

Indoor Farming is Going Mainstream



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Significant changes are underway in the indoor farming sector, none bigger than the recent AppHarvest public listing and the Plenty and Driscoll's joint development agreement. I have been an outspoken advocate of indoor farming in my articles: "[Is indoor farming poised to challenge the status quo?](#)" and "[Is Agriculture the next area to experience decentralization?](#)", so it might come as a surprise that I also have been voicing concerns about the near-term viability of the indoor farming sector. With the AppHarvest and Plenty/Driscoll's announcements, two of my biggest concerns, access to cheap and abundant capital and product diversification, are being mitigated.

On the capital availability side, AppHarvest's decision to go public via a merger with Novus Capital Corporation (NASDAQ:NOVS), a special purpose acquisition company (SPAC), opens a window to a tremendous amount of new capital sources. As part of the merger, AppHarvest raised \$375 million in equity through a private-investment-in-public-equity (PIPE) transaction, which valued the company at \$1 billion. I expect that this will provide AppHarvest with an advantage as the sector begins consolidating over the next few years: unlike its private competitors, it will be able to offer highly liquid public stock, as well as cash, to acquisition targets.

The AppHarvest transaction is the first major SPAC deal for an AgTech or FoodTech company, but there have already been numerous SPACs in the broader CleanTech sector. In 2020 alone, SPACs have been completed by mobility companies, including ChargePoint, Fisker, Hylion, Lordstown Motors, Nikola, QuantumScape and Velodyne Lidar. This activity makes me believe that we are in the midst of a paradigm shift in how highly capital-intensive CleanTech companies, including indoor farms, are financed. For the past 15 years, CleanTech companies that needed to raise \$100+ million to commercialize and scale new technologies (energy storage; electric vehicles (EVs) & EV charging infrastructure; light-emitting diodes (LEDs) and solar panels) were forced to raise expensive equity capital. They were unable to access non-dilutive capital (equipment finance, project finance, working

capital) as their technology was unproven and they were not profitable. Ultimately, most went bankrupt because they ran out of funding. In contrast, right now, billions of capital is flowing into “environmental, social and governance” (ESG) funds, which are focused on the public market, where, ironically, they have very few investment options. As a way to overcome this, more than 30 SPACs have raised, or are raising, capital to acquire CleanTech companies and take them public.

Another key factor driving the popularity of SPACs is the growing difference between valuations in the public market, which seem to reach record highs daily, and the private markets, where activity has slowed due to COVID-19 and associated economic concerns. Added to the fact that ESG funds are flush with cash, and trillions of dollars are pouring in from the Fed, the public markets are much more appealing for private firms looking for large amounts of growth capital, which is the profile of many indoor farming companies, especially vertical farms, today. I believe the current generation of private, capital-intensive CleanTech companies will prefer to access this cheap, abundant capital by going public, either through a SPAC or other strategy, rather than trying to find private capital sources, which will be costlier, if indeed available.

Not only is capital a requirement for future success in indoor farming, but product diversification also is essential. Plenty’s announcement of a joint development agreement to grow Driscoll’s proprietary strawberries year-round in Plenty’s indoor vertical farms is potentially a game-changing event for the sector. Until now, most vertical farming companies have focused on herbs, leafy greens and microgreens, which is a roughly \$40 billion market. However, with at least 15 indoor farming companies raising a minimum of \$50 million in capital, it is likely that the leafy green market could get saturated over the next decade with so many competitors chasing after the same market. The Driscoll’s deal marks the entrance of a vertical farming company into the lucrative berry sector and with it, a new \$40 billion market opportunity. It will be interesting to see if other indoor farming companies can enter into similar agreements to get access to unique germ plasm to grow other types of produce indoors.

Plant genetics for indoor farms is an area of increasing interest, especially following the recent launch of Unfold, a company that is working to combine leading seed genetics with the agronomic expertise to dramatically advance productivity, flavor and other consumer preferences of produce grown in indoor farms. Unfold recently raised \$30 million from Leaps by Bayer, the impact investment arm of Bayer AG, one of the largest seed genetics companies, and Temasek, an over \$300-billion Singapore sovereign wealth fund that is one of the largest global investors in both the traditional agriculture and

AgTech sectors. The development of seed genetics for vertical farms, whether by leading seed producers, BASF, Bayer, Limagrain, and Syngenta, or new entrants, Unfold and Vindara, is essential for the success of vertical farming companies, including AeroFarms, Bowery Farming, CropOne, 80Acre Farms, Freight Farms, InFarm, Iron Ox, Plenty, Shenandoah Growers, Square Roots, and TruLeaf. Vertical farms utilize new technology and have mostly proliferated as a result of the rapidly declining prices of LEDs. Thus, they offer tremendous opportunities as seed companies develop genetics to optimize growth under indoor conditions, including the replacement of sunshine with more reliable and predictable LEDs. Such controlled indoor environments provide significant advantages compared to the outdoor field, which is subject to the whim of Mother Nature. As more companies develop genetics to capitalize on the uniform growing conditions found, year-round, within vertical farms, we could see tremendous advances in nutrition, taste and yield as well as the added bonus of produce grown with a significantly lower environmental impact.

Although many challenges remain for the indoor farming sector, the events of the past month have begun to alleviate those concerns. With more capital sources available, starting with the public markets and hopefully leading to project finance, indoor farming companies are better positioned to raise the billions of dollars needed to bring indoor grown produce to communities throughout the world. Furthermore, as indoor farms fine tune their seed genetics, I believe the indoor farm-grown product portfolio will expand beyond fruits and vegetables to new areas including seafood and specialty grains & pulses.