

**Land Value Taxation and Eco-taxation:
Their Social and Economic Inter-relationship**

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in collaboration with
John Corkindale and James Robertson

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Abstract

This Report is a preliminary exploration of the inter-relationship between two forms of taxation: the long established land value taxation and the recently emerging eco-taxation. The exploration starts with comparing the distinct nature of the two forms (Sec 1 and Sec 2) and then the link between them (Sec 3) and the possible application of LVT to supplement eco-taxation (Sec 4).

Having explored the nature and linkage between the two forms of taxation we then switch direction in the remaining part of the Report. The switch stems from our view that future work to be undertaken would benefit from placing land value taxation and eco-taxation in a broader context. This is their contribution to the fundamental issue with which the world is concerned, namely the relationship between Nature on the one hand and man's institutions affecting Nature on the other, in the context of the concern of the human population on Planet Earth to sustain the quality of life of that population, both in the contemporary generations and also in the future.

This global exploration is sketched out in Diagram 1 in a provisional conceptual holistic model (Sec 5). We do not then further explore Nature itself but instead man's institutions, which provide the human impact on the planet's environment and natural resources. For this, in turn, we therefore explore the three components of these institutions shown in the model, namely land ownership and occupation (Sec 6), government planning, management and regulation as a basis for Government intervention in socio-economic activities in order to achieve better sustainability for current and future generations (Sec 7) and major shifts in the categories of Government taxation from the economically productive to the economically and socially disruptive. (Sec 8). In brief this shows how the on-going pressures to divert taxation from productive resources which create wealth to the damaging activities which destroy the wealth embodied in Nature, in particular natural resources, energy and the environment. In introducing this aspect the discussion introduces once more, within the context of taxation, the relationship between LVT and eco-taxation.

Since it is now accepted that the moves towards improved sustainability require international agreement and action (as evidenced at the World Conferences in Rio and Kyoto) there needs to be some vision of an international strategy for world-wide natural resource management (Sec 9) within which there also needs to be an extended concept of the *traditional land policy* of the Lincoln Institute towards a land policy for *natural resource management* (Sec 10).

Finally we set out a proposed Terms of Reference for a study in greater depth (Sec 11). For this we visualise using as a basis the exploration in the present report.

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Land Value Taxation and Eco-taxation: Their Social and Economic Inter-relationship

1. Comparing Origins of LVT and Eco-taxation

Land Value Taxation (LVT) is a means of shifting part of property taxes from land and buildings in combination onto land values alone. “for the benefit of the community.” Given this interest, LVT can be coupled with other types of exactions. From their previous analysis of the UK, Lichfield and Connellan (2000) have identified two other types of taxation that could have a similar impact on land values, viz value capture (betterment) and infrastructure recovery.

It is the first form of LVT, which targets the landowner and could be used for garnering revenue for meeting Government expenditures that we consider, is most appropriate for this Report. The advantage of this form of LVT is that it is a continuing tax that runs from year to year, on a quasi-rental basis, unlike the two other forms which are occasioned upon a particular event, such as an act of development or a disposal transaction. By contrast, eco-taxes are taxes on the use of energy and other natural resources, including the capacity of the environment to absorb pollution and waste (Robertson 1998:8)

The two kinds of taxation have quite different origins. Land value taxation has a long history in economic and political theory (Prest 1981) but even so, its application around the world is comparatively rare in practice. As Andelson (1997:8) comments:

there is a paucity of hard empirical evidence for its success in practice. Yet the evidence that does exist is consistent and its cumulative weight, if not entirely conclusive is, at the very least, impressive.

As to Britain, the efforts towards the application of specific land value taxes per se over the 20th Century have been powerful indeed but so far without sustained success (Lichfield and Connellan 1997: Chapter I.5), although income from the ownership of land arising in the form of rent is subject to income or corporation tax in general.

Eco-taxation on the other hand is a comparatively recent. a feature of the last half century, in tune with the upsurge in awareness of the threat to the planet earth of pollution and resource depletion. However, whilst this awareness, which has led to a huge proliferation in eco-taxes and economic instruments, is comparatively recent, the need for them emerged initially in the beginning of the 19th Century with the first industrial revolution on the planet, which took place in Britain in the 18th Century, with its ghastly depredations on the environment.

There is no need in this Report to take on a detailed description of Land Value Taxation and its implications, for the topic has been very well illuminated over the last century

since Henry George's seminal writings and activities (George 1879). By contrast there is less background information on eco-taxes although some exploration does exist (O'Riordan 1997). There is by now (OECD 1994) an impressive amount of information on the nature and distribution of such measures for the 28 OECD countries. They comprise economic instruments (other than eco-taxes) that are currently in place for the purpose of pollution control; and economic instruments (including eco-taxes) that are currently in place for the purpose of natural resource management. Not only is there considerable variety in these measures but the distribution is not at all uniform as between the countries.

Eco-tax here follows the definition used by the European Commission (ATW Research, 1996), namely, that it is based on a physical unit (or proxy for it) of something that has proven specific negative impact on the environment. It can be a tax (unrequited payments to government) or a charge (requited payments for which a service is provided by some public body generally in proportion to payment made). Economic and financial instruments are designed to modify market behaviour with a view to achieving Government objectives (DoE 1993).

2. Comparing the Subject Matter of the Two Taxations

Any taxation measure must have full regard to the subject matter to which it is applied. Here lies another major difference in the two kinds of taxation; namely that land value taxation is assessed on land as *terra firma*, and eco-taxation on *Nature as a whole* including land.

Land as Terra Firma

Even when *land* has the restricted connotation of *terra firma* its uniqueness is taken as commonplace, in the sense of being significantly different from other economic resources (Lichfield and Drabkin 1980: 12-13 and Gaffney 1994). And just because it is unique in this way it attracts policies whose content is also unique.

For one thing, the land resource is the platform of all human activities which, the telling exceptions apart (e.g. air, sea, space travel), can barely exist otherwise. For another it is God-given or a gift of Nature, and its original qualities are available to man without the use of man-made resources, albeit these are usually needed for man's actual use of these qualities. From this flows a third feature, its unique qualities as a factor of production compared with others: it is fixed in location, immovable, incapable of expansion of supply with only minor exceptions such as reclamation. Then it has a special place in society in that, for example, no state can be said to be independent which does not have control over its own land, and no individual can be said to be independent who does not have freedom of access to a part of that land. It is over possession of land which people have fought for centuries.

Because of this special place in society it is difficult for government to grant an individual absolute ownership of any portion of the land as against the rest of society, as he might have in a motor-car, television set, and so on. It is generally accepted that the individual use of terra firma needs to be subservient to some overriding control, as for example by the tribal chief, nation state law, federal government or international agreement.

Land as Nature

This uniqueness can certainly be attached to the concept as land of Nature, but even more so. There are several reasons:

- One concept teaches us that the planet Earth must be conceived as a living entity. It sees the earth as '*a single physical system, one that is alive to the extent that like other living organisms, its chemistry and temperature are self regulated as a state favourable for life*' (Lovelock 1991).
- Just because repercussions in one part of the globe can have reactions in another, all mankind is inter-dependent in relation to the physical tangible reality which is planet Earth. The destruction of jungles in South America can destroy a vital lung for the whole of mankind, and the quixotic behaviour of El Nino can cause climate changes on the other side of the world.
- This interdependence is experienced in that mankind as a whole is contributing to the penetration of the ozone layer through its environmental pollution, and so giving rise to global warming, possibly tending to give rise to world-wide inundation of low lying land through rises in sea level.

