

# Solutions **for the** energy sector



## Connect with our best energy

We create value with the best energy  
We connect with international leading manufacturers for the generation, transmission and distribution of energy.

To our customer on the energy market,  
we offer solutions that are high quality,  
sustainable and fairly priced..

We engage on the value chain, by helping  
to promote development, to strength the  
electrical market as an strategic allie.

We bet on renewable energies and smart  
grids.

We offer products, solutions, knowhow  
and consulting to our clients.

We believe on sustainability. Through our  
Business group we seek to positively  
contribute to society: environmentally,  
socially and economically.

We are Revi, Trent, Trevim, Syntesys  
Tecnológica, AC Piles and Axiotech,  
a Business Group that beats on energy  
transition with operations on Colombia,  
Chile and Peru.

### About us



# Green hydrogen

Decarbonizing the world is a priority

It is time to think about renewable energies.  
Sustainability involves all actors of society  
to work for the reduction of polluting emissions.  
Green hydrogen is an effective way to counteract  
environmental impacts.

### ¿What is there to know?

Solve energy needs without having  
such a negative impact on the

environment and reduce carbon emissions and greenhouse gases are clear and important commitments that companies have with society. To talk about sustainability is to act in a responsible manner, aware of world challenges. It is urgent to seek renewable energies that allow avoiding and controlling impacts, as well as mitigating climate change.

The production of green hydrogen  
is a route for the future  
towards the energy transition  
that already shows  
its results in the present.

Green hydrogen can be transformed into other substances, including environmentally friendly synthetic fuels that do not generate carbon dioxide.

This clean energy vector, is produced through hydrogen separation; through electrolysis, thermolysis or photocatalysis; from water molecules, biogas vapor or organic waste, among other options. It is key to supplying green energy resources to sectors such as industry, mobility or heavy transport that today generate a lot of pollution.

Green hydrogen is an effective and innovative energy proposal for society; it will positively impact economic growth, the creation of solutions and be an alternative of sustainability in the medium and long term.

It is impossible to think how to tackle climate change without breaking paradigms of consuming polluting energy, towards more sustainable ones. Colombia today is wealthy o environmental resources that could be attractive for production of this type of hydrogen at a very competitive costs, in addition, the strategic position in the world would facilitate important trade issues. additionally, there are laws that already support this type of production and consumption, even providing guarantees and incentives from tax issues.

It is a fact, Colombia joins the global initiatives for the energy transition, which commits businessmen and companies that provide this type of solution.



### The future is in our field

In our purpose of searching for the best energies, we offer consulting and accompany projects. If national or international actors, are interested in the energy transition, we seek to evaluate business models, applications and financial viability in order to join their search for solutions.

For years we have been leaders in the study of this type of energy. This knowhow and work is taken today into tenders in Colombia, regional innovation projects, and even training and consulting to clients interested in energetic sustainability issues.

“The development of hydrogen production and the adaptation of he economic sectors for its use, will **require large investments for the technologys development y** and the creation of its infrastruc

SOURCE ROADMAP COLOMBIA



### Green hidrogen



Has no direct Greenhouse Gas emissions during its end use.



Will progressively replace the use of fuels in the industrial sector.



Accelerates the use of renewable energy such as solar and wind.



An exponential growth in current demand is expected, at a global level, by 2050.



# Energy efficiency

## A challenge for the sustainability

Reducing costs, achieving better consumptions, mitigating the climate change, contributing for the productivity and competitiveness of the companies, are actions that work for the energy efficiency. There are five main topics about that.

### 1 Regulations to open outlooks

Creating an energy culture, achieving good practices for energy resources management, promoting the rational use of energy and the implementation of renewable energy sources, guaranteeing the appropriate supplying in required conditions, are some challenges to confront and strengthen an efficient and sustainable sector, which contributes for the country's development.

Nowadays, Colombia has a group of legislations that opens a lot of possibilities to plane, coordinate and regulate all the topics about energy efficiency. Some of them are the following:

- A 2nd article from the standard 143 of 1994, which gives some assignments to the Mine and Energy Ministry, in order to define guidelines to take an economic advantage of common and uncommon energy sources, based on an integral, efficient and sustainable management.
- **Standard 697 of 2001**, which creates the Program of Rational and Efficient Energy Use.
- **2nd article from the decree 381 of 2012**, which gives some functions to the Mine and Energy Ministry to create, take on, manage and coordinate the politics of rational use of energy and the development of alternative energy sources. Moreover, it looks for promoting, organizing and guaranteeing the development of programs based on the rational and efficient energy use.
- **Decree 1074 of 2015**, which showed the wished results and probable positive and negative impacts, generated by the modification of technical rules.
- **La Resolution No. 41286 from December 30th of 2016**, which took on the Plan of Indicative Action – PAI 2017-2022 for the development of the Program of efficient energy use.
- **The agreement about Technical obstacles for the commerce**, that allows to increment and facilitate the commerce, and obtain an effective access to the trade without any kind of obstacle or discrimination.
- **Standard 2169 of 2021**, which supports the achievement of environmental commitments of Colombia around the reduction of emissions towards 2030 and 2050.

“The **energy efficiency** is one of the most important and effective strategies for **climate change mitigation**.”

MINERGI



### 2 Certifications and energy management

Looking for support companies to improve their energy performance, nowadays, two regulations certificate committed organizations with the efficiency in this direction.

The first one, technical rule ISO 50001, which sets up the requirements for the Energy Management System, promotes rational and efficient use of energy, and the reduction of costs, greenhouse effect gases and harmful material for our health.

And the international standard ISO 50002, which complements the previous and focus on the development of energy management system. There are defined some principles and processes of the energy audit, in order to measure performances.

