

The energy issue

In recent years Russia's new role as a global energy power has been much reported. There is growing awareness of Russia's vast reserves of energy, which include over 20 percent of the world's natural gas and at least seven percent of oil reserves, and the increased political power this gives to the country.

However, much less information is available about other energy issues in Russia and the former Soviet Union. This issue of the newsletter provides a few snapshots of some of these,

In a world where energy security is such a pressing concern, energy efficiency measures must gain ever more importance. Natasha Podkovyrovna gives an interesting

account of an educational project looking at energy-saving issues from a theoretical and a practical point of view in an Irkutsk college. Katy Harris provides a more detailed account of the EcoDom project (first mentioned in BREN Issue 6), examining both the practical construction issues facing ecobuilders in Siberia and some of their ideological concerns.

An overview of the energy crisis in Tajikistan provides a fascinating insight into the 'post-peak-oil' world and Alla Lytvynenko outlines the energy challenges for the neglected municipal sector in Ukraine.

With energy questions looming so large on the world stage, it may seem that small-scale initiatives driven

by individuals and organisations are irrelevant, given their size when compared with the mighty energy companies and the vastness of the problems and threats. However, as it says in the article on the Altai "...a few local people with a solar panel fighting multi-national corporations and government-funded development programmes" can bring about results and hope for the future.

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Georgia's green future

Candice Sly is a postgraduate student at the School of Slavonic and East European Studies, University College London. She visited Georgia in September 2007 as part of a study visit for youth environmentalists, funded by the EU Youth in Action programme and organised by Georgian NGO Greenway together with UK voluntary organisation Look East Wild Earth. The group spent a week in Georgia to learn more about domestic environmental issues and to exchange new ideas and experiences. The trip included a visit to Borjomi-Kharagauli national park, an important illustration of what can be achieved through constructive cross-border co-operation.

Borjomi-Kharagauli is one of Europe's largest national parks. Covering 76,000 hectares of native forest and sub-alpine and alpine meadows, the territory not only envelops almost one per cent of the whole of Georgia, but offers permanent sanctuary to many rare and endangered species of flora and fauna.

A forest walk on a Georgian autumn day was never going to disappoint. Weaving up the mountain



side, the array of colours was staggering – further proof of Georgia's renowned natural diversity. It was clear to see that the park was well maintained and impressively accessible to tourists: clear routes, information, guides and accommodation were all available. Thanks to the German government and the Worldwide Fund for Nature (WWF), Borjomi is the only protected area in Georgia to have a management plan. In late 2006 Borjomi was certified by WWF as a

Protected Area Network (PAN) Park – an initiative to create a network of Europe’s most outstanding parks where combining nature conservation with sustainable tourism takes precedence. So far there are nine such parks. Borjomi-Kharagauli received PAN status in recognition of its high standard of biodiversity and management.

The management team has placed great importance on involving the local community in the park’s future. We met with consultants financed by the German-government-owned development bank, KfW Entwicklungsbank, and learnt how people living within the park’s new official boundaries have been affected, including by a hunting ban. New ways to support the park inhabitants’ incomes have been developed, such as sustainable tourism enterprises. This is also great news for tourists, who now have the chance to stay in the homes of local people and experience the world-

famous and justly renowned Georgian hospitality.

Since the collapse of the Soviet Union and worsening relations with Russia, tourist numbers in the park and the famous spa town of Borjomi have fallen. Yet the last few years have seen something of a tourism renaissance in the area and, with the park now gaining international membership of the PAN network, WWF hopes to further enhance the reputation of the park.

Borjomi sets a model example of how it is possible to benefit from your environment without simultaneously causing its destruction. With any luck, the success of the park will permeate through to other natural areas in Georgia also in desperate need of protection from commercial mismanagement, such as illegal logging. From a personal perspective, a trip to Borjomi-Kharagauli proved well worth

the two-and-a-half-hour drive from Tbilisi. Bears and eagles included, it’s a real chance to experience Georgia’s wilder side.