This world-wide interdependence is now reflected in the globalisation of socio-economic activity, which is being facilitated through the dramatic increase in electronic communication, with trading markets, financial currencies and international trade being seen through globalised spectacles. This is pushing towards the concepts of international government, as seen in Europe's, growing from the simple post-war concepts of freer trade, to at least a broad agreement on issues overriding the interests of states, and possibly beyond to Federal Europe.

Bringing the above to bear on our concerns in this Report means that the recoupment for the community of some element in the development value of land must be extended to the wider concept of Nature. For example, development of land as *terra firma* creates wealth on the land but in the process can destroy Nature, as for example in the externality of environmental pollution. How then can economic instruments be used in the situation where socio-economic activity on *terra firma* are seen not simply in the growth in development value which can be taxed, but in the generation of activities which together produce environmental pollution and natural resource depletion which needs to be checked.

3. Link between LVT and Eco-taxes

Despite the significant differences between the two kinds of tax there appears nonetheless to be links between them. A general overriding reason has been introduced by Robertson (1998, 1999) in emphasising that:

Policy makers should seriously examine the potential of the site-value tax, as a resource tax which will contribute to economically efficient, social equitable, and environmentally sustainable developments.

Robertson's reasons for doing so, which reflect the views of many others, are amplified below (Sec 8) within the general argument for a "tax shift" from "enterprise and employment onto resources including land, energy and the capacity of the environment to absorb pollution."

Given this, our aim is to explore further the nature of the link in order to see the mutual relationship of the two, more precisely whether Land Value Taxation can aid Eco-taxation and vice versa. The exploration in this Report is in principle and speculative. From this opening up of the subject, we set out a Terms of Reference (Sec 11) for "study" which will enter into the topic in greater depth.

4. Possible Application of LVT to Supplement Eco-taxation

Because of the links just described between LVT and eco-taxes, one point of particular interest for the purpose of this Report is this. In LVT it is the land as *terra firma*, which is taxed, and the possibility of levying the tax is reasonably straightforward, as evidenced by practice around the world (Andelson 1977). It is possible, for example, to identify the owner and also the occupier, and to organise therefore the mode of assessment the distribution of the tax between owner and occupier, and the method of collection. In the case of eco-taxes this is not at all so clear. Thus in relation to the link between LVT and eco-taxes it is important, if we are to explore the possibilities of LVT aiding eco-taxation, that the pre-conditions for so doing are considered. Some of the criteria, or canons of taxation, could be:

- The socio-economic activity to be taxed should, like land, be physically identifiable. This is hardly the case with fauna such as the marine life in the oceans, or the fish in the rivers, or the air and sun.
- The land in question must be capable of being *appropriated*, that is made the property of an owner, private and public to whom the tax demand is addressed. This clearly applies to terra firma, but not to minerals on the seabed since there is no exclusive owner. To meet the situation under the sea, governments have resorted to international agreement on the use and exploration of resources, which are not, appropriated such as oil or minerals under the sea, and the specification of radio waves in the air.

- Whatever the ownership of the resource to be taxed, there needs to be a *rental surplus* in the value of the resource over and above the cost of operation, or otherwise there could be no prospects of tax receipts.
- Linked to the identification and appropriation there needs to be the possibility of *collecting the tax* from the owner or occupier/operator.
- Thus where, following the Eurostat definition, there is a “physical unit (or proxy for it) of something that has proven specific negative impact on the environment” it might be possible to use LVT as a means of taxation to aid the general thrust of the eco-taxation.

In summary, in order to consider whether LVT might be practicable to supplement eco-taxation, it is necessary to apply the canons just described. It is also necessary to understand the incidence on the various parties involved in order to be able to direct the LVT to the appropriate party in the chain. The difficulties of so doing are brought out in Annexe 2, for three economic instruments in the UK, showing their complexity. Since the taxes and instruments are so varied we visualise the need for study in greater depth on this issue in the next stage

5. A Possible Holistic Model for Man’s Impact on Nature

From the preceding it is apparent that in what might be considered a narrowly conceived topic there are many ramifications. On the one side there is *Nature*, and on the other the impact of man on Nature. In this we do not so much consider his activities (e.g. clearing tropical forests) as the way he organises his activities via his institutions (e.g. laws, government, taxation) for these are the framework for more activities. This suggests that the exploration of the relationship in this Report, and in detail later, will benefit from some conceptual model which brings together the ramifications just mentioned, so as to provide a possible framework for the exploration. Such a tentative framework is given in Diagram 1 below. It is tentative and schematic at this stage and omits directional arrows.

At the top are the two elements, which are fundamental to the whole process, namely Planet Earth and its human population. Then the framework divides into two: Nature on the left and man’s institutions, which have an impact on Nature, on the right. This is not man per se but the way he organises his activities via his institutions (e.g. laws, government, taxation)

On the left, Nature is divided into terra firma, non terra firma and the natural environment. These are the platforms for the activities of man and the other animals, be they direct on the terra firma and non terra firma, or indirect from these activities, namely as externalities (Pigou 1932).

On the right is presented a picture of the relevant institutions of man which have their bearings on planet earth, confined in scope to the topic of this report. The influence can be concurrently both beneficial (production, consumption, exchange and transportation) and adverse (pollution and depletion of natural resources). They come in three headings:

The ownership and occupation of terra firma and nature, in various categories: none at all, proprietary or in common. Then comes the influence of government in terms of its planning and management, by regulation or economic instruments or both. Finally comes the influence of government taxation on socio-economic activities, property or pollution.

This simple framework would enable any particular aspect of man's institutions, which are studied, to be seen in relation to Nature in the round, as described on the left. For example, the form of ownership and occupation of terra firma in itself has repercussions on man's activities on Nature. For example, any proprietary interest in terra firma or Nature necessarily results in a market economy, where the exploitation of Nature is being dominated by the *private* benefits and costs of the owner or occupier, and not necessarily by the resulting externalities. Equally well, on the thesis of Garrett Hardin (1968) land held in common could result in depredation associated with the absence of proprietary ownership, just because it is in the common interest to exploit, and no-one has the proprietary responsibility to avoid the depredation. But, as Hardin (1991) later argued, this tendency could be overcome by agreed management of the commons; indeed he argued that his earlier Paper should have been called "The Tragedy of the Unmanaged Commons" (p.78). This management role is in practice taken over, in part at least, by government planning, management and regulation of man's activities on land. And finally, government taxation of human activities will fundamentally affect man's activities and thereby his impact on the planet.

