

**GROWING A NEW GENERATION  
OF ILLINOIS FRUIT AND VEGETABLE FARMERS**

# **CONVERTING TO YEAR-AROUND GREENHOUSE PRODUCTION: WHY AND HOW**

**J. D. Kindhart**

**February 2015**

# Converting a high tunnel

- Carefully evaluate market and income potential
- Evaluate crops being raised and cultural systems to be used
- Add heat
- Lighting?
- Energy conservation possibilities

# Why convert?

- Year round demand?
- Potential to make income?
- No longer have winters off!

Email | CITES | Illinois | Kindhart, Jeffrey D - x

← → ↺ <https://www.google.com/search?q=greenhosue+vegetable+crop+budget&oq=gr>

greenhouse vegetable crop budget

Web Shopping News Images Videos More Search tools

About 399,000 results (0.25 seconds)

**[PDF] Greenhouse Tomato Budgets for Mississippi**  
[msucare.com/pubs/publications/p2766.pdf](https://msucare.com/pubs/publications/p2766.pdf) Growing greenhouse vegetable crops and growing tomatoes hydroponically are popular among small producers who want to diversify their farms and ...

**Crop budgets for vegetable and berry growers**  
[www.uvm.edu/vtvegandberry/budgetlinks.html](http://www.uvm.edu/vtvegandberry/budgetlinks.html) University of Vermont \* Crop Production Budgets for Vegetable and Berry Growers ... greenhouse tomato budget · N. Carolina Farm Stewarship - 1 acre organic crop budgets ...

**Economics/Crop Budgets | North Carolina Cooperative ...**  
[tomatoes.ces.ncsu.edu/tomatoes-economicscrop-budgets/](https://tomatoes.ces.ncsu.edu/tomatoes-economicscrop-budgets/) Also included are sample budgets associated with greenhouse tomato production ... Cost budgets are reported for 20 vegetable crops as combinations of crop, ...

**Crop Production Budgets | UMass Amherst Vegetable ...**  
<https://extension.umass.edu/vegetabl...> University of Massachusetts Amherst \* Below are "Process Budgets" for various crops grown in Massachusetts. A Process Budget is a description of the production practices followed in growing a crop, ...

**Center for Crop Diversification Crop Budgets**  
[www.uky.edu/Ag/CCD/budgets.html](http://www.uky.edu/Ag/CCD/budgets.html) University of Kentucky \* Nov 19, 2014 - ... Budget updates. 2013 Vegetable and Melon budgets ... Virtual Grower An energy cost calculator for greenhouse growers from the USDA ...

**[PDF] Budget for Greenhouse Tomatoes - Agricultural Marketi...**  
[www.agmrc.org/media/cms/p2257\\_47C17DE16225E.pdf](http://www.agmrc.org/media/cms/p2257_47C17DE16225E.pdf) crop and make the right decisions at the right time. Not as much information is available about greenhouse tomatoes as compared to field vegetables, This can ...

**[PDF] Greenhouse Vegetable Production Potential Greenhou...**  
[www.hort.vt.edu/ghvegetables/.../Greenhouse\\_Vegetable\\_Production\\_Al...](http://www.hort.vt.edu/ghvegetables/.../Greenhouse_Vegetable_Production_Al...) Spring Crop. • Fall Crop. – Retail. • Spring Crop. • Fall Crop. – Greenhouse and. Field. • Long Season (April 1 to December 31). Greenhouse Tomato. Budgets.

**Organic Greenhouse Vegetable Production | ATTRA ...**  
<https://attra.ncat.org/.../view...> National Center for Appropriate Technology \* Tomatoes are the leading greenhouse vegetable crop, followed by European cucumbers, lettuce, peppers, and culinary ... Cheap sources of energy are key.

**Helpful Links - Vegetable Production - The University of ...**  
[vegetables.tennessee.edu/links.html](http://vegetables.tennessee.edu/links.html) Tennessee \* Mississippi State University, Budget for green house tomatoes · North Carolina Fruit and Vegetable Crop Budgets · South Carolina Vegetable and Melon ...

