



April 26th 2017

Milestone conference on **Energy saving in schools**

2017

Sofia, Bulgaria

speaker
from the Independent Institute for
Environmental Issues (Berlin):
Hoai Nguyen

Topics

1. Who is **UfU**?
2. What are NTEF and UfU doing together and what is **Fifty/fifty**?
3. **Why** save energy?
4. **How** save energy? What is the energy saving project?



UfU Unabhängiges Institut
für Umweltfragen

Who is UfU?

Independant Institute for Environmental Issues

- **founded by East German scientists** who wanted to make environmental data accessible and motivate public participation in environment protection and research
- **main fields of work today:**
climate protection, environmental education, environmental law, public participation



Fifty/fifty in Germany



- biggest pedagogical environmental program since 1996
- saving energy by user behaviour modification, not only by major investment
- schools get a part of the money back = financial incentive of schools (for example 50% of energy saved amount)
- 3.500 schools take part (10% of all schools)

**savings about 750.000 t CO₂ and
150 Mio. € (293.370.000 BGN)
each year**

Bulgaria – Germany – Romania project

- project is about showing Bulgarian and Romanian partner how to implement energy saving projects
- term: Okt 16 – Apr 18 (2,5 years)
- 8 teachers and NTEF have come to Germany for a study travel
- UfU has come to Bulgaria several times to help support the schools



Why save energy?

1. Energy costs money.



Why save energy?

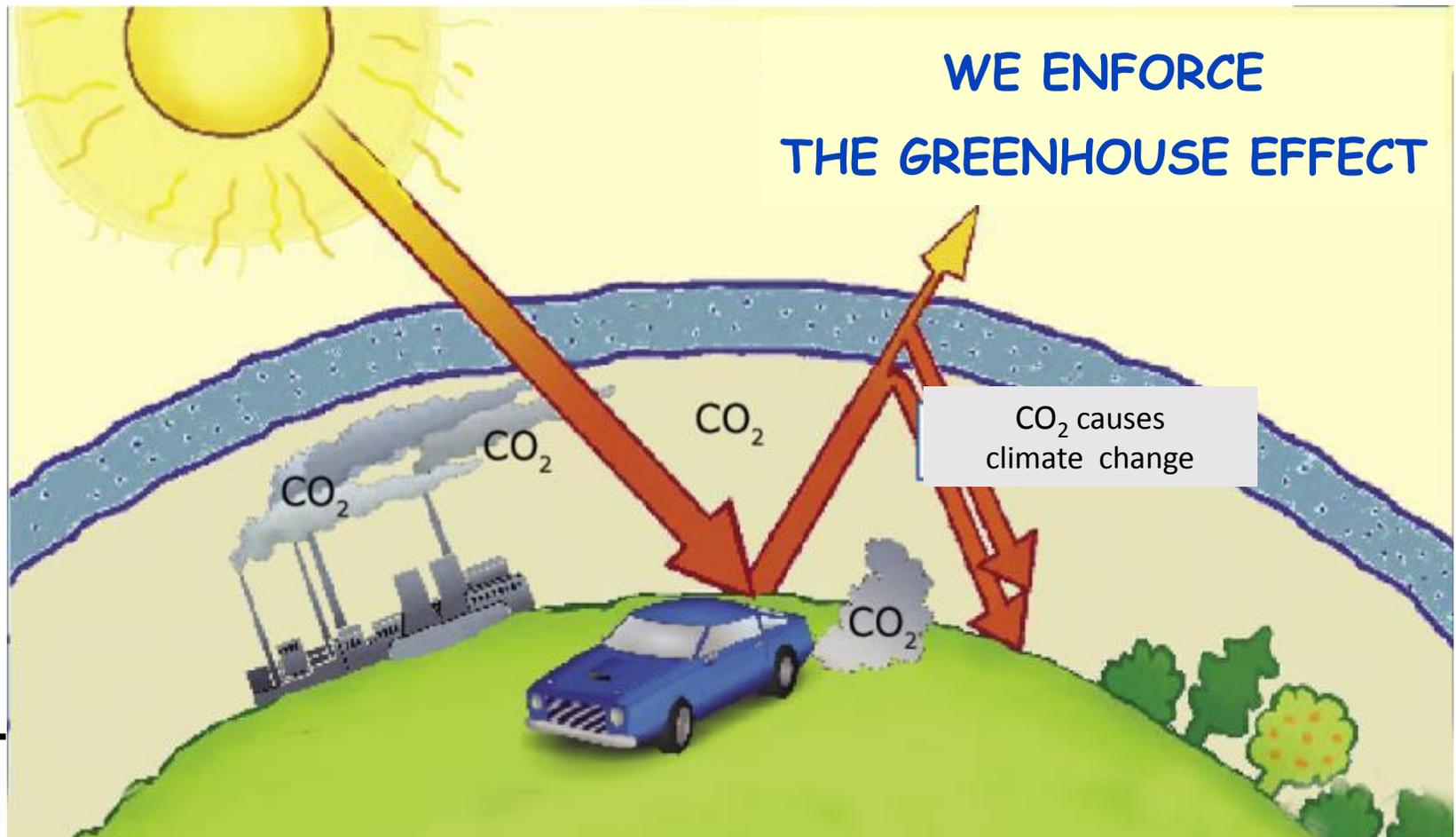
2. Fossil energy sources will become exhausted soon.