Further Information and contacts

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*A direct link to the study visit report is available on the **Greenway** website: www.greenway.ge/*

Borjomi-Kharagauli National Park: www.borjomi-kharagauli-np.ge/

Look East Wild Earth:
www.lookeast.org.uk

Youth in Action: www.britishcouncil.org/connectyouth-programmes-youth-in-action.htm

Education on energy Baikal Wave’s school partnership

In 2006 Baikal Environmental Wave’s Cost of Energy project developed a model for energy-saving in schools and colleges in Irkutsk, Eastern Siberia. Previous experience with our partner school, College No. 1, had proved them to be happy to step outside the traditional educational framework and take part enthusiastically in varied and creative activities.

The project aims were outlined as being to engage and teach students, staff and those responsible for school facilities about saving energy at the college and to benefit economically from energy saving.

Work began with an interactive seminar on energy issues and a presentation by the Director of Irkutsk Technical University’s innovation centre, Energy Effective. The centre had been asked to conduct an energy audit of the college. The results included infrared pictures of the school, which made it easy to identify the worst areas of heat loss.

The Director suggested different ways to alleviate this loss using large-scale, expensive measures (such as replacing the heating system), as well as small-scale, low-budget ones (such as draught-proofing windows,

removing things covering radiators, installing heat-reflecting screens behind them and putting in energy-saving light bulbs).

Next, three work groups were set up to undertake research, information and education and practical activities. When the survey of students’ attitudes conducted by the research group revealed a lack of knowledge about and interest in energy issues, it was decided to organise visits to Irkutsk hydro-electric dam, the new Irkutsk combined heat and power plant and Olkhon Island on Lake Baikal, where there are working examples of alternative energy.

The information and education group was responsible for producing posters, booklets and stickers asking people to conserve energy, promoting the project on the college website and conducting awareness-raising activities in the college.

Meanwhile the practical group worked on the library, which was chosen as the demonstration room. They investigated regulators to put on the radiators and calculated the amount of insulation material required for the windows and the wall behind the radiators and the number of energy-saving light bulbs needed.

The implementation of these practical measures gathered quite an audience.

The visits, to Olkhon Island in particular, raised some interesting issues. The students saw solar panels, solar ovens and small domestic wind turbines, as well as some of the actual and potential negative impacts of the submerged pipeline constructed in 2005 to bring mains electricity to the island. These include soil erosion around the platforms on both shores, destruction of the natural environment, more tourists bringing more litter and holiday home construction.

Overall the project provided an excellent opportunity to consider and discuss a wide range of energy-related issues, visit and learn about a number of local power plants and implement practical, energy- and money-saving initiatives at the college.

*This is an abridged version of a more detailed article by **Natasha Podkovyrovna**, energy-saving project manager at Baikal Environmental Wave nata@baikalwave.eu.org and translated by **Stephanie Ward** of Look East Wild Earth. The full article can be found at www.lookeast.org.uk and more info on Baikal Wave at www.baikalwave.eu.org*

Shine on Golden Mountains!

The Altai has some of the largest mountains and most beautiful landscapes of Russia. The Ukok Plateau, high in these mountains where the borders of Russia, Kazakhstan, China and Mongolia converge, is the latest target of large-scale energy proposals: Russia is planning a gas pipeline to China and in 2006 announced the planned route through Ukok. With winter temperatures of around -50°C, this mountain plateau is reached through high passes accessible only between May and September. The only easily accessible route, even in summer, is from the Kazakh side.

Ukok's dry beauty, inaccessibility and situation at the intersection of four great Asian nations has made it a place of symbolic and religious importance to the many tribes inheriting the region over millennia. It is sometimes referred to as the Altar of Eurasia. The plateau is between 2,000 and 4,500 metres high, covered with glaciers, glacial lakes and bogs. The most significant rivers of the region – Katun, Khovd and Irtysh – all flow from these icy heights. And the Russian legend of the land of Belovodi ('white water' – not dissimilar to Shangri-La) is often said to stem from here, among the glacial, blue-tinted waters, alpine meadows and high mountain steppe in the middle of the central Asian mountains.

