House in a house

Basic idea of a House-in-a-House with warm central zone and cool peripheral zone.
The **House-in-a-House** specifies the partition of the house in a warm central zone and a cool peripheral zone. The central zone contains sources of heat, while the peripheral zone is not or less heated. During the cold winter the utilization of the peripheral zone is limited.

The partition has several effects, reducing the heating requirements:

- Reduction of the effective surface area of the heated volume.
- Additional thermal insulation of the heated volume by a second wall.
- The surrounding peripheral zone serves as a thermal buffer, so the response time of the heated zone to the low outside night temperatures is increased.

The rooms and walls of the central zone are designed to avoid direct exterior walls of heated rooms. The heat transition always needs to pass two walls, so the overall heat transfer resistance is the sum of two walls. Such a house requires very low heat energy, making a regular heating system obsolete.

### Sources of heat

- Dwellers deliver about 1000 kWh per year with their body heat (500 kWh in the winter half year).
- Electrical devices dissipate nearly all their consumed electrical energy as heat. If possible, the big consumers (cooker, baking oven, dishwasher, washing machine, tumble dryer, etc.) should be placed in the central zone in order to utilize their waste heat.
- There can be an optional heater, for example a *compost heater*.

### Challenges

- As always with temperature differences between two rooms, the flowing of air from the warm to the cold zone can create condensation on cold surfaces and must be avoided.
- If the dwellers are temporary away, for example on a long vacation trip in winter, the temperature in the central zone declines due to the absence of one of the heat sources.
Information on the Internet

- [www.bio-solar-haus.de](http://www.bio-solar-haus.de): Separate weather protection hull as a variety of the House-in-a-House-Principle (German)
- [www.dezeen.com](http://www.dezeen.com): Several examples of Houses within houses