

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ

СУЧАСНІ ТЕХНОЛОГІЇ У ПРОМИСЛОВОМУ ВИРОБНИЦТВІ

МАТЕРІАЛИ
та програма

V Всеукраїнської міжвузівської
науково-технічної конференції
(м. Суми, 17–20 квітня 2018 р.)



Суми
Сумський державний університет
2018

HOW CAN SOLAR ENERGY REPLACE TRADITIONAL WAYS TO GAIN ENERGY IN UKRAINE

*Dzhulai M. V., student; Ablieieva I. Yu., Senior Lecturer,
Sumy State University, Sumy*

It is known, that energy complex is one of the most harmful for the environment. Especially, when we are talking about developing countries such as Ukraine, where thermal power station is the main way to produce energy. Modern TPP's use more than 30 % of fossil fuels in the world. The tendency of thermal power plants usage as a primal source of energy will also stay for the next decade by the predictions of specialists.

The environmental impact by TPP's depends on the type of used fuel. Ukrainian thermal power plants industry use energy coal (53 %) and natural gas (41 %) as main products to gain energy. Overall, technical state of the TPP's in Ukraine is unsatisfactory, because in the last few decades we had no any kind of modernization of the technologies. Thermal power plants functioning on the territory of Ukraine has a highly negative impact on the nature. Almost 30 % of all solid particles that enters to the atmosphere by the human's activities are produced by emissions of TPP's. Furthermore, thermal power stations produce up to 63 % of SO₂ and more than 53 % of NO_x, what can lead to acid rains on the Ukrainian territory. But the problem is that this is not the only way how can emissions of thermal power plant damage environment. There are few more of them:

1. Air emissions of different pollution substances can make a harmful impact on the human's body and health. It can be soot, sulfur dioxide, oxides of nitrogen, carbon oxides, heavy metal compounds and benzopyrene. As a result, we can see that the percentage of oxygen is very low close to thermal power plants compared to normal ratio.

2. There is some part of natural radioactive elements in the mineral coal can be found. Those elements will be released to the atmosphere with ash after the burning processes. Moreover, the biggest problem is that they become more radioactive than before the processes.

3. Accumulation of the amount of solid waste: ash, slag, dust. Ukrainian's thermal power stations use almost 30 million tons of mineral coal per a year. The amount of solid wastes is almost 10 million tons per a year. Utilization of solid wastes is one of the biggest problems of heat power engineering, because huge amount of territories is occupied by ash dumps. These lands are out from rational economic use. Ash and slag dumps can also cause problems related to water pollution, air pollution and ground pollution.

4. Big amount of thermal energy goes up to the atmosphere, and this is considered as a thermal pollution. Thermal pollution can lead to the changes in lakes and reservoirs. When the used hot water by the thermal power plants goes down to the ponds without purification this situation can lead to some problems as: decreasing of oxygen level in the water, increasing of toxicity, natural balance

loses. As an industrial country, Ukraine has many things to do to improve the technologies and there is no better time for it than now, when Ukraine tries to become a part of European Union. One of the possible ways to do such change is the providing the new economic instrument in use.

An emission tax is a tax made to shorten harmful impact to the nature created through industrial processes. As an example it can be electricity generation by the burning processes of coal. An emission tax is meant to discourage the use of products and services that can pollute the environment and to promote the conservation of natural resources such as coal, oil, water, air etc. Using of this economic instrument makes sense because thermal power plants in Ukraine are mostly private.

Exceeding of the emission taxes will inevitably lead to rapid environmental pollution which will provoke the fast change existing ecosystems. If the mankind want prevent this ruining changes from happening, we need to change our views on irrational usage of nature resources. Surplusing of the emission taxes and there for environmental damage can't be justified even by great economic profit, because overusing of non-renewable nature resource can lead to a global ecological collapse.

To be able to stay in line of the emission taxes any kind of industrial manufacturing requires new technologies and expensive fuel. Low level of technologies in the factories is a common problem of developing countries. As a rule, Ukrainian thermal power plants prefer to use not really expensive fuel - hard coal. In the case if the Ukrainian energy sector would like to switch to more expensive fuel it can lead to the growth of electricity prices. It is understandable that it will cause negative reaction of the society. Because of incredibly high bills people might start looking for the other ways of supplying themselves with electricity such as using alternative energy sources (solar energy, wind energy etc.). A lot of countries in the world try to switch traditional energy sources to alternative. The leadership in the alternative energy sources takes solar energy. Solar energy has few big pluses: it is a "green" way to receive energy, long term of usage, minimal maintenance services. One more plus is that solar energy has no impact on the nature and environment while in use.

Ukraine has a good climate for using solar energy. For example, the amount of solar radiation that comes to the ground in Ukraine is bigger than same index for Germany. In the same time, Germany is one of the most powerful countries if we are talking about solar energy. By this point of view, Ukraine can become a country with high solar energy efficient level in the case of good financing. Development of solar energy can help Ukraine to have particular or even full energetic independence. Unfortunately, it is very difficult to predict the way in which the situation can go after implementation of the instrument. Ukraine has hard times right now because of the economic, political and social problems. Hopefully, after solving these problems the understanding of the importance to solve ecological problems will grow up.