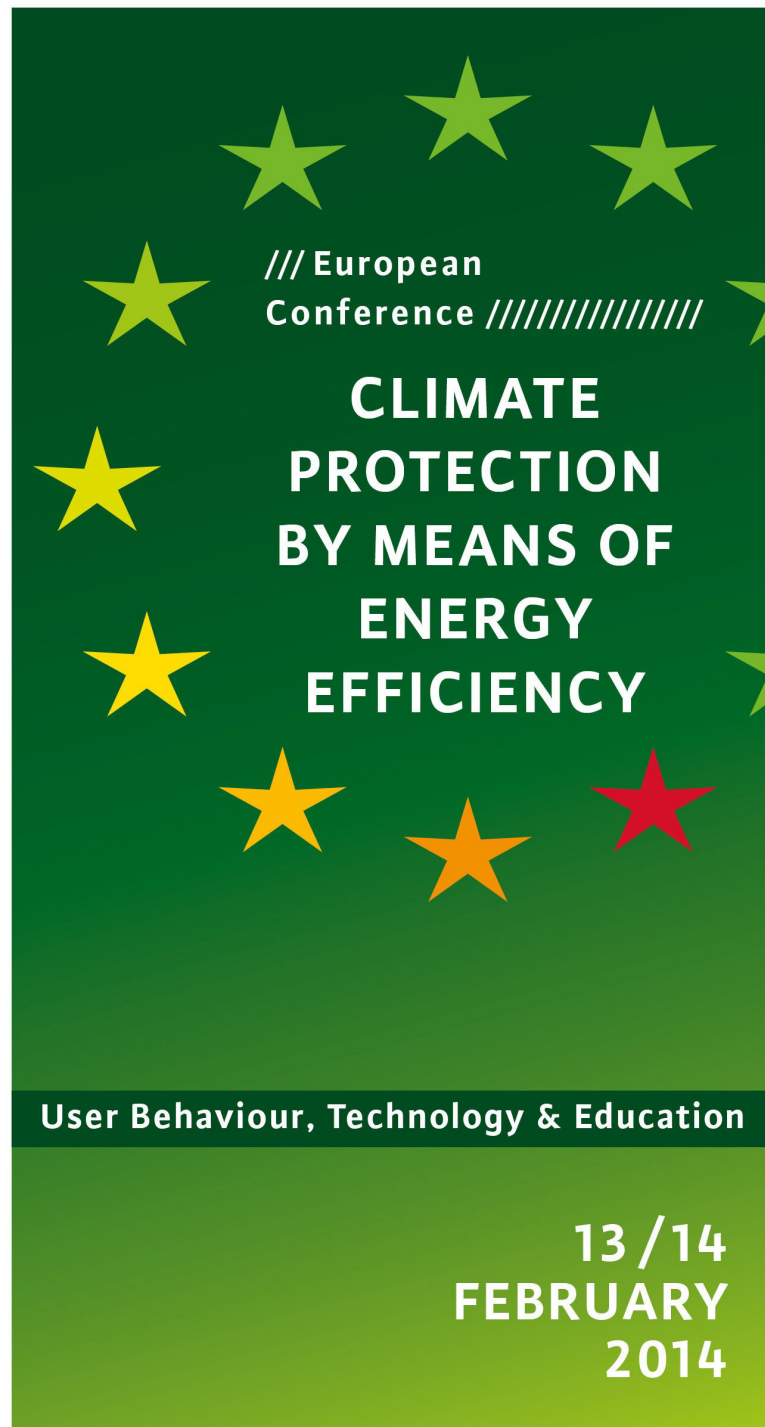


# CONFERENCE DOCUMENTATION



Federal Ministry for the  
Environment, Nature Conservation,  
Building and Nuclear Safety



**UfU**  
Independent Institute for  
Environmental Issues

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## Introduction

This reader gives you an insight into the issues 70 participants from Germany, Spain, Poland, Cyprus, Denmark, Lithuania and Hungary discussed at the conference "Climate Protection by means of Energy Efficiency - User Behaviour, Technology & Education" on February 13/14, 2014 in Berlin.

On February, 13-th, participants visited the Hein-Moeller-Vocational Training School that has been actively connecting energy conservation and the use of renewable energy sources (namely solar power) at the school with educational activities.

On February, 14-th, after a keynote speech on German and European energy efficiency aims given by a representative of the Federal Ministry of the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), the 70 conference participants learned about the requirements for energy efficiency-oriented renovation and building measures seen from the side of planners/building managers on the one hand and educators on the other. Participants from five European countries presented good practice examples. On the basis of these and their own experience, the participants analysed the interaction and conflicts in topics as the connection between technology and education in energy efficiency measures, user participation in the implementation of such measures and the user-friendly management of highly energy efficient buildings and developed approaches for solutions and further action.

This reader gives you a summary of the keynote speech, the introductory speeches, the presentations of good practice examples and the results of the workshops. You find the full text of speeches and presentations at: [www.ufu.de/eurofachtagung](http://www.ufu.de/eurofachtagung).

As the conference language was English, we provide the documentation in this reader in English. Additionally, we provide all German versions we have at this point.

The conference "Climate Protection by means of Energy Efficiency - User Behaviour, Technology & Education" was supported by the Federal Ministry of the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)

*Almuth Tharan*

*Independent Institute for Environmental Issues (UfU); [www.ufu.de](http://www.ufu.de)*

*Berlin, February 25, 2014*

## Einführung

Diese Dokumentation gibt Ihnen einen Einblick die Themen, die 70 TeilnehmerInnen aus Deutschland, Spanien, Polen, Zypern, Dänemark, Litauen und Ungarn auf der Konferenz "Klimaschutz durch Energieeffizienz – Nutzerverhalten, Technik und Bildung" am 13./14. Februar 2014 in Berlin diskutiert haben.

Am 13. Februar besuchten die Teilnehmenden zunächst die Hein-Moeller-Schule in Berlin-Lichtenberg, die seit Jahren Energiesparprojekte und die Nutzung erneuerbarer Energien (insbesondere der Solarenergie) aktiv in ihre Bildungsarbeit einbezieht.

Am 14. Februar begann die Konferenz mit einem Grundsatzreferat einer Vertreterin des Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB). Danach machten sich die 70 TeilnehmerInnen in zwei Einführungsvorträgen mit den unterschiedlichen Anforderungen an Energieeffizienzmaßnahmen aus der Sicht von Planers/Gebäudemanagern einerseits und der Bildung andererseits vertraut. VertreterInnen aus fünf europäischen Ländern stellten gute Praxisbeispiele vor. Auf Basis der fachlichen Einführung und ihrer eigenen Erfahrungen analysierten die TeilnehmerInnen anschließend in Workshops die aktuelle Situation und Konflikte in Themenbereichen wie dem Zusammenwirken von Technik und Bildung bei Energieeffizienzmaßnahmen, des Mitwirkens der NutzerInnen bei solchen Maßnahmen und des nutzerorientierten Managements energieeffizienter Gebäude.

Diese Dokumentation enthält Zusammenfassungen des Grundsatzreferats, der Einführungsvorträge, der Präsentationen der guten Praxisbeispiele sowie der Arbeitsergebnisse der Workshops. Die ausführlichen Präsentationen finden Sie hier: [www.ufu.de/eurofachtagung](http://www.ufu.de/eurofachtagung).

Da die Konferenzsprache Englisch war, liegen auch alle Teile dieser Dokumentation auf Englisch vor. Zusätzlich stellen wir Ihnen, soweit aktuell vorhanden, auch die deutschen Versionen der Texte zur Verfügung.

Die Konferenz "Klimaschutz durch Energieeffizienz – Nutzerverhalten, Technik und Bildung" wurde mit Unterstützung des Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit (BMUB) durchgeführt.

