Cap and Trade Programs

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Introduction

To ensure a cleaner, healthier environment, governments are increasingly using market-based pollution control approaches, such as emission trading, to reduce harmful emissions. The theory of emission trading and the potential benefits of market-based incentives relative to more traditional environmental policy approaches are well established in economic and policy literature. Until recently, however, practical applications of emission trading programs have been relatively limited. In 1990, the United States enacted legislation to implement a comprehensive national sulfur dioxide (SO_2) program using a form of emissions trading called "cap and trade." The U.S. SO_2 cap and trade program has proven to be highly effective from both an environmental and an economic standpoint. The success of this program and others that followed has spurred interest from policymakers, regulating authorities, and business and environmental organizations. Today, emission trading mechanisms are increasingly considered and used worldwide for the cost-effective management of national, regional, and global environmental problems, including acid rain, ground-level ozone, and climate change.

Cap and trade is a market-based policy tool for environmental protection. A cap and trade program establishes an aggregate emission cap that specifies the maximum quantity of emissions authorized from sources included in the program.

The regulating authority of a cap and trade program creates individual authorizations ("allowances") to emit a specific quantity (e.g., 1 ton) of a pollutant. The total number of allowances equals the level of the cap. To be in compliance, each emission source must surrender allowances equal to its actual emissions. It may buy or sell (trade) them with other emissions sources or market participants. Each emission source can design its own compliance strategy – emission reductions and allowance purchases or sales – to minimize its compliance cost. And it can adjust its compliance strategy in response to changes in technology or market conditions without requiring government review and approval.

How a Cap and Trade Program Works

1. The regulating authority sets a cap on total mass emissions for a group of sources for a fixed compliance period (e.g., 1 year).

2. The regulating authority divides the cap into allowances, each representing an authorization to emit a specific quantity of pollutant (e.g., 1 ton of SO_2).

3. The regulating authority distributes allowances.

4. For the compliance period, each source measures and reports all of its emissions.

5. At the end of the compliance period, each source must surrender allowances to cover the quantity of the pollutant it emitted. If a source does not hold sufficient allowances to cover its emissions, the regulating authority imposes penalties.

Cap and trade programs offer a number of advantages over more traditional approaches to environmental regulation. First and foremost, cap and trade programs can provide a greater level

of environmental certainty than other environmental policy options. The cap, which is set by policymakers, the regulating authority, or another governing body, represents a maximum amount of allowable emissions that sources can emit. Penalties that exceed the costs of compliance and consistent, effective enforcement deter sources from emitting beyond the cap level. In contrast, traditional policy approaches such as command-and-control regulation generally do not establish absolute limits on allowable emissions but rather rely on emission rates that can allow emissions to rise as utilization rises.

With cap and trade programs, even new emission sources may not increase the limits on emissions. The regulating authority may require new entrants to purchase or receive allocated allowances from the total allowable emissions set by the cap. Thus, the emissions target is maintained and the price of an allowance can adjust to reflect the increased demand for allowances.

A cap and trade program may also encourage sources to pursue earlier reductions of emissions than would have otherwise occurred, which can result in the earlier achievement of environmental and human health benefits. This is a result of two primary drivers: first, the cap and associated allowance market creates a monetary value for allowances, providing sources with a tangible incentive to decrease emissions. Second, a cap and trade program can incorporate the flexibility of banking to provide sources with an additional incentive to reduce emissions earlier than required. *Banking* allows sources to carry over unused allowances for use in a later compliance period when there might be more restrictive requirements or higher expected costs to reduce emissions. Essentially, banking gives sources some flexibility in the timing of emission reductions. This is in addition to flexibility given to sources in the location at which they make emission reductions.

Another environmental advantage of cap and trade is improved accountability. Participating sources must fully account for every ton of emissions by following protocols to ensure completeness, accuracy, and consistency of emission measurement. This system contrasts with most environmental programs that base compliance on periodic inspections and assumptions that equipment is functioning and the source is in compliance between inspections.

Accurate measurement of emissions and timely reporting are critical to the success of a cap and trade program and the integrity of the cap. After emissions data and allowance transaction information are reported, the regulating authority can provide detailed or summary information to the public. This transparency, or access to information, can provide confidence in the effectiveness of the program.

In addition to the environmental benefits of adopting a cap and trade program, significant economic benefits also support the use of such a mechanism. Cap and trade programs provide

sources with flexibility in how they achieve their emission target, which is uncommon under traditional environmental policy approaches.

