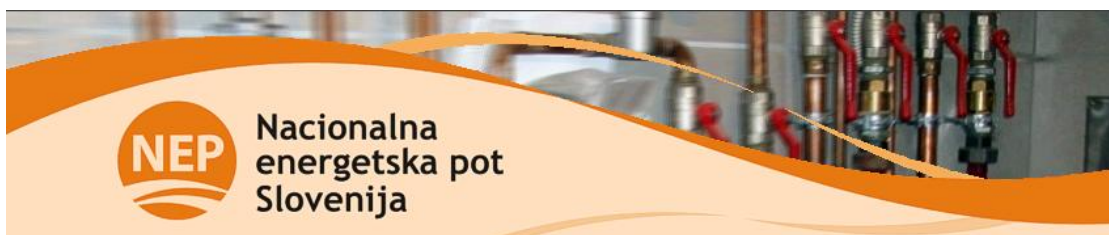


# Arch Network Exchange 10 – 17 October 2011

## Slovenia



FIONA STEWART SCOTTISH NATURAL HERITAGE

## Funders

The Leonardo da Vinci programme is part of the European Commission's new Lifelong Learning Programme and has specific objectives to improve and increase the skills and vocational training throughout Europe. This is achieved by working with a range of partners providing placements for employers, employees and those in education. Through various partners and also directly they provide funding to enable people to improve their skills base and also to exchange information. Further information can be found on the Leonardo da Vinci fund at <http://www.leonardo.org.uk>

I accessed Leonardo da Vinci funding via Arch Network which is a Scottish Non Government Organisation promoting learning and development in natural and cultural heritage between Scotland and other European countries. Trainers, students and young workers have the opportunity to gain new skills and to expand their European point of view by becoming involved in international joint working. Look up <http://www.archnetworks.eu/blog> for information on future exchanges.

Working for Scottish Natural Heritage (SNH) I am involved in a variety of nature conservation issues and I work with local authorities advising them on planning applications for many types of development including windfarms. SNH encourages personal development and I was able to seek the support of our Area Director to participate in this Arch Network Exchange.

The Vitra Centre for Sustainable Development hosted this Arch Network Exchange and Bojan Žnidaršič was our host for the Slovenian visit. Based in Cerknica he is the Director of this Non-Government Organisation which specialises on energy efficiency and renewable energy in buildings. Not only was he an excellent host ensuring that we had a full and busy agenda but he also ensured that we were informed of the culture and history of Cerknica and the surrounding areas that we visited.

# Introduction

## Slovenian Woodlands

Slovenia has a population of just 2 million and is an independent republic bordered by Italy, Austria, Hungary, Croatia and the Adriatic Sea. The country is shaped like a cockerel resulting in many tourist gifts in this shape. As we travelled through the countryside I thought there was a comparison with Ireland. This was due to the fact that although ruggedly landscaped you were never far from people. This may sound a bit strange as Slovenia is very mountainous and forested but every where we drove you could see a house on the hill, a farm or a small settlement. The highlands in Scotland must have been very similar before the clearances.



With 58% of Slovenia covered by forest it's amongst the most forested countries in Europe. According to Forest Department publications woodland ownership is now 80% private. The history behind ownership of land in Slovenia is complex but it's important to know that in 1853 farmers who had previously only had rights to cut forests in land owned by lords became forest owners. Despite nationalisation of some of the forests after World War II the majority of forests were still privately owned. New regulations were put in place in the 1960's compelling farmers to be members of co-operatives engaged in both agriculture and forestry. This later changed to allow the co-operatives to be separated into two categories -

“forest only” and “agriculture” only. Although forest management has been and still is complex, The 1993 Forest Act has resulted in forest management plans being produced for all forests irrespective of land ownership.

This attention to forest management should offset the use of wood for fuel in domestic and municipal properties. The Forest Act requires interaction of forest owners with government foresters when carrying out any silviculture activities and forest management is based on Close to Nature Forestry (CNF) which is comparable to The Forest Commission Scotland’s The Right Tree in the Right Place campaign. There are numerous government departments and non-government organisations assisting with the Forest Act aim of extending and retaining the forests and there are incentives available from the public purse to assist with this. Clear felling is not used in Slovenia and this means there is always a residual stand that must be left undamaged. We were concerned that the massive use of wood for fuel and the increase of biomass boilers would inevitably take its toll on the Slovenian Forests but the Slovenians take the management of their forests very seriously.

