

MARKET SIZE

Introduction

Rapidly changing public perceptions, approximately 19 million cannabis users across the U.S.,⁷⁴ various initiatives for reform, and prospects of “de-federalization” result in a huge market, making cannabis an appealing cash crop for entrepreneurs and investors across the U.S.

This segment explores Colorado’s market as a representative sample of what the U.S. legal cannabis market could become in the near future. Colorado is useful for these purposes as cannabis is legal for both recreational and medicinal use. Statistics from Colorado are used to estimate the potential size of a nationwide legal cannabis industry and are compared to contemporary estimates and statistics advanced by others.

Additionally, this section explores the market for hemp, analyzes various peripheral markets created by cannabis legalization, and discusses the wide variety of jobs that are generated.

It is useful to look at the cannabis market as one for business purposes, rather than subdivide it into medicinal and recreational markets, as demand and supply for cannabis are preexisting. Preexisting demand and supply suggest that legalization at a federal level could potentially result in market share currently occupied by the medicinal, recreational, black, and gray markets all forming part of a regulated industry.

Colorado’s Cannabis Market

The Colorado cannabis market is estimated to consume between 104.2 and 157.9 metric tons (MT) per year, accounting for Colorado residents and visitors.⁷⁵ These numbers have been suggested using demand- and supply-oriented models limiting scope only to those aged 21 and over, although use among under-21s is widespread. Notably, demand-oriented formulae have been favored across the board for various reasons, including the lack of availability of data when using a supply-side approach. For this reason, discussions of this segment will adhere to a demand-based approach.

In a demand-oriented approach, the number of users and the quantity of cannabis consumed by various users are estimated over a specified period of time, typically one month. Users are then subdivided based on frequency of use per month. Furthermore, the quantity demanded is tallied based upon dosage estimates, which can vary widely. Whilst frequency of cannabis use is easily ascertainable from survey reports, quantities consumed are not as readily available. Studies in Colorado have focused on these issues and developed useful, comprehensive data.

⁷⁴ Natural Revolution. (2015). *‘Up In Smoke’ – A Timeline of Marijuana Use in The U.S.* Retrieved from <http://naturalrevolution.org/up-in-smoke-a-timeline-of-marijuana-use-in-the-u-s/>.

⁷⁵ Marijuana Policy Group. (2014). *Market Size and Demand for Marijuana in Colorado*. Retrieved from <https://www.colorado.gov/pacific/sites/default/files/Market%20Size%20and%20Demand%20Study,%20July%209,%202014%5B1%5D.pdf>.

Market research indicates that there are an estimated 686,000 yearly users of cannabis in Colorado, of which 485,000 consume cannabis at least once a month. Monthly users represented nine percent of the 2014 population of 5.363 million residents. Additionally, 201,000 adult residents reported cannabis use within the last year, accounting for 3.8 percent of Coloradans. The vast majority of demand for cannabis in Colorado originates from regular users, and in particular from heavy users that consume cannabis almost daily. The top 21.8 percent of users account for 66.9 percent of cannabis demand. On the contrary, the entire population of rare users (less than once a month), which accounts for almost one-third of users, represents 0.3 percent of total cannabis demand in Colorado.

Estimated Nationwide Market Size

This subsection calculates the size of the cannabis market across the U.S. by using median tonnage statistics from Colorado and disregarding other potential variables. Additionally, whilst tonnage values are useful, a regulated cannabis industry across the U.S. will likely deal in ounces. For this reason, the estimates are converted to ounces. Although prices for cannabis typically vary between \$130 and \$300 per ounce,⁷⁶ a value of \$200 is used for the analysis here.

The first step is measuring Colorado's population as a percentage of the total U.S. population (general population statistics tend to be more accurate than statistics reflecting cannabis use). With 5.36 million residents, Colorado's population is approximately 1.68 percent of the total U.S. population (318.9 million residents). Although over-21s are the focus of this calculation, it is assumed that persons of varying age groups are spread equally across the U.S.

