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MARKET RELATIONS DEVELOPMENT IN THE GREENHOUSE GASES SPHERE

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*Odessa National Polytechnic University, Odessa, Ukraine**Хумаров О.А. Розвиток ринкових відносин в сфері викидів парникових газів.*

У статті вперше науково обґрунтовано необхідність формування внутрішнього вуглецевого ринку в Україні, як інструменту стимулювання зниження викидів парникових газів та енергозбереження. Визначено місце та роль ринкових відносин в торгівлі квотами на викиди парникових газів для акумулювання коштів та залучення інвестицій необхідних для екологічно чистого розвитку, екологізації економіки, раціоналізації енергоспоживання, залучення сучасних природозберегаючих технологій виробництва й утилізації відходів. Обґрунтовано функціонування внутрішнього вуглецевого ринку України; визначено сутність і суб'єкти внутрішнього вуглецевого ринку та його функції; розроблено концептуальну модель формування цивілізованого внутрішнього ринку обміну правами на квоти викидів вуглецевих одиниць, як сукупності регіональних вуглецевих ринків.

Ключові слова: Киотський протокол, внутрішній вуглецевий ринок, спільні проекти, концептуальна модель, економічні принципи, квоти на викиди вуглекислих газів, торгівля квотами

Хумаров А.А. Развитие рыночных отношений в сфере выбросов парниковых газов.

В статье впервые научно обоснована необходимость формирования внутреннего углеродного рынка в Украине, как инструмента стимулирования снижения выбросов парниковых газов и энергосбережения. Определено место и роль рыночных отношений в торговле квотами на выбросы парниковых газов для аккумуляции средств и привлечения инвестиций необходимых для экологически чистого развития, экологизации экономики, рационализации энергопотребления, привлечение современных природозберегающих технологий производства и утилизации отходов. Обосновано функционирование внутреннего углеродного рынка Украины; определена сущность и субъекты внутреннего углеродного рынка и его функции; разработана концептуальная модель формирования цивилизованного внутреннего рынка обмена правами на квоты выбросов углеродных единиц, как совокупности региональных углеродных рынков.

Ключевые слова: Киотский протокол, внутренний углеродный рынок, совместные проекты, концептуальная модель, экономические принципы, квоты на выбросы углекислых газов, торговля квотами

Khumarov O.A. Market relations development in the greenhouse gases sphere.

The article deals with for the first time substantiated necessity to form the internal carbon market in Ukraine as a tool for stimulating both greenhouse gas emissions reduction and energy saving techniques. Defined are the place and role of market relations in greenhouse gases' emissions trading to accumulate funds with attracting of investments required for the ecologically clean development, economy greening, energy consumption rationalization, as well as engaging modern natural resources-saving production technology and recycling. Proved are the grounds for the internal carbon market in Ukraine operation; the essence and subjects of internal carbon market and its functions; elaborated is the conceptual model of civilized domestic market for exchanging rights to carbon emission quotas, as a combination of regional carbon markets.

Keywords: Kyoto protocol, internal carbon market, joint projects, conceptual model, economic principles, quotas for greenhouse gas emissions, quota trading

The question of preventing further climate changes and overcoming the negative effects is constantly included to the agenda of the UN General Assembly meetings. Ukraine is consecutively fulfilling its obligations to reduce greenhouse gas (GHG) emissions with those emission quotas trading and already established a system of GHG emissions institutional control, ensuring its commitment to the Kyoto Protocol objectives.

Currently, Ukraine exercises its right on carbon units' international trade in two ways: emissions trading and joint implementation. At that, the carbon units trading seller is a country, while in the joint implementation mechanism the seller party is embodied with national enterprises and the buyers are their foreign partners. Here arises an urgent question of the national internal carbon market forming, through the use of Kyoto mechanisms for carbon units' trade turnover between the national economic entities.

The Kyoto mechanisms' implementation when establishing in Ukraine a system of GHG emission reducing, should take place in the direction of not only reducing the environmental burden, but also encouraging changes to reduce ecologic load, resources input, waste load of the national industry, with respective revision of the economic activity structure. Such a shift is advisable to implement transferring the air emissions reductions system gravity centre at the regional level.

