

# ENERGY MOVES THE WORLD

WE ARE GOING TO  
TRANSFORM THE  
ENERGY IN THE  
**HIBRID SYSTEMS**



**SIC**  
connect energy

## WHO WE ARE



Ecco Soma is a startup that creates innovative solutions to revolutionize energy generation, management and consumption. We developed the SIC-PVDG, an intelligent control system that maximizes the energy efficiency in hybrid systems

## WHAT 'S OUR CHALLENGE?

To solve the intermittency of renewable energy sources which compromises the efficiency and sustainability of hybrid generation systems. This intermittency makes generation unstable, hindering the maximum use of solar energy and increasing the use of fossil fuels to guarantee supply.

## HOW DOES SIC-PVDG SOLVE THIS?

With innovative technology, the SIC stabilizes the electrical grid by autonomously generating virtual inertia.

Operating in conjunction in the microgrid, it monitors consumption and generation sources in real time, mitigating fluctuations caused by photovoltaic generators. It adjusts power, absorbs or supplies energy according the changes in solar radiation and optimizes the minimum efficiency of the combustion generator by 30%.

Communication with the solar inverter limits generation at critical times, ensuring stability and maximum energy efficiency.

# THE EQUIPMENT

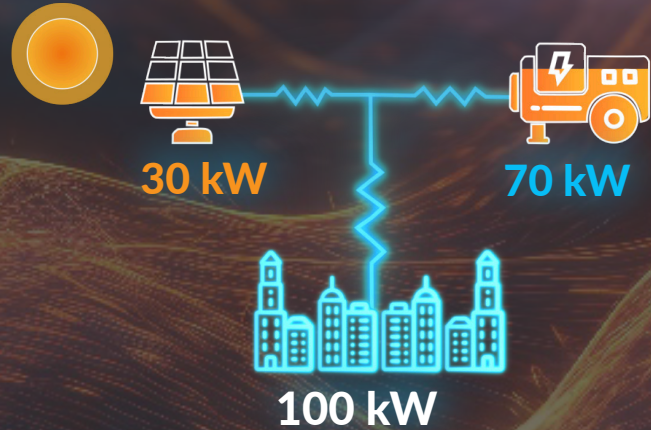


**Modular, scalable, and expandable** architecture: suitable for projects ranging from 100 kWp to large-scale operations.

**Flexible** and customizable sizing for maximum economic efficiency.

**Superior reliability:** eliminates the limitations of electrochemical batteries (BESS).

# OPERATION WITH SOLAR INCIDENCE

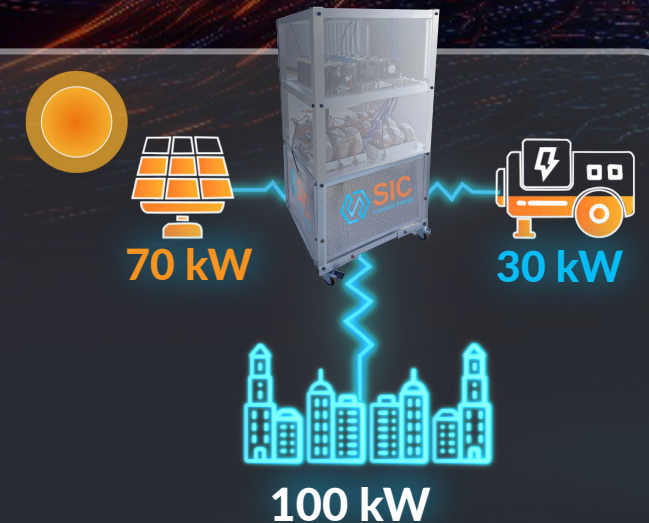


## CONVENTIONAL HYBRID SYSTEM:

Operating without batteries limits photovoltaic penetration as the generator absorbs fluctuations in PV generation caused by the intermittency of the renewable source. Therefore, to guarantee operation, the installed capacity of the generator should not be less than 70% of the installed capacity of the microgrid.c

