

Theoretical basis of economic instruments in environmental protection

Effective economic instruments which control proper utilization of environment are important aspect of ecologization. There are two types of such economic mechanisms and instruments.

- general instruments and mechanisms which are effective for the whole country's economy, its sectors and branches (on the macro level),
- specific instruments and mechanisms, directly connected with environmental protection and natural resources usage (the use of own specific mechanisms of utilization of environment).¹

Nowadays working out the effective concept of economic mechanisms which manages utilization of environment is possible according to following rules:

1. Effective utilization of environment and environmental protection can be worked out and realized only after finding such concept for all separate sectors and whole economy.
2. Economic mechanism of utilization of environment should become an integral part of “global” economic mechanism, it can't be local and include only nature complexes and branches of industry which exploit nature. Mechanisms of protection of environment should be correlated with other economic mechanisms, which operate in other stages of processing resources – good plan, connecting the primeval resources with final goods.
3. Economic mechanism of utilization of environment should be formed as synthesis for diverse fields of industry, and cover many geographical regions. This can not be done without taking into consideration basic economic processes which function in consumer society.²

Any undertakings connected with environmental protection, require investment, but if those costs are not incurred then society has to pay for repair of environmental damages. Those expenses are very important in calculating ecological losses. As the first expenses we consider expenses incurred on protection of environment in the sites where there is potential hazard. Second expenses - economical losses which are the result of not taking action connected with environmental protection. It includes compensation for loss of resources, and expenses for repair of devastation and expenses for predicting feasible losses in the future.

Giving characteristics of economic mechanism in solving ecological problems, Ukrainian scientist O.O. Weklych noticed, that economic mechanisms in environmental protection, exist in developed countries, and contain two major groups of ecological statutory regulations for industry.³

The first group is oriented towards enforcement of some regulations for pollutants of environment. It is unified system of regulations: money for waste, for storage or distribution of pollutants, charges for deterioration of natural environment, environmental taxes from company profits, when the production involves use of substances dangerous for the environment, compensations for braking environmental policies, or environmental standards, for causing hazard to human health or flora and fauna.

The second group of regulations, which activates undertakings dealing with environmental protection is meant to encourage introduction of the improvements to the present state of environment. This group is the strongest instrument for improving the state of environment, on one hand it is economically attractive for firms which use natural resources, on the other it creates possibility of converting to innovatory technologies, from monitoring the environment

¹ Wasiuta O.A. Problemy ekologicznoi strategii Ukrainy w konteksti globalnogo rozwytku .- Ternopil: Gal-Druk, 2001.- s. 238.

² Tamże. - s. 238.

³ Weklycz O. O. Analiz efektywnosci witeczynianogo ekonomicznego mehanizmu pryrodokorystuwannia szczodo idei stalogo rozwytku // Ekonomiczni reformy Ukrainy w konteksti perechodu do stalogo rozwytku / Materiały 2-ch konferencji ta rekomendacji do proektu Nacionalnoi strategii: Instytut stalogo rozwytku. — K.: Intelsfera, 2001. — s. 95.

towards prevention. State subsidies, reduction of taxes, low-interest loans, depreciation of machines and equipment used for environmental protection, buying and selling of pollution permits, encourages the firms to consider pro-ecological solutions. Those economic measures create favourable conditions for organizing actions aiming at prevention and improvement of the state of natural environment.⁴

All subsidies granted to firms for prevention and improvement of the state of natural environment come from the Budget or special ministerial funds. For example, in Austria there is natural environment fund, in Sweden - fund for prevention of pollution caused by burning of fossil fuels, in Turkey - fund for prevention of pollution of environment, and so on. Institutions which finance and distribute subsidies are able to function according to loan-financial methods. In majority of countries there is a law which stops the financial support when the requirements which enable the use of subsidies are not met. Fines for waste and bonuses for use of technologies which are environmental friendly are “soft “ market instruments of economic policy, which is used by more developed countries such as the USA, Japan, Sweden and other. They are not greatly acknowledged in Europe.⁵

There are three distinguished economic mechanisms for regulating the nature usage processes*:

- soft, pushing mechanism – liberal for ecology. It is the most general limitation for industrial development without inhibiting it. This type of economical mechanism is directed towards decreasing negative impact on environment. It does not do much to eliminate the cause of the deterioration, it has little impact on the rate and scale of the industrialization. This mechanism is typical for industry based development. This mechanism is being implemented in Ukraine;
- mechanism which encourages ecologically balanced and environmental friendly industries and types of activities. The market principles form the basis of functioning of this mechanism. This mechanism encourages the increase of production which uses new technologies, it promotes better utilization and protection of natural resources. As example of such mechanism we can give restrictions for farming in the country side;
- “fixed”, top-down mechanism, which is based on administrative and market instruments. Its stiff tax and loan policy hinders some branches of industry. This type of mechanism is representative for stable socio-economic communities.⁶

In reality those mechanisms do not exist separately and are tied together. It all depends on specific technologies, production and kind of business activity. For example in the near future, if we want to promote ecological development, there will be need for introducing both encouraging and fixed mechanisms, which will regulate functioning of separate firms and will be oriented towards final results.