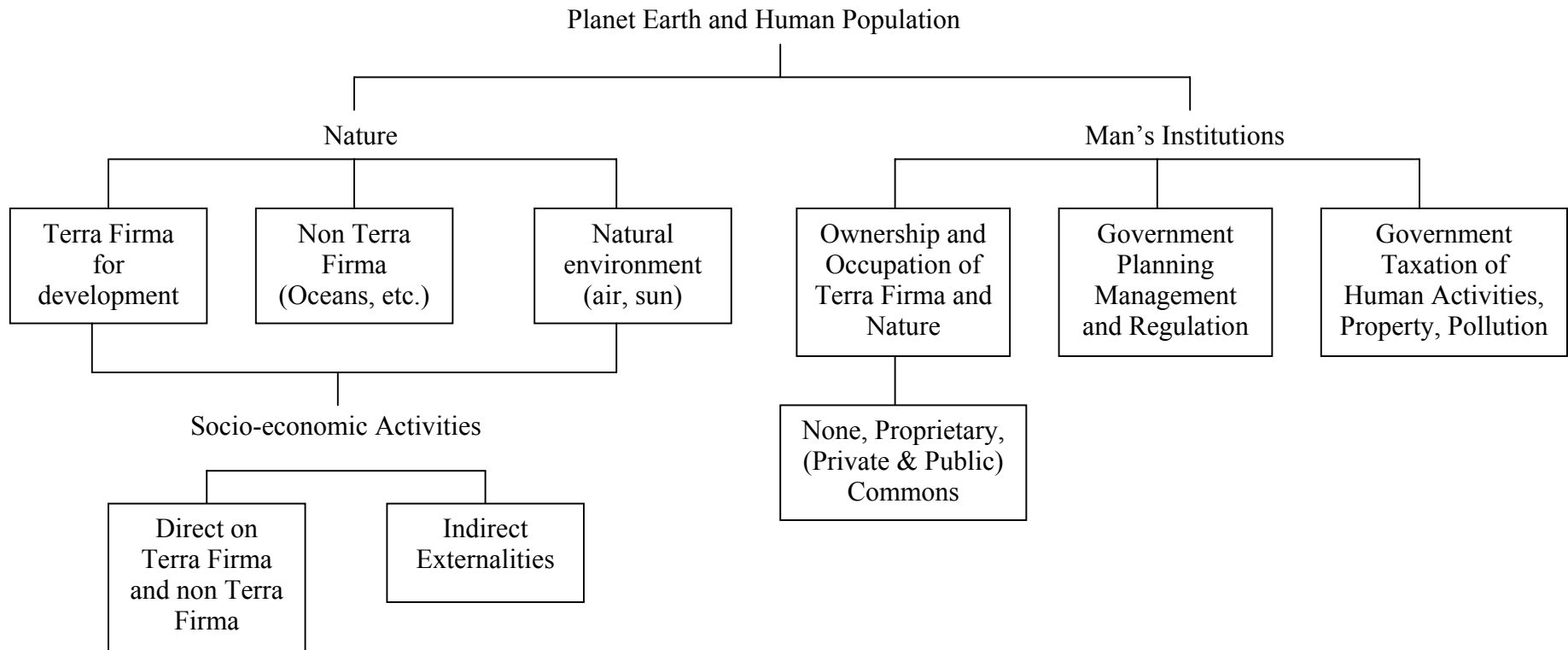


Diagram 1: Tentative framework for man's exploitation of Planet Earth.

Clearly the framework can only be tentative and exploratory at this stage. We visualise it being refined and used as a tool in the follow-up of this study. In the meantime, we go on to use it for initial exploration in this Report on the three themes just described.

6. Control over Land Ownership and Occupation

It is sobering to think that the environmental pollution and resource depletion by humans of Planet Earth, of the kind which concerns us so greatly today, is of so very, very recent origin in the life of the planet. This has been in existence in a form usable by its fauna and flora for some 5 billion years, and was occupied by the hominid ancestors of man for 70 billion years before the arrival of modern man (*homo erectus* and *sapiens* some 2.5 million years ago). But for most of his existence over this time Man was a nomad concerned with hunting and gathering, and could do little damage to the planet because he was moderate in number and lived at the low densities, required for hunting and gathering and family agriculture (Encyclopaedia Britannica 1974)). It was only at the end of this period, some 10,000-12,000 years ago, that Man was able to generate sufficient surpluses from agriculture to facilitate the specialisation of labour and activity which led to towns. Starting with Jericho towns were built in the Far East, Middle East and Europe.

But even then the problems of environmental pollution and resource depletion were on a modest scale, except perhaps in local circumstances. The big change took place with the Industrial Revolution which began in England around the middle of the 18th Century only some 250 years ago, and then for a complex of reasons which have recently been explored on the “scraggy” little rain swept island off the coast of mainland Europe..... when so many other parts of the world looked more promising” (Dugan and Dugan 2000). At that time the world population was some 700 million people but that was soon to grow under the influence of Empires (the initial globalisation), urban growth associated with the depopulation of rural areas, and exports and imports. It was then that the environmental pollution and resource depletion began in earnest in those places where the Industrial Revolution took hold. And under these influences the world human population grew to reach some 6 billion people by the year 2000 and is estimated to rise to some 9 billion in the next fifty or so years, as the Third World follows the pattern of evolution in the First World in urbanisation and industrialisation (Encyclopaedia Britannica, op cit).

Within this growth the degree of urbanisation in itself grows, both in proportion of total population and size of cities, as people inevitably leave rural areas, pushed by the increasing efficiency in agriculture which requires fewer people per acre and pulled by the growing towns which promise “pavements of gold” to those leaving the land. But this urbanisation is not just a change in utilisation from rural to urban pursuits. The towns and cities as they expand are no longer the traditional towns requiring agricultural support from the surrounding area but set up enormous demands on resources on those areas and abroad in terms of energy, waste, water, sewerage, natural environment. As such they have been termed “parasites” (Girardet 1992).

It is the cumulative pressures on Planet Earth of the kinds just described which during the 20th Century had caused the alarm bells to ring, initially with rural erosion in the United States at the beginning of the Century, with pollution and resource depletion in the middle of the Century (Club of Rome 1950; UN Stockholm Conference 1972) and in the latter part of the Century the realisation that the pollution could lead to the penetration of the ozone layers and global warming, as a precursor of natural disasters.

Thus Man in the short space of the recent 250 years has led mankind to potential disaster. The process of economic development and growth which has been so rampant over the last 250 years has been made possible by the change in the socio-economic system to market driven capitalism, which the industrial revolution found it necessary to embrace, following the feudal era of the Middle Ages following the influence of the Roman Empire before that.

This kind of capitalism required a change in the way in which the ownership of land and property was until then visualised. This was quite different from the centuries preceding. Initially there was tribal ownership the nature of which can still be seen in contemporary times in, for example, New Zealand (Maoris), Australia (Aboriginals) and Northern America (Indian). Title was in the tribal memory of the original peoples of the land without written title, so that the contrast with contemporary law becomes very striking (e.g. for Canada Raybould, T (1997)). Following this the principles of land and property ownership went through many kinds of transformation, to reflect evolving societies, including the mode of appropriating the rental values. In this, absolute private ownership was established early, perhaps in biblical times (Richards 1991). But the nature of the ownership went through many kinds of transformation, to reflect changing societies, including the mode of appropriating the rental value (Hudson 1994). For example, whereas under the Roman Empire rent from land was used to generate public revenue (Hudson 1997), in the following medieval times it was associated with feudal service to the lord, and not subject to direct exchange between property owners (Jupp 1997). These changing practises have been chronicled for England from pre-history to the Middle Ages, (Denman 1958). And it is only after medieval times that the market driven capitalist system, which was an essential concomitant of the Industrial Revolution, required land to be made a commodity and was therefore subject to the freedom of exchange in accordance with market rules, as with other commodities. It is this which is at the heart of our contemporary problems relating to natural resource depletions and pollution of the environment.

