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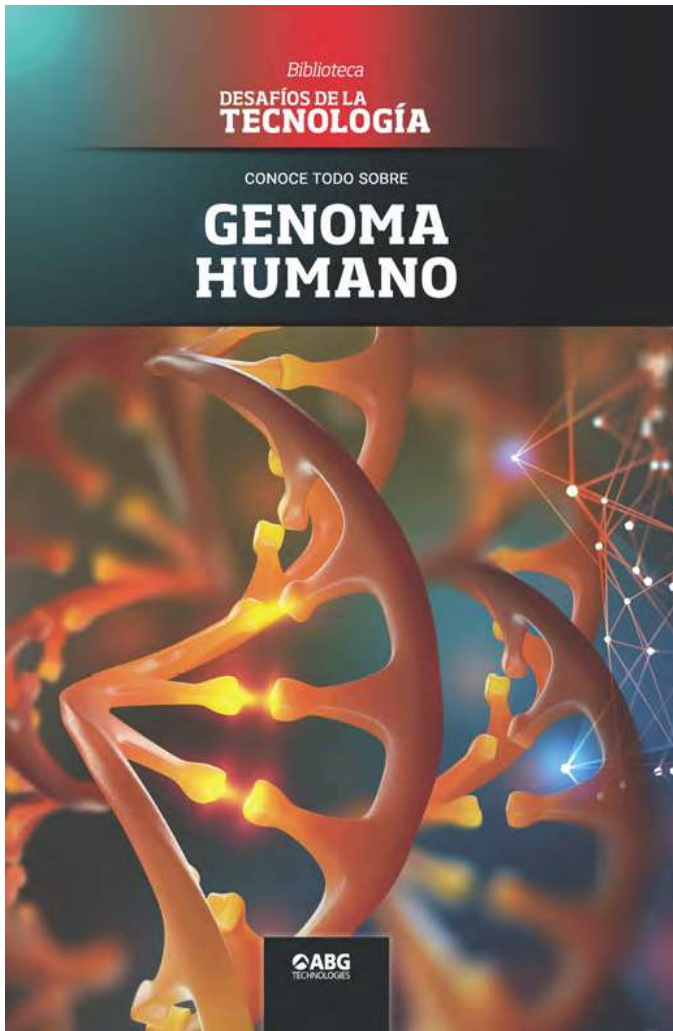
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The fourth industrial revolution has arrived with its first step as a qualitative leap, led by intelligent machines and developing at a breakneck speed.

In just two decades, the presence of intelligent and regulatory systems capable of dispensing with human beings is a global reality: big data, the Internet of Things, cyber-physical systems, automation, robots, nanotechnology, Deep learning and artificial intelligence.

We are facing a brand new technological revolution that will mark a before and after in human evolution.

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Human genome

*The genome editor CRISPR and the
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The 1970s ushered in the manipulation of DNA and the birth of genetic engineering. The transmission of hereditary information was proven.

The production of enzymes, drugs and diagnostic reagents began.

Later came the first transgenic mice, plants resistant to insects and herbicides, recombinant vaccines and the cloning of a sheep.

And in the second decade of the 21st century, the development of CRISPR-Cas, a genetic editing tool that allows us to correct errors in genes responsible for causing certain diseases.

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Cars of the future

The DeLorean of the XXI century and Nanomaterials

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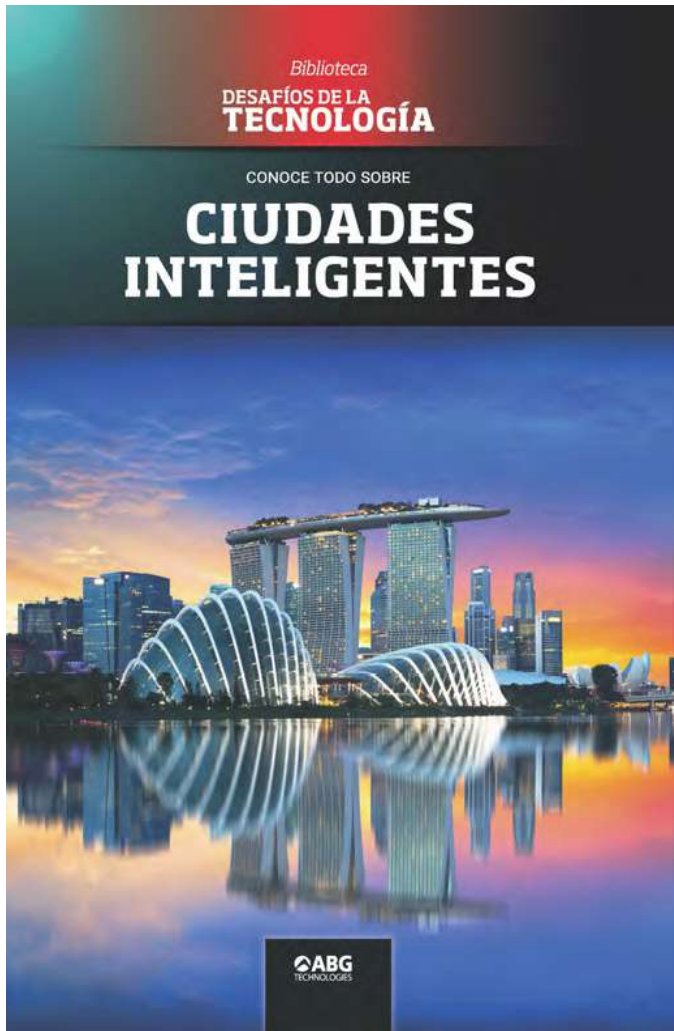
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Select prototypes exist that embody the "super car" of the future, and clean, non-polluting, electric cars will be global in no time.

