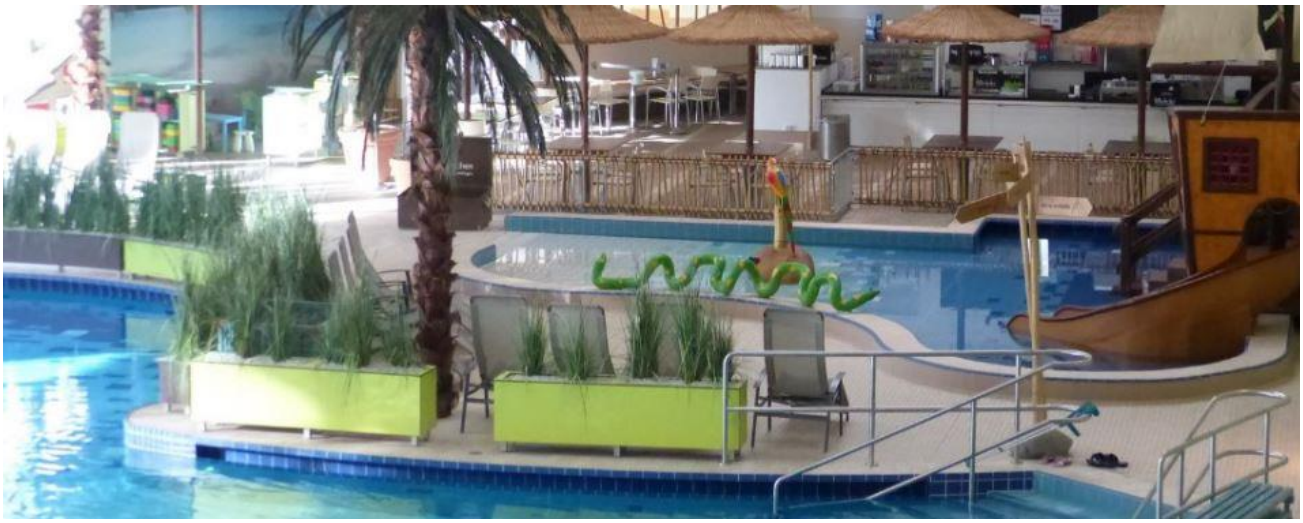
Press Release

7 February 2019



The energy consumption of indoor swimming pools can be reduced drastically through intelligent planning and technology. This is demonstrated by the Bambados in Bamberg (shown here) and the Lippe-Bad in Lünen. © PHI

Swimming with a clear conscience

Passive House indoor pools help municipalities save money - Planning handbook

Darmstadt, Germany. **Swimming pools constructed to the highly energy efficient Passive House Standard can help relieve the burden on municipalities significantly in the long term. This is demonstrated by two Passive House indoor swimming pools in Bamberg and Lünen (Germany), for which the Passive House Institute provided consultancy services. The Passive House Institute evaluated the pilot projects and has published recommendations in a free handbook for planning of energy efficient pools. The handbook is also helpful for optimised operation of already existing pools.**

Measurements in Lünen for research work by the Passive House Institute. © PHI

High indoor temperatures

Swimming pools are popular facilities, but for municipalities they often constitute a financial burden due to high annual running costs. Indoor pools have high indoor temperatures of around 32 degrees all year round, requiring a lot of energy for heating and for warm water. In addition, the technical systems consume high levels of electricity. "With a good building envelope and a ventilation system with efficient heat recovery, it is possible to reduce the energy consumption significantly, especially in indoor swimming pools", explains Søren Peper of the Passive House Institute in Darmstadt.

The Lippe-Bad in the town of Lünen in Westphalia is seen as a pioneering project for the Passive House Standard for indoor swimming pools. The handbook which has now been published is also helpful for already existing pools. © PHI

Useful handbook

This effectiveness is evidenced by the first two indoor pools built to the Passive House Standard. The leisure pool Bambados in the Bavarian city of Bamberg and the Lippe-Bad in the Westphalian town of Lünen were both opened in 2011. Esther Gollwitzer, Jessica Grove-Smith and Søren Peper of the Passive House Institute consulted on the projects from the planning phase. With the publication of the handbook, the Passive House Institute now assists in the planning and construction of indoor swimming pools to the Passive House Standard. Existing pools can also benefit from this handbook.