Over the last fifty years the forest area has increased by 31% and the growing stock by 157%.



*Slovenian natural forest*

## Three men and a woman visit Slovenia

I am interested in micro-renewables and ways of cutting my carbon footprint. Living in an old cottage with four foot thick walls it is a challenge to try to be energy efficient and “green” at the same time. I have to always be realistic in ways that I can live in a nice warm house but also try to reduce my reliance on fossil fuels for heating. I therefore was delighted when I dipped into the arch network website and saw that there was a visit to Slovenia which would allow a close look at domestic biomass boilers and the various innovative building techniques that are being used to produce low energy housing. My colleagues on this trip were Professor Colin Norton of the Scottish Agricultural College, John Ross from Highland Council and John Whitfield who runs a private consultancy on low energy use and alternative energy products. I couldn't have asked for a better mix of skills and knowledge and we had such a laugh!

Our host was Bojan Žnidaršič of the Vitra Centre for Sustainable Energy and he had organised accommodation in Dolenje Jezero which was fantastically situated at the edge of Lake Cerknica. He was a fantastic host.

When we got dropped off at night we usually just headed to the restaurant for our meal. And what meals they were! Always a local soup to start with which was really a meal in itself. This was followed by a meat course with the creamiest mash potatoes I've ever had. Suffice to say I had trouble buttoning up my cargo trousers at the end of the trip. There was always a selection of bottles with a home distilled vodka like substance. It is not illegal in Slovenia to make spirits and every one seems to have a still. The restaurants clear potent spirits instantly burned its way down to my stomach and despite an assortment of different herbs and berries in the various bottles we concluded these were for decoration only as opposed to flavour.

One night we were a little bit earlier than usual and we took this opportunity to explore our surroundings. Throughout our travels there was evidence of much building work and renovation. Dolenje Jezero was no different in this respect and we could see renovation work and new builds throughout. It still had a very rural and rustic appearance.



*Combination of old and new at Dolenje Jezero*



*A typical street in Dolenje Jezero*

Lake Cerknica lies in a depression of the limestone plateau known as karst which, due to the subterranean caverns results in it being completely drained in autumn due to the low rainfall. We walked around the edge and it was hard to believe that it was the largest lake in Slovenia as it was bone dry. It is protected by European legislation and is one of several Natural sites in Slovenia due to the many species of birds. When we were there in October there should have been water starting to appear in the lake. However it has been the driest summer in a long time and we were able to see the limestone cavern entrances and shallow depth.



*Lake Ceknica showing the limestone base and many paths created in the dry season*

## **The projects**

Our visits covered a range of different projects. It was interesting to visit the factories producing the products to be used on the low energy houses as well as those using the products. We visited three to four houses a day to look at their heating systems and talk with them about the reality of what worked and what with hind sight they would do differently. Every one was open with us and quite happily told of the cost involved in installing their biomass boilers, heat exchange systems and the cost of building their house. The innovation of some of the home owners was unbelievable. Several of the householders had adapted their own heating systems locating the best location for solar panels and building their own biomass boilers.

### *Building materials*

A typical Slovenian house was traditionally thick stone with wooden tiles. However with government grants available to assist with insulation of new housing and renovation of old there were building works in evidence every where we went. Old homes were being “wrapped” in polystyrene boards and new builds were being built with 15cm polystyrene boards which were then covered in more traditional materials to look aesthetically like an older building. This was a bit bazaar as the older buildings looked like new builds after renovation. We got the opportunity to see what was effectively a kit house and it was impressive the range of products used to ensure that the house would be sealed effectively to ensure that there would be no thermal bridges. Thermal bridges? Every house we visited, Bojan showed us the thermal bridges. These are where heat is lost from a house due to a “break” in insulation. It could be a gap in the envelope of insulating material or a stone wall dividing walls with insulation or even a poorly fitted window.