Then autonomous vehicles will arrive that, with intelligent on-board systems, will be able to drive without human intervention and communicate with traffic lights or other cars, in machine-to-machine dialogues.

They will also have to make ethical decisions... New fuels and powerful and efficient batteries will revolutionize the world of energy, and materials with intelligent microscopic particles will make the hard exterior and design of the bodies mere variables.

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Smart cities

Singapore, The first Smart Nation

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IoT, big data, artificial intelligence, new cloud systems, mobile technology and smart grids are already in use in cities such as Tokyo, Singapore, Toronto, London, Masdar, Querétaro and Binhai to improve the quality of life of their inhabitants.

This is the objective of cities that want to be classified as smart cities.

To achieve this, they need to apply engineering solutions to offer superior public services, easy access to city information, sustainability in the management and use of resources and excellent conditions for the sustainable development of the local economy.

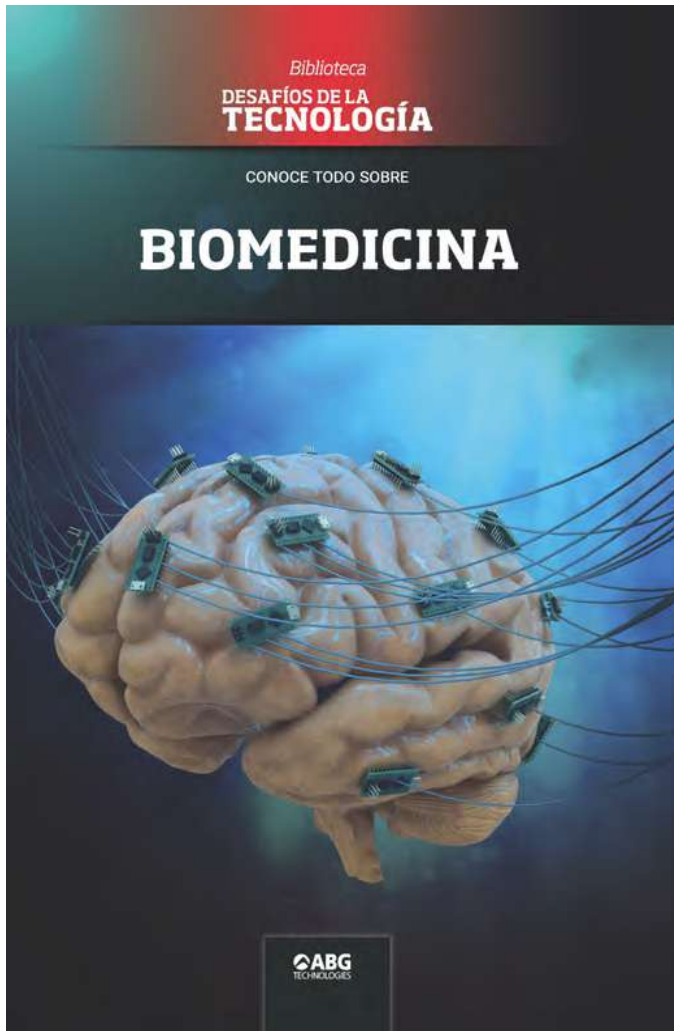
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Biomedicine

*A decisive factor in
the fight against pandemics*

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The use of pacemakers, stents or heart valves, performing ultrasounds or scanning the body to detect a pathology are common practice.

But there is much more to know: being operated on by a robot has become a reality.

These and other advances in biomedical engineering changed the lives of athletes and artists who regained the ability to compete, dance, or play an instrument as bionic human beings or cyborgs.

