



Globalization and Regionalization

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**STRATEGY OF UKRAINE'S PARTICIPATION
IN INTERNATIONAL QUOTA MARKET
OF GREENHOUSE GASES EMISSION**

Abstract

Theoretical aspects of national strategy are studied for Ukraine's participation in the functioning of international quota market of greenhouse gases emission. The effect of time factor produced on the efficiency of transactions with quotas is clarified. The market mechanisms which are preferential from national positions are substantiated.

Key words:

Quota of greenhouse gases emissions, Joint Implementation Mechanism, Green Investment Scheme, Joint Implementation Projects, Kyoto Protocol, international quota market, quota trading, and greenhouse gases.

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Introduction

As you know, anthropogenic emissions of greenhouse gases being the negative externalities of business activities, enhance a global warming, thus making the problem of people's surviving as a whole even more aggravated. The problem of climate change among other global problems is unique because it is caused by enormous costs the world community has to spend as a result of sharp increase and large scale of different natural calamities, extension of diseases, growing inequality in provision with drinking water, etc.

On the international level the problem of the greenhouse gases emission reduction is being resolved within the UN Frame Convention on Climate Change (UNFCCC) and its Kyoto Protocol. The key principle of these documents is setting quotas of the greenhouse gases emissions for a number of countries, and the mechanisms for trading in the quotas. The market approach applied to fight against the reasons of a global warming brought about interesting economic results. Thus, a powerful international quota market arose, the future potential participants of which could become any economic agents.

At present, Ukraine is a full-fledged participant of the Kyoto Protocol, and that enables to hope for efficient use of our country's potential capacities with respect to emissions reduction, and thus, its participation in quotas trading. The attractiveness of national economy from the viewpoint of carbon units generation could be explained by its low energy efficiency, which makes the cost of the reduction of greenhouse gases emissions much lower as against that in the developed countries; as well as by a significant surplus of the national quota. Accordingly, reduction of emissions in addition to producing evident ecological effect creates preconditions for attraction of additional and needed investments into basic capital of national enterprises.

From that view, the most critical issues are the following: how should Ukraine act under current conditions; what strategy of national quota application will be the most effective; what tactical measures should be taken on national level to create the efficient mechanisms for attracting the economic entities to the problem settlement of emissions reduction with minimal costs? In scientific researches the theoretical substantiation of the policy of Ukraine's participation in international trading in quotas is new and poorly developed. Among the scientists who are interested in that issue could be named the following: M. Hrab, W. Shevchuk, W. Dyukanov, O. Dyukanova, I. Synyakevych, T. Hordiyenko, N. Bykovets, O. Lohachova, O. Ryabych and others.

Nevertheless, there is a series of issues which because of complexity and disputability have not been properly studied in the works of respective experts. The scientists focus their main attention at the search of effective methods for emissions reduction in different economic branches, also at grounding the po-

tential benefits of trading in quotas, improvement of mechanisms for consummation of projects on emissions reduction, etc. Most of the developments reveal the essence and the peculiarities of the Kyoto Protocol mechanisms show the ways of their implementation in Ukraine. But that actualization and concentration on current and tactical problems brings about the unjustified ignorance of strategic aspects of the policy of Ukraine's participation in quota trading in greenhouse gases emissions from the standpoint of national interests, which is the subject of this paper. Its key issues are the following:

- substantiation of necessity to make reservation of some volumes of quotas to ensure the economic growth of the country in perspective;
- taking into account the time factor in the context of maximization of benefits from the excess quotas sale on international market;
- analysis of perspectives, effectiveness and obstacles for Ukraine to apply the market mechanisms of the Kyoto Protocol.

1. Substantiation of Ukraine's supply volume on the quota market

The quota for Ukraine¹ makes 926.033 mln. tons of CO₂-equiv.², while the volume of emissions in 2007 was only 436.005 mln. tons of CO₂-equiv. (figures of the recent officially approved inventory check, table 1 and fig. 1). International organizations, government, and independent experts regard that till 2012 the actual emissions of greenhouse gases will not exceed 60% of the quota, and thus a significant quota surplus will be saved up.

The available in Ukraine excess quotas could be regarded as a kind of a resource. The Kyoto Protocol mechanisms originally are the external marketing environment for Ukraine as an actor on the quota market, as well as they are the laws of business functioning in this area. From that viewpoint, the Ukraine's strategy used on the International Allowance Market of greenhouse gases emissions transforms into the strategy of effective utilization of the national resource potential. This optimizing task allows for the resolution of three major problems.

¹ The quota of the country (enterprise) consists of carbon units, the nominal of the most of them is 1ton of CO₂-equiv. The carbon unit is an integral kind of the commodity on the market of quotas.

² 1ton of CO₂-equiv. is an established unit for accounting the emissions of greenhouse gases. It is used to convert all gases into CO₂. It is caused by the fact that the effect of different greenhouse gases on the climate balance is different.