A huge number of rare plants and animals inhabit the region, including the snow leopard, Argali sheep, Manul cat, mountain goose and Steppe eagle. The area has been part of the 'Golden Mountains of the Altai' UNESCO World Heritage Site since 1998. The archaeological heritage of the region

is no less rich. Discoveries of remains of ancient Turkic and other cultures were made during the 1990s, the most amazing being the excavation of a *kurgan* (burial mound) from the Pazyrak culture of the early iron age (6000-1000 BC), where the well-preserved 'Princess of Ukok' was found, complete with intact remnants of clothing and belongings. These belongings led to new discoveries about the Pazyrak culture. Greek coins, Chinese jewellery and Indian silk provided evidence of trading, while buried horses led to theories of a horse-worshipping culture.



Fund for the Altai 21st Century (Altai 21) is a small NGO based in Barnaul. Fighting against large-scale energy developments that threaten the amazing natural landscapes and biodiversity on its doorstep has always been central to its mission. The economic sense of building a pipeline through such remote and mountainous terrain is being questioned by environmentalists – not to mention the potential damage to the natural and cultural landscape. The campaign against this energy giant echoes a much older, but still unresolved, campaign by Altai 21 against the construction of a large-scale hydro-dam on the Katun river, one of the last large dam-free rivers of Siberia, flowing through the heart of the Altai mountains. The proposal to dam

the Katun dates from the late 1980s and early 1990s when, at the height of *glasnost*, protests resulted in plans being halted. However, the proposals have recently been resurrected and public consultations, meetings and planning for the project continue.

The need to demonstrate alternative futures which do not involve large-scale, destructive energy projects, such as the Katun dam, led Altai 21 to develop demonstrations of alternative energy and to support eco-tourism initiatives. A small education centre and tourist lodge has been developed at Chermal, complete with straw-bale houses and solar panels, and named Milky Way after the stars that shine so brightly in the clear mountain air.

These campaigns may sometimes seem like 'David and Goliath' – a few local people with a solar panel fighting multi-national corporations and government-funded development programmes. In fact, protests led by organisations like Altai 21 have so far protected the Altai from developments such as the Katun hydro-dam. Even in cases where development does proceed, citizens' campaigns, such as the campaign against the Lake Baikal oil pipeline in 2005, are often vital in diverting the projects away from the most valuable and fragile landscapes and ecosystems and ensuring that at least some of the wilderness and beauty remains.



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Dom-tastic!

Eco-building in Siberia

Eco-Dom, a project to design and develop eco-building techniques and eco-houses in western Siberia, was begun by Igor Ogorodnikov over 20 years ago. Close links with the Institute of Thermal Physics in Novosibirsk have allowed academic research on energy efficiency in building and heating techniques to be conducted and published in academic journals. Eco-Dom is now involved in plans for larger-scale projects in nearby Novokuznetsk, as well as the original 'eco-village' near Novosibirsk.

The first Eco-Dom site is a small village just outside Akademgorodok, the university campus suburb of Novosibirsk. As we drove down an almost deserted road in late January, between snowy fields and tall groves of birch lit by the late afternoon sun, the village had a fairytale setting. The houses are large by Russian village standards, more similar to a typical detached German house in style. We first visited Igor's brother, who lives in one of the two straw-bale builds of the village. Ushered in, we found ourselves in a hallway tastefully lined with wooden panels and bookshelves. Typical of self-builders everywhere, several rooms and the veranda were unfinished, waiting for the return of the hot summer weather and further enthusiasm to finish them off.