Such is the case with Neil Harbisson.

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The international space station

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Observations from space, studies to overcome gravity, and the development of rocketry led the way to astronautics.

In 1957, the Soviets launched the first artificial satellite, Sputnik 1, into orbit and, in 1961, Yuri Gagarin was launched into Earth orbit. In 1969 it was the Americans' turn: Neil Armstrong took his first step on the Moon.

After these milestones, a new gauntlet was raised: to inhabit space. The International Space Station is the most recent station built, and the largest and most sophisticated to date.

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Megastructures

The Millau Viaduct

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The Millau Viaduct has broken numerous records. Built for vehicle traffic, this steel giant is known for its beauty, subtlety of structure and height.

But why was it built and how? What were the keys to raising this megastructure?

We reveal the secrets of this titanic project, the figures related to its construction, the rationale for its design, the people and companies that made it possible, the technology used, the day-to-day life of the viaduct...

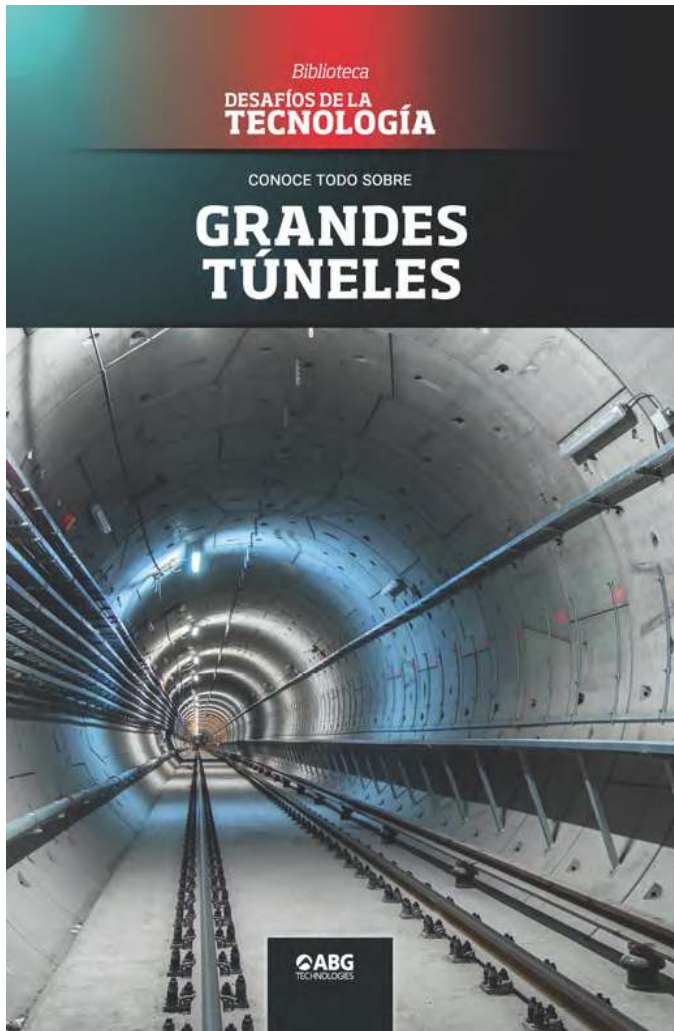
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Large tunnels

The Gotthard Tunnel

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The growth of cities made communication over land difficult. Civil engineering developed techniques in the construction of tunnels to overcome natural obstacles and allow the subterranean movement of people and goods via underground, sub-river or underwater.

The knowledge and technology available in the 21st century made the construction of the St. Gotthard tunnel in Switzerland possible, which was vital for connecting the countries in the north and south of Europe: from the SMART system in Kuala Lumpur, Malaysia to the Aqualine Bahia complex in Tokyo.

