



2017-1-DE03-KA219-035663

Flagship international meeting  
Bildningscentrum Facetten  
Åtvidaberg, Sweden

**APR 29-  
MAY 4**



**2019**



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# The Journey

During this project, we have all made a lot of friends from different countries and cultures. Even though we have travelled before, this was something completely new. We share this experience with people from other countries, with different cultures, which allows us to learn more about the host nation and the people that live there. Our project mates were more like friends than coworkers, which have made this project so special.

During the project we visited different countries, solving different tasks depending on which country we visited.

In February 2018 we had our first meeting in La Laguna, Tenerife, where we needed to figure out each country's social needs. The main focus became; homeless people,

students, elderly and immigrants. We also created the logotype and mainly just got the project started.

In April 2018, we visited Duisburg, Germany, where the wall construction was made, deciding on insulation, building material and calculations. A model of the wall was made, showing how it is supposed to look.

In November 2018, the travel went on to Hungary and Győr, where we figured out what the best solution for cleaning and moving the water from a water purifier station to our house is.

We also figured out how we can use grey water in our home.

In Cluny in France, we decide what electricity looks like in our house. We were divided into four groups building a box with electric components run by a solar panel.

Being a part of this project is an experience we will never forget.

Making friends we will keep for the rest of our lives. Not only making friends, learning about sustainability and renewable resources is something we will remember and have a lot of use of throughout life. It is also something we can get a lot of use of applying for jobs later on in our lives and this project is something that made us a lot closer to reality. So, being a part of this program will be a memory we keep for the rest of our lives.

David Lindgren – Sweden  
Antonio Corbacho – Spain  
Martin Csete – Hungary

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# Flagship



Flagship is a project with five different countries cooperating together to come up with a solution to a sustainable house. Coming up with the solution four things were needed to take into consideration. The house needed to be ecologically sustainable, economic, movable and modular. Students from Sweden, Germany, France, Spain and Hungary were participating in the project and during five weeks split in the different countries, the project was made.

# Target groups

In the different participating countries different groups are in need of cheap, sustainable houses, such as:

#### Homeless people:

Homeless people are in need of cheap houses that can easily be transported because of their lack of money and our houses can be a good solution for these people.

#### Old people:

Old people do not often require a lot of space and are rarely prepared to pay a lot of money for it. Therefore can these houses provide the needs old people need

#### Students:

Students studying at universities do not have a lot of money and paying for their own apartments is very expensive. Our house can then fulfil what students require, a cheap house with modular walls if needed.

#### Immigrants:

Immigrants often come in bigger groups and therefore it is not easy to get all of them home at the same time. So modular houses that are cheap and easy to combine is a good solution for solving the housing problem for immigrants.

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# Water

Without water our survival is impossible, and knowing that we are suffering a water scarcity we should consider water recycling as an obligation. In the household there are different types of water generated like grey and black water. We should also consider rainwater as a possible source of the resource.

Blackwater should be discarded because of its high content of bacteria but we still have two possible resources.

Capturing rainwater from a roof into a container can reduce expenses on the water of a household. This type of recycling is known as rainwater harvesting. One of the benefits of this kind of water catchment is that it reduces the negative impacts of urban water on natural catchments. Nevertheless, even if generally rainwater itself is considered as clean most of the time because of its contact with the catchment area some potential contamination comes into play. Some of those contaminants might be microbiological, chemical or

even debris, and this is the reason why a treatment system is extremely important.

The storage non treated water can be used for landscape irrigation, garden ponds, and most exterior applications. If it is used within buildings rainwater must be treated as mentioned before. The treated water could be used for showering, hand-washing, drinking, toilet flushing and clothes washing.

The main components of a Rainwater Harvesting System are rain, roof, collectors, tank, tank pump and a treatment system. One of the most important elements, beside rain, is that the roof surface is suitable for collecting rainwater. A gutter mesh must be installed so leaves and debris don't block gutters. Also gutter outlets should be installed in case of an undesirable obstruction. A leaf eater can be also installed to prevent blocking, this will also help to keep mosquitoes out of pipes. A first flush water diverter also called roof washer is necessary to prevent the first flush of most contaminated

rainwater to entering the tank. A tank screen is indispensable at the entry of the tank so that mosquitoes and pests can be kept out. Considering the annual rainfall of your area the size of the tank should be chosen. Another important element is the pump system which will distribute water. Last but not at least a water level monitor could be installed to help monitor your water usage. Depending on the usage of the recycled water a pressure filter or a uv sterilizer will be needed.