Analysis of recent researches and publications

The regulatory and legal sources as well as the scientific references pay much attention to the development of GHG emissions reduction and climate change on the planet issues. International and national scientific community researches various aspects of GHG emissions problem on technical, biological, social and economic levels. The main focus as to the GHG emissions reducing relates to the development and operation of global, regional and domestic markets [1, 3]. The problem of carbon markets' formation and operation has been considered by M.A. Yulkin. Thus, this author provides a definition of the carbon market in a whole, explores its development historical stages in different countries, but does not consider the conceptual provisions of the internal carbon market forming nor market relations' economic subjects' relationship [4]. The article by A.B. Pochtoviuk and O.A. Pryakhin exposes a SWOT-analysis of quotas trading for Ukraine,

considering the formation of GHG emissions permits distribution process [5]. Potapenko V.G. represents study of GHG quotas international allocation problem exposing the need to create conditions for developing in Ukraine the national carbon market, that will allow large private companies to modernize the steel industry and basic chemistry, engaging advanced technologies and attracting investments, thus obtaining additional funds to the budget [6]. Shkola I.M., and Babinska O.V. do consider the carbon market as a tool for implementing the strategy of sustainable low carbon development [7].

Unsolved aspects of the problem

Based on the analysis of existing publications on the Ukrainian carbon market we can conclude that all the authors discuss the need to form the national carbon market for trading GHG emissions with other countries on the basis of the mechanisms elaborated in Kyoto. Both scientific publications and practice still not consider the role of regions as economic entities acting in partners of state and companies, enterprises, households in creating the conditions for sustainable low carbon development in the national scale; evident is the lack for scientific researches onto providing regions and economic subjects with GHG emission quotas trading permissions. Today still not developed is the theoretical framework nor conceptual models of Ukrainian carbon market functioning through State – Regions – Entities partnership in GHG emissions reducing and these entities' integration in the global carbon market system.

This study purpose is to justify the need of developing market relations on a specific commodity: carbon units' emission quotas and the carbon internal market operation rules, so aimed onto elaborating proposals for its implementation in Ukraine.

The main part

The natural resources' use state economic regulation system includes separate market relations in terms of GHG emission rights buying – selling, where the state acts as the Seller of rights for GHG emissions placement in the atmosphere, and the buyers are economic subjects producing pollutant emissions. These relationships formed in times of administrative-ordering management remain unchanged with the development of market relations. The current trading system's main drawback refers to the disconformity of fee for polluting to the economic and environmental damage, misuse of funds received, absence of justification for allocating funds to regions and measures on GHG emissions reduction.

Analysis of funds received from the GHG emissions quotas trade during 2010-2013 shows that in Ukraine annually reported are around 4 bln. UAH. The obtained funds were directed to the purchase of vehicles for the police, insulation of social-purpose establishments' buildings (schools, kindergartens, hospital), reconstruction and modernization of boiling plants in the territory of Ukraine. As of December 31, 2011 in Ukraine there were 84 joint implementation projects (65 projects under the national and 19 projects under the international procedure). 73

projects have received ERUs, of total cost about 62.9 million (58% of all ERUs issued in the world). For example, the funds received from state resulting from GHG emission trading in 2012 were invested in real projects aimed at reducing GHG emissions; infrastructure development for environmental projects; monitoring and research. Overall in 2012, 987 projects implemented in 23 regions of Ukraine amounted to 3.7 billion UAH. The GHG emission reduction result was 247 thousand tons in CO₂ equivalent.

In particular, 94% of projects (933) were these ones of social facilities thermal insulation (facades and roofs insulation, windows and doors replacement) in the amount of 2.0 billion UAH.; 4.6% (46) relates to replacing boilers with the transition to alternative fuels and educational and health establishment, for the amount of 86.5 mln.UAH, and the last part are several individual projects (Table 1).

In the first half of 2014 in Ukraine more than 260 JI projects were registered and operated. These projects evolved in such economic sectors for reducing GHG emissions: power engineering (non-renewable energy sources), distribution of energy consumption; industrial chemistry, construction, transport, mining/mineral production, metallurgy, emissions from fuels (solid, liquid and gas) emissions from carboxylic halide and sulfur hexafluoride production and consumption, use of solvents, waste processing and disposal, afforestation and reforestation, agriculture [8].

Now in the global economic and ecological system dynamically growing are the carbon markets, which can be divided into three groups:

- International carbon market where trading is regulated by international agreements, in particular the Kyoto Protocol;
- National and regional carbon market regulated by national legislation;
- Voluntary emission reduction market where the member actors are companies as well as countries [3].

