

## SAUCE Schools at University for Climate and Energy



### WP 3

## Programme Development Report 2010

D2 of WP3 of the SAUCE project  
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### **About SAUCE – Schools at University for Climate and Energy**

For the EU project SAUCE, seven European universities and the Berlin Energy Agency have joined forces to develop and promote university programs for schools as an innovative educational tool aiming to make younger generations adopt intelligent energy behaviour. From 2010 until 2011, each university offers a series of one-week on-campus education programs for pupils' ages 10-13 on the topics of energy efficient behaviour, renewable energies and climate change in an exciting new learning environment.

The programs are complemented by activities reaching out to the pupils' teachers. Successful and effective teaching materials and information sources are made available, energy education experts and their teaching approaches are introduced to the teachers, and the exchange of knowledge and ideas between schools, academics and educators is facilitated. SAUCE thus contributes to improving teaching and curriculum on energy efficient behaviour.

SAUCE is supported by the EU Program Intelligent Energy Europe. This program aims to promote energy efficiency and renewable energy sources. It helps all of us to produce and use energy in more intelligent ways and to increase the use of renewables.

For more information on SAUCE: [www.schools-at-university.eu](http://www.schools-at-university.eu)

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## 1. Programme Development - Summary

What's shooting through that electricity cable? How do wind, sun and biomass get into the socket? Does a house need a hat and a scarf? What does the weather have to do with the global climate? Does the climate need protection? What does a climate researcher actually do?

All realized SAUCE programmes in 2009 gave answers on seemingly simple questions. These were answered by national and local energy and climate experts and (energy-) education experts. All programme focussed on behavioural aspects by bringing energy use into direct relation to the pupils' everyday lives.

The task of all participating SAUCE partners in work package 3 was to develop an educational programme to be offered to pupils aged 10-13 on the campus of the university as an inspiring non-school environment.

The delivery of each partner in WP 3 was to develop a programme as an interactive, interdisciplinary educational tool of the core topics of climate change and sustainable energy use and to present individual options for sustainable energy behaviour in daily life. The scope of each programme was:

- to raise children's awareness of intelligent energy and mobility behaviour
- to raise pupils' interest in green sciences and green technologies
- to broaden pupils' horizons regarding the international dimension of climate protection and intelligent energy use
- to strengthen pupils' problem-solving competences in regard to climate change and energy topics

All SAUCE partners developed and realized 2009/2010 programmes relying on the principles of participation and personal emotional involvement which affects positive and emphatic learning. The overall thematic focus of all programmes was linked to the social, every day life and technical dimensions of energy efficient behaviour. Interactive methods are used to get the message across: engaging the pupils in hands-on activities, in role plays and in thinking about solutions, and fascinating them with experimental sciences and arts.

The SAUCE lecturers were recruited from the university, the local community and from among national climate and energy education experts. All SAUCE partner universities have been establishing new ties to the local community and developing the environmental education network.

## **2. Programme development: Finding and Setting**

The programme development on a high educational and interactive level is a challenge and task for all SAUCE partners.

Meanwhile the SAUCE programmes have been carried out for the second and even the fourth time at the partner universities and evaluation results from questionnaires of pupils and teachers, interviews and personal contacts are still available.

Sixteen SAUCE programmes were successfully held, nine additional programmes have been or are currently being developed and are scheduled to be held between February and June 2011.

The assembling period which span the phase between 2009 to 2010 is now finished and big part of the partners has gathered a lot of conceptual and organisational experiences and lessons learnt concerning their programme development.

The first period of programme development was characterized to find conceptual and organisational guidelines and to establish the SAUCE educational tool on the campus of the University. This regarded the building up a local and university in-house network, to realize the structure of the educational tool according to the local conditions, to develop the campus as an exiting learning environment and to develop a suitable interactive programme. WP 3 Leader Berliner Energieagentur (the person in charge, Karola Braun-Wanke is now member of FFU ) described this finding process of each partner until March 2010. The summary and the Country reports are available as download on SAUCE website:

[http://www.schools-at-university.eu/project\\_results/d2\\_sauce\\_wp3\\_report.pdf](http://www.schools-at-university.eu/project_results/d2_sauce_wp3_report.pdf)

As a result of evaluation and lessons learnt the process of the ongoing programme development of each SAUCE partner characterized by continuous revision, improvement and enlargement of the programme elements. On the project level all partners reached an organisational and conceptual setting of their programmes. In this second stage the SAUCE partners reflect strongly about the quality level of their offers to bring the SAUCE idea across.

This report is focused on the actual state of the art of each SAUCE partner programme. Therefore FFU sent the following questionnaire design with seven topics (programme content, programme format; teaching methods, speakers, network, and evaluation) to all partners to figure out the different experiences with the format and for drawing useful comparisons between country activities.

### **2.1. Programme settings – Questionnaire**

#### **1) programme content**

- Which topics have been taken up in the programme so far?
- Did you choose a focus on individual topics?
- In the second programme, did you expand / narrow down the variance of topics, did you take up new topics, did you differentiate particular topics, possibly on recommendation of teachers?

**2) programme format**

- Which formats were chosen to present the topics? E.g. only workshops, only lectures, a mix of these or additional formats.
- Did the pupils visit a pre-structured whole-morning programme or did they freely chose from the range of programme elements offered.
- If a pre-structured programme was offered, please describe the structure in giving examples (what was the content and format, how were the pupils involved?)

