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DEPENSES DE LUTTE CONTRE LA POLLUTION DANS LES PAYS DE L'OCDE
POLLUTION ABATEMENT AND CONTROL EXPENDITURE IN OECD COUNTRIES

ORGANISATION DE COOPERATION ET DE DEVELOPPEMENT ECONOMIQUES
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ENVIRONMENT MONOGRAPHS

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Cette série vise à permettre une plus large diffusion de certains rapports techniques établis par le Comité des politiques d'environnement et la Direction de l'Environnement. Le présent rapport sur "Les dépenses de lutte contre la pollution dans les pays de l'OCDE" est mis en diffusion générale sous la responsabilité du Secrétaire général. Des exemplaires supplémentaires de ces monographies peuvent être obtenus, sur demande, en nombre limité.

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Introduction
(English Version)

In 1989, the OECD Council meeting at Ministerial level called, inter alia, for a next generation work programme on environmental economics that would integrate environmental and economic decision-making more systematically and effectively. This was reiterated during several G-7 Economic Summits, as well as by the meeting of the OECD Environment Committee at Ministerial level in 1991.

Compliance with this request requires tools such as environmental accounting, information on environmental expenditure and the development of databases which help to integrate economic and environmental information. The 1991 Recommendation of the OECD Council on Environmental Indicators and Information, in particular, made explicit reference to work on pollution abatement and control (PAC) expenditure statistics to link environmental and economic information.

This mandate reinforced the work on pollution abatement and control expenditure that has been pursued in the OECD since the late 1970s. The first questionnaire on PAC expenditure was sent to Member countries in 1980. In 1991, the OECD Group on Economic and Environment Policy Integration approved a revised questionnaire for the 1992 OECD survey. The revised questionnaire reflected developments in and comments from Member countries and assured consistency with related activities of Eurostat and UN-ECE. Data collection was carried out in collaboration with the OECD Group on the State of the Environment. Member countries also suggested that the results of the PAC survey should be accompanied by methodological explanations and a discussion on the use and limits of PAC statistics for decision-makers.

This is the third Environment Monograph on PAC expenditure in OECD countries; the first was published in 1990 (OECD Environment Monographs No. 38) and the second in 1993 (OECD Environment Monographs No. 75).

This document consists of three parts. Part 1 deals with concepts and methodological principles that apply to the compilation of PAC expenditure data. This conceptual framework is the basis for Part 2, which deals with the definitions, use and limits of PAC expenditure data. Part 3 presents the results of the 1994 survey in two sections: first, as summary tables covering all countries and, second, in more detailed tables for individual countries. Each country table is accompanied by a note on country-specific methodology.

Introduction
(version française)

En 1989, le Conseil de l'OCDE réuni au niveau ministériel a préconisé, notamment, un programme de travail novateur sur les aspects économiques de l'environnement qui intégrerait de façon plus systématique et plus efficace les décisions dans le domaine de l'environnement et de l'économie. Cette demande a été réitérée à l'occasion de plusieurs sommets économiques du G7 et également lors de la session du Comité de l'environnement de l'OCDE au niveau ministériel en 1991.

Plus précisément, une recommandation du Conseil de l'OCDE de 1991 sur les indicateurs et les informations concernant l'environnement a fait une référence explicite aux activités statistiques relatives aux dépenses de lutte contre la pollution (LCP) comme un moyen d'associer les informations dans les domaines de l'environnement et de l'économie.

Ce mandat a renforcé les travaux sur les dépenses LCP que l'OCDE mène depuis la fin des années 1970. Le premier questionnaire relatif à ces dépenses a été envoyé aux pays Membres en 1980. En 1991, le groupe de l'OCDE sur l'intégration des politiques économiques et de l'environnement a approuvé un questionnaire révisé pour l'enquête 1992 de l'OCDE. Ce questionnaire révisé tenait compte de l'évolution et des commentaires des pays Membres, tout en étant compatible avec les activités parallèles entreprises par Eurostat et la CEE-NU. Les données ont été recueillies en coopération avec le Groupe de l'OCDE sur l'état de l'environnement. Les pays Membres de l'OCDE ont par ailleurs suggéré que les résultats de l'enquête soient accompagnés d'explications méthodologiques et d'une analyse de l'utilisation et des limites, pour les décideurs, des statistiques relatives aux dépenses LCP.

Ce document est la troisième Monographie sur l'environnement relative aux dépenses LCP dans les pays de l'OCDE. Il fait suite aux documents publiés en 1990 et 1993 (Monographies sur l'environnement N° 38 et N° 75).

Le présent document se décompose en trois parties : la première partie traite des concepts et des principes méthodologiques applicables à la compilation des statistiques relatives aux dépenses LCP. La partie 2, basée sur ce cadre conceptuel, traite traite de l'utilisation et des limites des données relatives aux dépenses LCP. La partie 3 présente, en deux sections, les résultats de l'enquête menée en 1994 : a) par des tableaux récapitulatifs regroupant les divers pays et, b) par des tableaux plus détaillés par pays. Chaque tableau par pays est accompagné d'une note méthodologique spécifique au pays propre.

Part 1
Concept and Methodology

Definition of "Pollution Abatement and Control"

In this study, pollution abatement and control (PAC) activities are defined as purposeful activities aimed directly at the prevention, reduction and elimination of pollution or nuisances arising as a residual of production processes or the consumption of goods and services. This definition specifically excludes expenditure on natural resource management and activities such as the protection of endangered species (fauna and flora), the establishment of natural parks and green belts and activities to exploit natural resources (such as the supply of drinking water). Other exclusions are expenditure intended either for workplace protection or for the improvement of production process for commercial or technical reasons, even when they have environmental benefits. In total, PAC expenditure comprises the flow of investment and current expenditure that is directly aimed at pollution abatement and control, and which is incurred by the public sector, the business sector and private households.

The three conceptual issues associated with the statistical treatment of PAC expenditure are:

- definition of a baseline for PAC expenditure;
- treatment of integrated pollution control technologies;
- avoidance of double counting.

These issues are important for the correct compilation, use and interpretation of PAC expenditure data. The following sections consider each of them in turn.

Defining the baseline

Investment and current expenditure can have positive environmental effects without being directly motivated by environmental concerns. One example is investment in energy-saving equipment that is carried out because of increases in energy prices. Thus, investment in environmentally friendly equipment by firms may be part of normal, profit-maximising business behaviour. This type of expenditure can be distinguished from other expenditure that is directly incurred for PAC purposes (e.g. as a consequence of government environmental policies and regulations).

The question arises whether PAC expenditure data should include only expenditure directly incurred for PAC purposes or all expenditure with positive environmental effects. The answer depends on the use of PAC expenditure data:

- If PAC expenditure data are used **to identify the financial consequences of government environmental policy**, then only expenditures incurred directly for PAC purposes should be included.
- If the objective of collecting PAC expenditure data is to **assess the overall links between capital formation and pollution burden or to identify the share of overall expenditure which has positive effects for the environment**, then all expenditure with positive environmental effects should be included in PAC expenditure.

Most OECD Member countries, in their statistical approaches, include only expenditure that is directly aimed at environmental protection. This approach was also adopted in the OECD questionnaire agreed upon by Member countries. In statistical practice, the identification of such expenditure is difficult, particularly in the business sector, where firms may be unable to distinguish between the different investment motives. It is difficult to identify when pollution abatement is the actual motivation behind less wasteful use of raw materials; therefore, the measurement of air and water pollution abatement expenditure may differ from this baseline. For solid waste, for example, some countries employ simple, pragmatic solutions: the United States routinely attributes a fixed proportion (70 per cent) of expenditure for collection and disposal of municipal waste to pollution abatement and control (30 per cent is assumed to be ordinary expenditure not attributable to government environmental policies and regulations).

End-of-pipe and integrated technologies

The abatement and control of residuals from production processes can be done either by **end-of-pipe technology** attached to a given production process, or by **changing the process** itself. Investments in end-of-pipe technologies do not change the production process and the entire outlay is for pollution control. The difficulty associated with investments in integrated technologies is establishing what proportion of the total investment expenditure should be allocated to pollution abatement and control. In principle, the cost difference between the integrated plant and what would have been paid for a cheaper, viable, but less environmentally benign plant, should be recorded as PAC expenditure. There is, however, no easy way to handle this problem in statistical practice. One possibility is to pose this question explicitly in business surveys. Experience from a number of OECD countries shows that respondents often find it difficult to deliver accurate replies.

It is likely that the problem of accounting for investments in integrated technology will become more important in the future. Government environmental policies and business strategies are moving from curative to preventive approaches, thus increasing the relevance of integrated technologies as opposed to end-of-pipe solutions. In Finland, for instance, process integrated investments accounted for 32 per cent of industrial PAC investments in 1992 and 45 per cent in 1993 (Statistics Finland, 1995).

Avoiding double counting

As economic agents interact, the same pollution control activity can be recorded by several agents, thus making double counting a possibility. One example is private sector PAC expenditure that is subsidised by the government. Unless a clear distinction is made between the execution and the financing of PAC activity, both the public sector and the firm will report the expenditure for PAC purposes, resulting in double counting. It is, therefore, important to distinguish between the execution of an environmental service (*abater principle*) and the financing of the environmental service (*financing principle*).

The OECD questionnaire follows a structure that links these two approaches. Figure 1 presents the basic case with financial flows only between the public and the private sector. Investment plus current expenditure minus receipts from by-products of PAC activity make up the expenditure according to the abater principle. Purely financial transfers in the form of subsidies, fees or charges account for the transition to the financing principle. In theory, this approach could cover the various financial flows within the private sector (i.e. an input-output table for PAC market transactions) and within the public sector (flows of funds between different levels of government). At present, however, the availability of data limits the possibility of taking such a comprehensive approach.

Figure 1. **Abater and Financing Principles**

	PUBLIC SECTOR		PRIVATE SECTOR
	Investment expenditure		Investment expenditure
+	Current expenditure	+	Current expenditure
-	Receipts from by-products of PAC activity	-	Receipts from by-products of PAC activity
=	PAC expenditure according to the *Abater Principle* (Expenditure 1)	=	PAC expenditure according to the *Abater Principle* (Expenditure 1)
+	Subsidies to the private sector	-	Subsidies from the public sector
-	Fees/charges from the private sector	+	Fees/charges to the public sector
=	PAC expenditure according to the *Financing Principle* (Expenditure 2)	=	PAC expenditure according to the *Financing Principle* (Expenditure 2)

Only a few OECD Member countries (e.g. the Netherlands) evaluate expenditure according to both principles. Their work shows a significant difference between expenditure calculated according to the abater principle and that based on the financing principle: public sector expenditure is nearly 75 per cent higher, if subsidies and fees are taken into account, meaning a significant difference in the sectoral structure of PAC expenditure.

Part 2
PAC Expenditure Data: Interpretation, Use and Limits

PAC expenditure is the first-order, out-of-pocket expenditure of those economic entities that implement control measures and undertake compliance activities. As such, PAC expenditure does not provide any more, or any less information than, for example, health or education expenditure.

Total PAC expenditure provides a **general indication of a country's financial efforts directed at pollution abatement and control**. However, as absolute figures, the relevance of these data for policy purposes is limited; PAC expenditure has to be related to other variables. A common way of comparing PAC expenditure data across countries is to relate them to GDP or total gross fixed capital formation (Summary Tables 1 and 2).

Dimensions of PAC expenditure

PAC expenditure has several dimensions, each with a particular interpretation. Here, PAC expenditure is disaggregated by:

- environmental media (air, water, waste, noise);
- economic sector (public sector, business sector, households);
- type of expenditure (investment, current expenditure).

Environmental domain

Disaggregation of PAC expenditure by environmental domain (Summary Table 3) indicates whether pollution control efforts are directed towards waste management, noise reduction, or protection of air or water.

Here, waste includes municipal as well as industrial waste, which in turn includes hazardous waste, ordinary waste and inert or heavy waste (waste from the extractive industries and power stations, demolition waste). It includes sewage sludge but excludes waste water. For waste, PAC activities comprise: preventive measures to limit the amounts and harmful effects of waste generated from the final consumption of goods and to limit the production of industrial waste or lessen its harmful effects: collection and transport; treatment and disposal; exploitation of waste; and regulation and monitoring.

PAC activities for soil and water comprise collection and purification of waste water, combating of pollution in the marine environment, prevention, control and monitoring of surface water pollution, combating of pollution of inland surface waters, prevention and combating of thermal pollution of water, abatement of groundwater and soil pollution, and regulation and monitoring.

PAC activities for air comprise monitoring and regulation of atmospheric pollution, prevention of air pollution linked to the production process, installation of non-polluting technologies (clean technologies and clean products used in the production process) and elimination of emissions at the source (dedusting equipment and filters).

PAC activities for noise include regulation and monitoring, preventive action at the source and construction of anti-noise installations. Measures aimed at reducing industrial noise for workplace protection are excluded.

PAC activities related to other types of pollution control include abatement and control of non-radioactive radiation, multifunctional PAC activity and general administration of the environment.

Economic sectors

Disaggregation of PAC expenditure by economic sector indicates, first of all, the sector, where the PAC activity occurs (abater principle). When financial transfers between different sectors are taken into account, disaggregation of PAC expenditure by economic sector points to the sector paying for the PAC activity (financing principle). In Summary Tables 1-3 expenditure is allocated to the various sectors according to the abater principle and does not include financial transfers. Any conclusions about the sharing of the financial burden among sectors must therefore be drawn with great caution. The economic sectors distinguished are the public sector, the business sector and households.

The public sector comprises federal and local governments and communities.

The business sector covers agriculture, hunting and fishing (ISIC 11 and 13); forestry (ISIC 12); mining and quarrying (ISIC 2); manufacturing (ISIC 3); electricity, gas and water (ISIC 4); construction (ISIC 5); transport, storage and communications (ISIC 7); and other services (ISIC 6, 8 and 9 except government).

Household PAC expenditure according to the abater principle includes sewage treatment by private households (e.g. septic tanks) and purchase, operation and maintenance of air pollution control devices for motor vehicles. Operation and maintenance expenditure includes items such as price differentials for unleaded gasoline or service costs for proper adjustment of engines. Fees paid to communities for services such as waste collection are included in private household PAC expenditure evaluated under the financing principle.

The business sector and households comprise the private sector.

Type of expenditure

The distinction between investment and current expenditure helps in identifying patterns of abatement and control efforts over time. Typically, when PAC measures are first implemented, investment expenditure accounts for a large share of total PAC expenditure. Over time, current expenditure becomes increasingly important.

Investment expenditure is defined as outlays (purchases and own-account production) on land and on additions of new durable goods to the stock of fixed assets for pollution abatement and control.

Current expenditure includes PAC outlays for own production of environmental services (wages, rents, energy, maintenance and intermediate inputs) and for environmental services and specific goods bought in from the market (when, for instance, a chemical firm has its waste site cleaned up by a specialised enterprise).

Measuring economic effects

PAC **expenditure** is not the same as the **cost** of pollution abatement and control, but the cost can be calculated from PAC expenditure data. Capital goods are used over a number of years and their cost is spread over their service life. Expenditure data, on the other hand, shows the total value of the capital goods in the year of acquisition and does not, therefore, reflect accurately the economic effects over time. The calculation of the PAC cost requires appropriate assumptions about service lives, interest rates and several other parameters. For current expenditure, the notions of cost and expenditure coincide. For the purposes of assessing the economic impact of environmental policies, it would be preferable to look at cost rather than expenditure.

A different use of PAC expenditure data is to calculate PAC shares in total cost or total turnover for particular industries. **Cost shares** are a useful indicator for assessing **the effects of environmental regulation on industry competitiveness**. In industries where PAC cost shares are small, the impact of environmental policies will be felt less than in industry branches where these shares are high.

PAC expenditure data are also an important aid in identifying the positive economic effects of environmental policies. Measures to protect the environment create demand for abatement and clean production technologies and environmental consulting services, and spur environment-related R&D. National and international statistics on PAC expenditure provide the basic information needed to estimate the size and evolution of markets and potential for the environment industry.