The most important current problems of ecological policy is introducing reforms in tax system to promote ecological taxes, and strengthening the use of traditional instruments such as: the protection of water and forest complexes which are of key importance for efficient functioning of the Earth.

Instruments for environmental and resources management can be categorised in many ways; for example to what extent they are voluntary, are they centralized, what goals they aim to achieve, are they integrated with each other, are they in agreement with market mechanisms. Polish

⁴ Tamże. – s. 95.

⁵ Wasiuta O.A., Wasiuta S.I., Filipczuk G.G. Ekologiczna polityka: nacionalni ta globalni realii. U 4-ch tomach. – Czerniwci: Zelena Bukowyna, 2003-2004 rr. T.4.- s. 261.

* Rodzaje ekonomicznego mechanizmu wykorzystania przyrody – całokształt wszystkich form wykorzystania zasobów naturalnych oraz przedsięwzięć ich chronienia, gdzie włączone wydobywanie i przeróbka zasobów naturalnych, ich odnowienie lub odtworzenie; jest to także całokształt produkcyjnych stosunków oraz odpowiednich organizacyjno-ekonomicznych form i instytucji związanych z pierwotnym przyswojeniem, wykorzystaniem i odtworzeniem człowiekiem obiektów jej środowiska naturalnego dla zadowolenia swych potrzeb. // Ekonomiczna encyklopedia. U 3-ch tt. - T.3.- Kyjiw: Wyd-wo „Akademija”, 2002.- s. 631.

⁶ Ekonomiczna encyklopedia. U 3-ch tt. - T.3.- Kyjiw: Wyd-wo “Akademija”, 2002.- s. 631.

scientists divide the instruments of managing the environment into three groups⁷:

1. decentralized instrument,
2. command and control regulation – CAC,
3. incentive-based regulation-IB (economic instruments).

Decentralized instrument consists of general legal articles, for example civil liability, criminal responsibility and property law. This group includes also moral persuasion by means of information and communication with different social groups.

Command and control regulation are instruments of administrative-legal character: such as environmental standards, limits of emission and technological standards.

The range of incentive-based regulation-IB (economic instruments) is quite broad. It includes:

1. ecological charges (for emission within limits and for industrial use of environment),
2. ecological taxes (production charges),
3. deposit-reimbursement system,
4. transferable entitlements,
5. subsidies (grants, loans and tax reduction),
6. pledges,
7. fines.⁸

The group of means of force includes such instruments as: fees, ecological taxes, deposit-reimbursement systems, transferable entitlements, standards, permits and so on. The group of voluntary instruments includes voluntary trade commitments, elements of ecological management (environmental management in a firm, Agenda 21), in so far as those actions are regarded as separate instruments.

Instruments, which are meant to accomplish local goals, are the fees and NO₂ and SO₂ limits, sewerage solid waste management, some ecological taxes, deposit-reimbursement system, and some spatial planning regulations and geological and mining laws. Among instruments concerning global issues are taxes for emission of CO₂ and taxes for emission of other greenhouse gases.

According to market requirements the highest place in the hierarchy is taken by transferable entitlements, deposit-reimbursement systems, ecological taxes and fees. The administrative-legal instruments are of the highest rung.

Those tools can be classified according to degree of complexity. As simple instruments we regard fees and ecological taxes. As complex instruments we regard transferable entitlements, spatial planning, ecological management.⁹

Obviously between separate instruments and groups of instruments there are important differences not only in the qualities and structure but also in impact they have on the producers and consumers as well as on economy and society. There are also differences in their contracts and possibility of making independent decisions. We have to remember that just like there is instability of market as far as the environmental protection is concerned, there is instability of government meddling in this branch of economy (government failure). As the main causes of such situation we consider:

- failure in enforcement of regulations and legal instruments,
- lack of adequate tools for constant and precise monitoring of environment,
- inertia, which results in lack of flexibility and adequate reaction while working on creating ecological policy,
- lack of coordination of ecological policy with planning for other branches of industry,

⁷ B. Field: Environmental Economics. An Introduction. New York: Mc Graw-Hill 1994, s. 207 – 210, 226 - 246;
H.Verbruggen: The Trade Effects of Economic Instruments. In: Environmental Policies and Industrial Competitiveness. Paris: OECD 1994, s. 55.

