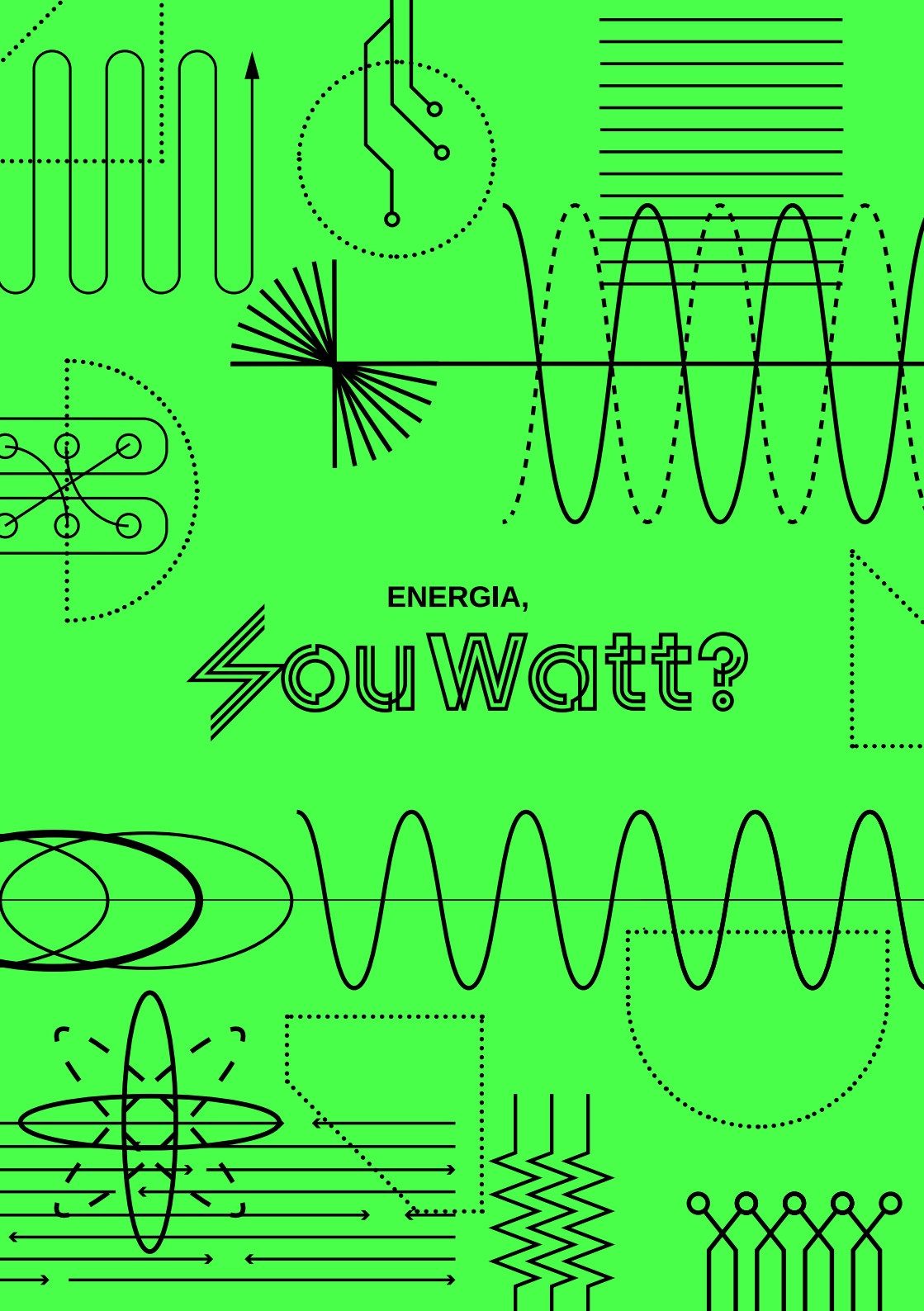
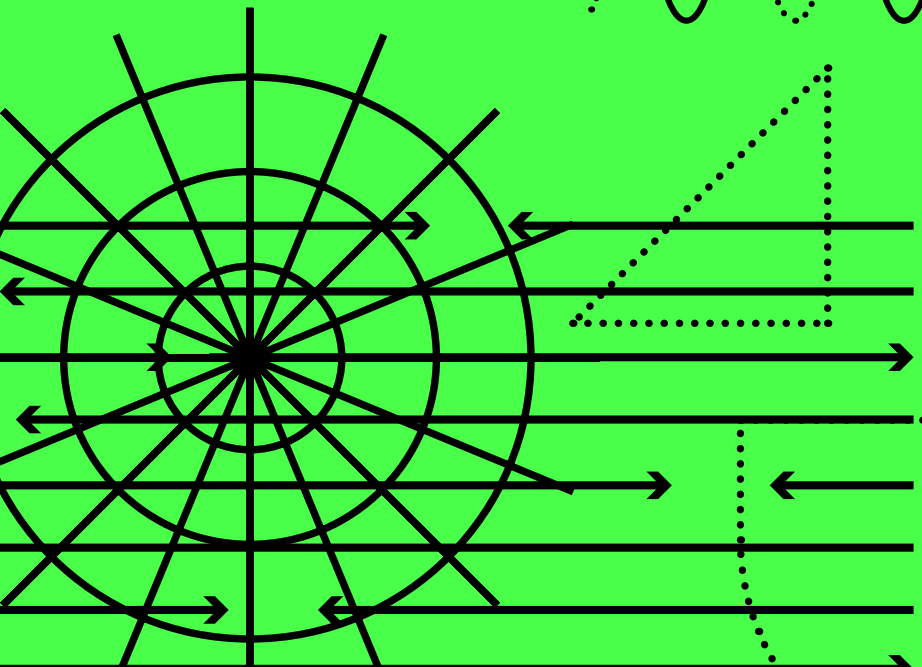