**3) teaching methods**

- Which teaching methods were used to get the content across?
- How is the interactivity with the children implemented? List the concrete forms: e.g. quiz, role play, theatre, experiments, creative writing, film with or without discussion, capoeira, interviews, "Zukunftswerkstatt"
- How would you describe the balance between play/entertainment and the conveyance of factual knowledge in your programme?

**4) speakers / workshop leaders**

- How do you ensure the quality of content and methods used in the workshops/ lectures?
- Do you brief the speakers? If yes, how are they briefed?

**5) networking, impact of external partners on programme development**

- Did you succeed in building a SAUCE-network?
- Which (educational) actors did you attract since the beginning of the project?
- In how far are these networking activities positively reflected in the programme?
- In how far have your contacts to the network generated new ideas and elements for the SAUCE programmes (the first and/or second programme)?
- Did you enter an exchange with other groups of actors (e.g. artists, companies, NGOs, sciences and research, politics), who have accompanied the process of programme development and positively influenced it, contributing to its improvement?
- Did you succeed in involving other faculties, professors, university teachers in the SAUCE programme?
- Did individual speakers/initiatives develop programme contributions specifically for the SAUCE programme?
- Did the SAUCE project initiate new cooperations, cross-disciplinary communication or project activities at your university? (e.g. students' Master thesis projects, etc.)

**6) exchange of experience and ideas on the SAUCE project level**

- Did your programme include elements, which were inspired by a project partner's programme, which have been adopted or modified? (e.g. introductory session (Wien/London – Transfer to Berlin), Workshop climate breakfast (Transfer from Berlin to Twente) ,

- Did you implement cooperation projects / exchange with partner universities? (E.g. video conference between Vienna and Berlin)

### **7) feedback from evaluation results on programme development**

- Which evaluation results influenced development of the second programme? Please describe, giving concrete examples.

### **8) methodological principles of your SAUCE programme, „lessons learnt“**

- From a more general point of view, and considering your personal experience with programme development and methodological practice, please list the basic principles which you would identify as central elements to keep in mind when developing a successful SAUCE programme.

## **2.2. Country reports: Programme Settings - Stat of the art**

The following questionnaires have been written by the SAUCE partners who are responsible for style and content. All partners were asked to answer the questions and to avoid repetitions of facts already reported in the previous report.

### **2.2.1 Aalborg, Denmark**

*Written by: Annette Grunwald, Leif Henriksen, Department of Development and Planning, Aalborg University, Denmark.*

#### **1) programme content**

There was focus on the some energy topics like last year with interactive workshops like energy system of the future, how is electricity produced by means of solar energy. The guidetour in the Energy Laboratory was a big success like last year. In the second programme we took up new topics, like "Build a green building", "Can a car run on grain and straw – and is that good for the climate?", "I look over the shoulder of an environmental planner." "Cola for your mobile phone. – bio-batteries."

The programme is run by faculty members and students of the Faculty of Engineering and Science and experts from a local NGO called Energy Service (Energitjenesten). There were 4 different Institutes from the faculty engaged in the programme: the Department of Development and Planning, who is accountable for the projekt, the Department of Energy Technology and as new partners the Department of Design and Arcitecture and the Department of Biotechnology, Chemistry and Environmental Engineering.

#### **2) programme format**

The programme format as well as the didactic design has been developed with our governing group that followed our project all the way through. The governing group consists of 3 teachers from local schools and a teacher working at the local school administration as a consultant of science teaching. The pupils visited a pre-structured whole-morning programme from 8.45 – 12.

After registration there was an opening event for all the participants of the day. As a new feature we had a quiz with questions on energy.

The best class of the week was awarded a prize which was a visit to Nordisk Folkecenter for Vedvarende Energi (Nordic People's Centre for Renewable Energy, [http:// www.folkecenter.net/gb/](http://www.folkecenter.net/gb/)).

The prize was presented by the pro-vice chancellor of Aalborg University.

After the opening event every class took part in 2 interactive different workshops.

A special offer for 2 classes was a 3 hours workshop in "build a green building".

One example of the interactive workshops offered:

"Become an architect for a day - build a green building"

Introduction –the lecturer introduces the issues to be dealt with by showing a series of slides of different residential areas.

Action – the pupils are divided in groups of 4 or 5. The groups are asked to build a model of a residential area while taking in consideration different "green" aspects. They are provided with building blocks of cardboard of varying dimensions, trees and bushes, people etc.

While the groups are working the lecturer and her helpers go round visiting the groups asking questions like "Where are the four points of the compass?", "How can you get more sunlight in your living room?" What does greening mean for living quality and for the environment- and how can we do?" "Where do you ride your bicycle?", "How far off is the school?"

Presentation – the groups finally present their models and there is a general discussion.

### **3) teaching methods**

We put an effort in developing and improving workshops where the pupils may test and experiment a variety of matters. See 2.

### **4) speakers / workshop leaders**

All speakers of the programme received a written introduction with didactic guidelines for their planning and completion of their workshops.

### **5) networking, impact of external partners on programme development**

SAUCE build up a local network and developed new contacts with different research groups from Aalborg University and the research group "Problembased Learning" (PBL) and the Institute of Learning, University College North Jutland, energy experts from Energy Companies, educational actors from public organizations, various municipalities (Aalborg, Thisted, Rebild), The Regional Centre for Science, Technology and Health, Aalborg, and the NGO Energy Service.

There is a co-operation with University College North Jutland on a teachers' in-service course dealing with the energy research of Aalborg University.

SAUCE which deals with building knowledge among teachers and pupils has resulted in a practical project on energy savings in schools. This project is also managed by the institute for planning and development.