Caveats

The relationship between PAC expenditure and the state of the environment can be explored only as part of the overall context of a country, and with the aid of supplementary information. Out of context, high PAC expenditure can be associated both with low environmental quality (indicating that such levels of expenditure are necessary) and with high environmental quality (indicating improvement as a result of high PAC expenditure).

PAC expenditure measures the economic effort to control pollution; it does not measure the cost of environmental damage. As such, PAC data should not be generalised to wider cost-benefit analysis, or used to decide whether abatement is justified. In deciding whether to undertake abatement, damage costs should be used. These are often very different from control costs.

All significant changes in a country's PAC expenditure must be reviewed with care. PAC expenditure may increase because of improved sectoral coverage (e.g. local government expenditure was not included before) or the inclusion of investments in integrated technology (e.g. only investments in end-of-pipe technology were reported earlier).

The remainder of this report presents the main results from the 1994 survey of PAC expenditure in OECD Member countries. Since the previous survey in 1992, country coverage and the international comparability of data have improved. In many instances, however, definitions and methodologies remain diverse across Member countries. International comparisons should, therefore, be limited to orders of magnitude.

Partie 1
Principe et méthodologie

Définition retenue pour la lutte contre la pollution

Par “lutte contre la pollution” (LCP), on entend ici des activités définies axées directement sur la prévention, la réduction et l’élimination de la pollution ou des nuisances qui résultent des processus de production ou de la consommation de biens et services. Cette définition exclut la gestion des ressources naturelles, certains domaines tels que la protection des espèces menacées (faune et flore), l’aménagement de parcs naturels et de ceintures vertes, ainsi que l’exploitation des ressources naturelles (comme l'approvisionnement en eau potable). Elle exclut également les dépenses engagées pour la protection du lieu de travail ou pour l’amélioration du processus de production pour motif commercial ou technique. Les dépenses totales imputées à la LCP correspondent au flux de dépenses d'investissement et de dépenses courantes visant directement à lutter contre la pollution et supportées par le secteur public, le secteur des entreprises et les ménages.

Le traitement statistique des dépenses LCP pose trois problèmes conceptuels :

- définir des critères de base pour apprécier les dépenses LPC ;
- préciser le traitement appliqué aux technologies intégrées de LPC ;
- éviter le double comptage.

Ces différents points , analysés dans les sections suivantes, sont déterminants si l’on veut utiliser et interpréter correctement les données relatives aux dépenses LPC.

Définition des critères de base

Bien souvent, les dépenses d'investissement ou les dépenses courantes ont des effets positifs sur l'environnement sans être pour autant directement motivées par des préoccupations environnementales. Les investissements en faveur des économies d'énergie réalisés après une augmentation du prix du pétrole en sont un exemple bien connu. Ainsi, les investissements d’une entreprise en faveur d'équipements respectueux de l'environnement peuvent s'inscrire dans un comportement commercial classique de recherche du profit. Ces dépenses se distinguent de celles consacrées à la LCP (par exemple, suite aux politiques et réglementations environnementales des pouvoirs publics).

Il faut se demander si les dépenses LCP doivent inclure exclusivement les activités entreprises à ce titre ou englober l’ensemble des dépenses qui entraînent des effets favorables sur l’environnement. La réponse dépend de l’exploitation des données sur les dépenses LCP:

- si ces données doivent contribuer à **évaluer les conséquences financières des politiques d’environnement adoptées par les pouvoirs publics**, seules les dépenses directement liées à la lutte contre la pollution sont à prendre en compte;
- si l’objectif de la collecte de données sur les dépenses LPC est d’**évaluer les relations entre la formation de capital et la charge polluante ou de déterminer la part des dépenses globales qui a des effets favorables pour l'environnement**, il conviendrait de prendre en compte toutes les formes de dépenses LPC ayant un rapport avec l'environnement.

Dans leurs méthodes statistiques, la plupart des pays Membres de l'OCDE ne prennent en compte que les dépenses directement destinées à protéger l'environnement. Le même principe a été retenu dans le questionnaire de l'OCDE approuvé par les pays Membres. Concrètement, il demeure difficile de cerner ces dépenses, notamment dans le secteur des entreprises où la distinction entre les divers motifs d'investissement n'est pas aisée. Étant donné les problèmes rencontrés pour déterminer dans quels cas la réduction du gaspillage des matières premières entre dans le cadre de la lutte antipollution, la mesure des dépenses de lutte contre la pollution de l'air et de l'eau peut s'éloigner des critères de base. Dans le cas des déchets solides, par exemple, certains pays recourent à des solutions simples et pragmatiques: les États-Unis considèrent systématiquement qu'une proportion fixe des dépenses (70 pour cent) consacrée à la collecte et à l'élimination des déchets municipaux relève de la lutte contre la pollution (la part restante, soit 30 pour cent, est jugée normale et non imputable aux politiques et réglementations d'environnement adoptées par les pouvoirs publics).

Technologies intégrées

On peut lréduire et contrôler les résidus des processus de production, soit par des technologies installées **"en bout de chaîne"** liées à un processus de production donné, soit en **modifiant le processus** lui-même. Dans la mesure où les investissements dans des technologies de "bout de chaîne" ne modifient en rien le processus de production, la totalité des dépenses peut être imputée à la lutte contre la pollution. Lorsqu'il s'agit de technologies intégrées, le problème consiste à identifier la part LCP dans l'investissement total. En principe, il ne faudrait prendre en compte que le surcroît de dépenses par rapport au coût d'une installation viable, moins onéreuse, mais moins respectueuse de l'environnement. Dans la pratique, il n'y a pas de solution simple à ce problème statistique. On peut poser explicitement la question dans les enquêtes menées auprès des entreprises. L'exemple d'un certain nombre de pays de l'OCDE montre que les déclarants ont souvent des difficultés à apporter des réponses précises.

Le problème de la prise en compte des technologies intégrées tend à prendre une importance croissante. En effet, les politiques des pouvoirs publics et les stratégies des entreprises en matière d'environnement sont passées d'une approche curative à une approche préventive, d'où l'intérêt croissant des technologies intégrées, par opposition aux solutions s'appliquant de "bout de chaîne". En Finlande, par exemple, les investissements dans les technologies intégrées représentaient 32 pour cent des investissements industriels de LCP en 1992, et 45 pour cent en 1993 (Statistics Finland, 1995).

Éviter le double comptage

Compte tenu des interactions entre les agents économiques, la même activité de LCP peut être imputée à plusieurs agents, d'où la possibilité d'un double comptage. Les dépenses effectuées par le secteur privé mais subventionnées par le secteur public en offrent un exemple. Tant qu'une distinction claire ne sera pas faite entre l'exécution et le financement de l'activité de LCP, le secteur public comme les entreprises imputeront cette dépense à la LCP et un double comptage se produira. Aussi, il est important de distinguer l'éxécution d'un service lié à l'environnement ("principe d'execution") de financement du service en question ("principe de financement").

Le questionnaire de l'OCDE suit un plan qui lie les deux méthodes. La figure 1 présente la situation de base dans laquelle seuls les flux financiers entre les secteurs public et privé sont pris en considération. De la somme des dépenses d'investissement et dépenses courantes, on retranche les recettes des sous-produits des activités de LCP pour obtenir les dépenses selon le principe d'exécution. Les transferts purement financiers sous forme d'aides financières, de droits ou de redevances correspondent à la transition vers le principe de financement. Théoriquement, cette méthode pourrait rendre compte des

divers flux financiers à l'intérieur du secteur privé (par un tableau d'entrées-sorties pour les transactions commerciales relatives à la LCP) et à l'intérieur du secteur public (flux financiers entre divers niveaux d'administration). Cette approche globale est cependant limitée pour l'instant par la disponibilité des données.

Figure 1. **Principe d'exécution et principe de financement**

	SECTEUR PUBLIC		**SECTEUR PRIVÉ**
	Dépenses d'investissement		Dépenses d'investissement
+	Dépenses courantes	+	Dépenses courantes
-	Recettes des sous-produits des activités de LCP	-	Recettes des sous-produits des activités de LCP
=	Dépenses de LCP selon le *principe d'exécution* (Dépenses 1)	=	Dépenses de LCP selon le *principe d'exécution* (Dépenses 1)
+	Subventions accordées par le secteur public	-	Subventions accordées par le secteur public
-	Redevances et taxes perçues par le secteur public	+	Redevances et taxes perçues par le secteur public
=	Dépenses de LCP selon *le principe de financement* (Dépenses 2)	=	Dépenses de LCP selon *le principe de financement* (Dépenses 2)

Actuellement, peu de pays de l'OCDE évaluent les dépenses de LCP selon ces deux principes. L'exemple des Pays Bas montre que l'on peut obtenir des résultats sensiblement différents pour les dépenses selon le principe d'imputation adopté : la prise en compte des subventions et redevances dans le calcul des dépenses du secteur public modifie le montant de près de 75 pour cent et a une incidence importante sur la structure sectorielle des dépenses LCP.

Partie 2
Interprétation, utilisation et limites des données sur les dépenses LCP

Les dépenses LCP sont supportées en premier lieu directement par les entités économiques qui mettent en oeuvre des mesures antipollution et entreprennent des activités de mise en conformité. Par elles-mêmes, ces dépenses ne donnent ni plus ni moins d'informations que les autres types de dépenses, consacrées par exemple à la santé ou à l'éducation.

Le total des dépenses LCP donne une **indication générale des efforts financiers déployés en la matière par les pays considérés.** Exprimées en valeur absolue, ces données ne présentent toutefois qu'un intérêt limité pour l'action des pouvoirs publics et doivent être reliées à d'autres paramètres. Pour effectuer des comparaisons entre pays, on rapporte fréquemment les dépenses LCP au PIB ou à la formation brute de capital fixe (voir tableaux récapitulatifs 1 et 2).

Structure des dépenses de lutte contre la pollution

Les dépenses LCP peuvent être envisagées de différents points de vue; ici, elles sont détaillées:

- par milieu environnemental (air, eau, déchets, bruit);
- par secteurs économiques (public, entreprises, ménages);
- par catégories de dépenses (investissements, dépenses courantes);

Domaines de l'environnement

La ventilation des dépenses totales LCP par domaine permet d'indiquer si les efforts visent la protection de l'air, de l'eau, la gestion des déchets ou la réduction du bruit (tableau récapitulatif 3).

Le terme "déchets" inclut ici les déchets municipaux et les déchets industriels - incluant les déchets dangereux, ordinaires et inertes ou lourds - (déchets des industries extractives et centrales électriques, gravats). Les boues d'épuration sont incluses mais les eaux usées sont exclues. Les activités LCP relatives aux déchets comprennent les mesures préventives destinées à limiter la quantité et la nocivité des déchets générés par la consommation finale de produits, et à limiter la production de déchets industriels ou à réduire leurs effets nocifs. Sont inclus, la collecte et le transport, le traitement et l'élimination, l'exploitation des déchets, la surveillance et la réglementation.

Les dépenses LCP pour l'eau et les sols incluent: l'assainissement et la purification des eaux usées , la lutte contre la pollution de l'environnement marin, la prévention, le contrôle et la surveillance de la pollution des eaux de surface, les mesures de lutte contre la pollution des eaux de surface intérieures, la prévention et la lutte contre la pollution thermique des eaux, la réduction de la pollution des eaux souterraines, la réduction de la pollution du sol, la surveillance et la réglementation.

Les dépenses LCP pour l'air incluent: surveillance et réglementation de la pollution atmosphérique; prévention de la pollution atmosphérique liée aux méthodes de production; mise en place de technologies non polluantes (technologies propres et produits propres utilisés dans le processus de production); suppression des émissions à la source (dépoussiéreurs, filtres).

Les dépenses LCP pour le bruit incluent: surveillance des niveaux de bruit; mesures préventives à la source, construction d'installations antibruit. Sont exclues les dépenses visant à la réduction du bruit pour a protection du lieu de travail.

Les dépenses engagées pour d'autres formes de lutte contre la pollution, incluant la réduction et le contrôle des rayonnements non radioactifs, les activités antipollution polyvalentes et la gestion globale de l'environnement.

Secteurs économiques

La répartition par secteur économique des dépenses LCP met en évidence les secteurs où les activités LCP s'effectuent (principe d'exécution). Lorsque les transferts financiers entre secteurs sont pris en compte, la répartition par secteur des dépenses LCP permet d'identifier les secteurs qui financent ces activités (principe de financement). Dans les tableaux récapitulatifs 1, 2 et 3, les dépenses d'investissement sont présentées selon le principe d'exécution et ne tiennent pas compte des transferts financiers. Par conséquent, la plus grande prudence s'impose lorsqu'il s'agit de tirer des conclusions sur la répartition de la charge financière entre secteurs. Les secteurs présentés sont le secteur public, les entreprises et les ménages.

Le secteur public inclut les administrations centrales et locales et les collectivités.

Le secteur des entreprises comprend l'agriculture, la chasse et la pêche (CITI 11 et 13); la sylviculture (CITI 12); les industries extractives (CITI 2); les industries manufacturières (CITI 3); l'électricité, le gaz et l'eau (CITI 4); la construction (CITI 5); les transports, entrepôts et communication (CITI 7); les autres services (CITI 6, 8 et 9 à l'exception des services publics).

Selon le principe d'exécution, les dépenses des ménages incluent le traitement privé des eaux usées (fosses septiques), l'achat, l'utilisation et la maintenance des dispositifs de lutte contre la pollution atmosphérique pour les véhicules à moteur. Dans les dépenses d'utilisation et de maintenance, on inclut par exemple la différence de prix de l'essence sans plomb et le coût du réglage adéquat du moteur. Les redevances payées aux collectivités pour le ramassage des ordures sont incluses dans les dépenses des ménages évaluées selon le principe de financement.

Le secteur privé inclut le secteur des entreprises et les ménages.

Catégories de dépenses

La distinction entre dépenses courantes et dépenses d'investissement permet de dégager les tendances des mesures de lutte contre la pollution au fil des ans. En règle générale, au moment de l'instauration de mesures de ce type, les dépenses d'investissement représentent une large part des dépenses totales LCP. La part des dépenses courantes augmente ensuite progressivement.

Les dépenses d'investissement incluent l'acquisition (achats et production propre) de terrains et de nouveaux biens durables ajoutés au stock de capital fixe, à des fins de LCP.

Les dépenses courantes incluent les dépenses afférentes i) à la production propre de services: salaires et traitements, loyers, énergie, frais d'entretien et consommation intermédiaire; ii) à l'achat sur le marché de services et de biens (par exemple, une société de produits chimiques qui fait nettoyer sa décharge par une entreprise spécialisée).

Mesure des effets économiques

Les dépenses LPC doivent être distinguées des coûts LPC, mais les données sur les **dépenses** LCP peuvent servir à calculer les **coûts** correspondants. L'utilisation des biens d'équipement se prolonge pendant plusieurs années et leur coût est réparti sur l'ensemble de cette période. En revanche, les dépenses d'investissement sont comptabilisées uniquement pour l'année à laquelle est effectué l'achat des biens d'équipement considérés; les effets économiques dans le temps ne sont donc pas pris en compte comme il convient. Il importe de retenir des hypothèses satisfaisantes sur la durée de vie des équipements, les taux d'intérêt et plusieurs autres paramètres pour calculer les coûts LCP (voir, par exemple, EPA 1990). Concernant les dépenses courantes, les coûts et les dépenses coïncident. Pour évaluer l'incidence économique des politiques d'environnement, mieux vaut se référer aux coûts qu'aux dépenses.

On peut aussi employer les données sur les dépenses LCP pour calculer leur part dans le coût total ou dans le chiffre d'affaires pour telle ou telle activité. **La part des coûts** LCP est un indicateur utile pour apprécier les **effets des réglementations d'environnement sur la compétitivité industrielle**. Dans les branches d'activité où cette part est faible, l'effet des politiques d'environnement sera moindre que dans celles où elle est élevée.

Les données sur les dépenses LCP peuvent aussi aider à identifier les effets économiques favorables des politiques d'environnement. Les mesures de protection de l'environnement suscitent une demande de techniques antipollution, de technologies propres et de services de conseil en environnement, tout en stimulant les activités de R&D liées à l'environnement. Les statistiques nationales et internationales sur les dépenses LPC fournissent les informations indispensables pour estimer la taille et l'évolution des marchés, ainsi que les perspectives qui s'offrent aux éco-industries.