**[PDF] An Economic Analysis of Sequential Cropping Systems...**  
[economics.aotk.edu/publications/horticulture/rs0901.pdf](http://economics.aotk.edu/publications/horticulture/rs0901.pdf)



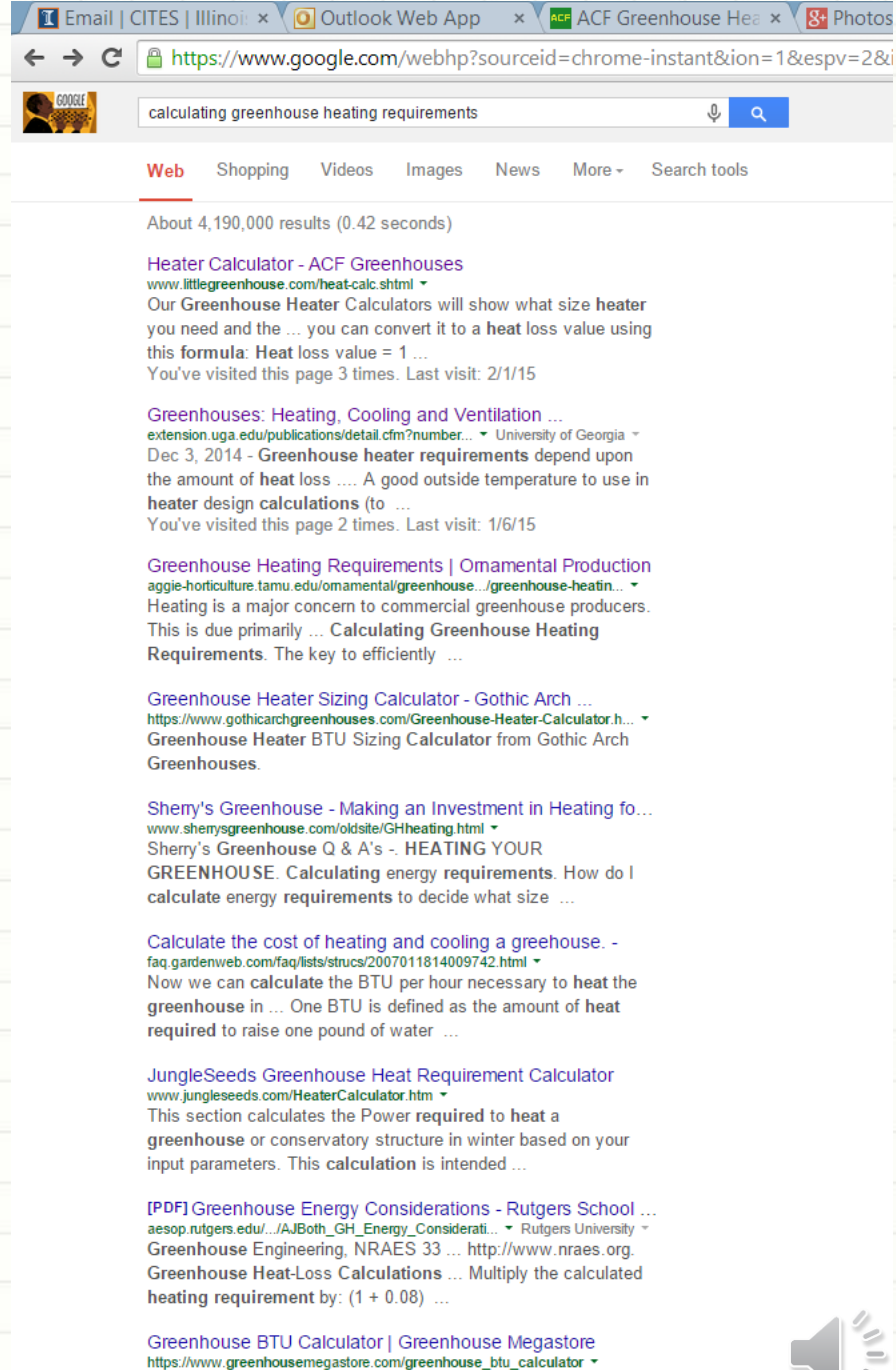


# Heating options

- Hot water / Boiler
  - Boiler Types
    - Fire tube
    - Water tube
    - Water jacket
  - Fuels
    - Waste wood/biofuel
    - Waste Oil
    - Firewood/Coal
    - Gas
- Unit Gas Fired Heaters

