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Minergie: The Swiss Sustainable Building Standard

Minergie is a sustainable building standard recognized globally for its effectiveness in achieving lower energy and resource consumption and a higher level of comfort, regardless of building design or type. In Switzerland, where the standard was developed, over 14,000 Minergie buildings have been voluntarily certified and wide government backing across the cantons has led to market penetration of sustainable buildings unmatched elsewhere in the world. Also key to Minergie's success is Switzerland's vocational training system, which has produced a construction industry workforce with the skills to take full advantage of the Minergie system.

Switzerland takes sustainability seriously. It is ranked number 1 in Yale's Environmental Performance Index[1] and is world-class in public transportation, recycling and organic food production as well as in buildings. Switzerland's success in the building sector is evidenced by comparing Minergie's penetration rates with LEED, a major U.S. green building rating system.[2] LEED has approximately 2,000 certified units. Minergie, in the roughly 100 times smaller Swiss market, counts over 14,000 certified buildings of many different types and sizes.

A Minergie building consumes around 60 percent less energy than the conventional Swiss building, which in turn was built to one of the world's highest regulatory building standards. Such energy efficiency is attained through an integrated planning approach as well as a focus on life cycle costs and quality benefits that involves the use of the Minergie standard from the very beginning of the planning process, as well as Minergie solution modules that solve design problems in particular competence areas such as windows and ventilation. On a technical level, Minergie represents a combination of the following 10 key elements:

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- Compact building form.
- Airtight construction of the building shell.
- Very strong thermal insulation for walls and roof.
- Very good windows, with coated multiple glazing.
- An energy efficient, draft-free ventilation system that provides a high-quality indoor environment, including plenty of fresh and filtered air.
- Water-based heating and cooling featuring chilled/heated floors, walls, beams, and ceilings which results in even and efficient distribution.
- Integration of renewable forms of energy such as geothermal, solar, wind, or wood.
- Use of waste heat.
- Careful selection of materials to avoid indoor and outdoor toxicity and to promote green values.
- Efficient household appliances and lighting.

MINERGIE BACKGROUND AND APPROACH

The Minergie base standard was introduced in 1998, with the more stringent Minergie-P and Minergie-P-ECO standards appearing later. Together they set performance criteria for materials and energy efficiency, as well as for comfort. The strategy of Minergie was not to certify a few "dream projects," but rather to achieve the greatest overall effect through a limited number of key performance indicators such as the specific energy consumption measured by the amount of energy delivered to the site. A large number of building owners could be attracted by positioning Minergie both as a performance standard that greatly exceeded the mandatory local building level and also as an economically competitive alternative to conventional buildings. Minergie adds higher performance criteria for the same factors that are found in local building codes, thus improving overall performance. In this way, Minergie now has a track record of over 10 years of pulling the market toward more sustainability in buildings. Different from other standards, Minergie certification is not based on point scoring but on reaching a threshold level in all key performance indicators. This makes it impossible to achieve Minergie certification with critical factors such as energy efficiency unaddressed.

Minergie has shown that buildings can be both sustainable and economically competitive. Some buildings, such as IBM's new European headquarters building located in Zurich, have had less than a one percent Minergie investment cost premium. Smart design and the right combination of materials can lead to high levels of energy and emissions efficiency very economically. Our experience has shown that sustainability improvements in the building space indeed represent "low hanging fruit."

A major benefit of sustainable building, as is clearly demonstrated by Minergie, comes from the higher quality levels of the indoor space created. Indoor quality is very important on multiple levels. As city dwellers, we spend 90 percent of our time indoors, so our buildings largely determine the quality of the air we

