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# The energy house -
# A project of the *Energy Club* at Isny secondary school

Sustainable, energy-efficient, self-built - that's three words to describe the energy house in the school garden at Isny High School. This exceptional project deserves a few more words: students have been planning (since 2016) and building (since 2019) a detached house in passive house construction using largely ecological building materials. They acquire the necessary know-how in cooperation with regional partners. Even after completion, the house remains an object of learning: guided tours are planned, as is monitoring the building data in science lessons. The room will be used for special lessons, project work or as a place of retreat. In addition, we would like to anchor this place in the public eye with events in the area of "environmental education and climate protection". The students have set up the financing without public funding: Half of it comes from a savings bond loan from parents, students and teachers and half from donations, grants and a great deal of personal contribution...

## Origins

David Amann, a teacher at Isny secondary school, founded the solar association “Solarverein Gymnasium Isny e.V.” in 2005 to equip the school roof with a photovoltaic system. In addition to operating the PV system, the association is also focussing on environmental education. The board includes students, the principal (J. Müller) and the teacher David Amann, who came up with the idea.

Some time later, David began to develop a new project idea: the planning and construction of an energy-positive house on the school grounds. He spent three years planning with the students in his Energie AG (energy club) before starting the four year construction of the house. For some time, he spent every Friday afternoon and Saturday on the construction site with the students.

Quick facts:

- Floor area 100 $m^2$, one-room house
- Construction method: Timber frame on column foundations
- Tight construction, building material: wood with wood fiber insulation

- Passive house standard meaning: Energy requirement: maximum 15 kWh per square meter and year (i.e. a total of 1500 kWh), so if we were to heat the house with oil, it would require 150 liters of oil per year (comparison with a normal house: 2000 to 4000 l of oil). Heating load: 1.5 kW. So we could heat the whole house with a hairdryer.
- Ventilation system with heat recovery
- PV system delivers approx. 10,000 kWh per year
- House embedded in a biotope park: pond, deadwood pile, green roof, flower meadow,...

Rough timeline:

- Visions and preliminary planning started in 2016 in the energy club
- Needs analysis, ideas for use, architectural planning (seminar course 2016/17)
- Preparation for planning permission and further planning steps (Energy Club 2017/2018)
- Preparations for construction, search for companies (Energy Club 2018/19)
- Start of construction: Easter 2019 (ground-breaking ceremony 29th of April 2019)
- Completion (almost!) of the exterior work 11.06.2021
- Interior work since fall 2019
- School lockdown equates to construction lockdown (March to June 2020 and December 2020 to April 2021)
- End of construction in 2023
- Opening on 17th of June 2023

The following paragraph was translated from this photo story:
https://energiehaus-isny.de/ueber-uns/

**Shell construction**

Building a wooden house is a bit like a magic trick...

At first, exciting preparations take place without seeing what the end result will be:

Excavators work on the building ground, column foundations rise out of the ground. Incidentally, due to the reduced use of materials, they leave a smaller carbon footprint than a concrete floor slab.

The floor, walls and ceiling are rolled into place to the sound of a drum roll and under expectant glances. The carpenters put the elements together, put in the windows, seal the roof, it's ready! After two days - hocus-pocus - everything is finished!

Is everything really finished? For us, four years of house building followed, with many more small and big tricks: inside and out.

**Climbing onto the roof of the school!**

90% of the “EnergieHaus” PV system stands high on the school roof. The construction was only for professionals who are free from giddiness and daring and don't shy away from tedious work. We only worked on the front row with rope safety. The view was best there!

Only the rest of the system is located on the “EnergieHaus”, as we don't have enough sun down here for more modules. The school building shades the whole roof too early.

All in all, the 10 kW system makes our passive house actually an EnergyPlus house.

**Planks that mean the world**

Our spacious terrace sets the stage for concerts and theatre. But what a job that was! We sunk countless screws into the boards or between them. Fortunately, the space is now also perfect for relaxing.

To build the house, we pumped out the existing school pond, relocated the animals and then enlarged the pond. Shortly after refilling, the animals returned on their own and people can now reach our little house by the lake via a footbridge.

**The path to lighting**

We always wanted to have a great acoustic ceiling. You can tell straight away that it's homemade and made from the same wood as the floor. Because we like to use leftovers! The floor was made from offcuts and as the boards were a little too thick, we had them sawn to size in the sawmill. The current remnant was perfect for our ceiling. After hours of work - sawing, painting, stapling - we saved almost 9000 euros (around 90%).

Our acoustic ceiling conceals ventilation ducts that exchange air without losing heat in winter. On the acoustic ceiling you can see the great lamps that we installed ourselves. We wanted the lamps to be in a neat line and not scattered around the room - once again, precise measuring was required...

**Our own four walls**

A small eye-catcher in the main room of the house is our clay wall. It not only creates a visually pleasant room climate, but also regulates the humidity: the clay wall absorbs moisture and can also release it again. A wall heater is also hidden between several layers of the natural material in case the temperature gets too low in winter. We clad the remaining walls with plasterboard and filled the joints. In contrast to the warm brown of the clay wall, we painted the remaining walls white to create a modern, cosy atmosphere.

**The wooden thermos flask**

Cold stays cold and warm stays warm. We achieve this effect in our house like a thermos flask with a thick layer of insulation to keep it a little cooler in summer and a little warmer in winter.

The only ingredients are dozens of blocks of wood wool, which are shredded in a large shredder. The wood wool is then blown through a long hose into the cavities in the wall, which are around 30 cm deep. This is repeated until all the holes in the wall have been filled. Therefore, plan a generous morning and make sure to wear a tight collar (because the wood fibers do not only end up in the wall). Not recommended without wearing a mask.

**Shingles**

Two years, X shingles and 600 workers! The shingle campaign got the whole school moving and gave the building a unique facade (in “Bregenzer Wald” style). If you look closely, you may have already found yourself. A laser cutter was used to immortalize several hundred people and businesses on the façade in a large-scale fundraising campaign.

Local and regional partners can be found at https://energiehaus-isny.de/unsere-partnerinnen-und-partner/

# Events

The EnergieHaus is not only intended to be a special learning and meeting space for schools, but also a venue for lectures, workshops, art and culture.

The first "KlimaCONNECT" event took place in the EnergieHaus on March 17th, 2024. While the “Isny Energy Summit” took place in the City Hall, a workshop on the topic of sustainable clothing took place in the EnergieHaus. More information about this upcycling workshop can be found here: https://energiehaus-isny.de/2024/03/17/klimaconnect/#more-372