The main problem of every project is the budget restrictions and that's why we have to overthink what kind of treatment system we can afford. Sometimes if an inversion in such a system is not possible a simple diversion from, for example, the shower or the bathroom sink into the toilet tank might help to reduce water consumption. The only condition over this is that we will have to use the water saved in the tank in less than 24 hours.

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# Hydroelectricity



Hydro power or water power is derived from the energy of falling water or fast running water which may be harnessed for useful purposes.

Hydroelectricity is the application of hydropower to generate electricity. It is the primary use of hydropower today. Hydroelectric power plants can include a reservoir, generally created by a dam, to exploit the energy of falling water, or can use the kinetic energy of water as in run-of-the-river hydroelectricity. Hydroelectric plants can vary in size from small community-sized plants, from micro hydro to very large plants supplying power to a whole country. As of 2019, the five largest power stations in the world are conventional hydroelectric power stations with dams.

Hydroelectricity can also be used to store energy in the form of potential energy between two at different heights with pumped-storage hydroelectricity. Water is pumped uphill into reservoirs during periods of low demand to be released for a generation when demand is high or system generation is low.

Other forms of electricity generation with hydropower include tidal stream generators using energy from tidal power generated from oceans, rivers, and human-made canal systems to generating electricity. The electricity can be transported through long-distance electric lines to homes, factories, and businesses.

Hydropower is the cheapest way to generate electricity today. That's because once a dam has been built and the equipment installed, the energy source flowing water is free. But damming rivers may destroy or disrupt wildlife and other natural resources.

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# Power

One of our basic needs is electricity and that's why we need to overthink what kind of system we are going to install in our house. To establish which system is the most suitable and efficient, we should take into consideration the different sources

that will be in our geographical setting.

Most of the energy produced nowadays, even in the most environmentally aware countries, come directly from non-renewable energies, such as nuclear power,

combined cycle or natural gas. That is why an investment in systems that benefit from renewable energies like hydro, solar or wind power would be the reasonable thing because of its sustainability.



# Wind power

Before installing a small wind energy system, there are some things that must be taken under consideration in your area, like the amount of wind, possible zoning restrictions as well as the requirement of obtaining a building permit.

Some of the main components of such a system are the turbine, the tower and the balance systems components, like a controller, storage batteries, an inverter, the wiring, an electric disconnect switch, a grounding system, and finally the foundation for the tower. But how does such a system work? Small

wind electric systems use the unequal heating of the Earth surface by the sun what ultimately generate wind. This spins the turbine blades and in turn, a rotor captures the kinetic energy of the wind which will be converted into rotary motion.

There are several options of systems that use wind as a resource. Some of them are a grid-connected small wind electric system which can be connected to the electricity distribution system, a stand-alone system which is not connected to the grid but that can be used in combination with other renewable resources by

including a small solar electric system and creating eventually a hybrid power system.

To sum up it is important to remark that small wind electric systems can help you avoid the cost of having utility power lines extended to a remote location and that it can lower your electricity bill by 50% to 90%, and finally profit from home renewable energy systems.

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# Solar power



Solar Power is the conversion of energy from sunlight into electricity, either directly using photovoltaics (PV), indirectly using concentrated solar power, or a combination between these two. Solar power remains, after hydro and wind, the third most important renewable energy source in terms of globally installed capacity. In 2012, more than 100 GW of solar PV power was installed in the world, an amount capable of producing at least 110 TWh of electricity every year. Solar power is also one of the cheapest renewable energy sources with an average price of 0.38 euro cents/kWp.

Solar Power is a renewable free source of energy that is sustainable and totally inexhaustible. It is also a non-polluting source of energy and it does not emit any greenhouse gases when producing electricity. Using solar power means reducing your energy bills and saving money.

Solar panels convert solar energy into usable electricity through a process known as the PV effect. Incoming sunlight strikes a semiconducting material (typically silicon) and knocks electrons loose, setting them in motion and generating an electric current that can be captured with wiring.

So what happens when you install solar panel in your home, and how they convert sunlight into energy? First, solar panels convert sunlight to DC current. An inverter (part of your solar power system that converts stored energy into voltage is needed to run standard electrical equipment) converts this DC electricity to AC. Your home takes the energy it needs, based on the number of electrical units requiring energy. If your residential solar system is also connected to the grid, any extra, unused electricity, is fed back to the grid (or to a battery, if you have a battery backup). In cases like this, you are typically eligible for something called net metering. This is essentially a credit that is given to your energy account from the utility company. When you draw energy from the grid, because you no longer have enough solar energy to consume, net metering compensates for the amount of energy you gave the grid. In essence, it's possible to come out with a zero balance because what you put into the grid, from your solar panels, is roughly the same amount that you took from the grid, e.g. during nighttime.