*Almuth Tharan*

*Unabhängiges Institut für Umweltfragen (UfU) e. V.; [www.ufu.de](http://www.ufu.de)*

*Berlin, 25. Februar 2014*



## Excursion to the Hein-Moeller-School in Lichtenberg district of Berlin

### Conference participants visit a good practice example for the combination of energy efficiency measures and education in a Berlin public building

The Hein-Moeller-School is a vocational training school educating Berlin's future electricians. The school has been cooperating with the Independent Institute for Environmental Issues (UfU) for many years on the initiative of a teacher who is very enthusiastic about energy issues, Mr Peters.

The director of the Hein-Moeller-School and the responsible staff member of the Berlin Building Management Company met the participants of the conference and

showed them round the school campus consisting of four different buildings including a gym, a school yard and four different solar installations.



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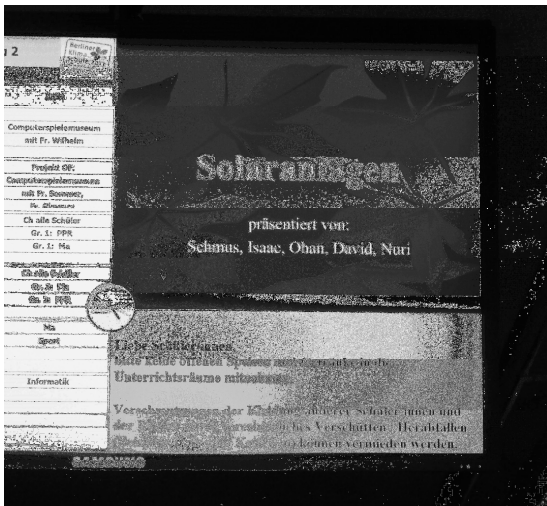


Three of the solar power installations are on the roofs of the buildings. One of them was financed by teachers of the school and is now run by the school club. There are different types of solar panels: thin-layer modules and crystalline modules. As the roof is accessible, they make excellent teaching material: measuring and shading experiments are taking place here. The solar power installation on the roof of another building is a good teaching object as well – but in this case for problems that can occur while building a solar power plant. One row of panels is too near to another row, so there is a shading problem, which was being worked on at the moment.

All solar installations of the school feed the electricity they generate into the general grid. The results of the installations are being monitored and shown regularly at the displays in the main halls of all buildings.

Out of the four buildings on the school campus, three were built more than 25 years ago; the fourth one was erected in 2001 and has a fairly good efficiency standard. One of the old and less efficient buildings was renovated in 2010. Apart from thermal retrofitting including the insulation of the walls and new windows with triple glazing, the building was equipped with a solar





façade, which was designed by an architect for beauty, but not for the maximum energy output as the angles in which the panels were installed are not steep enough.

Generally, the expertise of the building users was not used to the best effects during the renovation of the building, both concerning the solar façade, but also with respect to the electric fittings. But even this has a good side, as the building turned into a training ground for future electricians. So the apprentices optimised the building during the lessons while learning their trade. They installed

motion detectors in the toilets and achieved an energy saving of 65 per cent. They proved this saving by measuring the energy use in the rooms for two months. Apart from that they improved the airing, so that the bad smell disappeared.

The experience of the students will be implemented from the very beginning of the renovation of the third building at the school campus, which started a few weeks ago. This building will be insulated and new windows will be fitted. Due to the lack of financial means, an airing system will not be built. But – as the director says – regular manual airing during class time is sufficient, both for enough



fresh air and for mould-prevention - and user education as well as laboratory experiments with solar panels are part of the school program. The participants of the excursion tried out the experiments at the lab, too.



Finally, we asked for the next energy related project of the student

group around Mr Peters. This will be a small wind power plant in the school yard, which will just have a small energy output and will not be connected to the main grid. But in the tradition of the school, it will be used for experimenting and measuring – and also as energy source for charging mobile phones.



## Dr. Susann Schwarze

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Department for Fundamental Aspects of European Climate and Energy Policy; New Market Mechanisms

### Keynote

## European Energy Efficiency Policy – Role and Current Challenges

Task: to limit climate change, energy cost and the dependence on energy imports and to improve competitiveness

### The EU 2020 Objective

- Indicative EU energy efficiency objective: to save 20% primary energy by 2020 (compared to the prognosis of 2007)
- This is part of the EU energy efficiency directive
- The situation is being reviewed at the moment; a report is due in June/July 2014.
- The EU-energy efficiency guideline will be supplemented with additional measures in case this is necessary to meet the 2020 objective.



### Current challenges

- The implementation of the EU energy efficiency guideline in the EU countries
- What will happen after 2020?: EU Climate and Energy Package 2030
- Current prognosis of the EU commission: 21 % less energy consumption by 2030, but the energy consumption might again grow slightly after 2030
- Shall there be concrete measures or aims or just a climate objective supported by the EU emission trading system?

The position of Germany: The coalition agreement of the German government: *Within the EU, we will support a reduction of at least 40 per cent by 2030 as part of a triad of objectives: the reduction of green-house gasses, the increased use of renewable energies and energy efficiency.*

The position of other EU member states: differ from a climate objective (UK et al) to a triad of objectives similar to the German one (Denmark, France). Poland follows the climate objective only within international agreements.

The position of the EU parliament: three binding aims: to reduce the green-house gas emissions by at least 40 per cent, to improve energy efficiency by 40 per cent and to raise the quota of renewable energies by 30 per cent.

The position of the EU commission: to reduce the green-house gas emissions in the EU by 40 per cent and to raise the quota of renewable energies to 27 per cent. The energy efficiency objectives and measures will be re-formulated after the report on the state of the 2020 objective.

## Dr. Susann Schwarze

Bundesministerium für Umwelt, Naturschutz, Bauen und Reaktorsicherheit (BMUB),  
Referat für Grundsatzfragen der europäischen Klima- und Energiepolitik, Neue  
Marktmechanismen

### Keynote

## Europäische Energieeffizienzpolitik – Rolle und aktuelle Herausforderungen

### Aufgabe:

Begrenzung des Klimawandels, der Energiekosten  
und der Abhängigkeit von Energieimporten sowie  
Schutz der Wettbewerbsfähigkeit

### EU Ziel 2020

- Indikatives EU-Energieeffizienzziel ist die Einsparung von 20% Primärenergie bis 2020 (im Vergleich zur Prognose von 2007)
- Festgeschrieben in der EU-Energieeffizienz-Richtlinie
- Nach Prüfung der Zielerreichung wird im Sommer 2014 ein Bericht vorgelegt.
- Danach bei Bedarf Vorschläge für über die Energieeffizienzrichtlinie hinausgehende Maßnahmen, die das Erreichen des 2020-Ziels sicherstellen sollen.

### Aktuelle Herausforderungen

- Umsetzung der EU-Energieeffizienz-Richtlinie in den EU-Mitgliedstaaten
- Wie geht es nach 2020 weiter?: EU Klima- und Energiepaket 2030
- Aktuelle Prognosen der EU-Kommission: bis 2030 21 Prozent Energieeinsparung, nach 2030 würde der Energieverbrauch sogar wieder leicht steigen
- Soll es konkrete Maßnahmen oder Ziele geben oder nur Klimaziel mit EU-Emissionshandel?

Position der Bundesregierung zu diesem Thema: Koalitionsvertrag: „*Innerhalb der EU setzen wir uns für eine Reduktion um mindestens 40 Prozent bis 2030 als Teil einer Zieltrias aus Treibhausgasreduktion, Ausbau der erneuerbaren Energien und Energieeffizienz ein.*“

Die Positionen anderer EU-Mitgliedstaaten reichen von einem reinen Klimaziel (u.a. GB) bis einer ähnlichen Zieltrias wie Deutschland (DK, F). In Polen Klimaziel nur im Kontext internationaler Abkommen.

