



White Paper

Greenhouse vs Indoor Cannabis Cultivation

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The Issue

The Green Rush is here. Similar to those seeking gold 150 years ago, thousands of entrepreneurs and established corporations are looking to capitalize on this emerging market. The overall market is currently estimated at \$2.7 billion and should reach \$11 billion by 2019. Even with high consumer demand, an increasing supply has led to price decreases.

Wholesale prices have fallen from \$4,000 per pound to \$1,200 per pound since February, 2014. Increased competition and expansion of grow facilities contributed to this price decline, yet the drop is also a natural result for any maturing industry as dispensaries try to find the market's equilibrium price.

When falling prices both in retail and wholesale collide with rising costs, then the financial model for marijuana production becomes stressed. Utility companies are adding surcharges for high energy usage. According to the consulting company, Colorado Cannabis Systems, 10% of Denver's electrical grid and 12% of Boulder's grid are from indoor marijuana cultivation.

See the data below for additional information:

- Over the past year, the price for 1/8th of an ounce of recreational pot dropped as much as 40% in Colorado [according to a report](#) from the global brokerage services company, Convergenx, which recently surveyed several marijuana dispensaries. Convergenx reports that the average price for this amount of marijuana dropped from between \$50 and \$70 in June, 2014 to between \$30 and \$45 now. The price of a full ounce is now between \$250 and \$300 after selling for roughly \$300 to \$400 a year ago.
- The electricity is a huge portion of the cost of growing," says Dave Gardner, Senior Horticulturist with the consulting firm [Colorado Cannabis Systems](#). There are alternatives to warehouse cultivation. "It costs about half as much to grow in greenhouses," Gardner contends.

The Solution

With a tighter financial model, companies are forced to carefully manage their costs. Prices for marijuana will either remain stable or quite possibly fall. In this era of unpredictable utility resources, marijuana grow operations can pay higher utility bills through increased usage surcharges or consumption patterns. There is one clear conclusion. Utility costs should not fall anytime in the near future.

With this scenario, marijuana growers need to take a serious look at the costs and benefits of greenhouse cultivation vs. indoor warehouse grows. This decision could determine the grow operation's short and long-term financial profitability. In the event that marijuana prices continue to fall and utility costs rise, then the decision may determine whether the grow operation will survive at all. In the next sections, cultivation costs are examined from three areas: building/retrofit, equipment, and operating plus internal environmental factors.

Building Costs

| Greenhouse | Indoor |
|---|--|
| <ul style="list-style-type: none"> • Approximately \$25 per sq. ft. for the greenhouse building costs only • When the supplemental costs of heating, cooling, irrigation, benches, and other equipment are included, then the cost is around \$50 per sq. ft. • If the greenhouse will be built on undeveloped land where water, electrical, and sewage lines do not exist, then a reasonable estimate is \$75 per sq. ft. • Purchase costs for land range from \$1,000 per acre to \$100,000 or more | <ul style="list-style-type: none"> • An indoor grower starts with a vacant warehouse • Estimated costs to retrofit the warehouse for growing capabilities and add the necessary equipment is \$100 to \$125 per sq. ft. • Warehouse purchase rates in the City of Denver are around \$100 per sq. ft. • Lease rates are near \$15 per sq. ft. per year depending upon the geographic locale |

Sample Cost Structure

A grower may need 10,000 sq ft. of cultivation space. In a greenhouse, the cost to build the cultivation facilities plus add the supporting equipment is approximately \$500,000. Purchasing ten acres of land in a semi-rural area could run an additional \$150,000 to \$300,000 for a combined cost of \$650,000 to \$800,000.

The same size warehouse would cost \$1,000,000 to \$1,250,000 to retrofit for cannabis production and equip the space. Purchasing the warehouse would incur an additional cost of \$1,000,000. Leasing the warehouse for three years would cost about \$450,000 (\$15 sq. ft. per year).

In addition, a greenhouse or purchased warehouse becomes a fixed, tangible asset with the potential to sell for a higher price at a future date. As for a leased warehouse, there is an equipment salvage value, which would amount to only a fraction of the greenhouse or owned warehouse's future appreciation. The leased warehouse space gets converted to an alternate commercial use and the grower does not profit from the long-term appreciation.

