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Victor Manuel Martínez, a 53-year-old fruit farmer, installed solar panels on his 62-acre farm. Emilio Parra Doiztua for The New York Times

Finding Climate Solutions in a Spanish Village

Behind its rural facade, La Almunia de Doña Godina is doing its part to use technology to address climate change.

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By Rachel Chaundler

May 24, 2023

LA ALMUNIA DE DOÑA GODINA, Spain — Crisscrossed by irrigation canals — one of which was built by the Moors in the Middle Ages — and surrounded by fields filled with peach, apple and cherry orchards, this place, at first glance, is a traditional fruit-farming village in northeast Spain.

But in June last year, La Almunia received an unlikely distinction for a village with a population of around 8,000: The Spanish government named it a “City of Science and Innovation.” The title has been given annually

since 2010 to cities and towns that promote research and development in both the public and private sectors. Award-winning cities form a network in which they share ideas and showcase innovations. And each city is given an annual grant, renewable every four years, to hire “innovation officers,” capable of identifying opportunities for local technological development.

La Almunia received an unlikely distinction for a village with a population of around 8,000: The Spanish government named it a “City of Science and Innovation.” Emilio Parra Doiztua for The New York Times

Marta Gracia Blanco, La Almunia's mayor, said that the title, which was awarded to 20 municipalities in the country last year, including four towns with less than 20,000 residents, was more than justified. Behind its rural facade, La Almunia is a hub of sustainable technological innovation.

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On an egg farm on the outskirts of town, a start-up claims to have run the first tractor in the world on biomethane produced entirely from hen droppings. A lab at the water-treatment plant is purifying wastewater with eco-friendly aquatic plants. And at the local preschool, the new solar-powered air source heat pump, which generates underfloor heating, is a hit with the village toddlers.

"The children like to touch the floor and lie down," said María José Díaz, a 63-year-old teacher.

La Almunia is a small town, doing its part to use technology in new ways to address climate change, which is among the topics being discussed as leaders in business, science, culture and policy gather on Thursday and Friday in Busan, South Korea, for a New York Times conference, A New Climate.

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"There is a lot of innovation here because we are the only village in Spain that has its own public university," said Ms. Gracia Blanco.

Students at the Polytechnic University School of La Almunia (EUPLA). The university now has around 650 undergraduates — all studying engineering disciplines — and a thriving research department. Emilio Parra Doiztua for The New York Times

Founded 56 years ago by a religious order, the Polytechnic University School of La Almunia (EUPLA) was taken over by the town council in 1980. The university now has around 650 undergraduates — all studying engineering disciplines — and a thriving research department.

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For his final year project, Jesús Sancho, 23, who graduated last year from EUPLA with a degree in mechatronics, helped design a machine that could — if built — automate the sample-taking of sludge and oxygen in wastewater and lead to greater energy efficiency in treatment plants. He now works for La Almunia's wastewater treatment plant.

Latest News on Climate Change and the Environment

Colorado River deal. California, Arizona and Nevada reached a short-term deal that would help stop the drought-strained Colorado River from running dry — for now. The breakthrough agreement keeps the river from falling so low that it would jeopardize water supplies for major Western cities as well as for some of America's most productive farmland.

Predicting record heat. Global temperatures are likely to soar to record highs over the next five years, driven by human-caused warming and a climate pattern known as El Niño, according to the World Meteorological Organization. Scientists say even small increases in warming can exacerbate the dangers from heat waves, wildfires, drought and other calamities.

Doubling down on fossil fuels. While Trinidad and Tobago explores greener alternatives, the island nation remains committed to its long embrace of oil and gas. At the same time, the country is feeling the effects of a changing climate, with wetter rainy seasons and dryer dry seasons.

Protecting the Galápagos Islands. Ecuador announced a record-setting deal designed to reduce its debt burden and free up hundreds of millions of dollars to fund marine conservation around the Galápagos Islands, an archipelago of unique biodiversity that's famous for inspiring Darwin's theory of evolution.