The cap establishes the emission level for emission sources; the sources, however, are provided with the flexibility of choosing how they want to abate their emissions. Each source can choose to invest in abatement equipment or energy efficiency measures, to switch to fuel sources with no or reduced emissions, or to shutdown or reduce output from higher emitting sources. The regulating authority does not need to approve each source's compliance choices because the cap, accompanied by emission measurement and reporting requirements, enable the regulating authority to focus on assessing compliance results (i.e., ensuring that each source has at least one allowance for each unit of pollution emitted). Cap and trade programs also allow sources to trade allowances, providing an additional option for complying with the emissions target. Sources that have high marginal abatement costs (i.e., the cost of reducing the next unit of emissions) can purchase additional allowances from sources that have low marginal abatement costs. In this way, both buyers and sellers of allowances can benefit. Sources with low costs can reduce their emissions below their allowance holdings and earn revenues from selling their excess allowances – a reward for better environmental performance. Sources with high costs can purchase additional allowances at a price that is lower than the cost to reduce a unit of pollution at their facility (see Figure 1). This outcome is consistent with the "polluter pays" principle.

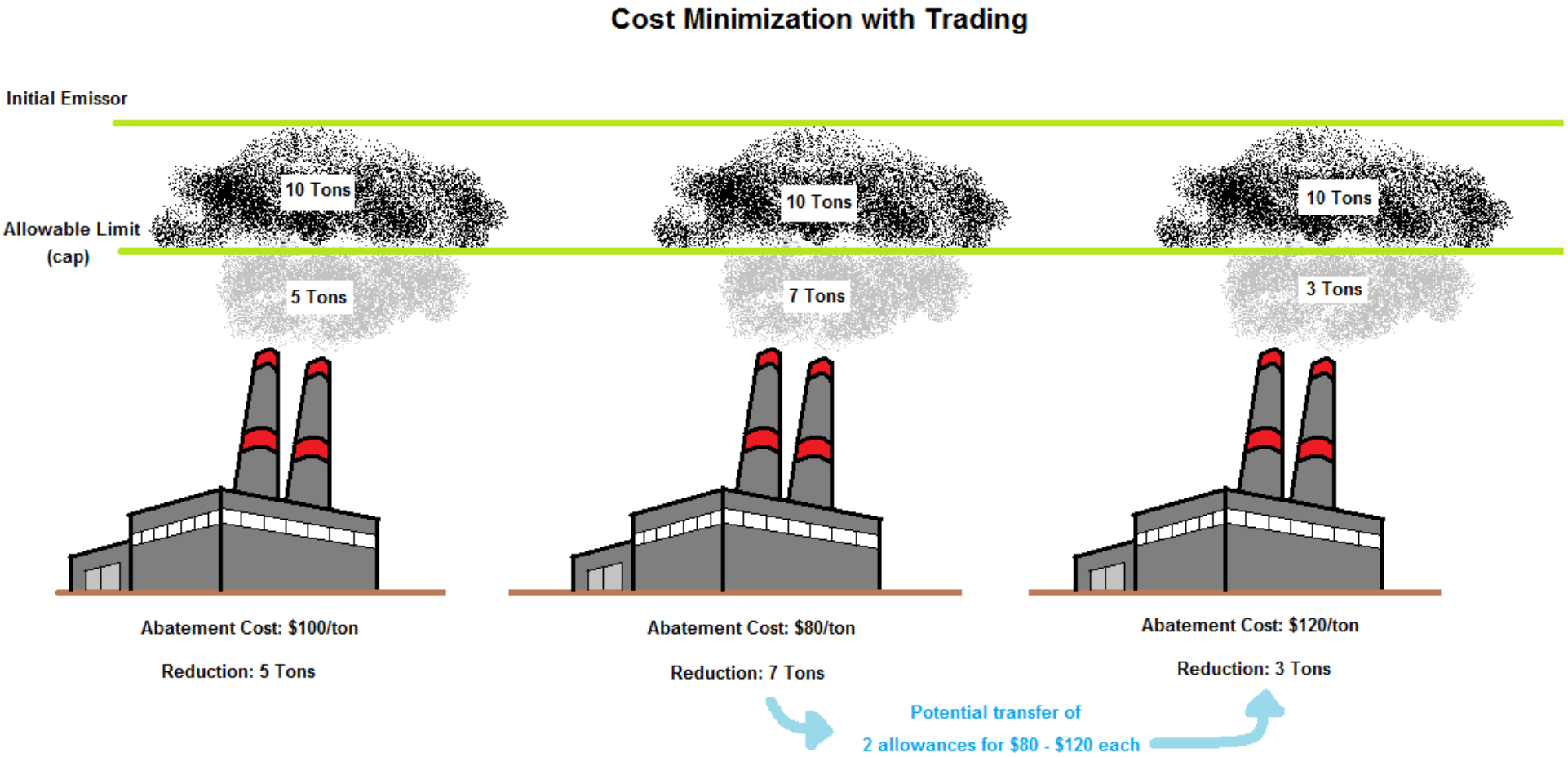

Figure 1

A well designed ca ncentives for innovation in emission abatemen e value creates an economic incentive to invest i nt options that can further reduce the costs of a

Finally, the cost-min ironmental benefits. Driving down the cos nakers and regulating authorities ne cost to society. This system makes it ater environmental improvement.