An overlooked advantage of greenhouse growing is the easy expandability of gutter-connected greenhouses. Doubling the growing space is as easy as adding on additional greenhouses using the same materials as the original. Warehouse expansion is difficult at best and impossible on many sites due to other industrial buildings surrounding the location. Expansion with warehouse

grows usually involves a second site, which often include the same logistical management issues along with many duplicate costs, such as offices, personnel, and security. With the proper master plan, the greenhouse production expansion will flow seamlessly with the original layout.

Lighting Costs

A greenhouse makes the best possible use of natural sunlight, which is the strongest and most cost-effective energy source available. The greater the amount of sunlight, the less a grower needs to use artificial lighting. Growers in areas, such as Washington State and the Northeastern US, will need to rely upon artificial lighting more than those in states with higher amounts of sunshine including Colorado, Arizona, California, and Florida. In these areas, turning four harvests per year without any supplemental lighting by growing all year long is quite feasible.

Marijuana greenhouse grows use about 25% of the lightbulbs of indoor warehouses, and at a cost of \$500 per light fixture. The cost to equip a 10,000 sq. ft. building with lightbulbs is approximately \$62,500 compared with \$15,625 for the same size greenhouse. This cost only includes the warehouse buildout and does not account for the on-going monthly utility expenses.



Operating Costs

According to the Rand Corp., the greatest single cost for indoor growing operations is electricity to provide sufficient light for the plants to mature and grow. One-third of a grow operation's costs are electrical-related. These utility costs do not include water or gas. When the additional utility costs are added to the electrical costs, then the combined utility bills can reach 50%. Thus, managing the operation's overall cost structure becomes especially challenging.

An average 2,400 sq. ft. home uses 903 kilowatt hours of power monthly according to the US government. A marijuana grow consumes about 360 kilowatt hours (kwh) per month per 25 square feet to produce 20-25 plants. With a 10,000 sq. ft. grow operation, this energy use can approach 144,000 kwh per month.

Cannabis is the only industry on the planet that grows indoors under artificial light. Tomatoes, lettuce, and flowers are all grown with greenhouses since indoor cultivation would make these everyday items cost-prohibitive. In addition to the lighting costs, large air conditioning systems are used to reduce the heat levels from those lights. With greater reliance on the sun, and less use of supplemental lights and heaters, growers can reduce their utility bills by as much as 70%.

Internal Environment

Working in an enclosed agricultural environment with high intensity lights without sunlight or natural ventilation is not a healthy way to spend a day at work. Indoor operations require large amounts of water, which causes high levels of humidity. Without proper ventilation, mold can build up inside the walls and insulation. Large indoor crops can also produce increased levels of pollen. Continual elevated levels of molds and pollens may cause allergies, asthma, and potentially severe respiratory conditions for warehouse employees.



Conclusion

Historical growing practices for marijuana favored indoor warehouses due to the legal status. There was a need to grow in a secluded space. With the evolving legality of marijuana, greenhouses are now emerging as the best all-around growing environment.

At \$50 per sq. ft. to construct a greenhouse compared to \$127 per sq. ft. (\$112 retrofit and \$15 lease) to obtain a warehouse, the initial financial outlay is far less in a greenhouse. Harnessing natural sunlight with 25% of the lights needed in a warehouse substantially reduces greenhouse equipment costs. Yet, the most substantial cost reductions are from the lower on-going utility bills. Creating a natural growing environment through ample sunlight and natural ventilation leads to utility bills, which are up to 70% lower.

About Nexus

Nexus Corporation has served the greenhouse industry as a top US manufacturer since 1967. With a corporate office and production facility in Northglenn, CO along with an advanced manufacturing plant in Pana, IL, the company brings innovative designs, high quality products, and exceptional customer service to its [System 420™](#) hybrid greenhouse systems.

Nexus has a team of engineers (licensed in 49 states), sales, project management, customer service, and operations professionals dedicated to managing a greenhouse development project from start to finish. The team has expertise regarding the customized design components, efficiency features, and cost management strategies necessary to maximize crop yields and return-on-investment.

For more information on greenhouses from Nexus Corporation, [click here.](#)

Sources

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