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Intelligent fabrics

The Designs of Hussein Chalayan

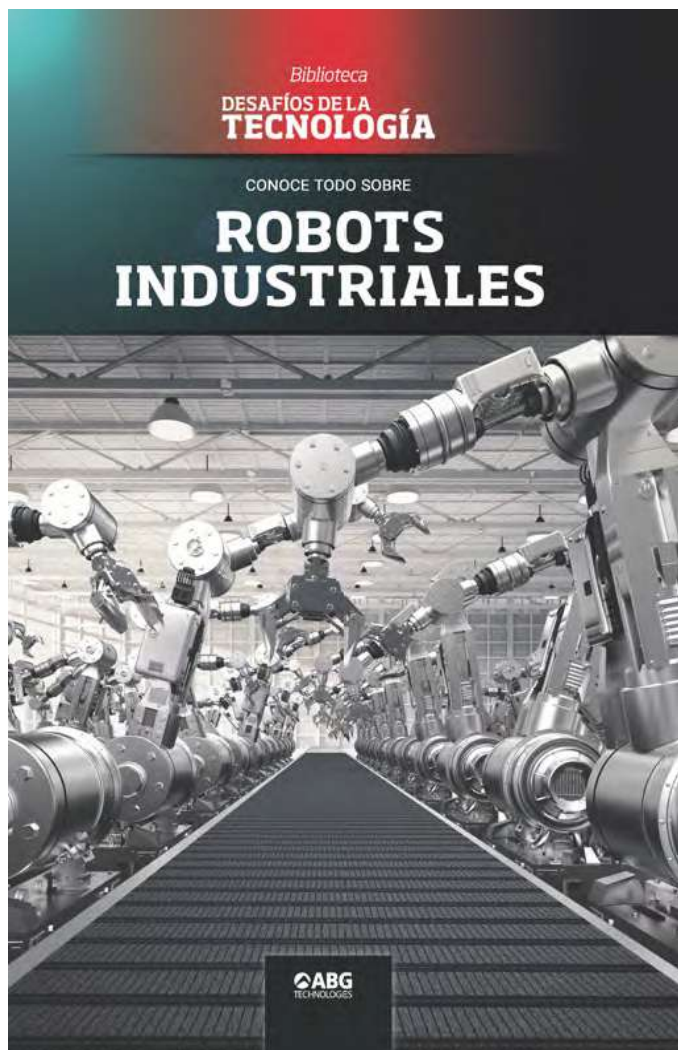
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Will it be possible to chat with our friends from a portable device, communicate and send a virtual hug through sensors incorporated into the very fabric of our clothes?

Smart fabrics already exist to conserve heat or expel perspiration; some protect us from impacts; others are capable of avoiding bad smells and safeguarding us from ultraviolet radiation, and many have lights that change color to the rhythm of our pulse.

Famous designers and prestigious brands transform the fabrics of the 21st century.

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Industrial robots

The Kennedy Space Center

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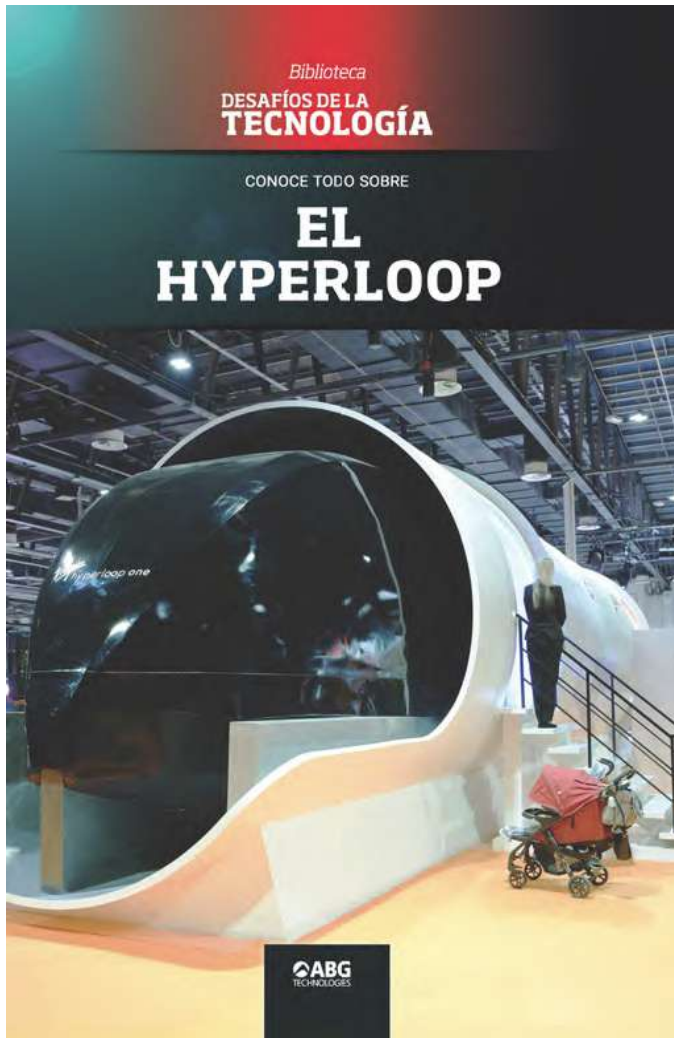
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Over the past decade we have witnessed the accelerated transformation of industry through the incorporation of robotic engineering in its manufacturing plants.

Huge super-automated platforms that require only minimal human intervention. The Kennedy Space Center, one of the largest and most important factories in the world, and the Indian refinery Reliance Oil required extraordinary investments to automate their production.

