Norges Naturvernforbund

Friends of the Earth Norway

БИОМ

PROJECT «ENERGY EFFICIENCY FOR SUSTAINABLE FUTURE»

ENERGY SAVING IN SCHOOLS

Ecological movement «BIOM»

INITIAL STATE OF SCHOOLS

Most of the school buildings was built in the last century and is characterized by the thermal discomfort, inadequate illumination level in the classroom. Humidity and noise are also important factors of the internal environment and must be controlled in accordance with the general policy of creating a safe and healthy learning environment in school buildings.

PROJECT«ENERGY EFFICIENCY FOR SUSTAINABLE FUTURE»

is implemented in the framework of the "Clean Energy", which aims to promote sustainable development of the energy sector, reducing greenhouse gas emissions, reducing impact on the environment, improving living conditions and is focused on the dissemination of ideas of sustainable energy and energy-saving practices in society.

Since 2012 started the practical implementation of measures to improve energy saving in the pilot school. Component of the project is aimed at implementing energy-saving measures in the pilot schools, in accordance with the recommended hygiene requirements to the conditions of student learning in modern schools of Kyrgyzstan with regard to temperature, light and ventilation, as well as the development of recommendations for the Ministry of Education and school administrators. The program was initiated by the Norwegian Society for the Conservation of Nature, "Friends of the Earth." In Kyrgyzstan, the National Coordinator of the Programme is the Ecological Movement "BIOM".