While I felt the house to be pleasantly warm, my Russian friends were shocked that anyone could live in such a cold environment. Urban Siberians mostly live in centrally-heated tower blocks with space heating provided by piped hot water from a district heating plant, controlled and paid for by the local council – the benefits of cheap energy in an oil-producing nation! I have never been in an urban Siberian flat in winter where the indoor temperature was less than around 25°C and personally I have to sleep with the window open even when outside temperatures are -15°C!

Igor's own straw-bale house next door is also unfinished and not yet inhabited. Covered with a pale pink render, it looks similar to straw-

bale houses I have seen in eco-developments in the UK – not surprising, as Igor learnt his building techniques during a month-long course in the USA, organised by the NGO Sacred Earth Network.



Some of the other earlier eco-builds do not look as pretty – covered in reinforced concrete, with flat roofs, they are reminiscent of army

bunkers. They are, however, effectively insulated, with thick walls and a high thermal mass. While the outdoor temperature was nearing -20°C, the inside, even in the house not currently being heated, must have been between 10°C and 15°C. These houses are experiments in learning how to adapt eco-building techniques to the extreme continental Siberian climate (where winter temperatures frequently fall below -30°C and summer temperatures near 40°C.)

The houses use passive solar gain, with larger windows on south-facing walls – a successful technique here as elsewhere. Ground-source seasonal heat stores, using wires deep below the ground to source heat, take the chill off the very worst of the Siberian winter freeze over a period of months. While Igor says these have worked well, they have been abandoned for later houses, as the design is impossible to maintain and repair once the house is built on top of them.

Solar photovoltaic panels are planned for the entire south-facing wall of one house. Now that Chinese manufacturers are exporting inexpensive panels, affordability and availability in nearby Siberia has increased rapidly. Solar panels in Europe are usually placed on sloping south-facing roofs, the most efficient angle to catch the sun. Not so in Siberia – while the angle of the sun and latitude are almost identical to the UK, anything placed on a roof would be covered in thick snow from October until May! So panels are placed instead on the sunniest vertical walls.

Another experiment has been working on new types of heat exchangers, a very important part of house ventilation in a climate where incoming air may be well below -20°C for several months of the year! The trick in Siberia is to build one that does not instantly freeze solid as outgoing warm air and condensation meet incoming icy air. Designs have included novel, fan-like spinning discs so that movement prevents freezing.

The eco-housing development was originally planned to be an eco-



village community. However, few of the residents interested in living in an intentional community had the money to invest in building a house and so the village was developed simply as a group of houses built by and for people who had the capital to invest in construction. The result is, to Igor, not entirely satisfactory. While some people entered fully into the spirit of eco-housing, others were more interested in developing a large detached house and the 'eco' elements of several houses in the village are little more than a token gesture. As prospective house owners were paying for and often building their own house, Igor and the Eco-Dom project had few means to insist on specific building techniques. In hindsight, Igor would have liked to have given far more attention to strict land leases which would incorporate eco-building standards as a requirement of the lease.

The development, while impressive in terms of the energy efficiency of building techniques, illustrates several of the problems of regular housing developments familiar to all of us. Most urban Russians currently live in small, compact flats in multi-dwelling buildings, heated centrally by a district heating plant and close to amenities and good public transport links. The eco-housing village, however, is out of town, with an infrequent bus link

and no shops, meaning most residents purchase a car. Houses are large and detached, making them expensive to heat (usually with wood pellet or multi-fuel stoves), even when the amount of

*How do you adapt
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temperatures near
40°C?*

space heating needed is comparatively small due to efficient insulation. While maybe not a direction in lifestyle that eco-enthusiasts would want to promote, Igor feels he is justified in developing eco-technologies for this kind of house, as detached out-of-town housing developments, unknown in the Soviet Union, are currently the most rapidly booming housing sector in Russia.

