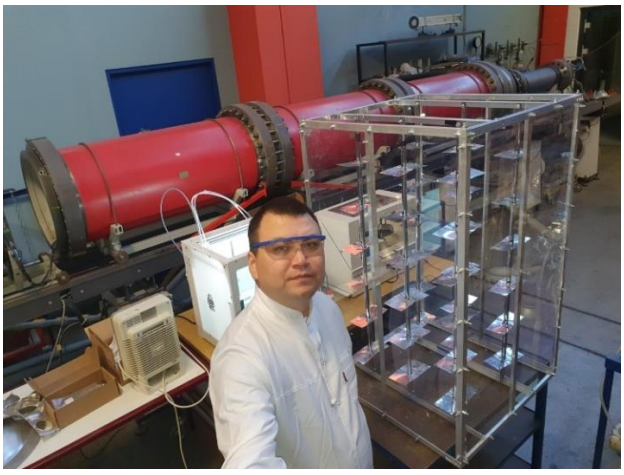
REPORT

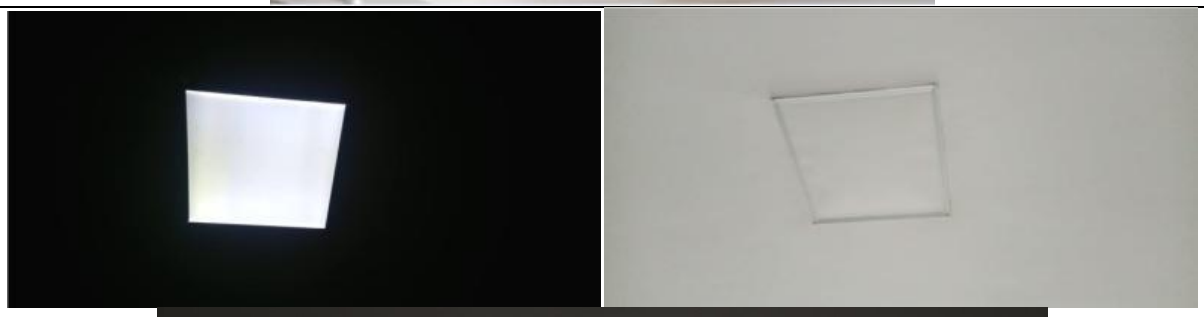
of M.Auezov South Kazakhstan University on sustainable development for 2019-2021

Green AUEZOV



2. Energy and Climate Change

Energy Efficient Appliances Usage



Energy Efficient Appliances Usage: Use of LED lighting and lamps with light detection

Energy efficient computers

Heliocamera for solar energy accumulation.

Energy Efficient Appliances Usage: Laboratory work in the specialty "Power Engineering" using a solar panel

In 2020, in connection with the Covid-19 Pandemic, the university decided to purchase new energy-saving computers without a system unit. 200 Monoblocks with a capacity of 90 W / h were purchased. They replaced ordinary computers with a capacity of 150-160 W / h. Thus, the university saved about 14,000 Watt / hour of electricity.

M.Auezov South Kazakhstan University intends to realize further energy savings by paying close attention to energy management. All parts of the organization can assess their own energy consumption and realize their own energy-saving potential by means of, for example, insulation, LED lighting and the deployment of sustainable technology.

Appliance	Total Number	Total number energy Efficient appliances	Percentage
Energy efficient computers	1597	200	12,5%
Powersave lamp*	22739	19147	100%
LED Lamp*		3592	
laboratory devices	2790	283	10%
		Average Percentage	**40,8%**

* In connection to the absence of incandescent lamps at the university, all lamps are energy efficient.

Smart Building Implementation

***Min. at least five requirements for each building**

No.	Name	Place	automation		safety				energy		water		Indoor environment				lighting				Building Area (m^2)
			B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4	
1	University M.Auezov SKU; Building A (main building)	Shymkent City, Kazakhstan			x	x	x				x		x				x				15883,70
2	University M.Auezov SKU; Building B (building 1)	Shymkent City, Kazakhstan				x	x				x		x				x				6016
3	University M.Auezov SKU; Building C (building 2)	Shymkent City, Kazakhstan			x	x	x				x		x				x				6573,78
4	University M.Auezov SKU Building D (building 3)	Shymkent City, Kazakhstan			x	x	x				x		x				x				14381,80
5	University M.Auezov SKU Building E (building 4)	Shymkent City, Kazakhstan				x	x				x		x				x				5454
6	University M.Auezov SKU Building F (building 5)	Shymkent City, Kazakhstan					x				x		x				x				~~4596,5~~
7	University M.Auezov SKU; Building G (building 7)	Shymkent City, Kazakhstan					x				x		x				x				~~6636,70~~
8	University M.Auezov SKU; Building H (building 8)	Shymkent City, Kazakhstan				x	x				x		x				x				9506,20
9	University M.Auezov SKU; Building I (building 9)	Shymkent City, Kazakhstan				x	x				x		x				x				5456,10
10	University M.Auezov SKU; Building J (building 10)	Shymkent City, Kazakhstan					x				x		x				x				~~2607,10~~
11	University M.Auezov SKU; Building K (building 11)	Shymkent City, Kazakhstan					x				x		x				x				~~2591,30~~
12	University M.Auezov SKU; Building L (building 12)	Shymkent City, Kazakhstan					x				x		x				x				~~1826,40~~
13	University M.Auezov SKU; Building M (building 13)	Shymkent City, Kazakhstan					x				x		x				x				~~4711,23~~
14	University M.Auezov SKU; Building N (building 14)	Shymkent City, Kazakhstan					x				x		x				x				~~1848,30~~
15	University M.Auezov SKU; Building O (building 15)	Shymkent City, Kazakhstan			x	x	x				x		x				x				2134,9
16	University M.Auezov SKU; Building P (building 16)	Shymkent City, Kazakhstan			x	x	x				x		x				x				2084,80

	Total																			67491,28

Please compile one row for each building (or homogeneous part of it) by ticking with a "X" for each requirement

Smart building implementation

$$\frac{\textbf{total smart building area}}{\textbf{total building area}} \times 100\%$$

***Total Building Area: 92308,81 m^2**

$$\frac{67491,28\ m^2}{92308,81\ m^2} \times 100\% = 73,11\% \sim 73\%$$

Note: One building could be classified as a smart building if it has a minimum of 5 features. Please add the total smart building area from buildings which are classified as smart buildings.