Norges Naturvernforbund

Friends of the Earth Norway

БИОМ

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN SCHOOLS

ILLUMINATION

Novopokrovka village, School-lyceum № 2, named Baranov

ILLUMINATION INITIAL STATE

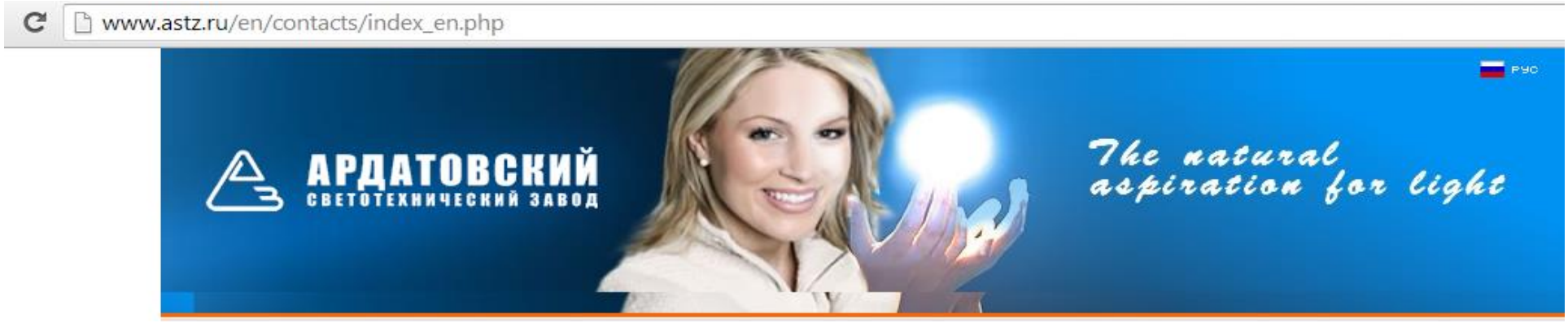
Novopokrovka village, School-lyceum № 2

School - Lyceum № 13

Ecology-Economic Lyceum № 65

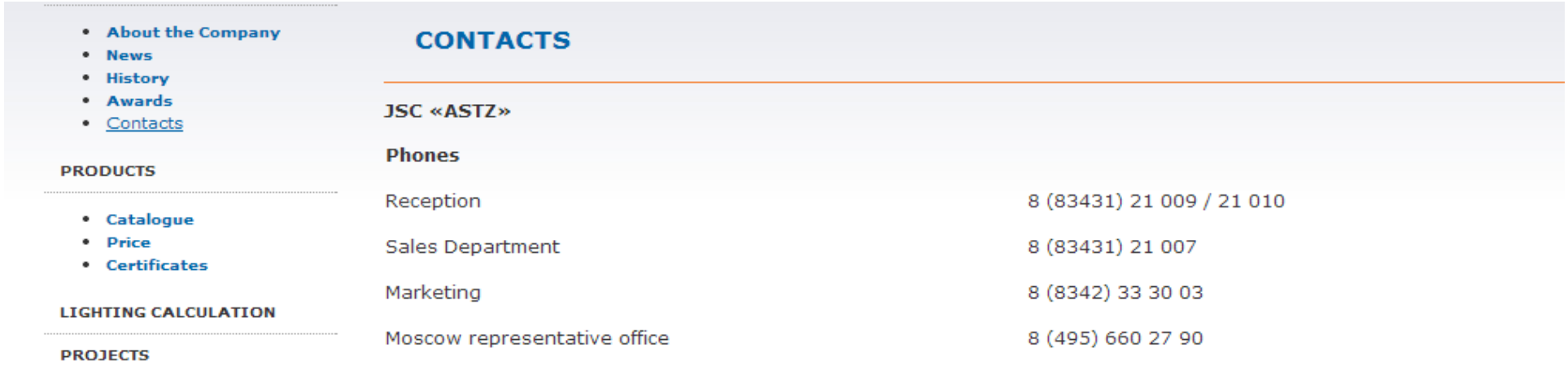
PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

http://www.astz.ru/ New light in schools



Negotiations were held with representatives of companies OSRAM and Philips in Almaty to Bishkek for the calculation of lighting in schools and the purchase of lighting equipment. However, the equipment and devices of these firms are too expensive for the budget of schools.

As a result of meetings and market research were selected Russian manufacturers of low-cost lamps with electronic ballasts that meet the standards and norms of lighting. The disadvantage is that in Bishkek works only one supplier of Russian manufacturers. Lamps with electronic ballasts are marketed in very limited quantities. Best quality characteristics have lights LPO46-2-36-613 Luxe, but the optimal value for the budget to be installed in schools were selected fixtures LPO46-2-36-714 Norma, Russian manufacturers - Ardatovsky plant. They also meet sanitary requirements of lighting in schools.



PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

For comparison, have been made in the DiaLux program calculation four lighting for each of the three classes of pilot schools by the specialists in lighting fixtures - for electromagnetic, electronic ballasts and LED

Эколого-экономический лицей № 65

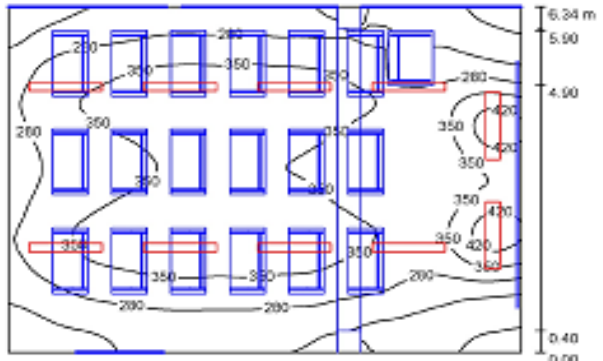
DIALux
12.07.2013

Оператор Пальченко Д.А.
Телефон 0772 484644
Факс
Электронная почта ddima_soho@mail.ru

