Russ George, the chief executive of Planktos, wants to grow massive floating fields of plankton, in part to mitigate carbon emissions.

SAN FRANCISCO, April 30 — Can plankton help save the planet?

Companies seek economies of scale in alternative energy.

Planktos, an "ecorestitution company," will deploy a ship to dissolve tons of iron, an essential plankton nutrient, over a 10,000-square-kilometer patch of ocean.
Some Silicon Valley technocrats are betting that it just might. In an effort to ameliorate the effects of global warming, several groups are working on ventures to grow vast floating fields of plankton intended to absorb carbon dioxide from the atmosphere and carry it to the depths of the ocean. It is an idea, debated by experts for years, that still sounds like science fiction — and some scholars think that is where it belongs.

But even though many questions remain unanswered, the first commercial project is scheduled to get under way this month when the WeatherBird II, a 115-foot research vessel, heads out from its dock in Florida to the Galápagos and the South Pacific.

The ship plans to dissolve tons of iron, an essential plankton nutrient, over a 10,000-square-kilometer patch. That’s equivalent to 2.47 million acres (3,861 square miles on land or 2,912 square nautical miles). When the trace iron prompts growth and reproduction of the tiny organism, scientists on the WeatherBird II plan to measure how much carbon dioxide the plankton ingests.

The idea is similar to planting forests full of carbon-inhaling trees, but in desolate stretches of ocean. “This is organic gardening, not rocket science,” said Russ George, the chief executive of Planktos, the company behind the WeatherBird II project. “Can it possibly be as easy as we say it is? We’re about to find out.”

For Mr. George, this is not just science and environmentalism but business, possibly big business. Around the world, new treaties and regulations are forcing corporations to look for ways to offset their carbon emissions, and Planktos and its competitors may be able to charge millions of dollars for their services.

And that is where this science project takes on a Silicon Valley twist, and a healthy dose of scientific skepticism. Planktos — along with Climos, a competitor started by a former dot-com millionaire whose mother is one of the nation’s top oceanographers — wants to commercialize ocean fertilization.
Their efforts underscore a growing effort to pull carbon from the atmosphere. Solutions include planting or restoring forests and — once many economic and technical obstacles are overcome — capturing tons of carbon from coal burning for electricity and oil refineries, piping it back underground or burying it under the ocean.

The technological solutions are starting to come from Silicon Valley, where investors and innovators are turning to environmental businesses. They are investing, too, in fossil fuel alternatives like wind, solar and ethanol power.

The financial returns for reducing carbon could be considerable, said Daniel M. Kammen, a professor at the University of California, Berkeley.

In Europe, where there is a market for carbon credits, it is now worth only $2 to offset a ton of carbon emissions. But not long ago, that figure was $35, and it is expected to rise again as the limits imposed under the Kyoto Protocol on global warming start to bite. Planktos believes that it can make a healthy profit if it receives $5 a ton for capturing carbon dioxide.

“The cost of offsetting carbon through these technologies is less than the cost of building solar panels or windmills,” Mr. Kammen said. “There’s no question that this is going to grow,” he said of various carbon offset strategies.

But the question in the case of iron fertilization is whether the exuberance and marketing spirit of Silicon Valley and its can-do attitude are getting ahead of scientific reality. And some oceanographic experts say that there is a risk of doing more harm than good from artificially stimulating plankton growth in the ocean.

It is widely accepted by scientists that dumping iron in certain areas of the ocean can cause plankton to bloom. But there is considerable skepticism over whether doing so will lead to long-term absorption of carbon dioxide from the atmosphere, said Ken Buesseler, senior scientist at the Woods Hole Oceanographic Institution.
Mr. Buesseler said that while carbon might be absorbed initially, there was ample evidence that when the plankton was eaten or decomposed, at least some of the carbon wound up going back into the atmosphere. The level of absorption depends on how much of the resulting mass of plankton sinks to the sea bed.

And some scholars in the field are concerned that creating plankton blooms could release methane and nitrous oxide, which might increase greenhouse gases. “There are some potentially dangerous side effects,” said Paul G. Falkowski, professor of geology and marine science at Rutgers University.

Mr. Buesseler has organized a conference for the fall to bring together the experts in ocean fertilization to assess the years of research in the field and see what might be done to further it. He also wants to explore the policy issues; one unresolved question is whether regulatory bodies will even endorse iron fertilization as a valid means of carbon sequestration that would be allowed under any so-called cap-and-trade system to limit global warming gases.
Many scientists, even those who see long-term promise in the approach, worry that the commercial and political pressures are accelerating the programs too quickly. But others say that such pressure might not be an entirely bad thing.

“The marketing is pushing us forward faster, saying, ‘Damn the science,’ ” Mr. Buesseler. But the vastly heightened concerns about global warming that are driving the market, he said, make it worth the effort. “I’m willing to consider it,” he said, “when I consider the consequences of doing nothing.”

Enter Mr. George, 57, the founder of Planktos, based in Foster City, Calif., just south of San Francisco. After working as an environmental consultant in Canada, Mr. George came up with the Planktos concept in 1997, the same year as the adoption of the Kyoto Protocol, the treaty that the United States declines to participate in, that has driven most carbon-reduction regulations so far.

In addition to the iron fertilization project, Planktos also has a subsidiary, KlimaFa, which has begun a 10-year project to plant a quarter of a million acres of new forest in Hungary.

Mr. George said his goal was broader than mitigating carbon emissions. He said he also wanted to restore stores of plankton that had been lost as climate change led to less iron being deposited from the land into oceans.
The efforts of the WeatherBird II, he said, do not assume that the science is ready for commercialization, but they are intended to provide research that could prove its effectiveness. And he agrees with many scientists and environmentalists that carbon sequestration is only one element in the effort to mitigate global warming, an effort that will still require lowering the use of fossil fuels.

Still, he asserts that many of his scientific critics are expressing doubts about the commercialization of ocean fertilization because of their own self-interest in maintaining a steady flow of research dollars for their own projects.

The scientists “have an enormous vested interest in preserving this as a research topic alone,” he said. “If this subject remains in academia for the next 10 or 20 years, it will certainly get a bunch of senior scientists on to retirement age, but it won’t do much for the planet.”

Some prominent scientists, though, are beginning to get involved in the commercialization efforts. One of them is Margaret S. Leinen, former assistant director for geosciences at the National Science Foundation, who is now the chief science officer of Climos.

Ms. Leinen’s connection to Climos is not just professional, but personal. She is the mother of Dan Whaley, the founder of the company. Mr. Whaley made his name and fortune during the dot-com boom, founding Get-There.com, a travel site that went public in 1999 and was bought by Sabre for $750 million in 2000.

Mr. Whaley has been putting together a panel of scientific advisers, which now includes the former president of the American Association for the Advancement of Science and the director for the National Center for Atmospheric Research.

Mr. Whaley declined to discuss the plan or timetable of Climos to do its own commercial project. Nor will he say definitively when and how Climos will provide proof to the market that it can use ocean fertilization to provide a long-term offset to carbon in the atmosphere.
That did not stop him, though, from a dig at his competitors at Planktos.

“Whoever is serious about this needs to engage the participation of and bring along the leaders in the oceanographic community,” Mr. Whaley said, “not just sail around throwing iron off the back of a boat.”