Building A

Building B

Building C

Building D

Building E

Building H

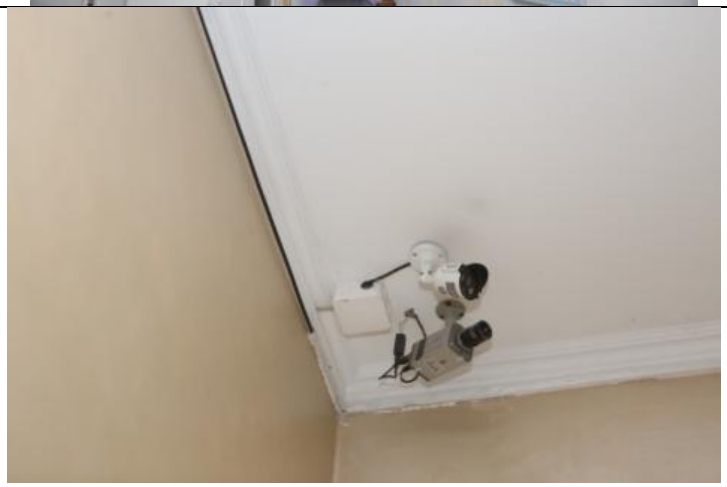
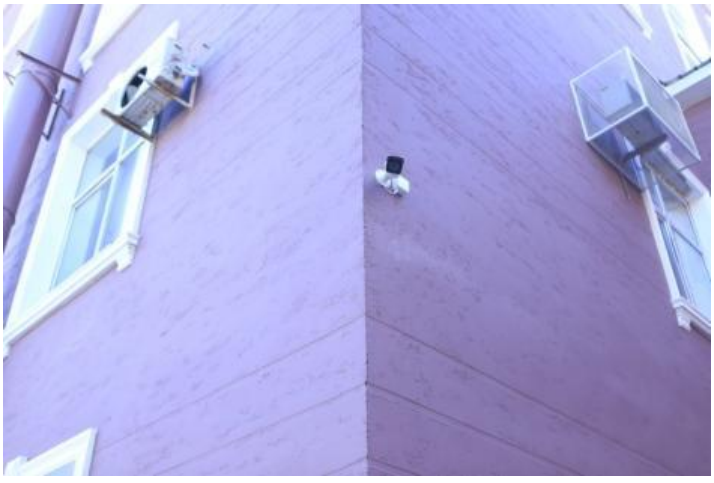
Building I

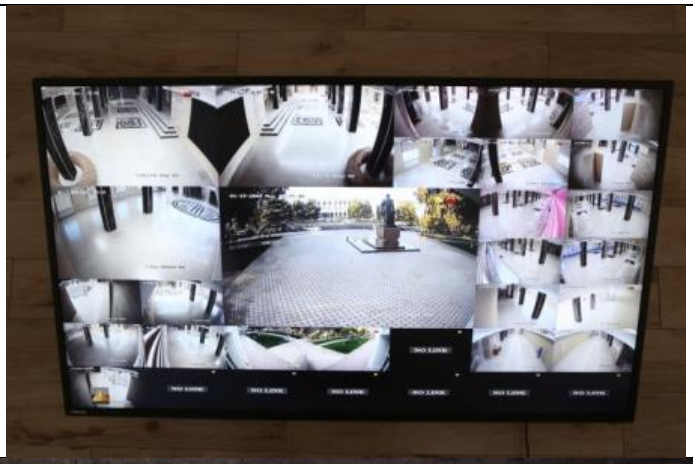
Building O

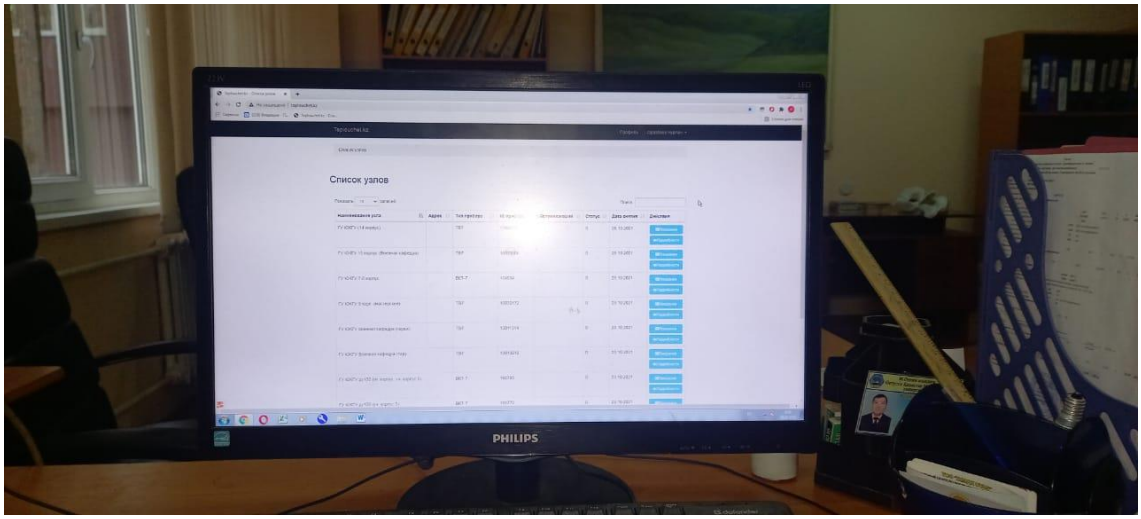
	
Building P	
	

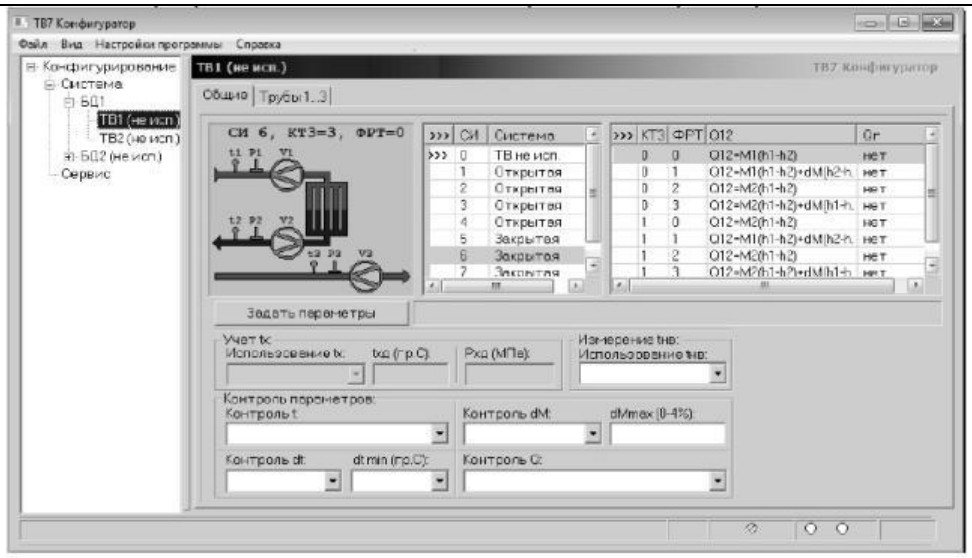
S1 Intruder Alarm System	 

	
	 