⁸ Barde J.-Ph.: Polityka ochrony środowiska i jej instrumenty. // Ekonomia środowiska i zasobów naturalnych, H. Folmer, L. Gabel, H. Opschoor (red.), Warszawa; Wyd. Krupski i S-ka, 1996.- s. 225.

⁹ Piotr Jeżowski, Związki ekonomii z ochroną środowiska// http://www.pesg.org.pl/ekokonf_3.html.

responsibility is not evenly divided among different institutions.¹⁰

Possibility of states meddling with ecological policy can take form of direct regulating, economical pressure, or uncertainties in management in environmental protection.

The ecological charges for emission are set according to the quantity and quality of emitted substances. It become a kind of substitute for charges for possibility of utilization of environment. It also includes charges for storage of waste in the rubbish dump. Charges for economic utilization of parts of environment are a variant of ecological charges, for example drawing water, utilization of water, use of natural resources, (charges for water, concession fees, and exploitation fees). The general specificity of ecological charges is based on that, it does not burden directly a company, but are merely a part of its costs. Ecological charges are based on the "polluter pays" principle. We can see the influence of ecological taxes on final consumers of goods and services by looking at prices.

As far as economical instruments are concerned especially ecological charges, major role is played by some municipal rates and rates for use of energy. They are indirect methods, but since the use of energy and most municipal services are closely connected with environment they are important instruments keeping the balance between demand for natural resources and environmental services and emission on pollution. Sometimes ecological charges contain charges for environmental services (for example for disposal and recycling of solid and liquid waste).¹¹

Fines are most often paid for devastation of natural environment, or for exceeding a limit (breaking rules of utilization of environment). Extorting character of fines is based on that the firm can not include it in its expenses, because it charges company's financial result.

Very often instead of using the word ecological taxes we use phrase productive charges (ecotaxes). They are closely related to ecological taxes, but are constructed differently, ecological surcharge is added to prices of products which are harmful for environment.

Ecological taxes are based on new ecological economy: subscribing negative environmental effects not the products. In developed countries with market economy the role of ecological taxes is increasing and it stimulates the economy. They are supposed to deal with two tasks:

- to make the value of production more proportional to expenses,
- to support policy, where losses are paid by the polluters, not by the society as a whole (realization of "polluter pays" principle).

The state has some influence only at the beginning, having influence only on the prices. All the rest is done by market mechanisms, they influence the behaviour of producer and consumer, the demand and supply, depending on the state of ecology, ect.

In general, tax reduction for producers can be estimated only taking into consideration the actions taken for preservation of environment. When there are some truly effective undertakings for preservation of environment there can be reduction of taxes profit, for example lowering it by the amount which a firm has reinvested in those undertakings.

In some cases there can be no taxes. For example ecological funds are tax free. This policy can be applied for profits, gained by recycling of used products and waste, for environmental tenders.

When the economy is set on the way of constant development, the tax system should expect the raise of taxes for branches of industry which exploit the environment.

The regional aspect is also very important. In regions, where environment is more polluted, the tax system should be more strict compared to the one from ecologically clean regions. Reduced taxes can be given to state and private firms, which produce machines and products which are environmentally friendly, or which provide ecological services (building and reconstruction of complexes which have something to do with preservation of natural environment).

Increase of taxes is reasonable when we assess production processes which are

¹⁰ Market and Government Failures in Environmental Management. Paris: OECD 1992, s. 72.

¹¹ Piotr Jeżowski, Związki ekonomii z ochroną środowiska// http://www.pesk.org.pl/ekokonf_3.html.

hazardous for environment. To give the factory time needed for converting the production process to make it more environmentally friendly progressive taxation must be introduced.

Besides, ecological taxes are much most reasonable solution than ecological fees, because they let to examine the products which are generally used.