Table 1

Greenhouse gases emissions in Ukraine in 1990–2007 years [7]

Year	Greenhouse gases emissions ³ , thous. tons CO ₂ –equiv.				
	CO ₂	CH ₄	N ₂ O	HFCs, PFCs, SF ₆	Total
1990	715 608,93	151 373,12	58 847,98	203,23	926 033,26
1991	616 711,46	138 774,70	54 652,52	162,19	810 300,87
1992	530 922,50	131 430,28	50 108,72	122,68	712 584,17
1993	476 216,19	119 522,20	46 238,37	123,72	642 100,48
1994	426 360,48	108 903,97	40 587,26	138,94	575 990,66
1995	389 242,27	95 733,84	36 867,57	153,45	521 997,13
1996	351 448,54	88 344,87	31 372,78	123,45	471 289,63
1997	337 113,93	81 504,30	30 275,49	126,68	449 020,39
1998	304 351,89	78 302,24	27 698,08	103,97	410 456,19
1999	299 457,20	76 100,78	25 399,19	87,74	401 044,91
2000	289 132,50	77 344,02	23 131,44	105,72	389 713,69
2001	292 941,51	72 420,72	24 918,53	139,49	390 420,26
2002	297 209,15	75 966,89	24 903,25	190,25	398 269,54
2003	314 388,84	74 754,96	22 065,52	130,93	411 340,25
2004	313 355,66	74 733,97	22 723,78	161,29	410 974,70
2005	320 688,67	73 866,23	22 774,57	199,35	417 528,82
2006	338 890,45	74 347,83	23 391,42	137,21	436 766,89
2007	340 147,29	72 026,51	23 651,91	179,57	436 005,27

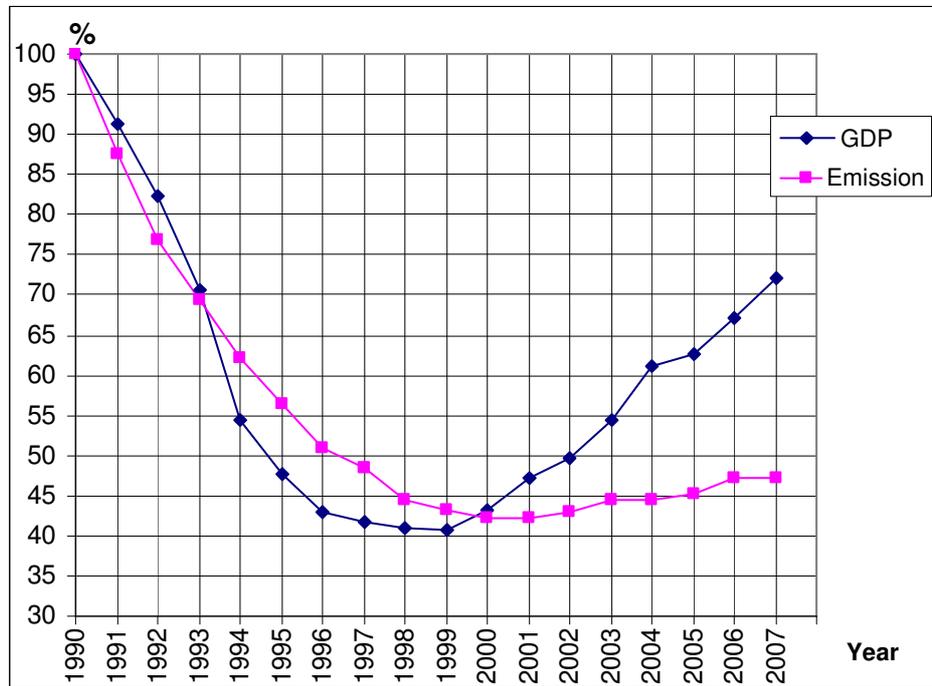
One of them consists in determination and substantiation of the quota volume to be sold on the international market. Any economic agent (be it a state or an enterprise) is interested in a maximally possible volume of the commodity supplied on the market, i.e. in our case, it is allowance for emissions. The question arises, who could wish to purchase the allowance for emissions from a Ukrainian enterprise or government? It could probably be overseas private foundations or companies, either government of foreign countries. But the main thing is, that no one national organization (public or private) has any impetus (since there is no need in that good) to purchase the Ukrainian allowance for emissions.

On first sight, that state of things does not contain any jeopardizes since the quota is not conveyed for free, the real investments are attracted which are channeled (though theoretically) for modernization and re-equipment of capital stock, increase of production efficiency, introduction of innovative technologies, etc. Nevertheless, it is worth accentuating some very important issues.

³Greenhouse gases (that is, those which enhance the greenhouse effect, thus warming the atmosphere) include the following: carbon dioxide (CO₂), methane (CH₄), nitrogen oxide (N₂O), hydrofluorocarbons (HFC_s), perfluorocarbons (PFC_s), sulfur hexafluoride (SF₆)

Figure 1.

Dynamics of Gross Domestic Product and volumes of greenhouse gases emissions in Ukraine in 1990-2007 (in % against 1990) [4; 7]



First, the energy saving potential is not endless in Ukraine. At the moment, it is very difficult to determine the exact curve of marginal costs of the greenhouse gases emission reduction, though it is obvious that the curve is of discrete step-like growing pattern. Ukraine has got a great many of entities, the value of potential emissions reduction of which is minor according to the world dimensions [6, 77–85]. It is very important not to allow the foreign investors «to skim off the cream», i. e. to purchase «the cheapest» Ukrainian quotas.

Second, it is critical for Ukraine to have a certain quotas reserve created, enabling to provide the future sustained functioning and growth of national economy. Ukraine after having sold a part of its quotas should not feel jeopardized to lose its potential incomes. In future, the alternative value ⁴ of the reserved

⁴ Alternative value of reserved quotas is determined by the expenditures on the reduction of the greenhouse gases emissions. If Ukraine has not got the excess quotas (no reserve made), it will have to purposefully reduce its own emissions (either to buy the quotas on

quotas will much exceed the probable current incomes, though much will depend upon the efficiency of quota utilization both at present, and in future.