In our opinion, one of the directions to affect GHG reduction and increase of GHG absorption and measures on adaptation to climate change shall be has forming the internal and regional carbon markets in Ukraine. These markets established will enable shifting from the traditional use of Kyoto mechanisms for energy-/ and nature-intensive industries to solve the problem of GHG emission reductions and encourage the implementation of economic restructuring in the region.

The region represents an entity operating with different economy sectors, both producing emissions and suffering from those emissions' negative external effects. For example, the oil refinery, energy facilities, power plants, etc., located along with health recovery, tourism, recreation, institutions, agricultural enterprises producing organic food. This is what makes the region needing to address problems of GHG emission reduction based on the characteristics of natural potential adaptive features and productive forces distribution on its territory to plan and allocate

the amount of permits and quotas for GHG emissions fixing the standard fees for atmospheric pollution.

Structurally the internal carbon market in Ukraine shall be composed of regional markets trading with a specific commodity: carbon units' emission quotas, arranged by administrative-territorial principle to direct and optimize the GHG emissions management. These markets main blocks are:

— GHG emissions purchase and sale between state and entities (principle already existing in the form

of permits and payments for environmental emissions);

— Trading with carbon emissions quotas (green investments) at such levels as enterprise – to – enterprise; enterprise – to – region, region – to – region; region – to – state;

— JI projects market with implementation levels: domestic enterprise – to – foreign partner; between domestic enterprises; region as an economic entity – to – investor.

Table 1. Use of financial result from GHG emission quotas' trading

№	Project title	Implementation region	Amount, mln UAH	% to the total amount
1	Construction of sewage treatment plants to clean mine water mine named after P.L. Boykov	Sverdlovsk town, Lugansk region	96,5	2,5
2	Complex modernization of Kyiv subway cars	Kyiv city	985,0	26,5
3	Reconstruction of 165 th district boiler with the introduction of heat pumps	Dzerzhynsk town, Donetsk region	62,0	1,6
4	Projects (3) of district heating using energy-efficient equipment for the Medical Rehabilitation and Recreation Treatment Center "Crimea" (Ukraine Ministry of Defense)	Crimea AR Partenit town	73,0	1,9
5	Collection and utilization of methane in landfill	Chernivtsi city	15,0	0,4
6	Technical modernisation of existing structure of the Ukraine Internal Affairs Ministry patrol cars with hybrid vehicles	Regions of Ukraine	406,5	10,9
7	933 projects of social facilities thermal insulation (facades and roofs insulation, windows and doors replacement)	Regions of Ukraine	2000,0	54,0
8	46 projects of replacing boilers with the transition to alternative fuels and educational and health establishment	Regions of Ukraine	86,5	2,2

The internal market should be regulated through administrative mechanisms, with infrastructure support and relying on the innovation system (the latest technical, managerial and other achievements) as presented at Fig. 1.

The author suggests methodological approaches to forming relationships for the emission rights trading, in conformity to the GHG emissions quotas allocated by the state to the regions. Currently, under international treaties the state gets emission quotas and compares them with the actual annual atmospheric emission from all emission producing entities in the country. A surplus revealed is sold those funds being used by the state to projects without proper study of the feasibility and contribution to emission reduction.

Development of the national carbon market in Ukraine will allow the country to implement policies and measures to reduce GHG emissions. Such a market example is the European Trading Scheme (ETS).

The scientific publications mainly give the following carbon market definition: the carbon market embodies a market of carbon units (CU), usually denominated as 1 ton of CO₂ equivalent, issued by authorized national and or international bodies in

electronic form as entries in the accounts at the carbon units registry (carbon registry) to confirm the right for GHG emission according to the quota (permission) established by such issuer (or the issuer's voluntary commitment to limit and reduce emission), or to prove the GHG emission reduction achieved through implementing a project recognized as a "project to reduce GHG emissions" (carbon project) according to specified requirements and criteria used by issuers to cover or compensate the produced emission.

The issuer is considered to be within allowed emissions quota (permission) volumes (has fulfilled commitments to emission limitation and reduction) if at the end of the relevant period, its actual emissions do not exceed the total number of CU in the issuer's account at carbon registry. At that the issuer may at any time at its own discretion trade with CU and accumulate those units at its accounts in the registry and transfer them into next periods [4, 8].

