Products and services
Creating value through innovation and partnerships

ABB has identified several key drivers and growth opportunities for our business. These include mitigation of climate change, the shift towards more renewables and increasing complexity of the electrical grid, the rise of emerging economies and their need for electrification, and the increasing digitalization and automation of industry.

ABB has a long heritage of technological innovation in renewable energy, efficient use of energy and sustainable transport. We are working to broaden the impact of clean technologies so that we can help our customers grow, while saving energy and resources, and lowering environmental impact.

Innovation is one of the pillars of ABB's Next Level growth strategy, hence research and development (R&D) is a critical strategic resource for the Group. To support our R&D effort, we maintain seven corporate research centers, employ some 8,500 researchers and developers in more than 30 countries and collaborate with more than 70 universities across the world. ABB's R&D investments in 2014 totaled $1.5 billion, representing 3.8 percent of revenues.

These investments bring results. In 2014, ABB filed more patent applications in Europe than any other Swiss-based company, which reflects our efforts to serve the market with innovative products and solutions. This was reinforced in 2014 when ABB was awarded the Zayed Future Energy Prize as well as Thomson Reuters recognizing ABB as one of the world's top innovators for a third year.

Alongside our Next Level growth strategy, we are also committed to increase our revenue from energy efficiency-related products, systems and services by 20 percent by 2020. In 2014, 51 percent of our revenues were already related to products and services in our energy efficiency portfolio. In the coming year, we will work to expand the scope of this portfolio, further formalizing processes and definitions for the methodology, and investigating ways to assess the portfolio's contribution to the environment, the economy and society.

Pushing the boundaries of technology and innovation

In 2014, we took further important steps to strengthen our future growth. We unveiled groundbreaking new technologies, expanded our global presence with new manufacturing facilities and sales and service capabilities in high-growth markets, and forged partnerships with other leading global companies to increase value for our customers and enhance growth momentum as part of our new strategy.

On the innovation side, we launched the world's most powerful submersible power transmission cable system. Our new 525-kilovolt (kV) extruded high-voltage direct current (HVDC) cable doubles power flow and extends range, enabling greater integration of distant renewable energy sources into the grid and improving intergrid connections.

ABB pioneered HVDC technology over 60 years ago and to this day continues to develop this technology. As an additional demonstration of ABB's innovation in this area, HVDC Light® was launched in 1990. This voltage-source converter (VSC) technology improves the flexibility and controllability of HVDC transmission to allow for the connection of weak grids prone to stability issues with stronger grids.

445 TWh of electric power saved by our variable speed drives

In 2014, ABB set a new record in transmission voltage using HVDC Light when we commissioned the 500 kV Skagerrak 4 link between Norway and Denmark. The link increases the availability of renewable hydroelectric and wind power in the region's electricity grid. In future, use of 500 kV VSC opens up new possibilities, especially when combined with our new extruded 525 kV HVDC cable.

ABB achieved a significant breakthrough in switchgear technology with the development of a solution that deploys a new insulation gas medium as a substitute for sulfur hexafluoride (SF_6). This alternate gas mixture has similar insulation properties to SF_6 now used in gas-insulated switchgear, but with substantially lower environmental impact due to its much-reduced global warming potential. The new technology will be deployed for the first time at a substation located in Zurich, Switzerland, as a pilot installation for the leading Swiss utility ewz.

Another groundbreaking innovation is our YuMi® robot, a new dual-armed industrial robot that uses innovative force-sensing technology to work safely alongside people for small-parts assembly. YuMi has been developed in the first instance to meet the flexible and agile production needs of the consumer electronics industry and will increasingly be rolled out to cover other market sectors.

Serving the mining sector, our "mining integrated distributed automation system" (MIDAS) is an application giving plant operators better information about the state of their electrical systems, allowing them to remotely control and correct identified problems. This remote substation monitoring allows the plant operators to solve problems safely at a distance from the electrical substation in the mine, thus reducing the time for electrical fault diagnosis and problem solving.