How should future generations prepare so as not to be left behind in this new technological revolution? Can we really leave control in the hands of robots?

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The hyperloop

The Revolution of Mass Transportation

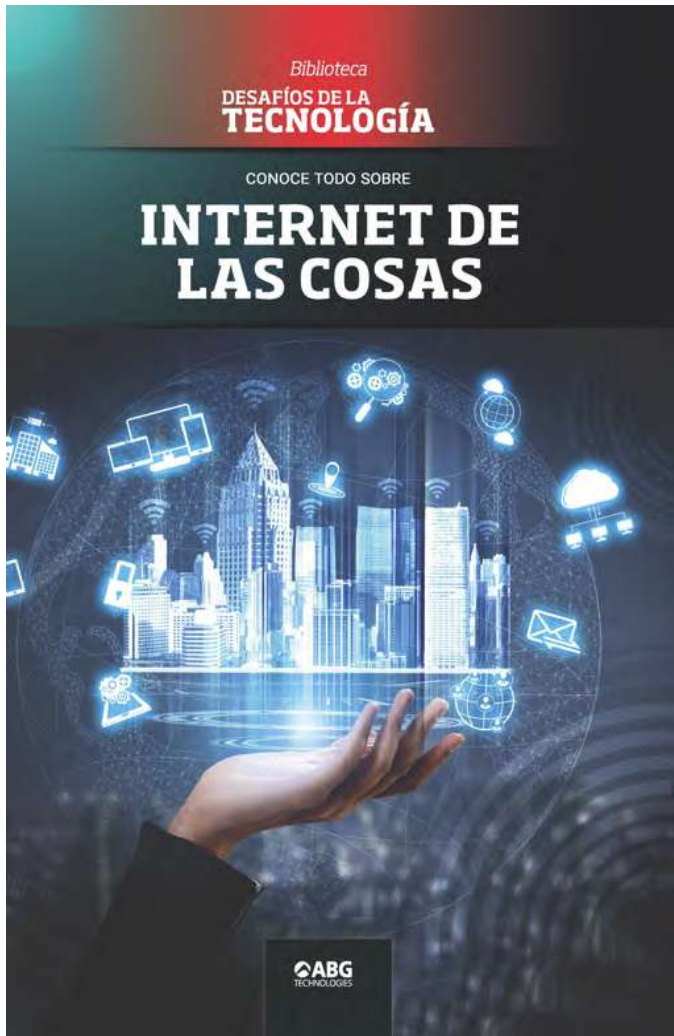
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The 21st century promises faster, cheaper and more autonomous means of transport, but also safer and free of polluting emissions.

To meet this new reality comes the Hyperloop, a technology that enables people to be transported in capsules within tubes at ultra-fast speeds.

The existence of vacuum pumps and magnetic levitation gave rise to this project. The Hyperloop is a new paradigm in mobility, connectivity and multimodality to bring the world together in a matter of minutes.

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Internet of things

The Smart Home

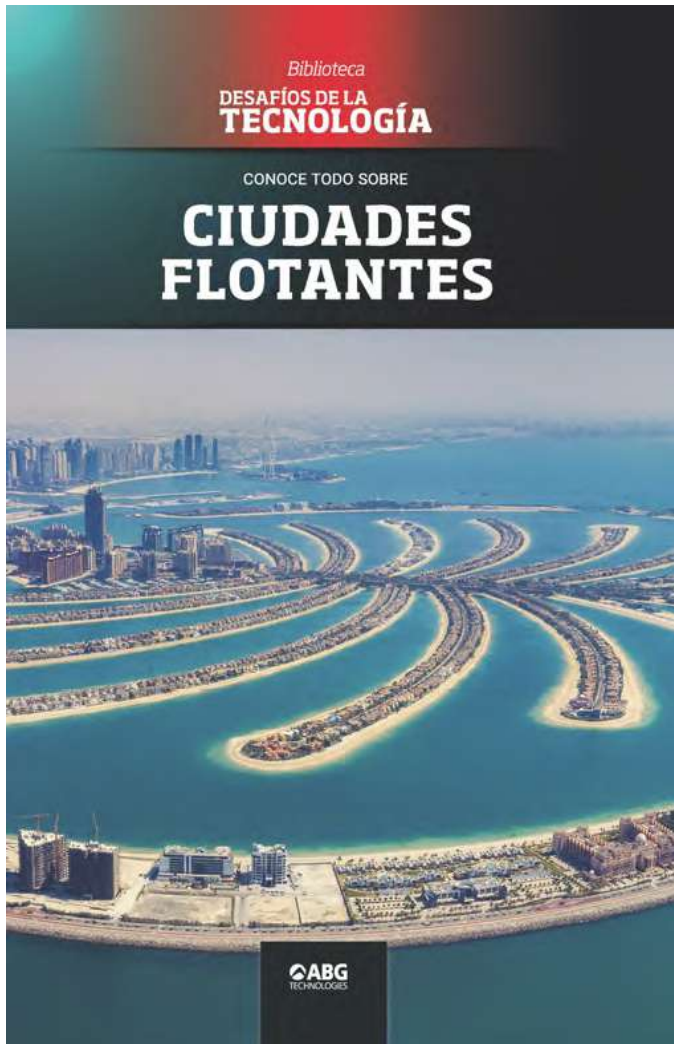
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We are looking at the most powerful social network in history, the Internet of Things.