As we can see from the definition provided it captures the quotas presence and their registration mechanism. This carbon market definition does not refer to economic contents and economic relations principles as to a specific commodity circulation (i.e. quotas for carbon units emission).

Other sources represent a concept model of domestic carbon market, which defines the market mission as creating a low carbon economy. The concept presents an international development formula treated as "Business – Science – State policy" also present are: the block "national strategy for

sustainable low-carbon development," "national action plan" block "system integration in the global carbon market" block and the block "domestic carbon market implementation stages". Also the conceptual model includes market infrastructure provided in a whole [7].

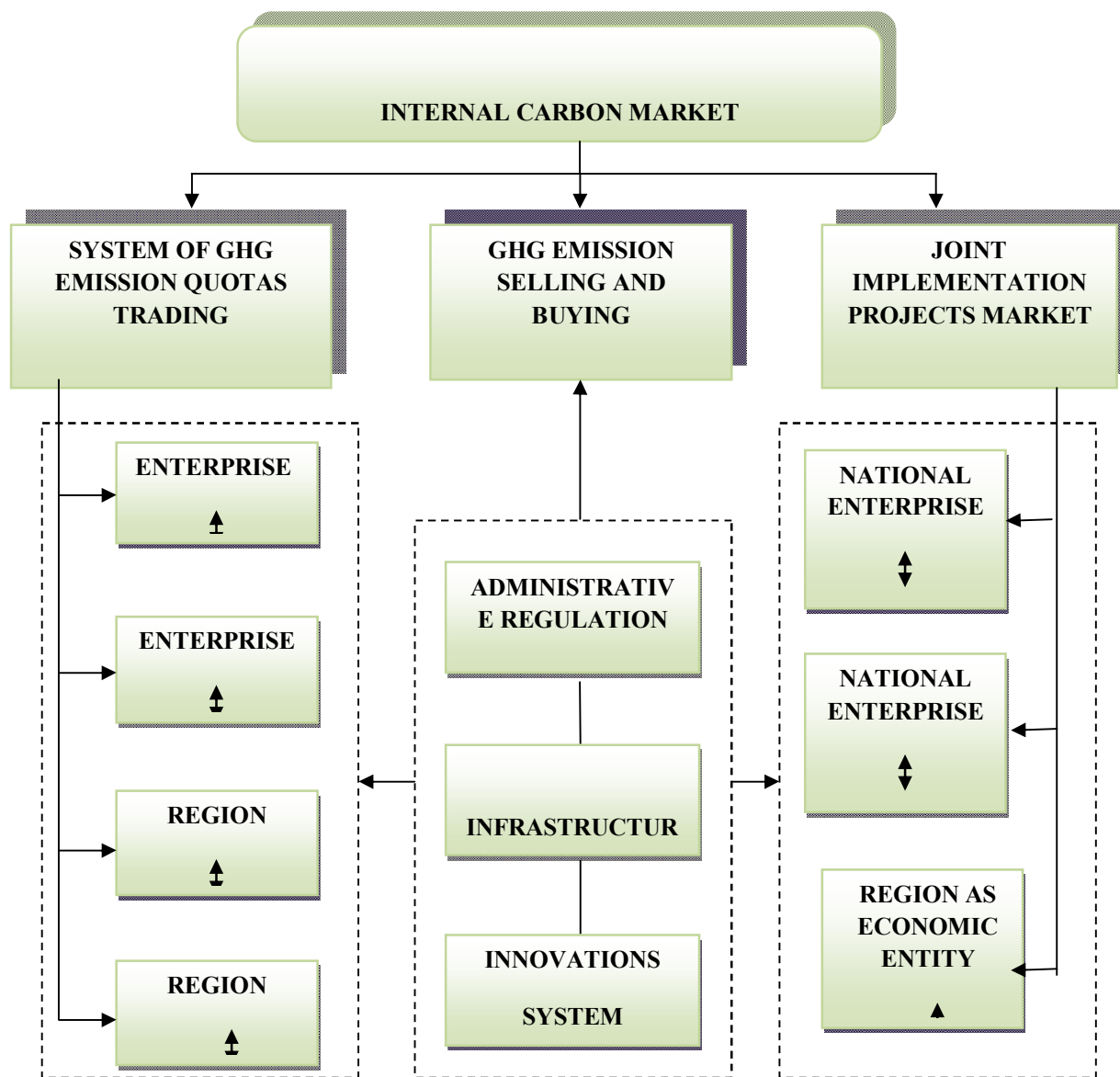


Fig. 1 Internal carbon market

The developed conceptual model of forming a civilized domestic market of carbon units emission quotas rights exchange is different from those proposed by that priority areas of the state regulation are the internal carbon market establishment and functioning, meanwhile afterward the state transfers part of powers to regions which, in turn, give more freedom to companies, firms, households economies. Therefore, we classify this market as civilized one, where the state is one of the subjects operating and implementing protectionism measures in carbon units' circulation within domestic and international markets (Fig. 2). The proposed market concept specificity refers to a new product: quotas for carbon

units' emission. These quotas are allocated by specifically authorized state bodies at the regional level, and regions should allocate quotas obtained between certain enterprises. This principle of quotas distribution provides more independence for territorial authorities and businesses in addressing GHG emission reduction and searching sources of financing and investment activities for entities, regions and states low-carbon development. According to the concept regions and enterprises obtain independence in carbon units' emission quotas market circulation in the domestic market with the opportunity to enter the world market. Those economics and enterprises, whose GHG emissions are not subject to quotas have

the opportunity to voluntarily reduce emissions and participate in market processes.

The author defines the "domestic carbon market" concept as this one that must include commodity-money relations, demand, supply and pricing, arising on specific commodity circulation: quotas for carbon units' emission. This is an area of carbon units' free commodity-monetary circulation as well as CU reduction in domestic and international markets in the course of trading the rights to CU emission quotas, joint projects implementation and voluntary limitation of emission. So, the carbon market becomes a tool of environmental, economic and industrial and technological policy.

The market relations' subjects in respect of specific commodity circulation (quotas for carbon units' emission) include:

- business economy, owing or using the emission sources (the state, region, enterprise, household);
- business economy, ready to purchase rights to CU emission quotas (foreign states, foreign and domestic regions, foreign and domestic enterprises, households);
- business economy, using funds received from the sale of CU emission right quotas;
- business economy, ready to invest into joint implementation projects.

