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**SOLAR ENERGY, VEGETARIAN DIET, AND PLENTY OF TREES:  
“ALBA’S” PILOT RECIPE FOR THE PLANET**  
**Study published in «PLOS Climate» by the University of Padua simulates the impact of  
emissions on Albarella Island in the Po Delta Park.**

Padua, June 28, 2024 – It's no secret that our planet's climate is changing, driven largely by rising concentrations of greenhouse gases. Carbon dioxide (CO<sub>2</sub>) levels have surged from 330 ppm in the 1970s to 420 ppm in 2024, leading to disastrous climate impacts such as a 1.5-2°C rise in average global temperatures, melting polar ice caps, and widespread climate disruptions. The Intergovernmental Panel on Climate Change (IPCC) has repeatedly sounded the alarm through their reports, and both global policy and industry are increasingly advocating for a shift from fossil fuels to low-CO<sub>2</sub>, renewable energy sources.

A new study titled “Tackling climate change: the Albarella island example,” published in «PLOS Climate» and led by Professor **Augusto Zanella from the University of Padua's** Department of Land, Environment, Agriculture and Forestry, focuses on the CO<sub>2</sub>-equivalent balance of Albarella Island, situated in the Po Delta Park (Rovigo). The research aims to plan a sustainable transformation over the next decade, involving energy sources, natural carbon storage, and consumption on the island.

Data Collection and Findings



*Augusto Zanella*

“We gathered the necessary data with the help of students, island managers, and residents to compile an annual CO<sub>2</sub>-equivalent emission balance, accounting for everything required to operate an island with over 110,000 annual tourists in terms of energy and resources,” explains Prof. Zanella. All economic activities on the island were converted into virtual CO<sub>2</sub> emissions to enable a sustainable transformation over 10 years in terms of energy sources, natural carbon storage, and consumption.

The study investigated various factors:

1. Net carbon storage of semi-natural ecosystems.
2. Diet of humans present on the island.
3. Use of fossil energy.
4. Demand for electricity.
5. Waste produced.
6. Transportation.

## Scenarios and Results

The researchers hypothesized two “extreme” scenarios: one where the island's economy remains unchanged, and another more optimistic scenario that envisages technological improvements to reduce emissions – such as using only solar-generated energy, planting trees on half of the island's grasslands, adopting a vegetarian diet for residents and tourists, and recycling all waste on the island.

In the optimistic scenario, emissions could be reduced by 75% within 10 years, returning to levels seen in the 1960s. These reduced emissions would primarily result from three factors: the construction, operation, and recycling of solar panels (25% of emissions); food consumption by residents and tourists (60.5%); and tree planting, which would sequester 14.5% of emissions before reaching maturity.

## A Practical Example for Global Change

“Our research offers a practical, direct example—a simulation based on real and objective data,” Zanella concludes. “We recognize that our experience cannot represent the complex reality of our planet. However, it demonstrates that in a geographically limited tourist area, a population prepared for change and employing new technologies could hope to reduce CO<sub>2</sub>-equivalent emissions by up to 25%. The irreducible energy losses and the need to feed a dense human population would currently prevent going below this threshold. Achieving this goal, which is not entirely conclusive, requires both a willingness to change and economic availability.”

## Project ALBA

The "ALBA – Albarella Laboratory for Environmental Diversity" project, initiated in 2019 by the University of Padua in collaboration with the Albarella Island Association, aims to sustainably manage the island's resources. The objective is to create and maintain an anthropized environment that diverges as little as possible from its natural counterpart through significant reductions in greenhouse gas emissions, as outlined by EU directives. The scientific lead of the project is Professor Augusto Zanella of the Department of Land, Environment, Agriculture and Forestry at the University of Padua.

For more details, see the full study:

<https://journals.plos.org/climate/article?id=10.1371/journal.pclm.0000418>

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