The IoT represents a great evolution and revolution for its ability to collect, analyze and distribute data. Everything can be controlled remotely from the app on our mobile phone.

Networks connected to provide security, analysis and administration will be able to establish dialogues between them. 5G technology promises to eliminate any friction between systems, while we must learn to safeguard our data.

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Floating cities

The Palm Islands

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Thanks to the latest technological advances and the incorporation of extraordinary materials, the possibility of living over water has progressed significantly.

The houseboats in IJburg and Sausalito are examples of this.

The magnificent Palm Jumeirah in Dubai, a great feat for planning and development, the ecological Oceanix City in French Polynesia, and the underwater Ocean Spiral, shaped like a sphere two hundred meters deep, embody the most daring projects of floating cities in current and perhaps future civil engineering.

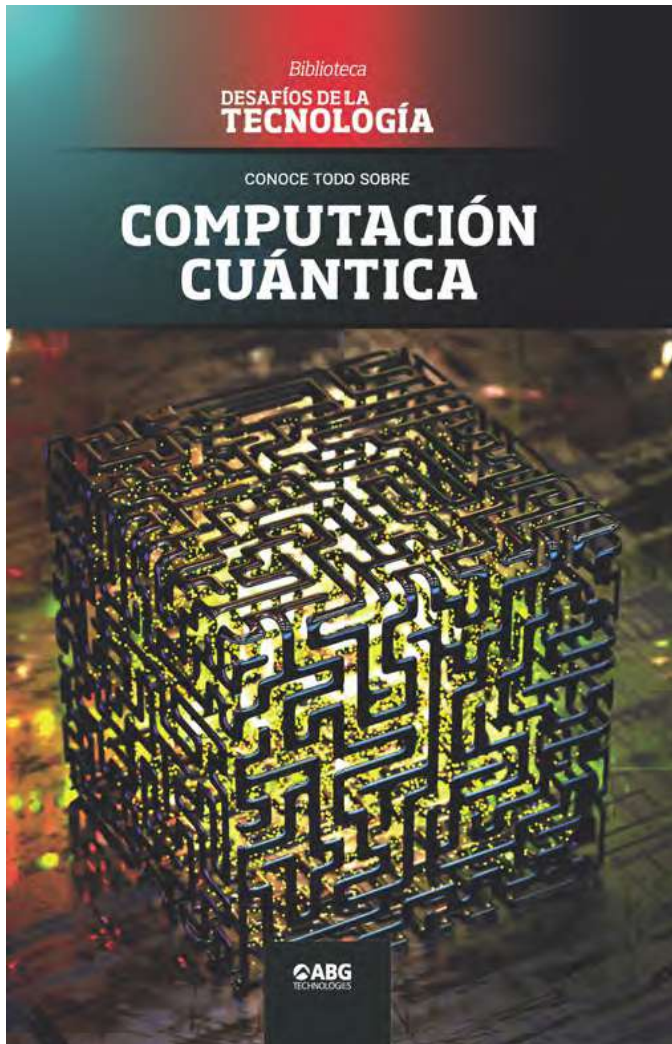
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Quantum computing

*Google vs. IBM,
and the supercomputer*

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The 21st century stands out with a transcendent concept: the qubit, a new basic unit of quantum information.

Quantum computing could solve complex logical, economic and financial problems using less time and fewer resources than current computers.

Discover how artificial intelligence, drone operations, cybersecurity, the internet of things, virtual reality, 3D printers, robots and autonomous vehicles will be affected by the emergence of quantum computing and what solutions should be proposed to accompany its evolution.

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Modern aircraft

The Boeing 787 and the Airbus 351

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Modern airplanes cross oceans, skirt the stratosphere, and have become the most reliable method of transport.

These advances have been made possible thanks to the development of new materials that reduce the weight of aircraft, among other achievements.

Traffic in airspace also requires precise and uniform systems for the communication and control over flights and navigation.