Position des Europaparlaments: drei verbindliche Ziele: Treibhausgasemissionen um mindestens 40 Prozent reduzieren, Steigerung der Energieeffizienz um 40 Prozent und Anteil von erneuerbaren Energien um 30 Prozent erhöhen.

Position der EU-Kommission: Reduktion der Treibhausgase in der EU um 40 Prozent, Anteil der erneuerbaren Energien auf 27 Prozent steigern, Formulierung von Energieeffizienzziel und –maßnahmen nach Überprüfung des 2020-Ziels im Sommer 2014





## Malte Schmidthals

Independent Institute for Environmental Issues (UfU)

Introduction:

### **Climate Protection, Investment Measures for Energy Efficiency and Modern Building Services from the Perspective of User Behaviour and Environment Education**

#### Fifty/fifty in Germany:

- 3.500 schools are implementing energy saving projects at the moment (10% of all schools)
- Is the biggest program for environmental education, has been running since 1993, on the European level from 1998 on, since 2009 as EURONET 50/50 (max)
- If 90% of all German schools run such a project, the climate protection potential would be immense: savings of 750.000 t CO<sub>2</sub> and 150 Mio. € annually are possible



The per annum saving potential of an average school: 4-15%, behaviour change alone saves about 4%, larger savings are possible, if behaviour change is combined with the proper management of the technical facilities

#### Implementation of efficiency oriented technology:

- In the last 15 years: single room control, remote control of heating systems, motion detectors, measuring the light to control artificial lighting
- In the last few years: airing systems, heat recovery systems, passive house schools
  - New challenges for users
  - New sources of errors in technology and behaviour

Aim of the conference: to find ways to develop an effective link between energetic renovation/energy efficient building and user education and motivation

- Essential to achieve: a cooperation between the until now separate "scenes": fifty/fifty – user behaviour educators and the staff responsible for the technical efficiency of the building

#### Problem Inventory - Users of energy efficient buildings

New sources of problems: disturbing noises, cold draught or bad air, excessive or too low air pressure, failure to meet the efficiency aim

Complicated technology: nobody at the building can solve the problems, thus "self-help measures" are implemented, e.g. the blocking of airing canals, often causing the escalation of problems in the system



Building users are not taken seriously: in many cases, the users are even seen as disturbing factors

Higher demands on user behaviour and incapacitation of the users at the same time: Building automation causes high expectations and irresponsible behaviour

But building users are complicated indeed!

The interest in selling a system conflicts with honesty: New technology and renovation measures create new and different problems, the necessity to adjust and fine-tune the system is not mentioned or even neglected by planners or builders.

User participation in planning measures: Who should be involved in the planning process and at what point? Different requirements on rooms and the needs of different user groups have to be taken into account

User participation in education centres – three possible ways

- User education and technology are combined (as in a classical fifty/fifty-project)
- Education and technology are separated (made by completely different players)
- In cooperation: separate, but coordinated approaches, different or same players

User participation in non-school buildings – special aspects in approaching adults:

- Low motivation
- Technology versus do-it-yourself: comfort and loss of autonomy
- High expectations and conflicts because of „other things to do“ and the promises of technology

## Theses

It is important to take the building users seriously – but you have to take the „maximum stupid user“ into account as well, users and planners have different time dimensions that have to be considered, the demands and expectations of the builders have to be communicated at an early stage, honesty is essential

User participation throughout the process is helpful: user participation should start early, but belated user interest should be accepted, too; user information should be easily understandable and comprehensive, participation in the decision making improves the acceptance

The installed systems should be fault tolerant:

1. Opening the windows should not disturb the system
2. Wrong user behaviour in one room should not disturb the system on the whole
3. Rather low-tech solutions should be preferred, as understandable systems are less softly handled in the wrong way and are easier to repair
4. De-central systems should be preferred unless this creates demands on the abilities of too many users

Einführungsvortrag:

**Klimaschutz, energetische Sanierung und moderne Gebäudetechnik  
Nutzersicht und Nutzermotivation**

Fifty/fifty in Deutschland

- ca. 3.500 Schulen nehmen derzeit teil (10% aller Schulen)
- Größtes umweltpädagogisches Programm, seit 1993 aktiv, seit 1998 auch immer wieder auf europäischer Ebene, seit 2009 EURONET 50/50 (max)
- Klimaschutzpotential, wenn 90 % der deutschen Schulen teilnehmen würden: Einsparungen von 750.000 t CO<sub>2</sub> und 150 Mio. € jährlich



Jährliches Sparpotenzial für eine mittlere Schule: Einsparungen von ca. 4-15 %, bewusstes Alltagsverhalten allein spart ca. 4%, größere Einsparungen durch richtige Technik-Nutzung

Einführung von Effizienztechnik

- Seit 15 Jahren: Einzelraumregelung, Fernsteuerung der Heizanlage, Bewegungsmelder, Helligkeitsmessung zur Lichtsteuerung
- In den letzten Jahren: Lüftungsanlagen, Wärmerückgewinnung, Passivhausschulen
  - Höhere Anforderungen an die Nutzer
  - Neue Fehlerquellen (Technik und Verhalten)

Ziel der Tagung: Wirksame Verbindung von energetischer Sanierung bzw. energieeffizientem Neubau mit Bildungsarbeit und Nutzermotivation

- Dafür notwendig: Kooperation der bisher getrennten „Szenen“ Fifty/fifty – Nutzerverhalten und technische Gebäudeeffizienz

Problemaufriss: NutzerInnen in energieeffizienten Gebäuden

Störungen durch neue Fehlerquellen: Störgeräusche, Zugluft oder schlechte Luft, zu kalt – zu warm, Unter-/Überdruck, energetische Ziele werden nicht erreicht

Komplizierte Technik: An der Einrichtung kann niemand helfen, deshalb „Selbsthilfe“, z.B. das Verkleben von Belüftungskanälen, dadurch Aufschaukeln der Fehlfunktionen



Nutzer werden nicht ernst genommen: Nutzer werden als "Störfaktor" angesehen

Höhere Anforderungen an Nutzer bei gleichzeitiger Entmündigung: Automatisierung weckt Erwartungshaltung und „Nicht-Verantwortlichkeit“

Aber auch: NutzerInnen sind tatsächlich kompliziert!

Verkaufsinteresse verhindert Ehrlichkeit: Neue Technik und Sanierungsmaßnahmen bringen neue/andere Probleme, Notwendigkeit des Einregeln von Gebäuden wird von Seiten von Planern und Anbietern verschwiegen oder sogar praktisch vernachlässigt

Nutzerbeteiligung bei der Planung: Wen wann einbeziehen? Unterschiedliche Ansprüche an Räume einplanen, verschiedene Nutzergruppen berücksichtigen

Nutzeransprache in Bildungseinrichtungen - Drei mögliche Wege:

- Nutzerschulung und Technik gemeinsam angehen (klassisch bei fifty/fifty)
- Bildung und Technik trennen (z.B. komplett voneinander unabhängige Akteure)
- In Kooperation: getrennte Termine, z.T. unterschiedliche Akteure

Nutzeransprache bei Nicht-Schulen - Spezielle Aspekte bei der Ansprache von Erwachsenen:

- Motivationsprobleme,
- Technik statt Selbermachen: Komfort und Autonomieverlust
- Erwartungshaltung wegen „anderer Aufgaben“ und Technikversprechen

## Thesen

NutzerInnen ernst nehmen - aber gleichzeitig an den "dümmsten anzunehmenden Nutzer" denken, Umgang mit unterschiedlichen Zeitdimensionen von Nutzern und Planern, Notwendigkeiten und Erwartungen der Bauträger frühzeitig kommunizieren, ehrlicher Umgang

Durchgehende Nutzer-Einbeziehung: Frühzeitige Einbeziehung in die Planung, aber auch verspätetes Engagement akzeptieren, leicht verständliche und dennoch ausführliche Information, Einbeziehung in Entscheidungen