In the long-term perspective the quota reserve (excess quotas) will exhaust, and we will face the problem of the own emissions reduction to be resolved. Till 2012 Ukraine will not have challenges to meet the obligations within the frames of the Kyoto Protocol. As fig. 1 shows, the GDP growth rates for several recent years exceeded the rates of increase of the greenhouse gases emission. But for some exceptions, the new production capacities have not been made in the country, the prior active ones have been restored instead. Slow increase of emissions was resulted by the produced «economy of scale effect». In future the emission growth will be inevitable. Annual volumes of greenhouse gases emission will increase even with no production capacities expansion in industry. The development of the field of services and small business will enable intense utility of energy resources in transport area, communal and housing sectors, electric power, etc.

In addition, it is worth noting that the main objective of the Kyoto Protocol is to avert the threat of climate change, and to hit this target the nowadays volumes of world greenhouse gases emissions should be reduced by 2–3 times in a maximally short time. Therefore, Ukraine should take respective actions, since our national quota will continuously diminish (fig. 2a). It is just the quota reserve that has to ensure the process of smooth transition from the policy of net-exporter on the quota market to the effective reduction of greenhouse gases emission, and thus to provide the economy with the opportunity to get properly prepared. As practice corroborates, the most complicated thing is to stop the trend of continuous emissions growth (BC segment of fig. 2b), and to stabilize their volumes. The economic agents will need to revise their attitude towards power consuming. Actually, this process is longstanding and cost consuming, specifically for the economic system under creation.

In addition, while grounding the quota volumes that could be sold or reserved, more or less reliable forecasts should be developed with respect to the volume of future greenhouse gases emission. Nevertheless, this process is described as rather ambiguous, therefore it is very difficult to evaluate the prospective volumes of power consuming and the growth rates of power efficiency. Furthermore, the trade mechanisms also can be radically changed in the nearest future.

We can state that there is a certain disagreement between the interests of an individual enterprise and the government, in general. It is very important for Ukraine who will become the holder of the emission allowances sold by an enterprise. The State, being a rational subject, is interested in maximizing the investment incomes, but at that, it aspires to preserve maximum possible volume of quota. So, it is necessary to find a compromise. That compromise consists in

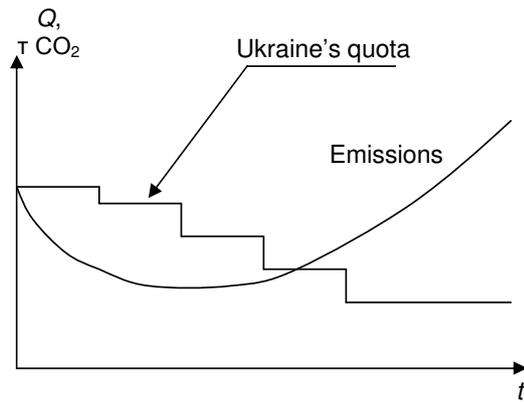
the market at ever growing price), and the cost of reduction is continuously increasing since the energy saving potential is exhausting.

attracting domestic investors to finance the emission reduction. There is no doubt that the ones exist, but the problem is quite different. Under present conditions our home investors have no real impetus to implement that kind of economic projects.

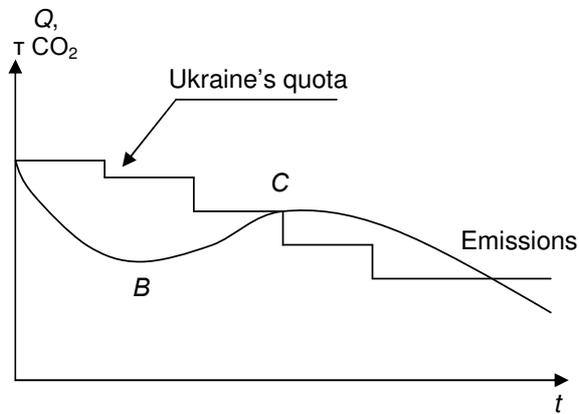
Figure 2.

Ratio of actual emissions and the nation's quota without (a) and with (b) the account for target-oriented policy of the government

a)



b)



Therefore, the key question lies in the following: how to restrict the quotas «outflow» from Ukraine, having not sacrificing the investment volumes within the frames of the quota market mechanisms?

The only taken decision is to create the effective national system for quotas trading. That system in addition to activating the Ukrainian business of trading in the emission allowances has to create a fixed domestic demand for quotas, and to protect the national market [2]. Theoretically, that effect could be achieved through administrative methods (like rigid policy in approving projects, directive planning, etc), but that way was many times proved to be wrong.

Under condition of making a required scheme of national system of quota trading functioned where a significant demand will be on Ukrainian side, it will ensure the following positive results:

- meeting the requirements of the Kyoto Protocol and the world community we will succeed in greenhouse gases reduction;
- we will manage to preserve a significant surplus of national quota;
- the potential volume of investments from the quota trading is not expected to diminish;
- both the buyers and sellers of emission allowances will have the real stimuli to modernize the national production.

2. Accounting for Time Factor for Substantiating the Strategy of Ukraine's Participation in the World Quota Market

Having substantiated the feasibility of quantitative optimization of the strategy of Ukraine's participation in the world quota market, now we will focus attention on the temporal aspect of that problem.

The search of time optimal division of efforts (both of the government and business) with respect to the reduction of the greenhouse gases emission is unjustly ignored, since the government has got the quota surplus, and that is why there is no need so far to actively work at the reduction of the greenhouse gases emission, on the other hand, business will obligatory make use of the opportunities of quota trading, though no proper conditions have also been made. Under those conditions the first and the second does not risk to use all potential opportunities for quota trading, as far as it is not the same at what moment one enters the market with the offer or when it is more feasible to reduce the emissions of the greenhouse gases. It is worth noting that these notions are similar, i.e. in order to offer the commodity on the market, it is necessary either to attain a certain emission reduction or to be prepared to do it in case of necessity.