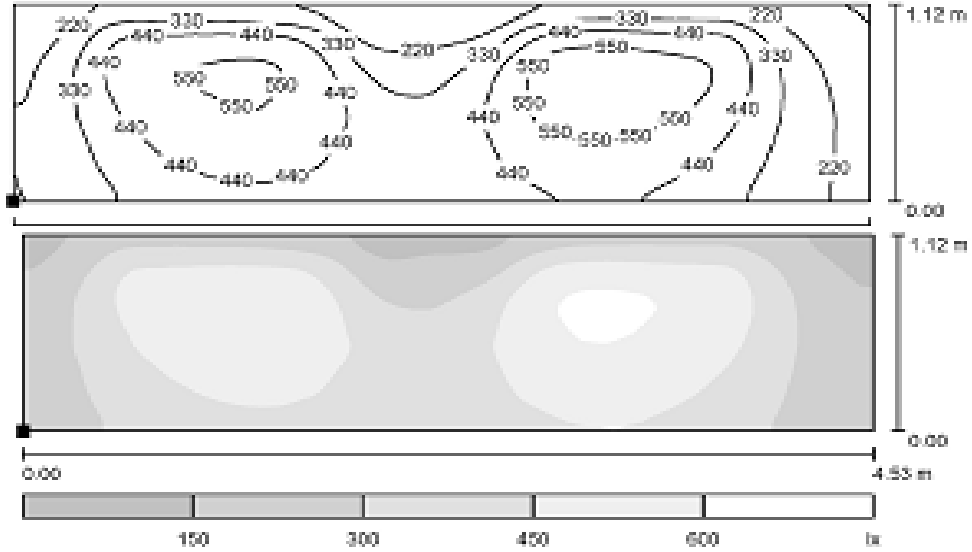
Эколого-экономический

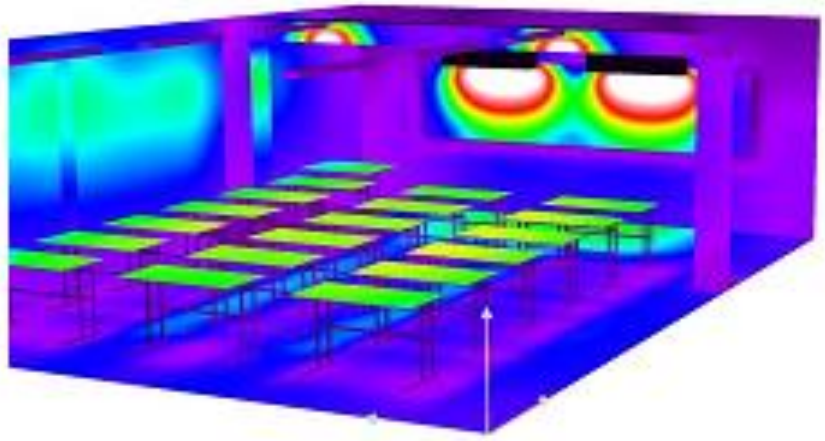
2 Шт. ASTZ ACT3 ЛБО46-36-003+P1 Class
№ изделия: ACT3
Световой поток (Светильник): 1930 lm
Световой поток (Лампы): 2850 lm
Мощность светильников: 48.0 W
Классификация светильников по CIE:
CIE Flux Code: 48 73 90 94 68
Комплектация: 1 x ЛЛ T8 G13 36Вт 28
Tцв=3795K (Поправочный коэффициє
1.000).

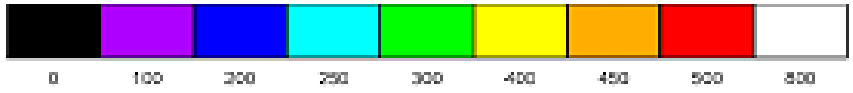
8 Шт. ASTZ ACT3 ЛПО46-2x36-713 Norma
№ изделия: ACT3
Световой поток (Светильник): 3635 lm
Световой поток (Лампы): 5700 lm
Мощность светильников: 72.0 W
Классификация светильников по CIE:
CIE Flux Code: 40 69 89 81 64
Комплектация: 2 x ЛЛ T8 G13 36Вт 28
Tцв=3795K (Поправочный коэффициє
1.000).