Précautions à prendre

Le lien entre les dépenses LCP et l'état de l'environnement ne peut être examiné qu'en fonction de la situation générale du pays considéré et à l'aide d'informations supplémentaires. Hors contexte, des dépenses élevées peuvent aussi bien signifier une qualité de l'environnement médiocre (qui rendrait ces dépenses indispensables) qu'une qualité de l'environnement satisfaisante (améliorée grâce aux dépenses LCP).

Les dépenses LCP mesurent les efforts économiques déployés pour maîtriser la pollution, mais non les coûts des dommages. Aussi, les données sur les dépenses ne devraient-elles pas être utilisées dans le cadre d'une analyse coûts-avantages ou pour déterminer si une lutte antipollution se justifie. Pour décider s'il y a lieu s'entreprendre cette lutte, il convient de se référer aux coûts des dommages. Ceux-ci sont souvent très différents des coûts de la lutte antipollution.

Tout changement significatif des dépenses LCP d'un pays doit être interprété avec prudence. Ces dépenses peuvent augmenter avec l'amélioration de la couverture d'un secteur (par exemple si les dépenses des administrations locales n'étaient pas couvertes auparavant) ou avec l'inclusion des technologies intégrées (si seuls les investissements en "en bout de chaîne" étaient rapportés lors de l'évaluation précédente).

On trouvera ci-après les principaux résultats de l'enquête sur les dépenses LCP réalisée en 1994 dans les pays de l'OCDE. Par rapport à l'enquête précédente, effectuée en 1992, le nombre de pays considérés et la comparabilité des données ont progressé. Dans biens des cas, cependant, les définitions et les méthodes demeurent disparates d'un pays Membre à l'autre. Les comparaisons internationales devraient par conséquent porter uniquement sur des ordres de grandeur.

Part 3
Results of the 1994 OECD Survey (English Version only)
Résultats de l'enquête effectuée par l'OCDE en 1994 (version anglaise uniquement)

3.1 Summary Tables[a]
Tableaux récapitulatifs

[a] *Caveat: As definitions and methodologies may remain diverse across Member countries, international comparisons should be limited to orders of magnitude.*

Summary Table 1 **PAC Expenditure as a Percentage of GDP** [a, b]

	1985	1987	1988	1989	1990	1991	1992
PUBLIC AND PRIVATE SECTORS [c]							
Canada	..	..	..	0.9	..	..	..
United States	1.4	1.4	1.4	1.4	1.5	1.5	1.6
Australia	..	..	..	..	0.6	0.7	..
Japan ♦	1.0	1.1	1.1	1.1	1.1	..	..
Austria ♦	..	1.8	1.7	..	2.0*	2.1*	..
Finland ♦	..	..	..	..	..	..	1.4
France	0.9	1.0	1.2	1.2	1.2	1.2	1.2
Germany ♦	1.5	1.6	1.6	1.6	1.6	1.6	1.5
Italy	..	..	..	0.9	..	..	..
Netherlands	1.4	1.5	..	1.4	1.7	1.8	1.9
Norway ♦	..	..	..	..	1.2	..	..
Portugal ♦	..	..	0.5	0.5	0.8	0.7	..
Sweden ♦	0.2*	..	0.4*	..	..	1.2	..
Switzerland ♦	..	..	..	..	..	..	2.1
United Kingdom	1.3	..	..	..	1.4	..	..
PUBLIC AND PRIVATE SECTORS, including private households							
United States	1.7	1.7	1.7	1.6	1.7	1.6	1.7
Australia	..	..	..	..	..	0.9	..
Austria ♦	1.0	1.8	1.8	..	2.1*	2.2*	..
France	1.0	1.1	1.3	1.3	1.3	1.3	1.3
Netherlands	1.5	1.5	..	1.5	1.8	1.9	2.0
Portugal	..	..	0.5	0.5	..	..	..
Switzerland ♦	..	..	..	..	..	..	2.1
United Kingdom ♦	..	..	..	..	1.5	..	..
PUBLIC SECTOR ONLY							
Canada	0.7	0.7	0.5	0.6	0.7	0.7	..
United States	0.6	0.6	0.6	0.6	0.6	0.7	0.7
Australia	..	..	..	..	0.4	0.5	..
Japan	0.9	1.0	1.0	1.0	1.0	..	..
Austria ♦	1.0	1.0	1.0	..	1.0	1.0	..
Denmark ♦	0.7	0.8	0.9	0.5	0.5	0.6	..
France	0.6	0.6	0.8	0.9	0.8	0.9	0.9
Germany ♦	0.7	0.8	0.8	0.8	0.8	0.9	0.9
Greece	0.7	0.5	0.5	0.5	0.6	0.5	..
Iceland ♦	0.3	0.3	0.3	0.3	0.3	0.4	0.4
Italy ♦	..	..	0.2	0.5	..	..	..
Netherlands	1.0	0.9	..	0.9	0.9	1.1	1.2
Portugal	..	..	0.4	0.4	0.8	0.7	0.8
Spain	..	0.5	0.5	0.6	0.6	0.6	..
Sweden ♦	..	0.6*	..	..	..	0.8	..
Switzerland	0.7	..	0.7	0.8	..	..	1.0
United Kingdom ♦	0.7	..	..	..	0.4	..	..

a) All significant changes in PAC expenditure shares must be reviewed with care, as PAC expenditure may also increase because of improved sectoral coverage and data availability.

b) Based on the abater principle (Expenditure 1). This includes for some countries receipts from by-products.

c) Based on public and business sectors, unless otherwise noted.

♦ Notes:

Japan: Public and private sectors: Partial figure. Data on business sector current expenditure not available.

Finland: Public and private sectors: Includes an estimate for public sector PAC expenditure.

Germany: Western Germany only.

Denmark: Public sector: Data for years 1985-1988 and 1989-1991 are not comparable (data from different sources).

Norway: Secretariat estimate.

Austria: Estimates were made to remove double counting of waste water and waste fees; figures include street cleaning. * These data are not comparable with other data because the definitions and methodology used are different. The Secretariat estimate for public and private sector PAC expenditure is 1.7 % GDP.

Iceland: Waste expenditure only.

Italy: Public sector: Partial figure for 1988, thus 1988 and 1989 data are not comparable.

Portugal: Public and private sectors: Only investment expenditure is included in the business sector data.

Sweden: * Public and private sectors: 1985 and 1988 business sector data only. * Public sector:1987 data refer to 1986.

Switzerland: Business and household sectors: 1992 data refer to 1993.

United Kingdom: 1985 and 1990 data are not comparable (see country table).

Source: OECD

Summary Table 2 **PAC Investment Expenditure as Percentage of Gross Fixed Capital Formation**

		1985	1987	1988	1989	1990	1991	1992
Canada	Public PAC	..	..	0.9	0.9	1.2	1.1	..
	Business PAC	..	..	..	0.8	..	..	..
	All PAC investment	..	..	..	1.7	..	..	..
USA	Public PAC	1.0	1.2	1.1	1.1	1.2	1.2	1.2
	Business PAC	1.9	1.7	1.7	1.7	1.9	2.2	2.2
	All PAC investment	2.9	3.0	2.9	2.8	3.1	3.4	3.4
Japan	Public PAC	2.9	3.2	3.0	2.9	2.7	..	..
	Business PAC	0.5	0.3	0.3	0.3	0.3	..	..
	All PAC investment	3.4	3.5	3.3	3.2	3.0	..	..
Australia	Public PAC	..	..	..	..	1.4	1.4	..
	Business PAC	..	..	..	..	0.5	0.5	..
	All PAC investment	..	..	..	..	1.9	1.9	..
Austria	Public PAC	2.7	2.5	2.1	..	2.2	2.1	..
	Business PAC	..	1.4	1.3	1.1	1.7	1.6	..
	All PAC investment	..	3.9	3.4	..	3.9	3.7	..
Denmark	Public PAC	1.0	1.2	1.9	1.7	1.7	1.9	..
Finland	Business PAC	..	..	..	..	..	..	2.1
France	Public PAC	0.8	0.8	1.3	1.3	1.2	1.2	1.3
	Business PAC	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	All PAC investment	1.3	1.3	1.7	1.7	1.6	1.6	1.8
Germany ♦	Public PAC	1.9	2.1	2.0	2.0	2.0	2.1	2.2
	Business PAC	1.6	2.0	2.0	1.7	1.4	1.2	1.1
	All PAC investment	3.5	4.1	4.0	3.7	3.5	3.3	3.2
Greece	Public PAC	3.7	3.1	2.7	2.8	2.8	2.8	2.9
Iceland ♦	Public PAC	0.4	0.3	0.3	0.3	0.3	0.4	0.4
Italy	Public PAC	..	..	1.0	1.4	..	..	..
	Business PAC	..	..	..	0.8	..	..	..
	All PAC investment	..	..	..	2.2	..	..	..
Netherlands	Public PAC	2.1	1.2	..	1.0	0.9	1.1	1.4
	Business PAC	1.0	1.5	..	1.3	1.9	1.6	1.7
	All PAC investment	3.1	2.8	..	2.2	2.8	2.7	3.1
Portugal	Public PAC	..	..	0.8	0.5	1.7	1.2	1.6
	Business PAC	..	..	0.4	0.6	0.2	0.3	..
	All PAC investment	..	..	1.3	1.1	1.8	1.6	..
Spain	Public PAC	..	0.6	0.7	0.9	0.9	1.1	..
Sweden ♦	Public PAC	..	1.0*	..	..	..	1.0	..
	Business PAC	0.7	..	1.1	..	..	0.8	..
	All PAC investment	..	..	..	..	..	1.8	..
Switzerland ♦	Public PAC	..	..	..	..	..	..	1.5
	Business PAC	..	..	..	..	..	..	1.5*
	All PAC investment	..	..	..	..	..	..	3.1
United Kingdom ♦	Public PAC	..	..	..	..	1.9*	..	..

♦Notes:
Germany: Western Germany only.
Iceland: Only waste investment.
Sweden: * Public sector: 1987 data refer to 1986.
Switzerland: * Business sector: 1992 data refer to 1993.
United Kingdom: * Public sector 1990: only water and air investment.
Source: OECD

Summary Table 3 **Investment and Current Expenditure in PAC**

			Public Sector			Business Sector			Private household	
		Year	Per capita	‰ GDP	‰ GFCF	Per capita	‰ GDP	‰ GFCF	Per capita	‰ PFC
EXPENDITURE ON WATER										
Canada	♦	1990	55.3	3.0	9.9	19.7	1.1	2.9	..	..
United States		1992	96.8	4.2	11.8	50.5	2.2	5.8	..	..
Australia		1991	44.2	2.7	12.2	..	..	..	4.1	0.4
Japan	♦	1990	..	..	..	..	..	0.7	..	..
Austria	♦	1991	142.1	8.2	16.9	78.1	4.5	8.5	0.3	-
Denmark		1991	56.6	3.3	10.1	..	..	..	..	..
Finland	♦	1992	..	..	..	36.2	2.4	6.2	..	..
France		1992	86.1	4.5	9.3	23.7	1.2	1.6	11.3	1.0
Germany	♦	1990	86.3	5.5	17.2	36.9	2.3	3.3	..	..
Italy		1989	29.5	1.9	7.9	12.8	0.8	2.1	..	..
Netherlands		1992	91.8	5.2	7.5	48.0	2.7	6.6	..	..
Portugal	♦	1991	28.6	2.8	9.7	..	..	1.7	..	..
Spain		1991	45.8	3.6	8.6	..	..	..	..	..
Sweden	♦	1991	63.2	3.8	8.6	..	..	4.6	..	..
Switzerland	♦	1993	103.2	4.5	7.9	30.4	1.3	3.0	45.0	3.3
United Kingdom		1990	11.1	0.7	1.0	80.8	5.1	13.6	..	..
EXPENDITURE ON WASTE										
Canada	♦	1990	33.5	1.8	0.9	9.5	0.5	0.7	..	..
United States		1992	51.3	2.2	..	87.7	3.8	3.3	..	..
Australia		1991	13.8	0.8	1.1	..	..	..	18.7	1.8
Japan	♦	1990	..	..	..	..	..	0.2	..	..
Austria	♦	1991	60.2	3.5	1.8	17.2	1.0	1.5	0.4	-
Denmark		1991	37.8	2.2	6.7	..	..	..	..	..
Finland	♦	1992	..	..	..	14.0	0.9	1.1	..	..
France		1992	62.8	3.3	1.3	22.0	1.1	0.6	4.3	0.4
Germany	♦	1991	47.6	3.0	3.2	18.4	1.2	1.6	..	..
Iceland		1992	78.0	4.2	4.4	..	..	..	..	..
Italy		1989	43.6	2.8	5.0	19.2	1.3	2.1	..	..
Netherlands		1992	77.4	4.4	6.7	17.7	1.0	1.2	..	..
Portugal	♦	1991	17.1	1.7	1.5	..	..	0.3	..	..
Spain		1991	24.1	1.9	1.8	..	..	..	..	..
Sweden	♦	1991	40.9	2.4	1.4	..	..	..	..	..
Switzerland	♦	1993	101.3	4.4	6.5	30.3	1.3	2.7	20.4	1.5
United Kingdom		1990	33.3	2.1	..	37.6	2.4	12.1	10.7	1.1
EXPENDITURE ON AIR										
Canada	♦	1990	..	..	..	20.8	1.1	3.2	..	..
United States		1992	4.0	0.2	0.2	68.8	3.0	13.1	31.0	2.0
Australia		1991	..	..	..	..	..	..	3.1	0.3
Japan	♦	1990	..	..	..	..	..	1.7	..	..
Austria	♦	1991	5.9	0.3	1.3	81.2	4.7	11.9	13.7	1.4
Denmark		1991	1.9	0.1	0.3	..	..	..	..	..
Finland	♦	1992	..	..	..	44.5	3.0	13.5	..	..
France		1992	..	..	..	19.8	1.0	1.5	3.3	0.3
Germany	♦	1991	0.4	-	0.1	52.4	3.3	6.1	..	..
Italy		1989	..	..	..	19.2	1.3	2.1	..	..
Netherlands		1992	3.2	0.2	..	45.1	2.6	7.2	18.0	1.7
Portugal	♦	1991	0.1	-	-	..	..	1.0	0.1	-
Spain		1991	1.0	0.1	0.2	..	..	..	..	..
Sweden	♦	1991	..	..	..	..	..	3.7	..	..
Switzerland	♦	1993	5.5	0.2	0.2	45.3	2.0	7.1	40.2	3.0
United Kingdom		1990	13.4	0.8	..	30.1	1.9	5.0	0.9	0.1

Per capita - the sum of investment and current expenditure, expressed in US$ per person and at current purchasing power parities.

‰ GDP - the sum of investment and current expenditure per 1 000 units of Gross Domestic Product.

‰ GFCF - investment expenditure per 1 000 units of Gross Fixed Capital Formation.

‰ PFC - current and investment expenditure per 1 000 units of Private Final Consumption.

♦ Notes:

Canada: Public sector: 1990 data, business sector: 1989 data.

Austria: Secreteriat estimates were made to reduce double counting and to arrive at figures that are amenable to international comparison.

Finland: Business sector refer to total industry.

Germany: Western Germany only.

Japan: For the public sector, disaggregation by environmental media is not available. There are no figures for business sector current expenditure.

Portugal: Household sector data refer to 1989.

Sweden: Public sector data refer to 1991 and business sector data to 1988. Business sector current expenditure data cannot be disaggregated by media.

Switzerland: Public sector data refer to 1992.

Source: OECD

3.2 Country tables
Tableaux par pays

CANADA

Sources and definition

A pilot survey by Statistics Canada (1992[1]) has provided some PAC expenditure data for the public and business sectors. Statistics Canada (1995[2]) has also published updated time series for public sector PAC expenditure, based on public accounts data and a survey of local government expenditures. In addition, a time series of government capital expenditure is available, based on the Capital and Repairs Expenditure Survey. The approach is different from the one used to collect data from Public Accounts and consequently, definitions of capital expenditures differ between the two sources. Water supply expenditures are excluded in line with the OECD definition.