A greater effect could be reached under condition if the country is prepared for the participation in trading on the international market, i. e. when it has the legislative and institutional bases clearly designed, the mechanisms approved for conducting transactions and quotas distribution among the enterprises (if the national system of quotas trading is created), and the infrastructure developed. Nevertheless, apart of that, there are the following key issues left:

a) the market prices are significantly fluctuating. Even not trying to prognosticate its future dynamics, but from the viewpoint that the setting of the global warming problem needs the world emissions to be reduced by 2–3 times, it is quite understandable that in the long term perspective the quota deficit will be observed, and the price will grow. Actually, that trend has already been observed now, nevertheless, it can not be taken for a reliable one, since the market is in the stage of making, and in addition the global crisis has produced its negative effect.

While current (short-term) price fluctuations are determinant for a single enterprise, Ukraine as a State, while planning its own policy must take into account permanent (long – term) tendencies. In addition, enterprises are greatly constrained in their actions. Thus, the ERU⁵ units could be offered on the market only after realization of certain measures (project); for the moment of ERU creation the enterprise is mainly bound up to with certain contractual obligations and has minor opportunities to influence price formation (though those risks are pre-conditioned in the contracts, either following the practice of the EU quotas market, they could be hedged through securities). The State is operating the AAU⁶ units that are actually available (though, as it is noted further, the problems are with their liquidity), and moreover, the main burden of the emission reduction can be shuffled off on business. Consequently, the State has got much more opportunities for «calendar» planning of incomes from the emission allowances (quotas) realization, that can significantly influence the final results (incomes) from trading;

b) wherever the temporal factor is in effect, the change of assets value (efficiency) should be taken into account, that the assets should be discounted. Since the Kyoto Protocol allows to shift all unused till 2012 quotas (implying AAU) for the subsequent period (periods) [13], actually we can argue that Ukraine owns a certain budget of quotas and can «consume» it (sell the quotas)

⁵ Emission Reduction Unit is a type of carbon units emerging at the greenhouse gases emission reduction as a result of implementation of projects within the frames of the mechanism of joint introduction (p. 6 of Kyoto Protocol). The source of ERU «emission» is a quota of the selling country. The ERU holder could be both a state, and an individual enterprise.

⁶ Assigned Amount Unit is a type of carbon units that make the quota of the country. Thus, Ukraine's quota makes 926 033,26 thous. tons of CO₂-equiv. or 926033260 AAU. In case Ukraine agrees to implement on its territory the joint project within the frame of the mechanism, it is obliged to convert a certain portion of available AAUnits into ERUnits, and give it to the enterprise free of charge which sells it to the investor. The AAU holders could be exceptionally countries.

immediately getting some benefits, either to postpone the time of its consuming. However, the current value of probable incomes could be either lesser or larger than the probable current receipts from trade.

In fact, it is a classic temporal budget constraint. We will formalize that issue as the following model. The initial parameter of our model is N index – a prognosticated quota excess in Ukraine, and D as a prognosticated price for the quota on the international market at a certain period of time, that is, it could be viewed as a function of

$$P = p(t). \quad (1)$$

Ukraine has to determine what volume of excess quotas it is feasible to reserve, and what volume could be sold on the market. The quota volume to be realized is called Q . We will have the following:

$$\begin{cases} Q = c'N \\ c' \in [0; 1] \end{cases} \quad (2)$$

Now we will consider a biperiodic intertemporal budget constraint.

C_0 – denotes the volume of sold (consumed) quotas for t_0 period, while C_1 – the volume of sold quotas for t_1 period, and:

$$C_1 = Q - C_0. \quad (3)$$

Ukraine can sell the quotas for t_0 period at the price of p_0 , at that its receipt will make:

$$V_0 = C_0 p_0. \quad (4)$$

The receipt for t_1 period is denoted by the following equation:

$$\begin{cases} V_1 = C_1 p_1 \\ p_1 = p_0 + \Delta p_0 \end{cases} \quad (5)$$

In case when $\Delta > 0$ (means that in future the price will grow). To correlate the money flows from trading in different temporal periods we will discount the probable receipt:

$$V_1 = C_1 p_1 \frac{1}{1+r}, \quad (6)$$

where r – discount rate.

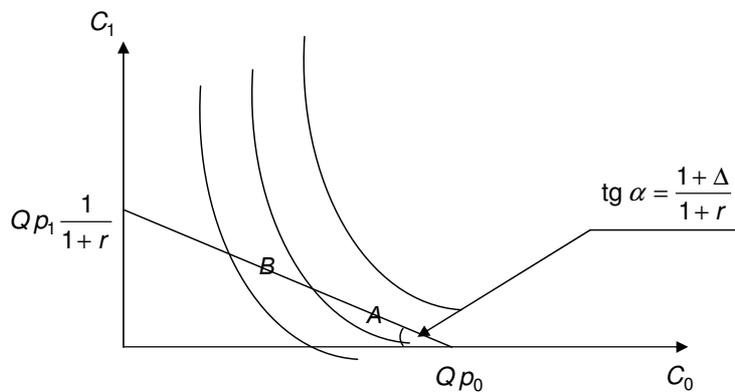
For Ukraine aspiring to maximize its benefits its choice transforms into a question of what the C_0 index should be to get the maximum trade receipts (fig. 3).

The following three variants are possible:

- a) $C_0 = Q$ – the whole volume of excess quotas designated for realization will be sold within the first period (immediately);
- b) $C_0 = 0$ – the sale of all designated excess quotas will be shifted for the future period;
- c) $0 < C_0 < Q$ – it does not matter when and with what volume of quotas come into the market.

Figure 3.