Why save energy?

3. Slow down climate change / greenhouse effect



Why save energy?

3. Slow down climate change

droughts



floods



melting of the poles



Why save energy?

4. raise environmental awareness pedagogically among the adults-to-be who carry it in their private households



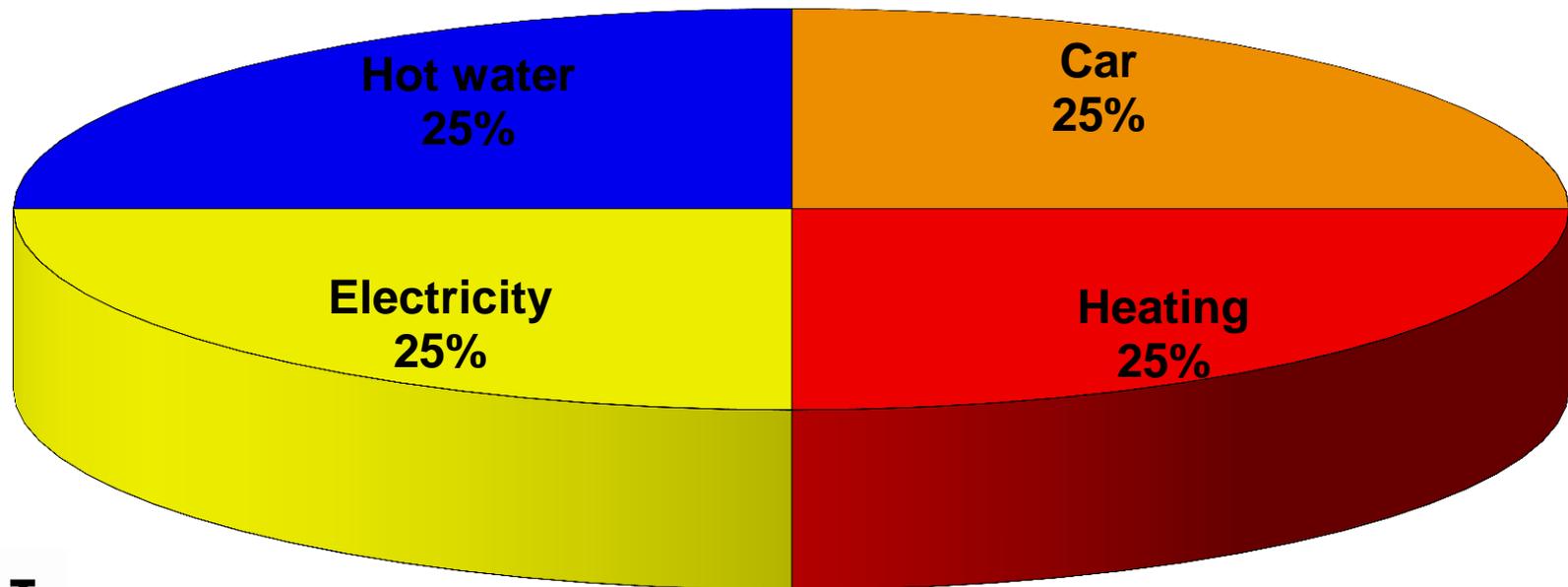
Why save energy?

