

## Australia Taps Invasive Weeds for Future Biofuel

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Australian scientists have found a new way to tackle the nation's invasive weed problem while contributing to clean energy goals by turning aggressive vine species into biofuel pellets.

Researchers from the University of Queensland (UQ) have identified Brazilian nightshade and climbing asparagus as potential candidates for conversion into biomass pellets, a form

of solid renewable energy. The study, conducted through UQ's Queensland Alliance for Agriculture and Food Innovation, evaluated over 20 weed species for their energy potential.

The pellets, made by compressing plant matter into dense, burnable fuel, can be used in heating systems or power generation. The approach aims to offer a more sustainable alternative to coal and reduce dependence on native forest wood.

"We're trying to discover something useful for our community and environment," said lead researcher Dr. Bruno Rafael de Almeida Moreira. He explained that each type of biomass must be carefully processed to avoid creating harmful byproducts. If not properly prepared, pellets can produce excessive ash or release toxic smoke.

Pelletising also reduces the cost and environmental impact of transporting raw plant material by increasing energy density. According to Moreira, this innovation aligns with global growth in the solid biofuels market, which is expanding in countries like the United States, Canada, and across Europe.

Unlike North America, where forest-based wood pellets are common, Australia's environmental standards do not classify native forest wood as renewable. Alternatives like recycled timber must be approved by the national Clean Energy Regulator, prompting the search for non-traditional biomass sources.

Co-author and AgriSustain Lab leader Associate Professor Sudhir Yadav said the new findings could reduce agriculture's carbon footprint while strengthening Australia's bioenergy sector. "Agencies like the Australian Renewable Energy Agency expect bioenergy to meet 20% of national energy demand by 2050," he said. "That's ambitious, but with continued research, it's achievable."

Moreira acknowledged that biomass currently makes up only 0.3% of Australia's renewable energy mix, but he remains optimistic that with innovation and investment, that figure can grow.

However, supply may be a limiting factor. Even the most invasive weeds have natural limits, prompting the team to explore other options like municipal green waste and broadacre crops such as sorghum.

Dr. Ian Paulsen, a microbiologist at Macquarie University not involved in the study, noted that while the concept is scientifically sound, large-scale implementation would face

economic and logistical hurdles. Biofuel production, he said, is generally not competitive without major subsidies or a sharp increase in fossil fuel prices.

“There are real logistical challenges in harvesting scattered weeds in bulk without harming local ecosystems,” Paulsen said.

Despite those concerns, the researchers maintain that expanding the range of bioenergy sources is vital for long-term sustainability. “We cannot rely only on wind or solar,” Moreira said. “Diversifying clean energy is key to ensuring it’s accessible for everyone.”

Professor Vincent Bulone of Flinders University added that regional factors must guide the strategy. He believes invasive weed pellets could benefit rural and Indigenous communities with high energy needs and abundant biomass.

He described the concept as a promising element within a broader energy strategy, not a cure-all, but a meaningful piece of the puzzle.