

NOVI SAD ECOLOGY MOVEMENT

SOLAR SOD HOUSE – YOUR SWEET, WARM HOME

Veljko Milkovic's Self-Heating Eco-House Concept

- Financial and Energy Savings Calculation Report -

The Solar Sod House (also known as the Eco House or Eko Kuca) is, in its basic purpose, similar to a conventional house. However, in most other respects it is essentially different, primarily because of its completely new room heating concept: using direct sun rays to heat the interior spaces. In fact, the main features of this solar house have been designed around maximizing the use of free sun heat. The house is earth-sheltered on three sides, with its only open side oriented directly towards south.

In order to have maximum solar heat gain for successful heating during the entire winter, it is necessary to enhance the sun's energy that comes in through the windows. This has been successfully achieved with specially calculated upper and lower reflecting surfaces that are installed above and below each window. The reflective surfaces have been shown to increase the solar heat gain by up to 2.5 times.

Direct advantages of solar sod over conventional house

1. **COST EFFICIENCY:** if heating costs during the winter season and air conditioning costs during summer are calculated for a 140m² two-storey solar sod house and a conventional, above-ground house with the same features, including five-centimeter thermal insulation, the results are the following:

Annual energy consumption for additional heating of the sod: 4,000 kWh

Annual energy consumption for the heating of the conventional house:
20,000 kWh

Annual consumption for air conditioning of the equivalent conventional house in summer: 3,000 kWh

(With the same comfort level that the solar sod house offers in summer)

Total difference of the energy spent is in favour of the solar sod house: 19,000 kWh per year.

The equivalent price of the energy saved in this way is, at current prices¹, about 2,500 DM² (1,250 euros) per year.

This means that in the period of 40 years the solar sod house will definitely save more than 100,000 DM (50,000 euros), and in 60 years it will pay back!

¹ This report was written in 1994 and all the calculations were made for that year.

² Deutsche Mark - German mark

2. Solar sod does not need installation of floor heating, therefore it needs no additional rooms for a boiler or fuel. This saves more than 20,000 DM (10,000 euros).
3. Because of the orientation towards the sun, there is also a 30 percent direct savings on electrical lightning. The solar sod house will, during its lifetime, certainly save over 6,000 DM (3,000 euros) on lightning.
4. The surface of the solar sod facade represents only one tenth of the entire surface of a conventional house. Therefore, costs of plastering and facade maintenance are only one tenth of the same costs of a conventional house.
5. Because of its location in the ground, the sod house, no matter its size, doesn't need lightning rods nor rain gutters for collecting rainwater from the roof. Money saved on this is certainly more than 2,000 DM (1,000 euros).
6. A significant advantage of the solar sod house that cannot be easily calculated is its security in case of earthquakes, storm winds and even wars. Also, the problem of noise and vibrations is successfully avoided by solar sod houses. A sod is a house where there is "no kosava (southeast wind), north wind, nor draught"!

Constructive advantages of a solar sod house

1. The solar sod house does not have a typical foundation, but it has a multi purpose foundation or base slab.
2. In comparasion to a conventional house, it doesn't have expensive roof construction. Rather it has a single slab made of reinforced concrete, covered with a protective layer of soil and vegetation.
3. The solar sod house has no gutters, but it has a lawn on the house roof. Maintenance costs of the lawn can be compared to the costs of gutter maintenance and replacement.
4. The costs of maintenance and replacement of reflective surfaces can be compared to the maintenance of heat exchangers and heating installations in a conventional house.
5. The solar sod house has one eave made of reinforced concrete that simultaneously forms an upper reflective surface. This is cheaper than building four eaves on a conventional house.
6. The lower reflective surfaces also function as protective window shutters, and their prices are lower than those of typical window blinds on a house.
7. The costs of buying a bigger piece of land that is required for a solar sod house can be compensated by income from growing agricultural crops on the site such as an orchard, garden or a park-plant nursery.
8. Instead of block or brick walls, the solar sod house requires external walls to be constructed of reinforced concrete³. This is slower to build, more complicated, and requires relatively expensive formwork. However, these higher building costs can be justified by the durability of a solar sod house, which is estimated to last four times longer than a conventionally-built house.

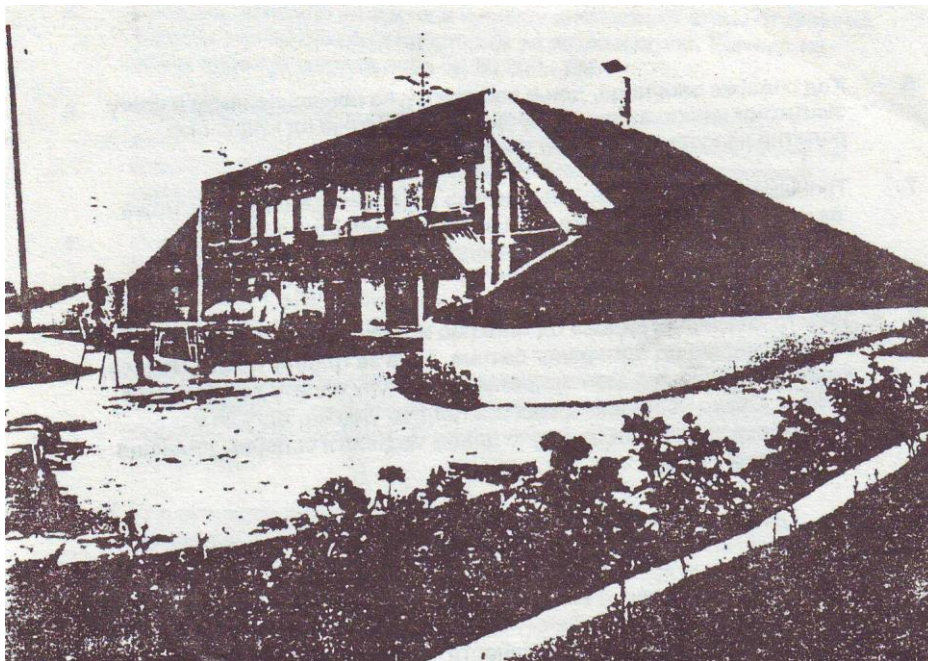
³ Although the autor of this report made his house of concete, it is also possible to make solar sods of: bricks, wood, stone blocks...

Conclusion

All the above-mentioned characteristics of a solar sod house compare favorably against the known flaws of conventional houses. Based on the previously presented advantages of the solar sod house, it is clear to see that it is in every way more economical than other houses. Its 100 percent rentability, which is the result of savings on heating over a period of 60 years, should be especially highlighted. This means that a solar sod house will, during its estimated lifetime of 300 years, pay back up to five times, which places it at the top of world inventions.

In Novi Sad,
December 05, 1994

Aleksandar Nikolic
Novi Sad, Serbia



Solar sod or self-heating ecological house (140m²) near Novi Sad, Serbia.
<http://www.veljkomilkovic.com/EkoKuca2Eng.html>

Building of prefabricated ecological structures (residential, commercial and agricultural) with and without earth sheltering (earth protection) is in preparation.

Literature

1. Milkovic Veljko and Aleksandar Nikolic: "Solar sod houses - the house of the future", Novi Sad, Dnevnik, 1983
2. Milkovic Veljko: "Ecological houses", "TIM-NT-90"; Novi Sad, 1991
3. Milkovic Veljko: "Sustainable life", Novi Sad ecology movement, in preparation.