# Solar power in our countries



The installation level of Solar Power has increased over the years and Germany accounts as the world's third most Solar energy user with an installed capacity of 41,200 MW, although being among the countries with the least sunshine hours, having France on the 8th, and Spain on the 10th place. Sweden doesn't account to one of the countries using much solar power, because of the lack of sun. In Hungary solar power isn't popular either also because of the lack of sun.

In generell the usage of solar power has increased, from this project i have learned that solar energy is of good use, it can easily be installed it saves you lots of money and you and it's nature friendly.



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# Insulation



Mineral wool has high fire protection, resistant to vermin, resistant to mould and decay, good insulation properties and low insulation thickness necessary. The cons are losing insulation effect in the wet, high dead weight, high energy consumption during production and bad heat storage capacity.

Price: 4-6 €/m<sup>2</sup>

Durability: for decades

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# Geothermal heating

Geothermal heating is a cheap and sustainable way to heat water. Geothermal heating use the heat from the earth to heat the water so no nonrenewable fuels are needed. Geothermal heating is a bit expensive to install the total cost of the workers and the pump can be between 11000–16000 €. But the price per month is 35 € and that's not quite as steep.

Heat pump:

Pros:

- Efficient electricity heating, ideal: 4 kWh heat from 1 kWh electricity
- Relatively independent of oil and gas imports
- With floor and wall heaters good energy balance
- Less heating costs than with oil (depending on price, see our heating comparison)
- State funding
- Grants and special electricity tariffs from many energy suppliers
- Combinable with green electricity, photovoltaic and solar collectors for hot water
- If modernized, old heating may remain "in" (bivalent operation)
- Small space requirement in the house or cellar
- Very low maintenance

Cons:

- Cost-effectiveness after practice tests controversial, especially in the old building
- High demands on the heating system:
- Optimum efficiency only at flow temperatures of up to 35 ° C (underfloor and wall heating or low-temperature radiators)
- Due to blocking periods of the electricity supplier, the heating must be storable: if necessary, buffer tank necessary
- Efficiency in practice often lower than the manufacturer's specification
- Heat source temperature only at groundwater constant: fluctuating operating costs
- On very cold days must be reheated (usually electric)
- Economy and ecological balance depending on the electricity mix
- Operation with green electricity not profitable
- Climate balance of air-water HP often worse than of gas condensing boiler
- On cold days, WPs generate peak loads in the grid instead of saving electricity
- Dependence on local conditions such as soil quality
- Only efficient heat pumps with an annual working load of at least 4 have a better climate balance than oil and gas boilers with the same heat output – often not achieved in practice
- Relatively small selection of experienced installers
- Many models contain climate-damaging refrigerant

Durability: 15–20 years

Price: from 20000 €

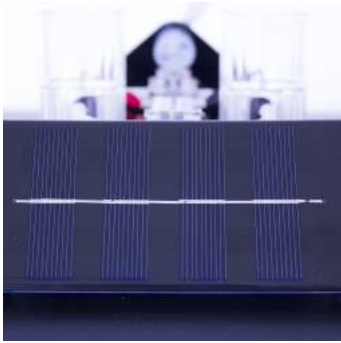
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**Tack** **Merci**  
**Köszönöm**  
**Gracias**  
**Dankeschön**  
**Thank you**





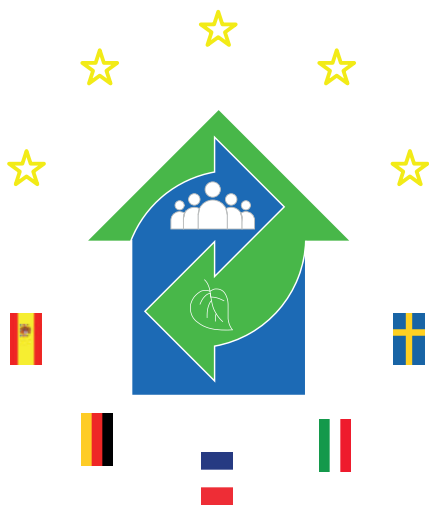
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