Chart of indifference curves and budget constraints in biperiodic case



Actually, the choice depends upon what factor will appear to be «stronger», either prognosticated growth of price, or the established discount rate:

$$\frac{V_0}{V_1} = \frac{C_0 p_0}{C_1 p_1 \frac{1}{1+r}} = \frac{C_0 p_0 (1+r)}{C_1 p_0 (1+\Delta)} = \frac{C_0}{C_1} \frac{1+r}{1+\Delta} \quad (7)$$

In case of $\Delta < r$, then it will be feasible to sell immediately the quotas (variant a); if $\Delta > r$ – it is good to postpone the market entrance till the price grows (b); if $\Delta = r$ – it means that the current value of a quota is equal for both temporal periods, and therefore, the aggregate receipt from trade does not depend on the moment of the realization of the commodity on the quota market.

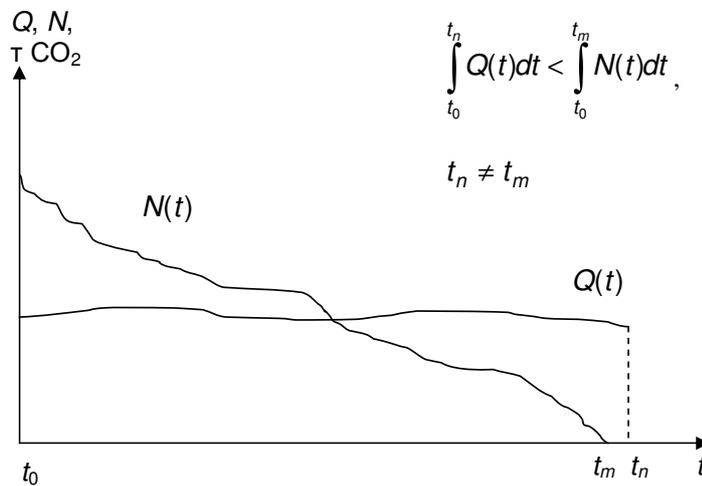
The case of multiperiod constraint is somehow more complicated. Here the prognosticated quota excess N (and c') is a function for t time, but not a constant, like it is in the previous case. Accordingly, the volume of quotas to be sold on the market is determined according to the following formula:

$$Q = N(t) \times c'(t). \quad (8)$$

In general, the graphs of $Q(t)$ and $N(t)$ functions could be of any shape, nevertheless it is clear that the $N(t)$ function will be decreasing (the quota excess will exhaust in time), while the $Q(t)$ function is determined by the state policy in quotas reservation (fig. 4).

Figure 4.

$Q(t)$ and $N(t)$ Functions



It is admitted that the quotas excess exists for a certain period of time, and in each particular moment of t_i period the whole volume of quota excess ($C_i = Q_i$) could be sold or a part of quotas could be put off for future periods ($C_i < Q_i$):

$$S_i = Q_i - C_i, \quad (9)$$

where S_i – the volume of unsold (but not reserved) excess quotas at the beginning of i -period.

In spite of the volume of quotas sale C_i for the t_i period, in the successive temporal t_{i+1} period we have a certain Q_{i+1} volume, as well as C_{i+1} i S_{i+1} . The budget equation will be the following:

$$C_0 p_0 + C_1 \frac{p_1}{1+r} + C_2 \frac{p_2}{(1+r)^2} + \dots + C_n \frac{p_n}{(1+r)^n} =$$

$$= Q_0 p_0 + Q_1 \frac{p_1}{1+r} + Q_2 \frac{p_2}{(1+r)^2} + \dots + Q_n \frac{p_n}{(1+r)^n}, \quad (10)$$

$$p_i = p_0 + \Delta_i p_0, \quad \Delta_i \in (-\infty; +\infty), \quad (11)$$

$$r = \text{const}. \quad (12)$$

Consequently, we will have a non-linear optimization problem the outcome of which is $C = C(t)$ function for the $[t_0; t_n]$ interval of time, i.e. a numerical series of yearly quota volumes to be realized on the market in a certain period of time.

Proceeding from the above, we can separate four main determinants (table 2) producing an effect on rational distribution of temporal excess quotas.

Table 2

Description of the model major variables

	Endogenous	Exogenous
Objective	N	P
Subjective	c'	r

1. The excess quota volume (N) depends upon future dynamics of the greenhouse gases emission as well as upon the Ukraine's obligations assumed on the international level with respect to emission reduction after 2012 (the quota volume).

2. The price of the commodity (N) is set on the international quota market, however its index for Ukraine can be slightly different (probably biased to decrease) because of different subjective factors (i. e. investment risks, loyalty of the authorities towards investors and particular projects, quality of institutional provision for projects implementation on governmental level, etc.).

3. The portion of excess quotas (c'), to be sold on the market is fixed by Ukraine from the view of the state and prospects for national economic growth, the value of emission reduction, conjuncture of international quotas market, etc.

4. Discount rate (r).

So far we have studied specifically the budget constraint, but to make the rational choice it is necessary to take into account the profitableness of sold quotas (indifference curves) for their holder. The major determinant here is considered to be the alternative losses. The economic agent (the state, the enterprise) having invested into the reduction of the greenhouse gases emission (that is, modernization of capital funds, energy saving, etc.) will get a certain effect and will use it for all subsequent temporal periods. This agent will agree to adjourn the project specifically under condition that in future it would be able to get greater receipt from the quota sales either to have any other benefit (i.e. more advanced equipment, the innovation technology, etc.). Under different conditions the economic agent during the project adjourns will lose a certain benefit which he could get if the project is implemented immediately. Thus, the rational agent will prefer the rapid emission reduction (quota sale) in case of having the opportunity to do so. Accordingly, it implies that the indifference curves will be sloping towards the OX axis (fig. 3).