Fehlertolerante Systeme sind erforderlich:

1. Fenster öffnen darf nicht stören
2. Falsches Verhalten in einem Raum darf das System nicht insgesamt schädigen
3. eher Lowtech, denn verstehbare Systeme werden seltener falsch bedient und sind meist leichter zu reparieren
4. eher dezentral (Ausnahme: wenn dadurch an zu viele NutzerInnen Anforderungen gestellt werden)



**Jens Kothe**

SPIE Energy Solutions GmbH

Introductory speech:

## **The role of user behaviour for the success of investment measures for energy efficiency**

SPIE has experience in energy saving contracting in public buildings in Berlin: 120 schools, 20 kindergardens, 50 non-educational public buildings, 4 hospitals, and 2 retirement homes

The problem all buildings have in common: They are public buildings with a high energy consumption, high cost and high CO<sub>2</sub> emissions

Many technological and organisational energy saving measures are not implemented, because the administration responsible for the building

- Does not have enough money,
- Does not have time for planning, implementation and maintenance,
- Does not have enough competent staff,
- Does not have enough motivated staff.

In the last 20 years, there are two new approaches for solutions:

- Energy saving contracts (many investment measures, little user motivation)
- User motivation (much user motivation, little investment measures)

Common incentive: Motivation by getting a share of the financial savings achieved by energy saving.

### The huge influence of the "mediators" (caretakers)

The users of buildings are numerous and they are changing rather quickly and frequently. The "mediators" are few; they stay for a longer time and have a great influence.

A caretaker who is supporting the energy saving aims

- Reports destroyed or stolen thermostat valves, closes open windows and doors, switches off unnecessary lights, approaches teachers and students, when they behave in an energetically bad way. In case of complaints about too low temperatures, he measures the temperatures first and fights off unjustified complaints.

A caretaker who does not support the energy saving aims does more or less the opposite.



### How do the contractors see user motivation?

- Generally, it is known and accepted that user motivation can generate additional savings – but there is no proven knowledge about the cost-benefit-ratio and this ratio is the 90% criterion of all our measures, which is our task.
  - User motivation requires little financial investment, but a large investment of time. Most contracting enterprises employ highly paid engineers who are too expensive to do user motivation. Of course, user motivation measures can be sourced out, but in this case there is no personal contact between the staff of the contractor and the building users. This is a bad thing, because information is getting lost in both directions.
  - In user motivation, the human factor plays an important role: It does not only matter, which information is handed on, but also whether the person receiving the information likes the person giving the information.
- These are the reasons why energy contracting firms rarely do “complete user motivation”.

### Contracting is better for energy saving, because

- The potential energy saving of 20 to 30% is considerably higher than in user motivation projects
- The energy saving success does not decrease for a long time as the typical contracting agreement covers twelve years

### User motivation is better, because

- Energy saving potential can be mobilised that cannot be mobilised otherways
- User motivation has effects outside the building itself: What students learn at school, they learn for life and – if it goes really well – they take it home as well (“Daddy, you should not always leave the light on in the corridor, this is bad for the environment”)

### If you did both things together, the results would be even better!

- The precondition is: The administration responsible for the building gives up its 50% share of the energy saving success to protect the 50% motivation of school and students.
- Another possible model could be: A contracting agreement according to which the savings will be divided between the building owner and the contractor in the first three years after the implementation of the technical measures. After that, the savings will be divided between the building owner, the contractor and the building users.

**Jens Kothe**

SPIE Energy Solutions GmbH

Einführungsvortrag:

## **Bedeutung des Nutzerverhaltens für den Erfolg energieeffizienter Gebäude – aus technischer Sicht**

SPIE hat Erfahrungen mit Energieeinspar-Contracting in öffentlichen Gebäuden in Berlin: ca. 120 Schulen, ca. 20 Kitas, ca. 50 Verwaltungsgebäude, 4 Krankenhäuser, 2 Seniorenwohnheime

Gemeinsame Problemstellung bei den Gebäuden:  
Öffentliche Gebäude mit hohen Energieverbräuchen, hohen Kosten, hohen CO<sub>2</sub>-Emissionen

Viele technische und organisatorische Energiesparmaßnahmen werden nicht umgesetzt, weil die zuständige Bauverwaltung

- kein Geld hat,
- keine Zeit für Planung, Umsetzung und Nachbetreuung hat,
- keine ausreichend kompetenten Mitarbeiter hat,
- keine ausreichend motivierten Mitarbeiter hat.

Zwei neue Lösungsansätze in den letzten 20 Jahren:

- Energieeinspar-Contracting (viele investive Maßnahmen, wenig Nutzer-motivation)
- Nutzermotivation (viel Nutzermotivation, wenige investive Maßnahmen)

Gemeinsamer Anreiz: Motivation durch Beteiligung an der tatsächlich erzielten Energiekosten-Einsparung.

### Der große Einfluss der „Mittler“ (Hausmeister)

Die Nutzer vor Ort sind sehr viele und wechseln über die Jahre.

Die Mittler sind wenige, sie bleiben länger in ihrer Rolle und haben großen Einfluss.

Ein Hausmeister, der die Energieeinsparziele aktiv unterstützt

- meldet demolierte oder gestohlene Thermostatventile, schließt offen stehende Fenster und Türen, schaltet unnötig brennendes Licht aus, spricht Lehrer und Schüler an, wenn diese sich energetisch schädlich verhalten, misst bei Beschwerden erst mal die Raumtemperatur, prüft, ob die Fenster geschlossen sind und „wimmelt Beschwerden ab“, wenn sie unberechtigt sind.

Ein Hausmeister, der die Energiesparziele nicht unterstützt, tut das Gegenteil.



## Beurteilung der Nutzermotivation aus Sicht der Kontraktoren

- Tendenziell ist durchaus bekannt und bewusst, dass Nutzermotivation zusätzliche Einsparerfolge bewirken kann. Es gibt aber keine Erfahrungen über das Kosten-Nutzen-Verhältnis und danach beurteilen wir mindestens 90% unserer Maßnahmen – das ist schließlich unsere Aufgabe.
- Nutzermotivation benötigt wenig investiertes Geld, aber viel investierte Zeit. Die meisten Kontraktoren beschäftigen gut bezahlte Ingenieure, die für Nutzermotivation in der Regel zu teuer sind. Natürlich können die Maßnahmen zur Nutzermotivation extern vergeben werden, dann werden aber keine persönlichen Kontakte zwischen den Mitarbeitern des Kontraktors und den Nutzern geschlossen. Dies ist schlecht, weil so Informationen in beide Richtungen verloren gehen.
- Bei Nutzermotivation menschelt es: Es kommt nicht nur darauf an, welche Information weitergegeben werden, sondern auch ob der Informationsgeber dem Informationsempfänger sympathisch ist.

→ Daher machen Kontraktoren wenig „komplette Nutzermotivation“.

## Energieeinspar-Contracting ist besser, weil

- die Einsparpotentiale mit oft 20 bis 30% höher sind, als bei Maßnahmen zur Nutzermotivation
- die Einsparung über mehrere Jahre hinweg nicht abnimmt, da die typische Vertragslaufzeit im Energieeinspar-Contracting 12 Jahre beträgt

## Nutzermotivation ist besser, weil

- Potentiale gehoben werden, die die Technik alleine nicht heben kann
- Nutzermotivation viel weiter wirkt: Was die Schüler in der Schule lernen, lernen sie fürs Leben und tragen es im besten Falle nach Hause („Papa, Du sollst nicht immer das Licht im Flur anlassen, das ist schlecht für die Umwelt.“)

## Beides zusammen wäre aber noch viel besser!

- Voraussetzung: Die Bauverwaltung verzichtet auf ihren 50%-Anteil an der Energiekosteneinsparung, damit Schule und Schüler sowie der Kontraktor ihre „50%-Motivation“ behalten.
- Denkbar wäre auch ein Modell bei dem in den ersten 3 Jahren nach Umsetzung der technischen Maßnahmen die Energiekosten nur zwischen Auftraggeber und Kontraktor geteilt werden und anschließend zu je einem Drittel zwischen Auftraggeber, Kontraktor und Schule/Schüler geteilt wird.