# Heat Requirement

- Hand calculation
  - Greenhouse volume
  - GH surface area
  - R-value of glazing
  - Etc.etc.etc.
- Online calculators



The screenshot shows a Google search interface with the query "calculating greenhouse heating requirements". The search results are displayed below the search bar, showing approximately 4,190,000 results in 0.42 seconds. The results list several relevant links, including "Heater Calculator - ACF Greenhouses", "Greenhouses: Heating, Cooling and Ventilation ...", "Greenhouse Heating Requirements | Ornamental Production", "Greenhouse Heater Sizing Calculator - Gothic Arch ...", "Sherry's Greenhouse - Making an Investment in Heating fo...", "Calculate the cost of heating and cooling a greenhouse. -", "JungleSeeds Greenhouse Heat Requirement Calculator", and "[PDF] Greenhouse Energy Considerations - Rutgers School ...". The search bar at the top contains the text "calculating greenhouse heating requirements" and a magnifying glass icon. The Google logo is visible on the left side of the search bar. The search results are organized into a list of links, each followed by a brief description of the content.

calculating greenhouse heating requirements

Web Shopping Videos Images News More Search tools

About 4,190,000 results (0.42 seconds)

**Heater Calculator - ACF Greenhouses**  
[www.littlegreenhouse.com/heat-calc.shtml](http://www.littlegreenhouse.com/heat-calc.shtml)  
Our Greenhouse Heater Calculators will show what size heater you need and the ... you can convert it to a heat loss value using this formula: Heat loss value = 1 ...  
You've visited this page 3 times. Last visit: 2/1/15

**Greenhouses: Heating, Cooling and Ventilation ...**  
[extension.uga.edu/publications/detail.cfm?number...](http://extension.uga.edu/publications/detail.cfm?number...) University of Georgia  
Dec 3, 2014 - Greenhouse heater requirements depend upon the amount of heat loss .... A good outside temperature to use in heater design calculations (to ...  
You've visited this page 2 times. Last visit: 1/6/15

**Greenhouse Heating Requirements | Ornamental Production**  
[aggie-horticulture.tamu.edu/ornamental/greenhouse.../greenhouse-heatin...](http://aggie-horticulture.tamu.edu/ornamental/greenhouse.../greenhouse-heatin...)  
Heating is a major concern to commercial greenhouse producers. This is due primarily ... Calculating Greenhouse Heating Requirements. The key to efficiently ...

**Greenhouse Heater Sizing Calculator - Gothic Arch ...**  
<https://www.gothicarchgreenhouses.com/Greenhouse-Heater-Calculator.h...>  
Greenhouse Heater BTU Sizing Calculator from Gothic Arch Greenhouses.

**Sherry's Greenhouse - Making an Investment in Heating fo...**  
[www.sherrysgreenhouse.com/oldsite/GHheating.html](http://www.sherrysgreenhouse.com/oldsite/GHheating.html)  
Sherry's Greenhouse Q & A's - HEATING YOUR GREENHOUSE. Calculating energy requirements. How do I calculate energy requirements to decide what size ...

**Calculate the cost of heating and cooling a greenhouse. -**  
[faq.gardenweb.com/faq/lists/strucs/2007011814009742.html](http://faq.gardenweb.com/faq/lists/strucs/2007011814009742.html)  
Now we can calculate the BTU per hour necessary to heat the greenhouse in ... One BTU is defined as the amount of heat required to raise one pound of water ...

**JungleSeeds Greenhouse Heat Requirement Calculator**  
[www.jungleseeds.com/HeaterCalculator.htm](http://www.jungleseeds.com/HeaterCalculator.htm)  
This section calculates the Power required to heat a greenhouse or conservatory structure in winter based on your input parameters. This calculation is intended ...