The next step is calculating how many MTs are likely to be consumed across the U.S. using ratios, cross-multiplication, and a median tonnage value from Colorado. As estimates of Colorado's cannabis consumption vary between 104.2 and 157.9 MTs annually, a median value of 131.1 MTs is used.

The calculation is as follows:

$$\begin{array}{l} \text{Step One: } 1.68 \text{ percent} : 131.1 \text{ MTs} \\ \qquad \qquad 100 \text{ percent} : X \end{array}$$

$$\begin{array}{l} \text{Step Two: } \frac{1.68\%}{131.1\text{MT}} = \frac{100\%}{X \text{ MT}} \end{array}$$

$$\begin{array}{l} \text{Step Three: } \frac{0.0168}{131.1\text{MT}} = \frac{100}{X \text{ MT}} \end{array}$$

$$\text{Step Four: } 131.1\text{MT} = 0.0168X$$

⁷⁶ Leafly. *DANK Colorado – Adult Use! Menu*. Retrieved from <https://www.leafly.com/dispensary-info/dank-colorado---adult-use-/menu>.

Step Five: $13,110 = 1.68X$

Result: $X = 7,803.57$

Given that the whole of the U.S. can consume an estimated 7,803.6 MTs of cannabis annually, the next step is calculating how many ounces this is. One MT is 1,000,000 grams whereas one ounce is 28.345 grams, leading to the calculation that one MT is 35,274 ounces. Multiplication of 35,274 by 7,803.6 MTs leads to a result of 275,264,186 ounces.

Of most interest is the dollar value of cannabis that could potentially be sold across the U.S. This can be calculated by multiplication of 275,264,186 ounces by \$200. The result is \$55,052,837,200, suggesting that approximately \$55 billion of cannabis could be sold across the U.S. if an environment similar to Colorado were generated.

However, this figure requires adjustment due to higher usage rates in Colorado than elsewhere in the U.S. For example, in Colorado 23 percent of cannabis users claimed to consume cannabis nearly daily, compared to 17 percent in the U.S. overall. These figures, when analyzed in terms of projected use across the U.S., suggest that users nationwide could consume cannabis at approximately 73.91 percent of the rate that Coloradans do. An adjustment made using these values is particularly useful as heavy users represent the majority of cannabis sales. The adjusted figure, 73.91 percent of \$55,052,837,200, suggests that \$40,689,551,975 (approximately \$40 billion) of cannabis could potentially be sold across the U.S. Similar values between \$35 billion and \$45 billion have been reached by many using demand- and supply-based models for nationwide cannabis market size projection.⁷⁷

Discussion

This subsection further analyzes the potential market size of a nationwide legal cannabis industry in light of various statistics, hypotheses, and projections. Further discussions include ancillary markets, job creation, and the hemp market.

Market Analysis

Bearing in mind that the projections advanced above are based on a Colorado-style cannabis trade across the U.S., which could take several years to develop, it is useful to review various data to understand properly the current market size and infer what the market may appear like in the next few years.

A report from *GreenWave Advisors* (GreenWave) is particularly useful in this regard.⁷⁸ In concurrence with IGC's understanding, GreenWave suggests that "[f]ederal law will likely

⁷⁷ Nelson, A. (2010). *How Big is the Marijuana Market?*. Retrieved from <http://www.cnbc.com/id/36179677#>.

⁷⁸ GreenWave Advisors. (2014). *The GreenWave Report – State of the Emerging Marijuana Industry Current Trends and Projections*. Retrieved from https://www.greenwaveadvisors.com/wp-content/uploads/GreenWave_Report_ES.pdf.

change, thus eliminating the current dichotomy” and that medical and “adult use” (recreational) markets will “likely merge into one substantially larger market.” GreenWave suggests that “marijuana sales revenues could reach ~ \$35 billion/year by 2020.” This figure accounts only for retail revenues (including sales and excise tax collections); ancillary and wholesale cannabis markets are excluded. This projection is similar to that advanced above in light of Colorado’s current state of affairs, especially given that the estimate is for 2020 and there may be substantial uptick in revenue thereafter.