## Bettina Baron

e&u energiebüro gmbh

Good Practice Example:

### **Saving Energy and Costs through Appropriate User Behavior An Example from Gelsenkirchen, Germany**

#### User-Oriented Energy-Conservation Projects

- 295 schools in 22 cities since 1997
- 51 day care centers in 7 cities since 1998
- 37 administrative buildings in 9 cities since 2001
- Other activities with retirement homes and churches



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Energy conversation in the municipal administration of Gelsenkirchen: several participating properties in Gelsenkirchen in three phases since 2003

Contractual Foundations: secured financial benefits for motivation, long-term commitment, one fixed base line year, energy use for heating is adjusted for the specific weather conditions of the year, every property will be evaluated separately, user-oriented concept, savings will be reinvested

The project depends on its success: The project funds itself through savings.

Motivation (15%): 14.622,30

Re-investment (40%): 38.992,80

General city budget (15%): 14.622,30

Compensation (30%)

#### Approach

##### Technical goal:

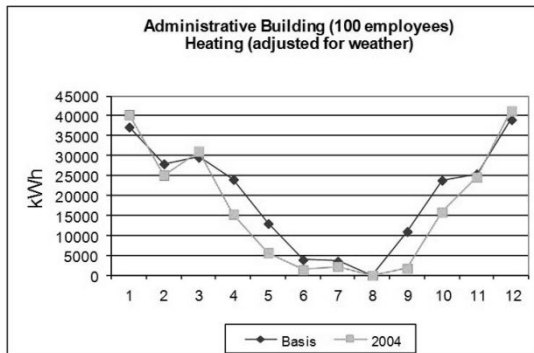
- Optimize facilities for achieving savings
  - Targets: building operators; facilities staff
  - Strategies: building audits, review of energy use, building analysis

##### Behavior-oriented goal:

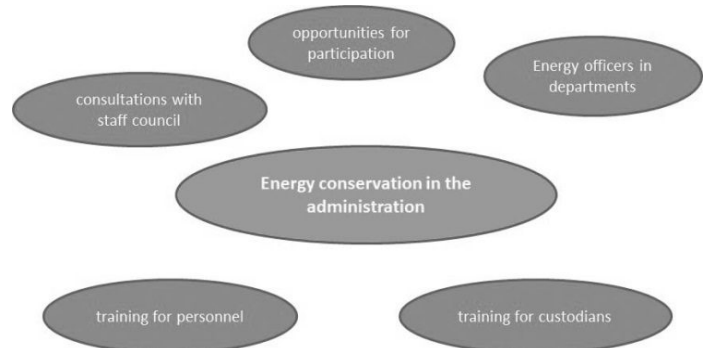
- Users accept optimization and support it through their actions
  - Targets: employees, administrators, staff council
  - Strategies: activities, monthly tips, exhibit



## Documenting Heating Use



## Engage the Users



## Marketing for Climate Change Awareness

### Regular activities:

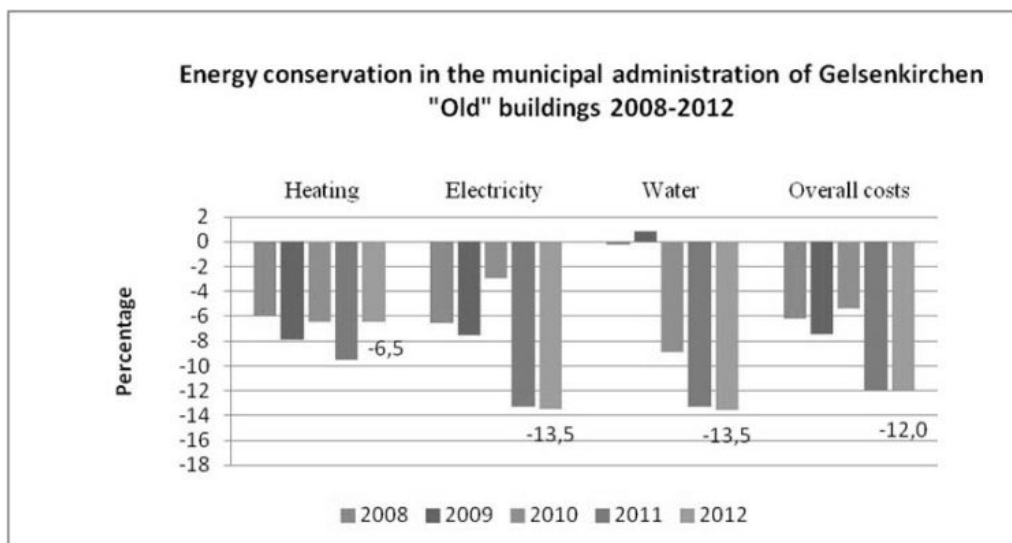
- monthly tips via email
- annual meetings of energy officers
- evaluation and awards via quizzes
- coordination meeting with project leadership

### Special activities:

- 2 building inspections
- ongoing temperature measurements
- employee surveys
- electricity analyses
- loan programs for measurement instruments
- Exhibit Energy conservation in the office,
- Activity "ENTspannung"

**Motivation:** Participation in the quiz, Activity Week – Electricity Conservation (Part of the project for energy conservation in the municipal administration of Gelsenkirchen)

## Results 2012



## **Pau Aguiló**

DIBA Barcelona, Environmental department

### **Good Practice Example:**

### **How did the Province of Barcelona come to energy saving projects at schools?**

Analysing the energy use of the Province of Barcelona, the provincial council came to the result that public buildings used for education – mainly schools and kindergartens - accounted for 18% of the annual energy cost of the municipalities (1,269,499€). A study conducted in public schools and private schools in 2004 -2005 showed that private schools spent 31.40€/student-year and public schools spent 62.31€/student-year. An energy audit case study developed the working hypothesis that 30% of over-consumption could be generated by improper management. This and the fact that there was zero investment capacity to solve management and/or structural problems of the buildings was the reason, why DIBA decided to work with the 50/50 methodology – as actions based on behavioural changes by building users require almost no investment. The 50/50 financial incentive for building users and administration serves as additional motivation.



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The first European 50/50 project, EURONET 50/50, which was coordinated by DIBA, showed good results:

- 58 schools from 9 countries took part.
- 6,900 students, teachers, and 43 municipalities working together to tackle climate change.
- 40 (70%) of the schools achieved energy savings.
- 339 tones less greenhouse gases emitted into the atmosphere!
- More than 1,100 MWh not consumed!!
- 2,100 € saved per school!!!
- Creation of the European network of schools 50/50 (193 members)



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Therefore, DIBA decided to initiate the roll-out project EURONET 50/50 max with 15 partners from 13 EU-countries. 500 schools will implement the 50/50 methodology - and 50 non-school public buildings as well, 10 of them in Barcelona province: 5 sports centres, 1 soccer field, 1 kindergarten, 1 municipal pool, 1 civic centre and 1 centre of economic development. Additionally, 50/50 is to be incorporated into national/regional/local strategies in all partner countries.



DIBAs conclusions from its 50/50 experience is that

- The clear and simple methodology offers the possibility to obtain great results.
- The 50/50 concept invites everybody to rethink their relation with the spaces they are using.
- The energy team is the key to the success.

The mission of the environment department of Barcelona Provincial Council (DIBA) is to contribute to the development of policies for the reduction of air, water and noise pollution and to generate a new energy culture that incorporates energy efficiency and energy conservation as a core value.