### 3 Audits: the beginning to achieve efficiency

Identifying, monitoring, and verifying energy efficiency levels in the companies, is the main purpose of the audits, made through extern people. Those audits represent an opportunity to improve energy performance of the processes.

Achieving that, is not only due to reducing production costs or obtaining fiscal benefits, it's also by the productivity promotion and the reduction of polluting gases.

Audits are the first step for a complete plan of efficient energy management and allow, from the real knowledge of the consumption, defining smart practices to give them a better manage, in order to reduce environmental impacts and optimize energy costs.

# 4

## Digitalization and measuring: huge challenges

The lack of industry digitalization and energy consumption measuring systems in companies, are a big reality diagnosed by the Mine and Energy Ministry. Maybe, achieving expected efficiency levels is a big challenge that wants to improve national industry competitiveness. This challenge needs to include state actors, private sector, academy, ONG's and final users.

More than the consumption measuring as a huge local challenge, it's necessary the development of automatic systems, for the diagnosis and control of energy predicaments in industries and companies.



# 5

## Looking the world to guide yourself

The whole world, not only Colombia, is working for the energy efficiency. Therefore, is necessary to recognize other country's experiences, due to it contributes some value to conjure up an appropriate work route.

In the document "Eficiencia Energética", published by the Mine and Energy Colombian Ministry, are mentioned some examples. In Spain, there is a standard that forces big companies to make energy audits. Those force the companies to reach some consumption rules and a specific energy performance.

Furthermore, in the United States, especially in California, there

is implemented the program called "Energy Advisor", which gives audits and accompanying in devices purchase and the monitoring of improving opportunities.

Chile is trying to set up a group of standards for an energy efficiency that generates a lot of benefits for some sectors. Moreover, they're expecting to promote the implementation of an Energy Management System for the huge consumers in industrial, miner and transport sectors.

In Colombia, Syntesys Tecnologica is one of our Group's companies. It has a smart view for the energy efficiency based on taking advantage of the information, in order to improve the reliability and availability of the electrical infrastructure. "Our agreement is to invite and promote, with client-designed solutions, the companies to have a rational and efficient use of electric energy of their net. For that, we're looking for mitigate risks during their operation, generating a great level of reliability and guaranteeing their system quality. It represents a smart management of our country's energy". Carlos Sanchez, Syntesys Tecnologica CEO.

## The most important of energy efficiency:



**Decreasing of energy costs, more than 50%.**



**Savings on energy payments**



**Positioning as a committed company with sustainability.**



**Permanent monitoring and control of energy costs.**



**Reduction of coal footprint. Saving energy payments.**



**Application of fiscal benefits.**



**Operational risks mitigation.**



# Energy storage on a Large scale

The challenge for the electricity sector is not only to generate, transform, transport and market energy, transforming, transporting and commercializing energy, it is now transcendental for the transition to more sustainable energy models, the possibilities of having storage systems for this resource that make its use more efficient.

Producing renewable energy is a process that is subject to many variables. It is not always possible to maintain control over this, factors such as environmental factors can affect the generation, therefore, storing energy is a success factor to ensure the stability of the system and the energy efficiency of the country.

The key issue at this point is how to maintain a constant availability and flow of energy, as well as to ensure that there is no energy, as well as ensuring that there is no waste of this resource.

In this sense, Marcel Dietl Guevara, Revi's Innovation and Development Coordinator, explains: "Since it is not possible to control how and when the energy needed will be produced, nor do we know with certainty how much energy we should have, the best thing to do is to have technologies Energy storage on a Large scale that guarantee supply according to demand".

This type of logic places energy produced from renewable sources in very attractive scenarios because it makes them more competitive. For example, solar energy production that can be produced on a large scale during daylight hours would be able to supply energy consumption at night, when the resource that generates it is no longer available, but the energy that has been intentionally and innovatively stored to meet that demand is available.

This type of strategy also becomes an interesting economic solution, so that energy consumption does not depend only on the market supply.

Another advantage of energy storage large scale is in the electrical infrastructure, said Marcel. In this case, after rigorous analysis of the network, containers could be installed, which would avoid in some cases the expansion of transmission lines, which are very costly and also quite complex. This solution, says the expert, is frequent when the

At Revi, we work closely with manufacturers of different technologies to bring our customers the best energy storage options.

centers of generation and consumption are very far apart, as is the case in countries such as Italy and Germany.

"In the south of Italy, on the coast, a lot of energy is produced because there is more sun, but it is in the north where the large industries are located and more is consumed. The same is true in Germany. In those countries, companies have already installed energy storage technologies to avoid grid congestion. The case of Colombia could be similar. The consumption centers are Medellin, Bogota, Cali and major cities, but the cheapest energy is produced in Guajira where consumption is low," he concludes.

## Enabling solutions

Some technologies used for energy storage large scale are containers that are installed in certain places, whose implementation is easy and agile, and do not generate much carbon footprint.

There are also micro-grids such as a solar farm that work very well for supplying energy to, for example, small remote villages that could have the resource on a permanent basis and could be used as a source of energy and from a green source.

Energy storage Large scale helps to improve issues such as fluctuating supply and ensures the permanent availability of this resource.

Other applications could be batteries that improve the consumption profile for commerce or industry, a relevant solution when you are a very large consumer and require a lot of energy, a reason that leads the grid operator to punish these high consumptions with high invoiced costs.

## A question of method

There are many ways to store this resource. These methods can be mechanical, electrochemical, chemical, thermal, with magnets or with super capacitors, the key is to achieve it without many losses and generating the best results for society, the market and the environment.

## Everyone wins

Storage brings benefits for:



The environment.



The power grid.



The grid operators.



Commerce and industry.



The tourism sector.

# We are a regional business group that bets on the energy transition.

Marketers



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