Characteristic activities and environmental media

For the public sector, the following PAC activities are included: sewage collection and disposal, waste collection and disposal, and other activities such as air pollution control, water pollution control, land remediation, environmental assessments, monitoring and administration of an environmental department.

For the business sector, the PAC expenditure figures are available for the following environmental media: waste water, solid waste and air.

Economic sectors

Here, public sector PAC expenditure figures are based on the time series of government expenditure, which includes outlays by federal, provincial, territorial and local governments. However, the breakdown of PAC expenditures by type of activity does not include federal outlays, since data on federal goverment transfers were not available at that detailed level.

Business sector figures are taken from the 1989 pilot survey. These figures include subsidies and grants; therefore, the abater principle applies. Some information is also available on recovery and savings from PAC activities. The figures shown in this report are based on the following sectors: mining, manufacturing, utilities, and services (including institutions). In the expenditure tables by environmental media, the Statistics Canada (1992) report on the pilot survey does not include estimates for non-sampled and non-responding firms. However, Annex F of that report does provide estimated sample-to-population ratios for capital expenditure. The Secretariat applied these factors to the business sector capital and current expenditure in order to arrive at figures that are amenable to international comparison.

[1] Statistics Canada (1992): *Analysis of the Pollution Abatement and Control Survey*, Capital Expenditures Section, Investment and Capital Stock Division.

[2] Satistics Canada (1995): Environmental Perspectives, Studies and Statistics 2, Catalogue No. 11-528E, Ottawa (Perspectives sur l'environnement, Études et Statistiques2).

CANADA[a] *Million of dollars at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Expenditure 1	2 11 4	705	..	1 490	4 308	74
1989	Investment expenditure	1 13 2	93	..	93	1 318	..
+	Current expenditure	..	..	..	..	..	..
-	Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 84 2	1 097	..	1 153	4 093	64
1990	Investment expenditure	1 34 4	129	..	188	1 661	..
+	Current expenditure	..	..	..	..	..	..
-	Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	2 06 1	1 249	..	1 394	4 703	76
1991	Investment expenditure	1 13 3	101	..	186	1 420	..
+	Current expenditure	..	..	..	..	..	..
-	Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 95 6	1 321	..	1 470	4 747	79
BUSINESS SECTOR: TOTAL EXPENDITURE							
1989	Investment expenditure	39 4	102	432	160	1 088	..
+	Current expenditure	32 5	252	325	101	1 002	..
-	Receipts from by-products	..	..	..	..	110	..
	Expenditure 1	71 8	354	757	261	1 980	..
BUSINESS SECTOR: INDUSTRY BRANCHES (1989)							
Mining and quarrying							
	Investment expenditure	3 8	14	24	x	77	..
+	Current expenditure	5 2	12	29	x	93	..
-	Receipts from by-products	x	x	x	x	x	..
	Expenditure 1	x	x	x	x	x	..
Electricity, gas, water							..
	Investment expenditure	x	9	x	x	82	..
+	Current expenditure	x	x	x	x	x	..
-	Receipts from by-products	x	x	x	x	x	..
	Expenditure 1	x	x	x	x	..	..
Trade, finance, commercial							..
	Investment expenditure	4	x	4	x	23	..
+	Current expenditure	0. 2	0.2	..	x	1	..
-	Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	4	x	4	x	24	..
Total manufacturing							..
	Investment expenditure	40 5	76	405	..	886	..
+	Current expenditure	23 5	218	198	..	650	..
-	Receipts from by-products	..	..	..	..	80	..
	Expenditure 1	64 0	294	603	..	1 456	..
Investment and current expenditure: selected manufacturing industries							
ISIC 34	Pulp and paper	32 2	71	99	..	492	..
ISIC 35	Chemical products	6 9	30	37	..	135	..
ISIC 37	Primary metal industries	16 2	131	353	..	645	..

a) Secretariat estimates. Definitions and methodological notes are on preceding page. "X" denotes data that must be suppressed, according to the confidentiality stipulations of the Statistics Act.

b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	1985	1989	1990	1991
Gross fixed capital formation	Business sector investment expenditure	92.0	103.6	104.0	100.0
Government final consumption expenditure	R&D	78.2	90.8	95.8	100.0
GDP	Business sector current expenditure and expenditure 1 for the public sector and selected manufacturing industries	80.1	94.3	97.2	100.0

UNITED STATES

Sources and definition

In the United States, PAC expenditure data have been collected since 1972. Statistics are developed by the Bureau of Economic Analysis and published regularly in the *Survey of Current Business* (Rutledge and Vogan, 1995[3]). Data on PAC expenditure for individual manufacturing industries are published by the Bureau of the Census. About two thirds of the data come directly from a number of primary sources, such as the Pollution Abatement Costs and Expenditure Survey (for capital and operating spending by manufacturing establishments), surveys of government finances (for government spending to operate sewer systems and for solid waste disposal), and surveys of new construction put in place (for government spending to construct sewer systems).

PAC expenditure is defined as expenditure for goods and services that are used to produce cleaner air and water and to dispose of solid waste in the United States. These figures cover most, but not all, PAC activities, which are defined as those resulting from rules and regulations restricting the release of pollutants into common property media such as air and water.

Characteristic activities and environmental media

PAC data comprise of two basic types of activities: pollution abatement, and regulation and monitoring. National R&D expenditure figures are available. Business investment expenditure includes expenditure for end-of-pipe technologies, as well as additional cost incurred for integrated, environmentally benign technology.

Characteristic activities are cross-classified by environmental media. The principal areas are air, water, and solid waste. The "solid waste" category includes the collection, and disposal of solid waste, as well as the alteration of production processes to generate less solid waste. The "other and unallocated" category refers to expenditure for abatement and control of noise, radiation and pesticide pollution, along with business expenditure not assigned to media.

Economic sectors

Public sector expenditure includes expenditure at the federal, state, and local levels. It is noted that, in this report, the current and investment expenditure of government enterprises are included in the public sector expenditure. The business sector comprises manufacturing and non-manufacturing establishments, including farm-related activities. Business sector PAC expenditure statistics show costs recovered from the sale of by-products of pollution control. Business is the only sector that recovers materials (e.g. metal filings) and energy (e.g. heat) during PAC activity. As such, it has by-product revenues from PAC activity.

PAC statistics classify expenditure according to the sector performing the activity and thus, adhere to the abater principle. This implies that expenditure, e.g. for the removal of solid waste by municipalities, is classified according to the abater incurring them (i.e. the municipality), although revenues from payments by consumers may cover most of the operating expenses. Private household expenditure relates exclusively to the purchase and operation of motor vehicle emission abatement devices.

[3] Rutledge, G.L. and Vogan, C.R. (1995): Pollution Abatement and Control Expenditures, 1993, *Survey of Current Business*, May 1995.

UNITED STATES[a] *Million of dollars at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	8 80 2	..	310	..	9 112	..
	+ Current expenditure	10 10 2	6 015	804	467	17 388	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	18 90 4	6 015	1 114	467	26 500	319
1990	Investment expenditure	10 83 1	..	205	..	11 036	..
	+ Current expenditure	12 55 8	10 606	744	620	24 528	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	23 38 9	10 606	949	620	35 564	407
1992	Investment expenditure	10 99 3	..	232	..	11 225	..
	Current expenditure	13 34 6	12 650	757	466	27 218	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	24 33 9	12 650	989	466	38 444	471
BUSINESS SECTOR: TOTAL EXPENDITURE							
1985	Investment expenditure	5 29 5	1 804	9 249	..	16 347	..
	+ Current expenditure	6 13 0	10 535	10 718	..	27 383	..
	- Receipts from by-products	42 5	136	975	..	1 535	..
	Expenditure 1	11 00 0	12 203	18 992	..	42 195	..
1990	Investment expenditure	5 72 0	2 364	9 820	..	17 904	..
	+ Current expenditure	7 72 4	17 193	7 356	..	32 273	..
	- Receipts from by-products	40 9	485	1 104	..	1 998	..
	Expenditure 1	13 03 5	19 072	16 072	..	48 179	..
1992	Investment expenditure	5 38 6	3 112	12 217	..	20 715	..
	+ Current expenditure	7 66 0	19 185	6 236	..	33 082	..
	- Receipts from by-products	32 4	425	918	..	1 667	..
	Expenditure 1	12 72 2	21 872	17 535	..	52 130	..
BUSINESS SECTOR: TOTAL MANUFACTURING EXPENDITURE							
1992	Investment expenditure	2 89 7	1 092	3 984	..	7 973	..
	+ Current expenditure	4 65 9	5 738	4 083	..	14 480	..
	- Receipts from by-products	31 3	414	908	..	1 635	..
	Expenditure 1	7 24 3	6 416	7 159	..	20 818	..
PRIVATE HOUSEHOLDS							
1985	Expenditure 1	..	..	15 217	..	15 217	..
1990	Expenditure 1	..	..	9 583	..	9 583	..
1992	Expenditure 1	..	..	7 681	..	7 681	..

a) Definitions and methodological notes are on preceding page.
b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	1985	1990	1991	1992
Gross fixed capital formation	Investment expenditure of the public and business sectors	89.3	100.0	100.0	99.0
Government final consumption expenditure	Public sector current expenditure and R&D	81.0	96.9	100.0	103.5
GDP	Business sector current expenditure	80.2	96.3	100.0	102.8
Private final consumption expenditure	Household expenditure	78.8	96.4	100.0	102.8

AUSTRALIA

Sources and definition

In 1994, the Australian Bureau of Statistics (ABS) published the results of a pilot survey on industrial pollution abatement expenditure (ABS, 1994[4]), an update with extended coverage was published in 1995 (ABS, 1995[5]). The 1994 publication included estimates of the PAC expenditure incurred by manufacturing and mining industries and the public sector in the financial year 1990-91. The 1995 publication covers the financial year 1991-1992 and includes figures also for agriculture, retail, wholesale and household sectors. The ABS is continuing work in the area of environmental expenditures. Estimates for the 1992-1993 financial year are to include waste handling expenses for a range of additional sectors including construction, community services, and transport and storage industries.

The public sector figures are mainly based on public sector accounts data held by the Australian Bureau of Statistics. Government transactions are classified according to the Government Purpose Classification (GPC). Current outlays refer to the sum of net current expenditure on goods and services and net current transfer payments. Capital outlays refer to the sum of expenditure on new fixed assets, net purchases of other capital assets (i.e., buildings and land), increases in stocks and net transfer payments to other bodies to fund capital expenditure.

For the manufacturing industry, capital expenditures were defined as expenditures on abatement and control facilities, processes to reduce or eliminate the generation of pollutants by employing material substitution, improved catalysts and equipment alteration and equipment converted to use fuels that generate less pollution. Current expenditures on pollution abatement and control included payments to contractors to remove and dispose of wastes, levies and fees paid to local government or other agencies for waste water treatment and solid waste disposal, and other operational and maintenance costs incurred by the establishment for the protection of the environment from the pollution. Capital expenditure for mining industry included expenditures on any element of the production process specifically attributable to protecting the environment through the reduction or elimination of pollutants and waste emitted by the establishment's operations. The Australian approach followed closely the OECD methodology for PAC expenditure. The Australian Bureau of Statistics intends to repeat the surveys regularly, to improve the sectoral coverage and to extend the survey to cover non-PAC expenditures, especially through the public sector.

Characteristic activities and environmental media

PAC expenditure for the public sector is grouped in to the following categories: household garbage, other sanitation, sewerage, urban stormwater drainage and protection of the environment not elsewhere classified. The environmental component could not be singled out for a number of public sector expenditure items and, consequently, public sector PAC expenditure is underestimated.

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[4] ABS (Australian Bureau of Statistics) (1994): *Cost of Environment Protection, Australia, Selected Industries 1990-91,* A Research Project of the Australian Bureau of Statistics, Catalogue No. 4603.0.

[5] ABS (Australian Bureau of Statistics) (1995): *Cost of Environment Protection, Australia, Selected Industries 1991-92,* Catalogue No. 4603.0.

Business sector PAC expenditure data relate both to end-of-pipe installations and process integrated technology[6]. PAC expenditure for total manufacturing includes the use of more environmentally friendly materials and fuels. Business sector expenditure comprises mining and quarrying and manufacturing. Though business sector data is collected from a limited numbers of industries, it can be considered to cover most of the total business area.

Economic sectors

Both public and private sectors are covered. The public sector is defined as all entities majority-owned and/or controlled by the Commonwealth, State or local governments. Government grants and subsidies are included in the public sector figures, whereas charges and fees paid by firms for environmental purposes are included in the private sector figures.

For the business sector, investment and current expenditure could be distinguished only for waste. Information on mining and quarrying, on the other hand, is more detailed and figures for different mining and quarrying products (ferrous metals, non-ferrous metals, coal and aluminium and gas) are available.

[6] To estimate the expenditure on change-in-production technologies, firms were asked to identify the primary reason for obtaining the equipment. If the equipment was purchased for PAC purposes (e.g. to accommodate new regulations), then the entire outlay was attributed to pollution abatement and control.

AUSTRALIA[a]

Million of dollars at 1991 prices

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1990	Investment expenditure	99 4	43	..	83	1 120	..
	+ Current expenditure	12 9	264	..	203	596	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 12 3	307	..	286	1 716	65
1991	Investment expenditure	94 7	86	..	49	1 082	..
	+ Current expenditure	10 1	242	..	215	558	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 04 8	328	..	391	1 767	79
BUSINESS SECTOR: TOTAL EXPENDITURE [c]							
1990	Investment expenditure	..	..	..	..	429	..
	+ Current expenditure	..	..	..	..	349	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	778	..
1991	Investment expenditure	..	..	..	..	537	..
	+ Current expenditure	..	..	..	..	621	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	1 479	..
BUSINESS SECTOR: INDUSTRY BRANCHES							
Agriculture (1991)		..	..	..	..	321	..
Total manufacturing (1991)							
	Investment expenditure	..	..	..	..	484	..
	+ Current expenditure	..	..	..	..	522	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	1 006	..
Mining and quarrying (1991)							
	Investment expenditure	2 3	6	13	12	53	..
	+ Current expenditure	..	..	..	..	98	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	152	..
Investment and current expenditure for selected manufacturing industries (1991)							
ISIC 34	Pulp and paper	8	..	..	..	8	..
ISIC 35	Chemicals	5 0	13	44	..	107	..
ISIC 36	Non-metallic mineral products	4	..	4	..	9	..
ISIC 37	Iron and steel	4 1	67	105	..	213	..
PRIVATE HOUSEHOLDS							
1991	Expenditure 1	9 7	443	74	215	829	..

a) Definitions and methodological notes are on the preceding page. Data refers to financial year.
b) Source: OECD Basic Science and Technology Statistics
c) Figure 1991 includes agriculture, that is not included in the 1990 figure.

Source: OECD

Price Index	Used to deflate	1990	1991
Gross fixed capital formation	Investment expenditure by the public and business sectors	99. 6	100.0
Government final consumption expenditure	Public sector current expenditure and subsidies	96. 0	100.0
GDP	Business sector current expenditure	97. 8	100.0

JAPAN

Sources and definition

In Japan, there are several regular surveys on PAC expenditure. In these surveys, PAC is defined as those activities which directly contribute to pollution control.

Public sector surveys are conducted annually. Investment and current expenditure by the central government have been collected since 1967; data on local government expenditure since 1971.

For the business sector, figures on PAC investment expenditure by large companies (i.e., enterprises with assets of 100 million ¥ or more) have been collected since 1965. These surveys cover most manufacturing industries, along with the energy and mining sectors. Since 1977, statistics on small and medium-sized manufacturing firms have also been compiled. So far, there are no surveys on business sector current expenditure.

Characteristic activities and environmental media

PAC expenditure covers the following environmental media: air, water, soil, solid waste, noise and vibration, and odours.

Economic sectors

Public sector figures include investment and current expenditure (Expenditure 1) by both the central and local governments. These have been adjusted to avoid double counting, particularly with respect to the flow of subsidies from the central government to the local governments.

