
We Are Renewable
and Solidary Energy
ice
racsa
cnfl
GRUPO ice

Credits

Coordination and editing:
Randall Sáenz.

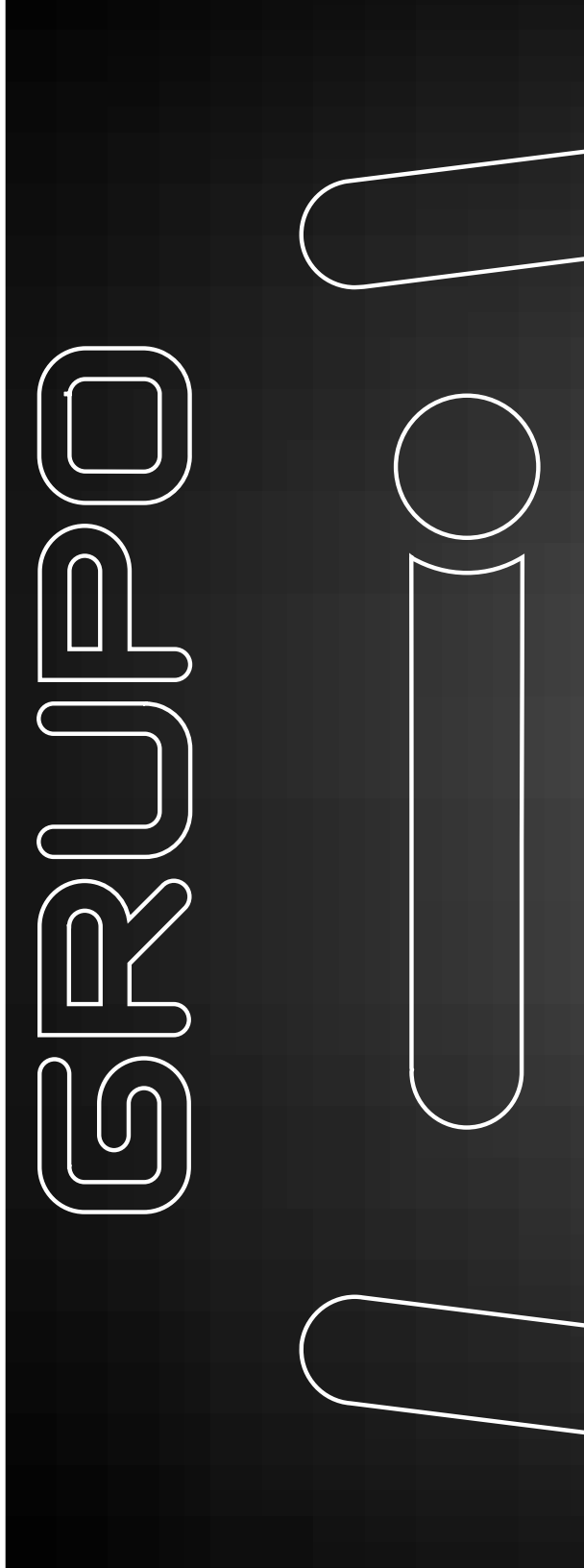
Layout:
Kenneth Arroyo.

