BUILDING A CLIMATE-RESILIENT FOOD SYSTEM

Sustainable food company building and operating some of the world’s largest high-tech indoor farms while providing good jobs in Central Appalachia
THE PROBLEM:

UNSTABLE FOOD SUPPLY
OVER-RELIANCE ON IMPORTS

The Causes:

U.S. fruit and vegetable imports, 2000–22

Notes: f = forecast as denoted in 2022. Import values are based on a fiscal year (October-September) and are adjusted for inflation using the Consumer Price Index for fresh fruits and vegetables and processed fruits and vegetables with a baseline year of 2021.

United Nations studies have found the world will need to produce 50-70% more food annually by 2050, yet 70% of all fresh water already is dedicated to agriculture.
WE KEEP GROWING IN AREAS WITHOUT WATER

THE CAUSES:
CEA CAN HELP SUPPORT GLOBAL FOOD SECURITY

2021: A Tipping Point

Less Land for Agriculture, More for Nature
In 2050, the world population is expected to reach 9-10 billion people. CEA uses much less space than conventional farming. As urban sprawl and development continue, we need to find ways to produce more food on less land.

A Solution for Areas Affected by Changing Climate
CEA reduces dependency on favorable weather. CEA offers a solution to stable food supply in the face of climate change.

Let Earth Keep More of its Resources
CEA uses much less water than conventional agriculture. Today conventional agriculture is responsible for 70% of global freshwater consumption.

Local Production = Food Security
Producing food closer to consumers means consumers get tastier, fresher fruits and vegetables.

The strain on the fresh produce supply chain during the COVID-19 pandemic has injected an urgency for the industry to grow domestic production.

While locally produced food was already a hot topic between consumers, retailers and growers, COVID-19 has highlighted an increased need for food to be produced locally.

Consumer preferences for local, fresh produce with lower use of pesticides and year-round availability is driving CEA-grown produce demand.

Imported produce is subject to inspection, which can disrupt the supply chain and adversely affect shelf life.

Food security and accessibility in the U.S. is as big of a concern for as any time since the Great Depression.
Strong potential ESG outcomes build a more resilient business with fewer risks

90% less water than open-field farms

Up to 30x higher yields than open-field agriculture

365 days; growing indoors is climate resilient – eliminates weather and seasonal constraints

100% Rainwater

0 soil usage, keeping carbon sequestered

Less Food Waste
Traditional ag pre-retail spoilage rate is 34% (1); CEA less than 10% (2)

Integrated Pest Management
Use of IPM and beneficial bugs helps avoid harsh pesticides

Efficient Labor
Ergonomic, employee-friendly working conditions. Higher pay than traditional agriculture

Reduced Food Miles
More efficient footprint allows for strategically located greenhouses

Closed-Loop Irrigation
Rainwater is collected, UV-treated, nutrients added and recirculates until used minimizing water and nutrient use and eliminating polluting ag runoff

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(1) International Journal of Environmental Research and Public Health
(2) World Wildlife Foundation, Indoor Soilless Farming
The United States has lagged in CEA investment. 20,000 additional CEA acres are needed in the U.S. just to displace vine crop imports from Mexico. (1)

\[ \text{CEA OPPORTUNITY} \]

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<tr>
<th>Controlled Environment Agriculture Production in Europe</th>
<th>Controlled Environment Agriculture Production in USA*</th>
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<tbody>
<tr>
<td>518,921 Acres</td>
<td>6,001 Acres</td>
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<th>Acres per Million Population - Europe vs. USA</th>
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<tbody>
<tr>
<td>Europe</td>
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<tr>
<td>700</td>
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<tr>
<td>USA</td>
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<td>18</td>
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CEA OPPORTUNITY
The Future of Global Food Infrastructure

CEA Projected Growth – Next 5 Years\(^{(1)}\)

- **Expected Supply**
- **Expected Demand for CEA Produce**

$+$2.2 Billion
opportunity in CEA over the next 5 years (+55%)

AppHarvest HIGH-TECH GREENHOUSE APPROACH COMPARED TO VERTICAL FARMING AND ORGANIC

- Vertical farming—tends to be smaller scale, hyper-local with all artificial inputs for light and city water
- Organic—precludes use of synthetic pesticides or fertilizers. Not a scalable solution for global food supply needs and costly.
NATURE + TECH = FAR MORE FOR FAR LESS
TECH SOLUTIONS:

FARM OPTIMIZATION TECHNOLOGY

- AppHarvest Morehead Farm is a 60-acre robot—automated for temperature, humidity, light
- Prototype robotic harvesting
- AppHarvest Berea salad greens system is touchless.
Central Appalachia is within a day's drive to 70% of the U.S. population.

**STRATEGICALLY LOCATED IN APPALACHIA**

- Climate and rain
- Access to labor
- Quick access to major markets
- Region committed to AgTech education
SOCIAL IMPACT: LIVING-WAGE CERTIFIED, FULL HEALTH BENEFITS, OWNERSHIP
Expect to quadruple our number of farms this year, diversifying into salad greens, strawberries and cucumbers and doubling our tomato capacity.
GROWING FARMERS + FUTURISTS
EDUCATION INVESTMENT
Building an AgTech Ecosystem
JOIN THE FOOD FIGHT

Not just food for thought.

AppHarvest

#fight