



# 6<sup>th</sup> International Conference on Countermeasures to Urban Heat Islands

4-7 December 2023

Melbourne, Australia



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6th International Conference on  
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# The Itaembé Guazú Project

## - a Cool Roof Island

Cathy Makunga

Presenting on behalf of the Province of Misiones,  
Ministry of Climate Change



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# MACOMA Environmental Technologies

## Who we are – What we do

**We are dedicated to advancing environmental sustainability through innovation and expertise.**

- We specialize in global research, development, and manufacturing of reflective nano-paint and photocatalytic products that address critical environmental challenges such as indoor air quality, air pollution, and climate change.
- Our top priority is developing and implementing a comprehensive global action plan to execute an international program to install cool roof reflective nano-paint.



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## MACOMA – From Nevada to Misiones - Timeline

- 2021 MACOMA becomes an Affiliate “start-up”
  - Nevada Center for Applied Research - UNR
- 2021 **UNR Center for Applied Research** signs collaboration agreement with the **Province of Misiones**, 1st UNR start-up affiliate collaborating outside the USA; **MACOMA** to bring innovative technology to reduce Urban Heat Island - Posadas
- March 2023 Factory Inauguration





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# The Stakeholders

## Leadership of the Provincial Government and the Ministry of Climate Change

Nevada Center for Applied Research



University of Nevada, Reno



Housing Authority

MISIONES PROVINCIA

IPRODHA INSTITUTO PROVINCIAL DE DESARROLLO HABITACIONAL



MISIONES

Cambio Climático

Association of Contractors



Misioneros – “The People”



Industrial Park





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## Agreements – Government/Business/Implementor

The **Ministry of Climate Change**, and the **Provincial Housing Authority (IPRODHA)** signed an agreement with **MACOMA** to supply the reflective nano-paint for the “**FIRST ISLAND OF COOL ROOFS ON SOCIAL HOUSING IN LATIN AMERICA**”!





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# Misiones, AR





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## Province of Misiones

- Approximately 1% of the Argentina's Territory
- 52% of Biodiversity
- 443 plant species per hectare of native forest
- 1.6 million species of animals
- Last continuous remnant of the Atlantic Forest
- First Ministry of Climate Change of Latin America



**MISIONES** Entre Ríos

Cambio  
Climático



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# Provincial Response Plan to Climate Change



Strategy to increase carbon sinks, reduce GHG, and increase the Adaptation capabilities.

A cross-sector plan with a quantitative mitigation goal and a qualitative adaptation goal

Contemplates renewable energy, sustainable use of the forests, holistic livestock management, organic and agroecological agriculture, education and circular economy