Высота помещения: 2900 m, Коэффициент эксплуатации: 0.80

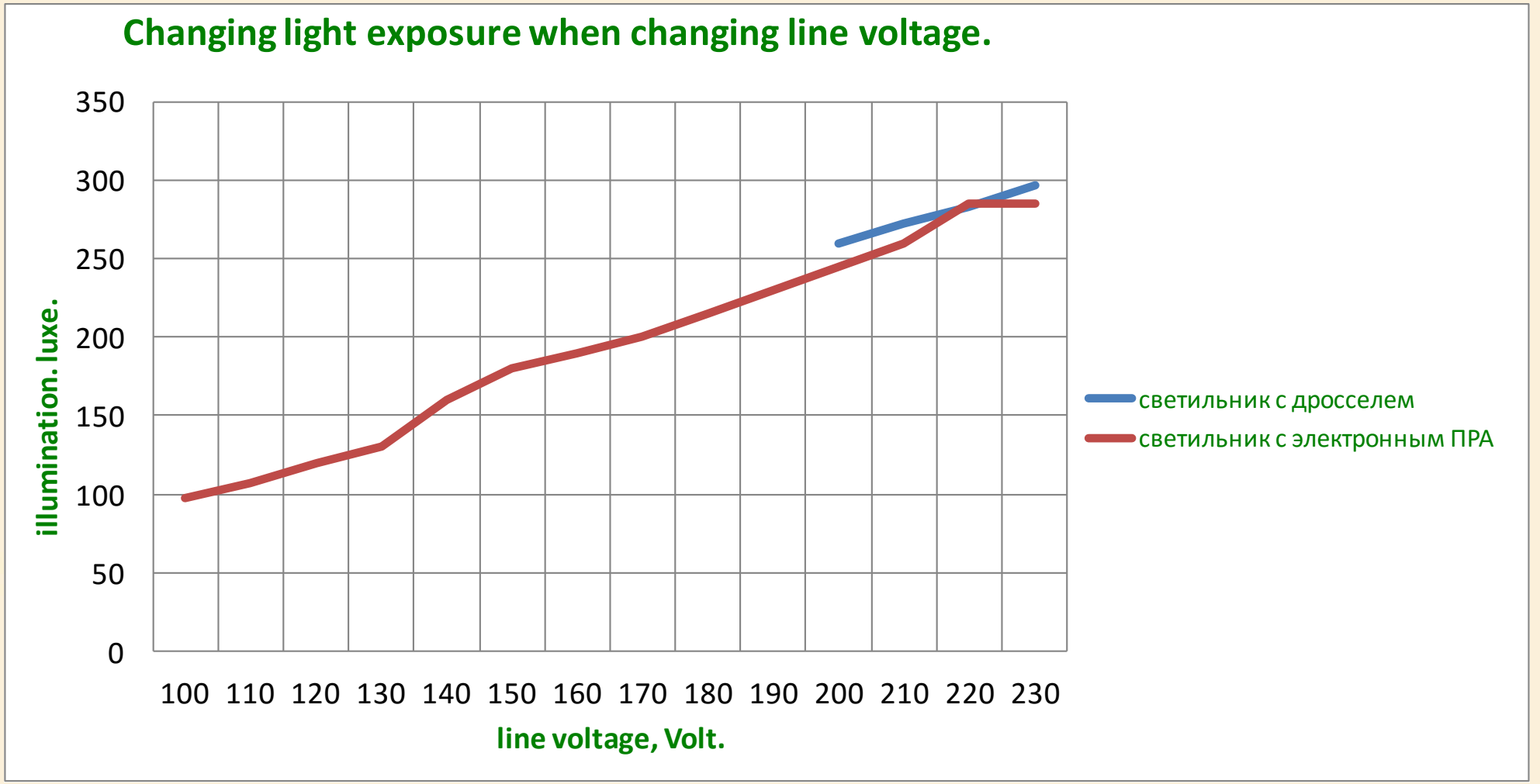




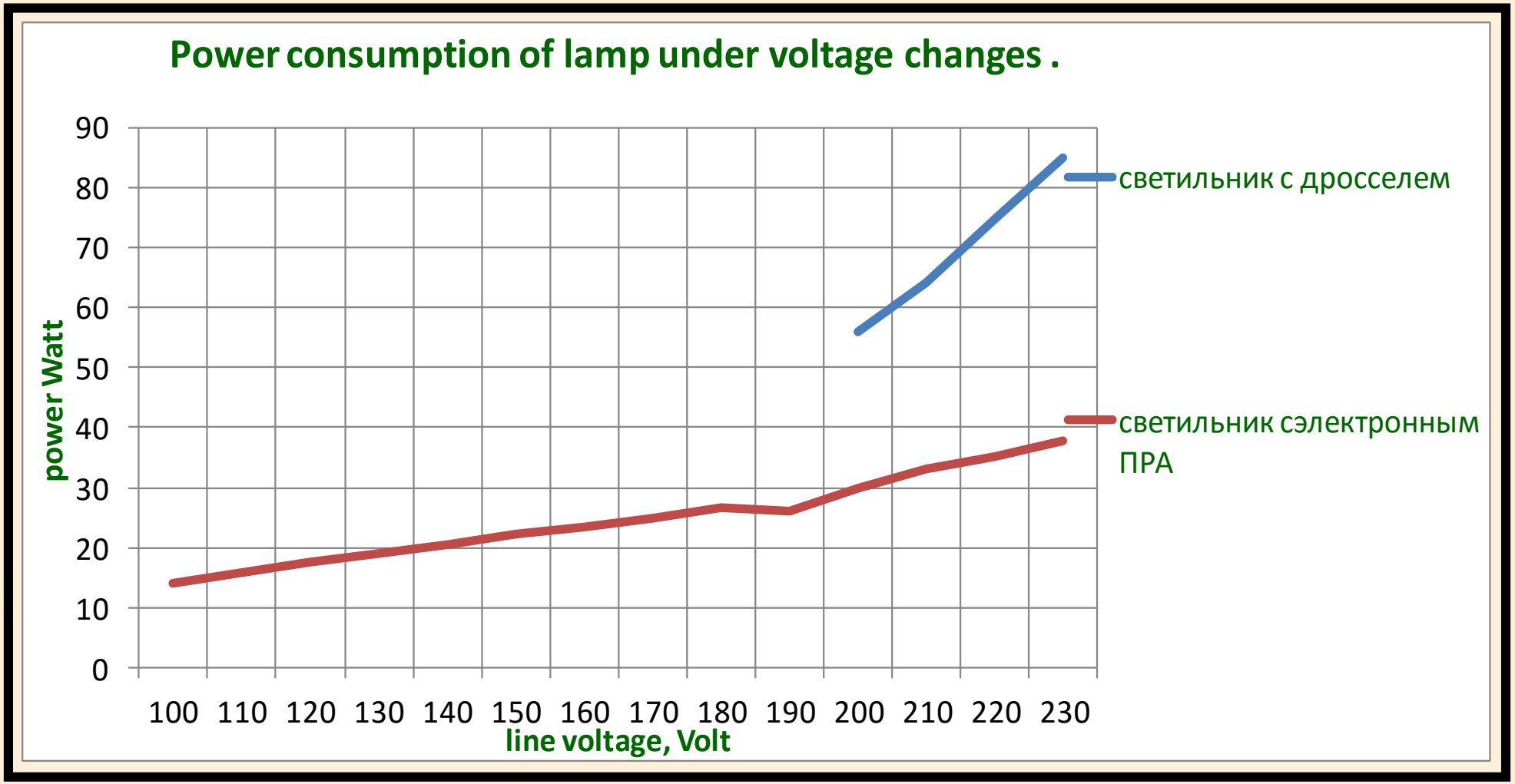


Lighting Engineering calculation
For Ecology-Economic Lyceum № 65

Schedule changing of light exposure the blackboard by fixture LPO 46-36-013 Class with inductive ballast and electronic ballast



Schedule the power consumption of fixtures for blackboard by fixtures with electronic ballast and inductive ballast



PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

installation works

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

RESULTS IN CLASSROOMS IN PILOT SCHOOLS

Before

After

Novopokrovka village, high school № 2. Pilot classroom

ECOLOGY-ECONOMIC LYCEUM № 65

Ecology class

before

after

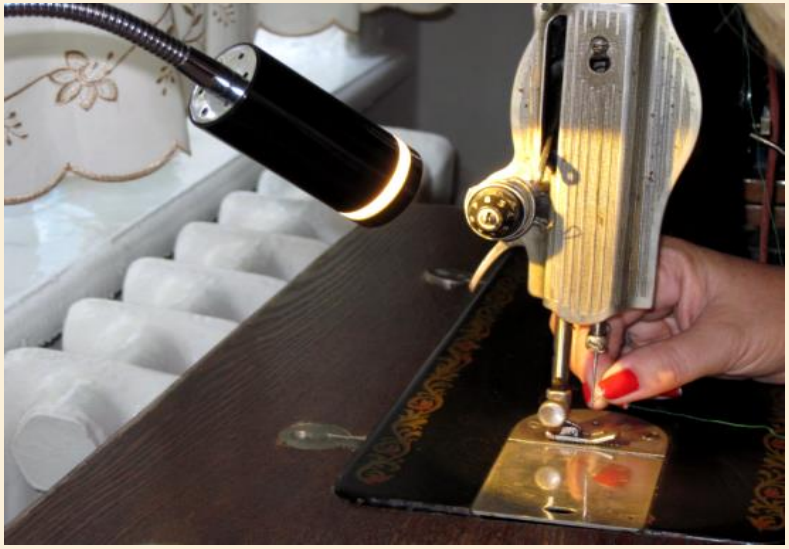
ECOLOGY-ECONOMIC LYCEUM № 65

Geography class

before

after

NOVOPOKROVKA VILLAGE, SCHOOL-LYCEUM № 2



before SEWING CLASS after

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

RESULTS IN CLASSROOMS IN PILOT SCHOOLS

Before

After

In the pilot classes of three schools were mounted lamps with electronic ballasts and ceiling mounted above the board in accordance with the lighting calculations and rules of artificial light in relation to the selected rooms.

Installed meters and presence sensors. Upon completion of the measurements carried out with the new light fixtures. They provide a standard level of illumination - 300 and 500 lux.

Already at the stage of the implementation of measures in the pilot classes on proper lighting of school administration appealed to the project with a request to give recommendations and practical assistance to improve the lighting in accordance to the standards.

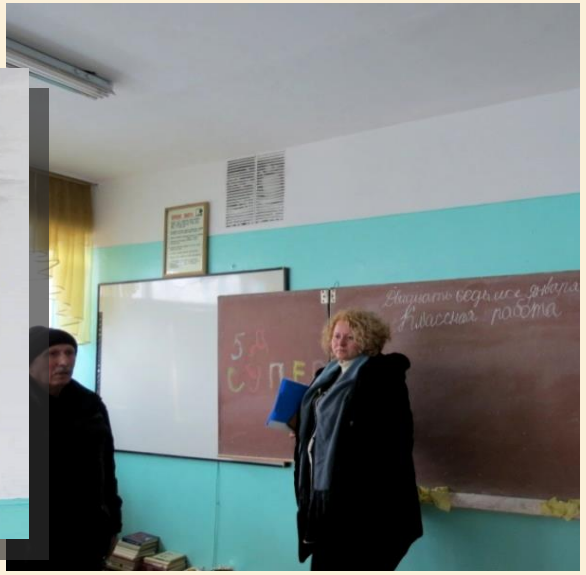
Bishkek School - Lyceum № 13. Pilot classroom

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

VENTILATION

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN SCHOOLS

EVALUATION OF AIR-HEAT REGIME AND VENTILATION IN THE PILOT SCHOOLS



PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN SCHOOLS

EVALUATION OF AIR-HEAT REGIME AND VENTILATION IN THE PILOT SCHOOLS

School-Lyceum № 2. Novopokrovka village

MEASURES FOR VENTILATION RECOMMENDED BY VENTILATION COMPANY

Were offered the following measures for improving air quality - major repair or upgrade an existing ventilation system.