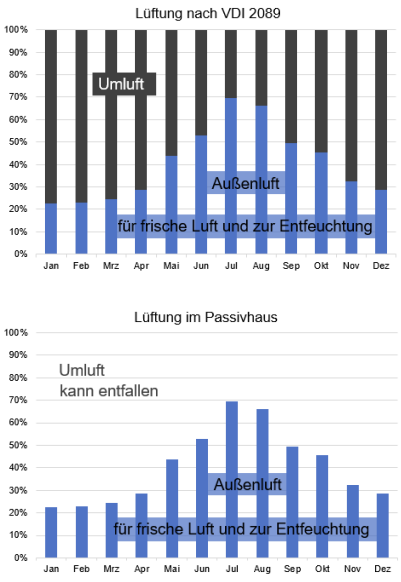
Consultancy services for pilot projects

Esther Gollwitzer of the Passive House Institute says: "With the latest research report and the respective handbook, the knowledge obtained so far has been analysed so that it can be applied in an even more targeted way in future projects. Even further savings potentials can be exploited with the experiences gained thus far." The research work was funded by the Deutsche Bundesstiftung Umwelt DBU (German Federal Environment Foundation). With their support, two seminars on the Passive House concept for indoor swimming pools are planned: on 28 October 2019 in Hanover, and on 6 November 2019 in Nuremberg. DBU General Secretary Alexander Bonde emphasis that the planning handbook used in the seminar may encourage the construction of further indoor swimming pools. It also contains practical references relating to operations monitoring and optimised operation.

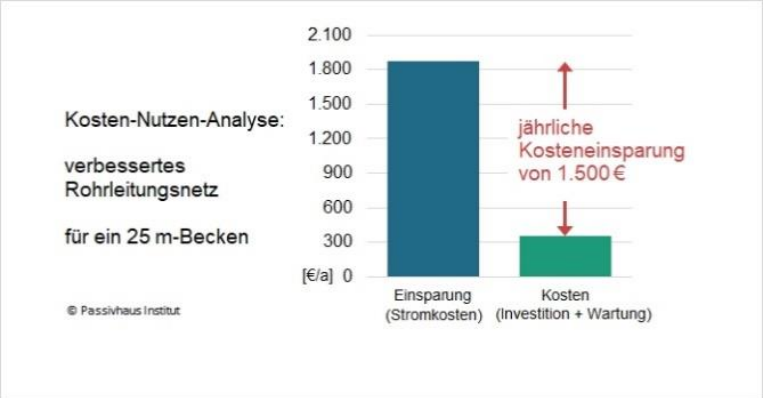
The Passive House concept for indoor swimming pools saves a significant amount of energy. Here are some examples:

• The basis for high energy savings in a Passive House indoor pool are a **thermally high quality of the building envelope** and a **ventilation system with heat recovery.** In conventional indoor pools, circulation air is usually blown onto the glazing in order to prevent water condensing on the glass. In a Passive House indoor pool, this is no longer necessary, saving significant electricity (see figures on the right, © PHI).

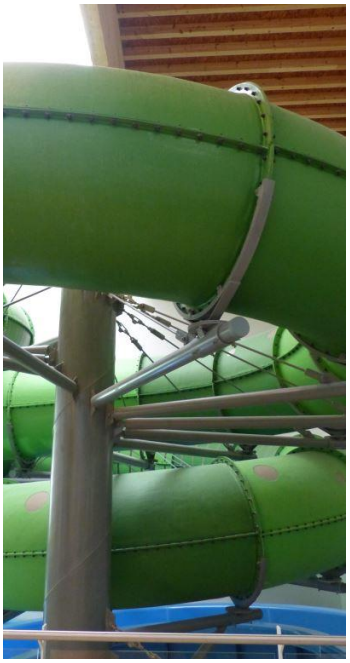
• In order to optimise the energy demand for a pool already in the planning phase, the Passive House Institute developed a calculation method for the **energy balance of swimming pools**.



• For the handbook, the Passive House Institute analysed the **building services areas** with reference to their cost-effectiveness. In the case of the Lippe-Bad, treatment of the wastewater resulting from filter washing, and the utilisation of waste heat from the cogeneration plant is particularly effective. Water-saving shower heads and a reduction in the pressure losses in the pipe network are recommended in general.



• **Commissioning** and **optimisation of operation** have a substantial influence on the energy consumption. In the Bambados leisure pool, adjusting the ventilation systems are controlled helped to reduce the electricity consumption by around 60 percent.