Through the school administration in Aalborg municipality, we have established cooperation with the administration for "Health and Sustainability". As a result of our energy saving project in 2009 this administration runs a model project in energy savings in 5 schools in 2010. The administration urges all schools to participate in energy saving activities in Aalborg municipality in 2011.

For the moment an environmental plan for the schools of Aalborg is prepared focusing on energy savings. The plan is made in a co-operation among Aalborg municipality,

Aalborg University and the Danish Outdoor Council, which manages the international programme called the green flag (groentflag.dk).

A similar energy saving project is prepared in Rebild municipality co-operating with Energi Nord (Energy North).

#### **6) exchange of experience and ideas on the SAUCE project level**

Exchange of experiences and ideas from UfU on energy saving projects in schools and from participation in the EU-project meeting "Euronet 50/50".

#### **7) feedback from evaluation results on programme development**

Developing and improving experimental workshops.

#### **8) methodological principles of your SAUCE programme, „lessons learnt“**

Practice related teaching, the pupils should be able to see, feel, seize, hear...

The speakers who are not acquainted with this target group need a certain basic knowledge of this group (see 4.)

### **2.2.2 Roskilde, Denmark**

*Written by: Thomas Budde Christensen, Tyge Kjær & Sigrid Mourits-Andersen, Roskilde Universitet*

#### **1) programme content**

The topics of the programme in this semester were concerning the same issues as in the workshop last semester: introduce children to the basic components of the climate problem and illustrate how problems can be solved by reorganizing patterns of production, consumption and energy generation. This issue also concerns and can be implemented in the primary schools course, 'Nature and Technique' curriculum.

Lectures were mainly given by university staff and a lot of the people involved in last semesters programme. Some teachers were new and external sources were also utilised.

The teachers involved:

- The theatre group from last semester was involved to do theatre / performance.
- Also 'Skolernes Energiforum' were participating. This organisation is used to teach children and has a lot of experience in different kind of interactive methods of teaching school children about energy savings and other climate issues.
- University staff from the faculty used their field of science to put different perspectives and methods upon climate change.

Thus the workshop was a combination of teachers from last year, but also involving new and other different ways of learning, than the last programme was offering. Each day begins with an explanation of the climate problem as a basis to understand the themes in subsequent sessions. The introduction is followed by two thematic sessions in which the pupils will be given the opportunity to dig deeper into a specific topic related to climate and energy. The thematic sessions vary from day to day. The thematic sessions cover a wide range of topics such as renewable energy sources, energy savings, global climate changes, transport, housing etc. The programme ends every day with a climate show in which a group of actors will present a special event in order to facilitate an alternative way of teaching climate and energy.

The structure of the programme makes it possible for the teachers to select a day in which the topics of the thematic sessions can be integrated into the ongoing teaching activities at the schools. Hopefully the teachers will use this opportunity to apply the thematic sessions as examples to illustrate how climate and energy issues relate the curriculum at the primary schools (mainly focussed on the nature/technique curriculum).

Here is the scheme from last programme compared with the programme of fall – this semester. The programme runs over one week.

### Schemes show the different topics from programme 1 in spring and programme 2 in fall 2010

Spring	Fall
Introduction to the climate problems. Reasons for climate change and what is the result of it?	Introduction to the climate problems. Reasons for climate change and what is the result of it?
Theatre: Stories about climate change.	Theatre: Stories about climate change.
Climate change in Denmark: How are rain, temperature and water level affected by GHG.	Lightning and sun energy: How the sun can be used as an energy source for your computer or hairdryer. Learn more about how the sun can be used as a power source.
Energy consumption and energy savings: How is it possible to save energy and when do we consume energy?	Windmills: How does a windmill work? Learn about the history of windmills and see the different types of windmills.
Windmills: How does a windmill work? An introduction to how windmills work and their history.	Future environmental Cars: Can we produce cars that run on anything other than gasoline? Learn about different kinds of cars and which of them most energy efficient is. What would it mean for the power supply if cars ran on electricity?
Windmills: How does a windmill work? An introduction to how windmills work and their history.	Climate Change in Denmark: How are rainfall, temperatures and sea levels influenced by global warming? Learn about the connection between climate and greenhouse effect.
Energy and houses: How to save energy in houses and buildings. What possibilities are there in houses to reduce energy consumption?	Renewable Energy: What is renewable energy? Can you make electricity from manure? Learn about solar, bio fuels, biogas and other renewable energy sources.
Renewable energy: What is renewable energy? Is it possible to make electricity from biomass and the sun?	Lighting and energy conservation: How you can help preventing the climate changes in your everyday life. Learn about the connection between energy savings and lighting.
Cars and energy: Is it possible to make cars drive on other kind of fuels than they do now? What car is the best for the environment and what consequences does it have for our electricity system if cars start to drive on renewable energy?	Energy and housing: how to save energy in homes and buildings? Learn about energy conservation.
Climate change in rich and poor countries? What consequences does it have for rich and poor countries?	Energy conservation: How to save energy? Learn about energy and energy conservation

### 2) programme format

The formats of the different presentations were a combination of workshops, lectures and a theatre. The theatre was built up as a performance where the teachers and

pupils had to take part. The days were planned as showed in the scheme below. First a presentation and introduction to the climate problematic was hold, where everyone was present. Then the Children got divided into two groups – the 2nd and 3rd part. The day ended with a theatre

### **3) teaching methods**

No comments given

### **4) speakers / workshop leaders**

No comments given

### **5) networking, impact of external partners on programme development**

The SAUCE programme at Roskilde University is based on in-house activities, with university staff in order to ensure a high quality. But also in order to ensure that the 'schools at university' approach is met by allowing the primary school pupils to meet the climate and energy researchers at the university.