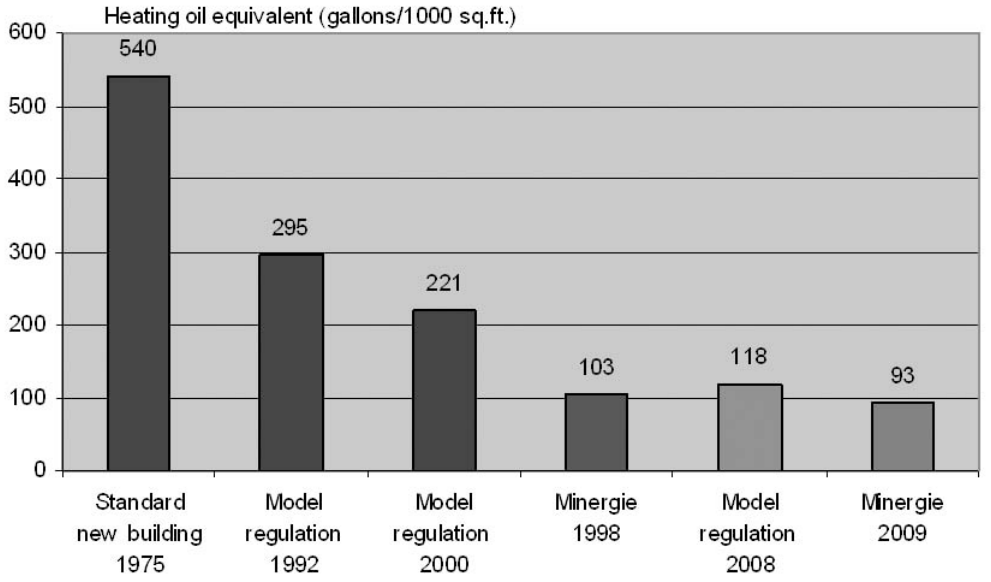

Figure 1. Heat Requirements of New Buildings.

Source: Konferenz Kantonaler Energiedirektoren, 2009: http://www.endk.ch/kantone.html.

breathe, as well as the temperature, draft, and light quality we experience, which are important factors for our well-being and efficiency. At home, this means healthier sleep, better learning, and more comfort; all valuable, but hard-to-price benefits. At work it leads to more motivation, fewer sick days, and the capability to work efficiently for longer periods of time. Since salaries represent by far the largest cost factor for the average commercial tenant, sustainable buildings create value that far exceeds the minor additional rental costs that may need to be charged for a very sustainable building.

DRIVING FORCE IN SWISS ENERGY POLICY

Minergie is a private organization and Minergie is a registered trademark owned by the nonprofit Minergie Association which permits clear legal protection of its certificates. The Association counts approximately 400 supporting members, including many architectural firms, construction and manufacturing companies, and banks. Minergie has a formal board, an executive strategy group, a technical agency, several competence centers and a network of licensed certifiers. Minergie is linked to almost 900 local businesses with first-hand experience in building to the standard. The Minergie brand provides a positive image and a high and long-term value to its customers. Leading companies such as SwissRE, IKEA, and IBM are among its members and have decided to construct all their new buildings in Switzerland according to the Minergie standard. Most remarkably: Credit Suisse, ZKB, Bank Coop as well as other Swiss financial institutions offer Minergie mortgages with favorable terms.

All 26 cantons (the Swiss equivalent of the U.S. states) are members of the Minergie Association and are integrated in the certification process. The large majority of cantons offer special subsidies to Minergie homeowners. In the case of Minergie-P, the average subsidies equivalent to U.S.$12,100 per new single-family home.

With 14,000 certified buildings, the Minergie standard has become a major factor in Swiss energy policy. It has been applied to a wide variety of buildings, ranging from single-family homes, to shopping centers and even historically valuable buildings with landmark status. Minergie buildings can be found in the desert as well as high up in the Alps. There are both Minergie huts and multi-million dollar Minergie villas. And the standard is widely regarded to be responsible for the performance improvements of the new Swiss cantonal building code (Model Regulation 2008), which approaches the level of the original 1998 Minergie standard (see Figure 1).

Recently, Minergie started its international roll-out with the aim of sharing Switzerland's success with other countries and making a tangible contribution to sustainable development through leveraging the full potential in the building sector (and potentially urban planning, in the future). A pilot localization project is already running in Abu Dhabi (www.swiss-village.com). For all of its roll-out, Minergie is based on a partnership approach, seeking to work with local authorities and independent agencies to run a highly customized standard (regulatory environment, climate, know-how, and cultural factors), but one that is internationally comparable.

Minergie standards offer building users a higher quality of life as well as higher efficiency; and as a consequence, the standards considerably increase a building's life cycle value. At the same time, building owners, architects, and planners enjoy freedom in design and selection of materials, as well as freedom regarding the internal and external structure of their building.

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1. See epi.yale.edu.
2. See www.usgbc.org.

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