Additionally, GreenWave predicts that if the federal government does not end prohibition but state-attitudes towards legalization continue on their current path, the industry could be worth \$21 billion by 2020. This figure is based on the assumption that more states will continue to legalize cannabis. For this model GreenWave assumes that ten additional states will have legalized recreational cannabis by 2020, and that a total of 37 states will have legalized medicinal cannabis. Matt Karnes, Founder and Managing Partner of GreenWave stated “[o]ur road map for the progression of states to legalize is very detailed -- our assumptions are largely predicated on whether a particular state has legislation in progress.”⁷⁹ Karnes further stated “[i]n the state of Colorado, we are beginning to see the sales impact -- i.e., cannibalization of medical marijuana sales by the adult-use market -- when the two markets co-exist... we expect a similar dynamic to unfold in those states that will implement a dual marijuana market.” Karnes further suggests that a merged market already exists as chronic pain is the most common ailment among medical cannabis users and recreational users likely can already purchase cannabis without great difficulty in states where medicinal use is legal.⁸⁰

A cannabis trade with \$35 billion of retail sales alone represents more annual revenue than the National Football League (NFL),⁸¹ approximately as much revenue as the newspaper industry,⁸² and a growth rate higher than the smartphone industry.⁸³ Such figures have led to the cannabis trade being coined “the fastest growing industry in the U.S.”⁸⁴

⁷⁹ Ferner, M. (2014). *Marijuana Industry Could Be Worth \$35 Billion In 2020, If All States And Feds Legalize It*. Retrieved from http://www.huffingtonpost.com/2014/10/23/marijuana-legalization-50-states_n_6036292.html.

⁸¹ Schrottenboer, B. (2014). *NFL takes aim at \$25 billion, but at what price?*. Retrieved from <http://www.usatoday.com/story/sports/nfl/super/2014/01/30/super-bowl-nfl-revenue-denver-broncos-seattle-seahawks/5061197/>.

⁸² Edmonds, R. (2014). *Newspaper industry narrowed revenue loss in 2013 as paywall plans increased*. Retrieved from <http://www.poynter.org/news/mediawire/247555/newspaper-industry-narrowed-revenue-loss-in-2013-as-paywall-plans-increased/>.

⁸³ Schwartz, C. (2013) *Marijuana Market Poised To Grow Faster Than Smartphones*. Retrieved from http://www.huffingtonpost.com/2013/11/04/marijuana-market_n_4209874.html.

⁸⁴ Ferner, M. (2015). *Legal Marijuana Is The Fastest-Growing Industry In The U.S.: Report*. Retrieved from http://www.huffingtonpost.com/2015/01/26/marijuana-industry-fastest-growing_n_6540166.html.

These numbers are further supported by *ArcView Market Research* (ArcView). ArcView suggests that based on the \$1.5 billion U.S. cannabis market of 2013,⁸⁵ the \$2.7 billion market of 2014,⁸⁶ and a projected market of \$3.5 billion in 2015, the industry could exceed \$10 billion in sales by 2018.⁸⁷ ArcView goes on to suggest that full-scale legalization could result in a cannabis market in the range of \$36 billion, exceeding the organic food industry by approximately \$3 billion. In fact, reportedly *Whole Foods* CEO John Mackey indicated interest in a “gourmet cannabis section” alongside its well-known presence in the organic food trade.⁸⁸

These statistics and projections can be better understood in light of retail sales in Colorado. In 2014, Colorado sold nearly \$700 million of cannabis. \$385.9 million can be attributed to medical cannabis, whereas \$313.2 million worth of recreational cannabis was sold. These statistics, described as “insane [numbers]” by Caitlin Murphy, Director of Marketing at the Emeralds Fields Dispensary Group, are based on data provided by the Colorado Department of Revenue. Given the disparity between Colorado’s cannabis sales in January 2014 and December 2014 is significant, with \$14.7 million in January and \$35.1 million in December, largely caused by a rapid increase in cannabis stores, future projections should resemble December 2014 patterns.⁸⁹

Notably, however, as a result of the interplay of several factors, predicting market size for the cannabis industry is challenging and has been described as a “fool’s errand.”⁹⁰ Whist IGC does not share this view, challenges towards accurate market size projection must be acknowledged. For example, the U.S. black market for cannabis varies between \$10 billion and \$120 billion. Further issues encountered in advancing market size predictions include the market share of and dynamic created by concentrates, topicals, and edible products; the effect of a legalized market on user prevalence; the impact of retail and medical demand on tax revenues; and the response of producers and retailers to the tax structure developed.