The other projects that Eco-Dom is involved in, however, take different housing models. Igor is advising a network of people in Novokuznetsk, an industrial town several hours' drive from Novosibirsk, who aim to build eco-houses on plots of land of a size that would also allow them to be self-sufficient in food production. He and his wife have bought a plot of land near the town and hope to build a house there too. Eco-Dom is also currently in discussions with the town council of Novokuznetsk and a consortium of construction companies about forming a partnership to build a new, larger-scale commercial housing development with multiple-dwelling buildings built on eco-housing principles. Maybe the idea for this project had its origins when Igor visited BedZED during a trip to the UK in 2006?.

Katy Harris visited the Eco-Dom project in Novosibirsk in January 2008 (katy@lookeast.org.uk). Look East Wild Land (www.lookeast.org.uk) is a project to link UK environmental organisations with similar projects in Russia and Eastern Europe.

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The Eco-Dom website (in Russian) is coming soon: www.z42.ru*

News in brief

Tajik energy crisis

During this year's exceptionally cold winter inhabitants of the small Central Asian republic of Tajikistan were left without electricity or heating. Each year, as the water for the vast hydro power stations in the foothills of the Pamir Mountains freezes, electricity becomes scarce and rationing is put in place. This year rationing was severe, with electricity supplies to industry stopped and only a couple of hours of domestic electricity supply per day in the main towns, such as the capital, Dushanbe, and none at all in smaller towns. As houses in Dushanbe are mainly heated by electricity too, this left most people without heating at the coldest time of year.

Relief comes only with the spring thaw: as the snows melt, the rivers unfreeze, water begins to flow and the power comes back on. The hydro-electric capacity of Tajikistan's mountainous terrain is huge, but that doesn't help in winter! Luckily for some, climate change is warming the earth, bringing the thaw several weeks before it was expected.

While environmentalists complain about the destructive nature of large-scale hydro power stations in the mountains, economists plan to tap the vast hydro-electric resources of Tajikistan's Pamir Mountains for export – potentially the biggest source of energy available for Central Asia. Russia and Iran are already planning to invest in hydro power stations aimed at export. It can be seen from the problems mentioned above, however, that hydro power cannot be the whole answer to Tajikistan's electricity problem – not without some very significant global warming...

Tajikistan can, in some ways, be seen as an experiment: it is, in effect, already living in a 'post-peak-oil' world – reliant on its own plentiful but seasonal renewable resources, without access to the cheap oil which still fuels the rest of the world. Due to geographical isolation and mountainous terrain, the only feasible power links are with Uzbekistan. While importing electricity from Uzbekistan in winter, in

return for exporting excess hydro power in summer, would be one solution, fragile and unstable relations between the two countries, coupled with poor infrastructure, has not allowed this to happen, throwing Tajikistan back on its own resources.



This illustrates the point that finding and using sources of renewable energy is not enough to solve the world's energy problems: the biggest challenges come in finding ways to store energy, and ways to exchange energy between different geographical locations with different types of resources available at different times. This means that international co-operation is potentially key to the question of energy security.

When I first about an environmental NGO in Tajikistan working on energy-saving education programmes in collaboration with European partners, my first response was amazement. Why start with Tajikistan, if we are trying to reduce the world's energy consumption? It is, after all, hardly the largest consumer of energy supplies. Yet energy saving is, in fact, a vital issue of human rights and livelihood for the inhabitants of Tajikistan if they are to stay warm in winter. It is by far the simplest and most effective grassroots solution to the challenges of improving the livelihoods of the people of Tajikistan and helping to provide the basic needs of warmth and light in the frozen winters of Central Asia.

Written by Katy Harris (katy@lookeast.org.uk), with information provided by Timur Idrisov (forearth@yandex.ru) of For the Earth, Dushanbe.

Baikalsk from pulp mill to bottling plant?

In January 2008 Coca-Cola Co's bottling partner in Russia began its assessment of a proposal to convert a doomed Siberian pulp mill on the shore of Lake Baikal into a bottling plant.

