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CLIMATE ACTION EDUCATION

Acquiring the skills and awareness needed to mitigate climate change

How can we change people's behavior towards climate protection? First, people need to know how their consumption impacts the climate. Focusing on energy issues in public forums also helps find a consensus. Respected community members set good examples. And adults have a hard time justifying their wasteful habits when well informed children confront them. Steps can be taken effectively within and outside conventional educational surroundings.

At Klimahaus in Bremerhaven, Germany, visitors of all ages discover how the various elements of the climate interact. Photo: Klimahaus.

MAIN TAKEAWAYS

- Capacity building is key in all sustainability projects. People need training and awareness to make changes. Technical solutions often fail for social reasons. But there are many ways to educate people about climate action.
- When children learn about climate action, they become multipliers, educating others and implementing what they have learned wherever they go.
- Adults are no different: they need to know how their actions affect the world. Once they do, their sense of fairness kicks in, and they set an example for others.

1 WHY CLIMATE ACTION EDUCATION?

Do you know what your fair share of water and energy is – or of emissions? Even aside from fairness issues, how much carbon do you emit? Finding out can be not only informative but also motivating. You can learn what steps would lead to what savings – and start consuming energy and resources more conscientiously; see the online calculators at Atmosfair, Carbon Footprint, and the WWF. Knowledge about climate and energy topics can be promoted in events offered by institutions or by individuals in communities. The aim is to enlarge technical expertise and consolidate skills in the field of climate protection and energy – and convince people to act.

This paper not only sheds light on the importance of education about climate action but also provides an overview of steps that can be taken. You do not need to be a top policymaker or world-renowned researcher to have an impact, and activities can snowball.

2 ENERGY AUDITS AND ENERGY CONTRACTING

Schools are natural platforms for education. Many methods have been developed in addition to standard book-learning. If a school's facilities need renovating, for instance, pupils can help an energy auditor assess the building by recording measurements. How much water is consumed, and how much of it is hot? What share of power consumption is lighting, and how quickly would switching to LEDs pay for itself? Where are the biggest thermal leaks in the building? How much would upgrades cost, and how quickly would they pay off? Some of these answers require expertise that only the auditor has, while others are simple measurements the pupils can help make. In the process, young people learn to look for savings everywhere, including at home. They may then not only want LEDs, but also insist that lights should be turned off when not needed, etc. With these behaviors they can in return have a positive influence on other family members.

Once the results are in, parents can also become involved as investors. In various "energy contracting" projects over the past few decades in Germany (PDF in German), parents, teachers, and community members have learned exactly how energy is consumed in their facilities – and quickly paid for energy upgrades with offset water and energy bills. Such projects continue today, such as in the 50/50 Reinickendorf project in northern Berlin.

