, largely because our current industrial system is not designed to use them and has scarcely thought about the potential value that might be recaptured from them. Some companies, such as Xerox, 3M, and Dow, have begun to think about how to restructure their product designs and

processes to recapture and use this incorporated value more efficiently. There has also been some thought about how to build networks of relationships among companies and sectors that might more efficiently recapture the usable value by trading and using waste materials. Scrap metal has been recycled in this way for a very long time, and there is increasing recycling of other industrial wastes and many postconsumer wastes. However, much material carrying negentropy and energy that still leaves the industrial and consumer system is likely to be worth capturing. Those used products and waste materials that are not sensibly reusable as subsystems, components, or materials, should be reused as a source of energy.

This "industrial ecology" systems view and related lifecycle concepts seem to be largely missing from this article. Incorporating this perspective could open opportunities for technological, organizational, and regulatory innovation. Current environmental regulatory statutes, and most of current practice, create difficulties for such an approach, although EPA has begun to try to find "patch up" ways to make it possible. System innovations in general and industrial ecology in particular are important technological areas for greater attention.

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David Vogel's essay "Reconciling Free Trade with Responsible Reg-

ulation" (*Issues* Fall 1995) makes several important points about the "trade and environment" debate. First, he demonstrates the need for these issues to be addressed by U.S. policymakers. Otherwise, future progress on both trade liberalization and the strengthening of regulatory standards may be undermined. Events transpiring since Vogel's article bear out his prediction. Despite repeated entreaties by the Clinton administration, Congress seems unwilling to grant new trade negotiating authority to President Clinton. How to handle transnational environmental concerns has been one of the main sticking points. Congress is also pursuing several measures to weaken U.S. environmental standards and their enforcement. One key reason being advanced is to boost U.S. competitiveness.

A second point made by Vogel is that if trade restrictions are to be used to achieve environmental goals, the goals should reflect international norms, not merely the norms of the particular country imposing the trade restriction. For example, an environmental treaty such as the Montreal Protocol on Substances That Deplete the Ozone Layer justifiably includes trade restrictions. Vogel suggests that when a conflict arises between international trade rules and an international environmental agreement, the latter should take precedence. There are good arguments for giving more weight to the environment than to commerce. So far, however, the new World Trade Organization (WTO) has been unwilling to agree in advance to defer to environmental treaties. Many govern-

ments want the WTO to decide disputes on a case-by-case basis after weighing the benefits of each environmental treaty. Unfortunately, the Clinton administration has maintained the trade-centric views of the Bush administration regarding environmental treaties.

A third important point made by Vogel is that “trade and environment” disputes are inevitable. After reviewing a few of these recent disputes, Vogel concludes that formal WTO dispute proceedings are an inappropriate forum for resolution of such issues. Instead, Vogel suggests that nations need to make a serious effort to coordinate their regulatory policies for traded goods. Unlike some other analysts, Vogel wisely avoids the trap of pressing for identical standards. What Vogel wants is for governments to exercise more care in writing their standards so as to avoid imposing high burdens on exporting nations.

The one criticism I have of Vogel’s article involves his discussion of “eco-protection.” Vogel reports that the trade community is concerned about the misuse of environmental standards. But he lets them off the hook too easily. Surely at least 90 percent of the world’s lingering trade restrictions have nothing to do with environmental goals. They are pure commercial protectionism to help local producers compete. In fact, many instances, such as agricultural import quotas, are directly harmful to the environment.

Vogel believes that there are valuable lessons to be learned by studying the experience of the European Union in combining rules on commerce and the environment.

Countries need not choose between more trade or more environmental protection. By following proper strategies that involve “trading up,” countries can continue to gain the benefits of both trade liberalization and environmental quality.

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## Information warfare

Bruce D. Berkowitz is correct in pointing out the risk to the nation from hostile penetration of our information systems, whether concerned with national security or not (“Warfare in the Information Age,” *Issues* Fall 1995). His emphasis is mainly on the security and vulnerabilities of computers and computer networks, including those imbedded in communication systems. A deeper examination, which Berkowitz hints at but does not provide, would show that the contest between penetration and protection of computer systems and networks is but the latest example of the competition for information through the technology that develops and manages it that has been an integral part of conflict in the 20th century.

Consider information warfare as a quest to learn everything that can be known about an opponent’s status and plans, and a simultaneous effort to deny the opponent similar information about one’s own side. Add a large dash of deception to convey false information without the opponent’s awareness, as well as secrecy about the information that has been gathered,

so that it may be exploited without the opponent’s knowledge. From this broader perspective, we can see that information warfare has many facets in addition to the attacks on the means of storing and transmitting information that Berkowitz discusses.

The great code penetrations of the world wars were aspects of information warfare that influenced the course of history. The Zimmerman telegram, which was part of a German attempt to persuade Japan to attack Mexico as a means of keeping the United States occupied on our side of the Atlantic, was decoded and leaked to President Wilson by British intelligence and was instrumental in leading to the U.S. entry into World War I. The Ultra operations of World War II, which laid German strategy open to Allied perusal and counteraction, are now well known. In a different type of strategy, the creation of a phantom army in eastern England by the use of dummy vehicles, electronic emissions, and leaked messages in the months before D-Day in 1944 caused the Germans to modify their response to the invasion and thereby helped the invasion succeed.

The development of modern sensors (beginning with radar) and electronic communications has spawned a vast technological contest in electronic warfare (EW) that goes on among actual and prospective military opponents in peacetime and wartime. It includes electronic countermeasures and counter-countermeasures to attack and defend sensors, weapon guidance systems, and communications. Without success in EW and attacks against the opponent’s mil-