The future of the Baikalsk Pulp and Paper Mill is in the balance. Despite plans to fit a 'closed loop system' that would recycle water, a project to be funded partially by the World Bank (see BREN Issue 5 2006), the mill now faces legal action for polluting Lake Baikal. In January 2008 Rosprirodnadzor, Russia's environment agency, increased its lawsuit against the mill to nearly US \$130 million.

Constructed in 1966, it has taken the government 40 years to become concerned, despite ongoing protests, about the environmental impact of the mill. Aside from the lawsuit, Rosprirodnadzor is also suggesting that the mill be converted into a bottling plant. In the opinion of Oleg Mitvol (Deputy Head of Rosprirodnadzor) reprofiling the plant to produce bottled water would be a chance to solve both the ecological problems and the social issues of new employment for the Baikalsk people.

Coca-Cola was the first company to receive the proposal, with Rosprirodnadzor saying it would provide assistance to the drinks giant. Coca-Cola has already invested over 1.5 billion US dollars in the Russian business. However, Oleg Mitvol claims, "It doesn't really matter whether it is Coca-Cola, Pepsi or Schweppes, as long as production doesn't pollute Lake Baikal". Given Coca-Cola's track record in terms of water pollution, perhaps Mr Mitvol should be more concerned about what replaces the polluting mill.

Energy disconnection

Energy efficiency & the municipal sector in Ukraine

Ukraine inherited an energy-intensive and centrally planned economy from the Soviet Union. Since independence in 1991 the economy has been undergoing structural changes, during which energy consumption has decreased. However, Ukraine still uses 3.3 times more energy to produce each unit of GDP than EU member states.

Increasing energy efficiency is regarded as the best way to decrease greenhouse gas emissions caused by human activity. It also promises reduced energy use per unit of production and improved security of energy supply (Ukraine depends heavily on supplies from Russia).

Worldwide the municipal sector is a major energy end-use sector. In Ukraine the sector uses about 30 per cent of total energy consumed.

The drive for economic growth in Ukraine meant the industrial sector was prioritised for restructuring and renovation. Privatisation of large industrial enterprises from the early 1990s has resulted in GDP growth since 2000. Meanwhile, however, the residential sector, housing stock and municipal utilities have been neglected, with almost no replacement of old equipment and infrastructure, meaning

municipal utilities have been unable to meet standards of service provision for households. Consumers constantly report low indoor temperatures in winter and no hot water supply.

During the Soviet period district heating systems provided heating and hot water to almost all households in towns and cities. But due to the unreliability of these systems many households have started to install private boilers and disconnect from district heating. This will increase greenhouse gas emissions – from centralised boiler houses it is possible to reduce or capture emissions, but from individual boilers it is almost impossible.

Unfortunately, one of the main investors in the rehabilitation of the municipal sector in Ukraine, the European Bank for Reconstruction and Development (EBRD), is considering funding projects which involve the decentralisation of heating and hot water supplies. There are several applications from municipal enterprises (Dnipropetrovsk, Kharkiv, Vinnytsya) to switch to individual household boilers. Since the EBRD prides itself on integrating environmental considerations into every project, it should not be considering these

decentralising projects, especially when European countries are encouraging the development of centralised district heating systems due to their efficiency. Instead it should support and recommend government and local authorities to consider upgrading district heating systems and increasing energy efficiency.

A number of laws in Ukraine have been passed to encourage energy efficiency. However, more work is needed. Ukraine could use a number of mechanisms to raise energy efficiency in the municipal sector and decrease greenhouse gas emissions. As a party to the Kyoto Protocol, it could use Joint Implementation to invest in renovation projects.

The energy strategy to 2030 focuses mainly on energy supply security through the restructuring of sectors of the economy, albeit taking energy efficiency measures into account. However, there is an over-emphasis on the exploitation of fossil fuels, such as coal, rather than energy efficiency.