Review of various articles, reports, and projections confirms that our market size forecast based on Colorado’s cannabis market is useful and accurate. Ever-increasing investment further

⁸⁵ Dowell, C. (2015). *Inside the Cannabis New-Money Dating Game*. Retrieved from <http://www.mjnews.com/inside-cannabis-new-money-dating-game/>.

⁸⁶ Truong, A. (2015). *The marijuana industry’s newest customers are sick and elderly dogs*. Retrieved from <http://qz.com/377887/the-marijuana-industrys-newest-customers-are-sick-and-elderly-dogs/>.

⁸⁷ Truong, A. (2015). *A Budding Business: The Marijuana Market is Expected to Top \$10 Billion by 2018*. Retrieved from <http://www.fastcompany.com/3021155/fast-feed/a-budding-business-the-marijuana-market-is-expected-to-top-10-billion-by-2018>.

⁸⁸ Fairley, J. (2015). *Could the Marijuana Industry Overtake the Organic Food Market?*. Retrieved from <https://www.mainstreet.com/article/could-the-marijuana-industry-overtake-the-the-organic-food-market>.

⁸⁹ Baca, R. (2015). *Chart: Colorado marijuana sales hit \$700 million for 2014*. Retrieved from <http://www.thecannabist.co/2015/02/12/colorado-marijuana-sales-2014-700-million/27565/>.

⁹⁰ Ingraham, C. (2014). *The marijuana industry could be bigger than the NFL by 2020*. Retrieved from <http://www.washingtonpost.com/blogs/wonkblog/wp/2014/10/24/the-marijuana-industry-could-be-bigger-than-the-nfl-by-2020/>.

clarifies that the market is in fact large, and that it is poised to grow significantly over the next few years.⁹¹

Peripheral Markets

A legal cannabis market gives rise to a large peripheral or ancillary market. Whilst it is very challenging to estimate the total size of the peripheral market created by cannabis, this subsection discusses some of the products and services that form this market.

Companies engaged in the peripheral market do not grow, produce, or sell the cannabis plant in its raw form. Rather, they service the core industry by providing a wide range of support services including product-tracking software, security systems, vaporizers, transaction processing systems, cannabis potency testing, and edibles and concentrates.

MJ Freeway, the “Marijuana Industry’s Premium Business Platform,”⁹² is a good example of a company that has enjoyed success working in the peripheral market created by cannabis legalization. Founded in 2010 by a team of software and IT professionals, the technology provides inventory control and grow management applications with unlimited remote technical support (patent pending).

MJ Freeway guarantees to meet any state tracking requirements, seeking to create a “legitimate, sustainable and professional industry.” Its SaaS (software-as-a-service) platform includes point of sale, inventory tracking, and manufacturing management applications. *MJ Freeway* considers itself a “one-stop shop” selling scales, labels, printers, credit card swipers, and other accouterments of the cannabis trade.⁹³ *MJ Freeway’s* success has attracted investment from Tao Capital Partners, a venture capital firm that invested in *Tesla* and *SpaceX*. Amy Pinsett, CEO of *MJ Freeway* stated, “[w]e found early on that there were some very unique needs and requirements for cannabis businesses, and that we could provide services geared to this niche.”

Ambient Water, Inc. (Ambient)⁹⁴ has used its clean-water technology in fracking operations in shale-rich states and household drinking supplies in the Middle East; it is now looking towards legal cannabis. Ambient CEO Keith White indicated that the firm, based in Spokane, Washington, is developing highly efficient greenhouses that will assist cannabis growers to produce bigger, better plants. Ambient’s technology captures moisture in the air and turns it into purified water. This is used to continuously replenish crops and adjust humidity levels. Cooling, heating, and ventilation systems keep cannabis plants at ideal temperatures while preventing harmful mildew and disease.