With this perspective the question arises: given that the serious damage to the Planet Earth from Man is so comparatively recent, and associated with the manifestations of capitalist free markets, can society regulate those markets, not so much for any ideological or political reason, but for a necessity of coping with the resultant dangers to the Planet.

This question has been the subject of interest, speculation and proposals over the 20th century. It was early in this century that government began to take to itself measures to regulate the land market by control over the environment in the public interest. Its tools were planning, management and regulation aimed at controlling development on the earth's surfaces under the banner of urban and regional planning, and the protection of Nature and

its resources under the banner of the environment (Ashworth 1954; Ward and Dubois 1972). This gives us the focus and basis for discussion of our next section.

7. Government Planning, Management and Regulations: The Basis for and Means of Intervention in Socio-Economic Activities

Overview

As just indicated, it is the activities of people in production, distribution/transportation and consumption on planet earth which gives rise to the fundamental problems which we are concerned. On the one hand people must engage in these activities to exercise their human condition; and on the other it is the very activities which need the use of natural resources on planet earth and thereby bring about the deprivation and pollution which gives rise to environmental concerns. It is these activities which can be summarised briefly as the operations of the *market*, that interchange between the demand and supply for production exchange and consumption. And it is this market, as operated by the population of planet earth, which is taken to be both the source of wealth creation and also the source of wealth depletion via environmental and natural resource degradation

From this situation has arisen the recognition of the need for intervention by government, at central, regional and local levels, aimed at remedying the defects of market operations, which in general terms is referred to as *market failure*. There are currently two major nostrums for such failure, if we leave aside the minority who argue that no intervention is needed at all, on the proposition that the unregulated market will be able to cope (Simon 1981; Anderson and Leal 1991).

- (i) Market Based Instruments: this view stems from those who have faith in the market but recognise its imperfections, and the need to remedy them. Here, the aim is to improve the workings of the market with a view to creating the optimal condition for people, which could flow from markets which do not have the imperfections.
- (ii) Regulation: Then come those who regard *market failure* as the inherent inability of the market to provide conditions which, on some normative view, are acceptable to contemporary society. For them the even improved market based instruments can never produce the required result and they look to regulation within the system set up for urban regional planning and environmental protection, which are sometimes integrated with each other and sometimes not.

The enthusiasts for control by economic instruments initiated by Government argue that their methods are more effective and efficient in combating environmental problems than can be brought about through regulation. They see the instruments as substitutes. The more cautious would see the necessity to retain the regulations, as having the direct force of Government behind them, as a base for aiding the instruments in furtherance of the policies set up in the regulations. The mixed package then facilitates the possibility of using the

most appropriate strategy within the two kinds of measures for the particular problems at hand.

Market Based Instruments

If markets work well, the goods and services people want to buy will be produced by the suppliers able to produce those goods and services of given quality for the least cost. However, for various reasons, markets sometimes fail in this regard in not being optimal for society as a whole. Externalities are one important example of market failure. They arise where one person's actions impinge on other people's well-being in ways that are not reflected in prices, simply because such action under typical rules in the market does not reflect the costs which the actor does not have to bear, nor the benefit for which he cannot charge (Pigou 1920). Since prices in the market are a signal about the costs and scarcity of goods and services, if they do not reflect their *full* costs or benefits free markets will not deliver optimum solutions for society. If, for example, certain costs, such as the costs of environmental damage caused during the production process (e.g. loss of recreational amenity, biodiversity) are not reflected in price, the output and consumption of that good or service may not be optimal.

Many environmental impacts are examples of externalities. These often arise because no one owns, or can charge for, the resource in question. Thus, for example, in the absence of legislation to control air pollution, factories would be free to discharge pollutants such as sulphur dioxide, dust and particles, etc., into the atmosphere without having to pay to do so. This means that the wider costs, which these emissions impose on society, through the damage they cause to the environment, are not included in the price charged for the goods produced by the factory. If these costs were included, they would act as an incentive to reduce the extent of the discharge of pollutants and society as a whole would be better off, even though the costs faced by the factory would have risen.

Without government intervention, markets do not usually provide a mechanism for such external costs to be included in pricing decisions, and it is for this reason that the OECD has promoted the application of the so-called "polluter pays" or "user pays" principle whereby the cost of adhering to government sponsored environmental quality standards (EQOs) is borne by the polluting agent or user rather than by the taxpayer.

Eco-taxes can help to overcome the problem of externalities by attaching a price to using the environment or to causing environmental damage. In principle, an eco-tax would be levied on a polluting activity to reflect the extent of the externality caused by the pollution. Ideally, an eco-tax should be equal to the value of environmental damage done by the pollutant emitted. This could ensure that the extent to pollution abatement would be optimal. If the tax were lower, there would be too little expenditure on abatement: the additional environmental benefits of further abatement would exceed the costs. Similarly, if the tax were higher, the expenditure on abatement could be greater than the value of the foregone environmental benefits. In practice, it may not be possible to establish what the optimum level of pollution is, often because it is difficult to place values on the

environmental damage (Pearce et al 1992). But eco-taxes can nonetheless be used to attempt to achieve target levels of pollution in a cost-effective way.

Regulation via Urban Regional Planning and Environmental Protection

such regulation the protection and enhancement of the environment are certainly important objectives (Cullingworth and Nadin 1994). Therefore the two systems can be said to be running in parallel (DETR 1994; Wood 1999).

But the functions of each differ. The regulatory control under planning is exercised in the main at the point of change, through development in the urban and regional system. In such regulation, the future activities on the land in question are visualised, on occasions with the aid of an environmental assessment in particular projects which are likely to produce significant impacts on the environment. Control can then be employed by refusal of planning consent, or grant subject to conditions, and also by planning agreements, including planning gain/obligations. These conditions and agreements certainly look into the future, but their potential effectiveness is circumscribed in urban and regional planning law, mainly to ensure that they are reasonable.

In practice it is difficult to accurately forecast the future, at the time of considering the planning application. By contrast, the controls through environmental and fiscal measures are primarily applied to the operations which subsequently take place on the land in question (aeroplane take-off landing and flight; transport on roads; collection and disposal of land-fill). In this context the environmental controls can look further into the future, and indeed are generally capable of adjustment over time should the problems with which they are concerned demand it. But by definition they do not bite until after the point of change, when the environmental impact is introduced, although when environment controls are adjusted pragmatically over time they can act as a deterrent to future pollution.