As it is emphasized by Polish scientist P. Jeżowski, the ecological fees (for emission) make sense for centralized production centres and larger factories. The ecological fees assume that there is monitoring of emission and the use of environment, which calls for additional expenses. When we have small and scattered sources of emission, this monitoring is practically impossible, so the fees have restricted use. Ecological taxes are discriminatory in the sense that it affects large producer and concentrated production, because small producer can avoid those charges.¹²

There are also special mechanisms and instruments, which are directly connected with environmental protection and exploitation of natural resources, in particular economic mechanisms. For better efficiency those instruments should be used in those branches of state's economy where those methods cause less losses in comparison to direct actions taken for environmental protection.

We can distinguish following elements of economic mechanisms which regulate the use of natural environment:

- charges for polluting the natural environment*;
- charges for the use of natural environment**;
- system of economic stimulants of actions connected with environmental protection (taxes, subsidies, cheap credits for undertakings which have something to do with environmental protection, fast depreciation of environmental funds, ect.);
- creating the market of environmental protection reserves;
- improving the prices by including the ecological factor, especially for production in those branches of industry which exploit natural environment;
- ecological funds;
- ecological programmes;
- transferable entitlements;
- system "deposit-repayment";
- ecological insurance.¹³

In general, active introduction of payment for exploitation of natural environment should enhance more adequate consideration of ecological factor in economy and rational use of natural resources. Besides there is a need for reforms in whole tax system. In those countries where the tax system is distorted*** introduction of new taxes and strengthening of traditional ecological taxes can give double profits. The reforms of tax system are about the improving of the state of environment as far as economic effects and social effects are concerned, and decreasing the negative impact on economy and social sphere created by distorted taxes. This concept of reforms

¹² Piotr Jeżowski, Związki ekonomii z ochroną środowiska// http://www.pesk.org.pl/ekokonf_3.html.

* Opłata za zanieczyszczenie środowiska naturalnego – ustawodawczo ustanowiona i normatywnie uregulowana kompensacja finansowa przedsiębiorstwami za socjalno-ekonomiczną szkodę, naniesioną społecznej gospodarce oraz zdrowiu ludności od zanieczyszczonego środowiska.

** Opłata związana z wykorzystaniem przyrody (opłata za wykorzystanie zasobów naturalnych) – odszkodowanie pieniężne użytkownikom naturalnych zasobów społecznych wydatków na oszczędzenie, odnowienie, wydobywanie i transportowanie naturalnych zasobów, które wykorzystują się, potencjalnych usiłowań społeczności w stosunku do powrócenia lub konkretnej zmiany wykorzystywanych dziś zasobów na przyszłość. Z ekologiczno-ekonomicznego punktu widzenia opłatę za wykorzystanie zasobów naturalnych trzeba naliczać z wliczeniem globalnego i regionalnego wpływu użytkowników wykorzystujących naturalne biocenozy. Na przykład, wycinanie lasu powoduje nie tylko miejscowe naruszenie bilansu wodnego czy powietrznego, ale i całego obszaru leśnego oraz atmosfery całej planety. Stąd historyczna potrzeba globalnej międzynarodowej orientacji „kompensacji ekonomicznej” państw za zanieczyszczenie oraz za wykorzystanie zasobów naturalnych planety na swoim terytorium // Ekonomiczna encyklopedia. U 3-ch tt. - T.3.- Kyjiv: Wyd-wo „Akademia”, 2002.

¹³ Wasiuta O.A., Wasiuta S.I., Filipczuk G.G. Ekologiczna polityka: nacionalni ta globalni realii. U 4-ch tomach. – Czerniwci: Zelena Bukowyna, 2003-2004 rr. T.4.- s. 206.

*** „Wykrzywiony system opodatkowania” – jest to taki system opodatkowania, który wstrzyma rozwój narodowej gospodarki w związku z destruktywnym jej wpływem na produkcję i handel. [39, C. 78].

of tax system is called the “double dividend”.

At the First International Congress for Economists which took up the subject of environment and natural resources in 1998, a group of scientists presented works devoted to “double dividend” that enabled drawing following conclusions:

- European Committee states that all industrial countries should up till 2010 limit harmful emissions which cause greenhouse effect by 15% in comparison to 1990, reformation of the tax system of the European countries on the basis of „double dividends” concept becomes especially actual.
- taxes for pollutants of environment in developing countries are important elements of ecological policy (it is needed not only to raise taxes but to reform the tax system as a whole based on the concept of “double dividend”);
- reforms of tax system, for example in Ukraine based on “double dividend” can give positive results (as far as economy, ecology and people's welfare is concerned). That is why there is a need for drawing financially balanced model, which would strengthen encouraging role of the taxes and weaken the negative impacted where their role is distorted;
- in the conditions of weak competitiveness and under strong influence of trade unions on economy, effect of tax system reforms based on concept of “double dividend” can be minimal (the true results of putting the “double dividend” into practice can be only checked empirically).¹⁴

European experience as well as the polish one, shows that ecological taxes, together with taxes for production which is hazardous for environment, are effective instruments of ecological policy where standard charges for pollution are higher then costs needed for prevention of ecological damages. Such ecological tax for leaded petrol was introduced in Sweden in 1988-1993 and resulted in reduction of contamination of environment by car fumes by 20%¹⁵. But we need to keep in minds that both taxes and pesticides, need careful handling. Needless reforms of tax system, often lead to undesirable changes in economy, which cannot be foreseen by the reformators.

