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# **CALCULATOIN OF ECONOMIC LOSSES OF UNINTENTIONALLY PRODUCED PERSISTENT ORGANIC POLLUTANTS (POPs) FROM CENTRALIZED HEATING IN ODESSA**

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Persistent Organic Pollutants (POPs) are a set of toxic chemicals that are persistent in the environment and able to last for several years before breaking down. POPs circulate globally and chemicals released in one part of the world can be deposited at far distances from their original source through a repeated process of evaporation and deposition. This makes it very hard to trace the original source of the chemical [1].

Many people are familiar with some of the most well-known POPs, such as PCBs, DDT, and dioxins. POPs include a range of substances that include:

- Intentionally produced chemicals currently or once used in agriculture, disease control, manufacturing, or industrial processes. Examples include PCBs, which have been useful in a variety of industrial applications, and DDT, which is still used to control mosquitoes that carry malaria in some parts of the world.
- Unintentionally produced chemicals, such as dioxins, that result from some industrial processes and from combustion (for example, combustion in the thermal power station) [2].

The main international instrument which regulates the handling of POPs is Stockholm Convention on Persistent Organic Pollutants (May 21, 2001) [3]. It was ratified in Ukraine in 18 April, 2007 [4]. Unfortunately it is the only one document that regulates exclusively the handling of POPs in Ukraine for today. As a result, we can conclude that in Ukraine there is no separate legal basis for dealing with POPs.

In this article are discussed evolution of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) as the main pollutants that are formed during fuel combustion in Odessa, 2012.

The polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) are two series of almost planar tricyclic aromatic compounds with very similar chemical properties. The most toxic and most extensively studied representative of the chlorinated

dioxins (PCDDs) is 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) [5]. The threshold limit value (TLV) for this pollutants is 0,1 ng/m<sup>3</sup> in European Union and 0,5 pg/m<sup>3</sup> in Russia.

According to [5] to [6], we calculated the formation PCDDs and PCDFs from central heating in Odessa by burning coal, fuel oil and natural gas (table 1).

Table 1 – The Evolution of PCDDs and PCDFs from Central Heating in Odessa, 2012

Type of fuel	Coal	Fuel oil	Natural gas	All
Emission	0,011	0,002	0,0008	0,0138

According to method [7], based on information [5], we calculated the amount of losses from the TCDD/F emission for Odessa, 2012. Since the value of the specific damage to this pollutant has not calculated yet, for the example we used the size of the environmental tax on the substance of the 1st class of danger [9]. As a result, we received payments of 0.058 Ukrainian kopecks.

Since TCDD/F are substances that are dangerous to the human body at any concentration and the MPC is  $0.5 \cdot 10^{-12}$  g, it can be concluded that the amount of tax on the substance of the first class of danger is too small for a sufficient compensation from these pollutants. That is why it is very important to create a separate State Control System of POPs, which is currently unavailable in Ukraine.

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## **POPULATION HEALTH AND ENVIRONMENTAL TAX POLICY IN UKRAINE**

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Power engineering today is the most vulnerable point of Ukraine economy. Energy Strategy of Ukraine aims to increase the share of domestic fossil fuels in the energy balance of the country to 91.8% until 2030 (Energy Strategy of Ukraine till 2030).

High dependence Ukrainian industry on fossil fuels leads to significant industrial and transport emissions. The carbon dioxide CO<sub>2</sub>, carbon monoxide CO, nitrogen oxides NO, NO<sub>2</sub>, sulfur dioxide SO<sub>2</sub> and hydrocarbons are discharged into the air as a result of combustion are. The largest contribution to greenhouse gas emissions by economic sector carries out power industry. Its share is 76,06 % in 2011.

It is obvious that Ukraine intends to continue to use fossil fuels. Therefore, the dependence on fossil energy sources and high prices on fuel required revision of energy policy.

Therefore, natural question arises to motivation the enterprises and the public to find alternative energy sources. We conducted the study in Ukraine as a whole and as an example examined the state of disease in the Poltava region.

As the results of correlation analysis the strongest correlation of the variables is noted for SO<sub>2</sub> and nitrogen oxides and diseases of respiratory organs.

The correlation analysis of variables indicative there is a close connection between respiratory diseases and SO<sub>2</sub> emissions and nitrogen oxides emissions from stationary sources 0.80 and 0.84. These components' emissions from mobile sources have not any relations with