The Constraints of Sustainability on Development

The two prime options just described for government interventions in the working of the market are essentially based on the nation state and its subsidiary local government organisations. But recent years has seen the beginnings of a federal approach for supra-national intervention, as in the European Community, and even fully international approach in particular aspects of the environment, for example, because of the international concern with global warming. It was in relation to this latter concern that the international community has been urging constraints on, and securing agreements with, the nation states under the concept of “sustainable development.” This seminal concept was explored in the World Conservation Strategy (IUCM 1980) and was then picked up by the World Commission on Environment and Development (1987) in its Brundtland Report. This not only adopted the concept from the World Conservation Strategy but also attempted to make it operational in the now famous formula that there should be constraint on economic growth in order to make development *sustainable* in that:

it meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED 1997:8).

This formulation has been endorsed as a matter of principle in the deliberations of various international bodies since Brundtland, for example at the 1992 United Nations' Conference (UNCED) in Rio de Janeiro, and also in Kyoto in 1997 International agreements policies and targets have been formulated and action initiated within the member countries down to the local level, under the title of Action 21. Thus it can now be said (Robertson 1998) that

The concept of sustainable development has been successful in promoting the idea that public policy should be concerned with improving the living standards of the people of a current generation as well as with concerning the environment for the benefit of future generations.

This context leads us to consider here the degree to which Land Value Taxation and Eco-taxation are consistent with the concept of sustainability.

It is not difficult to do so in relation to eco-taxation since this can be regarded as a natural off-spring of the UCM (1980) and WCED (1987). The primary purpose of eco-taxation is to ensure that the environment is conserved in order to ensure its availability to the future generations, even though this implies diminution of the product from contemporary development.

But it is less easy to show that Land Value Taxation in itself is sustainable in this sense. For one thing the concept was not around when Land Value Taxation was first subsequently introduced into the world through Henry George. Indeed doubts have arisen as to whether LVT as visualised by George can be seen as "green," because as practised it could stimulate development on open space which should be protected into the future, and also stimulate the premature release of farmland for development and encourage the related speculation in doing so.

The reason for this *apparent* conflict stems, in our view, from the *inherent incompatibility* between the system of Land Value Taxation which follows the market in making the assessments related to the "highest and best use" which can be obtained, and public policy which aims to regulate the market in the public interest, as for example in the of conservation of open land, natural amenities and beauty, and coastal zones.

In order to ensure compatibility between LVT and the regulation via planning etc., it is necessary to introduce the concept of the "*regulated market*." This means that the assessments of land value for LVT are based not on the unregulated market known to Henry George at the close of the 19th Century but on the *regulated market* of those countries which have subsequently introduced planning regulation and economic instruments in order to protect the environment. If this situation be the basis for the LVT assessment, then LVT must of necessity be "green" in so far as the plans and policy instruments of the locality in question are also "green." The two would run together.

Indeed, our views on this compatibility (Lichfield and Connellan 1999) go further. Land Value Taxation can be seen as an economic instrument for *aiding* the implementation of planning policy for the area in question, as the following instances will illustrate. Should there be an area which the market considers desirable for development, but is visualised by the local planning policy as green belt, or an area of landscape beauty which should not be spoiled, then the land value taxation assessment would be zero in order to avoid any stimulus to development. On the other hand, should there be an area of old, high density and insanitary dwellings which the owners retain in that condition because of their high profitability, but which policy considers should be redeveloped, then a land value tax would be levied to stimulate development. Where there is an area of architectural and historic interest, which should be conserved for the future, then again the land value taxation could be pitched at a level to avoid any stimulus towards redevelopment which would undermine the conservation area.

From the above we can now summarise the affinities between LVT and eco-taxes. Our basic assumption is that LVT could be imposed as an overall fiscal instrument and would therefore impinge on most owners (exemptions are referred to later). What then is its effect on “green issues.” If the assessments are to be “plan led” (in our parlance for a UK style planning system) then green spaces within urban areas will be assessed at their present use and any hope value for future development will not be reflected. If the assessments are left to follow market expectations (in more open planning systems) then the retention of such green spaces can be encouraged by scaled reductions in the tax bite or even exemptions. In other words, the imposition of LVT will not be used for penalising the owners of green spaces and forcing them towards the development option. This same principle of tax amelioration can be applied to areas outside the urban fringes (if LVT is to be imposed generally) where preservation of the countryside is a policy aim.

At the same time the general imposition of LVT would encourage development within urbanised areas and mitigate the tendencies towards sprawl at the urban edges with a beneficial effect on the green spaces beyond. The classic Georgist argument is that in this way the imposed taxation puts financial pressure on those owners of vacant lots and derelict properties where there is development potential. Updating the argument to address the current green issues, this brings with it the concomitant effect of lessening the pressures to expand the urban fringe.

In addition, there is the linkage between a general imposition of LVT and its affinity with Eco-taxation as can be cemented by adopting a principle that revenues garnered from such LVT could be used for the amelioration of pollution and redemption of other eco-transgressions.

Finally there is the overall point that LVT and other resource-based Eco-taxes share a fundamental principle that, in order to aim at efficient resource allocation, people should pay for what they take out of the common pot as contrasted with resources that they add to the common pot.

So in summary, the imposition of LVT in this way can be seen as being at least compatible with the armoury of green taxes and at best a widening of the concept of how we should order our institutions to serve our truly best interests.

Compatibility in Varying Planning Systems

In pursuing compatibility of this kind, different arrangements would be necessary in the different nation states. This arises because there is no standardisation in the urban and regional planning system as between the countries, and nor indeed between the LVT systems that already exists or which might be introduced. As for the planning systems, there is considerable variety in the details, as brought out by Booth (1999).

As a very broad generalisation, systems of planning throughout the developed world can be divided into two types. First, there are those that can be described as regulatory, in which current and future land uses are identified in zoning plans, to which attach more or less detailed rules for new development. Regulatory, zoning systems of this kind derive from the pioneering work, first in Germany and then in the USA, at the end of the last century. In principle, they are characterised by a scientific rationalism in the way that land uses are allocated. They are intended to provide an unambiguous basis for future development that leaves as little to the vagaries of chance as possible. They do not, again as a matter of principle, allow scope for discretionary decision making. Zoning systems and zoning control of one form or another—and in detail there are wide differences between them—account for the majority of the world's planning systems.

The second type of system can be described as discretionary, and is represented by Britain and a very small number of systems that claim a British inheritance. Seen from without, the British system is distinctly odd. For where it might be supposed that planning is primarily about removing future uncertainty over the form and location of urban development, the British system appears to introduce deliberately a blurring of the relationship between policy and implementation. The legislative source of that blurring is well known. Section 70 of the 1990 Town and Country Planning Act, in direct succession to Section 14 of the 1947 Act, requires that local planning authorities in dealing with planning applications “have regard to the development plan insofar as it is material to the application, and to any other material considerations.” The significance of this clause, as Davies (1980) and Booth (1996) have emphasised, is twofold. First, it substantially weakens the link between the plan and development control decisions, a link which is primordial in zoning systems. The development plan is potentially only one of a number of “material considerations” that will inform the eventual decision on what is built where; it may not even figure in the decision at all. The plan can, therefore, never be more than an indication of the future pattern and development, and there is no guarantee of what will or what will not be acceptable. Second, Section 70 explicitly grants decision makers wide discretion. The local planning authority is at liberty to determine what considerations are material to the decision it takes. The penalty that this system carries,

commentators such as McBride (1979) have argued, is uncertainty and delay which a more clearly defined relationship between development plan and development control would eliminate.