ENERGIA,
Sou Watt?

The exhibition Energia, Sou Watt? was created by the Cité de l'Économie, an interactive French museum. The title is a play on words with the standard unit used to measure energy transfer—that is, the amount of energy consumed or generated by a device. The Watt unit was named after the Scottish engineer James Watt in the 18th century. The exhibition, therefore, poses a question of belonging to its visitors: how are you part of the world of energy?



Energy, So Watt?

Climate change caused by human activity over the past two centuries demands an urgent response: the energy transition.

In order to meet international agreements and achieve carbon neutrality, we must gradually replace fossil fuels with clean and renewable energy sources. But this essential transition must be accompanied by a profound shift in our ways of living, producing, and consuming.

In the exhibition Energia, Sou Watt?, you are invited to take on the role of someone responsible for making political decisions regarding the energy transition. Every decision matters—and reveals how you would balance the economic, ecological, and social challenges that define this transition.

SESI Lab is a space where art, science, and technology come together to imagine and build possible futures. We believe that everyone can be an agent of change—and that's why we are always seeking to inspire new ideas and attitudes in the present.

Since opening our doors, we've chosen to work with annual themes to make our programming even more dynamic. This approach allows us to dive deep into important topics that are already part of our activities or emerging in the world today—always connecting different fields of knowledge with industry and real-life contexts.

In 2025, the theme guiding our experiences is "Energy and Energy Transition"—an urgent and essential issue in the fight against climate change. The energy transition lies at the heart of scientific discussions and is driving action among companies, universities, and governments around the globe.

It is with great enthusiasm that we invite you to explore our new temporary exhibition: Energia, Sou Watt?

Originally created by Cité de l'Économie, a highly interactive museum in France, this exhibition has been specially adapted for Brazilian audiences with scientific curation by Observatório do Clima.

This exhibition is part of the France-Brazil Season 2025, organized by the Institut Français and the Instituto Guimarães Rosa, with support from the Ministries of Foreign Affairs and Culture of both France and Brazil.

Here, the idea is to think, learn new things, and dream of possible futures.

In this exhibition, you'll step into a fun, interactive game where you take charge of major decisions about the energy transition.

Are you ready for the challenge?

Enjoy the exhibition!

CLAUDIA MARTINS RAMALHO
Superintendent of Culture, SESI Lab

O OBSERVATÓRIO DO CLIMA

Observatório do Clima was founded in 2002 with the goal of monitoring—and ultimately combating—climate change in Brazil.

It is a large network of civil society organizations, academics, and specialists from various fields who come together with a shared mission: to collect, analyze, and share data on greenhouse gas emissions—the very gases that are heating up our planet.

But raising awareness is not enough: Observatório do Clima is also committed to influencing policymakers so that public decisions are made with greater awareness, steering us toward a more sustainable future.

The reports published by Observatório do Clima are essential resources for governments, companies, and individuals like you to understand the serious changes caused by global warming—and how those changes impact everyone's daily life.