4. publicity for the school, municipality and the country



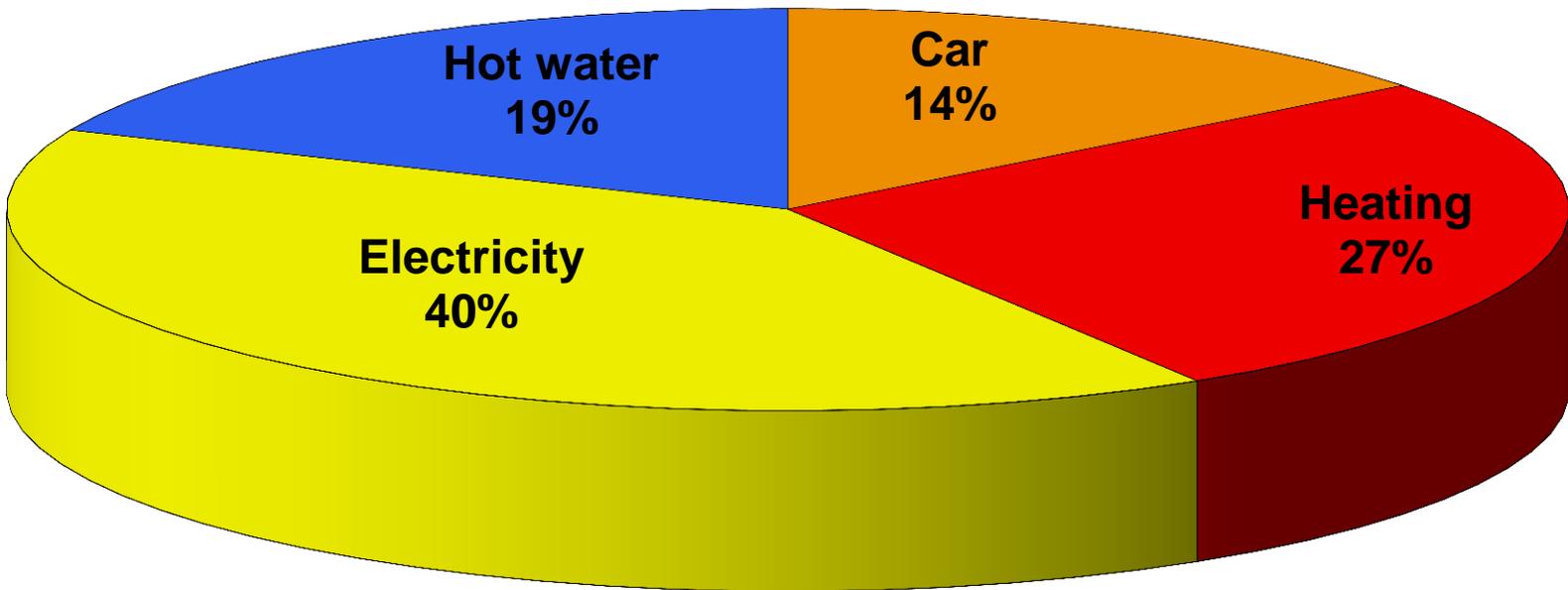
HOW save energy?

In which field does the average household consume the most energy?