Figures on PAC investment expenditure by the business sector are available, but there is no information on the current expenditure.

PAC statistics for the business sector include outlays by large companies in energy, mining and most manufacturing industries: no figures are available for large manufacturers of food and tobacco, wood and wood products. Expenditure by small and medium-sized firms represent the whole manufacturing sector. There are data on PAC expenditure by construction, transport, agriculture or forestry sectors. The Secretariat estimate for business sector expenditure in 1990 includes all companies.

At present, there are no surveys on household expenditure.

JAPAN[a] *Hundred million yen at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	..	..	..	..	26 105	..
	+ Current expenditure	..	..	..	..	4 414	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	30 519	101
1990	Investment expenditure	..	..	..	..	36 715	..
	+ Current expenditure	..	..	..	..	4 566	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	41 280	95
BUSINESS SECTOR: TOTAL EXPENDITURE							
1985	Investment expenditure	85 2	130	2 639	671	4 291	..
1990	Investment expenditure	1 00 6	304	2 349	1 078	4 737	..
1990[c]	Investment expenditure	..	..	..	..	9 929	..
	+ Current expenditure	..	..	..	..	18 349	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	28 277	..
BUSINESS SECTOR: INDUSTRY BRANCHES (1990)							
Mining and quarrying							
	Investment expenditure	7	3	1	-	11	..
Electricity, gas, water							
	Investment expenditure	15 8	22	1 518	368	2 067	..
Total manufacturing							
	Investment expenditure	84 1	278	830	710	2 659	..
Investment expenditure: selected manufacturing industries							
ISIC 32	Textiles and leather	4 8	3	14	15	80	..
ISIC 34	Pulp and paper	11 1	39	173	62	386	..
ISIC 35	Chemicals	9 1	6	48	45	189	..
ISIC 36	Non-metallic mineral products	2 1	4	26	8	60	..
ISIC 37	Iron and steel	7 5	63	193	105	436	..
ISIC 38	Machinery	25 3	68	118	299	738	..

a) Definitions and methodological notes are on preceding page.

b) Source: OECD Basic Science and Technology Statistics.

c) Secretariat estimate includes all companies.

Source: OECD

Price index	Used to deflate	198 5	1990	1991
Gross fixed capital formation	Investment expenditure by the public and business sectors	97. 2	98.8	100.0
Government final consumption expenditure	Public sector current expenditure and R& D	84.2	95.6	100.0
GDP	Business sector expenditure 1	92. 2	98.1	100.0

AUSTRIA

Sources and definition

In Austria, data on environmental expenditure have been collected by the Austrian Central Statistical Office since the early 1980s. Industrial expenditure figures are based on surveys carried out by the Austrian Chamber of Commerce every three years (Bundeskammer, 1992[7]). PAC expenditure is defined as expenditure that is directed towards avoiding, abating or controlling emissions and waste disposal into the environment. The figures are published by the Austrian Central Statistical Office (Österreichisches Statistisches Zentralamt und Umweltbundesamt, 1994[8]).

Characteristic activities and environmental media

PAC activities include direct pollution abatement and control, planning, monitoring and regulatory activity. The following environmental media are covered: waste water collection and treatment, waste disposal, air and noise. Data on expenditure for re-cultivation, R&D, and recycling were excluded from the tables for "Business sector: industry branches" in order to provide a closer matching with OECD definitions.

Economic sectors

Public sector expenditure covers all levels of government i.e., the federal level, the state level, municipalities, and special institutions such as the ecofund net subsidies to private sector. Net subsidies are shown for public sector and manufacturing in 1991 data. Some double counting occurs due to the addition of waste water fees and waste fees in both the business sector and the public sector expenditure. No information is available on expenditure by agriculture and forestry and the service industries. Private household expenditure relates exclusively to motor vehicle emission abatement devices (the cost of catalytic converters).

[7] Bundeskammer der gewerblichen Wirtschaft, *Aufwendungen der Industrie für den Umweltschutz*, Vienna. 1992

[8] Österreichisches Statistisches Zentralamt und Umweltbundesamt (1994): Umwelt in Österreich, Daten und Trends, Wien.

AUSTRIA[a] *Millions of shillings at 1991 prices*

		Water	Waste	Air	Other[d]	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1988	Investment expenditure	7 71 1	657	..	140	8 508	..
	+ Current expenditure	3 09 7	5 773	..	0	8 870	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	10 80 8	6 430	..	140	17 378	109
1990[e]	Investment expenditure	8 03 7	717	955	478	10 187	..
	+ Current expenditure	7 18 7	5 096	21	870	13 174	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	15 22 4	5 812	977	1 348	23 361	203
	+ Subsidies	2 27 5	212	230	604	3 322	..
	- Fees	8 31 2	4 023	..	..	12 335	..
	Expenditure 2	9 18 7	2 001	1 207	1 952	14 347	..
1991	Investment expenditure	8 27 0	870	630	510	10 280	..
	+ Current expenditure	7 56 0	5 840	30	1 030	14 460	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	15 83 0	6 710	660	1 540	24 740	293
	+ Subsidies	2 76 0	310	223	594	3 887	..
	- Fees	8 14 0	4 340	..	..	12 480	..
	Expenditure 2	10 45 0	2 680	883	2 134	16 147	..
BUSINESS SECTOR: TOTAL EXPENDITURE[c]							
1989	Investment expenditure	2 73 2	727	3 051	276	6 786	..
	+ Current expenditure	2 19 1	748	2 003	39	4 982	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	4 92 3	1 475	5 055	315	11 768	..
1990[f]	Investment expenditure	5 72 2	561	4 465	571	11 319	..
	+ Current expenditure	4 27 2	1 143	2 994	1 050	9 459	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	9 99 4	1 704	7 459	1 621	20 778	..
1991	Investment expenditure	4 17 0	710	5 810	660	11 350	..
	+ Current expenditure	5 34 0	1 370	3 240	1 290	11 240	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	9 51 0	2 080	9 050	1 950	22 590	..
PRIVATE HOUSEHOLDS							
1989	Expenditure 1	..	..	2 069	..	2 069	..
1990	Expenditure 1	1 0	10	1 458	124	1 603	..
	- Subsidies	..	..	..	..	..	..
	+ Fees	7 22 8	2 933	..	..	10 160	..
	Expenditure 2	7 23 8	2 943	1 458	124	11 763	..
1991	Expenditure 1	3 0	40	1 530	130	1 730	..
	- Subsidies	..	..	..	..	..	..
	+ Fees	7 21 7	3 322	..	..	10 539	..
	Expenditure 2	7 24 7	3 362	1 530	130	12 269	..

b) Source: OECD Basic Science and Technology Statistics.
c) 1989 data do not include expenditure by electric utilities.
d) "Other" expenditure include outlays by electric utilities that cannot be allocated to specific media.
e, f) Change in classification.

Source: OECD

Price Index	Used to deflate	1988	1989	1990	1991	1992
Gross fixed capital formation	Investment expenditure by the public and business sectors	90.7	93.4	96.3	100.0	103.3
Government final consumption expenditure	Public sector current expenditure, subsidies and R&D	86.6	90.3	94.2	100.0	105.3
GDP	Business sector current expenditure	90.5	93.1	96.2	100.0	104.2
Private final consumption expenditure	Household Expenditure	91.2	93.7	96.7	100.0	103.9

AUSTRIA[a] *Millions of shillings at 1991 prices*

		Water	Waste	Air	Other[b]	Total
BUSINESS SECTOR: INDUSTRY BRANCHES						
Mining and quarrying (1992)						
	Investment expenditure	1 3	17	21	11	62
+	Current expenditure	12 9	47	36	24	235
-	Receipts from by-products	..	..	..	..	..
	Expenditure 1	14 1	64	57	35	297
Electricity, gas, water (1988)						
	Investment expenditure	..	..	..	..	857
+	Current expenditure	..	..	..	..	364
-	Receipts from by-products	..	..	..	..	..
	Expenditure 1	..	..	..	..	1 221
Total manufacturing (1990)						
	Investment expenditure	3 58 7	862	2 314	171	6 934
+	Current expenditure	2 50 4	602	1 615	120	4 841
-	Receipts from by-products	..	..	..	..	..
	Expenditures 1	6 09 1	1 464	3 929	291	11 774
-	Subsidies	1 23 9	299	799	58	2 396
+	Fees	..	..	..	..	..
	Expenditure 2	4 85 2	1 164	3 130	233	9 378
Total manufacturing (1992)						
	Investment expenditure	3 02 9	1 074	2 920	143	7 166
+	Current expenditure	2 43 0	861	2 343	115	5 749
-	Receipts from by-products	..	..	..	..	..
	Expenditure 1	5 45 9	1 934	5 262	258	12 914
-	Subsidies	1 11 7	395	1 078	53	2 643
+	Fees	..	..	..	..	..
	Expenditure 2	4 34 2	1 539	4 185	206	10 271
Investment and current expenditure for selected manufacturing industries (1992)						
ISIC 31	Food and tobacco	65 1	167	185	32	1 035
ISIC 32	Textiles and leather	17 2	149	116	11	448
ISIC 33	Wood and wood products	67 3	123	536	35	1 368
ISIC 34	Pulp and paper	1 77 9	330	710	47	2 866
ISIC 35	Chemicals	1 41 6	355	853	21	2 646
ISIC 36	Non-metallic mineral products	47 6	255	1 243	24	1 998
ISIC 37	Iron and steel	11 1	84	79	21	296
ISIC 38	Machinery	9 1	59	101	11	262
ISIC 39	Other	76 0	424	1 966	47	3 197

a) Definitions and methodological notes are on preceding page.

b) "Other" expenditure include outlays by electric utilities that cannot be allocated to specific media.

Source: OECD

DENMARK

Sources and definition

In Denmark, data on PAC expenditure are collected by the Danish Environmental Protection Agency and Danmarks Statistik (Etwil and Vesselbo, 1993[9]). Expenditure figures pertain to activities that are directed at the prevention, reduction, and elimination of pollution or other environmental nuisances. Data are available for the public sector and utilities.

Danmarks Statistik plans to collect data on industrial PAC expenditure in the future. A preliminary survey was carried out in 1992 and a larger pilot survey comprising of 300-500 enterprises has been planned (Kring Rasmussen, 1993[10]).

Environmental media

Data for years 1985-1991 covers the following media: water and land, waste, air and "other". The "other" category includes outlays related to noise, as well as expenditure that cannot be allocated to any particular environmental media, such as expenditure on general administration.

PAC expenditure by utilities is directed exclusively towards mitigation and prevention of air pollution.

Economic sectors

All public sector levels (central government, counties, municipalities and inter municipal corporations) are included in the Database for Integrated Public Accounts (DIPA), from where the aggregate figures for environmental protection were obtained. Earlier expenditure evaluations were used to allocate aggregate investment and current expenditure data for water and land to water and waste media.

Data for the public sector include capital and current expenditure, subsidies, and fees; thus, PAC expenditure for this sector can be presented according to both the abater (Expenditure 1) and the financing (Expenditure 2) principles. For utilities, only the expenditure for investment and current expenditure (Expenditure 1) is available.

There is no data on household PAC expenditure at present.

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[9] Etwil P. and Vesselbo E. (1993): *Collection of data on expenditure on the environment by the General Government Sector*, Danmarks Statistik, in *Contributions of Member States and EFTA countries to the SERIEE system*, Eurostat F3, Luxembourg, 1994.

[10] Kring Rasmussen, V. (1993): *Collection of Data on Current Expenditure and Investments Relating to Environmental Protection in Industry*, Danmarks Statistik, in *Contributions of Member States and EFTA countries to the SERIEE system*, Eurostat F3, Luxembourg, 1994.

DENMARK[a] *Millions of kroner at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	1 305	82	..	29	1 416	..
	+ Current expenditure	1 95 9	1 607	..	849	4 415	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	3 26 4	1 689	..	878	5 831	67
	+ Subsidies	-	61	..	67	128	..
	- Fees	3 06 3	1 622	..	201	4 886	..
	Expenditure 2	20 0	128	..	745	1 073	..
1989	Investment expenditure	1 342	895	..	245	2 482	..
	+ Current expenditure	1 06 4	710	..	195	1 969	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	2 40 6	1 604	..	440	4 451	200
	+ Subsidies	..	..	..	..	370	..
	- Fees	..	..	..	..	4 028	..
	Expenditure 2	..	..	..	..	792	..
1990	Investment expenditure	1 313	875	..	260	2 448	..
	+ Current expenditure	1 12 4	749	..	222	2 096	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	2 43 7	1 625	..	482	4 544	241
	+ Subsidies	..	..	..	..	513	..
	- Fees	..	..	..	..	4 289	..
	Expenditure 2	..	..	..	..	768	..
1991	Investment expenditure	1 383	922	46	197	2 548	..
	+ Current expenditure	1 30 9	873	44	187	2 413	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	2 69 2	1 795	90	384	4 961	209
	+ Subsidies	..	..	..	..	596	..
	- Fees	..	..	..	..	4 881	..
	Expenditure 2	..	..	..	..	676	..

a) Definitions and methodological notes are on preceding page.

b) Source: OECD Basic Science and Technology Statistics

Source: OECD

Price index	Used to deflate	1985	1989	1990	1991
Gross fixed capital formation	Public sector investment expenditure	83. 0	94.2	96.2	100.0
Government final consumption expenditure	Public sector current expenditure, subsidies, fees and R&D	75. 6	92.5	95.7	100.0

FINLAND

Sources and definition

In Finland, the collection of PAC expenditure estimates began in 1992 as a joint project between the Ministry of Environment and Statistics Finland. Statistics Finland publishes annually the results of the sample survey (Statistics Finland, 1994[11], 1995[12]). Mining and quarrying, industrial manufacture and energy supply are included in the sample. Environmental protection expenditure are defined as measures that are primarily motivated by environmental protection considerations and do not meet the firm's general profitability criteria. Environmental expenditure include both process-integrated investments and end-of-pipe activities. Current expenditure figures include running and maintenance expenses of environmental protection facilities, additional expenses related to the use of cleaner products as well as other environmental operating expenditure, including cost of supervising and monitoring environmental protection, various fees and compensations, and administrative and R&D expenditure. For other environmental operating expenditure the disaggregation by environmental media is not possible.

Characteristic activities and environmental media

The statistics have been drawn up in accordance with the Eurostat SERIEE guidelines, the definitions are therefore broadly consistent with the OECD definitions. Environmental domains included are air, water, waste and "other". The category "other" includes, for example, noise abatement, nature conservation and landscape protection. Waste category includes waste treatment and measures aimed to protect soil and groundwater and to reduce the creation of waste.

Economic sectors

The public sector expenditure data is not available, but the development of statistics is under way in Finland. Expenditure data are available according to the abater principle. Subsidy figures can be presented only at the total industry level. Thus, the Finnish statistics allow a partial distinction between the abater and the financing principles.

[11] Statistics Finland (1994): *Environmental Expenditure of Manufacturing and Related Industries in Finland in 1992*, Environment 1994:4, Helsinki.

[12] Statistics Finland (1995): *Environmental Expenditure by Finnish Industry in 1993*, Environment 1995:9, Helsinki.