After visiting the exhibition and making decisions about the energy transition in this big interactive game, what stuck with you the most? This space is now yours: write down words related to the energy transition, and feel free to describe—or even draw—what you saw!

Here, you'll find some of the information you saw in the exhibition—along with a few new things. But above all, this booklet is for you, filled with activities and games to exercise your memory, observation skills, and imagination. There's no right order to follow—you create your own path.

Now that you've recalled what you saw, answer the following questions:

In the interactive game, which dilemmas stood out the most in your memory? Which challenges caught your attention the most?

At the end of the game, which profile do your answers relate to the most?

- ☐ I believe in science 
- ☐ I have social awareness 
- ☐ I trust the market 
- ☐ I want to protect the environment 
- ☐ I trust international cooperation 
- ☐ I want a world with regulation 

GLOSSARY

Paris Agreement

The Paris Agreement (or Paris Climate Agreements) is a treaty that came into effect in 2016, in which almost all countries of the world committed to adopting measures that can reduce the emission of greenhouse gases, such as CO2. The goal is to prevent the planet from warming by more than 2°C, on average, compared to pre-industrial levels. Currently, only Eritrea, Yemen, Iran, Libya, the Vatican, and the United States are not part of the agreement.

Fossil fuels

Fossil fuels, such as oil, coal, and natural gas, are non-renewable energy sources formed from organic matter millions of years ago. They are the main contributors to greenhouse gas emissions, which cause global warming. The energy transition aims to replace them with renewable and clean energy sources.

Clean energy

Clean energy refers to energy sources that produce little to no pollutants or greenhouse gas emissions, such as solar, wind, and hydroelectric power. These sources are essential for the energy transition because they help combat climate change, reduce pollution, and promote a sustainable future.

Carbon footprint

The carbon footprint is the measure of the total amount of greenhouse gases emitted directly or indirectly by human activities—such as transportation, energy production, and consumption. Reducing the carbon footprint is essential for the energy transition because it encourages the adoption of more sustainable practices and technologies, such as renewable energy and energy efficiency.

Global warming

Global warming is the increase in the planet's average temperature, primarily caused by the emission of greenhouse gases. It is a central issue in the debate on the energy transition because we need to replace polluting energy sources (such as fossil fuels) with clean and renewable alternatives.

Energy efficiency

Energy efficiency is key to sustainability: it means generating the desired amount of energy with a lower expenditure of resources. This reduces environmental impact, but it is also a way to save money. It ranges from changing habits—such as avoiding energy waste in daily life—to using more efficient equipment, like those with the Procel energy efficiency label.

Renewable energy

Renewable energy is obtained from natural and inexhaustible sources, such as solar, wind, hydroelectric, and biomass. It is essential for the energy transition because it replaces fossil fuels, reducing greenhouse gas emissions and dependence on finite resources.

Hydroelectric power plants

Hydroelectric power plants generate energy from the force of moving water, such as rivers and dams. They are a renewable and low-carbon emission source, which is why they play an important role in the energy transition. However, it is necessary to balance their benefits with environmental and social impacts, such as changes in ecosystems and local communities.

Biofuels

Biofuels are energy sources derived from organic matter, such as plants and agricultural waste. They are renewable and emit fewer greenhouse gases compared to fossil fuels. This helps reduce dependence on oil and promotes a low-carbon economy

Wind energy

Wind energy is generated from the power of the winds, captured by turbines, and converted into electricity. As a renewable and clean source, it plays a crucial role in the energy transition because it helps reduce greenhouse gas emissions and diversify the energy mix.

Green hydrogen

Green hydrogen is a renewable and clean energy source, meaning it has low carbon emissions. It is produced through the electrolysis of water, a chemical process that splits water molecules into oxygen and hydrogen, which currently has a high production cost. However, it is a promising market, and some companies have announced plans to transition from fossil fuels to green hydrogen.

Carbon sequestration

Carbon sequestration, or carbon capture, is a process of removing carbon dioxide (CO2) from the atmosphere and storing it in a way that is less harmful to the environment. This is something that plants and algae already do through photosynthesis. The ocean is also the planet's largest natural carbon reservoir —that's why human efforts have focused on reforestation and the artificial capture of CO_2 in the oceans to enhance this process. However, there are concerns that intervention in ocean waters could have harmful effects on marine life.