S2 Fire-fighting	 

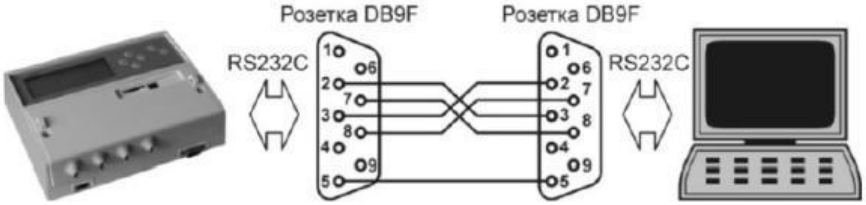
	 
S3 Video surveillance	 

	
	
A1 Water monitoring	 

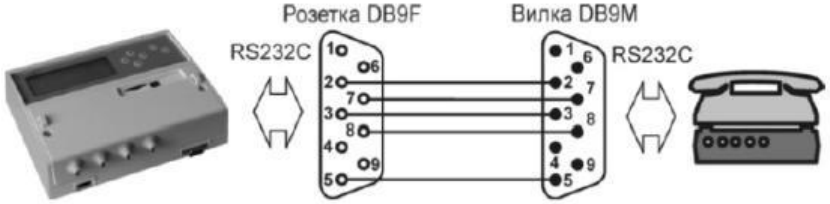
	  The water consumption in each case is automatically transferred to the computer monitor installed in the engineers' room in the case 16.
I1 Thermal comfort	Heat monitoring at the university for all buildings is carried out in room 113 of the 5th building. Electromagnetic heat meter «Teplouchet». This device is suitable for work with hot and cold water, which monitors the inflow and outflow, heat carrier in heating systems. The flow of liquid, in which various impurities and air constitute a tiny fraction (no more than one percent), are recorded and converted into electrical signals. This is the way the primary converter works. Checks Gigacalories (Gcal) temperatures by how many degrees. VKT-7 and TV-7 devices are connected in the university buildings.



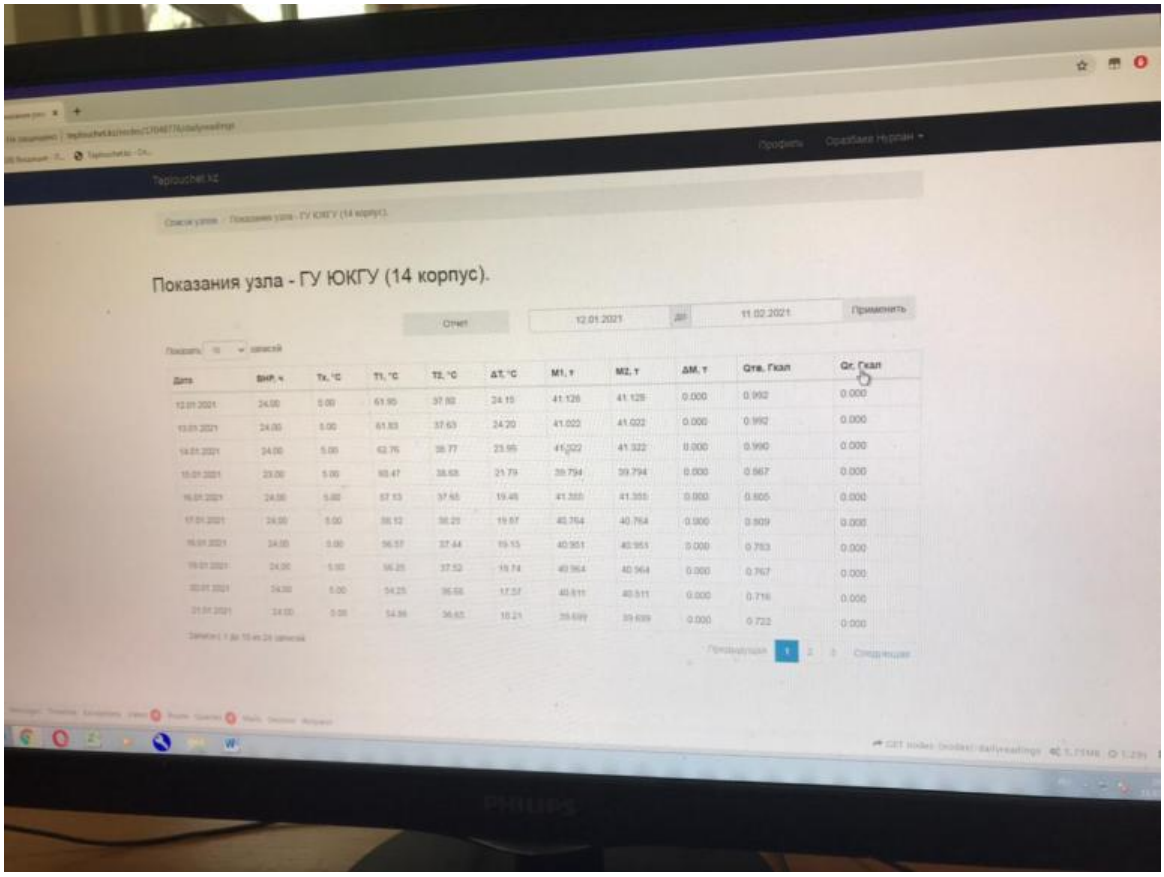
1 Подключение ТВ7 к компьютеру по интерфейсу RS232C