A network to teachers at primary schools has been established in order to ensure recruitment of pupils and to make sure that the content of the SAUCE programme is integrated into the ongoing teaching at the primary schools. Here it has been really important to be in contact with teachers in the time span between the invitations to the programme starts. Furthermore we have been sending out an e-mail to each of the teachers, thanking for their participations. This has given a good response and interest in getting more teaching material.

Furthermore there has been a presentation of the workshop on a conference at Roskilde University together with press releases in various climate forums

### **6) exchange of experience and ideas on the SAUCE project level**

No comments given

### **7) feedback from evaluation results on programme development**

No comments given

## **2.2.3 Berlin, Germany**

*Written by: Karola Braun-Wanke, Environmental Research Centre (FFU), Freie Universität Berlin*

### **1) programme content**

Since 2009 the Berlin programme have covered a range of energy and climate topics: Global climate change, its causes and effects; energy behaviour and energy efficiency in daily life (mobility, food production, architecture, electricity use); renewable energies (use, perspective and understanding of technologies), global climate protection and global ethical issues. Starting with the 3<sup>rd</sup> programme the content was enlarged by the climate relevant topic of waste: waste reduction, recycling, resource reduction, waste segregation, energy use associated with producing short-lived consumer goods.

All presentations sensitised pupils to the topics of sustainable energy use and motivated them to realize climate protection activities and energy savings in their own daily lives.

The programme covered different energy and climate topics:

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## 2) programme format

The Berlin approach continues to follow an open structure. Because the workshop format is favoured to the lecture format the offer of workshops was enlarged and since the 2<sup>nd</sup> programme the amount of events was continuously increased to include more small interactive workshops. Meanwhile, 48 different workshops, lectures and events were offered during the fourth programme. To react to the large demand by teachers, the SAUCE programmes allow teachers a more individual choice of one workshop and an open number of lectures during the whole event. Aiming for a meaningful impact of the programme the organizers advice to participate in the introductory lecture to welcome all the participants at university and introduce the subject before the subsequent participation in a workshop and/or a lecture.

Because of the very intensive engagement with the topics in combination with art, theatre, artistic, writing, role plays and games and the positive feedback received from participants, these cultural and art oriented workshops were increasingly offered in the 3<sup>rd</sup> and 4<sup>th</sup> programme.

The Berlin programme continued to profit from the vibrant network of external environmental education actors present in Berlin, and included many experienced local key climate and energy education experts. The proven and tested methods which were designed and implemented in the SAUCE format guarantee an exciting, inspiring and motivating atmosphere for the children participants.

Dates of programmes	Number of Pupils	Participants teacher	Number of workshop participants	total events
1. Schüleruni March 2009	2212	167	2580	36
2. Schüleruni Sept./Oct. 2009	1700	129	2420	45
3. Schüleruni March 2010	1128	99	2600	49
4. Schüleruni Sept./Oct. 2010	1640	135	2365	48
<b>Total</b>	<b>6680</b>	<b>530</b>	<b>9965</b>	<b>178</b>

## 3) teaching methods

The SAUCE programme is designed with the intention to guarantee high teaching quality. This is implemented by a diverse mix of methods. Founded on the evaluation results in the course of the four SAUCE programmes an emphasis was put on smaller workshop sized formats and the principle of interactivity was transferred to the lecture formats (for larger groups), too. Typical for the SAUCE programme is the mix of methods which also aim to teach competences and skills in the sense of ESD (Education for sustainable development): pedal powered film shows, creative writing, arts and theatre, role games, "zukunftswerkstatt", scientific experiments, energy campus tours require but also improve the children's knowledge and personal engagement. Through this interactive programme, SAUCE provides a balance to teaching of facts and figures. Interactivity and interdisciplinarity of SAUCE makes a visit at the SAUCE programme to be a "great experience", which supports the children's personal identification with the topics. This personal identification in turn enhances the effectiveness of subsequent teaching on these subjects at school.

Further results from bilateral exchange with teachers indicate, that also the individual personalities of the workshop lecturer have an important impact on the teaching process and effects. Both, the young lecturers (older pupils and university students) and the experienced older lecturers are very much appreciated by the participating pupils and are regarded as authentic “personal and professional models”. Ultimately, an “emphatic learning situation” develops for the pupils, which is experienced and memorized with a positive connotation and thus motivates pupils to become active in climate and environmental protection. The positive feedback of the pupils and the high acceptance gained among teachers shows that this effect is very relevant in the context of the generally negative associations with environmental topics and that therefore, the SAUCE programmes are highly appreciated by the participating schools.

#### **4) speakers / workshop leaders**

The Berlin team has taken advantage of the vibrant network environmental external education actors in Berlin, and altogether has included 30 experienced local key climate and energy education experts. At the beginning of their co-operation with the SAUCE project, all lecturers receive oral and writing guidelines and a briefing from the organizers about the interactive approach of the programme and enter into an exchange on how to perform in the SAUCE programme. Furthermore, each event is attended by the organising team in order to identify the immediate reactions of the participants. After the programme run, each lecturers is contacted by the SAUCE team to discuss these immediate impressions and results from the teachers’ feedback.