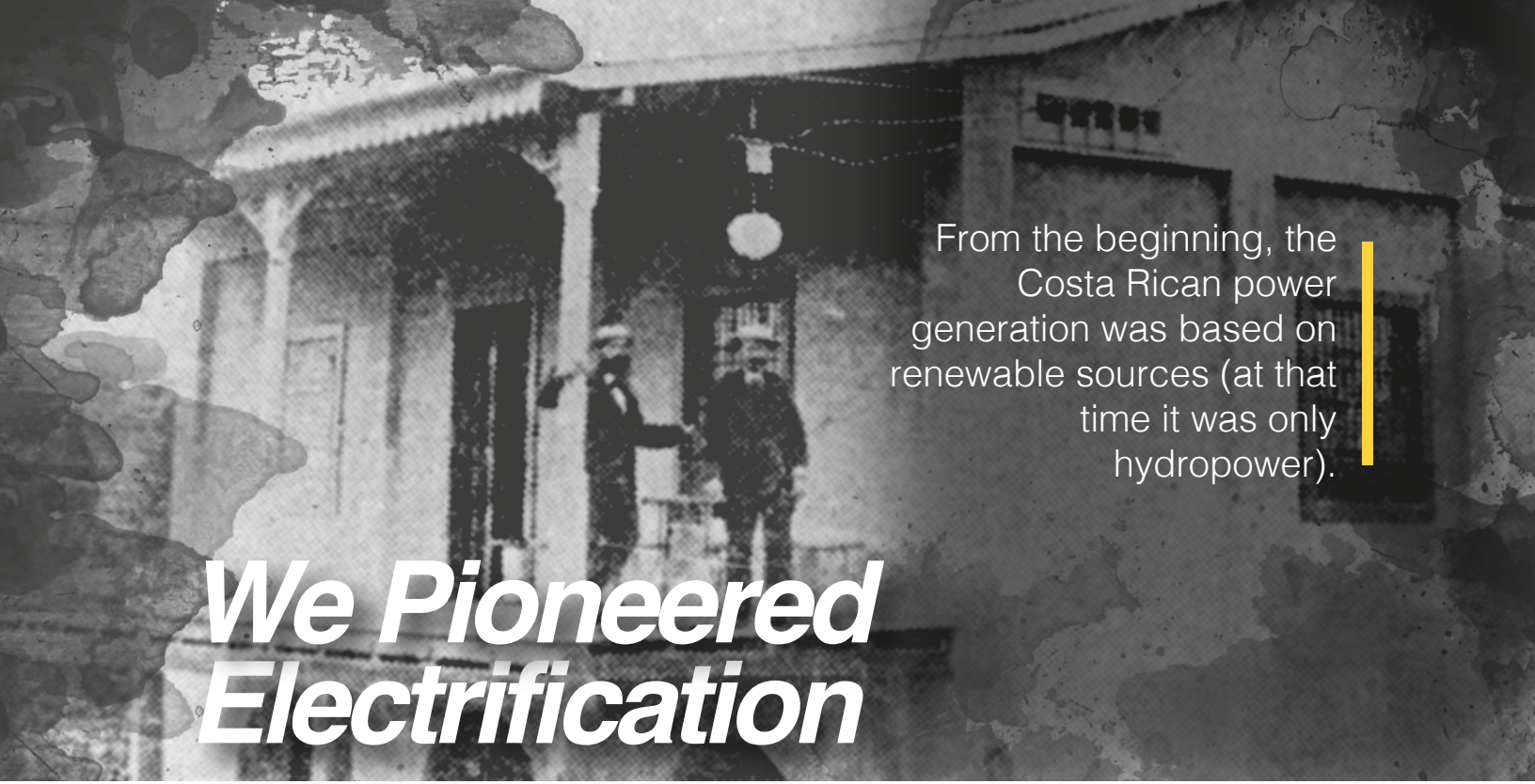
Content:
Division of Electricity.
Compañía Nacional de Fuerza y Luz.
Division of Communication.
Grupo ICE's Historical and Technological Museum.

Cover Photograph:
Jimmy Arriola, Grupo ICE.

Photography:
Division of Communication.
Jimmy Arriola and Tatiana Reyes.
Grupo ICE's Historical and Technological Museum.
Shutterstock.

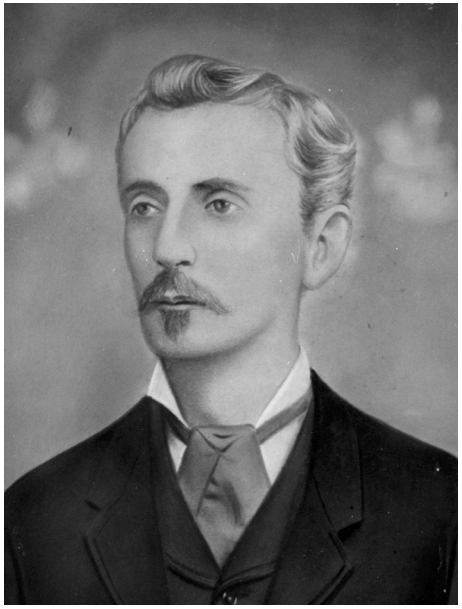
This is a production of the Corporate Division of Communication.
San José, Costa Rica.