The Airbus A350 and Boeing 787 are examples of this excellence in construction. What is their design like?

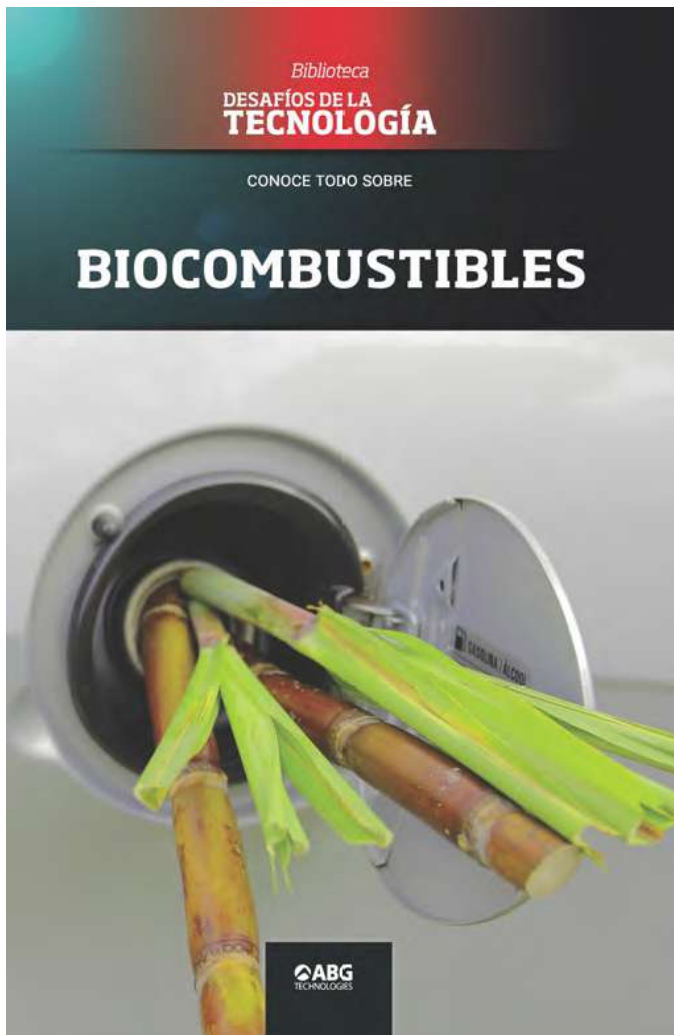
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Biofuels

Proálcool and Flex

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The generation of energy from renewable raw materials seems to provide a solution to global warming, the reduction of greenhouse gas emissions and the health of the planet.

Transportation is one of the primary sources of pollution and the world powers itself with petroleum derivatives, but can it do it with biofuels?

What are the possible applications, advantages and disadvantages of bioethanol and biodiesel? How do large companies evolve to achieve sustainability? What are the Proálcool and Flex systems?

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Magnetic levitation trains

The Shanghai Transrapid

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The invention of the railroad changed industry and communications.

As early as the 1960s, Japan had designed a prototype able to reach high speeds with very little power loss as the train did not come into contact with the rails.

These were the first magnetic levitation trains and they moved at 270 km / h.

More recent engineering feats include the iLint trains, powered by hydrogen batteries, and the small and light capsules capable of shooting through vacuum tubes at 6,400 km / h.

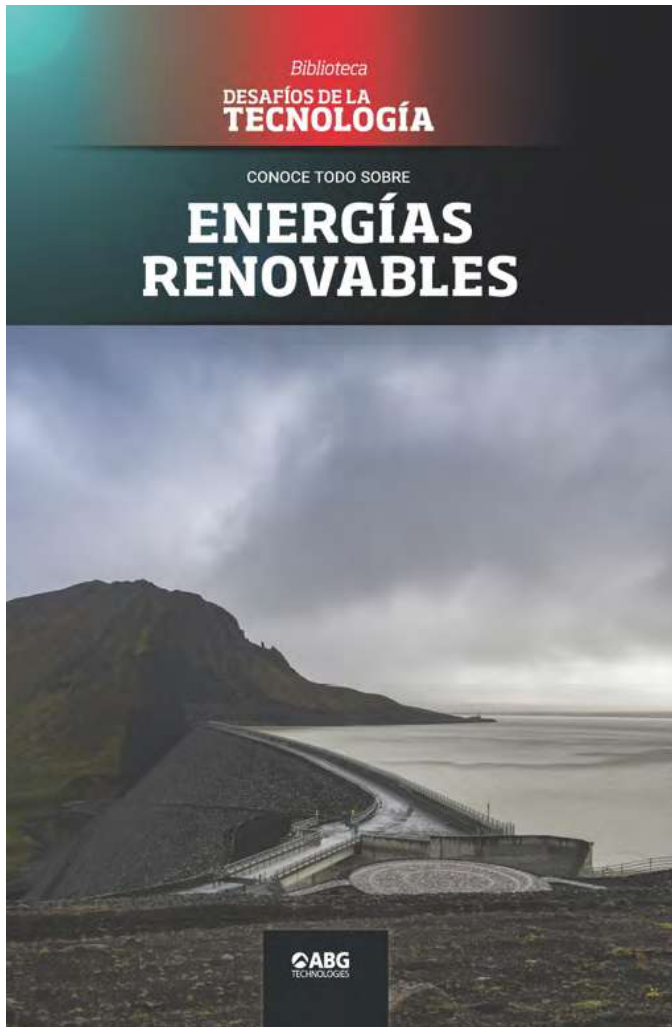
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Renewable energy