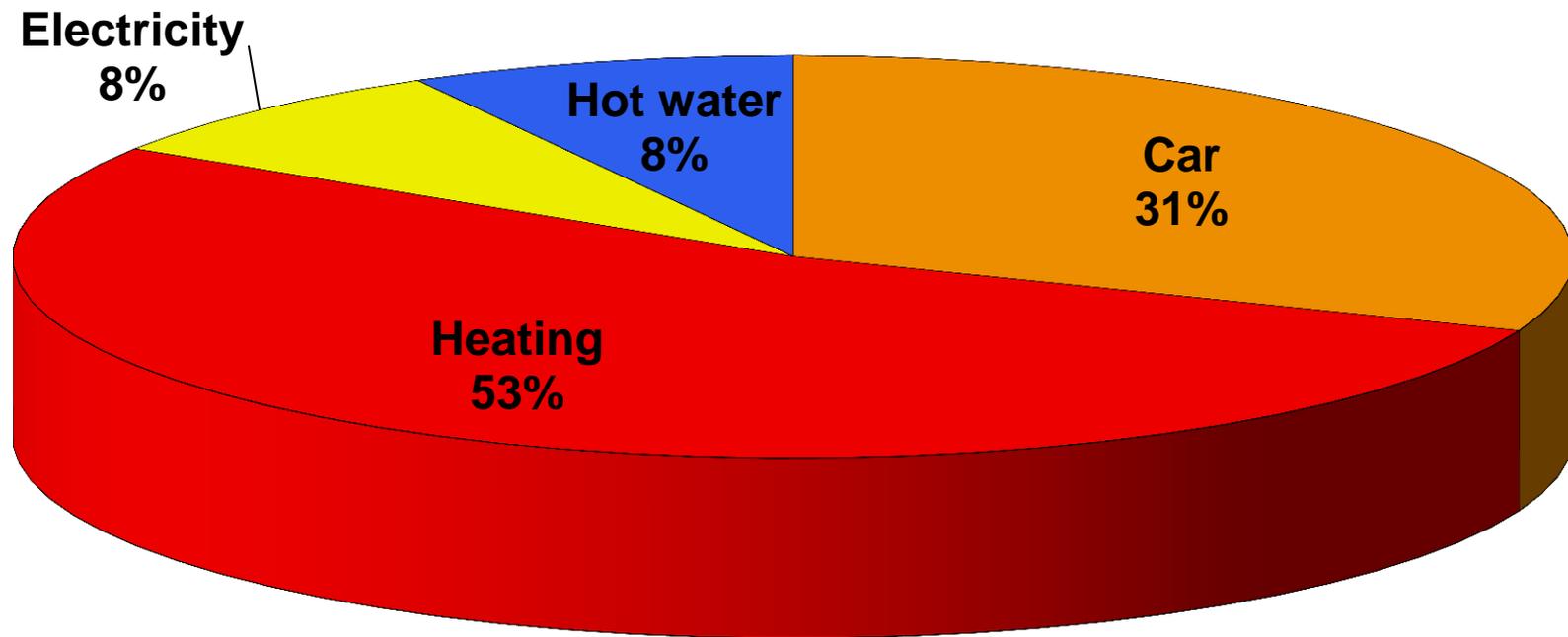
How save energy?

Most people's estimates look like this...



How save energy?

The truth...



How save energy?

Energy consumption of a medium size school
(500 students):

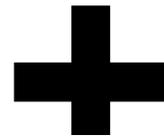


	Consumption (kWh/a)	CO₂ emissions (kg/a)	Costs (BGN/a)
Electricity	100.000	60.000	43.023 BGN (22.000 €)
Heating	1.000.000	240.000	146.670 BGN (75.000 €)
Sum		300.000 (150.000 m ³)	185.782 BGN (97.000 €)

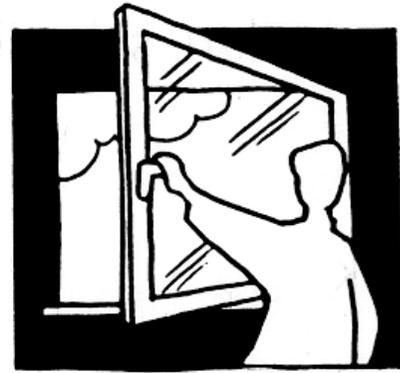
The most energy saving potential in public buildings lies
with the **heating**

What is energy saving in schools?

