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Reducing Risk By Conserving Fuel and Recovering Wasted Heat

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When policy makers make decisions that alter the selection and amount of fuels used by industry to produce goods, they also alter risks to public health, safety, and the environment. This phenomenon, which often goes unexamined in regulatory decisions, reflects the fact that the use of fossil fuels, America's major source of energy, is an important source of risk to people and ecosystems. Although these energy-related risks are sometimes regulated, they are often not fully reflected in the prices of fuels and electricity faced by consumers in the marketplace. Therefore, policy makers need to make special efforts to ensure that energy-related risks are considered in decision making.

In this issue of RISK IN PERSPECTIVE, we describe the roles that heat integration and fuel recovery from waste play in reducing consumption of fossil fuels thereby reducing energy-related risks. By examining the risk tradeoffs associated with burning hazardous waste as a source of fuel, we discuss how well-intentioned regulatory proposals aimed at reducing risk may inadvertently increase risk by failing to account for energy implications. We argue that policies that penalize heat integration and fuel recovery from wastes should be questioned unless the magnitude of changes in energy-related risks are considered. Although imperfect, this kind of risk-tradeoff analysis is feasible given currently available data and methods.

Heat Integration and Fuel Recovery as National Objectives

Almost 25 years ago, the quadrupling of oil prices by the Organization of Petroleum Exporting Countries (OPEC) sent shock waves through the U.S. economy as our nation's dependence on foreign oil collided with our increasing demand for fuel. This caused an immediate recognition of the importance of heat integration in industrial processes. Chemical engineers took advantage of opportunities to bring hot substances that needed cooling into indirect contact with cooler substances that needed heating so that the heat exchanged between the two substances decreased the net fuel requirements for production processes. Although investments in heat integration typically are made on economic grounds, they may coincidentally offer risk-reduction benefits because they offset additional fossil fuel consumption.

This type of integration may also be possible at a community level as has been demonstrated by the integration of four process industries in the Danish town of Kalundborg. In this town the "waste" steam, which remains after coal is burned to produce electricity, is piped to homes and industries in the town and used for heating. This heat use offsets the consumption of thousands of tons of oil and reduces the thermal load to the water supply. This type of integration occurs to some degree between U.S. industries (where industries now use or