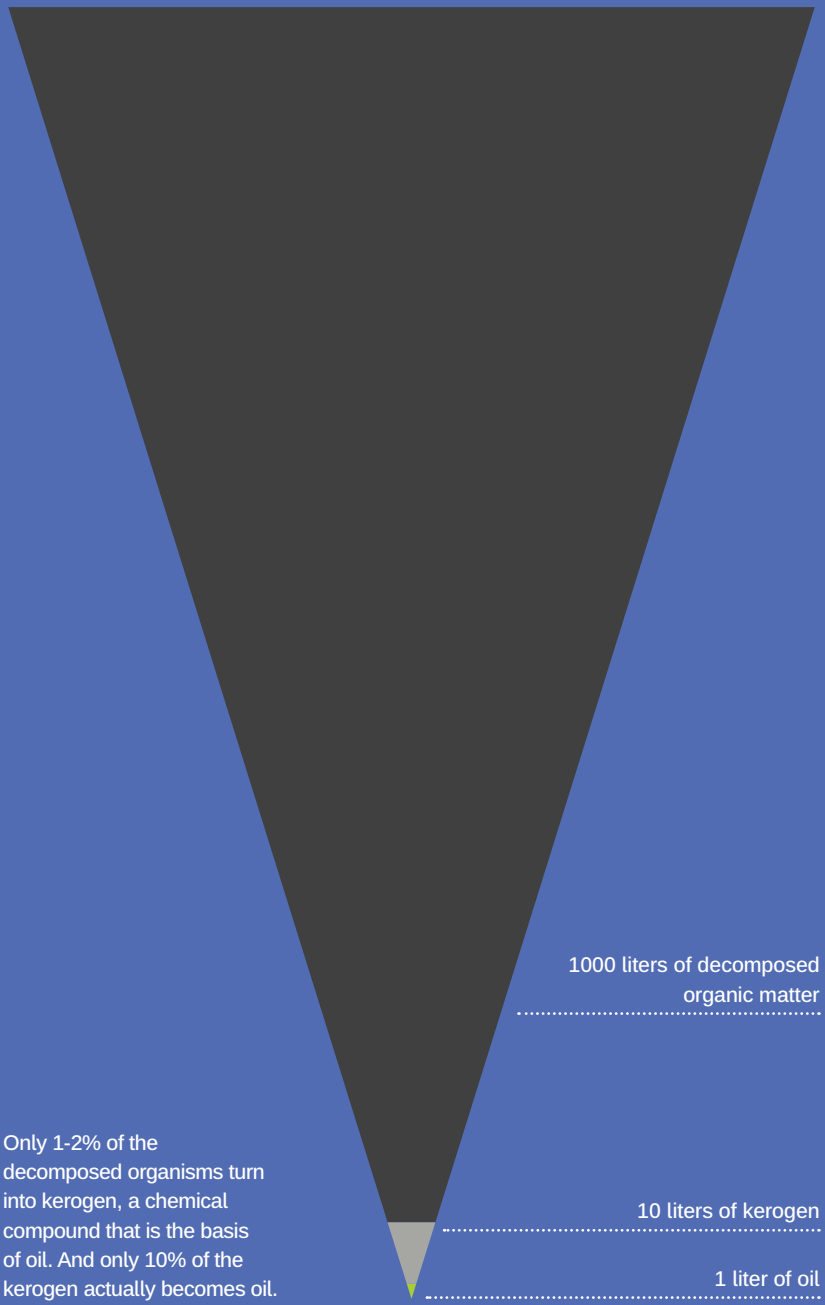
FOSSIL FUELS

Brazil generates 90% of its electricity from renewable sources, but the transportation sector still relies heavily on fossil fuels, such as oil and diesel. This is because the country chose, decades ago, to invest in highways rather than trains or ports. Almost everything we consume is transported by heavy trucks, which emit a large amount of greenhouse gases.

Have you ever stopped to think about the origin of oil?

It doesn't come from dinosaurs, as some people say. Oil is formed from bacteria, plants, algae, and other tiny organisms that lived millions of years ago. And, when they were alive, these organisms stored in their cells the energy from the Sun and from what they ate—it is this energy that we indirectly consume today when we rely on these fuels.

The drawing on the side helps to understand how many of these organisms had to exist to generate just one liter of oil.



Elegy for the Microbe

What is your name, my good microbe? I would
like to probe you.
You are gone, turned into oil—
You're in cars, always driving around.

Millennia before humanity,
The whole Earth was your home.
Who you were, no one remembers.
But I would like to—yes, I would like to ask.

Did you know?

"Elegy" is a type of poem that has been written since ancient times to celebrate the memory of someone who has passed away. Here, the elegy is a tribute to all the microscopic living beings that had to exist for us to use oil today, without even stopping to think about what we are consuming.

