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THE ONLY DIFFERENCE BETWEEN  
THE FIRST ENERGY-INDEPENDENT  
APARTMENT BUILDING AND OTHER  
MODERN RESIDENTIAL  
ARCHITECTURE IS THAT ITS WALLS  
ARE SO THICK BECAUSE OF  
THE VERY GOOD INSULATION.  
IT IS SITUATED IN BRÜTTEN,  
SWITZERLAND.

# What the future looks like!

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A home that needs no external power supply: it was officially  
opened in the middle of this year. Here's how it works



BRIGHT, COSY, AND SPACIOUS – THE LOUNGE, WHICH LOOKS LIKE MANY NEWLY BUILT APARTMENTS.



AN ISLAND OF CUPBOARDS LINKS THE KITCHEN WITH THE DINING AREA, ENABLING COOKING AS A SOCIAL FUNCTION.



EVEN AN ENERGY-INDEPENDENT HOUSE CAN HAVE FAMILIAR COMFORTS IN THE KITCHEN.

When Edwin L. Drake first struck oil in America in 1859, he tapped into a source of energy which still powers the world to this day. Switzerland meets around half of its total energy needs from the woodlands which, over millions of years, became the black substance which now powers our cars and heats our homes. But oil reserves are limited and using them harms the environment. Fortunately a rethinking process is well underway. In Switzerland, as in other countries, the proportion of electricity generated by renewable energies such as wind and solar power is growing. Last year it was already 23 percent. These sustainable sources are also available to private houses, which still consume a quarter of Switzerland's total energy – and four-fifths of that is for heating and hot water.

The world's first energy-autarkic apartment building was inaugurated in mid-2016 in Brütten, a town of 2,000 inhabitants in the Winterthur district. It approaches sustainability from three different angles and with previously unheard-of consistency: the generation of electricity, its

energy storage, and its power consumption. Furthermore, the nine families who live there use only the power generated on the building's property. "Just one hour of sunshine is enough in summer," says Roger Balmer, head of the pioneering project, "to cover the energy needs of all of its occupants for a whole day." That is only possible with the consistent use of the latest intelligent technology. But first things first.

The building came about as a project of Umweltarena Spreitenbach which, since 2012, has been an innovative platform on which companies can showcase their resource-saving projects and products in action. The importance of this concept has been highlighted by numerous accolades, such as the "European Solar Award." The energy-independent building achieves two aims simultaneously. Firstly, it gives examples of technologies which can be used to operate a project of this kind. Secondly, it is not merely a design study, it is a real place in which to live and feel at home. The building's technology gathers together all kinds of leading ecofriendly energy concepts.

Its roof and facade play a key role, being fitted with types of solar cells that are optimized in different ways for the generation of electricity. Together they supply up to 127 kilowatts, which is converted using 26 ABB solar inverters and fed into the building's own network. Any energy not immediately needed is stored for the short- and long-term. The latter is especially difficult: electrolysis is used firstly to produce hydrogen, which is then stored at 27.5 bar in two large pressure tanks containing a total of 120,000 liters. On overcast winter days it flows from there into fuel cells which convert it back into electricity. The 60°C heat produced is used for heating and hot water.

Geothermal energy is also part of the energy mix. A downhole heat exchanger converts the temperature difference between an almost constant 11°C spring water and the outside temperature into a choice of heat or cooling using heat exchangers and a heat pump. All of these and many other modules communicate with each other

electronically, which is the only way to combine the supply of energy with its use by occupants in a highly efficient manner. Wall and floor heating, and an ingenious ventilation system, produce pleasant interior conditions at all times. Power-saving lighting and energy-efficient household appliances help keep the building self-sufficient from a consumption point of view. This permits us to look into a future which may soon be everyday reality. A tablet can be used to control lighting, sockets, and blinds. The ABB-free@home system used to this end controls lots of other features as well (see following page). The pioneering Brütten project sets new standards in future residential construction. Its nine families are currently discovering what it feels like to live there on a daily basis. Their initial feedback is encouraging in terms of pursuing the vision of self-sufficient buildings. And they are providing suggestions about how to make this future even more comfortable to live in.

## Energy-independent – a sunny outlook

The meaning of the word “autarkic” lies somewhere between “independent” and “self-sufficient.” An autarkic building is both. Firstly, it does not draw any electricity from external lines, instead producing it all itself using solar and geothermal energy.

Furthermore, the building is frugal in the consumption of that energy. All of that is sustainable and it requires sophisticated technology at every level, on every floor, from the roof, right down to below the basement. But a building of this

kind is far from being a soulless habitation unit. Its interior climate is regulated so that all of its occupants feel comfortable in every season – and not only physically. The feeling of being part of progress is thrown in for free.