As to valuation assessments, zoning makes for the valuation assessments being fairly uniform and straightforward within any particular zone. By contrast, in development plans valuation assessment is more difficult to make in advance of a permit for a particular development project, thus giving rise to difficulties for the valuation assessors for the purpose of a land value taxation. But they can be overcome (Lichfield and Connellan 2000: Ch.8).

From the above it is apparent that LVT could be accused of not being “green” if applied independently of the planning policies and proposals of the authority in question. By the same token, if compatibility between the two systems is sought then the LVT can be “green.”

In addition there is another dimension where this could be claimed, namely if the income from LVT could be allocated in the interests of obtaining sustainability. Young (1993) suggests that the LVT income would be directed towards conservation. Lichfield (1999) goes further. He points out that while there is general agreement around the Brundtland formula there are numerous interpretations (Pearce 1989 Appendix) and no general agreement on how the objectives are to be achieved. As a result, there are many approaches in theory (Faucheux et al 1996). Amongst these Pearce (1989) builds up upon the concept of *constant capital*, as a basis for “non declining human well-being.” This simple formulation certainly has echoes in the topic addressed here: a need to protect the capital in natural resources and the environment as a basis for pursuing the fundamental Brundtland concept.

The problems of so doing are at the core of the international and national programmes to which we have referred. Clearly heavy endeavours will be required for the purpose over a long period. To cope with these endeavours financial resources in large quantities are going to be needed. From this basis it would appear logical that the financial resources should come not for example from general taxation, but from the transference from private consumption by land owners of the economic rent of land to the public, in accordance with Georgist principles. Furthermore, the source for the revenue can be continually expanding as the needs arise, by balancing the levels of Land Value Taxation required with the general increasing level of land values.

8. Land Value Taxes and Resource Taxes

Pressures for Restructuring the Tax System

Pressures for change in the structure of national tax systems are part of the overall context in which both land taxation and environmental taxation are likely to become more

important. In addition to specific arguments for particular changes in particular taxes, more general pressures for change are gaining support, as the existing structure of taxation becomes more widely recognised as perverse. The arguments include:

- the economic gains to be achieved by reducing distortionary taxes on business enterprise and human effort and skill;
- the economic gains to be achieved by greater efficiency in the use of natural resources (many of which are now overused), and greater efficiency in the use of human resources (which are now underemployed and underdeveloped);
- the social benefits, as well as the economic gains, of reducing unemployment by reducing the tax costs which employees and employers now both have to bear;
- the environmental benefits of taxes which will help to reduce levels of energy use, other natural resource use and pollution; and
- the economic gain of developing capacities and skills to exploit the growing world market for environmental technologies.

Towards a Tax Shift

Two important American reports are among recent publications that have discussed in depth the need and scope for a tax shift the lines just indicated. Hamond et al (1997) do not specifically include land value taxation among their recommendations, but they underline land value taxation's compatibility with them.

Reconciling healthy economic development with the protection of the air, water and natural habitats is one of the great challenges of the next century.

A revenue-neutral shift to resource taxes offers a way to help to meet this challenge. A resource tax could work somewhat like a rental or interest payment for the use of assets that are owned by all of us, ranging from the broadcast spectrum to the air we breathe. These new revenues would, by reducing other taxes that are a drag on the economy, provide a dividend—lower taxes on work and saving—to which the public is entitled.

These environmental levies would not impose a sudden charge for things that used to be available at no cost, as some people will protest; rather they would extend the effort to end “free lunches” to perhaps the biggest free lunch of all: free or low-cost use of assets owned by everyone in common.

In the other American report, Durning and Bauman (1998) give a prominent role to land value taxation as a Sprawl Tax, which it treats as one of five major types of desirable tax—

the others being Carbon Taxes, Pollution Taxes, Traffic Taxes and Resource Consumption Taxes. The following indicates the approach it supports

Most Northwest jurisdictions seek to prevent sprawl through the regulatory tools of land use planning; none applies taxes to the same task. Yet a simple reform to the existing property tax would turn it into a powerful incentive for investment in city and town centres and in adjacent neighbourhoods.

A property tax is actually two conflicting taxes rolled into one. It is a tax on the value of buildings and a tax on the value of the land under those buildings. As experience in Australia, New Zealand, Taiwan and Pennsylvania shows, shifting the tax from the former to the latter aids compact development while suppressing land speculation, promoting productive investment, and tempering housing costs, especially for the poor

With these approaches Robertson recommends that policies for a sustainable future should include eco-tax reform and site-value land taxation, among the connected parts of a larger package based on:

- the introduction of a range of taxes and charges on the use of common resources and values, including—but not limited to—energy and the site value of land; and
- the reduction, and perhaps the eventual abolition, of taxes and charges on employment, incomes, profits, value added, and capital
- less heavy tax on the incomes and profits they earn from useful work and enterprise, on the value they add, and on what they contribute to the common good; but
- heavier taxes and charges reflecting the value they subtract by their use of common resources, including land, energy and the capacity of the environment to absorb pollution and waste.

Eco-taxes are Regressive. Can Land Value Taxation Help?

If existing taxes on incomes, profits and savings are simply replaced by environmental and resource taxes imposed on consumers (i.e. at the end, rather than at the beginning of the “economic pipe”), this will hit poorer people relatively harder than richer. In fact, regardless of what taxes they replace eco-taxes are bound to have this regressive effect if they are applied “downstream” at the point of consumption. For example.

- Value added tax (VAT) on household energy has hit poorer households in the UK harder than richer ones, because poorer households do not have the money to absorb the higher cost of the tax or to invest in greater energy efficiency; and

- Similarly, fees and charges to reduce urban congestion will hurt small trades people who need to use their vehicles for their work, but will be painlessly absorbed by users of chauffeur-driven limousines.

If eco-taxes are to become a significant source of public revenue, this problem will have to be solved. Land value taxation can help.

The first point is that eco-taxes should be applied “upstream” whenever possible. Of key importance will be a tax on carbon-energy (or on fossil fuels and nuclear energy), collected at source, cascading down through the economy, and raising the cost of the energy content of all goods and services. It will reduce pollution, because pollution arises predominantly from energy-intensive activities. It will be administratively simpler and easier to understand than a proliferation of separate eco-taxes on individual consumers and polluters. And, by clearly raising costs for the extractors, producers and providers of energy and energy-intensive goods and services (as well as the prices consumers have to pay for such goods and services), salaries, dividends, pension contributions, stock options, capital appreciation, etc., they get from energy-intensive activities. It will thus be experienced as less biased against poorer people than a tax imposed directly on consumers. Even so, the impact of eco-taxes on consumers will still be regressive. It will have to be offset in other ways too.

This is where land value taxation comes in. There are obvious parallels between a tax on the site value of land (i.e. land in its unimproved state) and a tax on energy at source (i.e. energy in its unextracted state). Land and energy are essential to all economic activities. Their value, in their unimproved or unextracted state, has not been created by the efforts and skills of those who own and extract them. Requiring the owners and extractors to pay for that value when they wish to use it, makes sense.