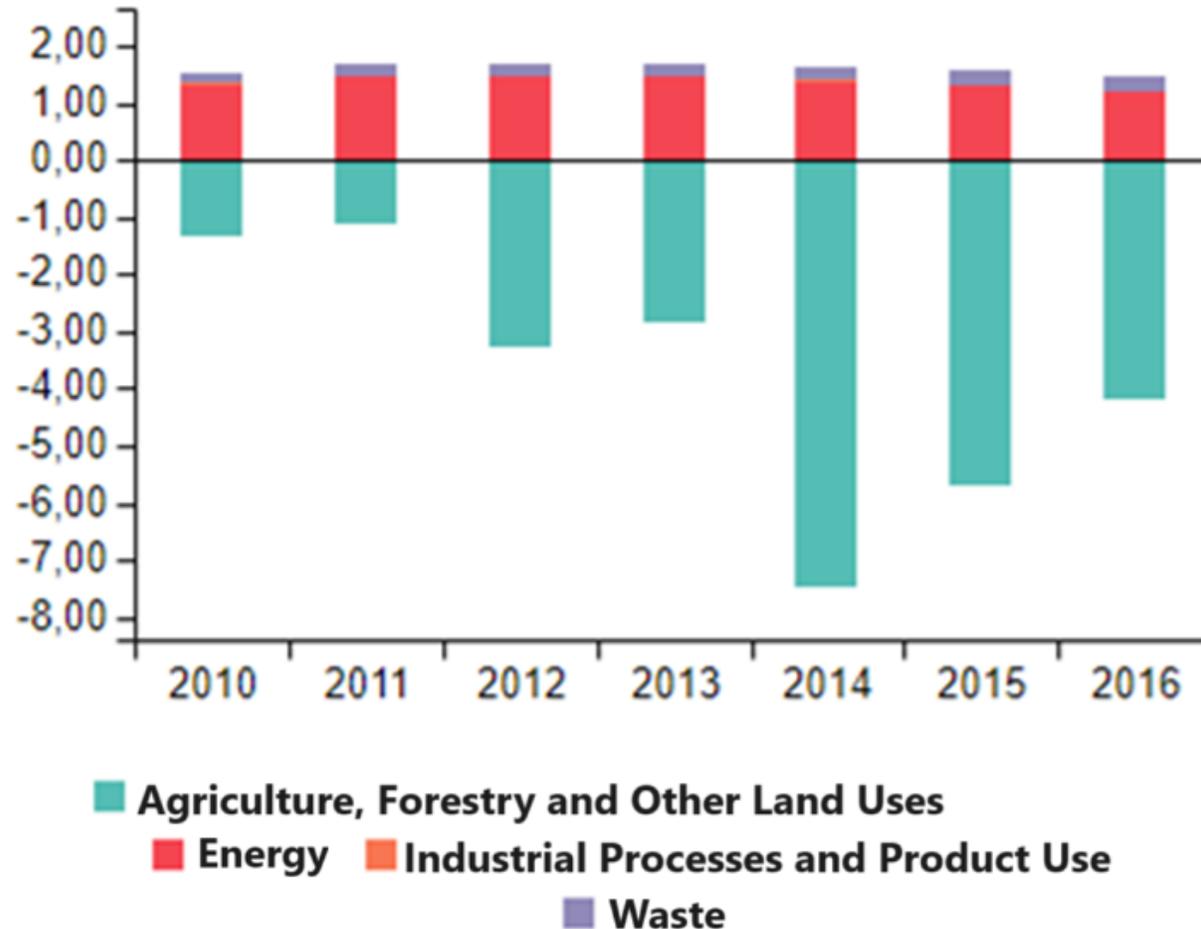


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## MISIONES

Unit of measurement  $\text{MtCO}_2\text{e}$



## GHG Inventory

Greenhouse Gases Inventory shows that the Province captures more  $\text{CO}_2$  than it emits

**Emissions:** 3.3  $\text{MtCO}_2\text{eq}$

**Captures:** 5.3  $\text{MtCO}_2\text{eq}$



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- Provincial Housing Authority
- Leadership: Eng. Juan Carlos Pereira
- Itaembé Guazú – 10 year project began in 2009
- Mandate to build homes for low-income residents



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## Itaembé Guazú Project



The largest planned housing complex in progress in Argentina - Initiated in 2009

It contains around 12,000 homes

Approx 50,000 Residents

The total area of the neighborhood covers 7.4 km<sup>2</sup>

Developed with sustainability criteria: Solar panels, solar water heaters, rain collection, recycling centers, and cool roofs