*Illustrated: 100 kW microgrid with 70 kW GMG and 30 kW PV*

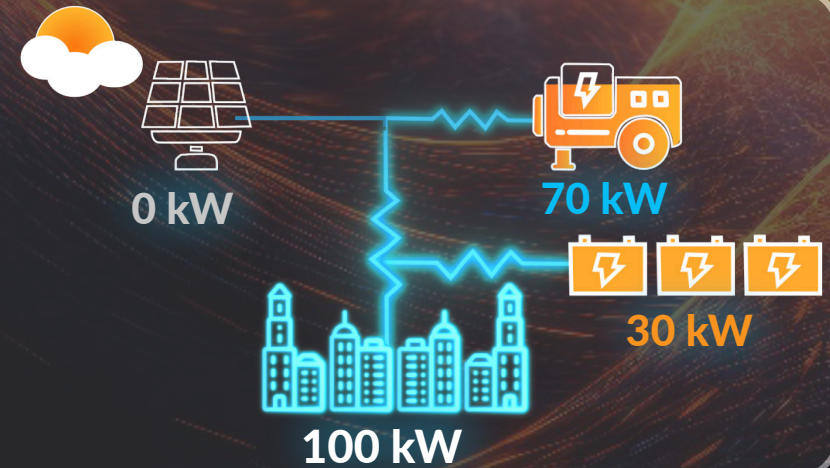
**WITH EMBEDDED SIC:** The system operates with high photovoltaic penetration because the SIC autonomously solves intermittency, absorbing fluctuations in PV generation and reversing the proportion of installed power, which is now 70 KW for the PV system and only 30 KW for the generator.



# OPERATION WITH SHADING

## CONVENTIONAL HYBRID SYSTEM:

Photovoltaic energy abruptly reduces its generation, which can lead the genset to be unable to handle the large amount of lost energy and enter protection mode, leaving the grid without power. Current solutions therefore use controllers with battery banks or extra generators to ensure operation. However, these have very high costs and lower energy efficiency.



**WITH EMBEDDED SIC:** Autonomously, the SIC promotes virtual inertia, ensuring the operation of the microgrid and preventing the genset converter from entering protection mode.

By mitigating system intermittency, it also ensures that combustion generators operate at minimum power, significantly reducing fuel consumption and GHG.

# RESULTS



## MORE CLEAN ENERGY

Photovoltaic energy penetration increases to 70%.



## LESS FUEL

It reduces consumption by 13,50% to 30%.



## FEWER EMISSIONS

Reducing greenhouse gas emissions by up to 30%..



## COST REDUCTION

It eliminates the need for large battery banks and extra generators, reduces maintenance costs, and optimizes generator performance.

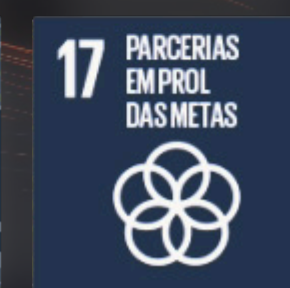
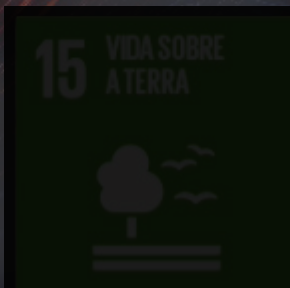
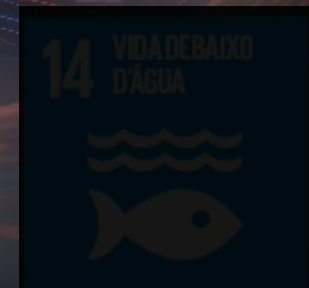
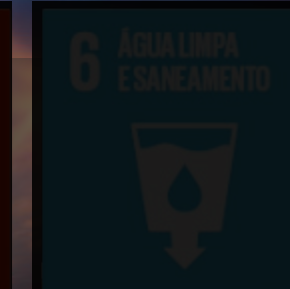
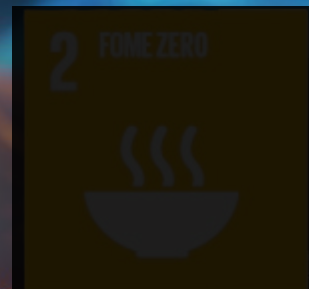


## MORE BUSINESS

Lower cost, higher productivity, affordable acquisition, and the best return on investment on the market.