The slide in the Bambados pool is entirely within the building envelope avoiding high heat losses. © PHI

Analysis of energy consumptions

As far back as 2009, the Passive House Institute (PHI) examined in a baseline study the building physics and technical conditions under which the Passive House concept could be implemented in public indoor swimming pools. In addition, in 2013 and 2015 the PHI published detailed research reports of monitoring carried out over several years for both pools. These reports also addressed the optimisation of operation of Passive House swimming pools. The analysis of the energy consumption values has now been incorporated into this handbook and enables recommendations to be made with regard to pool water technology, water attractions, and showers, among other things.

A high level of comfort, low energy costs

"Indoor swimming pools are very technology-intensive. Good planning and user-oriented commissioning ensure that the indoor pool performs well. All those involved can then enjoy low energy costs, a high level of comfort and durability of the building", explains Jessica Grove-Smith, physicist at the Passive House Institute. She is currently providing consultancy for a pool project in the southern English city of Exeter.

Free download

All research findings as well as the handbook "Passive House concept for indoor swimming pools" including checklists are available to download free from www.passiv.de in the "Publications and tools" section (in German). **Indoor swimming pools built to the Passive House Standard** will be one of the topics at the Passive House Conference "Better Building" in Heidelberg, Germany, taking place on 3 and 4 May 2019. https://heidelberg.Passivhaustagung.de/de/

General Information

Passive House buildings

Passive House buildings are characterised by a high quality of insulation, windows with triple glazing and an airtight building envelope. In winter, preheated air is introduced into the building by a heat recovery ventilation system. The five basic Passive House principles allow these highly efficient buildings to dispense with *classic* building heating. A major part of the heating demand of a Passive House is met through "passive" sources such as solar radiation or the heat emitted by occupants and technical appliances. A Passive House thus consumes about 90 percent less heating energy than existing buildings and 75 percent less energy than an average new construction.

Passive House & NZEB

The Passive House Standard already meets the EU requirements for Nearly Zero Energy Buildings. According to the European Buildings Directive *EPBD*, all member states must specify requirements for so-called nZEBs in their national building regulations. These came into effect in January 2019 for public buildings and will apply for all other buildings from the year 2021.

Pioneer project

The first Passive House in the world was built in Darmstadt-Kranichstein (Germany) 27 years ago by four private homeowners. Dr Wolfgang Feist was one of them. Ever since the homeowners moved in with their families in 1991, these terraced houses have been regarded as a pioneer project for the Passive House Standard. After extensive technical testing, building physicists attest to the still unimpaired functioning of the first Passive House and its unchanged low heating energy consumption. With its new photovoltaic system, the first Passive House now utilises renewable energy and received the Passive House Plus certificate.

The world's first Passive House building in Darmstadt-Kranichstein. © Peter Cook

Passive House and renewable energy

The Passive House Standard can be combined well with on-site renewable energy generation. Since April 2015, the new building classes "Passive House Plus" and "Passive House Premium" have been available for this supply concept. The first buildings in these two categories have already been certified, including private houses as well as office buildings.

Passive Houses worldwide

Passive Houses buildings for all types of uses now exist everywhere. In addition to residential and office buildings there are also kindergartens and schools, sports halls, swimming pools and factories built as Passive House buildings. The first Passive House hospital in the world is currently being built in Frankfurt am Main. Interest in Passive House is growing. In view of the consumption of resources in industrialised countries and the need to contain global warming, municipalities, businesses and private people are increasingly implementing new constructions or retrofits to the Passive House Standard.

Passive House Institute

The Passive House Institute with its headquarters in Darmstadt (Germany) is an independent research institute for highly efficient use of energy in buildings. The Institute founded by Dr. Wolfgang Feist holds a leading position internationally with regard to research and development in the field of energy efficient construction. Among other things, Dr. Wolfgang Feist was awarded the DBU Environmental Prize in 2001 for developing the Passive House concept.

Dr. Wolfgang Feist © Peter Cook

Passive House Conference

The Passive House Institute is the organiser of the International Passive House Conference and the accompanying specialists' exhibition.
The 23rd International Passive House Conference will take place on 21 and 22 September 2019 in Gaobeidian, China. www.passivehouse-conference.org
In addition, the "Besser Bauen" (Better Building) Passive House Conference will be held on 3 and 4 May 2019 in Heidelberg.
www.heidelberg.passivhaustagung.de

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