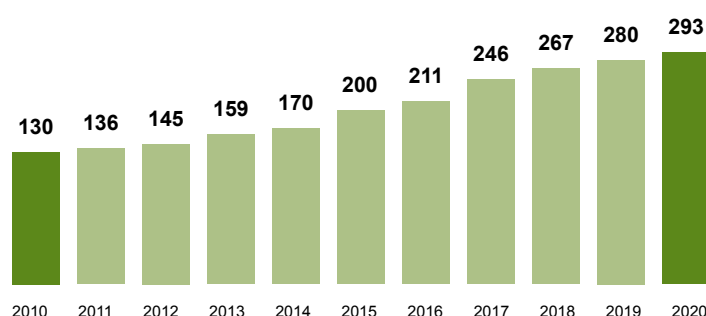




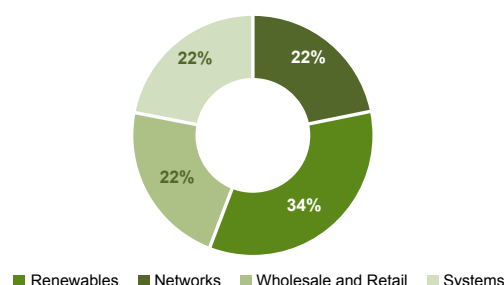
4.3 Intellectual capital

	Management approach	Principal activities 2020	Outlook
Promotion of R&D	<ul style="list-style-type: none"> Iberdrola continues to wager on innovation as one of its main pillars for successfully facing the future energy scenario, promoting energy efficiency, decarbonisation and the electrification of the economy. Iberdrola is Europe's leading private sector energy company and second in the world for R&D investment. <p>● Innovation Report</p>	<ul style="list-style-type: none"> €293 million of R&D investment in 2020, a 4% increase over 2019. Launch of the <i>Global Smart Grids Innovation Hub</i> technology centre in Bilbao. Development of the largest green hydrogen plant in Europe for industrial use, and the launch of <i>Iberlyzer</i>, for the manufacture of electrolyzers. EIB backs Iberdrola's innovation strategy with 100 million euros in financing for R&D projects. New <i>2020-2023 R&D Plan</i>, focused on the decarbonisation of electricity and the electrification of demand. 	<ul style="list-style-type: none"> Iberdrola will invest 75,000 million euros by 2025, focusing its innovation activities on: <ul style="list-style-type: none"> More and smarter clean generation. More and smarter storage. More and smarter networks. More energy solutions for our customers.
Efficiency and new products and services	<ul style="list-style-type: none"> New developments driving flexibility, operational efficiency and the safety of facilities, as well as a reduction in our environmental impact through the implementation of disruptive technologies and the reduction of emissions. Design of new products that guarantee an efficient, agile and high-quality service and ensure an improvement in the experience of its customers. 	<ul style="list-style-type: none"> Development of domestic and international R&D projects to promote sustainable development, renewable energy and emerging technologies. The Iberdrola Customers App will allow for monitoring <i>Smart Solar</i> self-consumption, showing its production in real time and the savings generated. New functionalities in the Iberdrola Public Recharge App for electric vehicles, such as "pay-as-you-go", a route planner, online booking, and access to the largest public recharging network in Spain, which also includes recharging points in Europe. 	<ul style="list-style-type: none"> As a result of its commitment to innovation, digitalisation and the continuous search for excellence and quality, Iberdrola has designed unique products and services for its customers. In the future, Iberdrola will maintain its commitment to energy management for the home, through smart devices that provide customers with enhanced knowledge and management of their consumption, together with products related to electric vehicle recharging.
Disruptive technology and business models	<p>Through the <i>Iberdrola-PERSEO</i> international start-up programme, investments are made in technologies and new disruptive businesses models, which ensure the sustainability of the energy model. Since its creation, more than €70 million have been invested through the programme worldwide.</p> <p>Lines of activity:</p> <ul style="list-style-type: none"> Technologies favouring the integration of renewable energies. Aggregation and management of distributed energy resources (batteries, solar, etc.). Innovative solutions for customers (demand-side management, digital solutions, etc.). Advanced technologies for operation and maintenance of energy assets. Electromobility: charging infrastructures and new solutions. Energy efficiency, including efficient thermal solutions. 	<ul style="list-style-type: none"> There were more than 25 pilot projects with start-ups in technological areas like Artificial Intelligence, Big Data, Internet of things (IOT), robotics and batteries in 2020. Launch of 7 <i>Start-up Challenges</i> for the start-up community, in areas like renewable generation, onshore and offshore wind-based and photovoltaic power generation, electric mobility, and the construction and maintenance of electrical power networks. New <i>Venture Builder</i> initiative for investing and creating electrification support businesses from scratch (in areas like the recycling of modules, wind-turbine blades and batteries, and the circular economy) and in sectors resistant to decarbonisation, like industrial heat production and heavy transport. <i>Iberlyzer</i> was the first project to materialise. 	<ul style="list-style-type: none"> Ensure Iberdrola's access to the energy technologies of the future. Promote entrepreneurship and the development of an innovative business community in the energy sector. Creation of innovative companies together with holdings in other technology and industrial groups and promotion of public-private partnerships. Form alliances with Iberdrola's key technology suppliers (<i>Open Innovation Ventures</i>).