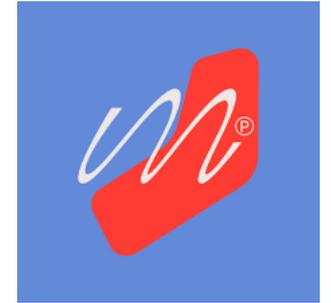


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Climático



Gobierno  
de Misiones

**IPRODHA**  
INSTITUTO PROVINCIAL DE  
DESARROLLO HABITACIONAL



# Itaembé Guazú Project

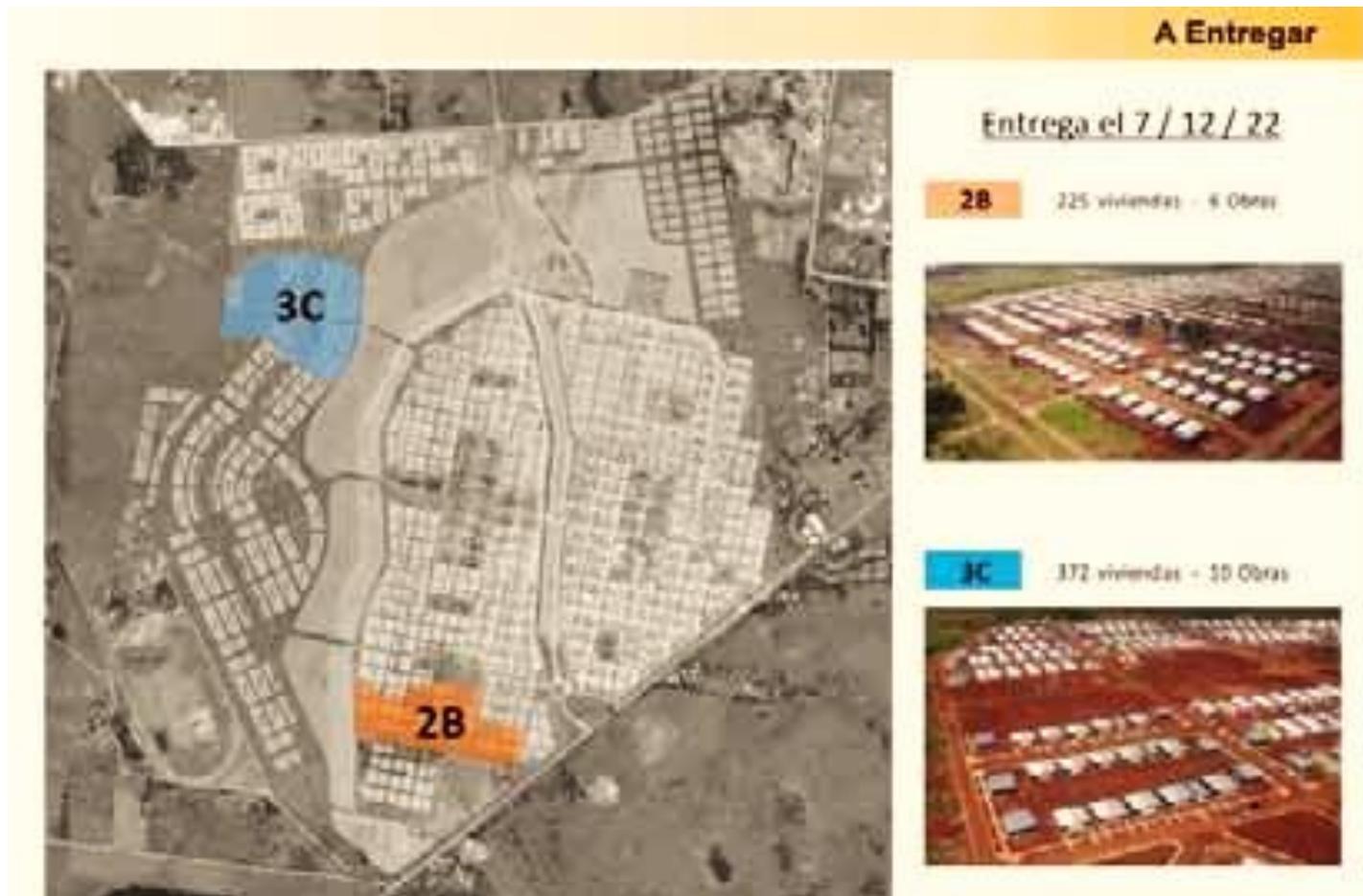




Gobierno  
de Misiones

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# Development Layout





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# Itaembé Guazú Cool Roof Project





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**RMIT**  
UNIVERSITY

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## Description of Itaembé Guazú Homes

- 75m<sup>2</sup> each
- 2 Bedrooms – 1 Bath
- Plumbed
- Metered Electricity
- Access to Natural Gas
- Some may have AC
- Corrugated Metal Roof

**\*Note: Duplex view**





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# Challenges



It's HOT!