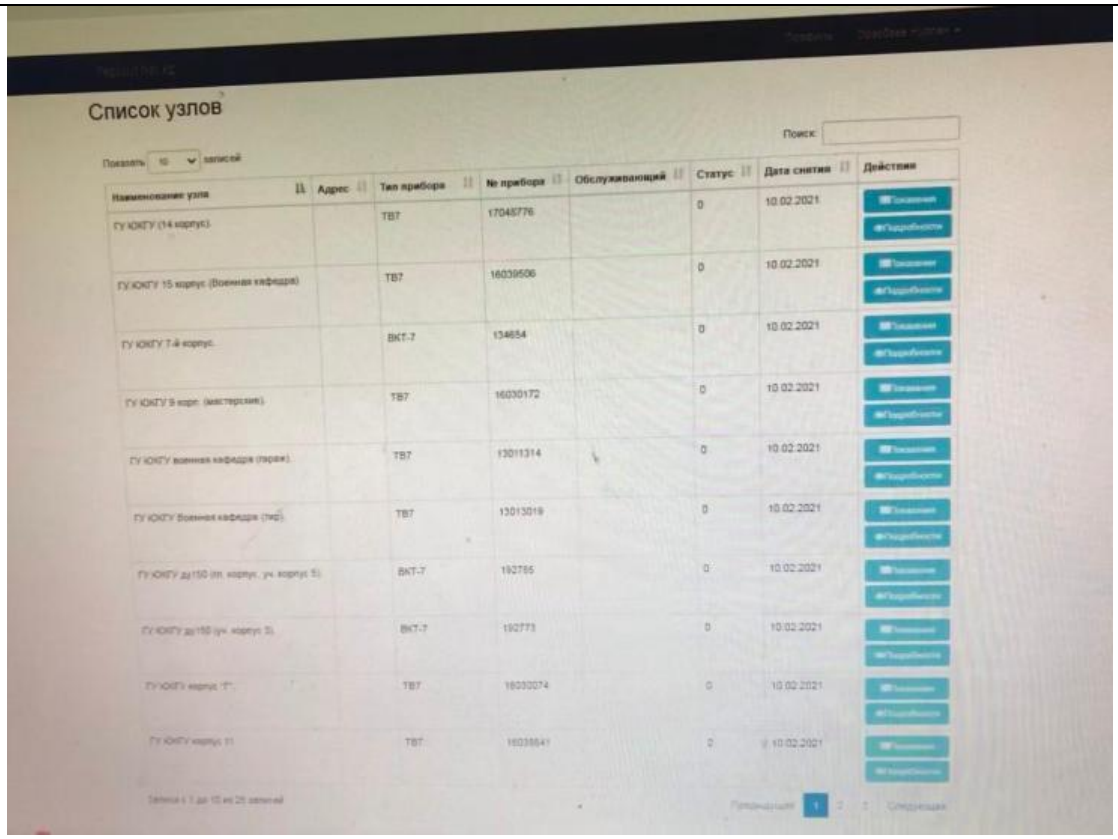


2 Подключение ТВ7 к модему



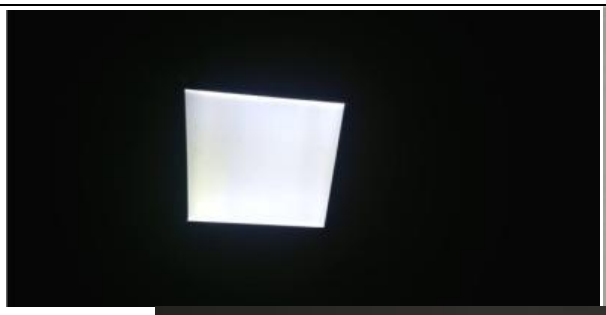

ТВ7
25.05.13 11:22:33
ТЕКУЩИЕ
ИТОГИ
АРХИВЫ
ТЕРМОТРОНИК
18-064074


Показания узла - ГУ ЮКГУ (14 корпус).
Отчет
12.01.2021
11.02.2021
Применить



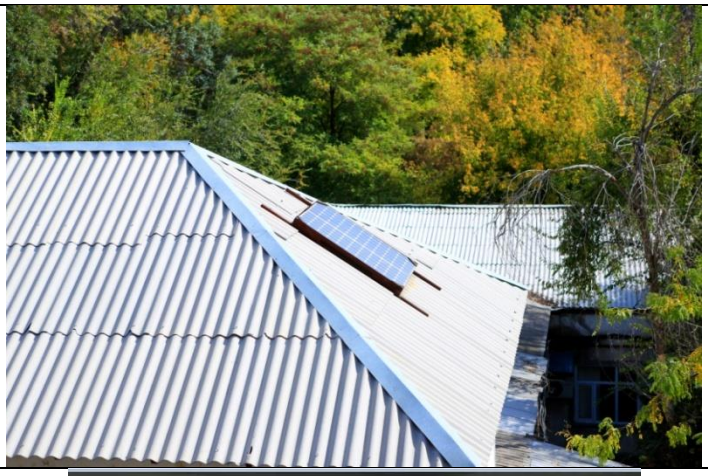
Heat readings in M.Auezov South Kazakhstan University are controlled automatically on a computer in the engineers' room, in case of an accident the button on the monitor lights up red.

L1 High-efficiency luminaires



Renewable Energy Sources in Campus



Campus 1. Solar battery (photo 1), rechargeable batteries (photo 2,3), transformer (photo 4).

Campus 1. Heliocamera for solar energy accumulation

1. The solar battery is located on the roof of the building opposite Building 4, where the sun's rays fall at the most efficient time.

Solar energy through cables is accumulated in batteries, then it is fed to transformers where direct current 12V is converted into alternating current 220V. The energy generated in this way can be used for lighting, charging phones, personal computer or netbooks.

Rated power of the battery 200 W, the voltage on the panel is 12V.