Traditionally, economic sanctions for misuse of environment and natural resources are regarded as legal mechanism of economic policy. In recent years many scientific papers have been written, the authors examine introducing economic sanctions for ecological harm as an instrument of economic environmental policy.¹⁶

In economical literature economic sanctions for ecological harm are often wrongly considered equivalent of ecological taxes, despite the fact that those mechanisms of ecological policy perform different roles. Ecological tax is to have stimulating and methodological function, and economic sanctions – stimulating and blocking functions and it has to function as an economic punishment.

Economic sanctions for ecological harm are expedient to implement in cases of breaking ecological standards. They have to bring full refund for ecological loss and be an instrument of economic punishment for misuse of natural environment and natural resources. We have to keep in mind that severe economic punishment in the case of industrial undertakings is risky and not appealing. In such a case most of the specialists consider not resorting to instruments of economic policy a better option. The creating of motivation for development of industry and better technology, which use the environment and natural resource wisely is preferable.

The fee for returned waste – economic mechanism of ecological policy, which expect transformation of expenses from special funds to factories and institutions which introduced improvements and as a result reduced the amount of harmful waste in environment. R. A Hamilton (World Bank) at the first World Congress for Economists on environment and natural resources proposed, creation of special national funds (ranging from 3% of NPB) which should be used for technological bonuses.¹⁷ Those funds are directed to those firms, which by introduction of

¹⁴ Syniakiewicz I. Ekonomiczni instrumenty ekopolityki: teoria i praktyka//Ekonomika Ukrainy.- 1999.- №10.- s.79.

¹⁵ Tamże.

¹⁶ Syniakiewicz I.M. Ekonomika pryrodokorystuwannia. Nawczalnyj posibnyk. Lwiw, IZMN, 1996, s. 156.

¹⁷ Syniakiewicz I. Ekonomiczni instrumenty ekopolityki: teoria i praktyka//Ekonomika Ukrainy.- 1999.- №10.- s. 81.

environmental friendly technologies achieved the improvement in the way they make use of environment and natural resources.

Ecological funds from outside the Budget (environmental protection funds) are important for financing conservation of environment. The main reason behind creation of those funds is having the Budget independent centralized source for financing environmental protection needs. Among their goals are:

- financing and providing credits for environmental programmes and scientific – technical projects, directed towards improvement of state of environment and ensuring ecological safety of people;
- activation of financial supplies for undertakings and programmes connected with environmental protection;
- economic stimulation of rational utilization of environment, for bringing in clean technologies;
- supporting environmental education and ecological awareness.

Sources of financing ecological funds are mainly charges for storage, emission of contaminating substances, and for distribution of waste, mandatory fines for accidental contamination, mandatory fines for breaking environmental protection laws. Ecological funds gather financial reserves for realization of ecological programmes, and enable shared financing of costs of conservation of environment. Without outside the Budget funds solving of specific ecological problems wouldn't be possible, especially with the chronic deficit in the Budget.¹⁸

Ecological conversion of external debt (or exchange of debts on environmental protection) is a new and perspective financial – economic instrument, which can play an important role in environmental protection. One of the forms of paying back the debts is conditional transfer from one kind of payment to another, for example compensation of debts, or its part by shared, accomplishment of undertakings in the field of environmental protection.*

Ecological conversion anticipate possibility of transformation of part of financial obligations to the Budget into taking obligation of financing undertakings in the field of environmental protection within the countries boarder, and in national currency up to set total.¹⁹ In most cases special earmarked fund manages the money of credited countries and countries-lender.