Metal roofs transfer all heat into the home  
Can be hotter inside than outside



It's HUMID



New Development = Few Mature Trees



Financial constraints may not allow for AC unit in home



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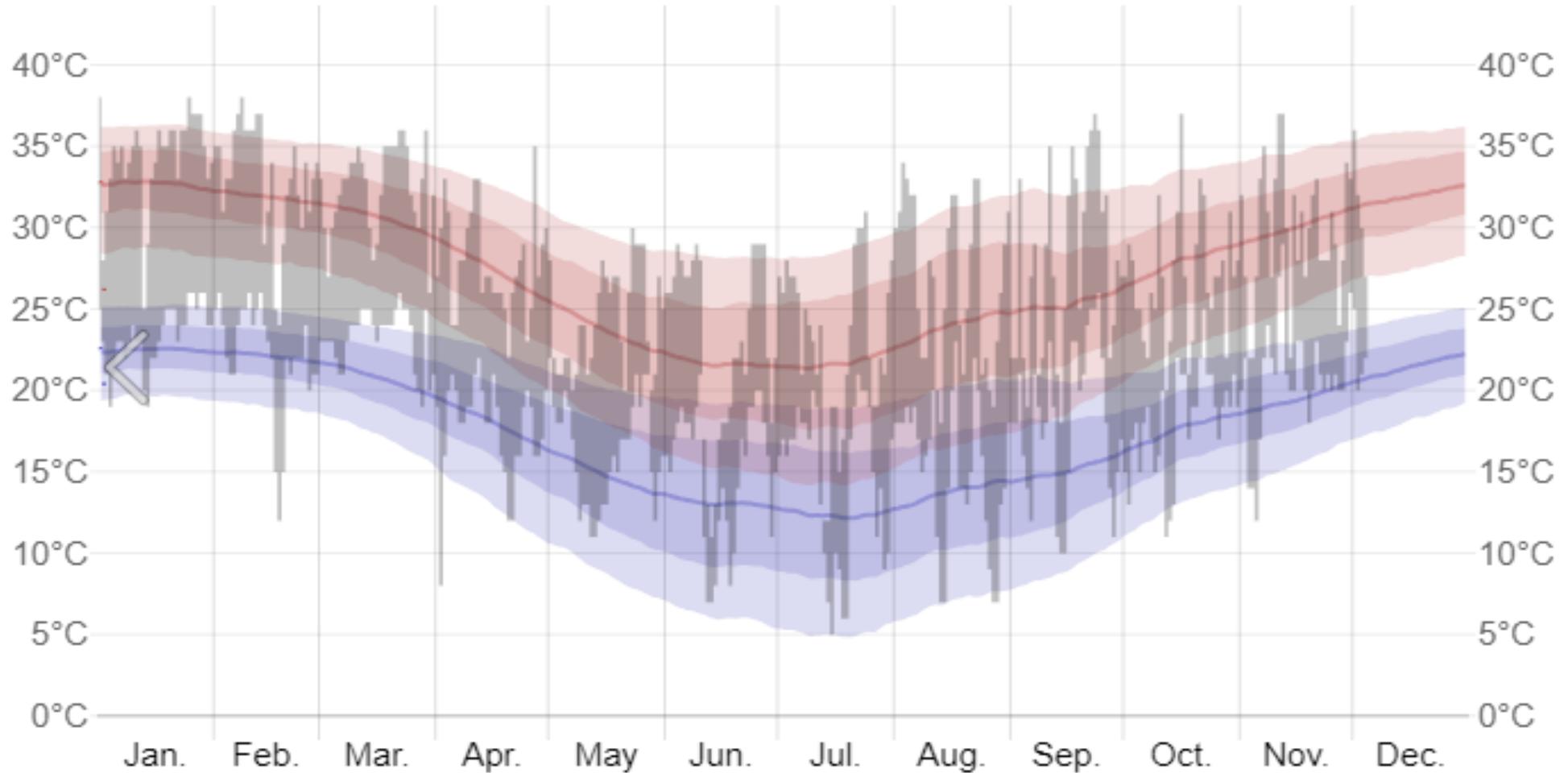
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# Posadas Temperature History 2023



Graph by Weather Spark



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## Cool Roof Solution

- Application of MACOMA Cool Roof Paint
- Can reduce 10°C inside the house
  - Increase indoor comfort
- Reduce the need for AC
  - Reduce Electricity expenses
  - Reduces CO<sub>2</sub> emissions