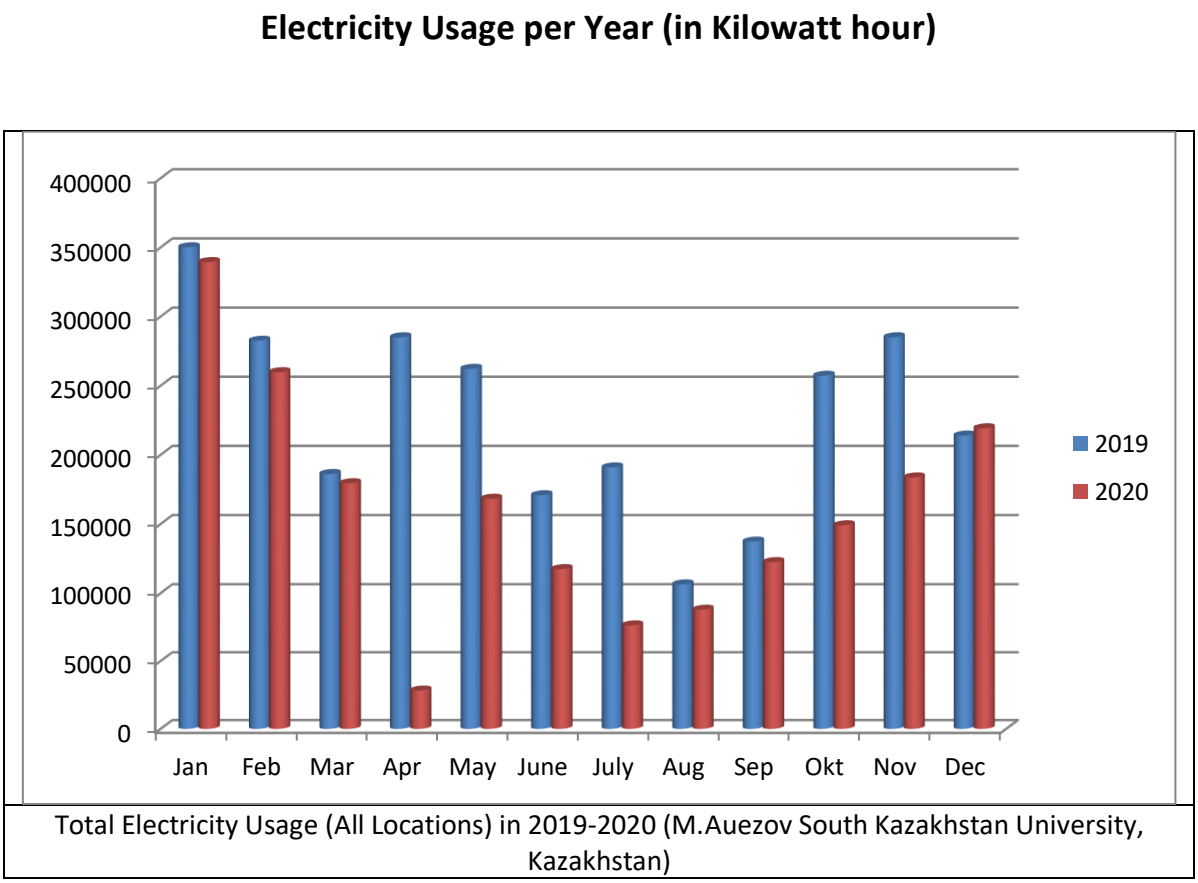
2. A Heliocamera for accumulating solar energy is installed on the roof of the Research Laboratory for Building Materials, Construction and Architecture. The heliocamera is used for the final heat treatment of concrete blocks.

In the upper cover of the heliocamera there is a plate that stores solar energy. Below in the chamber is water, which is a heat carrier. Water circulates along the sides and bottom of the receiver, inside of which there is concrete. The heated water gives off the heat of the phase transition to the product. In this way, heat exchange occurs, as a result of which the concrete heats up with an increase in strength without the use of additional energy.

Carry out and implement scientific work, a grant was received under the "Green Economy" program approved by N.A. Nazarbayev. The results of this work were presented at international scientific and practical conferences: in 2014 in Weimar (Germany), in 2015 in Japan, in 2019 in Belgorod (Russia).

In total, the university has two sources of renewable energy:
1. Solar battery, uses solar power
2. Heliocamera, uses combined Heat and Power

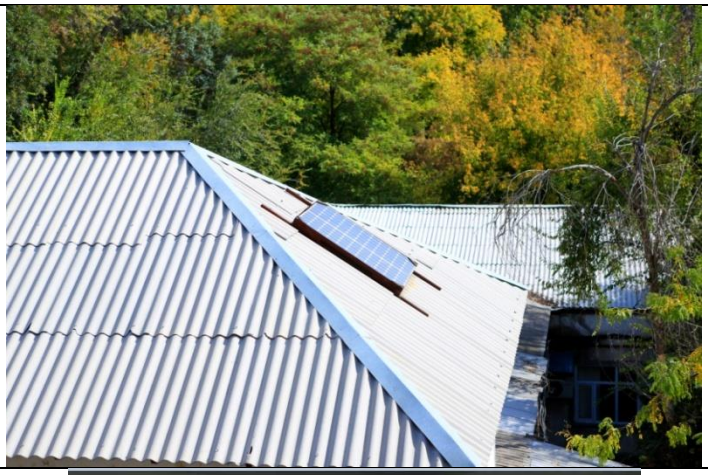
The capacity of the two renewable energy sources on campus is approximately 1 kWh.



Total Electricity Usage (All Locations) in 2019-2020 (M.Auezov South Kazakhstan University, Kazakhstan)

The total electricity consumption in the campuses of M. Auezov South Kazakhstan University for 2020 is 1,931,622 kWh. Electricity at the university is used for lighting, heating and cooling, work computers and other electrical appliances and laboratory equipment. Due to the Covid-19 Pandemic, electricity consumption has decreased by 2.2 times compared to 2020.

Ratio of renewable energy production divided by total energy usage per year



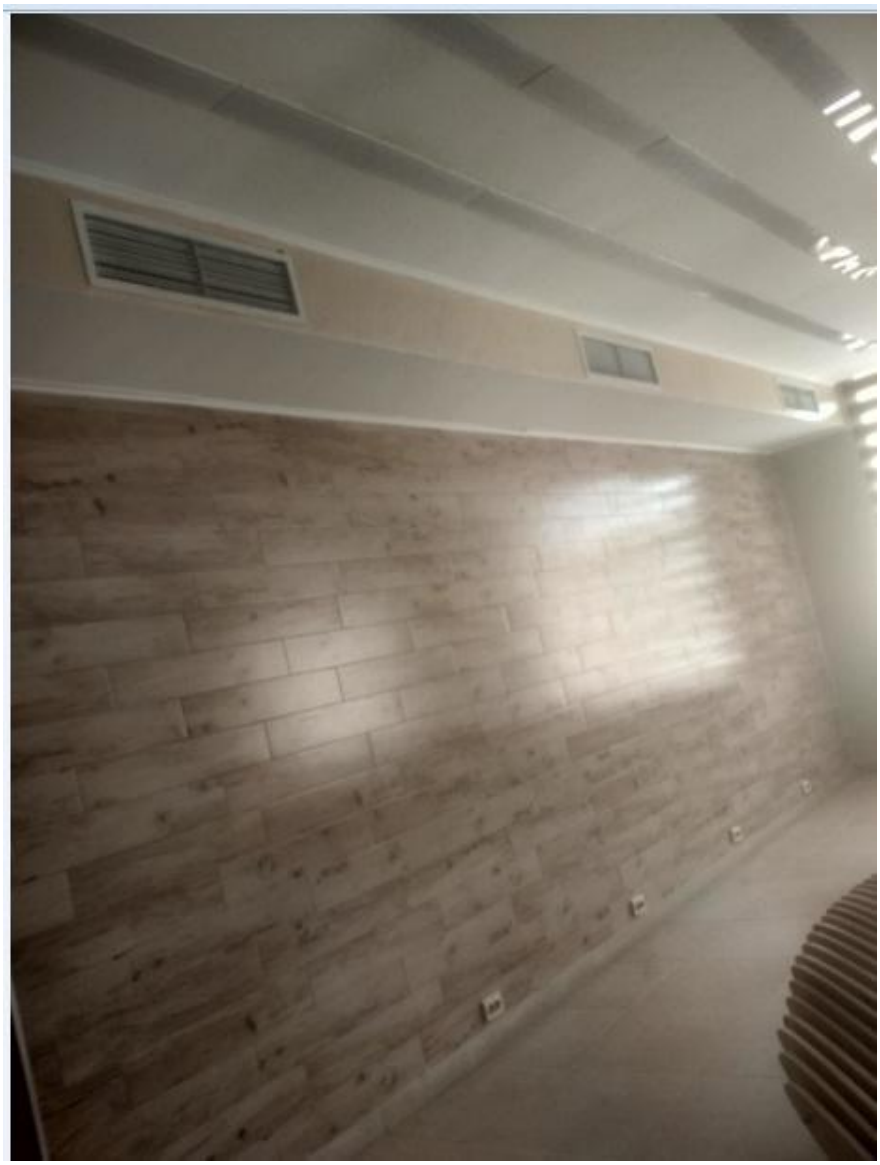
Campus 1. Solar battery (photo 1), rechargeable batteries (photo 2,3), transformer (photo 4).