⁹¹ Mullaney, T. (2015). *2015 Marijuana Stock Analysis*. Retrieved from <http://www.investopedia.com/articles/investing/022715/2015-marijuana-stock-analysis.asp>.

⁹² MJ Freeway. (2015). *Home*. Retrieved from <http://www.mjfreeway.com>.

⁹³ Woods, B. (2015). *How techies are profiting from the booming pot business*. Retrieved from <http://www.cnn.com/id/102526943>.

⁹⁴ Ambient Water. (2015). *Home*. Retrieved from <http://www.ambientwater.com/en/>.

Whilst the modern greenhouse has existed for centuries, companies such as Ambient and *Surna Inc.* (Surna)⁹⁵ see current designs as inefficient for growing cannabis. For example, in a conventional glass structure vents are opened when temperatures get too high, allowing moisture and carbon dioxide to escape through the hatches. Cannabis plants thrive most when humidity levels are at 70 percent in their growing phase and 40 percent during their flowering phase.⁹⁶ Such balances are difficult to maintain when vents are open; Surna and Ambient provide solutions to such issues through use of advanced technologies for climate control and air handling.

As legalization of cannabis becomes more widespread and operations of those growing cannabis increase in size and number, technological innovation in the field is increasing at a rapid pace. In addition to the efforts of Ambient and Surna, companies such as *BML* provide commercial grade Light-Emitting Diode (LED) grow lights. These lights can help those in industry achieve “maximum results in marijuana cultivation” while being electrically efficient. Switching to LEDs from High Pressure Sodium (HPS), Metal Halide, or Induction grow lights typically results in a 25 to 50 percent decrease in electricity usage, a substantial reduction in cooling costs, and less replacement lamps.⁹⁷

Other examples of those working in the peripheral market created by legal cannabis include *Leafly*, a cannabis dispensary and strain review website; *WeedHire*,⁹⁸ a website “looking to become the [*Monster.com*] of legal marijuana jobs”⁹⁹; and *Bud + Breakfast*, a Colorado-based cannabis friendly lodging website that will “keep the bowl burning for you.”¹⁰⁰

Further efforts include those of two Ohio graduate students who have invented a device that will allow law enforcement officers to determine whether motorists have used cannabis by testing saliva. With legalization trends continually on the rise, Driving Under the Influence of Drugs (DUID) concerns prevail. In particular, many are concerned about drivers using cannabis due to its ability to “slow-down decision-making, decrease peripheral vision and impede multitasking, all of which are critical driving skills.”¹⁰¹ Currently, Police must wait weeks to obtain the results

⁹⁵ Surna. (2015). *Home*. Retrieved from <http://surna.com>.

⁹⁶ Gallucci, M. (2015). *Legal Marijuana Growers Are Moving From Warehouse To Greenhouse, And Technology Firms Are Capitalizing On The Shift*. Retrieved from <http://www.ibtimes.com/legal-marijuana-growers-are-moving-warehouse-greenhouse-technology-firms-are-1846852>.

⁹⁷ BML. (2015). *Home*. Retrieved from <http://www.bmlhorticulture.com/led-cannabis-grow-lights/>.

⁹⁸ WeedHire. (2015). *Home*. Retrieved from <http://www.weedhire.com>.

⁹⁹ Thiruvengadam, M. (2015). *Looking for a job in the legal marijuana business? There's an app for that*. Retrieved from <http://finance.yahoo.com/news/there-s-now-an-app-for-getting-a-job-in-the-legal-pot-business-213647768.html>.

¹⁰⁰ Bud + Breakfast. (2015). *Home*. Retrieved from <http://www.budandbfast.com/home/>.

¹⁰¹ Christian Science Monitor. (2015). *Ohio students invent DUI marijuana testing device*. Retrieved from <http://www.csmonitor.com/Technology/2015/0427/Ohio-students-invent-DUI-marijuana-testing-device-video>.

of blood tests that indicate how intoxicated the driver was. Many believe the devices designed by these students carry promise to make our roads safer.