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# Funding Plan



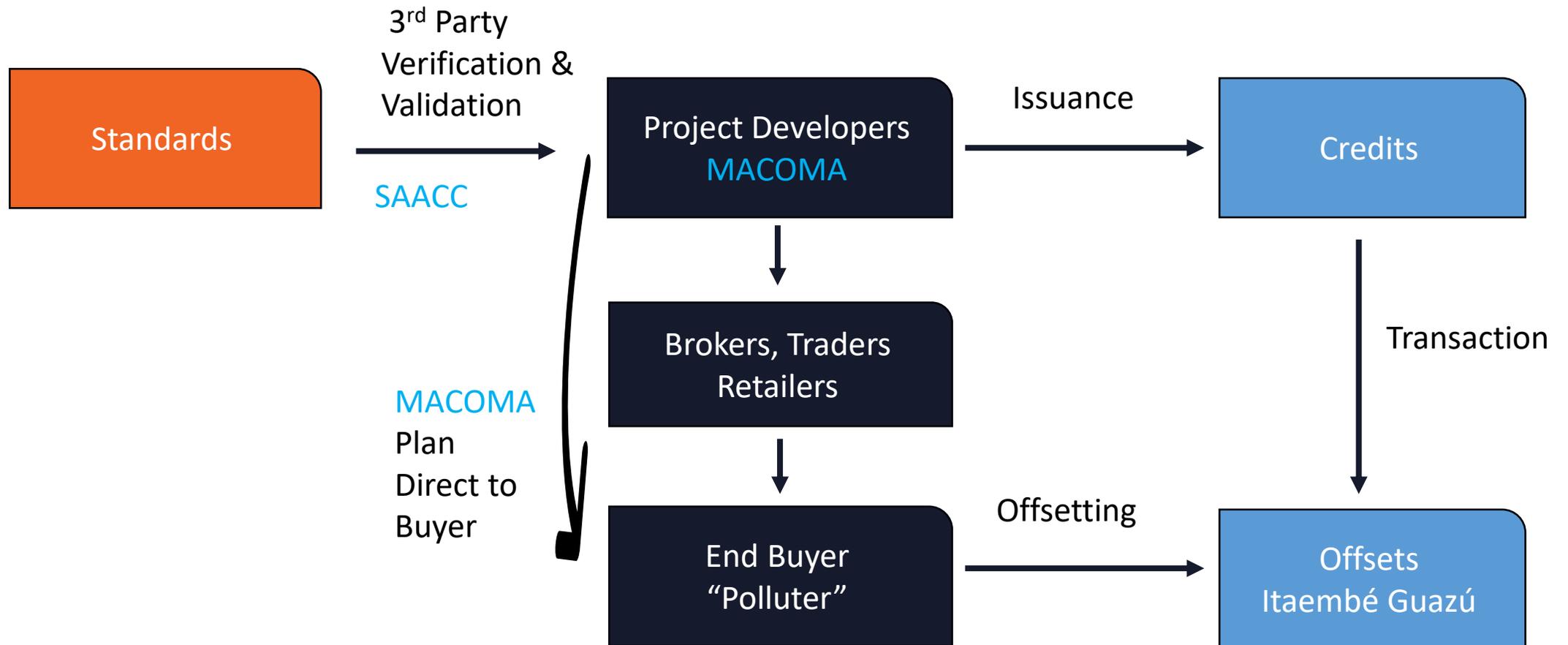
MICROCREDIT FOR INDIVIDUALS  
TO BUY THE HOMES  
**IPRODHA**



CARBON CREDIT MARKET –  
**VOLUNTARY MARKET**  
TO FUND COOL ROOF  
APPLICATION



# Structure of Voluntary Carbon Market Flow





# Voluntary Carbon Market - Standards for Project

## CO<sub>2</sub> equivalency for changing surface Albedo

- Every 100m<sup>2</sup> painted generates an effect equivalent, offsetting up to 28 tons of CO<sub>2</sub> emissions.

## Itaembé Guazú Cool Roof Island

- 1-time sale of credit for the life of the project
  - *The potential - each ton reduced could generate 1 carbon credit valued at 100 U\$D*
  - *Approx carbon credit value per home \$2100 = 28 x 100 x .75*

## Carbon Calculator for Kilowatt Hours (kWh) Savings

- The annual sale of “savings” credits to support the maintenance of the project
  - *Create a Trust for future maintenance*



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## Voluntary Carbon Market - Verifying Body



**SAACC**

**SCIENTIFIC ALLIANCE AGAINST CLIMATE CHANGE**

- Newly formed
- Association of Scientists – North/South America, Caribbean, India
- Climate Research
- 3<sup>rd</sup> party Validation for CO<sub>2</sub> offset Project(s)

**Visit Misiones! Enjoy the beauty of nature and SMILE!**



# The MACOMA Team



Global Alliance  
for Buildings and  
Construction



University of Nevada, Reno



The American  
Institute  
of Architects