The entities that carry out regulatory and organizational relations support for market circulation of specific commodity (quotas for carbon units' emission) include:

- Relevant legislative and executive power at the state level authorized for distribution of quotas between regions;
- Relevant legislative and executive power at the regional level authorized for distribution of quotas between companies and enterprises;
- State bodies specially authorized to promoting exchange of rights to CU emission quotas (Ministry of Ecology and Natural Resources of Ukraine, Ministry of Economic Development and Trade of Ukraine and others.);
- Regional public authorities specially authorized to promote exchange of rights to CU emission quotas (municipal and regional administrations, departments of Environment and Natural Resources, Department of Economic Development and Trade, centers and administrative services etc.);
- CU exchanges, CU crediting banks and joint implementation projects.

The internal carbon market's purpose refers to stabilizing and permanent reduction of GHG emissions through the use of market mechanisms for the implementation of joint projects, quotas trading and voluntary reductions to achieve sustainable low carbon development of states, regions, companies, enterprises, households.

The basic principles of entities' operation in the context of domestic carbon market should include the following:

- Use of market economic instruments in the joint venture introduction and emissions quotas trading;
- Compliance with national and international legislation as to the volume of GHG emissions quotas defined for Ukraine;
- Ensuring permanent measures to reduce GHG emissions based onto JI projects and green investment schemes;
- Increasing the national economy energy efficiency through cyclic economic and ecological modernization of production;
- Use of innovation engineering, technical, managerial and others solutions. (Best available technology).

The internal carbon market functions should include the following:

- Distribution function, including the carbon emission quotas distribution among regions of Ukraine and redistribution of carbon emission quotas among businesses in the regions of Ukraine;
- Stimulating function aimed at stipulation of regions, owners and managers of enterprises to innovation and technological development for getting extra emission quotas for the purpose of sale;
- Equivalent function relates to matching individual unit cost of labor, capital and GHG emission volumes in the manufacturing of products and services with the best technologies used at similar processes in Ukraine and abroad;
- Economic function oriented onto reducing transaction costs in the area of emissions quotas trading and joint projects implementation;
- Regulatory function aimed at regulating GHG emissions based on the mechanisms of balance between supply and demand of emission allowed quotas at the regions and businesses level;
- Information function that reflects supply and demand in the domestic market trading with remaining emissions quotas, supply and demand for JI projects with foreign and domestic buyers;
- Complex function, as evidenced through the impact on the power market and other markets in order to reduce energy consumption at the level of regions, entrepreneurs and households;
- Ensuring mobilization and redistribution of GHG emission rights and distribution of technical, financial, investment and organizational resources for low carbon technologies implementation in the regions, enterprises, households, thus ensure the entire economy transition on an innovative low carbon development path.