To facilitate and the exchange among SAUCE lecturers, organisers and teachers and to support the networking, the SAUCE team invited for a informal get-together on 25 November 2010 at the FFU. Aim of the meeting was to inform lecturers about general evaluation results and to allow for individual exchange. It was attended by 16 participants. The lively discussion centred on which the question which methods were most effective in reaching pupils and teaching them competences and skill allowing them to become responsible actors in the sense of sustainable development.

#### **5) networking, impact of external partners on programme development**

Generally, the Berlin team intends to keep those actors involved in the programme which have performed well in the past. The feedback routines described above have contributed to steadily improving the programme elements and to adapt them to the SAUCE format. Thus, the programme is characterised by a number of standard elements offered by locally well established actors.

Additionally, in the course of the project, contacts and exchange with university students has intensified so that several contributions have been offered by some of the faculty’s students. Furthermore, one student investigated the effects of the SAUCE programme for her master thesis (cf. evaluation report 2010 for results).

Also the SAUCE programmes cooperation with the Berlin administrations programme “Berliner Impulse”, which was initiated by the Berlin Energy Agency, has had very positive effects. The personal involvement of Senator Lompscher in all four SAUCE programmes has resulted in high visibility of SAUCE in the local policy. This visibility has drawn additional attention to the need to support the Berlin schools in their efforts

to integrate the topics of energy and climate in teaching. Furthermore, the senators engagement has also allowed the SAUCE programme to gain public visibility.

Finally, the expansion of the Berlin SAUCE network is also positively influenced by the fact that the SAUCE programme could be presented outside of the university. A SAUCE lecture was integrated in the lecture programme of the exhibition „WeltWissen – 100 Jahre Wissenschaften in Berlin“, and, on national level, the project was presented at conferences addressing university representatives and other actors involved in energy education.

#### **6) exchange of experience and ideas on the SAUCE project level**

Since we offered a SAUCE video conference with our SAUCE partner in Vienna there is a fruitful and communicative atmosphere between the partners.

The idea taken up from Vienna and Aalborg to include an introductory session in the programme has become a steady feature of the Berlin programme.

#### **7) feedback from evaluation results on programme development**

See above, item 2.

## 2.2.4 London, UK

*The UK SAUCE programme 2009 ran at the North Campus of London Metropolitan University, London. The UK input for WP3 has been written by Nicholas Watts*

### 1. Programme content

#### *Topics and focus*

General overview of climate issues in lectures provided by:

- a) the local council officer running Islington Environmental Learning Partnership (IELP, since renamed Islington Sustainability in Schools, ISIS) (first programme only)
- b) (in second programme) overview lecture by the Netherlands programme coordinator, Maarten Arentsen, also designed to allow comparison of the Dutch and British programmes and enable Maarten, in his role in charge of policy evaluation, to watch and evaluate a day of the London Met programme, and both coordinators to consider transfer of inputs across programmes
- c) presentation of Project Genie film by one of the key participants in its development (but not the originator himself) <http://www.projectgenie.org.uk/> (first programme only), which describes climate change and what children can do about it
- d) presentation of Pacific Islands' primary school materials on renewable energy solutions, including cartoon depictions of energy sources (first programme only, by Programme Coordinator, as emergency substitute for a presenter who failed to attend)
- e) presentation and explanation of the climate impacts on the lives and livelihoods of subsistence communities on the Pacific islands, and especially their children, to encourage engagement with the global scale of the issues and empathy with children in small countries vulnerable to climate change (Programme Coordinator's introduction, second and third programmes)
- f) demonstration lecture on climate science by Dr Andrea Sella, (<http://www.ucl.ac.uk/cheltenhamblog/tag/andrea-sella/> ) Engineering and Physical Science Research Council Senior Media Fellow at University College London and his students whom he is training to promote the appreciation and understanding of science in schoolchildren (one lecture in first programme, then by popular demand, i.e. as a result of feedback, opening session for every day of second and third programmes), includes using liquid nitrogen to make ice-cream
- g) lecture/workshop on the full range of climate and energy issues by specialist sustainability educators from the Centre for Alternative Technology, Powys, Wales (<http://www.cat.org.uk>), including small demonstration kits using PV cells to illustrate renewable energy (two days' sessions in first programme, alternating lectures and workshops in second and third programme).

The science and technology of climate change

Energy-saving options: 45-minute workshop sessions on

- i) audience participatory exercise in changing equipment and behaviours to reduce household energy consumption
- ii) children designing a blade for a model wind turbine from waste cardboard and plastic, and testing its efficiency in a specially constructed wind tunnel

iii) children using an empty printer paper box (A4 x 5 reams size) to create a model low-carbon house, including PV cell powered lighting, insulation, etc.

#### Climate awareness

i) cartoons and films presented and explained by their makers, including

a) a film of a youth expedition to the Arctic and the relation between the participants in the expedition and their classmates at home, following and following up on their exploits (Cape Farewell Education), and

a related 'workshop' session where students design and perform their own mime event to illustrate related issues of threatened species, melting glaciers, saving energy, etc.

b) animation (short version) now available at <http://www.mefedia.com/watch/27518601>) made and presented by Leo Murray and colleagues, accompanied by exploration of the link between direct action and climate challenges (Plane Stupid) and more generally the example of the suffragettes and the right of women to vote (first programme only, withdrawn in response to teachers' complaints that our presenters 'should not be encouraging juveniles to chain themselves to railings' though we think this was the teacher's personal interpretation!)

ii) mime and performance

Capoeira dancing workshops balance the day by encouraging movement, and address the relationship between culture of marginal and oppressed groups and climate change, by linking the fate of Amerindians and the Amazon rain forest in the battle to stop deforestation.