As local solutions for individual rooms is offered*:*

- *clearing of natural ventilation shafts*
- *replacement of air distributive gratings*
- *renovation of air ducts*
- *replacement deflector*
- *installing mechanical exhaust ventilation*

In order to choose the most suitable ventilation system for schools, it is necessary to take into account the following concepts: indoor air quality, energy consumption, comfort of staying in a room of children and teachers, heat loss, the cost of equipment, the cost of installation and maintenance - and it is only the most obvious.

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

INSULATION
ENERGY EFFICIENT WINDOWS

INITIAL STATE

SEARCH AND PREPARATION OF TECHNICAL SOLUTIONS FOR IMPLEMENTATION OF ENERGY SAVING MEASURES IN THE DEMONSTRATION CLASSES OF PILOT SCHOOLS

plant for the production of glass “INTERGLASS”. Tokmak

energy-saving double pane windows «IG-WARM GUARD PLUS»

интергласс строй

Высылаю Вам технические характеристики на энергосберегающий стеклопакет по наименованию «IG – WARM GUARD» и «IG – WARM GUARD PLUS». Нижеприведенные данные по техническим характеристикам стекла являются публичными и официально признанными.

Технические характеристики стекла ПЛАНИБЕЛЬ ТОП Н

Толщина	Светопропускание %	Светоотражение %
4	87	6
5	87	6
6	86	6

Технические характеристики в стеклопакетах

Состав	Светопропускание %	Светоотражение %	SF%	Коэфф. U
4 - 12(воздух) - 4	79	13	64	1,7
4 - 16(воздух) - 4	79	13	64	1,4

С уважением

Андрей Владимирович Штайнерт 04.07.14
Ген. директор ОсОО «Интергласс-Строй»

Компания «Интергласс-Строй»
720001, Кыргызская Республика
г. Бишкек, ул.Фрунзе, 551

«Interglass Stroy» Company
551, Frunze Str. Bishkek
Kyrgyz Republic, 720001

technical characteristics

The formula of glass unit: **4 – 12 (air) - 4**

- Very low coefficient of heat loss
- U-value 1,7 Watt/m2.K
- Transparency when light is reflected from the glass;

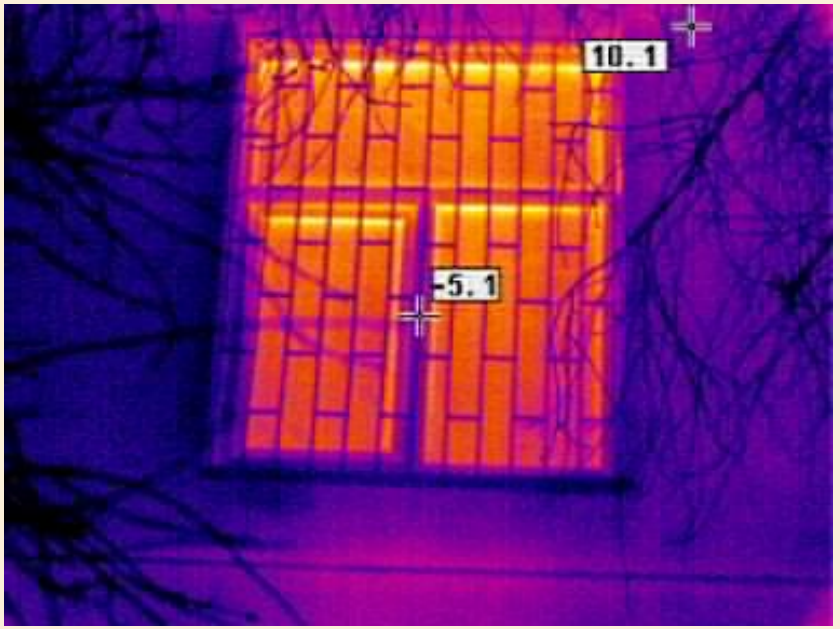
-A significant indicator of the transfer of solar energy (SF = 64%);