The domestic carbon market efficiency makes necessary the appropriate legal framework development. In Ukraine must be elaborated and enacted a law on the prevention and mitigation of climate change.

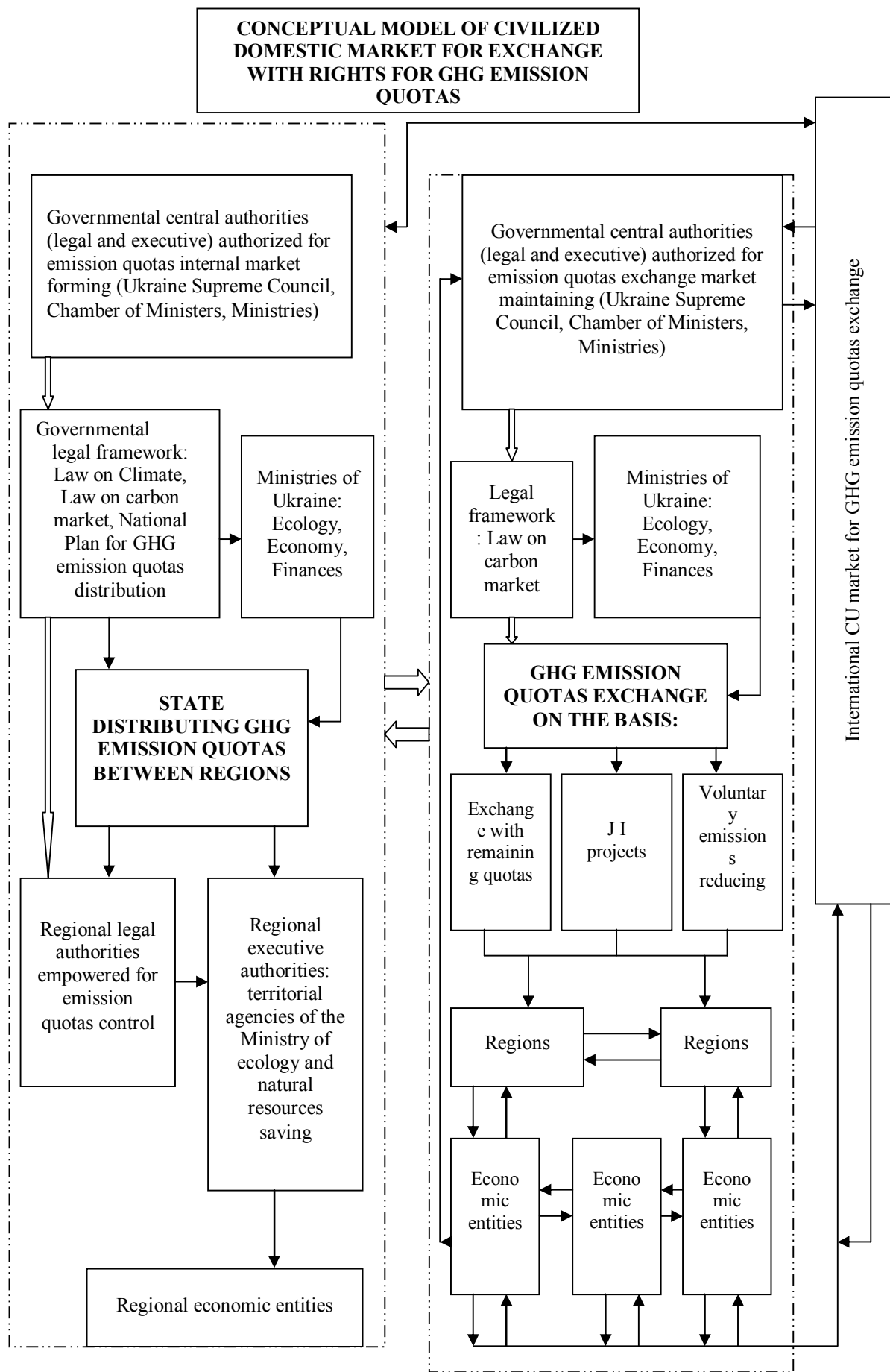


Fig. 2 Conceptual model of civilized domestic market for GHG emission CU quotas exchange