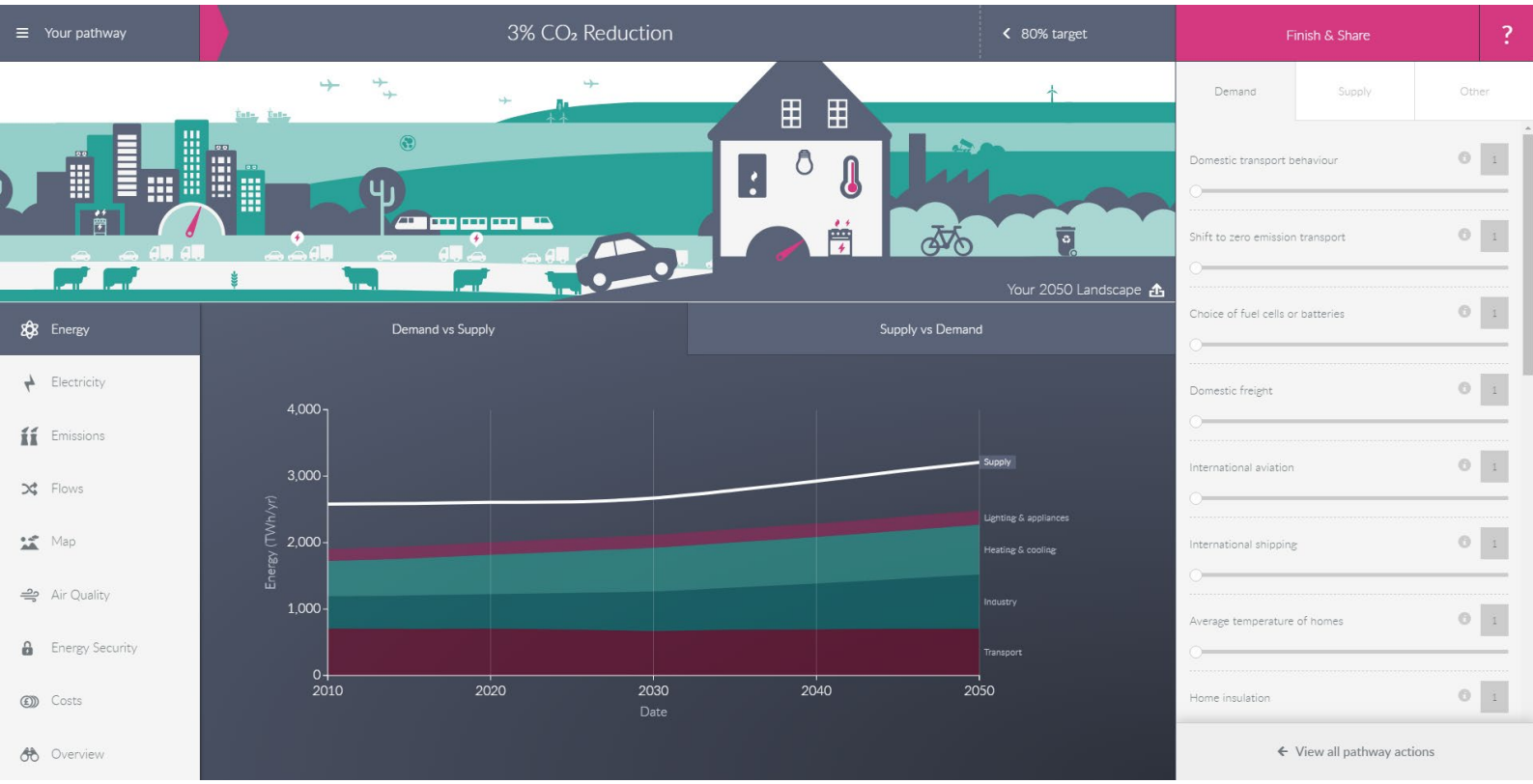
In energy contracting, investments are paid back through savings on utility expenses; a contract is signed with the school so that the savings are split between the investors (in the case of schools, usually local community members, especially parents and teachers) and the school. The 50/50 project above splits the savings equally between community investors and the school. That is some low-hanging fruit: a mere *half* of the savings is enough to provide investors with an attractive return.

3 SIMULATION GAMES

In the following examples learning revolves around games and fun. When children and adults learn playfully how they can make a difference, the overall task may not look so daunting. Every little bit helps – and that fact is always worth communicating as well.

One option to educate community members is to simulate a climate action. Such games provide a playful conclusion to relatively dry lectures on emissions levels, the impact of our consumption on the climate, country emission levels, etc. Teachers can use the prospect of a game to encourage pupils to keep learning; the syllabus then covers the rules of the game.

In a simulation, pupils might, for instance, act as national negotiators at a climate summit. In the (free for non-profits) Climate Change Negotiations Game, participants spend 2-3 hours trying to keep emissions within the 2°C limit. The preparations can include a discussion about why 2°C is defined as a limit in the first place and how climate summits work.



In the British 2050 Calculator, players move levers (right) about assumptions, and the chart in the middle shows the results.

For Germany, the Deutsche Bundesstiftung Umwelt DBU (German Federal Environmental Foundation) helped create Keep Cool, a game played online.[1] It includes modules about the structure of and main participants in international climate policy. It also discusses the role of fossil fuels and renewables in climate change. The EU-funded EnerCities is an online game for teenagers. Other online games for adults essentially allow players to become scenario modellers. For instance, the Foreseer project developed at the University of Cambridge outputs the result as a Sankey chart. In 2010, the UK Department for Energy and Climate Change (DECC) developed the 2050 Calculator, which allows players to visualize their assumptions much in the way that scenario modelers do. The goal is thus not to discover the game designer's winning situation, but to better understand the interplay between certain assumptions. The Climate Institute lists other such games, including some in Spanish and French.

Local groups in Germany have also developed their own real-life *Planspiele*, as simulation games are called in German. In Krafla, the participants play executives at energy companies. They have to remain profitable while reducing emissions. Energiespardorf Bayern (Bavarian energy-conservation village) comes in the form of miniature wooden model village brought to educational institutions in a trailer; the challenge is to reduce emissions without endangering food production and using more land. Both of these games are playable in around four hours.

A Dutch game called We-Energy can also be tailored to your home town. While other games are based on designing a future world in some fictional area, this game is centered around an actual map. Players then have to propose specific locations, which the other players from the same town will also know. The game thus not only covers the tradeoffs and benefits of various technologies, but also includes the aspect of public approval. When a wind turbine is proposed, for instance, players know the site and can comment on it from experience.