*An example of a properly insulated wall*



*a kit house*

Windows in new builds appear to be triple glazed as standard practice and at an average price of €1000 per window with spruce frames I was costing out how much it would be for me to hire a van and purchase some wooden triple glazed windows for my old cottage in Scotland! Not only that the windows we saw being produced had no trickle vents. Instead there was an option to open the windows by 3mm to provide ventilation. Historical Scotland would be delighted.

Green roofs were also on the increase although at 50 in the whole of Slovenia numbers were still small. The plastic under the grass roof is protected from weather and will last approximately 50 years. The membrane is vital to its success and there must be no plants with aggressive roots. Equally the grass must be 5-6cm in the soil or it can't survive. I was glad to hear at a presentation we were given that bamboo is not suitable for a green roof as it damages the membrane and spreads rapidly. Bamboo seems to be a favourite amongst landscape architects in Scotland and it has become a problematic garden escape.

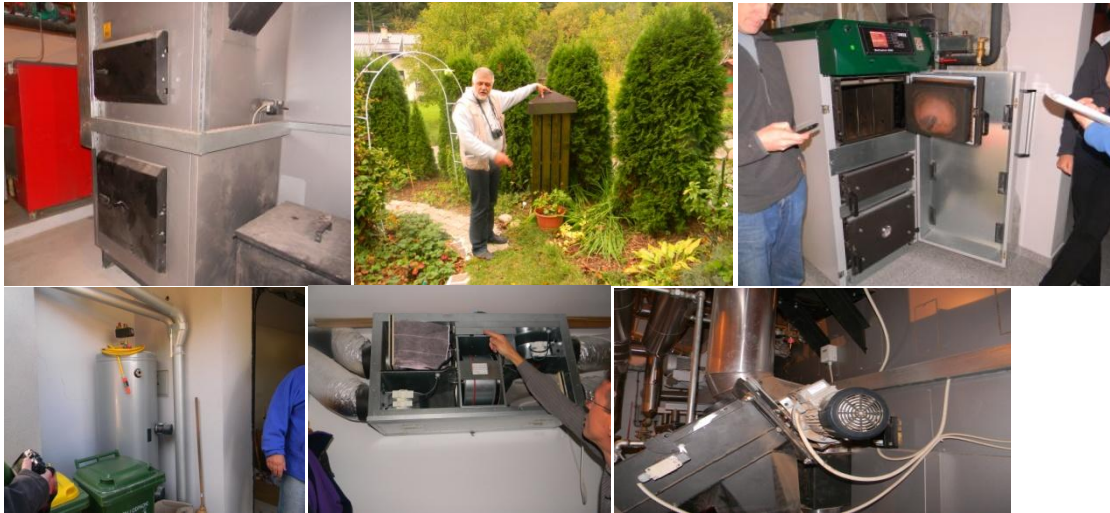
Despite the forests of Slovenia increasing over the last fifty years the quality of trees there still have catching up to do regarding having good quality timber for the production of the kit houses. At the Riko Hiše factory we were told that trees were not of a suitable quality for high standard production. Additionally the Slovenian government had concessions to export wood so there was a policy of using Austrian wood which entailed transportation costs.

The whole process of building the kit house was extremely quick. Turn around had to be a week or there would be humidity problems. All the wood was sealed so it didn't lose moisture. Likewise the windows were sealed to the walls by a tape which expanded to a tight fit within an hour. Interestingly as per usual politics were at play with the success of the Riko houses as there was a massive lobby from the cement and bricks company obviously touting for people to continue with the traditional way of building!

#### *Biomass boilers and heat exchange systems*

My head was spinning with the different kW biomass boilers and how many m<sup>3</sup> of wood they used in a year and how much water they could heat and energy output and despite a science background the way in which these boilers worked was way beyond my wee brain.





However I was interested to hear about the fact that they utilised every last bit of the wood source and that ash production was minimal with a shallow amount of ash produced for a 200kW boiler every week. This also means that there is such a little amount of smoke produced that there is not a fine particulate problem in the atmosphere. In Scotland planning authorities are keen to promote biomass as a means of reducing fossil fuel used and to help to reach ambitious Scottish government targets for the Climate Change (Scotland) Act 2009. Particulates are often a reason cited by communities keen not to use biomass. However the examples I saw in Slovenia have helped to alleviate any concerns I had and I will promote these examples of good practice. Biomass in Scotland is also a bit more problematic as often it is waste materials that are promoted as the “fuel” source which create a different variety of concerns.