This law should assign political, economic, organizational commitments of Ukraine under the Framework of the United Nations Convention on Climate Change and the Kyoto Protocol (hereinafter - Protocol) protocol procedures' legislative definition, including emission quotas trading, JI projects and Environmental (Green) Investments. The law on domestic carbon markets should be consistent with the law of Ukraine on the prevention and mitigation of climate change and comply with its procedures. The domestic carbon market law purpose should also be consistent with the procedures set out in the Protocol, which provides for measures to quantitative restrictions and GHG emission reduction mitigate climate change (Art. 2, 3 of the Protocol). The law should also expose the separation of powers as to GHG emission reduction units' quotas allocation between the state and the region, providing greater a competence to regions and companies, enterprises, and so on. Also required are the adoption the Law of Ukraine "On regulation of anthropogenic emissions, including greenhouse gases" and the development of the National Plan for allocation of quotas for GHG emissions. The Law of Ukraine on domestic carbon market should define government policy on the exchange with CU emission quotas rights at the level of state, regions and economic subjects like companies, enterprises, households. The law should create legal, economic, organizational conditions for the low carbon economy development in Ukraine and further domestic carbon market integration in the world market of GHG emission reduction.

Creating a legal and regulatory framework governing economic relations between the entities effecting GHG emissions quotas circulation in the domestic carbon market should include:

- Legal determination of carbon emission quotas status, rights to GHG emission quotas, rights exchange circulation, standardization and regulation of GHG emission rights exchange processes in the carbon market (buying/selling CU);
- Legal definition of rights exchange circulation processes in the region and on level the company, involvement of enterprises and regions to the exchange of rights for GHG emission quotas;
- Legislative support of processes (legal, economic, institutional, infrastructure support) of distribution rights to GHG emissions quotas between the following subjects:
 - by territorial criterion: the state – regions, the state – enterprises, regions – enterprises levels;
 - by industry sector criterion: among sectors of production.
- Legal criterion of permissions to quotas distribution between the state, regions and enterprises.

The market regulation is justified with its administration specificity and state control, that shall include the following:

- Defining industries and businesses, whose CU emission should be subject to quoted and limited

- by regions as economic entities and individual enterprises;
- Forming and regular filing of the greenhouse gas emissions registry;
- Determining the unified accounting methodology for GHG emissions of various business entities;
- Forming an information and communication system for collecting emissions data from all listed in the register economical entities;
- Defining annual GHG quotas (state level) further distributed among the regions, as market participants;
- Determining quotas, CU and GHG emission limits (regional level), further distributed among companies as market participants;
- Development and implementation of free quota status confirmation by entities for their sale;
- Development of organizational and economic mechanism for trading with a specific product: CU emission quotas in the domestic market of Ukraine;
- Developing a mechanism for determining the priority use of proceeds from the quotas sale;
- State administrative monitoring of quotas market;
- Development of the legal framework to introduce a civilized market of CU emission quotas rights administrative and infrastructure maintenance inclusive.

Scheme of GHG emissions market mechanisms state regulation is presented at Figure 3.

At the state level the specially authorized state executive authorities (Ministry of Environment and Natural Resources – Chamber of Ministers of Ukraine) and the legislative ones (Supreme Council of Ukraine, Ministry of Justice of Ukraine) should determine, allocate and approve quotas for carbon gases emissions as distributed between regions.

Method of allocation should be based on the following features:

- Consideration to emissions quotas allocated for Ukraine in accordance with international agreements;
- Determining the internal emissions quotas for Ukraine in accordance with international agreements;
- Consideration to the state of regional economy, regional GDP and GDP structure by contributing industries and businesses, highlighting at that structure entities producing pollutant emissions.
- Environmental conditions in the region, existing GHG load reduction in the regions;
- Consideration to the GHG emissions impact onto local community in the region.

At the regional level the specially authorized state executive bodies (such as the departments of Environment and Natural Resources behind the regional state administration) should distribute and approve quotas for emissions between enterprises as well as approve for enterprises the limits on carbon gases emission.