From the beginning, the Costa Rican power generation was based on renewable sources (at that time it was only hydropower).

We Pioneered Electrification



The Costa Rican Electrical engineer Manuel Víctor Dengo and the Guatemalan businessman, Luis Batres took the first laps for the electrification in the country at the end of the XIX Century.

They both, in a synergy of money and technical knowledge, founded, in 1883, the Compañía Eléctrica de Costa Rica. This Company built the first hydropower plant in the country, illuminated San José, and planned to provide the service for other places in the country.

Parallel to the electrical service, Luis Batres proposed, in 1886, the existence of telephone service in the country.

Goodbye to oil lampst

With the creation of Compañía Eléctrica, Costa Rica began the journey to electrification.

In spite of some advance, the service was deficient during the first decades for most of the population.

How was the evolution on these first years?

1882

The Government granted Manuel Víctor Dengo the concession to develop electric power for fifteen years.

1883

Creation of ***Compañía Eléctrica de Costa Rica (CECR)***, first Power Company founded by Dengo and Luis Batres.

CECR signed a contract with the Local Government of San José to provide electricity and to build the first hydropower plant in the country.

1884

On August, 9th, the electric service was inaugurated in San José.

The plant was located in ***Barrio Aranjuez*** and it generated 50 kw for 25 lamps.

1885

Batres bought Dengo its participation on the C***ompañía Eléctrica de Costa Rica***.

1886

The Guatemalan business man found two partners willing to invest: Fabián Esquivel y Minor Keith.

San José was the third electrified city in the world, in 1884, right after New York and Paris. Five years later, San José inaugurated its electric tram.

1887

Batres proposed the use of incandescent lights to illuminate public buildings and government offices in San José.

1888

The Company that belonged to the Guatemalan business man signed a contract with the County Corporation to provide electric lightning in Cartago.

1890

The stock corporation *Compañía de Luz Eléctrica de CR* was born, the stockholders were Keith, Esquivel, and Batres.

This company acquired the contracts, goods, and infrastructure from CECR.

1891

Keith signed the contract to provide incandescent electric lightning for public buildings in San José.

The new illumination system used vacuum sealed bulbs, these bulbs were brighter and lasted longer than arc lights.

1900

Costa Rica Electric Light & Traction Company Limited acquired the Costa Rican stock, contracts and plants.

The service was taken over by private companies.