Now it's your turn

Try to think about the number of species that are going extinct because of climate warming.
These are some of the Brazilian animals that could receive a tribute from you in the form of an elegy:

Jaguar
rhymes with…
star
ajar
bizarre
far

Maned Wolf
rhymes with…
gulf
self
shelf
health

Golden Lion Tamarin
rhymes with…
lung
cousin
tongue
rum

Sloth
rhymes with…
cloth
growth
oath
troth

NUCLEAR ENERGY

What is nuclear energy, really? It comes from a discovery by Albert Einstein: when you split an atom into two parts, it releases a huge amount of energy. This great scientific discovery changed the world and led to terrible consequences, such as the bombs dropped on Hiroshima and Nagasaki (1945). But nuclear energy is still used today in many places to generate power. Brazil has two nuclear power plants—Angra 1 and Angra 2—with a third one under construction.

A nuclear power plant is several stories tall. For example, Angra 2 is 60 meters tall, the same height as a 20-story building. The reactors work like giant pressure cookers: through nuclear reactions, the water inside is heated and turns into steam, which moves a turbine that generates electricity.

However, nuclear energy also brings several problems: the power plants are costly (which will also make your electricity bill more expensive).

Additionally, it is difficult to figure out how to store nuclear waste, which is very dangerous to the environment and to people. There have been nuclear accidents, such as the one in Chernobyl, Ukraine, in 1986, which leave no doubt about the risk these wastes pose.

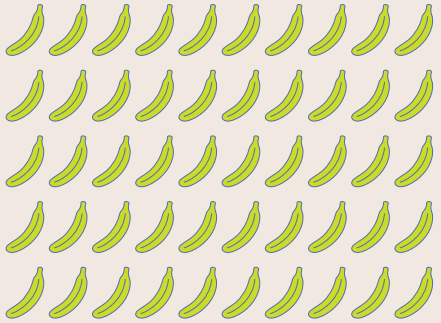
But not everything radioactive is dangerous. Even bananas emit radioactivity. In fact, anything that contains potassium (even humans, animals, and plants) emits a minimal amount of radioactivity. Bananas are known to have an abundance of potassium. So much so that, informally, some scientists have used the measure “equivalent to a banana” to refer to radioactivity.

ACTIVITY:

Connect the dots—how many bananas do you think are equivalent to each of these actions?

1/2 banana

10 bananas



50 bananas

50 million bananas

- ☐ 1 hour of airplane flight
- ☐ lethal dose of radiation
- ☐ 1 arm X-ray
- ☐ sleeping next to someone

BIOFUELS

Do you know what biofuels are?

They are sources of energy made from organic matter—plants, agricultural waste, and even animal waste. Unlike oil, they can be renewable and less polluting, helping to reduce environmental impact. Brazil has been at the forefront of this technology for decades.

Here, sugarcane has been turned into ethanol for a long time, but today we also convert corn, soybeans, and castor beans into biodiesel. These sustainable fuels are essential for decarbonizing critical sectors, such as cargo transportation. The potential goes beyond that: waste from the field, such as cattle manure, can now be converted into biogas, generating clean and cheap energy.

Around the world, scientists have already conducted experiments turning coffee, seaweed, fruit peels, human feces, chicken fat, and even old plastic into fuel. Who knows what else could become energy in the future?

The Power of What is Flushed Away!

Did you know that your pee can turn into electricity? It has already been tested to power small electronic devices. And there's more: feces are being studied as a sustainable fuel for aviation!

An Airplane That Goes Buzz

A little airplane powered by flies. Yes, that's right. In an experiment, British researchers worked on a revolutionary 15 cm drone that—yes!—would feed on flies in mid-flight, using microbial cells to convert the insects into energy.

ACTIVITY: Word Search

Find in the diagram below 10 unusual sources of biofuel that can help with the energy transition. Some are used today, while others are research for the future!