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Sakhalin victory!

Gazprom pipe dream in tatters

Environmental activists and indigenous peoples internationally and on Sakhalin Island are celebrating the successful culmination of four years of campaigning. On 3 March 2008 Sakhalin Energy, a conglomerate of oil companies led by Shell (and latterly Gazprom) announced the withdrawal of its request for government backing for its controversial Sakhalin II project. The multi-billion dollar project, as reported in previous issues of the BREN Newsletter, was to construct oil and gas platforms and an 800km

pipeline across the island in the Russian Far East.

“We celebrate this tremendous victory”, said Dmitry Lisitsyn, Chair of Sakhalin Environment Watch. “Since its inception over a decade ago, Sakhalin II has committed severe environmental violations. Every day new negative impacts are being seen, including now in Aniva Bay, where project sedimentation is negatively impacting our local scallop fisheries.” This is in addition to threats to the breeding grounds of the critically endangered western grey whale.

“The company has been unable to secure financial support”, said James Leaton, Oil and Gas Policy Advisor for WWF-UK. The fact that financing for Sakhalin II from the US government Export-Import Bank and UK government Export Credit Guarantee Department (ECGD) is being withheld means that any other bank considering financing the project (such as Royal Bank of Scotland and the Japan Bank for International Cooperation) faces greatly increased political and financial risks, as well as threats to its reputation.

Renewable energy from Dnipropetrovsk to Machynlleth

Oleksii Marianenko spent six months volunteering at the Centre for Alternative Technology in Machynlleth, Mid Wales, from September 2007 until February 2008, supported by the European Voluntary Service programme. His sending organisation is MELP (Youth Environmental League of Pridniproviya), a voluntary organisation in Dnipropetrovsk, Ukraine, which also has a strong interest in energy issues.

I grew up in the large industrial city of Dnipropetrovsk, in Ukraine, which became famous for the nearby great tank battle in the Second World War. After secondary school I decided to become a renewable energy engineer. I thought it sounded great, not like other ordinary professions! It's new knowledge and new technology! As I studied I came to realise all the advantages of renewable energy for everyday life.

In 2006 I participated in the Youth and Environment Europe (YEE) annual conference in Prague and attended a presentation given by Katy Harris on the Centre for Alternative Technology (CAT) in Wales. At the time it was my dream to go there - and it came true! I became the Ukrainian renewable energy volunteer at CAT.

CAT was founded over 35 years

ago in an old slate mine with the aim of promoting sustainable and organic living. Today CAT is well known nationally and internationally and the whole centre is like a renewable energy exhibition. Electricity is produced here by three wind turbines (75kW), two water turbines (7kW) and photovoltaic panels (18kW).

I came to CAT at a time of big changes – a new wood-chip boiler combined heat and power plant is being installed, capable of producing 100kW of electricity and 200kW of heat output. The project began in September 2007 and I was very happy to join in with the practical work of the installation and plumbing, as well as doing some technical drawing.

I also helped to repair and restart a water turbine and maintain the wind turbine. I'm very interested in all

aspects of renewable energy, so I used the opportunity of being at CAT to attend some courses on wind turbines and biomass space heating systems.

Voluntary work is an excellent way of getting the practical experience which most employers ask for. At CAT I received a lot of support and attention from more experienced colleagues in the large engineering department, which was fantastic!

Wales is a lovely place to live and work with its beautiful natural surroundings, very clean rivers and lots of forest. I enjoyed travelling and seeing new faces and new towns, like Cardiff, where you can see the different layers of the city, with completely new constructions and the old castle and other historic buildings. Then there are the famous Welsh beaches, which claim to be the most beautiful in the world.

Finally, I would like to say how great my time in the UK was – especially the opportunity to celebrate Christmas and New Year and have Christmas pudding! I will never forget it.



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European Voluntary Service www.britishcouncil.org/connectyouth-programmes-european-voluntary-service.htm

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