Some countries actively use transformation of external debt into internal one for financing undertakings connected with environmental protection. This transformation is quite common in Poland and Bulgaria. Both countries set conditional funds in national currency for undertakings connected with environmental protection in their countries, and countries-creditors lower their debts by certain amount. Poland has signed agreements for transfer of part of external debt for undertakings which are aimed at conservation with the USA, Switzerland, France, Italy, Norway and Sweden for the total amount of 571 mln USD. In Poland for managing of those funds was created EkoFundusz.²⁰

Bulgaria signed and agreement with Switzerland. In 1997 transformation of external debt for financing undertakings aimed at conservation came to 4 mln 230 thousand. USD. Those funds are managed by National Trust Fund.²¹

¹⁸ Wasiuta O.A., Wasiuta S.I., Filipczuk G.G. Ekologiczna polityka: nacionalni ta globalni realii. U 4-ch tomach. – Czerniwci: Zelena Bukowyna, 2003-2004 rr. T.4.- s.227.

* Wtórny rynek długów utworzył się w 1982 roku wskutek rozwoju międzynarodowego kryzysu długów, który zapoczątkował Meksyk deklarując niemożliwość obsługi własnych długów. Po raz pierwszy mechanizm konwersji długów został przyjęty w 1990 roku przez państwami-kredytodawcami Klubu Paryskiego, wskutek czego zostało rozszerzone koło zwykłych przedsięwzięć z wypłat oficjalnych dwustronnych długów // Kurykin S. Uprawnienia u sferi ochrony dowkillia ta pryrodokorystuwannia w Ukraini: problemy ta szlachy jich wyriszennia // Do pytanntia wdoskonalennia uprawnienia ochronoju dowkillia ta wykorzystanniam pryrodnich resursiw.- Kyjiw: WEGO „Mama”, 2003.- s. 38-39.

¹⁹ Seminar „perspektywy pryrodoochronnogo obminu borgiw w Ukraini i w regioni JeEK OON”. http://www.menr.gov.ua/index.php?mode=indexpage&entity_id=57&id_det=25&index_page_id=3.

²⁰ Kurykin S. Uprawnienia u sferi ochrony dowkillia ta pryrodokorystuwannia w Ukraini: problemy ta szlachy jich wyriszennia // Do pytanntia wdoskonalennia uprawnienia ochronoju dowkillia ta wykorzystanniam pryrodnich resursiw.- Kyjiw: WEGO „Mama”, 2003.- s. 39.

²¹ Tamże.

Ultimately should be changed indexes for fines for ecological violations. They should be high enough to exclude possibility of gaining profits from braking the set limits for pollution for companies which use the environment. In Poland for example, the sum of money paid for polluting the air is ten times higher than charges for buying limits of pollution. The possibility of high fine for ecological violations also enhances its function as protective economic regulator of utilization of environment.²²

Appearing of outer effects is attributed to lack of markets, where exchange of goods and services would take place on the level of economic units. Most of scientists thinks that lack of market where firms could organize exchange of permits for emission of pollutants, is the ultimate reason of too high presence of pollutants in environment. On the other hand some authors reckon that market mechanisms can not effectively solve complex tasks connected with social and ecological aspects of environmental protection, some orthodox thesis claims, that pollution is caused by private property and aspiration for maximal profits. Nowadays tendency for setting economic market for environmental protection is in the lead, but the range for implementation of market mechanisms as well as forms of countries economic policy are still discussed.

However the external costs become internal, when it finally reaches the violator.²³ Reaching optimum Pareto at the state of balance between competitors on the market requires zero compensations for the victims. Hence in environmental protection economy it is thought that for existence of external costs the first condition is sufficient. It is clear in the definition by famous Polish economist ecologist T. Żylicz, who says that appearing of external effect is connected with challenging of following premises, which are the basis of market balance.²⁴

1. Profit of every firm depends only on factors which are under its control and on the prices, which are shaped by demand and supply. This premises is undermined if decisions of other economic subjects have direct influence on the profit of company not by the mean of prices (production externalities).
2. The utility which is gained by every consumer depends on goods basket purchased on the market or comes from own resources.

It is particularly important that external cost is transferred from the offender to the victim, which means it has some features of public or private anti good. A typical example of public anti good is the air pollution in the city or the greenhouse effect. Example of private anti good is storing of company's waste on somebody's property. In the first case production of waste by the offender affects well-being of many individuals at the same time. Furthermore inhaling polluted air by every individual does not decrease the amount of pollution inhaled by others. In the case of private anti goods victims share the losses. If the waste is dumped on somebody's property, less of it is left.²⁵ This differentiation is crucial when we plan a system of ecological policy instruments.

In the first case victims are helpless against offenders. All of them together can suffer losses which exceed offenders' profits. Every individual victim, if wanted to force the offender to cut down the pollution, would have to bear some costs, but if they succeed the benefits would be equal for everybody. Own contribution in those benefits would be incomparably small in comparison to own expenditure spend in the process of getting it.