1941

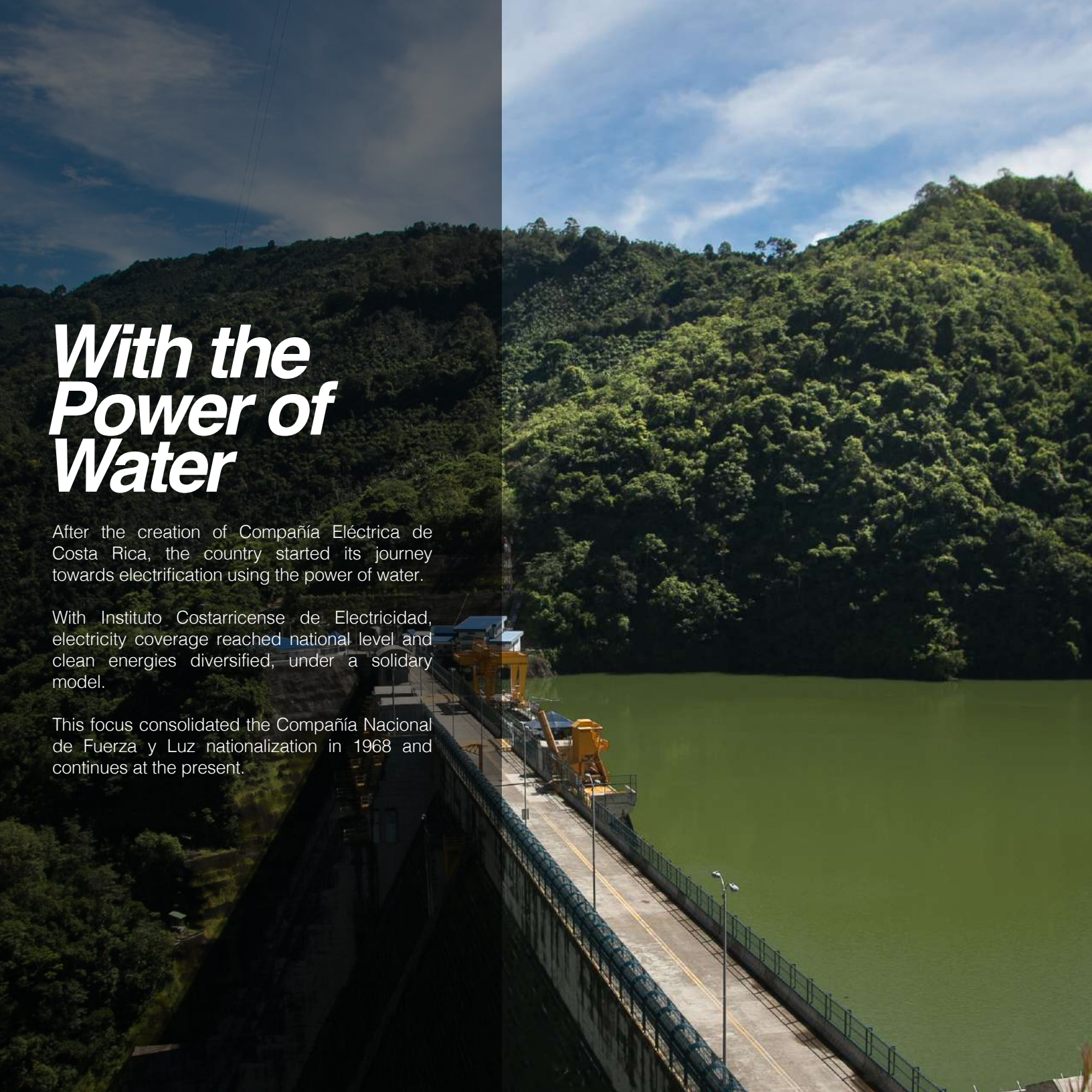
Three of those companies merged and formed *Compañía Nacional de Fuerza y Luz* that was a private Company at that time.

1949

Deficiencies in the service provided triggered social struggles that led to the creation of Instituto Costarricense de Electricidad, ICE (Costa Rican Institute of Electricity).

1968

CNFL was nationalized and was acquired by ICE. CNFL took over the electrification of the country's Metropolitan Area.



With the Power of Water

After the creation of Compañía Eléctrica de Costa Rica, the country started its journey towards electrification using the power of water.

With Instituto Costarricense de Electricidad, electricity coverage reached national level and clean energies diversified, under a solidary model.

This focus consolidated the Compañía Nacional de Fuerza y Luz nationalization in 1968 and continues at the present.

Our Electricity Grid

Thanks to its geographic location and geology, Costa Rica is a suitable place for Hydropower generation.

Since the beginning of electrification, hydropower has been the energy in which the National Grid is based.

In the 70's began a process of diversification using geothermal power and, in recent years, other sources were incorporated.

This is how the National Electric Grid is conformed:

- **Hydropower: 67,5%**
- **Wind: 17%**
- **Geothermal: 13,5%**
- **Biomass and solar: 0,84%**
- **Thermal: 1,16 %****

Source: Centro Nacional de Control de la Energía (CENCE), 2019 (National Energy Monitoring Center).

Note: (*) Percentages correspond to the installed capacity in the country.
(**) Backup source, it means, this source is used only when there is over demand.

The power generation in **Costa Rica based on renewable sources has surpassed 98%** for 5 consecutive years.

By not generating power based on fossil fuel, **Costa Rica has saved US$ 482 million** in the past 20 years.

This **clean energy system benefits 1.6 million households**, 295 businesses and 9 thousand industries.

Costa Rica holds the **third place of Geothermal energy** production in America, and the twelfth in the world.

Costa Rica was the **first country that used wind** for power generation.