The Kárahnjúkar Hydropower Plant

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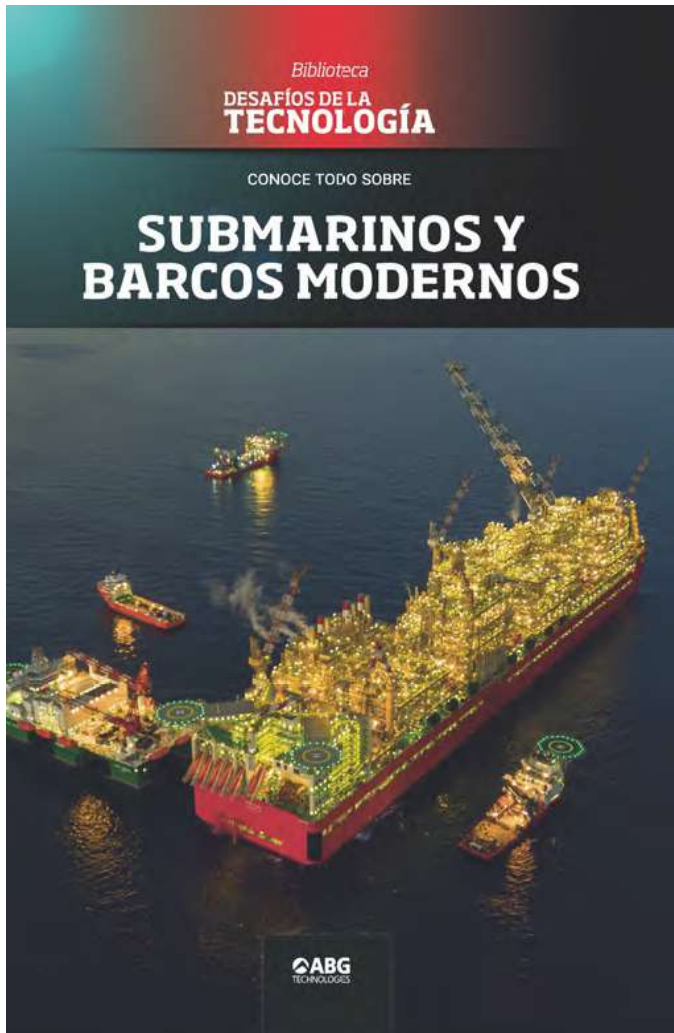
Much has been debated in recent years about renewable energy, but what do we really understand when we refer to "energy"?

How many types of energy are there? What are the implications of a resource being renewable, inexhaustible and clean?

Water was used to move mill wheels to grind grain into flour. Now, with advanced technologies, it is used for the generation of electrical energy.

The Kárahnjúkar hydroelectric power station, with a dam as high as a skyscraper, is one of the most important.

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Submarines and modern boats

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The means of navigation have given us the possibility of exploring seas, rivers and lakes, exchanging goods with other regions of the planet, moving from one place to another and conquering foreign lands.

Increasing globalization demands large ships that sail the seas transporting products and people around the planet.

Hence the construction of supertankers, container ships, cruise ships, aircraft carriers, icebreakers and, most recently, the Prelude FLNG, a true floating platform for the extraction, processing and storage of natural gas.

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Megaskyscraper

The Burj Khalifa

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Beginning with the construction of the pyramids in Egypt or the ancient city of Babylon, man has not relinquished his desire to conquer the heavens.

Essential to this has been perfecting the necessary construction techniques and developing materials as innovative as they were practical.

Thus, the invention of the "safe elevator" and emphasis on the use of steel. Examples of this are the Shanghai Tower, Taiwan's Taipei 101 and the incredible Burj Khalifa, the jewel of the Middle East standing 828 meters high.

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