DIBA is the Coordinator of Euronet 50/50 Max.



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## Patrycja Płonka

Association of Municipalities Polish Network „Energie Cités” PNEC  
Project Manager,

Good Practice example:

### The implementation of 50/50 in municipalities and schools in Poland

Patrycja Płonka: described the role and the work of PNEC as an organisation of Polish municipalities with members in all parts of the country in the implementation of the European projects EURONET 50/50 and EURONET 50/50 max.

Apart from implementing the 9-step methodology of 50/50 projects developed in Euronet 50/50, PNEC developed some additional tools for the participating schools, students and municipalities:

- National workshops for municipalities
- Additional material and tools for the education pack of the project such as measuring devices and other useful things as educational movies and games
- Energy audits & certificates were provided
- Promotional displays for participating schools
- Diplomas & t-shirts for energy teams
- 2nd year celebrations to promote the project in 1st second year
- Promotion of schools' activities and achievements on the PNEC website, in the press and at different events

Benefits from the implementation of 50/50 methodology in Polish schools:

- raising energy awareness of pupils & teachers and changing their behaviours towards more rational use of energy and other resources;
- moving environmentally-friendly behaviours from school to pupils' homes;
- obtaining additional funds by and for the school;
- reducing expenses by local authorities covering the schools' energy bills;
- improvement of the quality of the local environment and contributing to the global fight against climate change;
- joining learning with good fun!



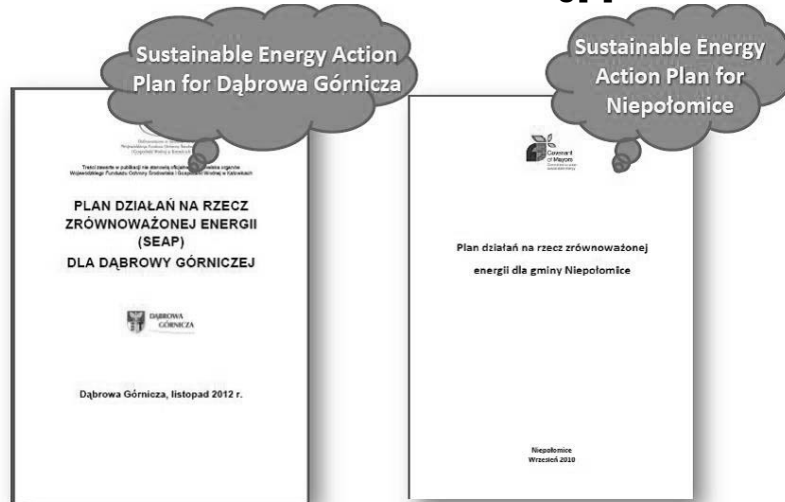


Additional benefit:  
City halls award the most active schools with thermal retrofitting of their buildings.

<= Before      After =>



Additional benefit - 50/50 in local energy policies!



Results of Euronet 50/50 at the 11 Polish schools in EURONET 50/50:

#### First year

Average savings in %\*: 6,1%  
Total energy savings in kWh:  
260 571,9 kWh

#### Second year

Average savings in %\*: 6,9%  
Total energy savings in kWh:  
249 861,4 kWh

EURONET 50/50 MAX - continuation of a successful initiative in 13 EU-countries!

- 500 schools and nearly 50 other public buildings join the 50/50 network and apply energy saving measures in 13 EU-countries - including 100 schools and 10 other buildings from Poland!
- Minimum energy savings achieved in each building involved reach 8%
- New methodological and educational materials and tools are developed
- The 50/50 concept is widely disseminated on the national, regional and local levels



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**Anthi Charalambous,**  
Cyprus Energy Agency (CEA), Director

**Good Practice Example:**  
**Energy saving, energy efficiency and climate protection in public buildings**

The reason why the Cyprus Energy Agency decided to focus public buildings

- They are large energy consumers, due to size, typology, the number of users and the lack of sufficient investment in energy renovation.
- Public buildings are often old constructions and sometimes characterized as historical buildings and limited measures can be applied.
- Public authorities also have a key role in leading by example.
- Promoting and rewarding efficient energy consumption in public buildings can have an effect in changing behaviour among users but also the citizens.
- Public authorities face the challenge of identifying funding for large scale investments and justifying up-front costs by showing the value of future savings in a perspective of sustainable economic growth.



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Three main examples for thermal retrofitting of public buildings done by CEA were:

Case I: Strovolos Municipal Library  
Historical building from 1910: no major changes could take place regarding the original materials and shape.



The major works were related with wall and roof insulation, installation of energy efficient heating/cooling system (geothermal heat pumps), lighting and glazing. Double glazing on north and east sides, laminated glazing on west side. The walls remained indoor and outdoor limestone, but the internal wall was insulated with polyurethane foam. A solar chimney was built for preheating the air.

Measures regarding user behaviour: Training of the Municipality Staff on energy saving in offices and the importance of the behaviour of the users



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### Case II: New Nicosia Town Hall

Measures implemented: Thermal insulation (stone wool), double glazing, solar shading, increase in thermal mass, optimal dimensioning of openings for passive lighting, heating, solar protection, 70% of natural light autonomy and high efficiency artificial lighting, opening design for optimal night ventilation (summer passive cooling), night ventilation, use of ceiling fans, 100% solar hot water.

Behaviour/user manual: The municipality and the energy engineer of the project prepared and distributed the user manual and provided the appropriate training for the users.

The results are really encouraging as the total consumption is what was calculated in the preparatory studies.



### Case III: Geroskipou Olympic Swimming Centre

The water temperature in the pool must be 27°C during winter period (October to April). The consequent energy needs are 1.500.000 ~ 1.800.000 kWh/year. Resulting to a consumption of 130 ~ 150tn of heating oil. The cost for this is 130.000- 150.000€!!!

Measures implemented: a geothermal heat pumps (GHPs) system, a pilot desalination unit based on the utilisation of the solar thermal energy which was used by the desalinator (evaporation-condensation type). The entire system works on 100 square meters of high performance solar collectors and is used for heating the water, too.

Case IV: The new building of the Ministry of Agriculture in Limassol can be reviewed in the full presentation.

### CEA working with schools

The Cyprus Energy Agency is a partner in the EURONET 50/50 max project that is co-financed by the Intelligent Energy Europe Programme. In Cyprus the EURONET 50/50 methodology will be transferred to 10 schools. From past projects, however, CEA already has a lot of experience working with schools including educational presentations, energy days, information days and other activities with school students at more than 200 schools of all educational levels which informed more than 24.000 students and 2.000 teachers.