Campus 1. Heliocamera for solar energy accumulation

No	Renewable Energy	Production (in kWh)
1	Solar battery	**1**
2	Heliocamera	**1**
	Total	**2**

2 (kWh) * 6 (hours of sun per day) * 80 (working days with sun) = 960 kWh per Year
960 / 1 931 622 (Electricity usage) = 0.049 %

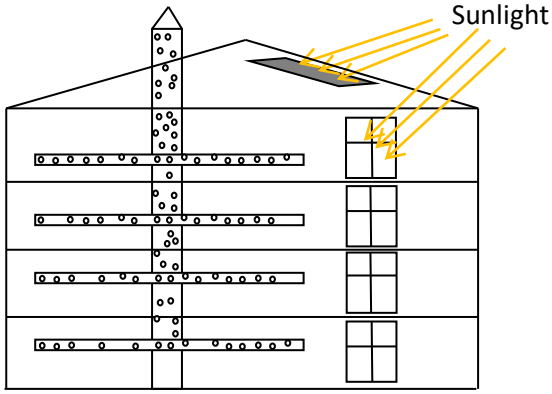
Elements of Green Building Implementation as Reflected in All Construction and Renovation Policies



Natural ventilation in University Campuses.


M. ÁÝEZOV atyndaǵy ÓNTÚSTIK QAZAQSTAN MEMLEKETTIK ÝNIVERSITETI
ADAMDY ADAMMEN
BILIM M.Áýezov

Natural lighting thanks to the large number of panoramic windows.



Schematic representation of natural ventilation and lighting. There is a solar panel on the roof of the building that stores solar energy. The ventilation shaft opens out through the attic to the roof of the building. Large windows provide natural light

Showery runoff from the roof of the main campus building 1

The M.Auezov South-Kazakhstan University has implemented ecological construction. This is confirmed by the presence of natural ventilation through ventilation shafts and the presence of a large number of huge windows for natural light.
Also, during the construction on the roofs of all buildings of the university, storm drains were provided, where rainwater enters. Thus, rainwater is collected from the roofs of buildings and goes through an extensive network of irrigation ditches to irrigate numerous fields, parks with vegetation or flower beds.

Thus, during the construction of the University, three elements of «Green Building» were implemented:
1. Natural ventilation
2. Natural lighting
3. Showery runoff of Rainwater

Greenhouse gas emission reduction program

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Solar battery</td><td>Heliocamera for solar energy accumulation</td></tr>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">Sharing of transport</td></tr>
<tr><td colspan="2">Drilling a well for technical water on the territory of the university.</td></tr>
</table>

Greenhouse gas emission reduction program of M. Auezov South Kazakhstan State University includes the following items:

1. The use of Solar battery and Heliocamera is aimed at reducing emissions from Type 2 sources.
2. Reducing private car trips by reducing parking spaces as well as Sharing of transport. This item aims to reduce emissions from type 3 sources.
3. In 2021, the university will enter into an agreement with the executive company for drilling a well for process water on the university grounds. This item aims to reduce emissions from type 3 sources.

Please Provide The Total Carbon Footprint (CO_2 emission in the last 12 months, in metric tons)

Option 2: Recommended by UI GreenMetric

CO_2 (electricity)

$$= \frac{electricity\ usage\ per\ year\ (kWh)}{1000} \times 0{,}84$$
$$= \frac{1{,}931{,}622\ kWh}{1000} \times 0{,}84$$
$$= 1{,}622.56 \text{ metric tons}$$

CO_2 (bus)

$$= \frac{number\ of\ shuttle\ bus\ in\ your\ university \times total\ trips\ for\ shuttle\ bus\ service\ each\ day \times approximate\ travel\ distance\ of\ vehicle\ each\ day\ inside\ campus\ only\ (KM) \times 240}{100} \times 0{,}01$$
$$= \frac{0 \times 0 \times 3 \times 240}{100} \times 0{,}01$$
$$= 0 \text{ metric tons}$$

CO_2 (cars)

$$= \frac{\text{number of cars entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240}{100} \times 0{,}02$$
$$= \frac{120 \times 2 \times 3 \times 240}{100} \times 0{,}02$$
$$= 34.53 \text{ metric tons}$$

CO_2 (motorcycle)

$$= \frac{\text{number of motorcycle entering your university} \times 2 \times \text{approximate travel distance of vehicle each day inside campus only (KM)} \times 240}{100} \times 0{,}01$$
$$= \frac{0 \times 2 \times 3 \times 240}{100} \times 0{,}01$$
$$= 0 \text{ metric tons}$$

CO_2 (total)

