

DISCUSSION & REVIEW QUESTIONS:

- Dr. Moore informs us that, “All life is carbon-based, and the carbon for all that life originates from carbon dioxide in the atmosphere. All of the carbon in the fossil fuels we are burning for energy today was once in the atmosphere as carbon dioxide before it was consumed by plankton in the sea and plants on the land,” and further that, “...fossil fuels are 100 percent organic and were produced with solar energy.” Considering these facts, why do you think that some people and organizations consider more carbon dioxide in the atmosphere to be such an unnatural, catastrophic, apocalyptic condition?
- We also learn from Dr. Moore that, “For most of the history of life on earth carbon dioxide has been present in the atmosphere at much higher levels than it is today. During the Cambrian explosion... CO₂ levels were as much as 10 times higher than they are today. From a big picture perspective, we’re actually living in a low carbon dioxide era,” but that, “... climate alarmists... say... CO₂ levels are getting too high.” Considering these facts, why do you think that some people and organizations are so worried about more CO₂ in the atmosphere causing global warming?
- Dr. Moore explains that, “Carbon dioxide is a colorless, odorless, tasteless gas which is an indispensable food source for all living things,” yet, “...the US Environmental Protection Agency has deemed this essential ingredient for life a pollutant!” Why do you think this is the case? Considering the resources it has unlimited access to, why do you think that such a powerful government entity could get it so wrong and make policy based on misinformation? Do you think politics has anything to do with it? Why or why not?
- Later in the video we learn that, “The optimum level of CO₂ for plant growth, for example, is four to five times what is currently found in our atmosphere. That’s why greenhouse growers worldwide actually inject additional CO₂ into their greenhouses – they want to promote plant growth. Likewise, higher CO₂ levels in the global atmosphere will boost food and forest productivity.” Why do you think that global warming alarmists don’t acknowledge that more CO₂ in the atmosphere would actually benefit the planet? Why do you think that the global warming alarmists don’t take this science into consideration when the facts are so easily available?
- Dr. Moore concludes the video by stating, “In fact, we’re already seeing the positive effects of increased carbon dioxide now. Satellite measurements have noted the “greening of the earth” as crops and forests grow due to our higher levels of CO₂... We should celebrate CO₂ as the giver of life that it is.” Do you agree with Dr. Moore that we should acknowledge the benefits of CO₂ in the atmosphere rather than decry it? Why or why not? Do you think that the global warming alarmists have any merit to their position? Why or why not?

EXTEND THE LEARNING:

CASE STUDY: GMOs

INSTRUCTIONS: Read the article “Capturing CO₂ With Tomatoes,” then answer the questions that follow.

- What is so revolutionary and industry-leading about what the farmer in Camarillo is doing? What does the electric plant do? What are the benefits for operating this way?
- Why does the Camarillo farmer need to inject CO₂ into his tomato greenhouse?
- Do you think it’s ironic or absurd that this farmer who needs CO₂ to grow his crops is actively working towards reducing CO₂ emissions into the atmosphere? Why or why not? Why do you think that any farmer would support, rather than oppose, the global warming activists?



QUIZ

THE TRUTH ABOUT CO₂

- 1. Where does the carbon for all life originate from?**
 - a. Diamonds in volcanoes.
 - b. Graphite from Sri Lanka.
 - c. Carbon monoxide in the atmosphere.
 - d. Carbon dioxide in the atmosphere.

- 2. Fossil fuels are 100 percent organic and were produced with solar energy.**
 - a. True
 - b. False

- 3. For most of the history of life on earth carbon dioxide has been present in the atmosphere _____.**
 - a. at much lower levels than it is today.
 - b. in extremely low levels.
 - c. at much higher levels than it is today.
 - d. at the same level as it is today.

- 4. Why do greenhouse growers worldwide actually inject additional CO₂ into their greenhouses?**
 - a. They want to create CO₂ resistant plants.
 - b. They want to promote plant growth.
 - c. Greenhouse growers do not inject CO₂ into greenhouses.
 - d. To make plant's colors more vibrant.

- 5. What are climate alarmists say is happening now? – CO₂ levels are getting too high.**
 - a. Water levels are getting too low.
 - b. CO₂ levels are plummeting.
 - c. Water levels are getting too high.
 - d. CO₂ levels are getting too high.



QUIZ - ANSWER KEY

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<http://news.discovery.com/earth/global-warming/co2-capture-tomatoes-120821.htm>

Capturing CO₂ With Tomatoes

Aug 21, 2012 03:00 AM ET // by [Eric Niiler](#)



Tomatoes inside Houweling's giant 150-acre greenhouse benefit from extra CO₂.
Casey Houweling

THE GIST

- A heat and power plant is designed to pump its CO₂ into a giant greenhouse.
- Inside the greenhouse, tomato plants benefit from the gas and flourish.

A California farmer is finding a unique way to capture emissions of carbon dioxide -- piping the climate-altering gas from a power plant into his massive greenhouse, spurring more plant growth and tastier tomatoes.

This carbon capture and tomato storage project is the first of its kind in the United States although similar ones exist in Europe.

The new \$13 million combined heat and power co-generation plant opens Aug. 22 at Houweling's Tomatoes in Camarillo, Calif. The two GE-built engines will burn natural gas to keep the greenhouse warm, while generating some extra electricity that is sold back into the local grid. At the same time, the 8.8-megawatt plant feeds its waste carbon dioxide directly into Houweling's giant 150-acre greenhouse.

"All the electricity (power) plants out there are putting CO₂ into the atmosphere and heat which are two big consumptions," said owner Casey Houweling. "If we use our energy wiser we would have impacts from two sides, reducing cost and becoming more efficient."

Houweling says the co-generation plant is a big investment but he expects it will pay off in the long run.

"There will be a big benefit because we won't be exposed to energy prices because we are selling the electricity," Houweling said. "Long-term we believe this will stabilize our production costs."

The power industry has looked at many types of carbon storage projects over the years as a way to reducing atmospheric emissions of the heat-trapping gas. Some firms have tried injecting it underground to abandoned mines or salt deposits, others have tried bubbling CO₂ through ponds of microscopic algae. But Houweling says that the extra CO₂ is a perfect fit for his greenhouse. He already has to purchase the gas anyway from an industrial supplier to makes his plants grow.

"In a greenhouse, if we don't add CO₂," Houweling said, "the plants will pull down the level so much they will stop growing."

Houweling says the addition of the co-generation plant makes his greenhouse facility almost 100 percent energy-efficient. He recycles 90 percent of his waste, captures rainwater for irrigation, and has deployed five acres of solar panels. The greenhouse-grown tomatoes also use less land than traditional row farming. That is a further energy savings, according to Scott Nolen, product line leader for General Electric.

"He can grow as much food on 150 acres as his neighbor in 5,500 acres," Nolen said.

Nolen said that until renewable sources of energy pick up the slack, there are still ways of making fossil fuel plants have less of an environmental impact.

"We'd all like to be in world where we don't burn hydrocarbons," Nolen said. "That's not possible yet but in the meantime, we want to make sure every molecule of hydrocarbon we burn for fuel is as efficient as possible."