In spite of this parallel, there is also an important difference between them. The site value tax is clearly progressive. It is not the poor but the rich who are enriched by “enclosing” the value of land. Taxing site values will not raise prices to consumers, whereas a tax on energy at source will cascade right down through the economy. This means that eco-tax reform is likely to be easier to introduce on a substantial scale, if it is part of a package that includes a site-value tax on land.

Internalisation of Costs and Collection of Economic Rent

The usual rationale given for environmental taxes has been the “Polluter Pays” principle, interpreted as meaning that those who impose costs on other people or on society (or future generations) should be required to bear those costs themselves; costs now externalised should be internalised. The principle of economic rent—the “user pays” principle that people pay society for the natural and societal resources they use—has figured comparatively little in the discussion of environmental taxes. Perhaps this is because pollution has not generally been seen as using a natural resource—the capacity of the environment to absorb pollution and waste. Once it is so seen, the question arises: Are

there significant differences of principle and practice between internalising costs and paying “rent”?

The taxation of economic rent—its collection as public revenue—can be understood as:

- the externalisation into public revenue of environmentally and socially generated benefits hitherto internalised as private income.

Seen that way it is the mirror image of:

- the internalisation into private costs of environmental and social costs hitherto externalised as public costs.

So, do internalising costs and paying for “economic rent” amount, in practice, to much the same thing? Or are there some problems in the environmental agenda that are better dealt with by one of the two approaches than the other?

The calculation of costs to be internalised is certainly fraught with difficulty. How are we to calculate the costs (extending into the far future) which are externalised by a company emitting a certain amount of a certain type of pollution in a certain place under certain conditions? Where the rights to use natural and societal resources are marketable, as for land sites or airport landing slots, the calculation of “rental” values seems straightforward. But it is not easy to calculate the right “rent” to be paid for polluting. Here again is a topic for further exploration.

9. Towards an International Strategy For Worldwide Natural Resource Management

The preceding section shows that while the growth of economic instruments and eco-taxes is flourishing and certainly making their contribution, there is considerable fragmentation of the measures themselves, and also inadequate co-ordination between them. One consequence could be inefficiency and ineffectiveness arising from the fragmentation, and there can also be internal contradiction in that particularly measures or taxes are working against others.

Thus it would appear necessary to introduce some rationalisation in the total process which could be termed a *Strategy for Environmental Protection and Co-ordination*. For example, there would need to be some machinery for predicting the impacts (physical, fiscal and economic) of each of the measures on the source of the environmental pollution and resource depletion that is creating problems (Tindale and Holtman 1996: Ch 6). And there needs to be some co-ordination amongst the agencies which are responsible for the measures and the taxes.

Thus what is apparent is the need for management of Nature as a resource, which requires co-ordination amongst many different agencies which will cover both the use and development of the natural resources and their management thereafter.

While this need is relevant for each and every nation state on the planet, that will not be sufficient. The issues, problems and constraints are global in nature, involving world collaboration across boundaries. And the solutions could be seen as part of the appraisal of the globalisation which is transforming the world: for both its opportunity and benefit and also its draw backs. The strategy that is needed here is part of the thrust for international government collaboration beyond the nation state and envisaged in the European Commission (Henderson 1999).

10. Towards a Land Policy for Natural Resource Management

Our Report of 1997 shows how the 20th century in Britain struggled with a policy for land value taxation on terra firma or space, which is yet to come to fruition. It was during this century, in particular the latter half, that land as Nature became a prime environmental concern, which has escalated rapidly towards the end of the century, particularly under the threat of global warming. Accompanying that concern, policies are beginning to emerge, including for regulation, economic instruments and eco taxation aimed at the protection and enhancement of the natural environment, for the benefit of mankind.

But compared with the land policies for terra firma, which have become rich over the decades of proposal and debate (Lichfield and Darin-Drabkin 1980), those for land as Nature are still in an uncertain and formative stage. The problems are far more complex and conclusions and proposals are emerging and evolving in an uncertain fashion. That is a challenge which we need to address (Lichfield 1983).

11. Terms of Reference for the Further Work Envisaged as Stage II

We now go on to suggest the Terms of Reference for the further work on the same topic. Since the present report was seen as a “start up” for the “further work” we find it convenient to give the Terms of Reference for the further work by reference to the start up. This is therefore now presented in relation to the section headings of the present Report.

Sections 1-2: nothing further is visualised

Section 3-4: explore further the *possibility* of extending LVT to natural resources, by amplifying the criteria or canons of taxation that would be called for. With this in mind, amplify the possible incidence of specific eco-taxes on sectors of the community with a view to elaborating the possible application of LVT to supplement eco-taxation.

Section 5: clarify and develop further the possible holistic model of man’s impact on Nature as a framework for the further study.

Section 6-8: using the start up study as a base, clarify and amplify the components of the tentative holistic model and investigate further the role of LVT and Eco-taxes in the in the context of taxation shift.

Section 9-10: explore the potential for a land policy for natural resource management.

Section 11: findings, conclusions and recommendations

All the above would be presented in the form of a consolidated Report which would embrace and subsume this Report of the start up study.

ANNEXE 1

Three Economic Instruments in the UK (Smith, 1995).

Landfill Tax

The environmental issues concerning waste disposal largely have to do with the environmental consequences of different methods of waste disposal—landfill, incineration, sea dumping, etc. Other forms of waste management besides disposal, such as recycling, may also involve pollution and amenity costs. For example, glass recycling is energy using and therefore likely to be polluting. The public authorities and private companies that collect household waste decide what disposal option to employ—landfill, incineration, or separation and recycling. Environmental problems arise because the decision-makers concerned do not face costs that reflect the full social costs (including environmental externalities) of the choices they make. In some cases decision-makers face no costs at all. Households in the UK, for example, face a zero cost for waste disposal. In other cases, whilst decision-makers may face some costs such as, for example, the charges that public authorities may have to pay to the operators of landfill sites or incinerators, these costs may not reflect the environmental costs of choosing a particular course of action because price signals may be wrong or non-existent. An efficient structure of prices would require, first, that appropriate charges or taxes were levied where environmental externalities arise, and, second, that each stage in the waste “chain” from product manufacturer to waste disposal were linked by an appropriate financial transactions.

The difficulty for policy is that it is unlikely to be practicable to levy appropriate taxes on all disposal options, or to ensure that financial incentives link all of the relevant decision-makers. Illegal disposal such as fly-tipping) remains, by definition, uncharged, and raising the costs of legal disposal options may encourage greater use of illegal ones, which in turn could have costs in terms of disamenity or environmental damage. Transmitting the financial signals may be difficult too. Even where charges for the collection of household refuse seek to provide households with an incentive to minimise waste volumes, they will rarely distinguish between different categories of waste according to their costs of disposal.

Landfill sites for waste disposal are becoming increasingly scarce, as existing sites are exhausted and as planning obstacles limit the development of new sites. This trend is forcing many industrialised countries to reappraise waste management strategies, and to reduce reliance on landfill disposal and to increase the proportions of waste reused and recovered. Where waste management is operated by government agencies and private companies paying the full market rate for the landfill facilities they use, there is no obvious need for central government to discourage the use of landfill disposal on grounds of future scarcity. Scarcity of landfill sites will be reflected in higher charges levied for their use by owners and operators, reflecting the opportunity cost of current landfill use in terms of future landfill capacity.

