IWRM Action Hub

IWRM TOOL - C4.03

Tradable Pollution Permits

Summary

Ensuring good water quality is an essential step towards water security. Consequently, pollution control is a big part of water resource management. A market-based instrument to deal with water pollution are tradable pollution permits. This Tool introduces basic concepts related to tradable water permits, discusses the enabling conditions and barriers for its adoption, and presents recommendations for implementation based on practical experience.

What are Tradable Water Permits?

Under a tradable permits system, “the government establishes an overall level of allowable pollution and then allots this in the form of permits among firms. Firms that keep their emissions below the allotted level may sell or lease their surplus permits to other firms or use them to offset excess emissions in other parts of their own facilities” (Stavins and Whitehead, 1992, 192). The point of this is that polluting firms and public agencies differ in their ability to abate their pollution – some can do it easily and cheaply, for others it would be more difficult and costly. Consequently, tradable pollution permits can be a cost-effective way to achieve a reduction in overall pollution.

The freedom to trade pollution “entitlements” gives an incentive for polluters to consider abatement (since they can sell their surplus quotas) while others face the cost of having to purchase permits. For society, the existence of tradeable permits enables pollution abatement to be achieved in the least costly manner. Over time, pollution standards can be tightened, increasing the value of the permits and the pressure on market participants. Credits are traded within defined trading areas.

Water Tradable Pollution Permits (WTPP) can be organised under two different systems (Stavins,

2003):

- **Credit programmes**: Credits to pollute are assigned when a firm reduces emissions below the level required by the government; these credits can enable the same or another firm to meet its control target.
- **Cap-and-Trade systems**: an allowable overall level of pollution is established and allocated by the government (through free distribution or through sale) among firms in the form of permits, which can be freely exchanged among sources.

Enabling Conditions and Barriers for Adopting WTPP

Applicability of WTPP depends upon both the specific environmental problem being addressed and the particular objectives of the public policy. Nonetheless, research on study cases of WTPP in USA (Fisher-Vanden and Olmstead, 2013) has identified five necessary conditions to make this instrument to succeed:

1. The pollutant is uniformly mixed to avoid the potential for hot spots
2. The pollutant can be easily measured and monitored, allowing enforcement to be effective at deterring noncompliance.
3. Sources have significant cost differentials so that the potential gains from trade are large
4. The number of polluting sources is large enough and the regulatory driver stringent enough to generate sufficient trading volume
5. There is flexibility in when, where, and how reductions and trades are made.

On the other hand, an important practical problem of using WTPP is the degree of complexity to establish pollution source limits (Kraemer, Kampa, Interwies, 2004):

- Water can be polluted by a number of substances (or classes of substances), which have very distinct effects on water-based ecosystems.
- The presence of two or more pollutants at the same time can lead to synergies, both positive and negative.
- Most sources of pollution contribute more than one substance that is dangerous to the water environment.
- The precise location of a discharge that determines the environmental consequences

WTPP vs Pollution Charges

While both share a common objective, there are several key differences between WTPP and pollution charges. Table 1 summarises key areas of divergence between WTPP and pollution charges which helps in the process of identifying which one would be most appropriate based on the circumstances.

Table 1: Key Differences between WTPP and Pollution Charges. Source: Stavins and Whitehead, (1992)