FINLAND[a] *Millions of FMK at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR (1992)							
	Expenditure 1	..	..	..	..	..	151
BUSINESS SECTOR: TOTAL EXPENDITURE							
1992	Investment expenditure	571	99	1 236	9	1 916	..
	+ Current expenditure	592	344	218	192	1 345	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 163	442	1 454	201	3 261	..
	- Subsidies	5	21	17	19	61	..
	+ Fees	..	..	..	..	..	..
	Expenditure 2	1 159	422	1 437	182	3 199	..
1993	Investment expenditure	547	59	1 062	9	1 676	..
	+ Current expenditure	594	340	321	210	1 465	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 141	398	1 383	219	3 141	..
BUSINESS SECTOR: INDUSTRY BRANCHES							
Mining and Quarrying							
1992	Investment expenditure	8	2	1	-	11	..
	+ Current expenditure	10	7	2	4	24	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	19	9	3	4	35	..
1993	Investment expenditure	7	4	1	-	12	..
	+ Current expenditure	15	2	2	6	25	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	22	6	3	7	37	..
Electricity, gas, water							
1992	Investment expenditure	6	-	677	3	693	..
	+ Current expenditure	-	15	67	45	152	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	6	16	745	48	845	..
1993	Investment expenditure	16	8	725	7	756	..
	+ Current expenditure	16	17	116	54	205	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	32	25	841	62	960	..
Total Manufacturing Industry							
1992	Investment expenditure	494	66	532	4	1 212	..
	+ Current expenditure	526	258	116	132	1 165	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 019	324	648	136	2 377	..
1993	Investment expenditure	525	47	336	1	908	..
	+ Current expenditure	562	321	204	149	1 235	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 087	367	540	150	2 144	..
Investment and current expenditure: selected manufacturing industries (1993)							
ISIC 31	Food and tobacco	125	48	6	5	183	..
ISIC 32	Textiles and leather	5	3	-	-	8	..
ISIC 33	Wood and wood products	8	15	5	2	30	..
ISIC 34	Pulp and paper	654	71	133	64	921	..
ISIC 35	Chemicals	161	90	298	43	593	..
ISIC 36	Non-metallic mineral products	11	16	12	4	44	..
ISIC 37	Iron and steel	65	45	75	18	234	..
	Machinery	38	64	9	13	123	..
ISIC 39	Other	3	2	..	..	5	..

a) Definitions and methodological notes are on the preceding page.
b) Source:OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	1991	1992	1993
Gross fixed capital formation	Investment expenditure by the public and business sectors	100.0	96.1	96.3
Government final consumption expenditure	Public sector current expenditure	100. 0	102.0	102.0
GDP	Business sector current expenditure	100. 0	100.7	103.1

FRANCE

Sources and definition

In France, data on PAC expenditure form an integral part of a regular analysis of the economic aspects of the environment and data is published regularly (Ministère de l'Environnement, 1994[13]). Since 1992, Statistical Office of the Ministry of Industry has carried out an annual survey on industrial PAC expenditure. Data for public sector investments on waste water treatment were adjusted according to trend on supply. Revised figures are available as far back as 1988. Current expenditure is estimated using the figures of a baseline study. Updated figures are produced through a set of observable variables such as the wage index for public servants, or information about the state of the equipment used for pollution control.

Characteristic activities and environmental media

PAC data cover the areas of pollution abatement, regulation and monitoring and R&D. Business investment expenditure does not include expenditure for integrated technology.

Characteristic activities include:

- waste water collection and treatment;
- abatement of polluting accidents such as oil spills;
- collection and treatment of waste (including street cleaning for public sector);
- reduction of noise;
- abatement of air pollution; available for private sector only. Public expenditure on air pollution control forms part of the expenditure category "general improvement and protection of the natural environment and the national heritage", which was excluded from the OECD survey. According to the Ministry for the Environment, the share of public expenditure on air pollution is comparatively small.

Economic sectors

Public sector expenditure includes all levels of government. In general, the abater principle is followed. In some years, such as 1988 and 1992, evaluations of financing flows were undertaken. From these, it is possible to estimate the extent of the private sector participation in financing PAC activities. PAC definitions were revised in 1992 to include street cleaning. Also in 1992, expenditures by central administration on general administration of the environment were estimated for the first time.

Private household expenditure includes septic tanks, anti-pollution expenditure for motor vehicles, protection against noise, and expenditure for waste (waste bags). The methods used in France, for the time being, do not allow receipts or cost-recovery by industry to be identified.

[13] Ministère de l'Environnement (1994): *Données économiques de l'environnement*, éditions 1992-1993, Imprimerie France Quercy, Cahors.

FRANCE[a] *Millions of francs at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1988	Investment expenditure	11 83 6	2 081	..	2 449	16 366	..
	+ Current expenditure	16 82 8	17 950	..	1 650	36 665	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	28 66 4	20 031	..	4 099	52 794	684
1990	Investment expenditure	12 74 9	1 612	..	2 841	17 343	..
	+ Current expenditure	17 47 8	19 403	..	2 330	39 352	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	30 22 7	21 015	..	5 171	56 413	624
1992	Investment expenditure	12 91 0	1 768	..	3 808	18 486	..
	+ Current expenditure	17 74 8	20 437	..	3 204	41 388	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	30 65 7	22 205	..	7 012	59 874	957
BUSINESS SECTOR [c]							
1985	Investment expenditure	1 47 7	650	1 914	706	4 748	..
	+ Current expenditure	4 43 9	4 477	3 812	..	12 727	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	5 91 6	5 127	5 726	706	17 475	..
1988	Investment expenditure	2 06 3	738	1 865	798	5 464	..
	+ Current expenditure	5 34 9	5 570	4 572	..	15 491	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	7 41 2	6 308	6 437	798	20 955	..
1990	Investment expenditure	2 27 6	841	1 969	811	5 897	..
	+ Current expenditure	5 79 2	6 457	4 805	..	17 054	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	8 06 8	7 298	6 774	811	22 951	..
1992	Investment expenditure	2 29 4	884	2 036	775	5 988	..
	+ Current expenditure	6 17 0	6 964	5 034	..	18 168	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	8 46 4	7 848	7 070	775	24 157	..
PRIVATE HOUSEHOLDS[c]							
1985	Expenditure 1	4 17 9	1 291	609	1 065	7 144	..
1988	Expenditure 1	4 10 1	1 370	626	1 192	7 288	..
1990	Expenditure 1	4 11 2	1 465	875	1 230	7 683	..
1992	Expenditure 1	4 00 3	1 523	1 162	1 172	7 860	..

a) Definitions and methodological notes are on preceding page.
b) Source: OECD Basic Science and Technology Statistics
c) Group "other" for business and household sectors refers to expenditure on noise.

Source: OECD

Price index	Used to deflate	198 5	1988	1990	1991	1992
Gross fixed capital formation	Investment expenditure by the publ ic and business sectors	84.0	91.6	96.9	100.0	100.7
Government final consumption expenditure	Public sector current expenditure	83. 7	90.1	97.1	100.0	103.0
GDP	Business sector current expenditure	81. 8	91.2	96.8	100.0	102.1
Private final consumption expenditure	Household expenditures	83. 0	90.8	96.9	100.0	102.4

GERMANY

Sources and definition

In Germany, surveys of the business community have been conducted annually since 1975 in order to evaluate PAC investment expenditure. In addition, estimates are carried out for industrial current expenditure, as well as the current and investment expenditure of the public sector (Statistisches Bundesamt, 1994[14], 1995[15]). PAC expenditure figures relate to western Germany only.

PAC investment expenditure is defined as

- expenditure for capital goods to protect from environmental damage and nuisance caused by the production process;
- expenditure for capital goods in order to produce more environmentally friendly products.

The inclusion of the latter item distinguishes German statistics from other national sources. The possible bias appears to remain small, however, as the item accounts for less than one per cent of overall PAC investment expenditure in industry.

PAC expenditure is defined as expenditure directly related to the protection of the environment. In the context of expenditure for clean products, only the part of expenditure which is incurred in response to environmental regulation is included.

Characteristic activities and environmental media

German expenditure statistics cover expenditure for direct pollution abatement and control, monitoring and control, and R&D. Survey-based investment expenditure includes expenditure for end-of-pipe technologies as well as the additional cost incurred for integrated, environmentally benign technologies.

The following environmental media are covered: water, air, treatment and removal of waste, and protection against noise. Expenditure on workplace protection is excluded.

Economic sectors and additional data

Public PAC expenditure includes the different levels of government. Industrial PAC expenditure covers quarrying and mining, manufacturing, utilities and construction. No expenditure figures are available for private households. Business sector receipts from the sales of PAC by-products are not identified and therefore not netted out from expenditure. Industry PAC investment expenditure figures are evaluated according to the abater principle. At the two- and three-digit levels of ISIC, only investment expenditure figures are available.

[14] Statistisches Bundesamt (1994): Umweltökonomische Gesamtrechnungen - Basisdaten und ausgewählte Ergebnisse - 1994, Reihe 4, Fachserie 19, Metzler-Poeschel, Stuttgart.

[15] Statistisches Bundesamt (1995): Umweltökonomische Gesamtrechnungen - Ausgaben und Anlagevermögen für Umweltschutz - 1995, Reihe 6, Fachserie 19, Metzler-Poeschel, Stuttgart.

The Federal Statistical Office also publishes the receipts of the public sector from environmental services, as well as the volume of private sector capital expenditure that qualified for investment tax incentives.

GERMANY[a] *Millions of DM at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	7 06 4	649	23	270	8 006	..
	+ Current expenditure	3 71 3	3 907	17	-	7 637	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	10 77 7	4 556	39	270	15 643	786
1990	Investment expenditure	8 86 8	1 562	42	409	10 881	..
	+ Current expenditure	4 47 1	5 288	21	-	9 780	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	13 33 9	6 850	63	409	20 661	928
1992	Investment expenditure	..	..	..	..	12 175	..
	+ Current expenditure	..	..	..	..	11 390	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	23 565	1 125
BUSINESS SECTOR: TOTAL EXPENDITURE							
1985	Investment expenditure	1 25 9	389	4 713	312	6 673	..
	+ Current expenditure	3 90 5	1 706	3 431	117	9 159	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	5 16 4	2 095	8 144	429	15 832	..
1990	Investment expenditure	2 09 6	870	4 319	314	7 600	..
	+ Current expenditure	4 26 8	2 015	5 202	135	11 620	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	6 36 4	2 885	9 521	449	19 220	..
1992	Investment expenditure	..	..	..	..	6 006	..
	+ Current expenditure	..	..	..	..	12 213	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	18 218	..

a) Definitions and methodological notes are on preceding page.
b) Source: OECD Basic Science and Technology Statistics.
Source: OECD

Price index	Used to deflate	198 5	1989	1990	1991	1992
Gross fixed capital formation	Investment expenditure by the public and business sectors	84. 3	91.0	95.4	100.0	103.9
Government final consumption expenditure	Public sector current expenditure and R&D	84. 2	92.1	95.5	100.0	103.6
GDP	Business sector current expenditure	85. 4	93.3	96.3	100.0	104.4

GERMANY *Millions of DM at 1991 prices*

	Water	Waste	Air	Other	Total[a]
BUSINESS SECTOR: INDUSTRY BRANCHES (1992)					
Mining and quarrying					
Investment expenditure	6 0	10	190	20	270
+ Current expenditure	14 0	120	370	10	630
- Receipts from by-products	..	..	..	..	..
Expenditures 1	19 0	120	560	30	900
Electricity, Gas, Water					
Investment expenditure	23 0	150	870	60	1 300
+ Current expenditure	58 0	430	2 230	20	3 270
- Receipts from by-products	..	..	..	..	..
Expenditures 1	81 0	580	3 100	80	4 570
Construction					
Investment expenditure	2 0	30	30	20	90
+ Current expenditure	1 0	50	30	10	90
- Receipts from by-products	..	..	..	..	..
Expenditures 1	2 0	70	50	30	180
Total manufacturing and quarrying					
Investment expenditure	1 68 0	600	1 900	220	4 390
+ Current expenditure	3 73 0	1 760	2 900	100	8 500
- Receipts from by-products	..	..	..	..	..
Expenditures 1	5 41 0	2 360	4 800	320	12 890
Investment Expenditure: Selected Manufacturing Industries (1989)					
ISIC 31 Food and tobacco	9 1	36	93	21	242
ISIC 32 Textiles and leather	2 7	13	30	4	75
ISIC 33 Wood and wood products	8	15	68	3	95
ISIC 34 Pulp and paper	16 4	134	79	9	386
ISIC 35 Chemicals	1 02 3	254	943	44	2 264
ISIC 36 Non-metallic mineral products	26	15	159	24	225
ISIC 37 Iron and steel	11 4	18	304	22	458
ISIC 38 Machinery	32 6	73	541	74	1 013
ISIC 39 Other	8	-	1	-	9

a) Differences in the sums are due to rounding.

Source: OECD

GREECE

Sources and definition

A number of pilot studies on environmental expenditure have been carried out in Greece (Skourtos and Stefanou, 1993a[16],b[17], 1994[18]). These studies contain data on both public and private sectors. According to the Greek Law (1650/1986) the term *environment* includes cultural aspects (monuments, archaeological sites, etc.) and, consequently, the relevant expenditure is often classified as environmental expenditure. The pilot studies, however, tried to adhere to the SERIEE definition of environmental expenditure.

The current accounting practice of Greek enterprises does not include differentiation between environmental and non-environmental expenditure.

Characteristic activities and environmental media

The environmental media include waste water, groundwater and soil, solid waste, air, noise and other.

Economic sectors

Only data on public sector investment expenditure was collected.

No surveys on household PAC expenditure have been carried out.

[16] Skourtos M. S. and Stefanou P. (1993a): *Collection of data on expenditure on the environment by the General Government Sector of Greece*, in *Contributions of Member States and EFTA countries to the SERIEE system*, Eurostat F3, Luxembourg.

[17] Skourtos M. S. and Stefanou P. (1993a): *Collection of data on expenditure on the environment in industry of Greece*, in *Contributions of Member States and EFTA countries to the SERIEE system*, Eurostat F3, Luxembourg.

[18] Skourtos M. S. and Stefanou P. (1994): *Statistics of Environmental Expenditure in Industry and Services and the State sector: The Greek experience*, Athens/Mytilene, Greece, September 1994.

GREECE[a]

Millions of Drs at 1991 prices

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	74 87 9	3 623	..	..	78 502	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	.	..	..	..
	Expenditures 1	74 87 9	3 623	..	..	78 502	945
1986	Investment expenditure	66 66 7	3 333	..	..	70 000	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	66 66 7	3 333	..	..	70 000	751
1987	Investment expenditure	54 57 7	3 345	..	..	57 923	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	54 57 7	3 345	..	..	57 923	588
1988	Investment expenditure	54 77 3	..	..	..	54 773	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	54 77 3	..	..	..	54 773	922
1989	Investment expenditure	61 91 1	2 692	..	..	64 603	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	61 91 1	2 692	..	..	64 603	1 171
1990	Investment expenditure	66 82 5	2 378	119	262	69 584	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	66 82 5	2 378	119	262	69 584	930
1991	Investment expenditure	64 00 0	2 500	..	..	66 500	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	64 00 0	2 500	..	..	66 500	712
1992	Investment expenditure	65 55 1	2 507	179	1 119	69 355	..
	Current expenditure	..	..	..	..	..	..
	Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	65 55 1	2 507	179	1 119	69 355	578

a) Definitions and methodological notes are on preceding page.

Source: OECD

Price index	Used to deflate	198 5	1986	1987	1988	1989	1990	1991	1992
Gross fixed capital formation	Investment expenditure by th e public and business sectors	41.4	51.0	56.8	63.9	74.3	84.1	100.0	111.7
Government final consumption expenditure	R&D	42. 2	48.2	54.8	64.7	74.6	90.2	100.0	114.9

ICELAND

Sources and definitions

Data on PAC expenditure are collected by the Statistical Bureau of Iceland. Investment and current expenditure figures are available for the public sector only.

Characteristic activities and environmental media

Waste is the only environmental media covered by the data.

Economic sectors

Only public sector PAC expenditure data is reported here.

ICELAND[a] *Millions of IKr at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum R&D[b]
PUBLIC SECTOR							
1989	Investment expenditure	..	249	..	..	249	..
	+ Current expenditure	..	977	..	..	977	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	1 226	..	..	1 226	..
1990	Investment expenditure	..	230	..	..	230	..
	+ Current expenditure	..	1 013	..	..	1 013	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	1 243	..	..	1 243	..
1991	Investment expenditure	..	288	..	..	288	..
	+ Current expenditure	..	1 342	..	..	1 342	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	1 630	..	..	1 630	30
1992	Investment expenditure	..	297	..	..	297	..
	+ Current expenditure	..	1 323	..	..	1 323	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	1 620	..	..	1 620	30

a) Definitions and methodological notes are on preceding page.

b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	198 9	1990	1991	1992
Gross fixed capital formation	Public sector investment expenditure	80. 8	93.9	100.0	102.9
Government final consumption expenditure	Public sector current expenditure, subsidies and R&D	83. 1	92.4	100.0	103.7

ITALY

Sources and definitions

In Italy, the first estimates of public environmental expenditure were presented in the 1989 Report on the State of the Environment (Ministero dell'ambiente, 1989[19]). These were based on a study carried out by the Research Institute for Economic Planning (ISPE), which was initiated by the Ministry for Environment. Since then, both the Italian National Statistical Office (ISTAT) and ISPE have proceeded to update and to develop environmental expenditure statistics. The most recent data were published in the *Report on the State of the Environment in Italy* (Ministry of the Environment, 1993[20]). Secretariat estimates for business sector investment expenditure are based on turnover of anti-pollution industries (supplier side).