Electricity for All

Over the last seven decades, ICE and Compañía Nacional de Fuerza y Luz have consolidated –together with other cooperatives and power companies— a global solidary model.

Evidence of this has been, that during this period, the national coverage went from 14% (1949) to almost 100% at the present time.

The Costa Rican Institute of Electricity was born in 1949 with the call to electrify the country based on clean energy.

The matrix diversification and the use of regulation reservoirs have encouraged quality and continuity unique in this service.

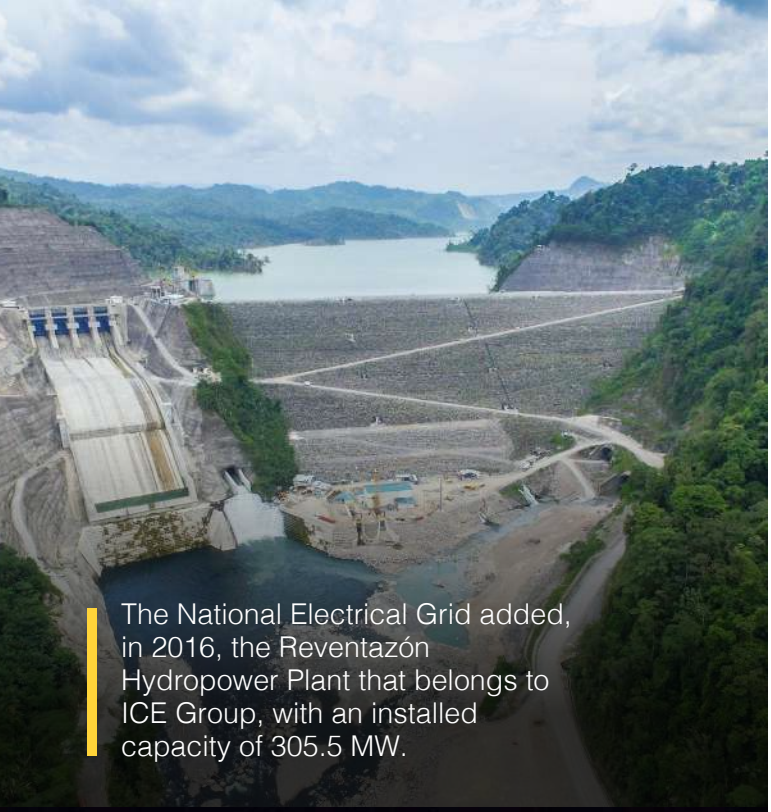
Pillar of the Power System

ICE Group supplies power for 77.57% of the 51100Km2 on the country.

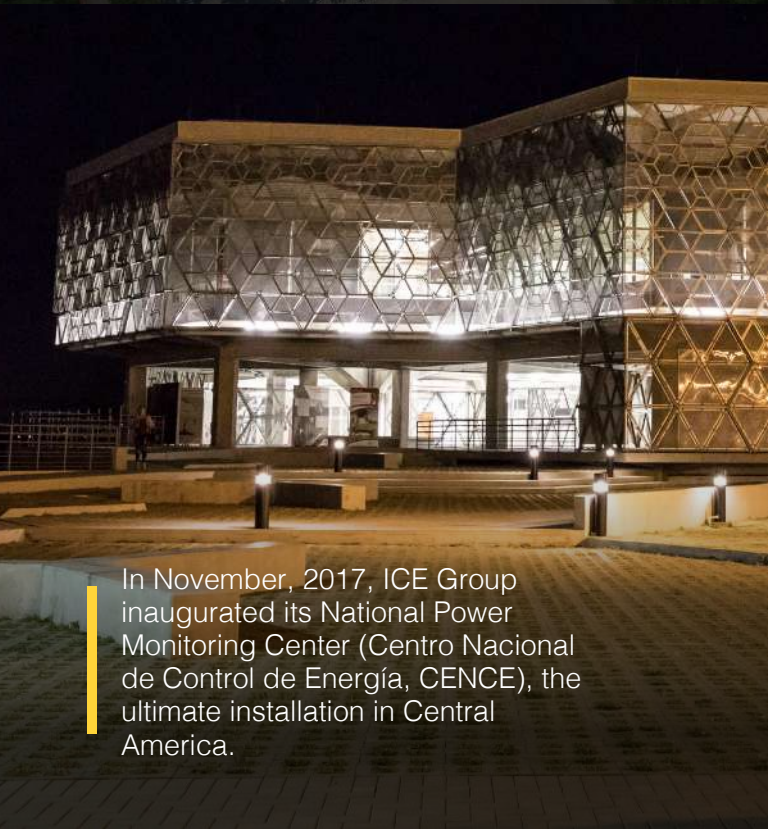
Costa Rica has 99.7%, power coverage thanks to a solid electric grid provided by ICE and CNFL.

