**Designing Environmental Policies**

**By Environmental policy,** we understand any measure by a government or corporation or other public or private organization regarding the effects of human activities on the [environment](https://www.merriam-webster.com/dictionary/environment), particularly those measures that are designed to prevent or reduce harmful effects of human activities on [ecosystems](https://www.britannica.com/science/ecosystem). It is the commitment of an organization or government to the laws, regulations, and other policy mechanisms concerning [environmental issues](https://en.wikipedia.org/wiki/Environmental_issues). These issues generally include [air](https://en.wikipedia.org/wiki/Air_pollution) and [water pollution](https://en.wikipedia.org/wiki/Water_pollution), [waste management](https://en.wikipedia.org/wiki/Waste_management), [ecosystem management](https://en.wikipedia.org/wiki/Ecosystem_management), maintenance of [biodiversity](https://en.wikipedia.org/wiki/Biodiversity), the protection of [natural resources](https://en.wikipedia.org/wiki/Natural_resource), [wildlife](https://en.wikipedia.org/wiki/Wildlife) and [endangered species](https://en.wikipedia.org/wiki/Endangered_species), and preservation of these natural resources for future generations. Environment refers to the physical ecosystems, but can also take into consideration the social dimension (like health and quality of life) and an economic dimension (resource management and inter-temporal production decisions). Policy can be defined as a "course of action or principle adopted or proposed by a government, party, business, or individual".Thus, environmental policy focuses on problems arising from [human impact on the environment](https://en.wikipedia.org/wiki/Human_impact_on_the_environment), which counter responds onto human society by having a negative impact.

Environmental policies are needed because environmental values are usually not considered in organizational [decision making](https://www.britannica.com/topic/decision-making). There are two main reasons for that omission. First, environmental effects are [economic externalities](https://www.britannica.com/topic/market-failure#ref307835) of production and consumption systems. Polluters do not usually bear the consequences of their actions; the negative effects most often occur elsewhere or in the future. Second, natural resources are almost always under-priced because they are often assumed to have [infinite](https://www.merriam-webster.com/dictionary/infinite) availability. Together, those factors result in “the [tragedy of the commons](https://www.britannica.com/science/tragedy-of-the-commons).” The pool of natural resources can be considered as a commons that everyone can use to their own benefit. For an individual, it is rational to use a common resource without considering its limitations, but that self-interested behaviour will lead to the depletion of the shared limited resource and that is not in anyone’s interest. Individuals do so nevertheless because they reap the benefits in the short term, but the [community](https://www.merriam-webster.com/dictionary/community) pays the costs of depletion in the long term. An action of a firm/individual will have external effects on other firms/individuals. An example of an externality is when a factory produces waste [pollution](https://en.wikipedia.org/wiki/Water_pollution) which may be dumped into a river, ultimately contaminating water. The cost of such action is paid by society-at-large, when they must clean the water before drinking it and is external to the costs of the factory.

The principal driver of environmental degradation is a misalignment of perspectives. Individuals, firms, and governments make choices based on the costs that they will incur and the benefits they are expected to reap, but generally ignore the consequences of those decisions on others outside of their decision making purview. These externalities can be experienced across a wide range of geographic scales, from impacts that are quite localised to those that span the globe. Intertemporal externalities are also important – when actions today have long-lived impacts, such as the release of greenhouse gas emissions and over-exploitation of mineral resources, impacts may be felt across generations. The key point is that all actors within the economy, are unlikely to undertake decisions that completely attend to these externalities, leading to excessive levels of environmental degradation. The rationale for governmental involvement in the environment is [market failure](https://en.wikipedia.org/wiki/Market_failure) in the form of forces beyond the control of one person, including the [free rider problem](https://en.wikipedia.org/wiki/Free_rider_problem) and the [tragedy of the commons](https://en.wikipedia.org/wiki/Tragedy_of_the_commons). The “free rider” problem is when the private marginal cost of taking action to protect the environment is greater than the private marginal benefit, but the social marginal cost is less than the social marginal benefit. The “tragedy of the commons” is the problem that, because no one person owns the commons, each individual has an incentive to utilize common resources as much as possible. Without governmental involvement, the commons is overused. Since incentives for individuals to use the commons sustainably are weak, government has a role in the protection of the commons.

While many approaches can be taken to address these market failures they all share the same objective. They encourage decisions that are socially optimal, such that they weigh both the private and external costs against the private and external benefits of any action. The principal forms of non-price policy instruments used for environmental protection are mandates and bans. Mandates require that individuals or firms adopt a particular technology or production process to decrease the negative externalities produced from individual or firm activity. Standards require that firms or individuals maintain levels of a harmful good below a certain level. Bans prevent firms or individuals from using a certain good or production process. In each of these cases, non-compliance with the regulation leads to civil or criminal punishments of varying severity. Mandates and bans can occur at all levels of governance ranging from municipalities placing restrictions on local industrial pollutants to global agreements banning or restricting harmful activities.

Price-based policies for environmental protection also take two primary forms: taxes/subsidies or a cap-and-trade system. Taxes and subsidies offer the most straightforward approach to price these externalities. Taxes are imposed on activities that cause external damages; since firms (or individuals) now bear those costs directly, they have strong incentives to reduce environmental harms. For example, a carbon tax would encourage firms to take into account the external damages caused by carbon emissions when making investment decisions. Subsidies work similarly but in the opposite direction. Payments are offered for actions that create external benefits –payments for ecosystem services are prominent example – to encourage the relevant actors to engage in more of that behaviour. Such incentives can play an important role in boosting innovation and in the dispersion and adoption of [innovations](https://www.merriam-webster.com/dictionary/innovations). The key feature of price-based policies is that externalities can be internalised by forcing decision making entities to bear the full costs of their actions but a potential drawback of financial incentives is that they distort the market. If taxes/ subsidies are set optimally, such that they precisely correspond to the external harm/benefit, the externality will be fully internalised and regulated actors will only engage in actions where the social benefits exceed the social costs. Moreover firms now incorporate the environmental costs and benefits of their actions into their decision making since the tax/subsidy transforms them into an explicit item on their business records.

An alternative mechanism to adjust the price of an externality-producing good is to set up a cap-and-trade system. Under a cap-and-trade system, the policymaker creates permits that allow firms (or individuals) to engage in some harmful activity (i.e. creating pollution, chopping down a forest, etc.). The total number of permits is called the “cap” (or quota), and it establishes the maximum amount of the harmful activity that is allowed. The policymaker assigns (or auctions off) these permits to firms, which then have the ability to trade with one another on the open market. Under trading, the reductions implied by the cap are met in the most efficient way possible, with low-cost abatement firms shouldering more of the responsibility (in exchange for payments from high-cost abatement firms). If designed optimally, the market clearing price of those permits, like the optimal tax, will correspond precisely to the external damages caused by the harmful activity. While both tax and cap-and-trade systems can be used to re-align incentives and improve environmental quality, it is important to note their differences when the costs of protection are uncertain. Cap-and-trade systems fix the level of environmental harm so that all of the uncertainty is propagated through permit prices. Tax systems fix the price of environmental harm so that all of the uncertainty is propagated through pollution levels. The consequences of those uncertainties will differ across economic and regulatory settings and should serve as a useful guide for selecting between these two strategies.