Thus, for maximum effective distribution of excess quotas it is necessary to know at least the probable price on the market, as well as to be able in case of necessity to sell a certain portion of quotas. Because of obvious reasons, both conditions are absolutely unreal, therefore the dominating in Ukraine aspire to sell the largest volume of quotas immediately is far from being indisputable. That question needs at least the basic research against the substitution of national interests by current needs. Moreover, in future the growth of Ukrainian economy is expected, and the unused available quotas will be needed for further development.

3. Optimization of Mechanisms for Ukraine's Participation in Quotas Trading

According to the Kyoto Protocol Ukraine has the right to take part in all mechanisms within that agreement, though the real interest lies only in two of them, particularly in the quotas trading and the mechanism of joint implementation. Article 17 of the Kyoto Protocol allows any country having the excess quotas to sell it to some other country [5]. If Ukraine takes that way of implementation of the Kyoto Protocol norms, it will actually mean the nationalization of the quotas emissions. In that case the received receipts from trading will become one of the items for budget revenues (either a separate non-budgetary fund). It means that the government will have an exclusive right to dispose of the re-

ceived funds. There the two following options are possible for the development of events:

a) the received funds will be spent for current consuming, financing of social actions, budget deficit cover, etc. This result is less desired out of all possible ones, nevertheless, we think it is the most probable, in particular, from the view of the practice of the latest years;

b) the funds received from the quotas trading will be invested into the actions directed at the economic energy-saving reduction, modernization of technologies and fixed capital, etc. It is clear that the latter way of the utilization of the receipts from trading use is more effective.

Within the frames of art.17 of the Kyoto Protocol Ukraine can face some barriers in the process of trading in the allowances for the greenhouse gases emissions. In the period of the Kyoto Protocol development the participant countries were expected to take active measures to reduce the emissions. To promote this process and make it flexible and effective it was recommended (the USA initiated) in case of getting the excess emission reduction (implying the emission reduction is less than the quota volume) to allow the country to sell the volume of the «saved» quota. That proposal was rational, since in different countries the efficiency of investments made into the reduction of the greenhouse gases emission significantly fluctuates. However, in 1997 for the moment of concluding the Kyoto Protocol, there were no even approximate evaluations of the emission volumes in the countries of the former socialist camp, and those countries were allowed to choose the base year by their own, when the emissions volumes would become the basis for the quota calculation. The experts understood that the process of transition to market economy would slow down the economic growth, but they did not expect the emissions reduction to be that large scaled.

When practically all post socialist countries appeared to have enormous quota surplus⁷ it caused a great concern. If those carbon units (so called «hot air» which implies the quota excess received as a result of economic recession in those countries instead of being reached due to purposeful policy) are entered on the market, in fact it will lead to its failure. The «hot air» on the market of emissions allowances could be compared with extra money issued by the Central Bank. Trading in the «hot air» could bring about the «obligations inflation», any stimuli to reduce their own emissions would disappear in the developed countries since it would be easier and much cheaper to meet their obligations.

In order to meet this problem there was developed a compromise mechanism for trading in «hot air», that is the arrangement of target (green) investments (TGI). The matter of the TGI consists in the «hot air» exporters' taking ob-

⁷ According to our calculations the aggregate volume of quota surplus in early 2008 made over 2000 mln. tons CO₂-equiv. For comparison, the aggregate quota deficit in the countries of the Kyoto Protocol (actually, aggregate demand) at the same time did not exceed 700 mln. tons of CO₂-equiv [11]

ligations to guarantee the target channeling of the received funds. At that, under the condition of the TGI it could be possible to finance a wide range of ecological tasks – from the creation of the system of compiling statistic information and training of relevant specialists to the utilization of coalmine methane, or replacing coal with gas in the TPP (thermal power plant) [14, 31, 32]. The TGI disables the use of the receipts from trade for current expenditures (this process will be controlled by the country – the quota buyer), however, the TGI is still not agreed. So far, it is not clear how it will be implemented, since each country is free to choose its particular mechanisms for the TGI application which completely depend upon bilateral agreements between a quota seller and a buyer [10, 30]. That liberal behavior provides certain opportunities as well as it contains considerable threats. So, the TGI could become the simplest (from the view of the complexity of undergoing bureaucratic and verification procedures) mechanism for quotas trading, but in this case the exporting country (e.g. Ukraine) faces very high demands with respect to the quality of institutional and regulatory facilitation of trade.

Theoretically, under TGI the country can sell a portion of excess emission allowances, and only after that it can use these funds for implementation the actions directed at the reduction of the greenhouse gases emissions. However, the more attractive variant for the investor is the one, according to which the exporting country will have to offer a package of concrete projects which could be implemented, either it can implement the projects itself and offer the actual reduction of emissions.

Despite the above, the decisions concerning the particular projects and particular enterprises to implement them will rather take the exporting country, specifically the state body responsible for this field, and that allows for certain risks. It is worth noting that it is just that stage of development Ukraine is proceeding now. Thus, on March 18, 2009 the first Agreement on selling the AAUs within the frames of the TGI was concluded between Ukraine and Japan. Nevertheless, neither Ukrainian Government, nor the National Agency of Ecological Investments (NAEI), which is a specially authorized organ, have not yet announced the details of the Agreement, either the list of projects which are to be invested with the trading funds [9].

In general, the procedure of funds disposition in Ukraine is as follows. An enterprise develops a project of production modernization and submits it to the NAEI. The interagency task group examines the project and takes a decision as for feasibility of its implementation. In case of the positive decision, the NAEI itself defines the project contractors according to the Law of Ukraine «On Purchasing of Goods, Works and Services on Public Accounts» [8]. Accordingly, in spite of significant advantages if to compare with the budgeting apportionment, that variant has also certain drawbacks. The key weak point consists in high probability of speculation and corruption, especially in case when the disposition of receipts from trade through the TGI will be closed. Also the negative phenomenon is the choice of the project contractor to be done by the NAEI (since in Ukraine these procedures are not effective).