Investments in R&D (€M): 1st private energy company in Europe and 2nd in the world



% R&D investment by strategic areas





Highlight the value of the company's intangible assets

Main R&D research projects

Smart grids	<ul style="list-style-type: none"> The FLEXENER project has commenced in order to investigate new simulation technologies and models in the areas of renewable generation, storage systems, flexible demand management and operation of the distribution network. ONE NET and COORDINET continue to develop new flexibility tools and platforms in coordination with electricity transmission and distribution companies and consumers. ATELIER seeks to develop Positive Energy Districts in eight European cities, where smart solutions will be tested.
Renewable energy	<ul style="list-style-type: none"> The European FLAGSHIP project has been launched, involving the installation of the first generator of more than 10 MW on a floating platform. The ROMEO project has continued with the study and design of best practices and tools for optimising the operation and maintenance of offshore wind farms. The NextGEMS project has begun, with the aim of developing and applying high-resolution ground-based systems for the prediction of extreme phenomena such as storms, based on two existing production systems.
Clean generation	<ul style="list-style-type: none"> FLAGSHIP is a notable project which, through the creation of digital “twins”, enables the simulation of operating environments that differ from the ones in the basic design of the plant, improving the operational flexibility, reliability and efficiency. The COATI project was launched for the development of software tools that would enable the implementation of specific loading plans for spent nuclear fuel elements.
Customers	<ul style="list-style-type: none"> Iberdrola Energy Cloud, a virtual battery that stores a customer's excess from the production of self-produced solar power that is transmitted to the network from their residence. Smart Solar for Homeowners Associations, in which residents' surpluses and deficits are offset between each other and they can see their savings on an app. Smart Mobility Home, an integrated solution including purchase of a recharging point, installation, a special rate under the Electric Vehicle Plan and an app to control it.

Green hydrogen, the energy vector of the future

Iberdrola has inaugurated what will be **the largest green hydrogen plant in Europe for industrial use, with an investment of 150 million euros**. The plant, located in Puertollano (Ciudad Real), consists of a photovoltaic solar plant, an ion-lithium battery system and one of the world's largest hydrogen production systems using electrolysis. The hydrogen produced will be used at a Fertiberia ammonia factory.

This project between Iberdrola and Fertiberia contemplates the development of 800 MW of green hydrogen with an investment of 1,800 million euros by 2027.

Together with the Basque enterprise Ingeteam, **Iberdrola has also founded Iberlyzer**, which will become the **first large-scale manufacturer of electrolyzers in Spain**.



Global Smart Grids Innovation Hub, a global innovation centre for smart grids

Iberdrola has launched the **Global Smart Grids Innovation Hub**, a centre that will **act as a platform driving innovation**, combining its technological capacity with that of providers, collaborators and startups around the world.

Iberdrola has already identified more than **120 innovation projects** with a **value of 110 million euros** in this area.

The centre, which will come into operation in 2021, will be a collaborative space with some 200 professionals to address the challenges of the networks of the future, including digitalisation and new consumption models like electric mobility and self-consumption.