Technical optimizations



Optimized user behavior



The optimization of the user behavior is an **inexpensive** and at the same time **effective** climate protection program.

Conscious everyday behaviour saves approx. 4 – 15 %

In everyday school life

1. use thermostatic valves correctly
2. lights only on when necessary
3. correct ventilation

Technology / caretaker

1. appropriate hallway lighting
2. lowering the room temperature during
 - a) day
 - b) night
 - c) weekend
 - d) holidays

No one has to freeze
or to sit in the dark!



School authorities

1. necessary repairs
2. suggestions for investments
3. optimization of heating control capabilities

Impressions

Energy team

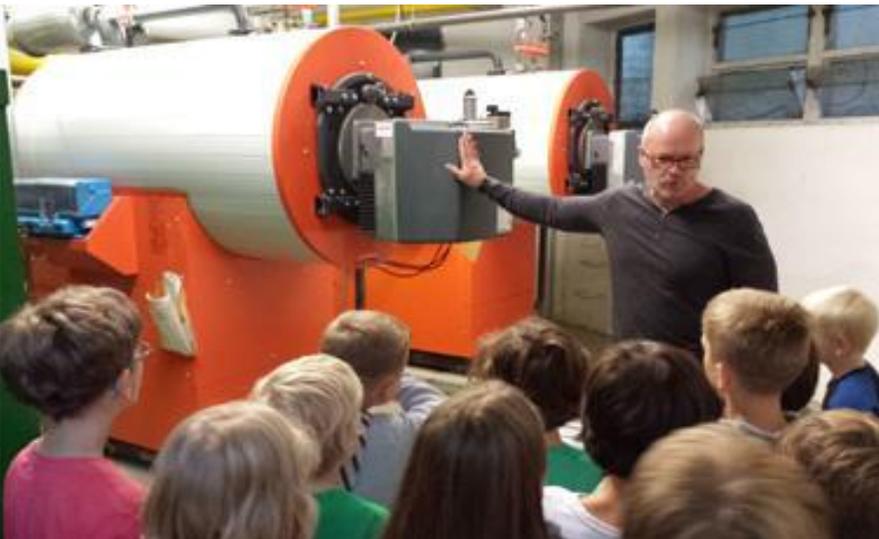
group of students + teacher + caretaker



+ external consultant

Impressions

Energy tour with the kids



Impressions

Temperature measurements



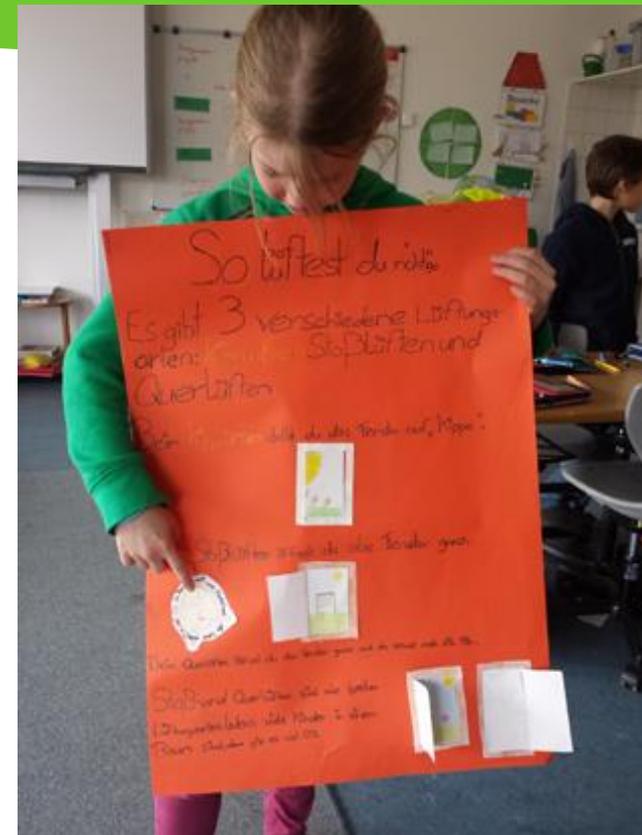
Impressions

Light intensity



Impressions

Publicity



Impressions

Publicity

Klimawandel

Kühe, Dürren und Hurden jede 40 Sekunden Metan aus (Das der Umwelt sehr schadet).