Another mechanism of the Kyoto Protocol is the agreements (projects) of joint implementations (PJI). In appliance with art.6 of the Kyoto Protocol the country with the quota deficit can finance the project which will provide the reduction of greenhouse gases emissions on the territory of other country, and due to that the first country will have the right to enlarge its own quota by the volume of attained reduction [5]. The quota of the receiving country will shrink by the same volume accordingly. The feasibility (advantage) of the PJI for both sides is similar to that of trading within the frames of art. 17 of the Kyoto Protocol, implying great difference in marginal costs for emissions reduction in different countries. The energy efficient industrial countries (Japan, the EU countries, Canada) due to the mechanism of joint implementation can reduce their own expenditures for meeting the obligations within the frames of the Kyoto Protocol (nevertheless, the emissions are actually reduced not in Japan, but in Ukraine, where it is cheaper by many times), and the exporting countries can modernize the available and introduce new technologies on account of foreign investments.

The PJI is also possible in two following options:

a) the state will leave the role of trade mediator for itself while all important items will be agreed with foreign investors and national enterprises. At that, the state has the right under certain conditions to reject or to suspend the project consummation. Each project should, in addition to be approved by the state organ, undergo the independent international verification, and only after those procedures it could represent itself in the capacity of an offer on the quota market. The investors interested in the project, will conclude the respective agreement with the enterprise and pay for the received emissions reduction. In its essence it provides a traditional case of implementing a mechanism of joint introduction. It is also carried out in two options (so called, tracks). They differ in the procedure of PJI coordination. Thus, under Track-1 the main role belongs to the recipient country, while under Track-2 it belongs to independent international body (with this purpose the Supervising Committee for Joint Implementation was established);

b) according to certain principles the state distributes a share of national quota among economic entities and enables to use it at discretion. At that, the agents who received the carbon units, undertake certain obligations respective the volumes of the greenhouse gases emissions reduction. In case the enterprise succeeds in having the quota surplus (actual emissions for the end of the year will be lesser than the available volume of carbon units), it will be able to sell the excess quota. In fact, the national quota market is being created, while the state has to undertake the role of the «night watch» (legislative facilitation, consulting services, etc). The enterprises get interested in emissions reduction, since the financial sanctions will be imposed on them in case of the deficit of carbon units, and in case of the surplus the enterprises will yield the receipts. Consequently, the emission allowance being an administrative constraint transforms into an asset having the real economic value. Today similar systems are successfully functioning in the EU, partially – in the USA and Australia [3; 11]. The major advantage of that option is the attraction to quotas trading practically

of all economic agents rather than separate enterprises. In that way it is possible not only to reach the maximum efficiency in excess quota utilization in Ukraine, but also to significantly reduce the greenhouse gases emissions.

Trading within the frames of art. 17 of the Kyoto Protocol was initially thought as a way of cooperation of the countries in effective emissions reduction, that is it was provided for the exchange to proceed as the chain of a «country- country». The mechanism of joint implementation created the preconditions for the cooperation of «a country - business»⁸. However, the introduction of TGI and a series of national/regional systems of quotas trading somehow changed those ties. Thus, according to the TGI the cooperation can also proceed between the country-buyer and the enterprise of the country-seller (but obligatory with the mediation of the exporting country), while the mechanism of joint implementation has been transformed into the chain of a «business-business». Now we will define all distinguishes between the TGI and PJI. They are as follows:

- the main PJI determinant is the obligatory «additionality»⁹ of those projects and reference to the period of 2008-2012 as oppose to the TGI;
- the TGI is based on selling of excess quotas («hot air»), while the PJI provides for conveying a portion of national quota, the volume of which equals the received reduction of the greenhouse gases emission under the outcomes of the project. According to the TGI the projects could also be implemented, however, the emissions allowances (the commodity) actually exist despite the results of the project, while within the frames of the mechanism of joint introduction the commodity emerged specifically after the project implementation;
- the PJI undergoes a very intricate procedure of international examination and approval, while the TGI is controlled by the investing country, and when the agreement with the exporter is achieved the procedure of examination could be rather simplified;
- in order to launch the TGI the exporting country faces great demands respectively the provision with the effective system of inventory and verification of projects, since failure in meeting those demands will bring about failure in conducting transactions. According to the mechanism of joint implementation the functions of verification and monitoring could be assumed by specialized international organiza-

⁸ It is meant that a «country» is an investor, buyer, and «business» means the one in the exporting country.

⁹ According to art.6 of the Kyoto Protocol the TGI can generate the good on the emission allowances market specifically under condition when the emissions reduction is proved to be the result of additional actions, and under any other condition it would be impossible. Actually, as practice shows, it can not be always proved [5].

tions. Consequently, the TGI is less complicated for implementation but requires significant preparation costs.