Government intervention in waste management is, however, needed to regulate the externalities from landfill and other waste disposal options which are not reflected in the charges levied by operators. In the UK, two components of the externalities associated with landfill sites have been identified. One is a “fixed” element, not directly related to amounts disposed, reflecting the disamenity of the site to local residents. The other is a volume-related component. The landfill tax that was announced in the 1994 Budget proposed an ad valorem tax on the charges levied by landfill operators. This was objected to on the grounds that an ad valorem tax would penalise facilities that operated to higher and more costly environmental standards. Thus an ad valorem tax would be a poor proxy for the environmental externalities that the tax should aim to internalise. As a result of these objections, the basis of the landfill levy was revised, and, when it was introduced, it was based on the weight of landfilled waste. There is, however, a strong case for recognising that different categories of waste may have different environmental implications and therefore for levying different rates of charges per ton on different categories of waste. For example, rubble and other inert construction wastes pose relatively few environmental problems when landfilled, and the appropriate charge would be much lower than for other types of waste.

In parallel with the landfill levy, provision was made for “environmental trusts” which could be financed from rebates from the landfill tax. The trusts are non-profit-making private-sector bodies engaged in the restoration of landfill sites or research into waste management. Rebates against the landfill levy are made available to landfill operators who make payments to the trusts. In effect, the landfill operators can choose whether to pay the landfill levy to government or to an environmental trust.

The landfill levy raises various issues concerning its likely efficiency and effectiveness;

- The levy is likely to have resulted in substitution away from landfill, although the extent of the substitution away from landfill towards other disposal options such as incineration is difficult to measure;
- Less desirable substituting may also be occurring; the higher cost of landfill increases the gains to be made from illegal disposal, including unlicensed landfill and export of hazardous waste;
- The landfill levy imposes substantial additional costs, in the form of tax payments, on industrial sectors that make heavy use of landfill disposal, although there is scope for offsetting tax reductions tied to the levy which could leave the overall burden of taxation on industry unchanged;
- The levy encourages substitution in disposal, but provides little or no incentive for other desirable behavioural changes, such as waste reduction through changes in product design and packaging, or greater household participation in waste separation and recycling.

Increases in the rates of excise duty on motor fuels.

In the 1995 Budget, the UK Government made a commitment, as part of its strategy to curb greenhouse gas emissions, to a steady annual increase in motor fuel duties, of 3 per cent in real terms. Higher motor fuel prices have, in principle, three main effects of relevance to environmental policy:

- The cost of each journey made would increase, and “marginal” or inessential journeys would be discouraged;
- For some owners of motor vehicles, a higher fuel price would make ownership no longer worthwhile. The number of vehicles owned would fall, as a result of fewer purchases of new vehicles and/or earlier scrapping of existing vehicles particularly “gas-guzzling” makes:
- Higher petrol prices would tend to encourage manufactures to design more fuel-efficient motor vehicles, and to encourage purchasers of new cars to choose more fuel-efficient vehicles.

The consensus in OECD countries is that changes in the price of petrol have rather little impact on petrol consumption in the short term, but that they have considerably greater significance over the longer run. The evidence suggests that a short run (one year) price elasticity is typically about - 0.2, but that, over the longer term, the figure increases to a range of - 0.5 to - 3. This econometric evidence thus provides a guide to the likely impact of policies to increase motor fuel prices on the externalities associated with fuel consumption, such as the level of greenhouse gas emissions from motoring. To the extent that these reductions in fuel consumption occur because journeys are fewer and shorter, there will also be an effect on the externalities relating to vehicle use, such as accidents and congestion.

However, higher taxation of motor fuels also has distributional effects, in terms of a differential impact on different groups in the population. Research suggests that these effects may be relatively modest across the income distribution as a whole because the density of car ownership is much lower among low-income households. The additional petrol duty therefore has a progressive incidence across income groups, in the sense of taking a higher percentage of spending from the better-off households. (This is unlike the case of increases in taxes on domestic energy which are clearly regressive in their impact.)

Nevertheless, high taxes on petrol may be unacceptable for their impact on certain groups, such as rural dwellers, for whom no alternatives to petrol consumption may be available in the short term. Such households may have a high consumption, and, unlike urban dwellers not easily be able to switch to public transport. In the longer run, of course, household location decisions provide a route by which individual households may respond to higher petrol prices; in the long run, higher petrol prices may affect the pattern of residential location, as households move to areas that support a public transport service. However, in

the shorter term, increases in petrol duty may lead to unavoidable increases in the tax burden on poorer rural households, without having any significant impact on their fuel consumption.

Water emissions charges

Polluting emissions to the water system in the UK are regulated through a system of discharge “consents”, which specify for a particular operator the maximum levels of permitted emissions. The system is operated by the Environment Agency which took over functions previously performed by the water authorities before privatisation of the water industry and then by the National Rivers authority. A system of discharge consent charges is levied by the Environment Agency (EA). Charges for the consents are intended, in the long run, to raise revenues sufficient to cover the administrative costs of the EA in administering, monitoring and enforcing the system of consents. This position is being reached gradually as existing, uncharged consents expire and are replaced by new consents. This system is based on the maximum permitted volume of effluent specified in the discharger’s consent, and varies according to the content and destination of the effluent.

The structure of the tariff is intended to reflect the costs that each discharger imposes in terms of monitoring and compliance work, rather than the pollution damage of the effluent itself. Thus the tariff rises with the size of discharge, but less than proportionately with volume, since monitoring costs do not rise proportionately. Similarly, the weightings in the charge formula for chemical content and destination reflect monitoring cost rather than relative pollution damage, although since more detailed monitoring will be appropriate for discharges of greater toxicity, there is a tendency for costs to be higher for more damaging emissions than for less damaging emissions.

It is clear that the charges levied on water pollution in the UK have the potential to have incentive effects on polluters’ decisions. However, the current structure of charges levied may not maximise the potential for environmental and economic gains from the use of economic instruments in water pollution control. The structure of charges in the UK, which have been implemented solely for the purposes of cost recovery, clearly do not conform in structure to any optimal pattern of relative incentives which might have been designed for the purpose of internalising the environmental externalities associated with water pollution. Incremental modification of the charging structure could however, greatly increase its environmental impact. Raising the general level of charges would be one aspect of this; restructuring the charges could also lead to a more efficient structure of pollution abatement incentives.

A further consideration is that the UK has yet to exploit the scope for using economic instruments to regulate non-point sources of water pollution—especially pesticide and fertiliser use. Evidence on the effectiveness of taxes used for this purpose in some EC countries is, however, sparse, and it is clear that such taxes would provide a somewhat rough-and-ready incentive, with only limited scope for differentiation according to local environmental conditions. Despite this, there may be gains from using taxes to discourage

excessive use of fertilisers and pesticides; given the impossibility of directly measuring the amounts used, regulatory policies face severe practical limitations, and may have to involve costly and onerous monitoring and policing.

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