Nonproducing wells. Ever since the first offshore platforms went up off Louisiana 85 years ago, the Gulf of Mexico has been an oil and gas juggernaut. But decades of drilling has left behind more than 14,000 old, unplugged wells at risk of springing dangerous leaks and spills that may cost more than $30 billion to plug, a study has found.

He said he was pleased that he did not have to work in a city, like so many young people in Spain. "Life is better in a village if you are able to find a job with a high level of satisfaction," he said. "Especially one that helps improve the environment."

Last year, the hike in electricity prices after the Russian invasion of Ukraine led to a tenfold increase in requests for licenses from the village council to install solar panels. According to Ms. Gracia Blanco, most of the 46 requests received since February 2022 were made by fruit farmers, hoping to lower the cost of pumping irrigation water from their wells.

Victor Manuel Martínez used to irrigate his fruit trees during the night, when electricity from the grid was at its cheapest. But now, if the sun is shining, he gets all the power he needs from the solar panels during the day. Emilio Parra Doiztua for The New York Times

Victor Manuel Martínez, a 53-year-old fruit farmer, installed solar panels on his 62-acre farm, which is on high ground on the edge of town with no irrigation canals. Over the centuries, vines were farmed here for table wine. But with the possibility of using electricity to pump the groundwater to the surface, farmers started to switch to the more profitable cultivation of cherries, apples and peaches in the 1970s.

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Mr. Martínez used to irrigate his fruit trees during the night, when electricity from the grid was at its cheapest. But now, if the sun is shining — and it usually is — he gets all the power he needs from the solar panels during the day.

The new system, he explained, is not only a money-saver but it also enables him to control the irrigation in different sectors of his farm from his cellphone.

Marta Gracia Blanco, La Almunia's mayor. Emilio Parra Doiztua for The New York Times

The local fruit farmers' efforts at renewable energy got Ms. Gracia Blanco thinking. She decided to offer the roofs of municipal buildings — including

the retirement home and the youth hostel — to local families who were unable to invest in solar power because, unlike the farmers, they didn't have the space to install panels.

With the help of Carlos Pesqué, head of energy communities at Ecodes, an environmental nonprofit based in Zaragoza, Spain, Ms. Gracia Blanco is setting up a plan that offers villagers the chance to invest, depending on their consumption requirements.

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"An investment in two panels could cost about €1,000 [about $1,100] and would generate an energy package of 1,200-1,500 kilowatt-hours per year," Mr. Pesqué said. "That could meet the daytime needs for a family of four."

Though the electricity from the municipal rooftop installations would be channeled into the grid, participants in the plan would see a reduction of up to 40 percent in their energy bills for 25 years, under current Spanish energy distribution legislation, and they could expect a return on their initial investment in four or five years, according to Mr. Pesqué.

At a local preschool, the new solar-powered air source heat pump generates underfloor heating. Emilio Parra Doiztua for The New York Times

Sergio Callejas owns a bookstore in downtown La Almunia. Emilio Parra Doiztua for The New York Times

“This is a very good opportunity,” said Sergio Callejas, 52, who owns a bookstore in downtown La Almunia. He wants to invest in energy packages for his store and his home, above the store, where he lives with his wife and two children.

Excited about participating in a new energy model based on collective consumption, Mr. Callejas would not object to paying a slightly higher premium to allow low-income families to join the plan for free. “We should all have a right to cheap energy,” he said. “The sun is there for everyone.”

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La Almunia has plentiful supplies of hen droppings, too — about 300 tons are produced every day on local egg farms and are distributed to local farmers as fertilizer because of the high nitrate content.

A start-up called BiogasDT has built a pilot biogas refinery on La Almunia’s largest egg farm, Grupo Bailón. The refinery captures the methane from 2.5 tons of fresh hen droppings every day — before it can evaporate into the atmosphere. Then, the methane is converted into a renewable gas called biomethane.

Biomethane could be used as a renewable option for farm vehicles — if they are equipped with special compressed natural gas tanks. Emilio Parra Doiztua for The New York Times

Paul Nikitovich, the chief executive of BiogasDT. Emilio Parra Doiztua for The New York Times

“It’s a game changer,” said Paul Nikitovich, the chief executive of BiogasDT. He said that biomethane from hen droppings — and other livestock manure — could be used as a renewable, non-fossil-fuel option for farm vehicles — if they are equipped with special compressed natural gas tanks rather than, or as well as, tanks for diesel or gasoline. The refinery’s liquid residue can also be used as a biofertilizer, “free of pathogens, with no smell and no flies,” Mr. Nikitovich said.