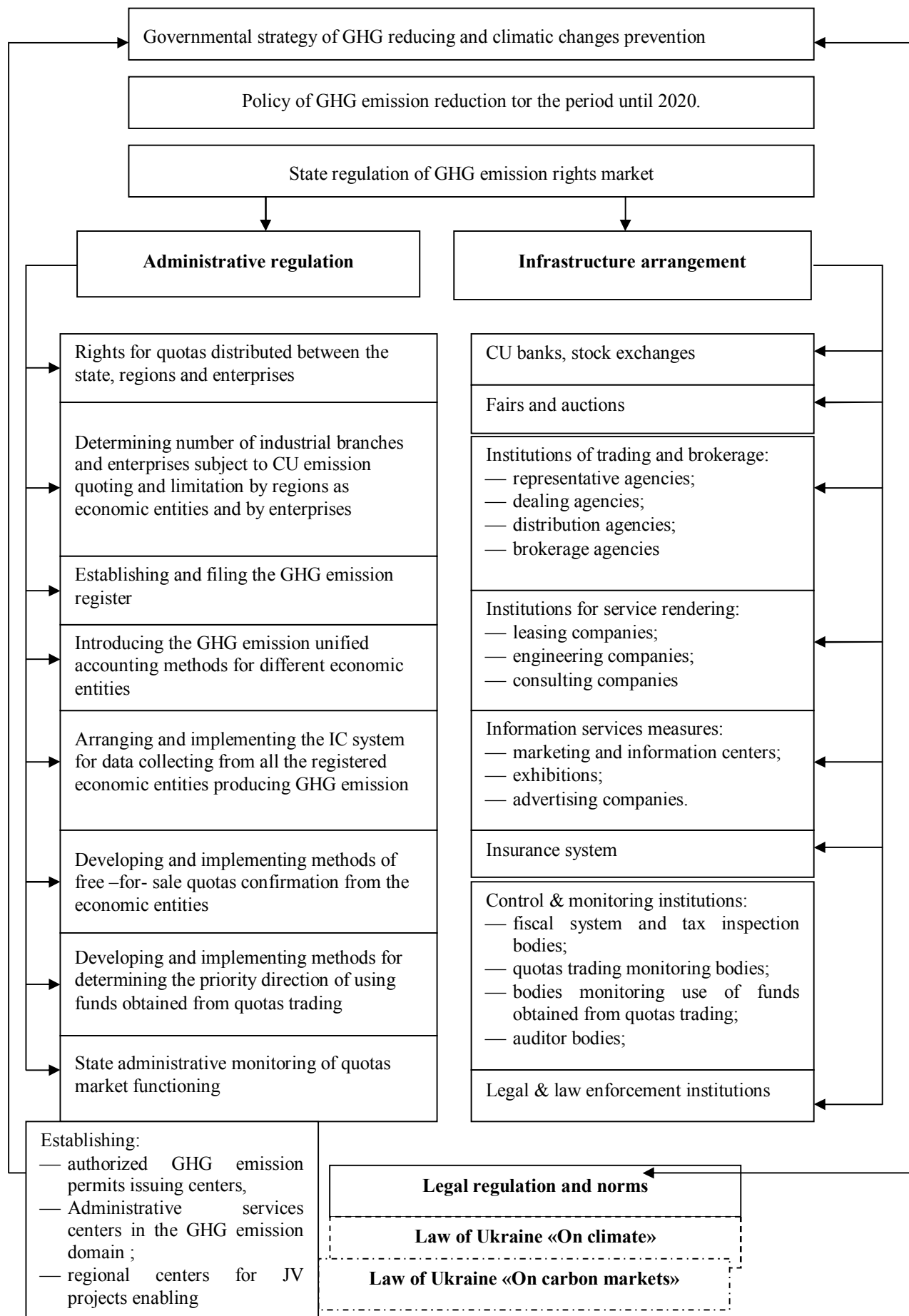


Fig. 3. Scheme of GHG emissions state regulation using market mechanisms

Conclusions

One of the top priorities development directions in Ukraine is to create a low carbon economy. The internal carbon market trading emission carbon units represents a tool for GHG reducing, accumulation of funds and investments attracting for the sake of environmentally friendly technologies

implementation, thus reducing energy consumption by improving the energy use efficiency. The internal carbon market concept should include more autonomy guaranteed to the regions and enterprises in EU emission market circulation as well as the access to world markets.

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