In the first programme only, we included a two-session afternoon with StreetPerformers UK that involved pupils writing a climate change verse for a song (a reworking of the classic 'A Change is Gonna Come') or painting a handshake logo, and then watching performance of the song by StreetPerformers, and seeing the logo designs exhibited afterwards. This was extremely popular and worked very well, and we hope to match it in outreach to developing country communities. However, it was quite costly and involved major logistical issues with equipment and materials as well as problems with local noise regulations that limited the range of venues available in the University. However, we are now working with music teaching and arts colleagues to develop something similar, hopefully also with the participation of StreetPerformers, for the fourth session.

iii) food sessions, including:

a) involvement of children in making, and eating, foods (sweets), explaining the source of ingredients and the energy involved in their cultivation, harvesting and transport, (part of workshop programme for all sessions) and

b) exploring with children the same questions in relation to the chocolate *Kinder Egg*, its aluminum foil wrapper and the plastic toy made in China that it contains analysis of climate and energy components of bought sweets, addressing issues of embedded carbon (part of CAT workshop in second and third programmes).

### *Second programme, revisions*

The experience of the first programme reinforced our appreciation of the need to limit the length of sessions, allow sufficient time (logistics) to get children/students from one session to another and to balance: lectures and experiential/kinetic learning. We reduced the amount of film in the second programme. As the second and third programmes ran over two weeks in June of 2010, alterations to the first programme were common to both of the second and third programmes.

In the second programme, we selected the sessions that had worked best for the children attending the London Met SAUCE programme, a multicultural mix from schools from a wide range of inner-city communities. While these included some eco-schools with a commitment to and record of involvement in carbon budget issues, most had a teacher responsible for 'sustainability', but there was a wide variety of types and strengths of engagement.

Film, in the second programme, was limited to the Cape Farewell workshop, where it was directly linked to the mime session, and to a short clip of subsistence communities' response to climate threats, illustrating also the impact of climate change on marine biodiversity, in the short introductory session by the Programme Coordinator.

In the second programme, we developed a daily programme of the best lectures, events and workshops from the first programme. In the second and third programmes, we secured a much better response to request to complete feedback questionnaires. These will inform changes to the final two programmes.

## **2. Programme format**

As explained above, a mix of formats was used, starting with a brief, generic plenary introduction by the Programme Coordinator (about ten minutes, allowing for unplanned variance in arrival times of different schools). This was followed, in the first programme by a lecture, but a different lecture every day. In the second and third programmes, the lecture was the demonstration science lecture, because of its vitality and active engagement of a lecture theatre full of children, its 'typicality' of the university experience, and also because of teachers' comments of how important it was because UK primary schools have poor or no science lab facilities.

The lecture was always followed by, in the remaining three sessions of the day, by workshops that accommodated children according to consideration of feasibility. The active engagement of the children meant that group sizes ran from about 20 to a maximum of about 60 (the latter in the lecture theatre).

While groups of children from a small number of schools were invited to present to their peers in the CAT-led sessions, we plan a more structured approach to this form of peer education in the fourth programme.

The design session for wind-turbine blades was competitive (the blades were designed and made by small groups of children and the wind tunnel tests gave an efficiency score, with the prize of a hydrogen cell car going to the best-performing group), and as a result of the competition particularly popular. We are working on the introduction of more games/competitions for the fourth programme.

Pupils attended a pre-structured programme for the four-session day, with all of them attending the opening introduction and lecture sessions, and then attending three from

a selection of about eight further workshop sessions and events. The classes were pre-allocated to sessions for logistical reasons, but with a view to ensuring a mix between sitting, watching and listening on the one hand, and kinetic/experiential learning (dancing, making things) on the other.

Content and format is as described above, but a detailed programme illustrating one day is attached ('SAUCE detailed programme').

### **3. Teaching methods**

These are outlined above: lectures, workshops, mime and dance studios.

We are also working with colleagues to use GIS-Participatory Mapping to allow pupils to draw their travel routes, places they play, etc. in a gaming-style session in computer labs in the host faculty at London Met (the Faculty of Applied Social Sciences), which will be used to raise awareness of energy issues in London, as well as of the carbon budget of travel modes and routes, and the links between active transport and health.

A key feature of our approach is to range across the disciplines, engaging with natural sciences (demonstration lectures), workshop activities informed by the social science of behaviour change in response to climate and energy priorities, and the arts and humanities, both in order to vary the pupils' experiential learning opportunities and to show that, whatever pupils' favourite subject might be, they could use it to help fight climate change.

### **4. Speakers/workshop leaders ('performers')**

Performers were briefed individually for the first programme, but for the second and third programmes, we held a collective briefing session to which the teachers were invited, to foster an exchange between performers, both evaluating the first session, in which most of them had participated, and to suggest programme refinements both in content and in management.

Interactive sessions included quizzes, role play/mime, experiments and design, creative writing (first programme in relation to StreetPerformers session), film with discussion, dance (capoeira, which opens discussion up to global issues, deforestation and the plight of vulnerable communities).

We have, as stated above, attempted to balance the delivery of factual information with other aspects, roughly in about a 1:2 ration.

The briefing for speakers, as well as the collaborative discussion sessions, includes a detailed discussion of their programme in relation to the goals of the project and the pedagogic issues involved. This part of the briefing was enhanced after the Project Team had discussed the pedagogy at their meeting, but could be systematized for post-project dissemination.