Last October, Mr. Nikitovich installed a biomethane gas pump at the refinery and filled up a methane-powered tractor with renewable fuel. The tractor was then used to spread biofertilizer on a field. “If you produce biomethane locally and use it locally, you can reduce the CO_2 transport footprint,” he said.

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But no local farmers have yet invested in farm vehicles with natural gas engines, according to Sergio Nerin, the vice president of the local farming cooperative, Cosanse.

With a retail price of about $162,000, “tractors that run on biomethane cost a lot more than tractors that run on diesel,” Mr. Nerin said.

Still, Ms. Gracia Blanco, the mayor, understands the value of testing new sustainable models, even on a small scale.

“We’re a village, so we’re not going to stop climate change,” she said. “But we can serve as an example.”

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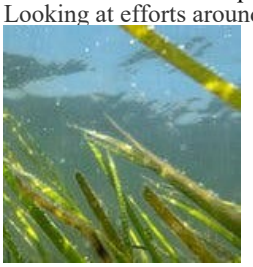

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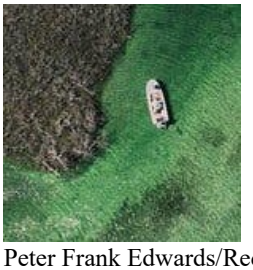

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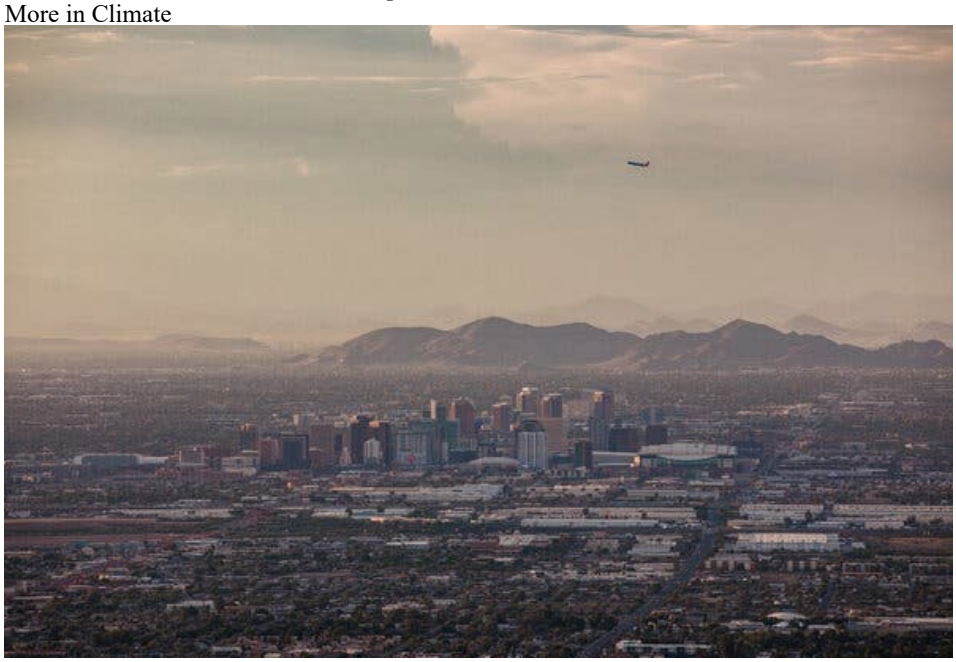

