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## Heat a greenhouse with compost, even in the city!

Posted on [January 31, 2013](#) by [Laura W](#)

*Article and photos by Jessica Clark, [South Pine Street City Farm](#)*

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The thermometer shows the temperature of the compost, 118 degrees and rising!

A well managed greenhouse can be invaluable to the gardener. It provides a safe warm space to grow seedlings for the spring, even in the chilly month of February. It can extend your growing season late into the fall. It can even be a place to over winter more tender plants, such as rosemary or fig trees! Sometimes I have stepped into a greenhouse on a cold bright winter's day, just to feel the warmth and be reminded of summer.

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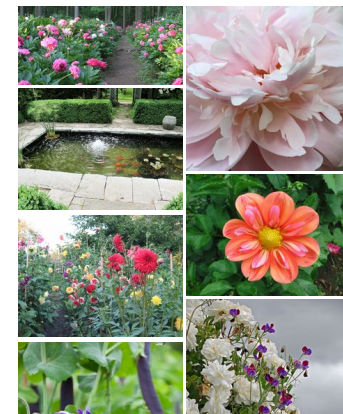
 

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Each bay holds about 1.25 cubic yards of compost materials, a layer of cardboard and a layer of clean mulch goes on top and then the soil. There are spinach seedlings in the back and mesclun in the second bay.

One of the main differences between a simple hoop house and greenhouse is that a greenhouse is actively heated so that it remains warm, even overnight. For commercial operations this is achieved through some sort of electric or fossil fuel heating system, similar to the heating of a regular house. These systems often heat the air to 50°F or above and can use an incredible amount of energy on a brutally cold night. They also need to be plugged in to an electrical outlet to operate. But what do you do if you don't have access to electricity and/or you want to cut down on your fossil fuel usage? Thankfully there may be another way to heat a greenhouse, while also producing quality compost.

Some of you have expressed interest in my compost heated greenhouse project from my mention of it in an answer to the HVGA [Dirty Dozen questions](#). In my project I am exploring the use of decomposing

compost, in my case “urban compost” consisting of used coffee grounds from local cafes and municipal yard waste, to heat a greenhouse over the winter and into the spring. These materials are both waste products that would otherwise be headed for the dump. When organic materials begin to decompose, the biological activity creates heat, a surprising amount of heat in fact. A really active pile can maintain a temperature of 130°F or higher for several weeks. In the greenhouse I am maintaining, I am currently using this heat to directly heat soil on top of it. The soil itself can reach a balmy 70°F. Even though the air temperature inside the greenhouse may hover around freezing, the warm soil keeps the root zone of the plant well above freezing and this can be more important to the health of the plant than the air temperature. Meanwhile, the compost that is being created underneath the soil can be later added to garden beds, or even used

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as a base for seedling starter medium. As the compost cools down, I harvest what is growing in the soil and replace the compost with new materials.

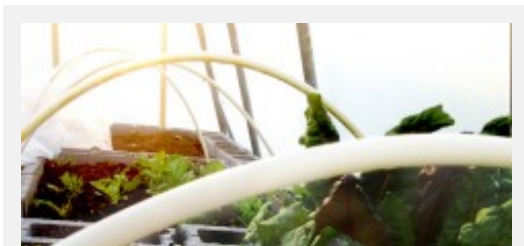


This side of the greenhouse is in full force. I have added another layer of insulation by using row cover held up by PVC hoops. This picture was taken in early December.

While compost heated greenhouses and cold frames, called hot beds, are not a new technology, they have mostly relied on animal manures for their compost ingredients. Since I operate in a city and the greenhouse is a stone's throw away from the neighbors, my project has mainly focused on the use of readily available materials in an urban setting and also on the ability of the greenhouse to operate without offending the neighbors' view or sense of smell.

In a compost heated greenhouse, some other things to watch out for are gaseous byproducts of the composting process such as carbon dioxide and ammonia. While a slightly elevated level of these gasses is actually beneficial for the health of the plants, too much of it can be bad for both plants and people. So far the urban compost has actively generated a lot of carbon dioxide, but not so much

as to harm the plants. The actively composting coffee grounds create some ammonia, but a very low amount compared to actively composting manures.



Although my project will not be completed until the spring, I have very high hopes for it. During the spring I hope to give tours of the greenhouse and later on I will be leading a workshop on urban/suburban compost heated greenhouses



The greenhouse in January. Some of the crops have been harvested.

through HVGA. I want to thank Laura and HVGA for allowing me to geek out on my compost greenhouse experience. Also, I would like to thank [Northeast SARE](#) (Sustainable Agriculture Research and Education program) for providing funding for this project and the YMCA of Kingston and Ulster County for housing the greenhouse amongst their beautiful community gardens.

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*National Institute of Food and Agriculture, U.S. Department of Agriculture.*



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## **4 Responses to *Heat a greenhouse with compost, even in the city!***



**Rebecca says:**

January 31, 2013 at 6:56 pm

Wow. Great work Jesica!  
Would love to come to see the greenhouse.

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**Anna** says:

February 4, 2013 at 4:43 pm

Please keep us posted as your experiment progresses. This is so interesting, I want to know more!

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**janis Cortright** says:

February 4, 2013 at 6:01 pm

I want to hear more about this.

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**Greg Draiss** says:

February 4, 2013 at 7:46 pm

Outstanding idea. Good luck with this project

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