

Chapter 3

Promoting Technological Environmental Innovations: What is the Role of Environmental Regulation?

Jacqueline C. K. Lam

The University of Hong Kong, Hong Kong

Peter Hills

The University of Hong Kong, Hong Kong

ABSTRACT

This chapter reviews and discusses the debate over the effectiveness of environmental regulation in promoting industrial Technological Environmental Innovation (TEI). Using the innovation-friendly regulatory principles adapted from Porter and van der Linde (1995a and 1995b), this chapter demonstrates how properly designed and implemented environmental regulation (TEI promoting regulation) has played a critical role in promoting TEI in the transport industry in California and Hong Kong. In both cases, it has been shown that stringent environmental regulations that send clear and strong signals for future environmental performance requirements are critical in promoting TEIs in the public transport industries. Unlike traditional command-and-control regulations, TEI promoting regulations are strongly supported by incentive and capability-enhancing measures.

INTRODUCTION

Technological Environmental Innovation (TEI) has been seen as a critical means to achieve

both economic gains and improved environmental performance in the greening of industry literature (Porter and van der Linde, 1995a and 1995b; Gouldson and Murphy, 1998; Murphy and Gouldson, 2000; Mol and Sonnenfeld, 2000;

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Mol, 2003). TEI offers not only the potential to reduce emissions and resource consumption but also the opportunity to improve eco-efficiency and economic competitiveness (Porter and van der Linde, 1995a and 1995b; Gouldson and Murphy, 1998; Mol, 1995; Mol and Spaaragaren, 2000). Industries can achieve long-term economic sustainability through continuous greening of their production and operational processes. Economists have argued that economic, institutional and attitudinal barriers may hinder the adoption of TEIs and that relevant environmental policy instruments are needed to overcome the barriers (Klemmer, Lehr and Lobbe, 1999; Jaffe, Newell and Stavins, 2005). This paper reviews and discusses the debate over the effectiveness of environmental regulation in promoting industrial TEI. With reference to the innovation-friendly regulatory principles modified from Porter and van der Linde (1995a and 1995b), this paper argues that properly designed and implemented environmental regulations have played a critical role in promoting TEI in the transport industry in California and Hong Kong.

TECHNOLOGICAL ENVIRONMENTAL INNOVATION AND REGULATIONS

It has been argued that traditional environmental regulation as characterized by environmental standards or permits offers little incentive for TEI because of its inflexible, technology-forcing, bureaucratic and adversarial characteristics (Fiorino, 2006: 73-75). There are repeated claims that environmental regulations, typically those employed in the US, are based on existing technology and do not provide additional incentives to innovate once the regulatory requirements have been met (Porter and van der Linde, 1995a and 1995b; Jaffe and Stavins, 1995; Norberg-Bohm, 1999; Fiorino, 2006). Environmental regulations are often not effective in promoting TEI diffusion because regulatory standards are usually more lax

than standard practice and therefore provide little incentive for diffusion (Jaffe and Stavins, 1995; Fiorino, 2006). Environmental regulations that are based on performance standards are usually technology-setting, which could hamper radical innovation because firms do not like taking risks (Norberg-Bohm, 1999). In some cases, the incentive to innovate and diffuse environmental technologies is further constrained by bureaucracy long embedded in the regulatory system (Fiorino, 2006). Finally, the relationship between regulators and regulated industries are sometimes highly adversarial (Fiorino, 2006). High uncertainty and the lack of trust have left industries with little incentive to move forward.

Despite these claims about the inefficiency of environmental regulation in promoting TEIs, Porter and van der Linde argue that “the problem with (environmental) regulation is ... the way in which standards are written and the sheer inefficiency with which regulations are administered” (1995a:46). They contend that environmental regulations that are properly designed and implemented and aim at innovation can provide strong pressure and incentives, and result in higher resource productivity and efficiency and more competitive advantages. Consequently, industries can actually be incentivized to innovate continuously. Nevertheless, innovation-friendly environmental regulation differs from traditional compliance-oriented forms in a number of ways, namely, goal-setting, outcome-oriented, stringency, flexibility, certainty, consistency, incentive-based, voluntary-based, information-coupling, participatory, process-based and capability-enhancing (Ashford, 2000 and 2002; Porter and van der Linde, 1995a and 1995b). Among all the regulatory characteristics, Norberg-Bohm (1999) argues that environmental regulations that provide stronger political or economic incentives (incentive-based), and clearer signals about future environmental performance requirements (certainty), are critical for driving TEIs where pay-offs are more long-

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