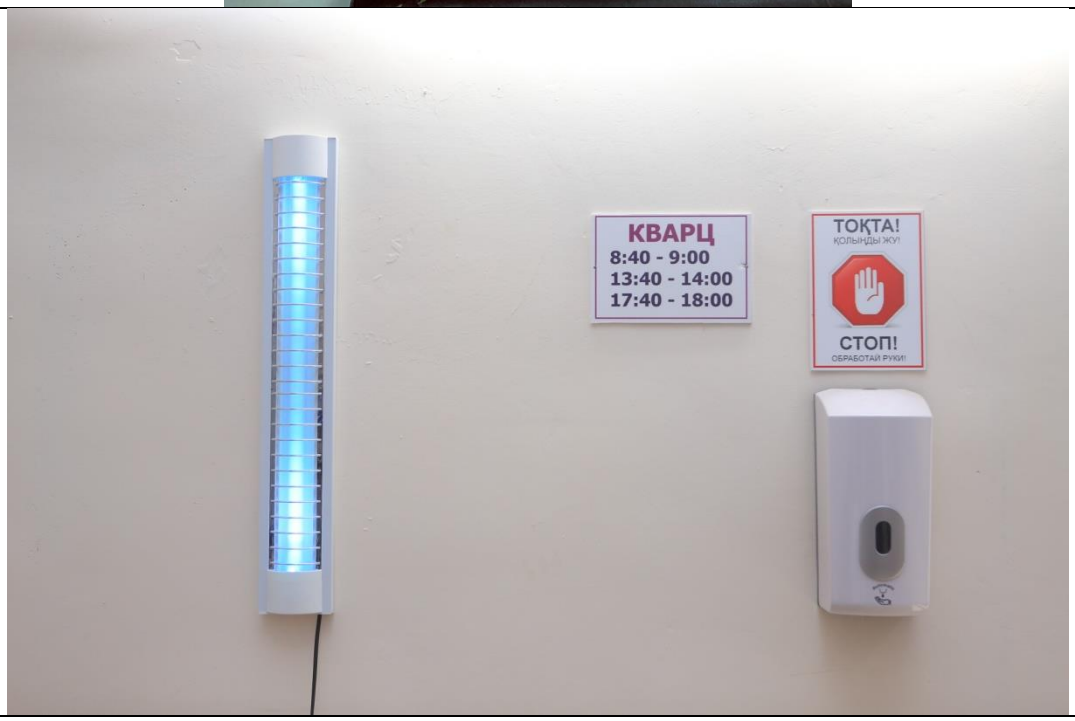
$$= 1{,}622.56 + 0 + 34.53 + 0$$
$$= 1{,}657.09 \text{ metric tons}$$

Carbon footprint in 2019-2020 = 1,657.09 metric tons

Total Carbon Footprint (M.Auezov South-Kazakhstan University)

Due to the fact that the number of buses, cars, and motorcycles used at the M.Auezov South-Kazakhstan University is small, the total carbon footprint is small.

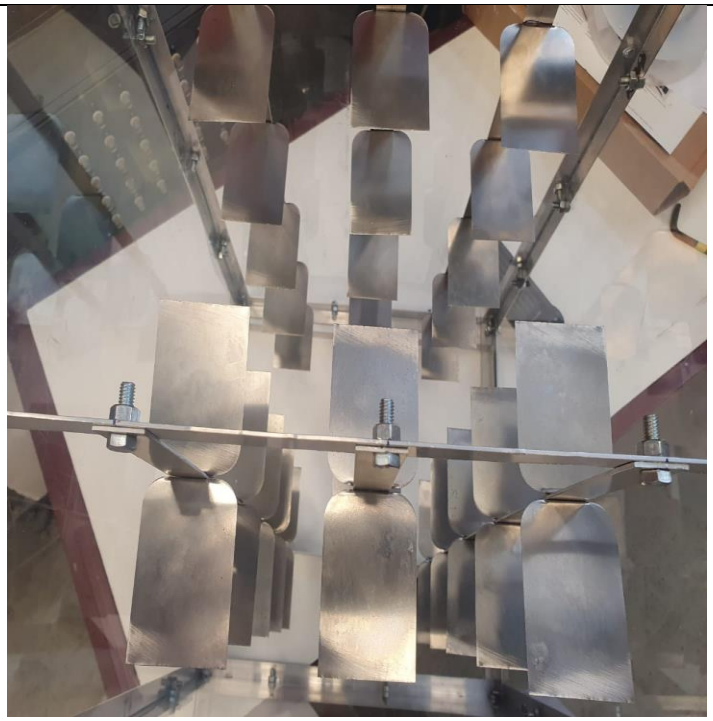
Number of innovative program(s) during Covid-19 pandemic



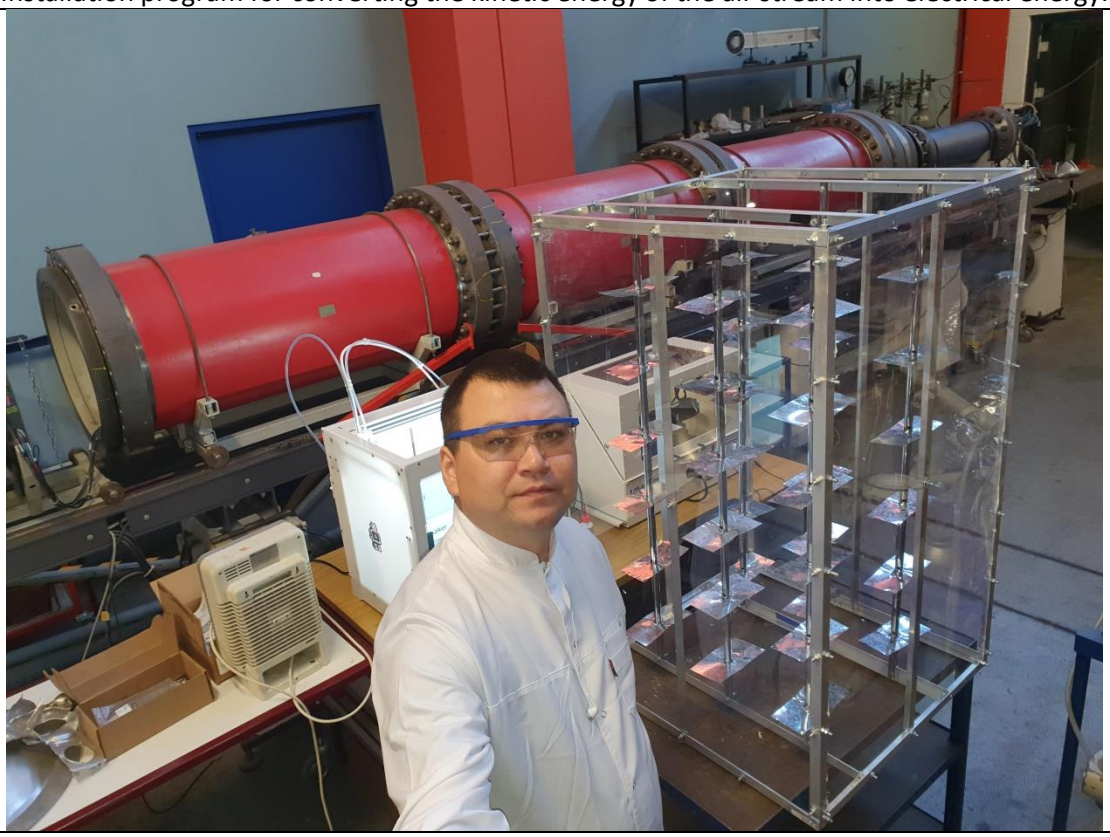
Smart room sterilization system using UVC rays
Innovative program (M.Auezov South Kazakhstan University)