H	M	A	N	U	R	E	E	R	T	S	V	U	K	N	A	D	O	T	I
L	C	O	F	F	E	E	W	E	C	R	A	T	P	I	N	B	U	G	A
M	T	R	E	I	B	A	N	A	N	A	O	S	K	R	F	Y	C	D	T
S	A	U	L	O	E	N	V	D	T	C	I	E	G	O	D	C	L	S	I
A	E	C	L	T	O	A	W	S	E	H	I	F	C	O	R	A	S	L	G
T	F	N	T	O	D	U	R	E	S	A	Q	D	T	N	E	S	L	C	I
D	J	O	A	I	W	R	N	I	E	P	T	C	H	M	L	S	A	E	O
T	P	D	A	R	R	E	A	N	H	O	L	A	C	R	L	A	F	N	O
T	A	P	I	E	H	E	L	R	T	C	O	A	P	N	K	V	I	R	C
E	G	L	N	O	T	R	G	I	A	L	Y	P	S	R	U	A	E	S	T
G	I	A	E	L	T	F	A	O	B	E	Y	A	T	T	F	U	D	M	B
T	R	O	C	H	U	Y	E	D	A	F	H	E	C	T	I	S	I	P	E
N	U	G	B	O	O	S	A	N	E	F	M	R	T	W	Y	C	N	I	E
R	S	P	L	C	R	E	R	N	S	C	L	M	O	Y	T	E	R	L	S
A	G	H	M	R	L	N	E	T	S	M	A	Y	C	N	X	I	H	T	U
C	M	S	R	G	N	A	T	S	C	O	L	N	R	Y	A	E	T	U	D
M	P	I	A	E	S	W	R	M	D	E	I	G	E	T	P	H	O	E	L
D	A	R	N	C	Y	H	T	L	N	M	S	I	T	L	F	H	A	E	T
R	N	S	F	C	E	L	O	G	T	M	E	A	S	R	O	I	C	A	G
K	N	R	L	A	U	B	O	I	S	T	U	E	R	X	H	O	N	U	F

Solution at the end of the booklet.

How Much Does the Electricity Cost?

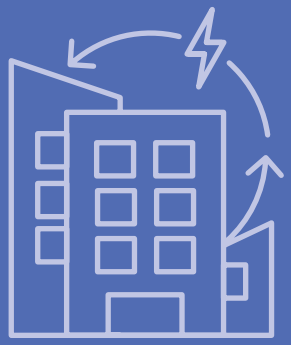
The electricity bill is one of the biggest nightmares for family budgets in Brazil. For half of the population, it costs the same as the food on the table! And for 53% of low-income families, half (or more!) of their salary goes straight to paying for energy.

CONSTRUCTION AND HOUSING

As the planet faces increasingly extreme temperatures, many families in Brazil are confronted with the dilemma of either paying high electricity bills or living in stuffy and humid homes. Only a few (very few) can afford to use air conditioning, for example. The challenge is clear: we need housing that offers thermal comfort without relying on expensive or polluting energy.

Imagine homes with natural ventilation, green roofs, low-impact walls, and integrated solar panels. These innovations already exist, but they need to reach the peripheries and vulnerable communities, where they are most needed.

Efficient housing should be a basic right, not a privilege. The question is: what kind of cities are we building? Places that reproduce injustices or spaces planned to prosper?



ACTIVITY: How Much Do You Consume?

Below are the household appliances and how much energy each one consumes. Mark how many of each of these items you have in your home.

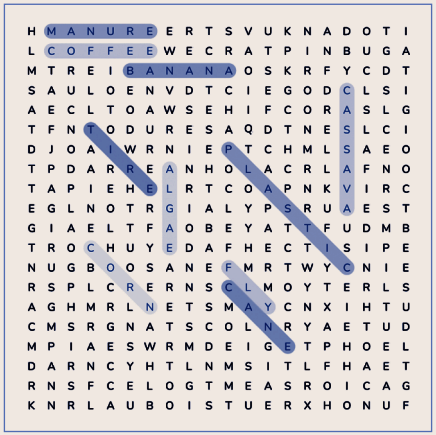
Air Conditioner 120 kWh	Electric Shower 70 kWh	Refrigerator 30 kWh
Electric Coffee Maker 18 kWh	Television 16,5 kWh	Computer 16,2 kWh
Small Fan 15,6 kWh	Microwave 12 kWh	Iron 12 kWh
Vacuum Cleaner 10 kWh	Washing Machine 6 kWh	Hair Dryer 4,5 kWh
Blender 1,1 kWh	Mixer 0,48 kWh	

SOLUTION TO THE GAMES

PAGE 15

Sleeping next to someone = 1/2 banana
1 X-ray of the arm = 10 bananas
1 hour of airplane flight = 50 bananas
Lethal radiation dose = 50 million bananas

PAGE 17



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Escaneie o QR-code para a versão em português

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EXHIBITION “ENERGIA, SOU WATT?”

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Citéco

SCIENTIFIC CURATION
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