*\*Results may vary depending on the hybridized system configuration and site environmental conditions. ☒The performance and benefits presented are contextualized within the use of SIC in Brazil.*

# SUSTAINABLE DEVELOPMENT GOALS



# SIMULATION

## POTENTIAL IN THE LEGAL AMAZON

*Simulation of the application of the SIC (Integrated System of Communication) based on data released in 2022 and 2023 by the Ministry of Mines and Energy.*

Government predicts

**USD 9,35 billion**

in investments to enable the transition of isolated systems in the Legal Amazon.

The utility bill of Fossil fuels (refund) is about

**USD 551,4**

billions/annual



Potential fossil fuel annual savings are more than

**USD 12,75 million**

using SIC-PVDG in hybrid systems

# SIMULATION

*Study of the application of SIC in existing hybrid systems.*



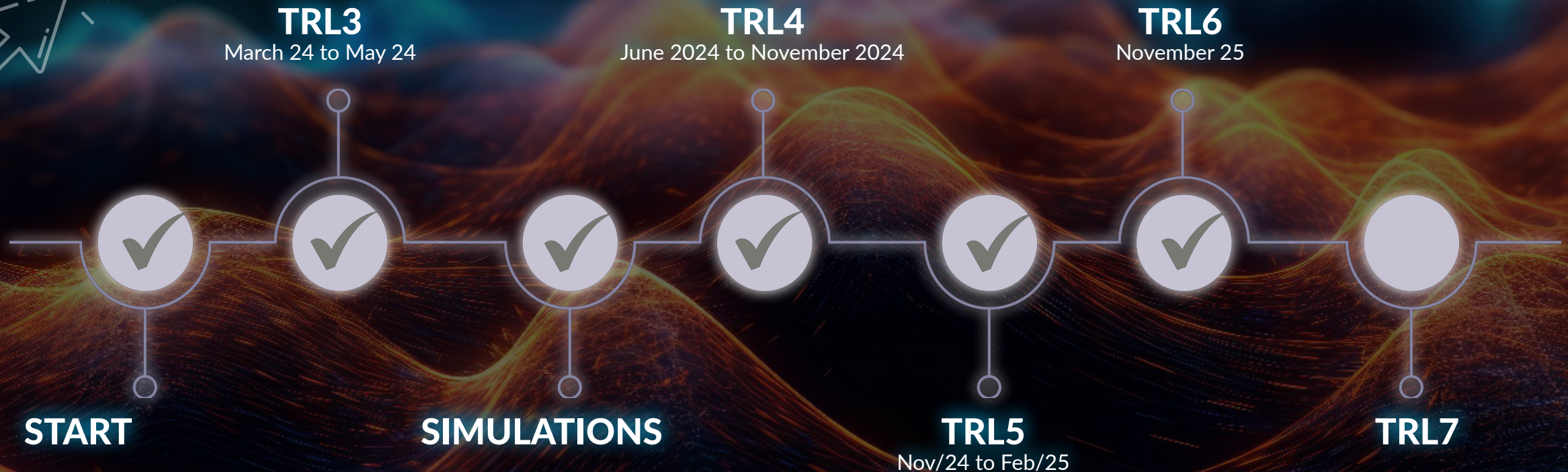
## SUCUNDURI - BRAZIL

Study on a 500kWp photovoltaic system: results of a 17% reduction in diesel consumption, depending on hourly load curves. Equivalent to more than USD 130,841,121.4 annually and a payback period of 2.28 years.

# STATUS



Check out the detailed breakdown of technological maturity according to the Technology Readiness Level (TRL) methodology.



Development of an active filter to stabilize hybrid networks.

Definition of Performance and safety requirements.

Analysis of the converter in microgrid scenarios with hybrid generation (diesel and photovoltaic).

Laboratory tests with simulations: Confirmation of efficiency in mitigating photovoltaic oscillation.

Prototype assembly and testing in a relevant environment: Confirmation of efficiency with diesel generators.

Advanced validation of the complete prototype in a relevant environment.

SIC Demonstration in a real operational environment.

ICTs



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**LET'S TRANSFORM THE ENERGY  
EFFICIENCY OF HYBRID SYSTEMS!**