### **5. Network**

There is now an informal network between presenters, and many of the Islington – based teachers are part of ISIS. Unfortunately, though, recent budget cuts have led to the closure of London Sustainable Schools Forum, and we will need to consider any role we could play in securing funding for, and developing, a wider network. ISIS itself may be under threat in 2011.

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The programme was developed in response to a mix of supply and demand approaches, including the participation of the Programme Coordinator in a wide range of relevant meetings and activities sponsored by our performer organizations. We have held ongoing discussions with Arcola Energy to keep abreast of developments in the performing arts, as well as with the other partners in more general terms of possibilities of longer term cooperation and innovation (for example, a UK or international group of SAUCE pupils participating in a Cape Farewell expedition)

The SAUCE programme has involved science, teacher education, arts and public health colleagues from London Met, and this will be built on further in the next programme.

## **6. Project level exchanges**

The UK SAUCE food sessions were prompted by a desire to replicate the Berlin climate breakfast. We expect the fourth programme to include more examples of international transfer. Our main cooperation so far within the project group has been in the form of the Netherlands Coordinator's visit to the UK programme.

## **7. Feedback from evaluation results.**

These are detailed in programme changes, outlined above. The feedback questionnaires for the second and third programmes will be analysed in more detail in preparation for the fourth programme as well as for the WP6 evaluation report.

## **8. Lessons learnt**

In the UK context the only way teachers can be engaged in the programme, given their workload and the logistics of arranging several teachers as well as groups of parents to accompany the children to the University in a culture that is extremely cautious about the safety and security of children in their care, is to provide a four-session day for each class and each pupil. We calculate the participation rate accordingly (number of pupils x number of sessions attended). It is further clear that group size is negatively related with effectiveness and appreciation of the programme. To this end, we believe this calculation is contextually appropriate and simultaneously fosters more active take-up of SAUCE programme content in the schools that participate in the programme.

Central principles include balance between learning styles/activity types, and careful timing of activities to maintain attention span; focusing on what can be done, rather than the ultimate down-side of climate change. These are not new, but confirm existing views.

### **2.2.5 Twente, Netherlands**

*The Dutch Sauce programme 2009 has run at the Campus of the University of Twente in Enschede. The Dutch input for WP3 has been written by Maarten Arentsen*

#### **1) programme content**

Additional to the first programme, the second program had water, waste and food as new topics. We also added entertainment in the afternoon. It was a crazy professor offering a nice show to the children every day in the afternoon. It acted as a kind of relaxed closing session of the day. So we expanded the programme.

#### **2) programme format**

In the second programme, the days are a mixture of different activities and themes. But we group themes together on a day. We try to have a mass meeting at the start and several workshops during the day. We have a mixture of lectures, workshop, games, experiments, excursions and entertainment

#### **3) teaching methods**

See also under 2. We have a nice balance between head, hart and hands. We have added several excursions to the programme, among others on waste water treatment/ energy production from waste and food production.

#### **4) speakers / workshop leaders**

All staff is briefed on do's and don'ts. Excursion personal is experienced and expert in children programs

#### **5) networking, impact of external partners on programme development**

Additional to the first WP3 report, we managed to enlarge the network with a local museum and the Twente Young Academy who is responsible for the children's activities at the university. We also developed collaboration with the teacher university Saxion and we will run a first joint program in January 2011.

#### **6) exchange of experience and ideas on the SAUCE project level**

In Twente we use the Austrian video on Windy Wind. To our knowledge this is the only video of children showing other children how a wind turbine looks from the interior. Very nice video.

#### **7) feedback from evaluation results on programme development**

We adjusted the length of the activities. Children indicated that they sometimes faced problems because of the length of the activity.

We added entertainment

We added more excursions, things to do.

## 2.2.6 Riga, Latvia

*Latvian input for WP3 has been written by Diana Šulga.*

We have had one SAUCE programme so far and preparing now for the second one in February 2011, so the previous report should be considered as a base.

### 1) programme content

- Which topics have been taken up in the programme so far?
- Did you choose a focus on individual topics?
- In the second programme, did you expand / narrow down the variance of topics, did you take up new topics, did you differentiate particular topics, possibly on recommendation of teachers?

Previous report

All topics of the First programme were well accepted. To have the possibility to differentiate the programme, negotiations are on-going now with the Faculty of Physics and Mathematics of University of Latvia about the development of a new topic – Measurements of Heat Losses from School Buildings.

### 2) programme format

- Which formats were chosen to present the topics? E.g. only workshops, only lectures, a mix of these or additional formats.
- Did the pupils visit a pre-structured whole-morning programme or did they freely chose from the range of programme elements offered.
- If a pre-structured programme was offered, please describe the structure in giving examples (what was the content and format, how were the pupils involved?)

Previous report

### 3) teaching methods

- Which teaching methods were used to get the content across?
- How is the interactivity with the children implemented? List the concrete forms: e.g. quiz, role play, theatre, experiments, creative writing, film with or without discussion, capoeira, interviews, “Zukunftswerkstatt”
- How would you describe the balance between play/entertainment and the conveyance of factual knowledge in your programme?

Previous report

We did not aim at either the play or conveyance of factual knowledge but rather focused on experiential learning.

### 4) speakers / workshop leaders

- How do you ensure the quality of content and methods used in the workshops/lectures?
- Do you brief the speakers? If yes, how are they briefed?

Previous report

What is actually ment by „brief“? If it is giving instructions/suggestions on how to work with the audience then yes, when negotiating with speakers/facilitators, we formulated

what we expect from them, but it was rather a sort of formal reminder because all of them have rich experience in working with this kind of activities and target groups.