**[PDF] Greenhouse Energy Considerations - Rutgers School ...**  
[aesop.rutgers.edu/.../AJBoth\\_GH\\_Energy\\_Considerati...](http://aesop.rutgers.edu/.../AJBoth_GH_Energy_Considerati...) Rutgers University  
Greenhouse Engineering, NRAES 33 ... <http://www.nraes.org>.  
Greenhouse Heat-Loss Calculations ... Multiply the calculated heating requirement by: (1 + 0.08) ...

**Greenhouse BTU Calculator | Greenhouse Megastore**  
[https://www.greenhousemegastore.com/greenhouse\\_btu\\_calculator](https://www.greenhousemegastore.com/greenhouse_btu_calculator)

# R value of some common glazing materials

Single layer 6 mil poly  $R = 1.15$

Double inflated 6mil poly film  $R = 0.7$

Polycarbonate 10mm double wall  $R = 0.53$





# Other heat considerations

- Split required BTU amount to avoid a zero heat situation
- Have back up systems in place
  - Extra fuel
  - Stand by electrical generator
    - Wired with disconnect switch
    - Fired periodically to make sure it will work when needed















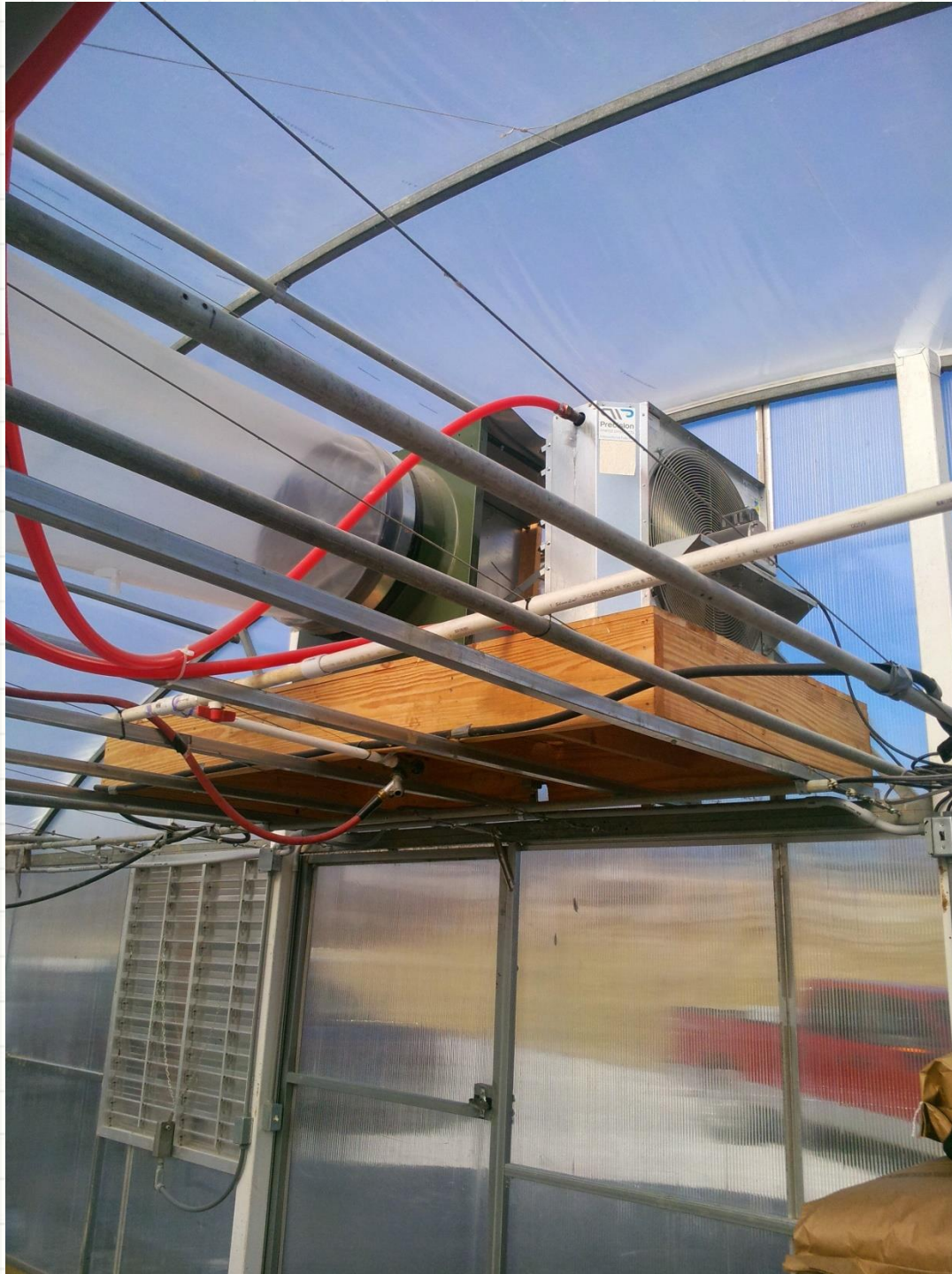




**WARNING**  
OPEN FLAME AND HOT SURFACES  
FURNACE BEFORE OPENING DOOR



















MODINE

Technical specifications and safety information label.

Warning label with a yellow background and black text.







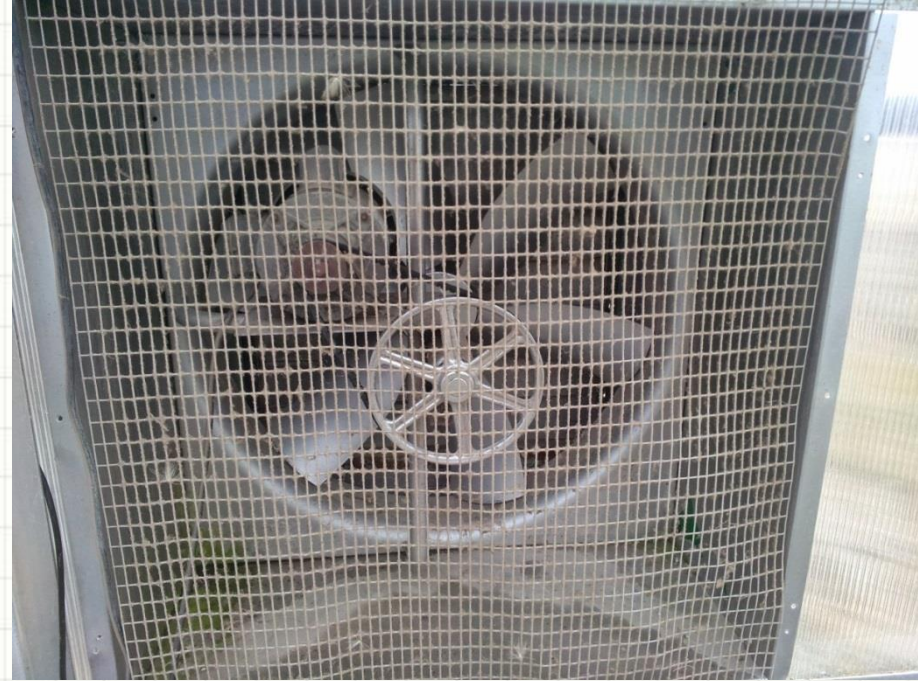




# Greenhouse Cooling

- Ventilation fans
- Whitewash
- Shade cloth
- Fan and pad





















# Crops

- Tomato
- Pepper
- Cucumber
- Lettuce
- Herbs

# Cultural Systems

- Soil
- Hydroponic



# Bonuses

- Better ability to control humidity
- More rapid crop development
- More predictable

# Drawbacks

- EXPENSE
- Insect pests



# January 5





# January 12



*Ray-Hear*  
**Heavy-Duty**  
Propagation Mat  
Model No. **PHD2110**  
Size: 21" x 10"  
Voltage: 120 volts  
Output: 300 watts

*Ray-Hear*  
**Heavy-Duty**





# January 20





# January 30























28/06/2012











CLERMONT





































# To reach us

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