



МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ
КАФЕДРА ІНОЗЕМНИХ МОВ
ЛІНГВІСТИЧНИЙ НАВЧАЛЬНО-МЕТОДИЧНИЙ ЦЕНТР

МАТЕРІАЛИ

**XIV ВСЕУКРАЇНСЬКОЇ
НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ
СТУДЕНТІВ, АСПІРАНТІВ ТА ВИКЛАДАЧІВ
ЛІНГВІСТИЧНОГО НАВЧАЛЬНО-МЕТОДИЧНОГО ЦЕНТРУ
КАФЕДРИ ІНОЗЕМНИХ МОВ**

«TO MAKE THE WORLD SMARTER AND SAFER»

26 березня 2020 року



Сумський державний університет
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**Суми
2020**

THE PROBLEM WITH RENEWABLE ENERGY

S. Podveza – Sumy State University, group IN – 92

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The global energy market is in the process of a transition from the use of fossil fuels to clean energy. In 2015, 19.3% of global energy consumption came from renewable sources. But until now, we cannot figure out how to store this energy effectively. For example, to power a cross-Atlantic flight for a jet, we should need a battery weighing about 1000 tons. But at the same time, we can use only 20 tons of kerosene. Now imagine what size battery is needed to power a city?

But batteries are not the only way to store renewable energy. The first thing we consider is Gravity Energy Storage. There is a strange railway in Tehachapi (California): when the wind blows, the wagon enters the mountain, and when it subsides, it rolls down. ARES technology is used to accumulate energy from sources of periodic action - solar and wind power plants. When the energy production is high (the wind is blowing, the sun is shining), wagons with the help of electric motors drive uphill - they accumulate potential energy. If energy production drops and consumption increases (evening - the wind died down, the sun has disappeared), the cars roll down, the engines operate in generator mode and transfer electricity to the network.

Scientists write that the efficiency of the system is 86%. And they add that the system:

- has a lower life cycle cost than batteries;
- relevant for arid areas.

The next is the compressed air energy storage system that is cheaper than lithium-ion batteries and also does not use natural gas, as other systems of this type do. Hydrostor Terra developed uses surplus energy from power plants to compress air, which is then stored underground in a container. The heat resulting from this compression also accumulates. At peak hours of energy consumption, when it is necessary to get energy from the storage

again, compressed air is raised to the surface and heated using previously collected heat. Hot air rotates the turbine, which generates electricity. The very principle of storing energy in the form of compressed air is nothing new, but usually systems of this type use natural gas to heat the air which reduces the overall efficiency of the method and leads to carbon dioxide emissions. Representatives of the company Hydrostor argue that the efficiency of their energy storage system is about 60%.

Also Beacon Power proposes storing energy in the form of kinetic energy of massive flywheels rotating at high speed. Massive carbon fiber flywheels with a diameter of 1 meter rotate at a speed of 16,000 rpm. So. To maintain this speed, the flywheel must rotate in a rarefied medium with minimal friction which is provided by a system of electromagnets that supports the flywheel in a soaring state.

So, we have a lot of developing technologies in this area and in the future they will help us decrease using of fossil fuels. It's good that some governments are trying to completely switch to renewable energy sources. But unfortunately, it will not happen soon.

VERTICAL FARMING: THE FUTURE OF FOOD

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In 30 years, 6.5 billion people will live in megacities (about twice as much as today), and to feed such population will be a huge problem.

As humanity grows larger, space continues becoming a crucial issue. So, things like houses, interior design, and even garden are becoming more and more vertical. But we are starting to have a large version of gardens, farms. While the field and the greenhouse take their place, this alternative retains it.

Vertical farming is the cultivation of products in vertically laid layers. In this case, soil, hydroponic or aeroponic cultivation