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## Janus Hendrichsen

NGO RE Denmark, Energy Service Denmark, Local Department Manager, School Teacher, Energy Advisor

### Good Practice Example:

## Energy audits in multi-user buildings - Communication and engineering in interaction

Background: EU 20/20/20, Municipalities have reached up to 30% reduction in consumption, Citizens need to be more engaged, The transport issue!, New trends: energy costs ARE relevant. My assessment: climate is only important to those that are already saving energy



### The scene

- 99% of all service/maintenance personnel have never seen the energy label of the building
- Service personnel are not used to making presentations
- Municipal technical departments often don't know about daily operations in each particular building
- Municipal technical department staff are mainly engineers
- Typical conflicts: Criticism towards performance: "who are you to tell me what to do?"
- Building renovation projects are often designed without consulting the service personnel, but they have to deal with the practical solutions to the problems afterwards
- The introduction of the building performance after renovation: instructing how users should act differently is left to people with no conflict management skills

### Energy label characteristics

- "Do now part" – typical targetting efforts with high investment return
- "Do when renovating" – typical efforts with long time investment return
- No focus on comfort
- Little focus on electricity – more on heat
- Written in a predefined standard with more focus on precision than communication

### Method

- Reading energy label and consumption data before visit
- Initial meeting with manager/staff
- Tour in selected areas of the buildings
- Summary of results
- Decisions about recommendations

### Typical findings

- CTS and ventilation systems often poorly regulated
- Who has the right to set standards?
- Management more interested in budgets, than staff
- Staff and user groups don't always understand the consequences of their actions
- Even though an initiative may have high investment return, it may still not be carried out
- Even when renovating, simple efforts to introduce minimum insulation standards are not carried out
- Budgets for investments demand less than 10 y return
- Problems with technical installations are not connected to high heat loss
- Budgets for renovation often not connected to energy consumption

### Results

- Giving maintenance staff a central role increases their significance among other staff groups
- External advice sparks behavioural changes
- Municipal technical depts often listen when external consultants point to obvious savings
- Politicians are often more easily persuaded, and will become more interested in the results, if they have ownership to the idea of audits
- Don't produce what is already there
- Don't provide too much information
- Prioritize your recommendations
- Relate to your experiences – don't just go by the book
- Get personal: share your opinion on what, how and why
- Remember all elements: comfort, maintenance and savings when calculating investment return
- Only RE active installations are often not related to the building operation

### Conclusions

Good advice is only good if someone carries it out in action

Therefore:

- Sell the idea
- Convince the right people
- Provide the others with the right arguments
- Money, money, money.....

## Results of Workshop 1

Hartmut Oswald

### The combination of technical measures with education on climate protection in 50/50 projects

#### Discussion on lighting

Reasons for excessive and thus energy wasting lighting are:

- Planning mistakes
- The highest possible demand on lighting as main criterion for the planning (the same light as in the arts cabinet for all class rooms)
- More efficient new lamps whereas the number and the energy consumption of the lamps remaining the same
- Lighter colours in the room than before or than estimated just in case

When to get rid of superfluous lighting?

- If the lighting exceeds the standard by a large margin (50% or 100%)

Measuring should be carried out, also to communicate the opportunity of combining artificial and natural light → the marking of light switches is helpful.



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#### Discussion on the duration of fifty/fifty-projects

As a project of regional school administration and working with an external educator fifty/fifty projects should be designed for a longer period of time, if necessary with intermediate tendering.

In the individual school, the project should run for not less than three years. The longer the project is running, the less extensive the external support will be.

Depending on the situation of the school, the external support can be suspended for some time or be carried out with less use of resources (for renewal of the activities or control).

In any case, the project should strive to reach pedagogic aims that exceed the mere energy saving.

#### Visit of the heating system of the conference venue



This was done as a practical example for the technical part of an energy tour in an energy saving project

Learning about the existing heating system:

- Source of energy, burner, condensing boiler?
- Heating circuits, supply and return temperature, warm water supply, expansion tank

## Ergebnisse Workshop 1

Hartmut Oswald

### Verbindung von technischen Maßnahmen mit Klimaschutzbildung in fifty/fifty-Projekten

#### Diskussion zu Beleuchtung

Gründe für zu starke, d.h. energieverwendende Beleuchtung

- Falsche Planung,
- Planung orientiert sich an den höchst-möglichen Forderungen (Kunstraum etc.) auch in „normalen“ Unterrichtsräumen
- Bessere Effizienz neuer Lampen bei gleichbleibender Leuchten- und Wattzahl
- Hellere Raumbofläche als früher oder als sicherheitshalber angenommen

Wann überflüssige Beleuchtung herausnehmen?

- Bei starkem überschreiten der geforderten Beleuchtungsstärke (möglicherweise ab 50%, sonst erst ab 100% Überschreitung)

Messungen auch zur Vermittlung von Kombination Tages- und Kunstlicht durchführen → Markierung der Lichtschalter



#### Diskussion der Dauer von fifty/fifty-Projekten

Als Gesamtprojekt bei einem Schulträger und ggf. als Auftrag an einen Dienstleister sollte das Projekt auf Dauer angelegt sein (mit entsprechenden Zwischenausschreibungen).

Bei der einzelnen Schule sollte eine Betreuung nicht unter drei Jahren stattfinden, wobei bei längerer Betreuung die Intensität abnehmen wird.

Je nach Schule kann im Einzelfall später die Betreuung für ein oder zwei Jahre ausgesetzt, bzw. nur mit wenig Aufwand (Erinnerung, Kontrolle) umgesetzt werden.

In jedem Fall sollten pädagogische Ziele gesetzt werden, die über das reine Energiesparen hinausgehen.

#### Besuch des Heizkellers des Tagungsortes



Als praktisches Beispiel für den „technischen Teil“ eines Energierundgangs  
Erklärung der gefundenen Bauteile/  
Funktionalitäten:

- Energieträger, Kessel, Brenner, Brennwert-Kessel
- Heizkreise, Vorlauf-, Rücklauftemperaturen, Warmwasserbereitung, Ausdehnungsgefäß usw.



## Results of Workshop 2

Almuth Tharan

### User participation in renovation and reconstruction



The participants of the workshop came both from a teaching as well as a planning background plus some from different backgrounds who were just interested in the topic.

In an intensive discussion process, the participants of the workshop developed a procedure how a renovation/reconstruction projects can be carried out in a participative and effective way.

	Step
1.	The administration responsible for the building/the planners give a first information before the actual planning starts, Transparent preliminary schedule of planning/implementation steps should be communicated. A contact person for all questions regarding the project should be named.
2.	Planner comes to the building and experiences the building in standard operation before renovation
3.	All building users formulate their interests and define the interests they have in common A "core team" - preferably made up from representatives of the different user groups – takes over the task of formulating and prioritising the interests and the communication into the user groups – which should be integrated into the everyday life at the building (e.g. of a school, where aspects of the measure could be integrated into teaching
4.	The planners should name examples, where similar measures were implemented, so that building users can have a look or talk to the users of that building
5.	The planners make a draft planning and explain it to the core team in a way the group members can understand
6.	The core team discusses the draft planning and consult the user groups of the building if necessary. They formulate questions and hints that have to be communicated to the planners
7.	After the communication with the core team, the planners make the final planning, on which tenders are based.
8.	At this stage at the latest, the planner should make a concept for user training. In case of a large measure, the first room that is ready could be used as a training room.

	Step
9.	Test run of the building during/after the measure – monitoring to be done together with core team.
10.	Fine-tuning of the building management
11.	To secure the lasting effect of the user training, a handbook for using the building should be made in cooperation between the planners/the administration responsible for the building und the core team.
12.	The leading body of the building users should make a plan on how to maintain the knowledge about using the building for the future years.

As some of the steps described above require resources, mainly working time, the workshop participants discussed, how these can be "organised".

The issue of working hour reductions for teachers was raised – these could be granted or not – however, accompanying a renovation measure will always be work that feels like "additional" – therefore it should be integrated as much as possible into the every-day life in the building.

User participation and to a certain extent user training could be part of the tasks described in a tender – also on the background of the experience that not having any resources going into participation often looks economical at the beginning. But it turns out not to be economical at all, when users intervene when the measure is running or when they do not use the building appropriately after the measure is finished.



User participation should be seen as an essential part of the building measure.

A large majority of the workshop participants underlined that to make a renovation/construction measure with the participation as described above or any other meaningful participation steps, a political impetus from the relevant administration or the municipal political level is essential.