In the case of small private companies individual victims, especially if they are not so numerous, have much stronger stimuli for putting pressure on the creator of external costs because in the case of reducing the amount of waste dumped in the given area, almost all the benefit goes to the land owner.

²² Weklycz O. Udoskonalenia ekonomicznych instrumentów ekologicznego uprządkowania w Ukraini // *Ekonomika Ukrainy*. - 1998. - № 9. - s. 72.

²³ T. Żylicz : *Ekonomia wobec problemów środowiska przyrodniczego*. PWN, Warszawa 1989, s. 90.

²⁴ T. Żylicz. *Mikroekonomia*. Warszawa: Uniwersytet Warszawski, 1993. – s.73; Żylicz T. *Ekonomia środowiska i zasobów naturalnych*.- Warszawa: Polskie Wydawnictwo Ekonomiczne.- 2004.- s.19; Żylicz T., *Wymagania ekologiczne integracji z Unią Europejską. Aspekty ekonomiczne*. W: *Integracja Polski z Unią Europejską w dziedzinie ochrony środowiska*, Łódź : „Biblioteka”, 2000. – s.21.

²⁵ Żylicz T., *Wymagania ekologiczne integracji z Unią Europejską. Aspekty ekonomiczne*. W: *Integracja Polski z Unią Europejską w dziedzinie ochrony środowiska*, Łódź : „Biblioteka”, 2000. - s.37.

From the economic point of view what matters is not only physical size of emitted pollution, but also the losses caused by it. "Victims" have no influence on the size of emitted pollution, but they have some influence of the size of losses caused by it. If more people moves into the polluted area, the value of external costs will increase. So in a way the victims are co-origina-tors of external costs. Some scientists claim that it is the victims that should be taxed. The main reason behind this tax would be to forcing the victims into taking some actions aimed at minimizing losses caused by pollution. On the other hand many Polish economists are for awarding victims compensation equivalent to the losses incurred as a result of pollution. The tax exemption for victims who renounce awarded compensation for their losses might be the most effective.²⁶

This problem is a real challenge for economists-theorist who claim that problem of external costs can be solved, if the market allows for creation of suitable price for anti-goods such as pollution. Such a price would have to be asymmetrical – other level of prices for consumer (victims) of external costs and other for offenders. No normal market price would be able to meet this asymmetrical condition. If the buyer of a product would pay 10 monetary units, than because of the mutual inverse of market transactions – the seller would have to get for his products exactly the same 10 monetary units. This price would then be effective one and assure optimum Pareto, where both the consumer and the producer are in balance. But when there are external costs reaching the optimum Pareto requires positive price for pollutants for production of external cost, and zero price for consumption of external effect of pollution for the victims. It cannot be normal market price, which is symmetrical for the producer and consumer. So reaching economic effectiveness calls not for normal market prices, but the fiscal instruments, which would have asymmetrical qualities. The optimal tax for environmental pollution have these qualities²⁷.

Understanding of environmental pollution in neoclassic economy is slightly different form the popular understanding. The physical effect of environmental pollution if for the economists important as much as it lowers the level of consumers needs and as much it forces the industry to bearing additional costs, to keep a certain level of production. So not the physical changes in the environment but the losses are the subject of economic analysis. For economists this loss is (or should be) as real as any other wastage in the country's economy. That why the loss for the environment is valued – neoclassical economy expresses it in price category.²⁸

Improvement of the condition of environment does not come automatically. Expenses which have to be borne to lower the level of pollution are for economists as real as losses caused by pollution. That is why in economic sense the optimal not the zero level of pollution is desired. That is one where public costs for repair of one unit of pollution equals the costs of loss done by this unit. In other words, it is such a level, where final profits caused by reduction of pollution equal the final public costs of this reduction.

Balance on every market is set in position, where the final profits for companies (taking-MR) equal the final costs (MC), in the case of consumers the final profits resulting from consumption of goods (MU) equals the final costs of purchasing those goods (MC). The general market balance reaches the Pareto optimum when $MR=MC$ and $MU=MC$.

Final profits and final utility can be more generally called marginal benefits. Then the balance and Pareto optimum is reached only for producers and consumers, and the final profits equal the final costs $MB=MC$.²⁹

As it is emphasized by Polish economists, we talk about market defects when, there is a difference between final private profits (MPB) and final private costs (MPC), and corresponding optimal for public values: MSB and MSC . The Pareto optimum is then: $MSB=MSC$.³⁰

²⁶ Analiza skuteczności działania instrumentów ekonomicznych ochrony środowiska w Polsce. Praca zbiorowa pod redakcją Kazimierza Górki.- Kraków: AKADEMIA EKONOMICZNA W KRAKOWIE, 1999.- s.33.