### **5) networking, impact of external partners on programme development**

#### **Previous report +**

- Did you succeed in building a SAUCE-network?

SAUCE network is focused on the SAUCE programme. It comprises the participating teachers and experts contributing to the teacher training seminars and pupil programmes. It is used “vertically” from University of Latvia (we send out useful information on environmental events and related topics) and does not perform any other activities.

- Which (educational) actors did you attract since the beginning of the project?
- In how far are these networking activities positively reflected in the programme?
- In how far have your contacts to the network generated new ideas and elements for the SAUCE programmes (the first and/or second programme)?
- Did you enter an exchange with other groups of actors (e.g. artists, companies, NGOs, sciences and research, politics), who have accompanied the process of programme development and positively influenced it, contributing to its improvement?
- Did you succeed in involving other faculties, professors, university teachers in the SAUCE programme?
- Did individual speakers/initiatives develop programme contributions specifically for the SAUCE programme?
- Did the SAUCE project initiate new cooperations, cross-disciplinary communication or project activities at your university?  
(e.g. students' Master thesis projects, etc.)

One of our Master students of the Environmental Management programme works on his Master thesis related to the ecoschools and environmental communication and he and his class took part in the SAUCE programme, too.

### **6) exchange of experience and ideas on the SAUCE project level**

No exchange and cooperation so far.

### **7) feedback from evaluation results on programme development**

No evaluation results influenced the development of the second programme; programme content was well accepted by participants.

## **2.2.6 Vienna, Austria**

*The Austrian input for WP3 has been written by Manfred Duchkowitsch.*

### **1) programme content**

The main topics covered in the two runs of SAUCE in Vienna were as follows: Climate issues in general, renewable energy sources, solar power and its technology, mobility, food production, consumer powers, ecological footprint, the pursuit of personal happiness.

We did not choose a focus on individual topics but tried to keep our programme as diverse as possible in order to meet the needs of the different school types we want to attract.

As this approach was highly appreciated in the first programme we expanded the variance of the programme for our second run by adding three new workshops on “happiness”, “food production” and “a society without oil”.

### **2) programme format**

The workshop format was highly favoured to the lecture format by the teachers. Therefore we decided to extend our choice on workshops and cut down on the lectures. Instead of a whole day of lectures in the first run, we had two lectures parallel to the three hours workshops on Tuesday in the second run. None of them was booked.

The school classes were invited to visit a pre-structured whole-morning programme. Each day started with an introductory lecture to welcome all the participants at university and introduce the subject. The school classes then were guided to the seminar room of their respective workshop.

As a closing event all the participants were invited to reflect upon the morning in a quiz game (“1, 2 oder 3”) and to change the way things are by adding their commitment onto a “climate scale” outweighing an oil barrel.

### **3) teaching methods**

The teaching methods used included variants of performing experiments in small groups, role plays, drama education, video shows including discussions afterwards, playing games, experiential learning, working on demonstrative materials,...

All of these bear a strong interactive approach which was the reason for choosing the respective performers.

A playful approach to learning is a basic need especially to overcome the tragic facts of the subject. Therefore the emphasis in our programme lies on showing up alternatives in a pleasant way. There is more to “play” than entertainment.

The scales in our programme tend to incline towards the conveyance of factual knowledge although we are on a good and positive way towards a playful approach.

### **4) speakers / workshop leaders**

Apart from evaluation done by teachers and pupils the organisational team gets feedback on the workshops/lectures by a written report of the attending students (helping with logistics) and by visiting the workshops to get a picture themselves.

Speakers of all lectures/workshops do receive a short guide beforehand on how the idea of SAUCE should be transported.

I.e. introduce yourselves, encourage questions, see for enough breaks,...

### **5) networking, impact of external partners on programme development**

The Austrian SAUCE network consists of about 30 educational actors in climate and energy issues and about 90 teachers.

Networking interaction takes place during the teacher trainings (educational actors are also invited and attending) and personal talks with the organisational team.

Subjects as a positive approach to the topics in question were discussed and further contacts (and therefore the new format with less lectures and new workshops in the second programme) were generated.

Although mainly based on educational actors from NGO's there are also a lot of university staff involved in the Vienna SAUCE programme. The inputs range from the best insulation for houses up to a critical view on society. The involved University institutes were:

- Research Center of Transportation Planning and Traffic Engineering, Vienna University of Technology
- Institute for Energy Systems and Thermodynamics, Vienna University of Technology
- Central Institute for Meteorology and Geodynamics, Vienna University of Technology
- Institute of Building Construction and Technology, Vienna University of Technology
- Department of Political Science, University of Salzburg

Most of the offered workshops of non-universitarian origin are being held in schools on a regular basis. Nevertheless some had to be fundamentally reorganised to meet the needs of the "Climate and Energy" focus. The Planetarium in Vienna set up a completely new programme and one workshop ("The Climate Checkers") was developed especially for SAUCE.

A master thesis on the subject of "Didactics in Climate and Energy related fields" is being discussed.

### **6) exchange of experience and ideas on the SAUCE project level**

Apart from a video conference on the results of the first SAUCE programme between Vienna and Berlin an exchange of workshops was planned but did not work out due to conflicting schedules.

### **7) feedback from evaluation results on programme development**

A very important result of the evaluation was the cut-down on lectures in the second programme. Certain workshops that were not perceived as being adequate for the age group have been removed as well.