

Green Roofs for a Viable Environment

1. Every summer in the heart of Manhattan, a tower block erupts with organic vegetables and herbs. The tomatoes, peppers, cucumbers and sweet potato and rosemary, basil and sage are not the produce of a private roof garden but a demonstration by the Earth Pledge Foundation of the potential for city-based food production. A love of vegetables, however, is not why city authorities are starting to pay attention to organisations such as Earth Pledge. With energy savings and improved waste water management in view, they hope green roofs can cut costs as well as helping to save the environment.

2. North American cities such as Chicago, Toronto and Portland, Oregon, are starting to green their rooftops. Such roofs are also (Example) included in plans for prominent (1)_____ such as the expansion of the Vancouver Convention (2)_____ Exhibition Centre, where a six-acre "living roof" will (3)_____ a variety of native plants. Part (4)_____ the reason is awareness of the "urban heat island" (5)_____. With many large surfaces that absorb (6)_____ radiation and return it to the (7)_____ as heat, urban areas are becoming hotter relative to the (8)_____. "It is a well-known phenomenon," says Stuart Gaffin, research leader on green roofs at the Centre for Climate Systems Research at Columbia University. "There_____ can be up to 6 degrees Fahrenheit (about 12 degrees centigrade) difference in the urban versus suburban temperature."

3. A green roof is typically made of a specialised growing medium and plantings such as seedhams and grasses. It acts as insulation and the vegetation provides shade and returns moisture to the atmosphere, preventing solar energy being absorbed by the roof. The effects are limited to the top storeys of any individual structure, so the key for high-rise cities is getting green-roof technology implemented on a large scale.

4. "To the extent that you can get enough green roofs in an area to cool the city down, you can reduce the overall energy consumption in all the buildings and reduce the temperature in the city," says Steven Peck, executive director of Green Roofs for Healthy Cities, based in Toronto. A recent study by the City of Toronto and Environment Canada suggested that relatively modest amounts of green roof - 5 per cent of the total land use in Toronto, or half all roofs (assuming that roofs account for 10 per cent of urban land use) would create a 1 to 2 degree centigrade reduction in urban heat island.

5. Even when considering the effects for individual buildings, a further benefit emerges when the climate simulation models are applied to a single hot day, as the green roof can moderate peaks. The annual energy savings projected for an eight-storey building with a green roof in Madrid, Spain, were about 6.4 per cent, says Brad Bass, a researcher with Environment Canada and professor at the University of Toronto Institute for Environmental Studies. But when the simulation was run for one hot day, the savings were nearer to 10 per cent for the whole building. Prof Bass says this has implications for power-generation companies. "The real beneficiaries of this peak-demand knowledge are the utilities," he says. "If you are promoting green roofs to utilities, you tell them that here is a simple way of easing the demand on the grid during a heat wave."

6. While research in this area is in its early stages, there are signs that the role of utilities is being recognised. In Quebec, the province's Energy Efficiency Fund - which creates energy efficiency programmes and activities for natural gas customers - is offering clients a Dollars C1 (43 pence) per square foot incentive to implement green roof systems.

7. Leslie Hoffman, executive director of the Earth Pledge Foundation, a non-profit organisation, believes that for city authorities looking to cut costs, it is the capacity of green roofs to soak up storm water that will ultimately persuade officials to invest in the technology. Earth Pledge has been commissioned by New York City's water board to create models for Lower Manhattan storm water flows. "What they are interested in is the ability to quantify the value of the benefit," says Ms Hoffman. By acting like a giant sponge, a green roof delays the run-off of storm water that, for cities with combined storm water and sewerage systems, can create problems. "There are drainage basins in New York City, for example, where as little as one-twentieth of an inch of rain could create an overflow," says Ms Hoffman.

Cognome _____

Nome _____

Matricola _____

1. VOCABULARY (1 point)

Complete paragraph 2 in the text with the best words from the box below.

Example: included

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

air and countryside effect
feature included of solar projects

II. HEADINGS (1 point)

Choose the best heading from the list below for each of the numbered paragraphs from the text.

Example: Paragraph 2 F

9. Paragraph 1 _____
10. Paragraph 3 _____
11. Paragraph 4 _____
12. Paragraph 6 _____

- A. Falls in temperature due to green roofs
- B. How green roofs can prevent flooding
- C. Data on energy economies from green roofs
- D. Subsidies for green roofs
- E. Description of a green roof
- F. ~~Comparative city and countryside temperatures~~
- G. Why US cities are interested in green roofs

III. REFERENCE (1 point)

What do the underlined words in the sentence refer to?

Example: Are starting to green their rooftops(paragraph 2)
North American cities

13they hope green roofs can cut costs(paragraph 1)

14 "It is a well known phenomenon," says Stuart Gaffin(paragraph 2)

15 It acts as insulation and the vegetation provides shade(paragraph 3)

16 ... you tell them that here is a simple way of easing(paragraph 5)

IV. GENERAL COMPREHENSION (1 point each)


Indicate if the following statements are true (T), false (F) or if there is not enough information in the text to decide (N), based only on the information in the text.

Example: The authorities like green roofs because they promote gardening F

17. There are more green roofs in Chicago than Toronto _____
18. Research shows that green roofs lower city temperatures _____
19. Green roofs are confined to North America _____
20. Prof. Bass believes green roofs have advantages for utilities _____

V. Part Two (5 points each)

21. Would green roof systems be feasible in Italian cities? Write a short paragraph to explain your position.



22. The city of Quebec provides financial incentives for green roof systems. Write a short letter to persuade the Minister of the Environment to follow the Quebec example.