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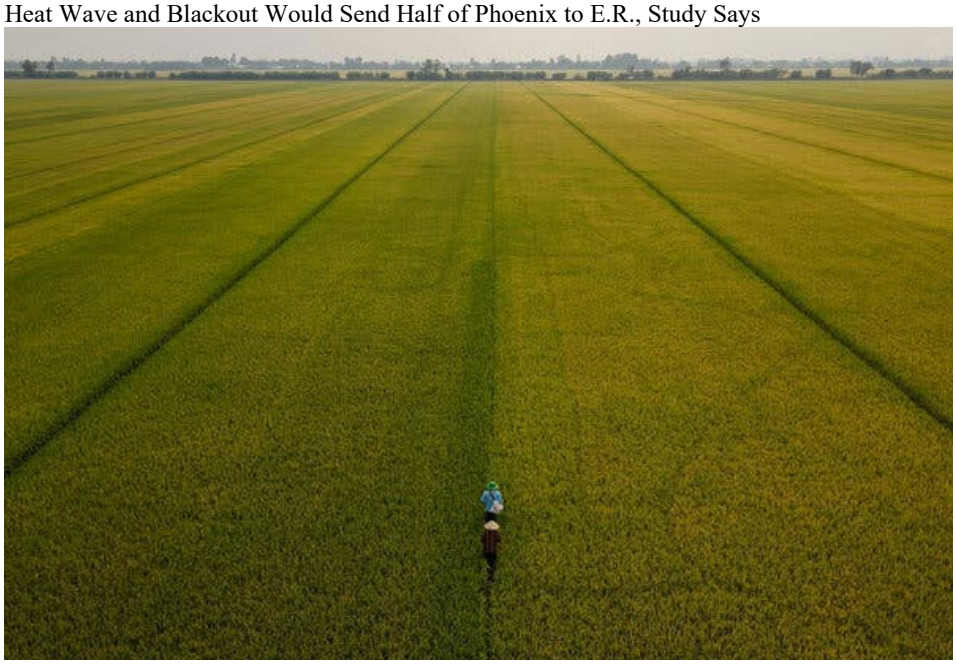

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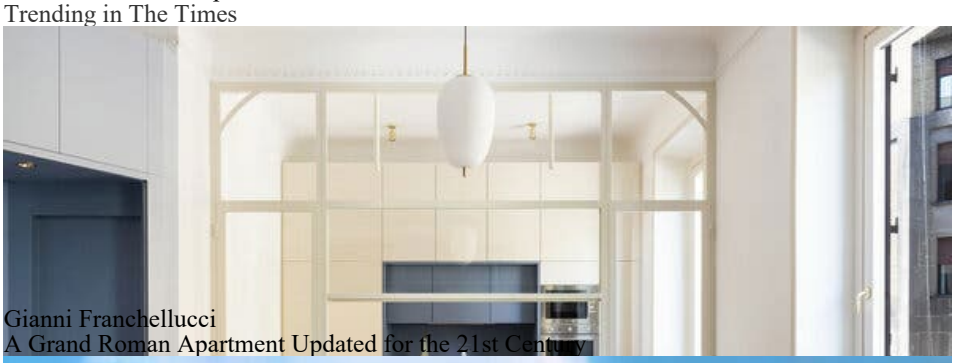

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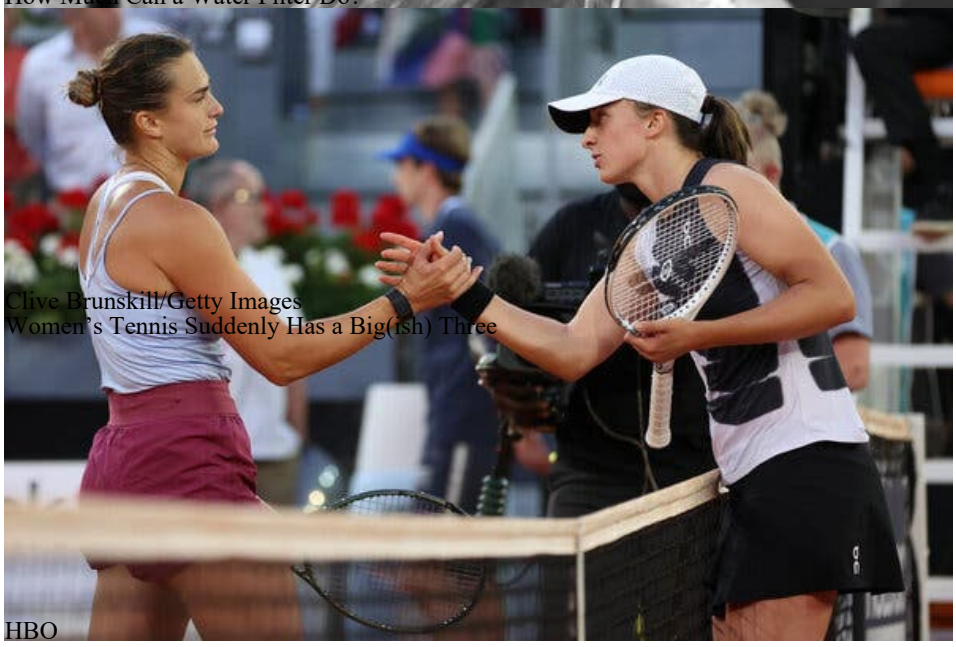