In English, Carbon City Zero has players act as town mayors to become the first zero-carbon city for heat supply. This game also includes such social aspects as public apathy. Like We-Energy, it is a board-and-card game. The Great Energy Escape is much different; it's a kind of escape room. Players first view two videos made by the two "forces" trying to take over the town: one wants to switch completely to renewables, while the other wants to foil the attempt. The participants then search the room for clues; the goal is not, however, to escape from the room, but to discover the renewable energy supply that the good scientist has tried to keep hidden from her evil counterpart. In Germany, the Center for Political Education (BPB) solicits proposals for new simulation games.

Whether you are playing such games or developing your own, you'll want to be aware of one potential pitfall: designing "winning" outcomes that players may not agree with. When games make assumptions about technologies, players may spend time arguing, say, about the rating for the environmental impact of battery storage. These discussions are useful in reality; indeed, one could argue that they should be the goal. But in many games, these talks between players about the game's assumptions are beside the point, not the point itself; they slow the game down and do not affect the outcome at all. Players may then leave the game frustrated, feeling that they were forced to play by rules they disagreed with just to finish.

The solution is obvious: make the game's assumptions the whole point. "The players should discuss the game's constraints," says British researcher Bradon Smith of the University of Bristol. "Otherwise, you end up with a technocratically predetermined winning situation that the players are merely trying to discover."

Such games could then also do without "winning" as a goal altogether; participating in the learning experience would be enough.

4 EDUCATIONAL MATERIALS AND WORKSHOP IDEAS

Smith himself works on energy in literature (see the My Friend Jules project in Stories for Change), and that field opens up many new possibilities of participatory talks without winners and losers. For instance, participants can be asked to write about energy – but with guidance. After all, everyone would probably have writer's block if simply asked to start writing about energy. Fiction writers have therefore developed a staged approach that can be easily copied:

- First, close your eyes and think of your last experience with energy: plugging a cable into a socket, making a fire, walking through a wind farm, whatever.
- Imagine what you see – then what you smell, hear, feel, and taste.
- Now write down adjectives describing those sensations. In the next step, turn those words into sentences – and finally, into a paragraph-long story.

The goal here is merely to have people talk about how they relate to energy. People read their brief "stories" to each other, and others can react. Because of the inherent subjectivity, disagreements are less likely than in games based on assumptions about environmental impacts, etc. The result is more likely to be a friendly conversation than a divisive debate.

Museums are places where such non-competitive learning seems natural; exhibitions are generally more about the experience of the visit that about discovering a predetermined winning outcome. Other options include pub quizzes in which the questions are all about the climate. They can be tailored to the audience and include young people. If you speak German, Klimafieber (Climate Fever, PDF in German) contains a number of quizzes and games for young people.

Adults learning how much electricity they can produce on a bike and what appliances they could power with that amount of energy. Source: AEE.

Germany's powerado project consists of 10 modules for schools. The kits allow pupils to make measurements, conduct experiments, and play games. For instance, pupils build miniature wind turbines that power a diode when blown on. In one game, visitors from outer space come to Earth to learn about energy, and the Earthlings (pupils) have to decide which of the visitor groups will use the energy best – the other visitors are not told any earthly secrets.

In Germany, an environmental education program has been running for 15 years to spread not only into schools, but even kindergartens. The children learn about how sheep make biogas, how biodegradation

works, what water seepage is, and why plastic does not get recycled in nature. The whole thing takes place at the local municipal waste recycling facilities.

Films are also available, For instance, the German Climate Consortium (DKK) created a Massive Open Online Course (MOOC) in German and English. Moderated by leading journalists, the course is presented by top German policy analysts and climatologists. The viewing experience can be made more memorable by having pupils ride bikes to power a generator for the projector. At one school in Berlin, ten bikes were needed to keep a film running. Pupils thus got a good idea of how much energy they consume in everyday activities.

Often, schools look for ways to anchor such projects in the overall curricula. The 50/50 campaign provides materials that allow pupils to participate in the discussion about energy conservation and financing. These materials can be used in a wide range of classes:

- In **physics**, pupils learn about energy flows and how to measure energy.
- In **geography**, they investigate global resource distribution and consumption.
- In **chemistry**, they learn about the composition of fossil and renewable energy sources.
- In **ethics**, they discuss climate justice and sustainability.
- In **IT/math**, they visualize the measurements they make.
- In **German**, they write reports about all of their findings from the project.

5 EVENTS AND COMPETITIONS

Events and competitions can motivate communities to become more active in the field of climate education. The NGO co2online launched the Energiesparmeister (energy conservation expert) competition with help from Germany's ZDF (TV "Channel 2") and the German Environmental Ministry. A jury decides what school projects for the Energiewende are the best; the winner in each of Germany's sixteen states is awarded 2,500 euros.

