

[youtube:<http://www.youtube.com/watch?v=mW9fMfgL5Zg>]

What it is

Roof gardens keep flat roofs cool in Summer – and also help insulate in winter. They require little maintenance and reduce energy bills significantly. 12% of roofs are “green” in Germany already, and Tokyo law requires at least 20% of all new roofs to be “green”.

12.5 million square feet of green roofs were installed in Germany in 2001 alone.

Green roofs are of three types:

ornamental roof gardens requiring high maintenance, roofs with shallower soil and narrower range of planting,

while the third type is made up of sedums, mosses and whatever else establishes itself naturally.

How it works

A layer of soil is placed over a waterproof roofing material, with raised sides to prevent soil washing into drains when it rains. The soil is planted with vegetation which can withstand extremes of hot, cold, dampness and drying out. Cooling happens not just because of shading the roof surface, but also because up to 60% of all rain is retained on the roof in the soil and as it evaporates, it acts as an air conditioner, cooling the entire surface.

Plants themselves also lose water by transpiration, cooling their leaves down.

Water loss is higher than at ground level because wind speeds are greater.

The impact can be huge. For example, studies on Chicago City Hall after installation showed that roof temperatures fell by up to 30 degrees C on hot summer days and surrounding areas were cooler by 9 degrees C.

We know that with every degree less difference between internal and external temperature, the fuel bill can fall by up to 10%.

Why it matters

More than 30% of all carbon dioxide emissions in many developed nations is heating or cooling buildings. Here is a low cost way to permanently reduce energy use, improve the appearance of buildings, and reduce the temperature experienced in the street by pedestrians and drivers.

The Tokyo government estimates that if half their roofs were green it would save a million dollars every day in air conditioning energy use.

Benefits in addition to improved insulation are: reduce storm water run off, preventing water pollution by keeping contaminants in soil, longer roof life. Reducing heat of entire neighbourhood, encouraging plant and animal biodiversity, improved sound insulation and leisure opportunities for users of the building. Roof gardens also increase the capital value of buildings and their marketability.

The saving of energy per square metre are very complex to calculate. In a typical Central European location, savings have been estimated to be up to EU50 a year in reduced fuel bills. (National Green Roof Congress).

Challenges

Roof weight can increase by as much as 30 - 950kg per square metre for roof gardens depending on depth of soil, when saturated by heavy rain. Most roofs need strengthening to take such weight. Maintenance can also be costly if a garden is intended.

If green roofs completely dry out, they can actually become hotter than gravel roofs in the height of summer.

Business Opportunities

The UK could be the largest potential market for green roofs in Europe with an estimated 50 acres of roofs across the city which could be suitable for conversion, at £50 to £120 a square metre for ornamental roof gardens to less than £10 a square metre for moss and natural vegetation cover. Hundreds of companies will service this demand ranging from specialist roofing companies to design, planting and maintenance.

Roof gardens save energy and improve the environment.

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Articles and Videos on Global Warming

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[How business will help solve global warming with green technology](#)

[CARBON DIET to save the World](#)

[Global Warming - Science Summary](#)

[Future of Oil Prices: Middle East, global economy](#)

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