Environmental expenditure is defined as all expenditure targeted at the conservation and rehabilitation of the environment.

Characteristic activities and environmental media

The Italian Environment Ministry adjusted its general environmental expenditure figures in order to correspond as closely as possible to the OECD questionnaire. The following environmental media are included in PAC expenditure tables for Italy: waste water treatment, air pollution control, conservation of soil and hydrological systems, waste disposal and noise protection.

Economic sectors

For the year 1988, public sector data included expenditure by the central government, the regional governments, and the Agency for the Promotion of the Development of Southern Italy. 1989 data includes also estimates of expenditure incurred by municipalities. Subsidies for environmental purposes are included in investment and current expenditure; however, no information is available on government revenues from fees and charges for environmental purposes.

Environmental protection expenditure figures in Italy have to be considered as rough level estimates.

[19] Ministero dell'ambiente (1989): *Relazione sullo stato dell'ambiente*, 1989, Instituto Poligrafico e Zecca dello Stato.

[20] Ministry of the Environment (1993): *Report on the State of the Environment in Italy*, Survey for the Environmental Impact Assessment, Public Information and the Report on the State of the Environment, Instituto Poligrafico e Zecca dello Stato.

ITALY[a] *Billion lire at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1988	Investment expenditure	2 54 4	106	-	-	2 650	..
	+ Current expenditure	51 7	4	-	-	521	..
	- Receipts from by-products	-	-	-	-	-	..
	Expenditure 1	3 06 1	110	-	-	3 171	247
1989[c]	Investment expenditure	2 12 8	1 344	..	224	3 695	..
	+ Current expenditure	49 0	2 693	..	796	3 978	..
	- Receipts from by-products	-	-	..	-	..	..
	Expenditure 1	2 61 7	4 037	..	1 020	7 673	207
BUSINESS SECTOR							
1989	Investment expenditure	56 0	560	1 120	..	2 240	..
	+ Current expenditure	57 9	1 159	579	..	2 317	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 13 9	1 719	1 699	..	4 557	..

a) Definitions and methodological notes are on preceding page.

b) Source: OECD Basic Science and Technology Statistics.

c) Includes the estimations of expenses made by municipalities. Data for years 1988 and 1989 are not comparable.

Source: OECD

Price index	Used to deflate	198 8	1989	1991
Gross fixed capital formation	Public and business sector investment expenditur e	84.7	89.3	100.0
Government final consumption expenditure	Public sector current expenditure and R&D	76. 4	81.7	100.0
GDP	Business sector current expenditure	81. 3	86.3	100.0

NETHERLANDS

Sources and definition

The Netherlands Central Bureau of Statistics has been conducting surveys on environmental expenditure for a number of years. In 1979, the Central Bureau of Statistics conducted a special survey to provide a basis for the annual investment surveys that have been carried out since then. Estimation methods are used to update survey results for current PAC expenditure. These data are published along with other environmental statistics (Netherlands Central Bureau of Statistics, 1993[21]).

PAC activity is defined as the reduction of the flow of emissions and waste arising from production processes and from consumption activities. PAC expenditure relates to measures which would not have been introduced in the absence of environmental considerations.

Characteristic activities and environmental media

The following characteristic activities are covered: direct pollution abatement and control, regulation and monitoring, co-ordination of PAC activities, and R&D. Investment expenditure comprise end-of-pipe technologies as well as expenditure for pollution control that is integrated in new technologies. Only part of the purchase value of environmentally friendly goods is classified as PAC expenditure; this is the proportion that is, for environmental reasons, in excess of alternative value of normal equipment. Expenditure for the development of more environmentally friendly products is explicitly excluded.

Environmental media comprise waste, surface water, groundwater, soil, air and noise.

Economic sectors

Public PAC expenditure include expenditure by the central government, provinces, water boards, municipalities and inter-municipal corporations. Private household expenditure includes additional expenditure for phosphate-free washing-powder and additional expenditure for low-sulphur fuels.

A major concern of the Netherlands' statistical approach towards PAC expenditure is to trace financial flows associated with pollution control. The amount of transfers, subsidies, and payments in exchange for environmental services is evaluated. Therefore, expenditure data are available according to both the abater principle and the financing principle.

[21] Netherlands Central Bureau of Statistics (1993): *Environmental Statistics of the Netherlands, 1993*, Voorburg/Heerlen.

NETHERLANDS[a] *Millions of guilders at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	1 757	132	1	7	1 896	..
	+ Current expenditure	1 150	1 119	48	500	2 817	..
	- Receipts from by-products	19	91	-	-	110	..
	Expenditure 1	2 888	1 160	49	507	4 603	130
	+ Subsidies	63	9	57	68	198	..
	- Fees	1 418	774	96	130	2 418	..
	Expenditure 2	1 534	395	9	445	2 383	..
1991	Investment expenditure	723	516	1	2	1 242	..
	+ Current expenditure	1 984	1 787	101	974	4 846	..
	- Receipts from by-products	25	107	-	1	133	..
	Expenditure 1	2 682	2 196	102	975	5 955	177
	+ Subsidies	81	10	76	29	196	..
	- Fees	2 036	1 670	1	996	4 703	..
	Expenditure 2	727	536	177	8	1 448	..
1992	Investment expenditure	831	747	-	3	1 581	..
	+ Current expenditure	2 041	1 727	97	1 084	4 949	..
	- Receipts from by-products	31	77	-	2	110	..
	Expenditure 1	2 842	2 397	97	1 085	6 421	191
BUSINESS SECTOR: TOTAL EXPENDITURE							
1985	Investment expenditure	254	53	365	235	907	..
	+ Current expenditure	299	226	324	219	1 068	..
	- Receipts from by-products	-	-	-	-	-	..
	Expenditure 1	553	279	689	453	1 974	..
	- Subsidies	65	10	59	72	206	..
	+ Fees	469	313	45	86	913	..
	Expenditure 2	957	582	675	467	2 682	..
1991	Investment expenditure	640	127	797	202	1 766	..
	+ Current expenditure	676	407	610	423	2 116	..
	- Receipts from by-products	-	-	-	-	-	..
	Expenditure 1	1 316	534	1 407	625	3 882	..
	- Subsidies	81	10	63	29	183	..
	+ Fees	652	811	1	652	2 116	..
	Expenditure 2	1 887	1 335	1 345	1 248	5 815	..
1992	Investment expenditure	737	129	804	212	1 882	..
	+ Current expenditure	765	423	610	432	2 231	..
	- Receipts from by-products	-	-	-	-	-	..
	Expenditure 1	1 503	553	1 414	644	4 113	..
PRIVATE HOUSEHOLDS							
1985	Expenditure 1	11	-	68	-	79	..
	- Subsidies	-	-	-	-	-	..
	+ Fees	1 002	489	55	49	1 594	..
	Expenditure 2	1 013	489	123	49	1 673	..
1991	Expenditure 1	-	-	604	-	604	..
	- Subsidies	-	-	-	-	-	..
	+ Fees	1 384	858	-	343	2 585	..
	Expenditure 2	1 384	858	591	353	3 186	..
1992	Expenditure 1	-	-	558	-	558	..

a) Definitions and methodological notes are on the preceding page.
b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price Index	Used to deflate	198 5	1991	1992
Gross fixed capital formation	Investment expenditure by the public and business sectors	91.2	100.0	102.0
Government final consumption expenditure	Public sector current expenditure, subsidies and R&D	96.4	100.0	103.9
GDP	Business sector current expenditure	93.3	100.0	102.3
Private final consumption expenditure	Household expenditure	92. 7	100.0	103.1

NETHERLANDS[a] *Millions of guilders at 1991 prices*

	Water	Waste	Air	Other	Total
BUSINESS SECTOR: INDUSTRY BRANCHES					
Agriculture, hunting, fishing and forestry (1992)					
Investment expenditure	228	-	75	11	314
+ Current expenditure	138	24	9	25	196
- Receipts from by-products	-	-	-	-	-
Expenditure 1	366	24	83	36	510
- Subsidies	62	-	19	3	83
+ Fees	59	-	-	53	111
Expenditure 2	363	24	65	86	539
Mining and quarrying (1992)					
Investment expenditure	34	2	13	13	62
+ Current expenditure	43	14	3	31	91
- Receipts from by-products	-	-	-	-	-
Expenditure 1	77	16	16	44	153
- Subsidies	-	-	-	-	-
+ Fees	1	13	-	8	22
Expenditure 2	78	28	16	52	174
Electricity, gas, water (1992)					
Investment expenditure	6	-	28	-	34
+ Current expenditure	12	5	82	28	127
- Receipts from by-products	-	-	-	-	-
Expenditure 1	18	5	111	28	161
- Subsidies	-	-	-	-	-
+ Fees	3	13	-	135	151
Expenditure 2	21	18	111	163	312
Other (1992)					
Investment expenditure	200	48	-	173	421
+ Current expenditure	152	227	286	-	665
- Receipts from by-products	-	-	-	-	-
Expenditure 1	352	275	286	173	1 085
Total manufacturing (1992)					
Investment expenditure	270	79	367	382	1 098
+ Current expenditure	421	152	231	237	1 041
- Receipts from by-products	-	-	-	-	-
Expenditure 1	691	232	597	619	2 139
- Subsidies	17	5	10	-	31
+ Fees	268	371	-	0	639
Expenditure 2	942	598	588	619	2 747
Expenditure 2: selected manufacturing industries (1992)					
ISIC 31 Food and tobacco	249	52	24	60	385
ISIC 32 Textiles and leather	24	11	47	7	89
ISIC 33 Wood and wood products	1	15	8	3	26
ISIC 34 Pulp and paper	49	45	9	19	121
ISIC 35 Chemicals	464	276	278	211	1 229
ISIC 36 Non-metallic mineral products	14	37	31	22	105
ISIC 37 Iron and steel	49	39	91	30	209
ISIC 38 Machinery	92	123	33	55	303

Source: OECD

PORTUGAL

Sources and definition

In Portugal, PAC expenditure statistics are developed in the Ministry for Environment; first estimates are for years 1988 and 1989. The OECD methodology is applied, which is also compatible with the environmental accounting system of the European Communities (SERIEE). Detailed results covering the entire field of environmental protection and a methodological discussion are given in Ribeiro (1992[22]).

Characteristic activities and environmental media

Environmental media covered include water, air, noise and waste. The category of "other" expenditure includes all overhead expenses for PAC purposes, which cannot be allocated to a particular medium.

R&D expenditure is only included to the extent that the present projects preceding environmental investment activity or studies carried out by the central administration.

Economic sectors

Public sector expenditure includes expenditure at the central government level, at the departmental level and at the municipality level, but expenditure on "waste" refer only to municipalities. Expenditure by municipalities are based on a survey. In 1992 classifications were altered slightly and consequently expenditure on noise is now included in the group "other".

Business sector expenditure comprises the main branches: mining, food, textiles and leather, chemicals, machinery, iron and steel, non-ferrous metals, wood, pulp and paper, and utilities (gas, water and electricity). PAC expenditure data relate mostly to end-of-pipe installations. The 1990 and 1991 data have been extended to cover capital and current expenditures of the central government and capital expenditures of enterprises. The business sector figure for 1990 is estimated from public administration data[23]. Private household expenditure covers air pollution equipment. Fees paid by private households include fees for waste water treatment and solid waste disposal.

For the main economic sectors, Portuguese statistics allow to distinguish between the abater and financing principles, i.e. fees and subsidies for PAC purposes are identified.

[22] Ribeiro, *Methodological problems inherent in setting up an economic database on the environment*., Portugal 1992.

[23] Source: Calculation based on information from IAPMEI, IFADAP and DGE (in Ribeiro, 1992).

PORTUGAL[a] *Millions of escudos at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1988	Investment expenditure	15 72 8	3 630	250	3 240	22 848	..
	+ Current expenditure	6 29 7	3 421	292	7 119	17 128	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	22 02 5	7 051	542	10 359	39 977	938
	+ Subsidies	1 44 2	524	65	8 928	10 960	..
	- Fees	37 7	162	..	..	539	..
	Expenditure 2	23 08 9	7 414	607	19 287	50 398	..
1990	Investment expenditure	39 77 8	4 047	50	5 428	49 302	..
	+ Current expenditure	9 98 2	5 295	32	20 499	35 808	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	49 76 0	9 342	81	25 927	85 110	1 258
1992	Investment expenditure	33 81 8	4 499	99	10 222	48 638	..
	+ Current expenditure	8 61 6	13 604	56	18 639	40 915	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	42 43 4	18 103	155	28 861	89 553	1 472
1993	Investment expenditure	36 43 4	6 202	45	5 240	47 921	..
	+ Current expenditure	8 11 5	18 145	238	9 016	35 513	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	44 54 9	24 347	283	14 255	83 434	1 614
BUSINESS SECTOR: INVESTMENT EXPENDITURE							
1988	Investment expenditure	64 9	869	162	10 383	12 063	..
1989	Investment expenditure	3 67 2	1 521	466	10 156	15 815	..
1990	Investment expenditure	97 3	1 749	1 764	133	4 620	..
1991	Investment expenditure	5 15 2	818	3 111	605	9 686	..
BUSINESS SECTOR: INDUSTRY BRANCHES							
Agriculture, hunting, fishing and forestry							
1990	Investment expenditure	9 8	73	2	1	174	..
1991	Investment expenditure	17 9	129	8	..	316	..
Mining and quarrying							
1990	Investment expenditure	1	34	22	3	60	..
1991	Investment expenditure	8 7	0	4	64	155	..
Electricity, gas, water							
1991	Investment expenditure	..	..	879	7	886	..
Total manufacturing							
1990	Investment expenditure	87 4	1 642	1 741	129	4 386	..
1991	Investment expenditure	4 88 7	689	2 221	534	8 330	..
PRIVATE HOUSEHOLDS							
1988	Expenditure 2	40 3	173	148	..	724	..
1989	Expenditure 2	38 1	163	150	..	695	..

a) Definitions and methodological notes are on the preceding page.

b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	198 8	1989	1990	1991	1992	1993
Gross fixed capital formation	Investment expenditure by the public and business sectors	71.1	79.5	88.8	100.0	111.1	118.9
Government final consumption expenditure	Public sector current expenditure and R&D	74. 4	81.9	89.6	100.0	108.8	113.9
GDP	Business sector current expenditure	64. 1	73.8	85.1	100.0	116.6	127.4
Private final consumption expenditure	Expenditure by private households	69. 6	77.5	87.5	100.0	113.3	121.8

SPAIN

Sources and definition

In Spain, public sector data on environmental expenditure have been collected since 1987. The data are published by the Ministry for Public Works, Transport and Environment (Ministerio de Obras Públicas, Transportes y Medio Ambiente, 1994[24]). In methodological terms, data collection in Spain has closely followed the SERIEE-framework developed by Eurostat. As such, consistency is assured with the definitions used in the OECD questionnaire.

Characteristic activities and environmental media

Characteristic activities include direct PAC measures for the following environmental media: air, industrial and household waste, noise, soil, surface water and groundwater. Expenditure is further divided into current and investment expenditure. Current expenditure is directed towards personnel, characteristic goods and services, and interest payments.

The figures presented here are consistent with the 1994 publication of the Ministry for Public Works, Transport and Environment, which contains revised environmental expenditure data for years 1987-1991. There have been minor changes in the expenditure classification and, consequently, the figures for expenditure on water and "other" differ from the previous monograph.

Economic sectors

Only public sector expenditure data is reported here. The public sector includes all levels of government. In the Spanish statistics, it is possible to identify transfer payments from the public sector to the private sector.