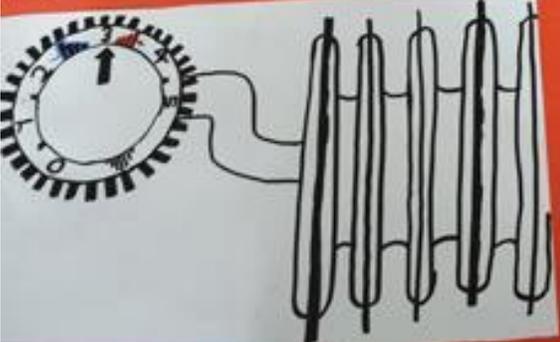
Klimawandel
 CO2 macht es auf unserer Erde immer wärmer. Wenn es immer wärmer wird, sterben viele Tiere und es gibt mehr Überflutungen, Waldbrände, Dürren und Menschen in armen Ländern hungern. Das ist gar nicht gut!
 CO2 kommt aus unseren Autos, Fabriken, Kläranlagen und vielen mehr. Viel CO2 entsteht durch die Erzeugung von Energie, also Strom und Wärme.
 Jeder kann mit Energie sparen, um die Erzeugung zu verhindern!

Werte können sinken durch den Klimawandel
 Durch den Klimawandel sinken die Werte für die Artenvielfalt, die Wasserqualität und die Gesundheit der Menschen. In den letzten Jahren sind die Meerespiegel, die Meeresoberfläche und die Meeresoberfläche um 10 cm gestiegen. Das ist ein Zeichen für den Klimawandel.



Angemessene Temperaturen

$t = 17^\circ\text{C}$

Richtiges Lüften

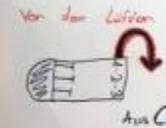
Stoßlüften **Aberlüften** **Kippstellung**



Blüften statt länger auf Kippe - das Luft und verschwendet nicht die Energie.

Wärme

Thermostat beim Lüften abdrehen damit wir nicht für draußen heizen. Danach wieder aufdrehen damit es schnell wieder warm wird.

Vor dem Lüften  Aus (⊖)

Nach dem Lüften  Auf (+)

**Now let's hear what the
experience of the Bulgarian
pilot schools have been.**



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WORKSHOP

Where schools need help /

How can **Energy saving in schools**

be established in Bulgaria?

speaker

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Hoai Nguyen

Schools

Indira Gandhi (Liulin)

Konstantin Irechek (Liulin)

Hristo Masimov (Samokov)

Neofit Rilski (Samokov)

Discovered potential



Schools

Indira Gandhi (Liulin)

Konstantin Irechek (Liulin)