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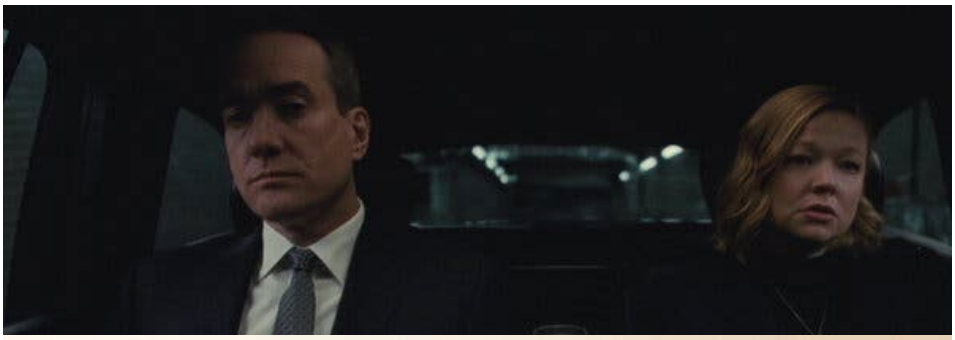

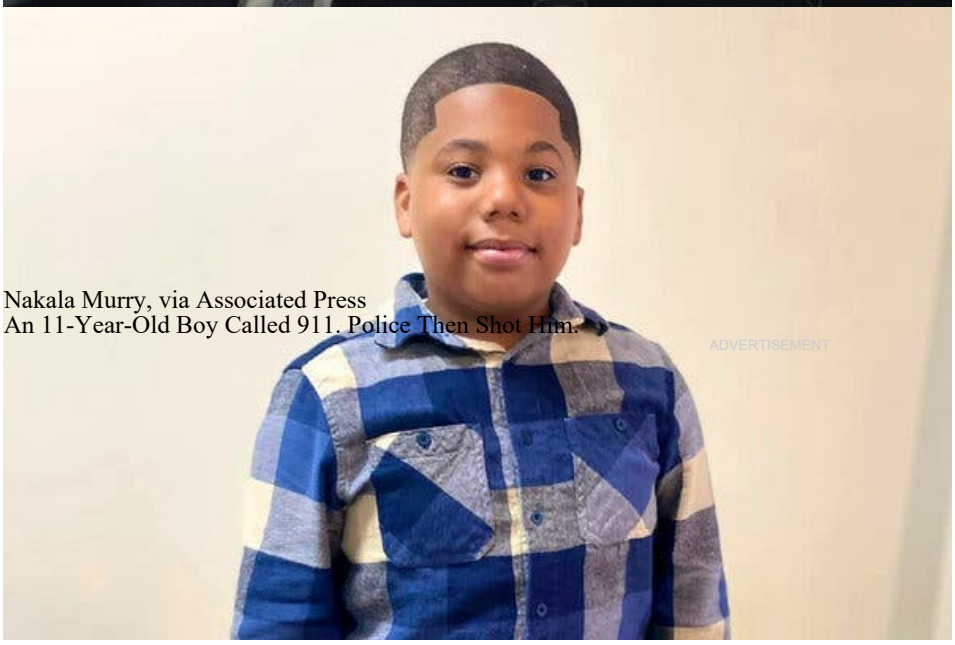

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