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Building A Vertical Farm Team

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In the nascent industry of vertical farming, often referred to as the “wild west,” knowing what team members you need to get a project started is critical. Unlike traditional agriculture, vertical farming projects bring together multiple disciplines, including growers, engineers (of all types), general contractors, finance people, architects, operations/logistics people, food safety people and technology providers. The challenge the vertical farming space faces is that all these different disciplines don’t tend to play nicely together and, as we have seen in the industry time and time again, they often don’t cohesively work together when problems arise.

In my experience, here’s what I’ve seen work as the core makeup of a successful vertical farming implementation team. This team in the initial planning phase includes a grower, a mechanical engineer (or engineering firm) and a finance/business person. Other members of the team need to be added as the project progresses, but aside from someone raising funds for the venture, these are the “three pillars,” as I refer to them.

The grower

These are often people with agriculture backgrounds or have training as agronomists. Growers are obviously responsible for making the crops grow, but during the design phase they play other critical roles, too. When planning out a project, the grower is the one who gives the engineers direction on the growing environment they need. This includes setting temp, humidity and CO2 level targets. It also includes fertigation planning, picking the lights for the grow facility, planning operation flow, crop rotations, determining how product will move through the farm and any other miscellaneous planning necessary for the facility.

The mechanical engineer

The reason why I specify the importance of a mechanical engineer is because they work directly with the grower to determine the necessary equipment to create the proper growing environment. Once the mechanical engineer understands the specifics of the HVAC cooling systems, the electrical load for the lights and all other mechanical equipment necessary for the facility, they then can engage the architect, structural

engineer, civil engineer and electrical engineer. They also work directly with the general contractor once the design has been completed through the build-out process into commissioning of the systems. For initial planning of the facility, the mechanical engineer/team is imperative to do proper cost estimation because the HVAC system and all other necessary facility upgrades to support the HVAC tend to be one of the biggest, or is the biggest, renovation cost.

The finance/business person

At the end of the day, vertical farming is intended to be a business venture that makes money. If it's not profitable, then it's not successful. The financial/business person is responsible for gathering inputs in the initial project planning phase and determining if the venture is feasible. This includes gathering initial capital expenditure costs for building construction, ongoing facility operation costs and market information of what cost the end product can be sold for. This person also tends to be the one in charge of determining who the end customer will be and what the go-to market strategy is for the venture.

All three pillars are equal

Now that we've discussed the roles of the three different pillars of the team, I'll explain why it's critical that each one of them come to the table with equal authority and why they all need to work in unison.

Let me provide some examples:

● The grower sets targets for the grow environment oriented around "flexibility," meaning they want the facility to be able to accommodate a wide range of growing conditions. The engineer designs a system that can accommodate this range (flexibility is always more expensive) and presents the cost to the financial person. Then the finance person takes these inputs and realizes that the market can't support the prices necessary to support that expenditure. If the grower and engineer supersede the finance person, the project is in trouble.

● The grower and finance person decide the crop they want to enter the market with is a cooler temp crop that requires substantially more HVAC. The engineer then does a feasibility study and determines two things: the budget the finance person provided for them isn't enough for the project and the electrical capacity for the building can't meet the requirements. If the grower and finance person try to supersede the engineer, the project is in trouble.

● The engineer and the finance person come up with a facility design that's within budget, but doesn't take the grower's requests into account, making the building a good engineering project, but not a good growing environment. Again, if the finance person and the engineer supersede the grower, the project is in trouble.

The process of designing a vertical farm isn't a quick one-shot process. It takes time, planning and multiple iterations for every geographical location, market and building retrofit. I do believe that if the three pillars of the team come to the table with respect, patience and understanding, the project can be viable, but if anyone supersedes the other, the project is in trouble.

Other important team members

As I stated before, the three pillars are the starting point for the team, but there are many other members that need to be added on as the project progresses:

Architect—The architect is responsible for the building layout. They work closely with the grower to develop the operational flow of the facility and, with the mechanical engineer, to situate the mechanical equipment where it needs to go. Architects are also responsible for local codes and regulations such as egress

requirements.

Structural Engineer—Structural engineers are the unsung heroes when it comes to catching building issues early. If the project is a retrofit build, I recommend engaging the structural engineer before the building is acquired so they can ensure there are no structural issues with the building. The structural engineer will work closely with the mechanical engineer and architect to situate the mechanical equipment and they'll work with the grow team to ensure the floor can support the weight of grow racks, tanks, etc.

Civil Engineer—If the project is a new build, a civil engineer needs to be engaged if any dirt/foundation work needs to be done. They're also engaged if concrete needs to be poured for upgraded transformers or mechanical equipment pads.

Electrical Engineers—The electrical engineer is a member often not brought in as early as they should be. Once the mechanical engineers determine estimates of the electrical load for a project, they hand that off to the electrical engineers to assess if the building has the necessary power or if an upgrade needs to happen. Vertical farming is very energy intensive; upgrades are much more common than not, and transformers can have very long lead times, so you want the electrical engineer to engage with the power company as early as possible.

Food Safety Consultant—When developing a go-to market strategy it's important to determine the food safety requirements that your intended client will want you to adhere to and make sure that's kept in mind in the building design. Things like drains, building material, cold storage requirements and air filtration can add substantial cost to a project if it's not accounted for early.

After these team members, you'll need to engage a general contractor and mechanical contractor to do the building design and installation. I also recommend if you don't have the expertise in-house, to work with a branding agency to help tell the story of your produce to get them engaged and a logistics person/team to help coordinate getting produce to the customer.

Finally, engaging with industry consultants, especially if you're new to this industry, is always a good idea. With this being such a new industry, you just don't know what you don't know (that is what makes this industry exciting, though).

I wish you luck in your future endeavors, dear reader, and as always, if you have any questions or want to learn more, please reach out. I'm always happy to help. Cheers!

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