Also in 2014, we announced a $300 million R&D and production hub in China for power and low-voltage products. We also extended our network of sales and service operations in China, targeting faster-growing cities in the country's interior. In Brazil, we opened a production site as part of a $200 million expansion plan to further extend our offering of locally produced products.

Collaboration for a better world

ABB is actively driving our technology development through our own research and by working with leading institutions such as the Federal Institute of Technology in Zurich (ETH), with business partners, and with multi-stakeholder programs such as the United Nations Sustainable Energy for All (SE4ALL) initiative.

Our investments in research initiatives, fellowships and strategic partnerships with over 70 universities and research institutions around the world continue to enhance the ABB portfolio and lead to international and cross-industrial cooperation in almost every ABB business. For example, in 2014 ABB in Switzerland contributed five million Swiss Francs to the ETH Zurich Foundation, creating a professorship to support the development of high-performance power semiconductors to improve the efficiency of power conversion systems and energy transmission over long distances. In China, ABB has established an annual, nationwide university innovation contest to cultivate talent and promote technological innovation.

We announced several innovative business partnerships in 2014, focused on increasing customer value and reducing environmental impacts. A strategic collaboration with BYD Co. Ltd., aims at joint development of new solutions for energy storage. ABB's products and technology for grid storage, electric vehicle charging and integrated marine systems, combined with BYD's knowledge in battery technology, will accelerate new solutions for electric vehicle charging, the fast ramp-up of renewables combined with energy storage in off-grid and on-grid solutions, as well as battery and energy storage solutions for the fast growing marine segment.

ABB is also partnering with Volvo Buses to co-develop and commercialize electric and hybrid buses with open standards-based direct current fast charging systems. This approach enables maximum reuse of existing e-mobility technologies, thereby assuring rapid deployment of urban e-mobility. The first joint project for Luxembourg's public transportation system is planned for 2015.

In Japan, ABB and Hitachi have agreed to form a joint venture for HVDC system solutions. The new entity will be responsible for the design, engineering, supply and after-sales services related to the DC system of HVDC projects, bringing ABB's latest technologies to the Japanese market where Hitachi will be the prime contractor. With the increasing introduction of renewable energy and innovation in electric power systems, demand for these systems is expected to increase for applications such as wide-area power transmission and connection of offshore wind farms.

In the automation area, Philips will combine its LED lighting expertise with ABB's building automation technologies and know-how to simplify the integration of connected lighting systems and building device control for commercial buildings. Lighting, heating, ventilation and air conditioning constitute 70 percent of the energy consumption in commercial buildings and the introduction of building device control along with efficient lighting technology can significantly improve energy efficiency.

ABB's commitment to the UN's SE4ALL initiative also focuses on promoting energy efficiency. We will support the Global Efficient Appliances and Equipment Partnership Programme, offering our technical expertise on energy efficient motors and transformers. The initiative aims to assist developing countries and emerging economies to devise policies that accelerate energy savings.

Investing in technology leadership

Additional key components of ABB's innovation strategy are investments around inorganic growth (mergers and acquisitions) and venture capital investment. ABB has executed more than $10 billion of strategic acquisitions since 2010, expanding our portfolio in efficient motors, solar inverters, measurement products, building automation and other areas.

Our corporate venture capital unit, ABB Technology Ventures, makes early- and growth-stage investments in novel companies introducing new technologies or improvements to existing technologies. In 2014, we made key investments in Persimmon Technologies, to help develop its 3D deposition technology for motor component manufacturing, and in the artificial intelligence research company, Vicarious.

ABB's investments, along with recognition by Thomson Reuters and other innovation awards, reaffirm our commitment to innovation and the future success of ABB and our customers. Together, we are pushing the boundaries of technology and innovation to decouple economic growth from energy consumption and environmental impact, and to achieve a better world.

Examples of achievements and innovations announced in 2014 are shown on the following pages.