- light reflection 13%;
- light transmittance 79%

ENERGY EFFICIENT WINDOWS

ECOLOGY-ECONOMIC LYCEUM № 65

SCHOOL-LYCEUM № 2. NOVOPOKROVKA VILLAGE THERMOGRAMS

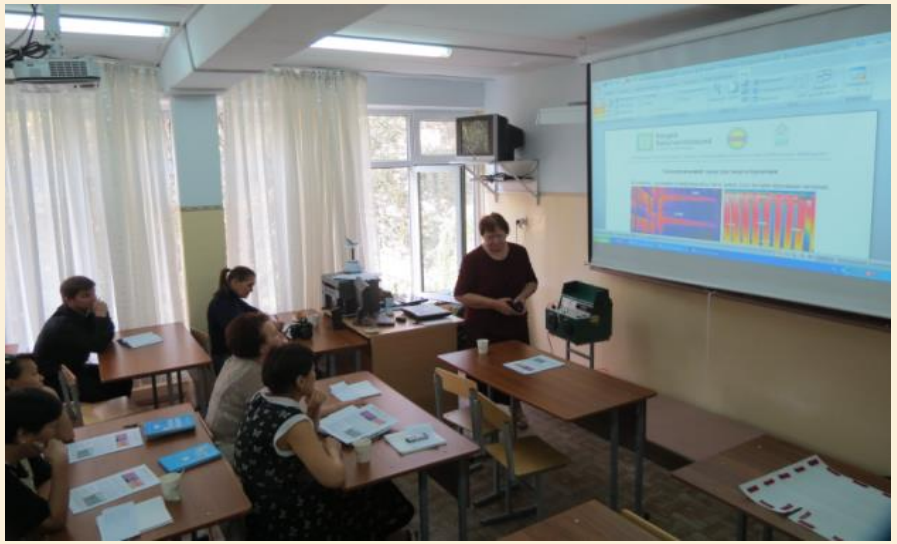


energy efficient windows

PRACTICAL IMPLEMENTATION OF ENERGY SAVING MEASURES IN PILOT SCHOOLS

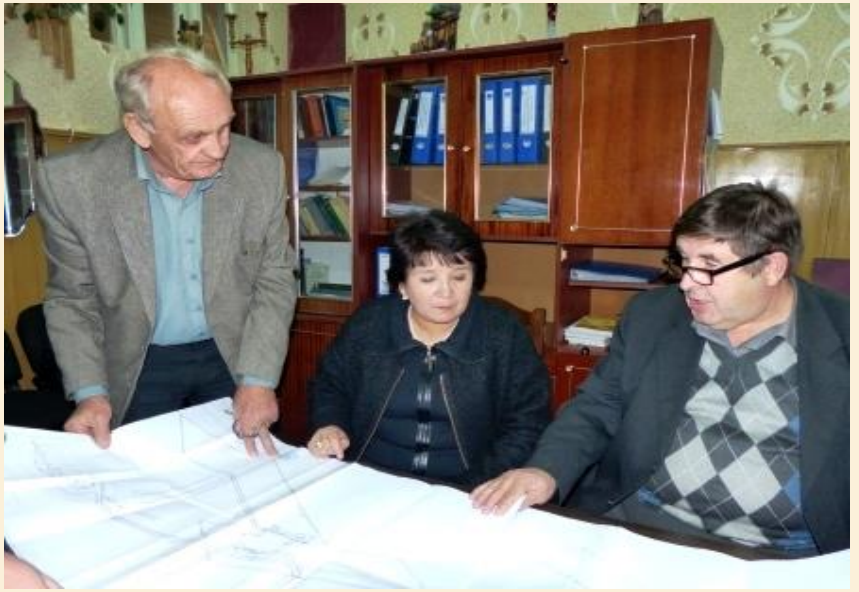
CO-FINANCING OF ENERGY SAVING MEASURES

CO-FINANCING OF ENERGY SAVING MEASURES



MASTER-CLASS ON ENERGY SAVING IN ECOLOGY-ECONOMIC LYCEUM № 65

CO-FINANCING OF ENERGY SAVING MEASURES



Rehabilitation of the heating system, school-lyceum № 2. named by Baranov. Novopokrovka

EM “BIOM”

www.biom.kg
biom.kg@gmail.com