## Results of Workshop 3

Florian Kliche, Dino Laufer

### Energy saving user behaviour in energy efficient buildings

#### Incentive structures - Different incentives needed

- For teacher: reduction of "teaching hours"
- Incentives for the care taker/ technical officer?
- For pupils: (50/50)

#### User participation as resource

- A participatory planning process improves the identification of the users with the building
- Integration of the users should start before the implementation of a measure



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#### Awareness building

- „Upgrade“ of the position of the caretaker
- "Consciousness" + "Responsibility" are important concepts for all players
- Quiz and other activity oriented elements are helpful for the development of a new awareness
- Educational training of teachers – at universities and in further education

#### Experience, Activities

- Certified training for technical staff
- With the new start in the renovated building, training is necessary
- Training of "school teams"
- Integration of CO<sub>2</sub> measurement in training and everyday life
- Excursions to good practice examples



#### Barriers

- Opening the whole window to ensure proper airing is often seen as a security problem for the school and the children
- Energy projects come "on top" of all other tasks
- Energy saving measures can be too cost-intensive
- Flexibility of the projects is necessary in order to integrate them meaningfully into the everyday educational work
- Fragmented responsibilities for planning, building, management and education on the responsible administrative level
- In many cases a driving force is needed to keep up the attention and the project!

## Results of Workshop 4

Bettina Baron, Heike Müller

### Motivation of adult building users for climate protection and energy saving

The members of this workshop had a very interesting discussion, starting with a little input about the question: "What motivates us as adults?"

After that, the moderators asked the participants what they would do to put people off energy saving? To this interesting question the participants found answers like: energy saving causes cancer or "just do nothing".

After that the workshop members changed their stance and looked from the other side: What does work in motivating adults? Which incentives are positive, what makes people take actions?

Some brief conclusions of the answers:

- It is important to have reliable short background information about climate change, so that people believe you. Because there is much confusion about climate change in the public reporting.
- Many people say that energy saving is very important but they don't do it. There is a gap between thinking and speaking and acting.

So, how can we get people to act?

- It is very important to do concrete things to show and provide information that people can change their behaviour (for example at work)
- It is a good motivation to work together and to have fun doing things together
- Mistrust for example against the management of a building should be avoided or resolved (mistrust could be: "We don't know how much energy we use. Are the figures correct or not?")
- Controlling the energy use and information of the users are very important
- The managerial staff communicating the project should be friendly, so their messages will be heard and accepted by all staff members
- A connection between "my way to spend energy" and the energy costs (topic of



- controlling) has to be made
- It is important to check out the buildings to know at what points energy saving can be useful and which are the potentials
- Awards can be given
- Competitions can be made

But the question that is still open is: How can we really reach a change of the mind-set of people?

## Results of Workshop 5

Uwe ter Vehn, Meike Rathgeber

### Energetically highly efficient school and administration building

#### Problem inventory - the way it is:

- More highly efficient administration buildings
- School renovation with too much technology and different standards re. building, technology and usage
- Unsuitable usage: heating from above in a room for toddlers. If you have a stone floor there, fan heaters will be used
- Leaky doors in kindergartens after three months of usage due to sand being brought in
- High CO<sub>2</sub> concentration is bad for learning
- Too much high tech: the users can't cope and too much maintenance is needed
- The airing system is often run at a fixed setting and not according to the needs of the users, it is running all the time, the users get annoyed by the noise
- Single room control for temperature and CO<sub>2</sub> too expensive, calibration necessary
- Controls are set to incorrect figures - handling, planning and building mistakes
- The users want to do something themselves, therefore low acceptance of automation
- Geothermics often do not work because of air in the system
- Less caretakers and less well-trained ones
- No proper documentation, but a chaotic collection of irrelevant information
- Much technology means many contact persons from different crafts
- The airing system lobby is pressing hard



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#### Course of action – examples

- Important: there is no point in investment if the correct running of the system and the necessary maintenance is not guaranteed
- The general analysis often is: „The users are to blame. The technicians are innocent“
- The users usually have an excellent knowledge of the problems.
- Control of consumption figures and action, if they are much higher than planned
- Aim: fresh air in and no warmth out, the desired temperature and no glaring light

#### Perspectives - what should happen?

- focus on the running of a system, NOT the planning or the building
- More and better trained caretakers
- The error list should be worked off meticulously -> intensive maintenance
- More technology requires more staff
- Form a technology team from the users
- User participation saves time and money,
- Increase the acceptance of the technology; train users first, build after that
- The building should be paid from one budget, the actual running from another (renovation manager)
- If there is NO saving in the first years, invest in advice and training
- See the bigger picture & cooperate with planners, builders and building managers



## Ergebnisse Workshop 5

Uwe ter Vehn, Meike Rathgeber

### Energetisch hocheffiziente Schul- und Verwaltungsgebäude

#### Problemaufriss: So sieht es aus.

- Es gibt zunehmend energetisch hocheffiziente Verwaltungsgebäude
- Schulsanierung oft mit zu viel Technik und verschiedenen Standards (für Gebäude, Technik und Nutzung)
- Unpassende Maßnahme für Nutzung: Wärme von oben bei Krabbelkindern! Steinfußboden geht nicht -> es werden Heizlüfter verwendet
- Nach 3 Monaten undichte Türen in Kitas durch Sandeintrag
- CO<sub>2</sub> als Bildungsnachteil
- Zu viel Hightech überfordert Nutzer und verursacht zu hohen Wartungsaufwand
- Lüftung läuft mit Festwert und oft nicht nach Bedarf, läuft durch, Lärmbelastung
- Regelung (Temperatur und CO<sub>2</sub>) für alle Räume zu teuer, Kalibrierung erforderlich
- Regelung falsch eingestellt (Bedienungs-, Planungs-, Ausführungsfehler)
- Nutzer wollen selbst was tun, keine Akzeptanz von Automatik
- Erdwärme funktioniert nicht wegen Luftabschluss im System
- Weniger Hausmeister und oft fehlende Qualifikation
- Keine Anlagendokumentation, sondern wilde Sammlung unwesentlicher Infos
- Viel Technik bedeutet viele Ansprechpartner / Gewerke
- Lüftungslobby macht Druck



#### Handlungsmöglichkeiten - Beispiele

- Wichtig: Investition bringt nichts, wenn Betrieb + Wartung nicht gesichert sind
- Analyse: „Nutzer machen was falsch, die Techniker sind unschuldig“
- NutzerInnen kennen die Probleme sehr präzise
- Verbrauch überprüfen+handeln, z.B. wenn Verbrauch deutlich höher als geplant
- Ziel: frische Luft rein, keine Wärme raus, Wunschtemperatur, Blendschutz



#### Perspektiven – Was kann getan werden?

- Schwerpunkt: Betrieb als Kostenfaktor, NICHT Einbau oder Planung
- Mehr und qualifizierte Hausmeister
- Fehlerliste konsequent durchgehen -> intensive Betreuung
- Mehr Technik erfordert mehr Personal
- Träger bildet Technikteams aus Nutzergruppen
- Beteiligungsmanagement spart Zeit und Geld, auch kontinuierlicher Kontakt mit den Nutzergruppen
- Akzeptanz von Technik muss steigen: zuerst Nutzer schulen, dann Technik einbauen
- Innerhalb eines Trägers: Expertenbildung durch Schulung und Austausch mit allen
- Bau wird aus einem Budget bezahlt, Betrieb aus einem anderen (Sanierungsmanager)
- Wenn in den ersten Jahren KEINE Einsparung – dann Investition in Beratung+ Schulung
- Betrachtung aller Bereiche & gute Kooperation bei Planen, Bauen, Betreiben

The Independent Institute for Environmental Issues UfU was founded in 1990 during the transition period in East Germany by scientists with a background in the civil rights movement.

Now – almost 25 years later - UfU has 30 staff members working in the three departments in the fields of climate protection & environmental education, environmental law & public participation and resource management & environmental communication.

The Department of Climate Protection & Environmental Education has been working in energy saving projects like fifty/fifty for twenty years. Apart from that, the department develops teaching and project material on numerous climate- and energy-related issues as well as education concepts and works in education-research as well as practical education projects on behalf of German Federal or State Ministries and their agencies, municipalities, companies, organisations and the European Union.

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