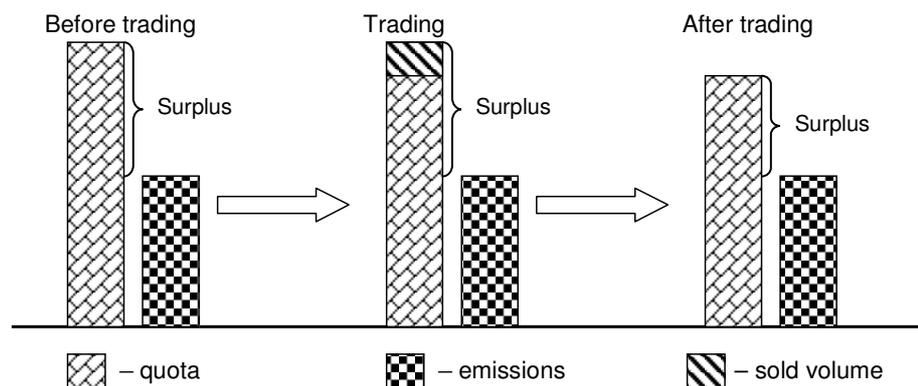
Actually the excess of quotas in Ukraine can be viewed as a reserve for the growth of national economy. Having sold the excess quotas Ukraine will lose this reserve, though it will receive certain funds instead¹⁰. In case when the mechanism of joint implementation is taken as an alternative, Ukraine will preserve the quotas reserve, and will receive the funds but in the kind of capital investments (fig. 5, 6).

Among other PJI advantages we can emphasize the following:

- abolishment of administrative control over the process of quotas trading, that enables to avoid its negative consequences;
- maximum translucent and independent trading procedure, no necessity in the state disposition of funds from the quotas trading and transition to the market mechanism of funds disposition;
- shortening of time interval from the moment of the project submission to its implementation.

Figure 5.

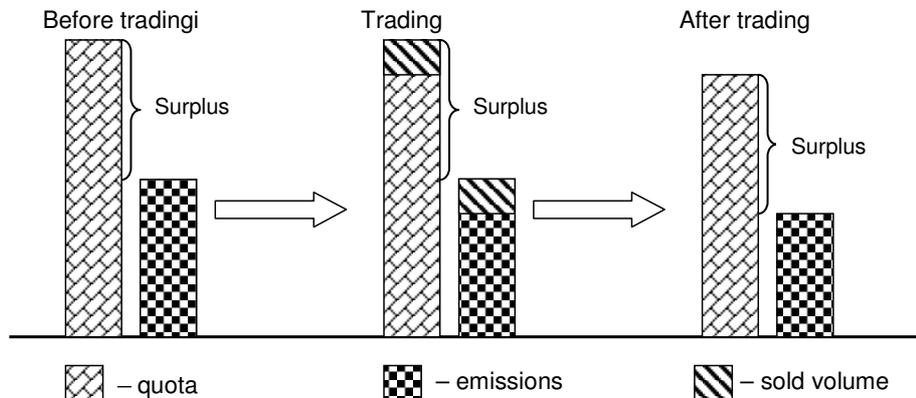
Diagram of trading in quotas (art.17 of Kyoto Protocol)



¹⁰ The TGI partially enables to preserve the quotas reserve, but its effectiveness in this aspect is much lower as against the PJI.

Figure 6.

Diagram of joint implementation mechanism



Conclusions

First, within the frames of the Kyoto Protocol Ukraine has got a considerable quota surplus which, alongside with low energy efficiency of national economy enables our country to become one of the most potential suppliers of quotas on the international market. From that view, there emerged an immediate need to find the most effective ways for the utilization of carbon units in Ukraine. Nevertheless, the desire to sell the maximum possible portion of national quota to foreign investors is wrong, since in that case the long-term market trends and the national interests are not taken into account.

Second, the national economy is expected to grow in future, and it will result in the increase of the greenhouse gases emissions. So, in order to ensure the future sustained economic growth it is necessary to create the reserve of quotas.

Third, there exists a real jeopardy for Ukraine to lose for nothing the cheapest potential of emissions reduction (i.e. «cream skimming» by foreign investors on the undeveloped and unregulated market). To have the sufficient quota surplus preserved and steady receipts ensured for financing the actions directed at the emissions reduction (modernization of the economy) it is necessary to stimulate the domestic demands for quotas.

Fourth, Ukraine should aspire to maximize the receipts from trading in the emission allowances, making in this way the grounded choice between current and future quota trading (both AAU and ERU).

Fifth, the final benefits from trading in quotas are determined by the mechanisms of the Kyoto Protocol, which will be used by Ukraine for conducting transactions. At the moment, trading in quotas within the frames of art.17 of the Kyoto Protocol provides for more threats than opportunities. The major risk is the purposeless use of receipts. The offered scheme of target investments still is undetermined. No matter that it simplifies the procedures of approval and implementation of projects; it greatly enlarges the preparation costs of the country. Ukraine managed to reach the agreement with Japan on trading in quotas within the frames of this scheme that is obviously an important result, nevertheless, the effectiveness of that method of utilization of surplus quotas is rather doubtful.

The TGI needs extra study and improvement. To have it effectively implemented, primarily it is necessary to develop the relevant institutional instruments, the efficient mechanisms for channeling the receipts from trade into the real projects. We consider the question principal that the funds from selling of AAU units have to supplement the investments within the frames of the mechanism of joint implementation, and they have to be used specifically in the areas where the PJI are either impossible or unprofitable (because of lack of funds in the recipient, high risks, long time to benefit, etc.) including in public sector.

Sixth, the mechanism of joint implementation as oppose to trading in the frames of art. 17 of the Kyoto Protocol (including TGI) enable to preserve the surplus of national quotas. The application of the mechanism of joint implementation shifts the main accent to the activities of enterprises. The government loses its monopoly on the quotas market, likewise some administrative mechanisms of influence. Nevertheless, the market relations arise instead, and potentially they could ensure better results.

In our opinion, the optimal strategy for Ukraine is to create the national system for emissions allowance trading, first of all oriented at the development of domestic market. That system has also to ensure step by step (gradual) integration of the country into the international quotas market. The priorities should be the projects of joint implementation, though the use of the scheme of targeted investments is also possible, but as a supplementary mechanism.

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