What's ICE Group's contribution to the National Electrical Grid?

- A network of **40 plants**, most of them based on clean generation: 24 hydropower, 7 geothermal, 2 wind, and 1 solar plant.
- **Six** thermoelectric plants as a backup.
- **1500 solar panels** to supply power where there is no infrastructure available such as National Parks and indigenous communities.
- Together, the electric companies from ICE Group (ICE and CNFL) supply **69.9%** of the power in the country.
- Together, these companies serve more than 1 300 000 customers.
- ICE Group's generation capacity is **2.5 million kW**.
- **ICE's National Monitoring Center (CENCE)** monitors and operates SEN (National Grid).
- ICE and CNFL have installed **105 thousand smart meters** (for reading, and remote connection and disconnection).
- By 2021, ICE Group plans to have 385 000 AMI (*Advanced Metering Infraestructure*) meters installed.



The National Electrical Grid added, in 2016, the Reventazón Hydropower Plant that belongs to ICE Group, with an installed capacity of 305.5 MW.



In November, 2017, ICE Group inaugurated its National Power Monitoring Center (Centro Nacional de Control de Energía, CENCE), the ultimate installation in Central America.

At National Level

- The **National Electrical Grid** consists of 8 companies: ICE, CNFL, Jasec, ESPH, Coopelesca, Coopealfaro Ruiz, Coopeguanacaste, Coopesantos.
- Each one of them has coverage zones assigned.
- ICE and CNFL serve **77.57% of the country**.
- The National Electrical Grid (Sistema Eléctrico Nacional, SEN) counts with **444 generation units**, 40 of them belonging to ICE.
- They all have a generation capacity of **3,5 million kW**.
- There is a public lighting network of **300 000 lights** which covers the whole country.
- The National Grid connects with other countries through the **Central American Electrical Interconnection System (SIEPAC)**.

Boosting Electromobility

- ICE Group has been a positive catalyst of electrical mobility in the country, even before the enactment of the **Law to promote and provide an incentive scheme for electric transportation**, in January, 2018.
- In 2018, ICE Group installed **one fast and five semi-fast** charging points for electric vehicles.
- In 2019, ICE Group installed **30 fast charging points all over the country**.
- The ICE Group's main goal is that electric vehicles can operate in the whole country.
- ICE Group acquired **100 electric vehicles** to replace its combustion units.
- These 100 vehicles will prevent the emission of **350 tons of greenhouse effect gas** per year.

> ICE Group aims to create an *interconnected system of charging points*.

Smart Grids.

Converging Services

ICE Group —leveraged in the convergence of its power and telecommunication services— encourage smart grid projects.

These projects include the installation of remote meters (for measuring, and real-time connection and disconnection), charging networks for electric vehicles, and smart lighting.

They include wireless internet in public parks, public surveillance, and citizen media sites.

As part of this process, in 2018, ICE Group installed 237 surveillance cameras in five cantons, and it installed the first smart posts in the country.

During 2019 and 2020, ICE and CNFL will move towards the installation of 36 semi-fast charging points and 3 fast charging points in its served zones.

ICE Group plans the installation of 100% smart posts for its customers.

Knowledge to expor

ICE Group works, together with Comisión Ejecutiva Hidroeléctrica del Río Lempa (CEL) from El Salvador, in the enlargement of **5 de Noviembre and Chaparral** hydropower plants.

ICE Group has also exported its knowledge on geothermal energy to Bolivia.

We Are Renewable
and Solidary Energy