Issue	Tradeable Permit Systems	Pollution charges
Permits fix the level of pollution control while charges fix the marginal costs of pollution control	Policy makers determine how much total pollution can occur (through the issuance of permits), but they cannot set bounds on expenditures for pollution control. This strategy could be particularly appropriate for environmental problems with tight margins of error or with marginal costs of control that do not rise dramatically with increasing regulatory stringency.	Charge systems control the maximum amount that a firm may pay for each increment of emissions, but do not dictate with certainty how much control will actually occur. Such a tactic may be more suitable where the margin of error on damages is not tight, but the potential industrial impacts of "over-control" are especially great. This could occur, for example, where small increases in control costs lead to very large swings in production and employment.
In the presence of technological change and without additional government intervention, permits freeze the level of pollution control while charges increase it.	Technological improvement will lower pollution-control costs and permit prices, rather than emissions levels, unless the government intervenes.	Technological change will both lower total pollution-control costs and increase levels of control. Although firms will choose to control more emissions and pay less taxes, this can be offset by the expanded production that results from lower operating costs.
With permits, resource transfers are private-to-private while they are private-to-public with pollution charges.	Firms choosing to emit pollution beyond their initial permitted level must make payments to other firms who agree to control more than their initial share. For those who believe that the private sector can utilize these resources more effectively, permits offer an advantage over charges.	Payments for uncontrolled emissions flow to government. Alternately, the government can earmark the revenue from charges for environmental investments, deficit reduction, or reductions in distortionary taxes.
While both charges and permits impose costs on industry and consumers, charge systems make the costs more explicit to both groups.	Both charges and permits force firms to internalize the costs of their pollution, either through expenditures on pollution controls or through cash payments (buying permits or paying charges).	Charge systems make these costs very visible both to industry and the public. While this may be problematic for short-term political reasons, it may ultimately be advantageous in that it can educate the public about the costs and trade-offs associated with various levels of environmental control.

Issue	Tradeable Permit Systems	Pollution charges
Permits adjust automatically for inflation, while charges do not.	Because a permit system's "currency" is emission rights, price movements in the overall economy will not affect levels of emissions control.	Inflation would reduce the taxes in real terms. Firms would therefore control less. An obvious way to resolve this problem would be to link the charge rate to some price index.
High transaction costs (e.g., costs associated with identifying willing buyers and sellers of permits or costs of tax collection) can drive up the total costs of compliance, having a negative effect under either system.	Transaction costs can decrease the amount of trading that will occur in a marketable-permit system	Transaction costs can decrease the amount of pollution control that will be achieved with a charge system.
Permit systems may be more susceptible to "strategic" behavior	If any one firm controls a significant share of the total number of permits, its activities may influence permit prices. Although no magic cut-off point exists, it is unlikely that firms could engage in price-setting behavior if they controlled less than 10% of the market. If other firms present credible threats of entry to the market, it is less likely that anticompetitive behavior can thrive.	

Practical Experiences with WTPP

There are several WTPP schemes that have been already implemented, including:

- **Nutrient Cap Management and Trading in Maryland's Chesapeake Bay Watershed, United States**: where farmers can produce credits in the trading system by installing riparian buffers or covering crops (Maryland Department of Agriculture, 2020). To qualify as credits, these practices must be certified and inspected by appropriate authorities. Certified users that want to trade are able to access a data information portal to support their trading decisions (Maryland Department of Agriculture, 2020)
- **Cap-and trade system to reduce nitrogen pollution in Lake Taup, New Zealand**: As a measure of success, the WTPP system limited the nitrogen leaving agricultural land, up to the point that a decade later allowed to retire permanently 20% of the original nitrogen discharge allowances (Waikato Region, 2013; OECD, 2017).
- **Hunter River Salinity Trading Scheme, Australia**: a permit scheme for coal mining and power companies to discharge salty water. The river is divided into blocks with specific thresholds based on the flows of the river and salt concentration (Environment New South Wales, 2006).

Key Considerations and Lessons Learned

Here are some of the key considerations and lessons learned to keep in mind in the process of designing and implementing WTPP:

- There is a need for a mechanism for initial allocation of rights (whether for water or pollution discharges) which should be seen to be fair and be equitable and effective. Initial prices can be set by governments or determined through public auctions.
- The decision on how long permits are valid is important, if ever governments want to change the price for a pollution unit. If permits are valid indefinitely, companies can “bank” unused pollution certificates which means that later price corrections will be less effective.
- In order to be effective, monitoring systems need to be put in place to keep track of the pollution discharges of companies and/or other users so their actual discharge can be determined, and fines imposed if companies surpass the pollution levels allotted through their permits.
- A system that relies on pollution permits as opposed to mandatory pollution cuts or limits set by the government allows companies that are wealthy enough to keep polluting.
- It is also possible to set up a system in which credits are not just sold or given out, but also generated through environmental services or water treatment, e.g., Maryland Nutrient Trading System.

Thematic Tagging
Private Sector , Water services

Source URL: https://www.iwrmactionhub.org/learn/iwrm-tools/tradable-pollution-permits