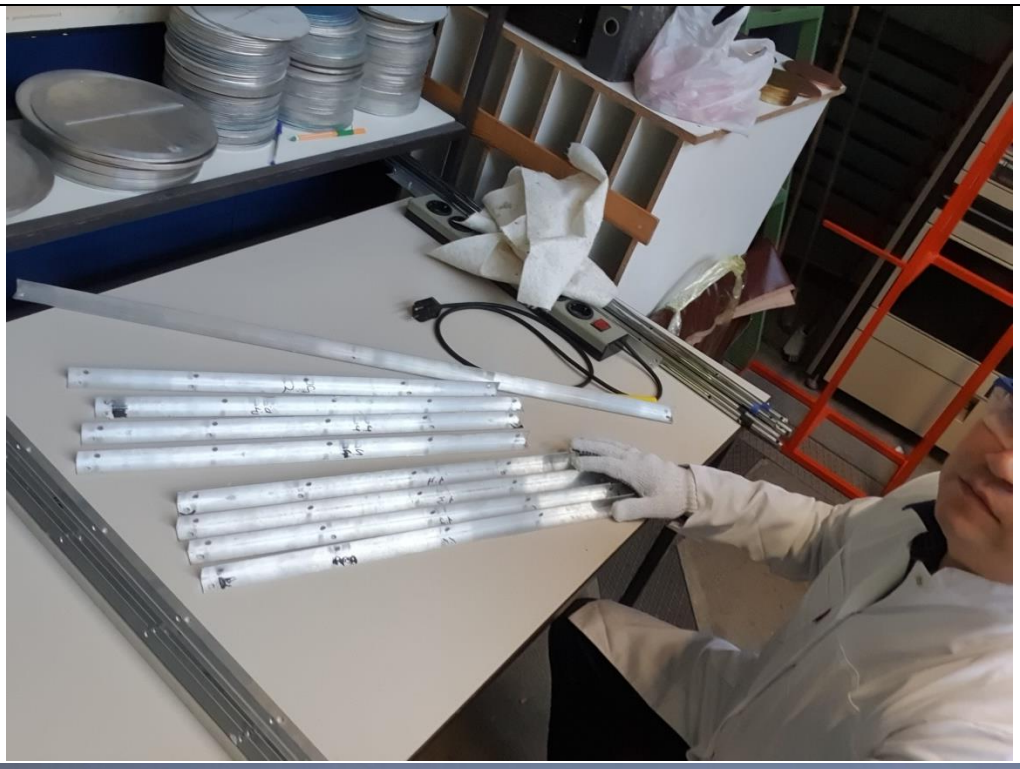
For M.Auezov South Kazakhstan University, an innovation in 2020 in connection with the Covid-19 pandemic is the use of quartz lamps to sterilize premises during the absence of students and teachers. The university purchased 340 quartz lamps. Of these, 297 lamps were delivered to classrooms in all academic buildings of the university.

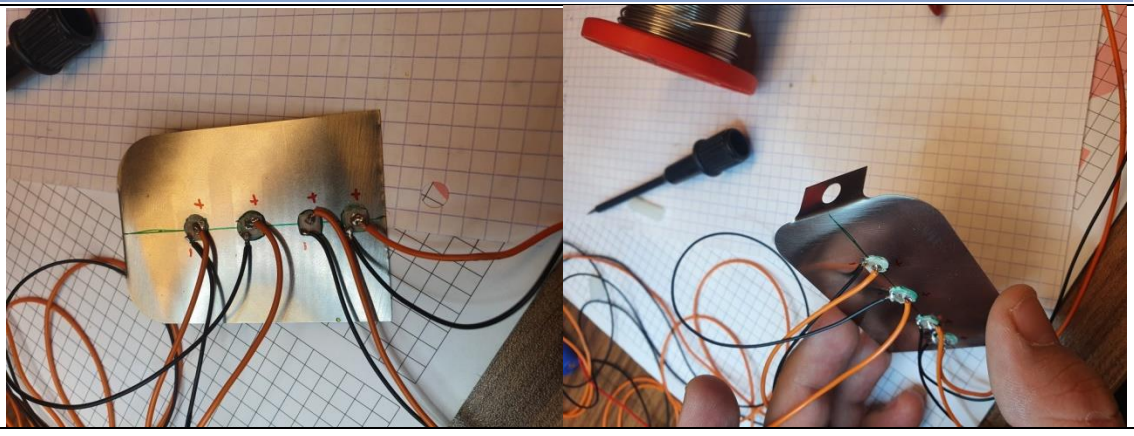
Impactful university program(s) on climate change



Installation program for converting the kinetic energy of the air stream into electrical energy.







Impactful university program (M.Auezov South Kazakhstan University)

The program of M. Auezov South Kazakhstan University on effective climate change is a project of the scientist Serikula Zhandos, which is being implemented jointly with the University of Germany Aachen (RWTH Aachen University) under the title “Installation based on the laws of vortex interaction of flows for converting the kinetic energy of the air flow into electrical energy".

As a result of the implementation of this project, an installation has been created for converting the kinetic energy of the air flow into electrical energy. The difference between this product is the simplicity of design and installation, applicable in absolutely any buildings and structures. It can also use the kinetic energy of not only wind, but also other sources, such as waste gas, air flows to optimize the costs of the enterprise.
Project number APP-PHD-A-19/011P

Additional evidence link (i.e., for videos, more images, or other files that are not included in this file):
http://www.fpip.kz/index.php/en/grant-programs/phd
https://m.facebook.com/story.php?story_fbid=4006738016036455&id=100001008874479&sfnsn=mo
https://m.facebook.com/eesijournal/photos/a.132873841765724/149107940142314/?type=3&source=57