[24] Ministerio de Obras Públicas, Transportes y Medio Ambiente (1994): *Gasto público en medio ambiente en 1991 y datos comparativos 1987 - 1991*, Madrid.

SPAIN[a] *Millions of pesetas at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1989	Investment expenditure	76 38 1	14 253	7 216	6 146	103 997	..
	+ Current expenditure	87 00 4	105 171	5 303	8 051	205 529	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	163 38 6	119 424	12 519	14 198	309 527	5 255
	+ Subsidies	11 12 3	4 350	736	1 005	17 214	..
	- Fees	..	..	..	..	..	..
	Expenditure 2	174 50 8	123 774	13 255	15 203	326 740	..
1990	Investment expenditure	86 74 6	13 235	2 342	9 290	111 613	..
	+ Current expenditure	97 34 2	107 481	3 546	14 061	222 430	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	184 08 9	120 716	5 888	23 351	334 043	12 443
	+ Subsidies	5 46 3	6 225	504	6 321	18 513	..
	- Fees	..	..	..	..	..	..
	Expenditure 2	189 55 1	126 940	6 392	29 673	352 556	..
1991	Investment expenditure	112 91 3	23 559	2 280	3 330	142 082	..
	+ Current expenditure	84 79 1	80 488	1 837	20 788	187 904	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	197 70 4	104 047	4 116	24 119	329 986	12 387
	+ Subsidies	10 91 0	22 436	888	874	35 108	..
	- Fees	..	..	..	..	..	..
	Expenditure 2	208 61 4	126 484	5 004	24 992	365 094	..

a) Definitions and methodological notes are on the preceding page.

b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price Index	Used to deflate	1989	1990	1991
Gross fixed capital formation	Public sector investment	90.1	95.4	100.0
Government final consumption expenditure	Public sector current expenditure, subsidies and R&D	86.6	92.9	100.0

SWEDEN

Sources and definition

In Sweden, data on PAC are currently available from the surveys in manufacturing industry for 1981, 1985, 1988 and 1991. Some cost statistics are also available for the central government. The 1991 surveys of industry and municipalities adhere to the SERIEE definitions of environmental protection measures and expenditure, which are also compatible with the OECD definitions. Statistics Sweden emphasises that the figures reported here are incomplete and uncertain: Swedish environmental protection expenditure figures should therefore be regarded as rough estimates (Björsell, 1993[25]).

Characteristic activities and environmental media

In general, public and business sector data cover the treatment and collection of waste water and solid waste, as well as air and noise media.

Public sector data comprise the expenditure of the central, regional and local governments. The figures for water refer to budget appropriations. Those for solid waste refer to estimated expenditure associated with the collection and treatment of household, industrial and hazardous waste. Receipts for waste include the value of heat from waste incineration. Data for air refer only to the abatement of SO_x emissions. The "other" expenditure is largely comprised of expenditure on the administration of municipal environmental programmes, along with activities related to controlling noise pollution. For the year 1991, the group "other" includes also central government expenditure. It is noted that investment expenditure statistics are not always available and capital costs are used in their place. In some cases, the substitution may significantly underestimate the true investment expenditure for a given year.

Business sector investment expenditure includes new capital purchases, as well as the modification or replacement of process technologies if those adjustments result in reduced environmental pollution. Data reported for current expenditure by the business sector are concerned with the operation of environmental equipment and pollution control programmes; expenditure on training and technical development is also included. The industry survey explicitly excludes the following: investments to improve the quality of workplace, interest payments on capital purchases, fines related to infractions of environmental regulations and expenditure on remediation.

Economic sectors

Public and business sector data are available. While the effects are likely to be minimal, it should be noted that some degree of double counting does occur. This issue should be considered when interpreting the figures on the treatment of sewage and solid waste, as these are cases where the business sector pays for services performed by the public sector. At the moment, there are no data available on the PAC expenditure of private households.

[25] Björsell M. (1993): *Environmental Expenditures in the Swedish Manufacturing Industries, An Inventory of Problems*, Statistics Sweden, in *Contributions of Member States and EFTA countries to the SERIEE system*, Eurostat F3, Luxembourg, 1994.

SWEDEN[a] *Millions of kroner at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1986	Investment expenditure	1 549	943	152	30	2 675	..
	+ Current expenditure	2 483	2 406	258	635	5 782	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	4 031	3 350	410	665	8 456	255
	+ Subsidies	-	-	139	-	139	..
	- Fees	3 745	2 358	-	55	6 158	..
	Expenditure 2	286	992	549	609	2 437	..
1991	Investment expenditure	2 400	400	..	..	2 800	..
	+ Current expenditure	3 040	3 500	..	3 000	9 540	..
	- Receipts from by-products	..	375	..	..	375	..
	Expenditure 1	5 440	3 525	..	3 000	11 965	577
	+ Subsidies	..	..	..	..	..	..
	- Fees	4 900	3 400	..	..	..	..
	Expenditure 2	540	125	..	..	..	..
BUSINESS SECTOR: INDUSTRY BRANCHES							
Total industry[d]							
1988	Investment expenditure	1 553	..	1 242	310	3 105	..
	+ Current expenditure	..	..	..	..	2 243	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	..	..	..	..	5 348	..
1991	Investment expenditure	..	120	..	..	2 300	..
	+ Current expenditure	..	850	..	..	2 700	..
	- Receipts from by-products	..	..	..	..	260	..
	Expenditure 1	..	970	..	..	4 740	..
Mining and Quarrying							
1991	Investment expenditure	..	..	..	..	170	..
	+ Current expenditure	..	14	..	..	144	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditures 1	..	..	..	..	314	..
Expenditure 1: selected manufacturing industries (1991)							
ISIC 31	Food and tobacco	..	..	..	..	446	..
ISIC 32	Textiles and leather	..	..	..	..	32	..
ISIC 33	Wood and wood products	..	..	..	..	195	..
ISIC 34	Pulp and paper	..	..	..	..	1 340	..
ISIC 35	Chemicals	..	..	..	..	778	..
ISIC 36	Non-metallic mineral products	..	..	..	..	107	..
ISIC 37	Iron and steel	..	..	..	..	520	..
ISIC 38	Machinery	..	..	..	..	991	..
ISIC 39	Other	..	..	..	..	20	..
Investment expenditure: selected manufacturing industries (1991)							
ISIC 31	Food and tobacco	27	6	30	14	77	..
ISIC 32	Textiles and leather	1	0	2	2	5	..
ISIC 33	Wood and wood products	2	1	24	2	29	..
ISIC 34	Pulp and paper	503	21	100	20	644	..
ISIC 35	Chemicals	83	6	180	13	281	..
ISIC 36	Non-metallic mineral products	0	1	29	0	31	..
ISIC 37	Iron and steel	33	4	68	14	120	..
ISIC 38	Machinery	30	32	140	17	219	..
ISIC 39	Other	1	0	0	0	1	..

a) Definitions and methodological notes are on preceding page.
b) Source: OECD Basic Science and Technology Statistics.
c) 1988 figures may include expenditure on waste.
d) Includes only establishments with more than 200 employers.
Source: OECD

Price Index	Used to deflate	1986	1988	1991
Gross fixed capital formation	Investment expenditure by the public and private sectors	74. 2	82.5	100.0
Government final consumption expenditure	Public sector current expenditure and R&D	72. 1	79.3	100.0
GDP	Business sector current expenditure	70. 8	79.0	100.0

SWITZERLAND

Sources and definition

The Swiss Federal Statistical Office carried out a pilot survey on PAC expenditure in 1994. The pilot survey was based on the OECD PAC expenditure concepts and is therefore also compatible with the Eurostat SERIEE system. The pilot study (Bundesamt für Statistik, 1996[26]) contains data on public sector PAC expenditure for 1992 and business sector expenditure for 1993. It also includes estimates for household PAC expenditure for 1993. The data for earlier years are based on the Swiss financial statistics, which use partly different definitions and concepts.

Characteristic activities and environmental media

Environmental media covered include water, soil, air, noise and other. Water and soil include water and soil protection and groundwater. The "other" category includes mainly forests, landscape, research, education, information and management.

The figures for totals are more reliable than the disaggregated ones, because the overall totals are estimates based on all data received, whereas the individual columns may represent only partial responses. The figures in the "other" column have been adjusted accordingly so that each line sums up correctly.

Economic sectors

The public sector statistics account for PAC activities at all levels of administration, i.e. the federal government, the cantons, and the communities. Their reporting method already controls for double counting.

For the public sector, receipts from by-products are negligible and have not been estimated separately.

For households, the expenditure figures are rough estimates based on waste water and waste fees, and expenditure on air (catalytic converters, exhaust gas controls/regulations for private cars, and installation of low-NO_x heating systems). Expenditure on air is calculated from the number of units sold and the unit price.

[26] Bundesamt für Statistik (1996): Umweltausgaben und -investitionen in der Schweiz 1992/1993, Ergebnisse einer Pilotstudie 2 Raum, Landschaft und Umwelt, Bern.

SWITZERLAND *Millions of francs at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[a]
PUBLIC SECTOR							
1985	Investment expenditure	..	..	..	..	..	..
	+ Current expenditure	..	..	..	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 36 1	563	13	-	1 938	50
1989	Investment expenditure	..	..	..	..	..	..
	+ Current expenditure	..	..	..	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 54 6	980	88	-	2 614	16
1992	Investment expenditure	63 2	523	17	66	1 238	..
	+ Current expenditure	83 4	911	60	381	2 186	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 46 6	1 434	77	447	3 425	..
	+ Subsidies	..	..	..	..	..	..
	- Fees	78 8	589	9	8	1 395	..
	Expenditure 2	67 8	845	68	439	2 030	..
BUSINESS SECTOR: TOTAL EXPENDITURE							
1993	Investment expenditure	24 4	222	579	217	1 261	..
	+ Current expenditure	19 8	249	94	268	810	..
	- Receipts from by-products	-	33	1	4	38	..
	Expenditure 1	44 2	438	672	481	2 033	..
	- Subsidies	1	2	5	1	9	..
	+ Fees	6 2	72	2	17	153	..
	Expenditure 2	50 2	507	670	497	2 177	..
PRIVATE HOUSEHOLDS							
1993	Expenditure 1	61 5	279	549	..	1 443	..
SELECTED MANUFACTURING INDUSTRIES: Expenditure 2 (1993)							
ISIC 31	Food and tobacco	7 9	24	20	2	126	..
ISIC 32	Textiles and leather	7	2	4	2	14	..
ISIC 33	Wood and wood products	2	7	13	11	33	..
ISIC 34	Pulp and paper	1 1	13	29	23	76	..
ISIC 35	Chemicals	18 3	136	70	206	594	..
ISIC 36	Non-metallic mineral products	1 8	18	41	10	87	..
ISIC 37	Iron and steel	2 8	29	71	33	160	..
ISIC 38	Machinery	5 5	39	93	47	234	..

a) Source: OECD Basic Science and Technology Statistics. The 1985 figure refers to 1986.

Source: OECD

Price index	Used to deflate	198 5	1989	1991	1992	1993
Gross fixed capital formation	Investment expenditure by the publ ic and business sectors	83.8	94.2	100.0	99.8	98.0
Government final consumption expenditure	Public sector current expenditure, Expenditure 1 for 1985 and 1989	80.7	87.7	100.0	105.9	108.0
GDP	Business sector current expenditure	79. 0	89.7	100.0	102.6	104.7
Private final consumption expenditure	Household expenditure	83. 3	89.8	100.0	104.2	107.4

UNITED KINGDOM

Sources and definition

The United Kingdom started to collect PAC expenditure statistics in the beginning of the 1990s. The expenditure figures for 1990 are based largely on a study commissioned by the Department of the Environment (HMSO, 1993[27]). This study is based on a combination of published information and market research. Some estimates are also provided which are consistent with previous replies to the OECD questionnaire.

PAC statistics reported here must be considered as orders of magnitude only. Overall estimate in a given year is subject to an error band of ±10 per cent. Institutional changes during the 1980s, particularly, the privatisation of water and electricity supply industries make temporal comparisons of public or private expenditure very difficult.

Characteristic activities and environmental media

Definitions of characteristic activities correspond as closely as possible to OECD definitions. In particular, expenditure relating to nature conservation, mobilisation of natural resources (e.g. drinking water supply), improvement of amenities, training and education has been excluded.

Public sector air expenditure includes central and local authority grants to householders that are affected by smoke control orders, as well as inspection and monitoring costs. Public sector noise expenditure estimates include the enforcement of noise abatement regulations, which are intended to compensate for increased highway and aircraft noise and assistance with soundproofing. “Other” expenditure refers to the costs of reclaiming derelict land, including the restoration of mineral workings and the general administrative costs with respect to pollution control. General administrative costs for water, air and waste are given in respective categories. Environmental expenditures for total manufacturing have been divided to environmental media according to the corresponding share of media estimated for total industrial pollution abatement expenditure.

Economic sectors

Information on transfer payments between the public and private sector are not generally available so that UK entries are confined to recording PAC expenditure according to the abater principle.

In 1989, public water authorities in England and Wales became privately owned companies, whereas water authorities in Scotland and Northern Ireland remained public. Entries as private or public expenditure have been carried out accordingly.

[27] HMSO (1993): *A Review of UK Environmental Expenditure*, A Final Report to the Department of the Environment by Ecotec Research and Consulting Ltd, London.

UNITED KINGDOM[a] *Millions of pounds sterling at 1991 prices*

		Water	Waste	Air	Other	Total	Addendum: R&D[b]
PUBLIC SECTOR							
1985	Investment expenditure	..	..	..	..	..	..
	+ Current expenditure	..	..	..	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	1 855	1 395	28	42	3 319	80
1990	Investment expenditure	103	..	..	..	..	..
	+ Current expenditure	302	..	498	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	406	1 227	498	..	2 384	75
BUSINESS SECTOR: TOTAL EXPENDITURE							
1985	Investment expenditure	..	..	..	..	..	..
	+ Current expenditure	..	..	..	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	544	767	1 590	153	3 054	..
1990	Investment expenditure	1 467	..	542	..	..	..
	+ Current expenditure	1 420	..	532	..	..	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	2 886	..	1 075	..	3 961	..
BUSINESS SECTOR: INDUSTRY BRANCHES (1990)							
Agriculture, Hunting, Fishing							
	Expenditure 1	-	82	-	..	82	..
Mining and Quarrying							..
	Expenditure 1	-	-	-	26	26	..
Construction							
	Expenditure 1	..	69	..	..	69	..
Electricity, gas, water							..
	Expenditure 1	..	..	..	..	589	..
Total Manufacturing							
	Investment expenditure	..	..	..	..	1 355	..
	+ Current expenditure	..	..	..	..	1 355	..
	- Receipts from by-products	..	..	..	..	..	..
	Expenditure 1	542	948	948	271	2 709	..
Investment and current expenditure: selected manufacturing industries							
ISIC 31	Food and tobacco	85	96	192	..	415	..
ISIC 32	Textiles and leather	21	21	32	..	75	..
ISIC 33	Wood and wood products	11	21	32	..	75	..
ISIC 34	Pulp and paper	75	85	160	..	351	..
ISIC 35	Chemicals	149	170	309	..	682	..
ISIC 36	Non-metallic mineral products	21	21	53	..	106	..
ISIC 37	Iron and steel	106	128	234	..	522	..
ISIC 38	Machinery	75	96	170	..	373	..
ISIC 39	Other	64	75	149	..	319	..
PRIVATE HOUSEHOLDS							
1990	Expenditure 1	..	397	32	301	730	..

a) Definitions and methodological notes are on preceding page .
b) Source: OECD Basic Science and Technology Statistics.

Source: OECD

Price index	Used to deflate	1985	1990	1991
Gross fixed capital formation	Investment expenditure by the public and business sectors	74.2	99.6	100.0
Government final consumption expenditure	Public sector current expenditure, Expenditure 1 and R&D.	66.9	93.3	100.0
GDP	Business sector current expenditure	71.7	93.9	100.0
Private final consumption expenditure	Household expenditure	73.1	93.1	100.0

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