*Ash from the 200kW boiler after a week of burning*

Most householders had originally used oil for fuel and traditional ceramic stoves. However the cost of oil had forced many home owners to re-think their method of heating. Even with the additional cost of installing a biomass boiler owners rationalised that the boilers would pay for themselves in several years as they were using considerably less wood despite using more energy.

### **Solar panels and photo voltaic**

Solar panels were much commoner in Slovenia than in Scotland and assisted with water heating and boosting the heating systems. Photo voltaic was also installed in one of the houses that we visited although the owner was waiting to get connected to the grid. He has an impressive number of PV's on his roof top and had also designed his house to make use of passive heating. A 2<sup>nd</sup> floor conservatory was cleverly designed to be in shade in the summer and full sun in the winter. This house had an old style ceramic stove in their living room where they dried fruits for winter consumption. Their water boiler was connected to the solar panels and despite using oil for fuel their consumption had dropped from 2,000 litres of oil to 600litres per year. They had decided that their next investment was going to be a logwood boiler.



*The house at Begunje with 54 PV's and the conservatory with overhanging roof*

Many of the houses utilised the fact that they were built into the hillside. Due to the extensive insulation they were cool in summer and warm in winter. One homeowner had a model

created of his house and as he lived in his parents house beside his plot of land he spent a whole year watching and recording the shade from the sun in order to maximise passive heat potential. The house was then located in the best possible position to gain from the sun all year round.



*Recreational area which is just starting to get heat from the autumn sun. Cool in summer as it is in shade.*

### *Passive house*

The heat exchange systems requires a sealed house in order to operate. I have never been a fan of this as I like nice fresh air in my house. However I have completely been won over on this form of heating. Using little electricity the air is filtered as it comes in. Equally it passes through filters on its way back out. Having condensation build up in my house I could see the gain to air quality as well. As the air is filtered on the way out dust is also removed. Emphasis is on ensuring all external doors are kept shut in order to retain the heat gained from heart exchange and the biomass boilers. As a passive house body heat is also part of the heating programme. The owner was quite open that she had not been keen to have a sealed house but she has thoroughly researched the pros and cons and visited passive houses with heat exchange systems to see for herself the “atmosphere” of the house.



*Passive house*



Filter for air leaving the house.  
Note the accumulation of dirt.

## **What made it for me?**

I thoroughly enjoyed the visit to Slovenia and we covered the topics I had read about in the information regarding the exchange. The agenda was tightly packed we were up at six in the morning and got back to our accommodation usually about 6:30pm. This was great though as we used all the time available to see as many projects as possible and really absorbed the culture of Slovenia at the same time. By visiting private houses and talking with the owners we got a real handle on the reality of the various low energy initiatives. We also got to see parts of Slovenia that we would never have explored had we visited the country on our own. Our host Bojan gave us a running commentary of the culture and

history of Slovenia as we travelled to our various projects and this made the trip unique and unforgettable. I could have googled Slovenia for weeks and still not have gained the knowledge of the local culture that I obtained on this trip.

The thrill of visiting a SMART house and a passive house was for me fantastic. I was amazed at just how well the passive house worked and my cynicism about the real gain from heat exchange systems soon disappeared as I heard from owners the true value of the extra heat obtained from this. Previously I had equated such systems as eco-bling that people used to show their green credentials. I don't now as I have heard about uses ranging from assisting with heating water to actually assisting with heating houses.

### **What can I use at home?**

I will promote the examples of good practice that I saw with biomass boilers and the installation of a district heat system in Cerknica. They've certainly convinced me that these systems not only work but that they are affordable and "clean". I am also in the process of blocking all drafty areas at home and have purchases polystyrene blocks to insert at strategic spots in my dormer windows in my attic bedrooms. I may even look into installing photo voltaic panels in my garden to assist with my heating bill.



## Acknowledgement.

I would like to thank my colleagues Colin Norton, John Whitfield and John Ross for being such enjoyable companions. Bojan Žnidaršič went way beyond the call of duty ensuring that we were looked after. Libby Urquhart very quickly re-organised the renewable trip in Slovenia to make sure that it could take place this year thank you so much.