Whilst a dollar value of the peripheral market created by cannabis legalization is not as easily ascertained as that for cannabis itself, it is clear that this market is very large and ever growing due to consistent investment, technological innovation, and creative business ideas.

Cannabis Jobs

The large cannabis and peripheral markets result in creation of many jobs. Colorado generated at least 10,000 cannabis-related jobs in 2014.¹⁰² When combined with thousands of preexisting jobs in Washington and California, it is clear that a significant cannabis-related job market already exists. Furthermore, it is estimated that the cannabis trade will create 200,000 jobs in 2015.¹⁰³

Legal cannabis provides unique opportunities for interested persons. Some of these positions include Edible Creators, Concentrates Processors, Glass Merchants, Courier and Delivery Services, Security, Strain Reviewers, Trimmers, Tourism-related jobs, Administrative positions, “Budtenders,” Regulators, Web and Software related positions, Retail Store Owners, and Farmers.¹⁰⁴

Hemp Market

Hemp fibers can be used in a wide array of products, including fabrics and textiles, yarns and spun fibers, paper, carpeting, home furnishings, construction and insulation materials, auto parts, and composites.¹⁰⁵ Hemp seed and oilcake can be used in a variety of foods and beverages, and can be an alternative protein source. Oil from the crushed hemp seed can be used as an ingredient in a range of nutritional supplements. Hemp seeds can also be used for industrial oils, cosmetics and personal care products, and pharmaceuticals. Approximately 25,000 products can be made using hemp, spanning across nine submarkets.

Despite its non-psychoactive nature, the hemp plant (*Cannabis sativa L.*) has since long been categorized alongside its psychoactive counterpart, resulting in prohibition. Cannabis legalization measures across the U.S. represent the distinct possibility of revival of the hemp market.

¹⁰² Bennett, J. (2015). *Job Growth In The Cannabis Industry Continues, 200,000 Positions Expected*. Retrieved from <http://dailycaller.com/2015/01/16/job-growth-in-the-cannabis-industry-continues-200000-positions-expected/>.

¹⁰³ Green, J. (2014). *How Many New Marijuana Industry Jobs Will Be Created In 2015*. Retrieved from <http://www.theweedblog.com/how-many-new-marijuana-industry-jobs-will-be-created-in-2015/>.

¹⁰⁴ Becker, S. (2015). *Need A Career Change? Here Are 16 Jobs In Marijuana Industry*. Retrieved from <http://www.cheatsheet.com/business/16-jobs-being-created-by-the-marijuana-industry.html/?a=viewall#ixzz3Zsr04YG1>.

¹⁰⁵ Johnson, R. (2015). *Hemp as an Agricultural Commodity*. Retrieved from <https://fas.org/sgp/crs/misc/RL32725.pdf>.

The Hemp Industries Association (HIA) estimates that the total U.S. retail value of hemp products is approximately \$500 million annually. Additionally, the hemp market has a large potential to grow should its products be more widely available for sale. Eric Steenstra, Executive Director of Vote Hemp stated “[t]here’s no question in my mind that this could be a multibillion-dollar crop where we could see millions of acres, eventually... Is that going to happen in a year or two? Of course not.”

When the Congressional Research Service tried to assign a specific dollar value or economic indicator to how large the hemp market could be, it concluded that this cannot be done.¹⁰⁶ This was largely due to historical prohibitory trends and because the hemp industry has not been fully utilized to date. If current legalization trends continue, the hemp market could potentially grow to unprecedented levels, creating markets and opportunities of similar magnitude to those created by the psychoactive cannabis industry.

Conclusion

The cannabis market is large and consistently growing. As the legal climate related to cannabis continues to evolve, it is a fair expectation that the market will grow, new opportunities will arise, and investment will increase. Whilst these are still early days in the U.S.’s experience with cannabis regulation, results are positive and provide economic hope for a broad spectrum of interested persons.

¹⁰⁶ Becker, S. (2014). *Calculating the Enormous Potential of the Hemp Industry*. Retrieved from <http://www.cheatsheet.com/business/calculating-the-enormous-potential-of-the-hemp-industry.html/?a=viewall>.