

Innovation

Investing in the future

ABB is first and foremost a technology company, and every year we devote more than \$1 billion to research and development activities. We maintain seven corporate research centers, employ 8,000 scientists and support 70 university collaborations around the world.

Sustainability remains a top priority for most of our customers, and for ABB as a company, so it commands a significant share of our R&D budget.

Innovation is at the heart of ABB's success and crucial to our long-term competitiveness. Through continuous development of our product and solution portfolio, ABB helps customers improve their operating performance, grid reliability and productivity while saving energy and resources, and lowering environmental impact.

ABB's approach to innovation consists of three pillars: Corporate research and development (R&D), alliances with academic and research institutes, and our corporate venture capital unit, ABB Technology Ventures (ATV).

At the heart of it are our people, in R&D and beyond, together with our partners: customers, suppliers and leading technology institutions around the world. Our R&D centers around the globe are close to both our customers and our technology partners. In recent years, we have strengthened our research presence in growing markets like India and China, as well as in the United States.

The power grid revolution

The growing global population is driving an even greater increase in the demand for electricity. Added to this, governments around the world are focusing on reducing CO₂ emissions by increasing the use of renewable energy sources in the power chain.

Whereas traditional power plants were typically located close to centers of consumption, emerging renewable generation often requires transmission from remote areas. Existing grids are under pressure to meet growing demand for power, as well as provide a stable and sustainable supply of electricity, often over long distances.

High-voltage direct current (HVDC), pioneered by ABB's predecessor company ASEA in the 1950s, is the technology of choice for bulk power transmission over long distances with minimal losses. HVDC lines also require less space and can transmit electricity underwater or underground.

Deployment of HVDC has led to an increasing number of point-to-point connections in different parts of the world. The logical next step is to connect the lines and optimize the network. However, a major stumbling block has been the absence of an HVDC circuit breaker that acts quickly enough to interrupt current and isolate faults and at the same time keep losses to a minimum.

ABB has now developed a solution to this century-old challenge – the world's first circuit breaker for HVDC. It combines very fast mechanics with power electronics, and will be capable of interrupting power flows equivalent to the output of a large power station within 5 milliseconds; that is, 30 times faster than the blink of a human eye.

Considered a game-changing technology, ABB's new breaker will enable the development of HVDC transmission grids. These grids will enable interconnection and load balancing between HVDC power superhighways, integrating renewables and transporting bulk power across long distances with minimal losses. We are now in discussions with power utilities to identify pilot projects for the new development.

In recognition of this groundbreaking development, ABB has been selected as one of the world's 50 disruptive companies by the MIT Technology Review, a publication of the prestigious Massachusetts Institute of Technology in the United States.

Conclusions of a two-year joint research project with General Motors show that the batteries in electric vehicles on the road today could find a new life down the road as energy storage systems in the power grid. The project demonstrated that a device combining five battery packs from plug-in hybrid Chevy Volts is capable of providing enough electricity to power three to five American homes for up to two hours and could serve the grid for at least 10 years.

Collaboration to grow our knowledge

ABB has long recognized the value of teaming up with other pioneers. Investments in research initiatives, fellowships and strategic partnerships have enhanced the ABB portfolio and led to international and cross-industrial cooperation in almost every ABB business.

In addition to our support for 70 university collaborations across the globe, we have recently announced the ABB Research Grant Program, intended to support promising graduate students and senior researchers working on projects with industrial applications in the power and automation area.

We selected 40 research projects for funding from over 500 proposals submitted by more than 250 universities in 46 countries. Grants typically range from \$50,000 to \$80,000 per year. Funding is initially for one year, but the program is designed to fund projects over multiple years.

Through this university collaboration program, we reinforce our commitment to an open innovation approach. By partnering researchers from the ABB Corporate Research Centers with the best graduate students and professors from around the world, ABB plans to support a truly collaborative innovation ecosystem.

Within ABB, we launched a program in 2012 to support more ambitious and larger internal collaborative research projects called “big bet projects.” These “big bets” are expected to deliver breakthrough technologies that have a significant impact on ABB’s business – for example, by delivering a significant cost reduction or performance improvement, or even a new functionality or product. ABB has selected nine such research projects to pursue in 2013, including the further development of bulk power transmission, active management of local energy flows from renewable energy sources, and potential life-cycle cost reduction in transformers.

Investing in technology leadership

The third pillar of ABB’s technology approach is the corporate venture capital unit, ABB Technology Ventures (ATV). ATV investments are used to build technology leadership strategically and drive growth. We make early- and growth-stage investments in novel companies introducing new technologies or improvements to existing technologies. This both complements and adds to the activities of our existing R&D programs.

In 2012, we made a key investment in TaKaDu, a provider of advanced monitoring solutions for water distribution networks. This investment gives ABB access to a field-proven monitoring system that complements our automation portfolio for the water sector. This includes a range of power and automation products and integrated solutions that allow customers to produce, transport, distribute, treat and use water efficiently, reducing energy consumption, minimizing losses and improving reliability.

Girish Nadkarni, managing director at ABB Technology Ventures, has recently been selected for the Global Corporate Venturing Powerlist 100, an inaugural selection made by the monthly magazine “Global Corporate Venturing” that recognizes the most influential corporate venturing units around the world.

This sort of acknowledgement, along with the recognition by MIT and other innovation awards, confirm our commitment to innovation and the future success of ABB and our customers.

GRI indicators

PR1 Health and safety impacts of our products

ABB products generally help improve users’ health and safety. They do this, for example, by improving industrial environments (automation control products), reducing exposure to aggressive, repetitive or hazardous operations (robotics), and reducing potential explosions, fire risks and oil pollution (oil-free capacitors and cables). Products with a potentially negative impact are those that could contribute to global warming (leak of SF₆ gas from substations), require deforestation and present a visual impact (transmission lines), cause losses of energy (most electrical products), or cause electrocution if misused.

PR2 Number of non-compliance incidents relating to product health and safety

All countries in ABB’s sustainability management program are asked to give details of any non-compliance incidents, including those concerning health and safety impacts of products and services. One potential violation was reported for 2012, concerning certification of an ABB supplier’s product. This case is still under investigation.

PR3 Product and service information

ABB’s goal is to produce Environmental Product Declarations (EPDs) for our core products. They describe and quantify the environmental impact and performance of ABB products through every phase of their life cycles, covering raw material extraction, component manufacture, transportation and use over their full operating lifetime. They can also contain recovery, recycling and disposal instructions for when the product has completed its useful life. The EPDs are published on ABB’s website and help customers to select products that will improve their own environmental performance. ABB also engages with customers with particular reporting needs, to ensure clarity and completeness of environmental data.

PR6 Adherence to marketing communication regulations PR7 Non-compliance concerning marketing communications

This is not an issue for ABB, which works in the field of advanced technologies and does not supply to the consumer product market.