A classic example was the winning school in Saxony, where pupils conducted an energy audit of their buildings and proposed steps to parents and teachers. When the results were in, pupils presented them at other schools in the town of Zwickau and to city officials.

The wide range of projects that won in 2019 shows that "energy conservation" is loosely defined. For instance, a school project in the City-State of Bremen won by getting rid of plastic at the school's kiosk and providing a zero-waste school breakfast. The service organized by pupils later expanded to include plastic-free hot lunch for teachers.

The competition has inspired state governments to support school projects. For instance, Saxony-Anhalt launched a campaign in 2014 that provides expertise to school projects. In 2017, 14 schools took part. The winner was a 50/50 project from the capital city of Magdeburg. The revenue was used to ensure that climate education continues; for instance, a geocaching trail takes pupils along stations where they can learn more about job opportunities. Since 2008, Berlin has had a competition called Berliner Klimaschulen (Berlin Climate Schools). Klimakita is a similar campaign for daycare centers in North-Rhein/Westphalia.

In the Kinder Meilen (children miles) competition, children aged 4-12 note how many trips they made by foot, bike, skates, and public transport. The resulting Green Footprints are then presented at the annual UN Climate Conference. Materials are available to those wishing to participate.

School projects also connect people across international lines. For instance, the twinned cities of Marburg-Biedenkopf (Germany) and Koscierzyna (Poland) are launching joint school projects in which pupils will learn to build mini solar vehicles. But most of the joint project is devoted to sharing knowledge about community energy cooperatives and energy-renovations of school and other municipal buildings.

6 ADULT EDUCATION

Broad climate action is only possible if adults have the right information and awareness. Furthermore, communities can do a lot in the energy transition, but tasks like district heat require cooperation between numerous different players. The challenge for the heat transition is thus to create a platform that brings together craftspeople, building owners, (potential) providers of waste heat and renewable heat, and city officials. For many of those involved, the heat transition is a new issue. A manufacturer, for instance, may have heat to sell, but as a waste product, not their core business. Likewise, building owners may not know the payback of investments in energy renovations and renewable heat. In 2016, the AEE therefore produced guidelines (PDF in German) on creating a such local platforms as meeting places for the heat transition.

Such learning platforms help district heat networks get created. Right now, the city of Kehl is implementing a smart district heat network connected to numerous consumers and suppliers of green heat. The "smart" part is that heat producers will receive signals incentivizing them to export more or less heat to the network to suit momentary demand. And one reason why this heat network was created in Kehl is that word got out about the good example set by the nearby town of Offenburg, whose own smart district heat network is currently being expanded. For all of these projects, awareness-raising platforms were used to get local citizens and businesses involved.

Other educational platforms have also made a difference. Created for the United Nations Decade of Education for Sustainable Development (2005-2014), Germany's National Platform on Education for Sustainable Development (BNE) still offers programs for all age groups. The topics range from climate action to globalization, responsible consumption, cultural diversity and social justice.

One example of a program supported by the BNE for adults is the University of Tübingen's Competence Center for Sustainable Development. New interdisciplinary and transdisciplinary courses were developed, and steps were also taken to make the Center's own work more sustainable. For instance, reusable cups replaced throw-away cups for coffee to go.

Another BNE-supported project is Bremerhaven's Klimahaus. As its executive director and co-developer Arne Dunker puts it, "More than a museum, we are about experiencing science." Visitors young and old experience nine different global climates in Klimahaus – from the cold of the Arctic to the humid heat of Niger. In addition, Klimahaus has special areas, such as the World Future Lab, where visitors play simulation games like those mentioned above. The challenges range from saving a South Sea island from rising sea level to creating a sustainable neighborhood and making sustainable products.

The art world has long been interested in the climate world – and vice versa. Since 2011, PIK – Germany's leading climate research institute – has had an artist-in-residence program. For instance, Chris Jordan took the famous photo of the dead bird whose insides were filled with ingested pieces of plastic. Germany's Environmental Agency UBA also uses art to draw attention to sustainability issues and provide spaces of creative learning and reflection.

The AEE's paper on renewables and tourism also contains links to numerous hiking and cycling paths that have energy and climate information along them to educate visitors.

Furthermore, various civil society groups have created educational platforms for climate action. The Protestant and Catholic Churches in Germany, for instance, have joined forces in the Zukunft einkaufen (Shopping for the future) project, which helps church members make more sustainable purchases.

Fairness can rarely be decided "objectively" by experts alone, as the debate over legacy emissions shows. People have to speak with each other and compromise. Reducing consumption to a fair level will still be a challenge, but one that more people are committed to tackling. The discussion that comes out of the educational process thus turns citizens into active participants in climate change mitigation – citizens who might want to move faster than policies currently require.

[1] For a technical review of Keep Cool's impact on players, see this PDF.

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