²⁷ Żylicz T. Ekonomia środowiska i zasobów naturalnych.- Warszawa: Polskie Wydawnictwo Ekonomiczne.- 2004.- s.112.

²⁸ Ekonomiczna wycena środowiska przyrodniczego. Pod red. G.Anderson, J.Śleszyński // Wartościowanie dóbr i zasobów środowiska.- Białystok: Wydawnictwo Ekonomia i Środowisko, 1996.- s.45.

²⁹ Analiza skuteczności działania instrumentów ekonomicznych ochrony środowiska w Polsce. Praca zbiorowa pod redakcją Kazimierza Górki.- Kraków: AKADEMIA EKONOMICZNA W KRAKOWIE, 1999.- s.26.

³⁰ Tamże.- s. 28.

Theoretical models of regulation expects that appearing of market defects, in other words external effects is enough a good reason for making some economic decisions only by the government. However we have to differentiate between the correcting economic regulation and the need for correcting of general system of country economy aiming at defining and enforcement of property law, which are the basis of freedom of ventures.

Another crucial problem is general taxing as form of financing some element of public life. It is known that general taxes, if they do not have qualities of flat-rate or headage distort final decisive relations and influence the market balance and effective allocation.

Two basic types of regulations leading to reaching this goal are³¹:

1. administrative – legal approach (prescriptive – banning) the direct regulation of amount of produced, sold, bought and consumed goods;
2. economic (price) approach, correction of prices for transactions, indirectly correcting the amount of goods.

Nowadays in the world there are two standard types of management if the field of environmental protection: administrative and market. Majority of countries which are effective in environmental protection are oriented towards market management – when there are no limits of waste but its price is known, which can be calculated in linear growth depending of the amount of waste. Such a system forces firms to optimize production processes and to introduce new technologies.³²

Theoretical basis of classical instruments of internalization of external effects, as they are discussed among economists, can be enumerated as follows:

- pigou tax: taxing productive and consumerist undertakings which create external effect;
- broadening of market-price mechanism onto new subject without presence of external regulations. This way external effect can be treated as a good (Coase's statement);
- “internalization” of external effect by means of merging subjects which influence each other. Application of this method is so limited that it can be passed over.³³

The optimum of Pigou tax, Polish scientists illustrate in following way: net social benefits (NSB) from business activity can be calculated as gross income $P(Q)$ reduced by private costs of this business activity (PC- private costs) and by external costs (EC)

$$NSB=P(Q) - PC(Q) - EC(Q),$$

where P is a price, Q is a supply of business activity which cause pollution (price P does not depend on the value of supply Q , due to former premises of ideal competition).³⁴

Of course, setting by the government the optimum rates of Pigou tax, requires being aware of individual function graphs, which are kept secret by the companies and one should not expect that it will be disclosed to the government. Recognition of those function graphs requires not only precise monitoring of the emission, but also exact models for diffusion of pollution and valuation of losses suffered by each victim. That is why governments often resort to second best solutions and tax emission of pollution, which are proportional to arduousness of a given pollutant, but identical for all companies within the same branch and often for all pollutants in the country.

Theory of public goods and external effects creates premises for regulating-allocative role of state in environmental protection. This role is social regulation of various instruments, which act against negative external effects of productive undertakings, which use natural resources. Without whose instruments it would be impossible to protect environment, to manage the ecological issue, utilization of environment and natural resources on the international, regional and

³¹ Fiedor B. Podstawy ekonomii środowiska i zasobów naturalnych.- Warszawa: C.H. Beck, 2002. – C.13.

³² W Ukraini zbilszać platu za zabrudnienia nawkolyzniejszego seredowyszczca // Wseukrajnińska gazeta „Deń”. - 10 grudnia 2005.- № 229.

³³ Fiedor B. Podstawy ekonomii środowiska i zasobów naturalnych.- Warszawa: C.H. Beck, 2002. – C.14.

³⁴ Analiza skuteczności działania instrumentów ekonomicznych ochrony środowiska w Polsce. Praca zbiorowa pod redakcją Kazimierza Górki.- Kraków: Akademia Ekonomiczna w Krakowie, 1999.- C.22.

local level and on the level of individual companies.