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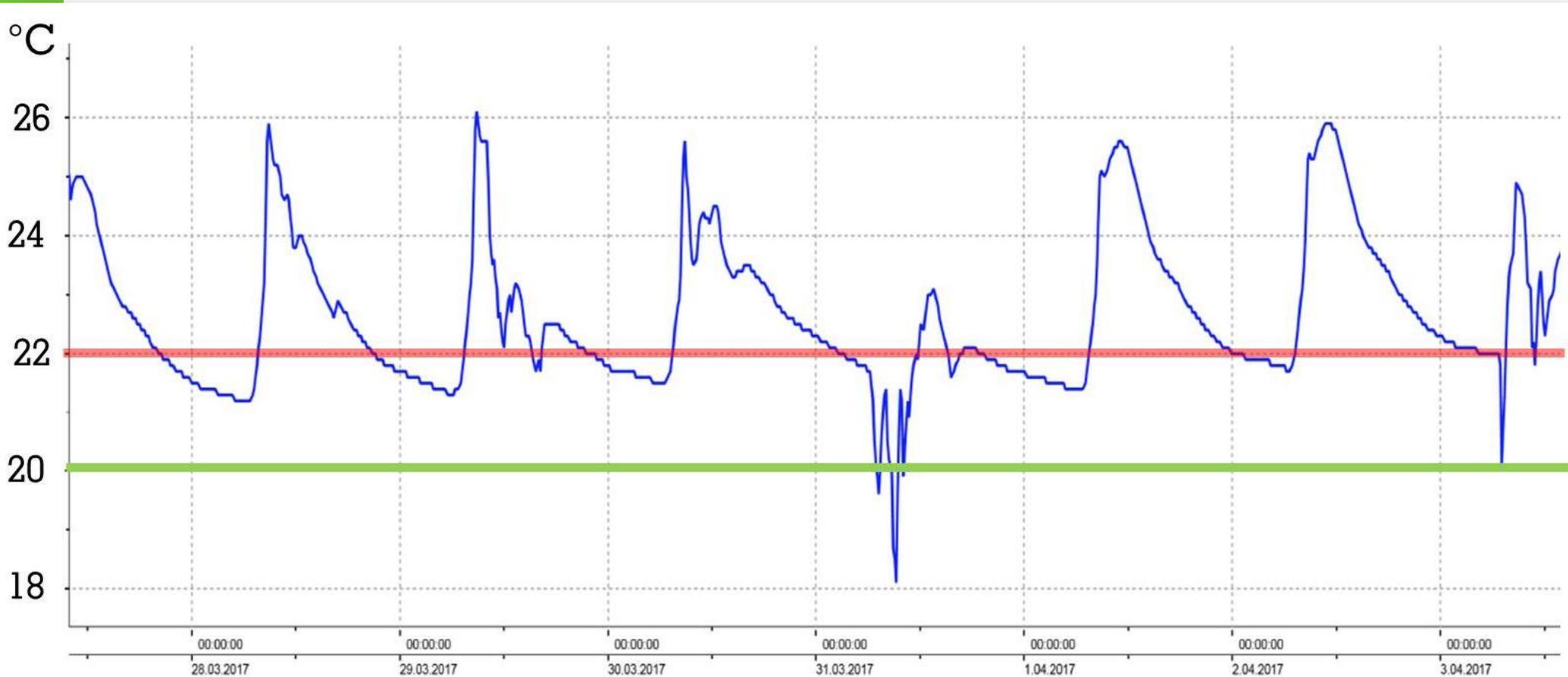
**Heat energy
escapes
directly**



We need thermostatic valves



Optimizing setting of heating settings



Incentive system (IS) for schools



For successful continuation in the long run there should be:

- (1) **external consultation**
- (2) there should be regular events
 1. **caretaker and teacher trainings**
 2. **kick-off** in autumn and **closing event** in spring
 3. annual meeting for **experience exchange/knowledge sharing**
- (3) **payments of the teachers** for extracurricular work

IMPORTANT :

external advice should be ensured

1. for **educational** input in school
 2. for **technical** advice on site
 3. as a **link between schools and offices** responsible
- UfU & NTEF have been the external consultation in this multinational project
 - NTEF has expertise in the technical area, renovates schools (insulation, windows), has engineers
 - has coordinated the activities of the Bulgaria-Romania-Germany project within Bulgaria



Overall requirements for a successful project implementation



(1) **Standards** of temperature, lighting and CO2 concentration

(2) **Saved money** should possibly be partially spent tied to specific purposes / **earmarked**

(3) **Curriculum:** Integrating energy saving in the standard curriculum should happen interdisciplinary to change the mindset of all students



Overall requirements for a successful project implementation



- (4) **Coordination** of all activities and parties: Who should coordinate all this? Ministries + consultation company,
- (5) **Motivation** from students from Roma households
- (6) **Public relations**
- (7) **Including schools all over Bulgaria:** How can schools in all parts of the country be reached?

Let's discuss & collect ideas now!

- If schools have participated for a few years they could get **rewarded with an investment for construction measures**, e. g. insulation of the buildings, new radiators etc.
-

Agreements / distribution of tasks

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**Thank you for thoughts and
for participating!**