

Saving the Environment With ABB Motors and Drives



ABB Motors and Drives



Building upon more than 100 years of experience, ABB is the world's leading provider of drives, motors, generators and power electronics. The products are widely used in the process, industrial, marine and building service sectors – proven in thousands of successful installations worldwide.

Induction motors and generators are the workhorses of industry widely used in all industries and utilities. Typical applications include pumps, fans, compressors, conveyors, mills, and crushers.

ABB offers LV (Low Voltage) and HV (High Voltage) motors with aluminum, steel and cast iron frames. HV induction motors are of modular design, have complete range of enclosures and cooling arrangements, and are known for high efficiency. LV motors in M3000 range are eff1 motors according to the EU efficiency classification. ABB has no motors in the lowest efficiency class, eff3, anymore. ABB also has a motor range complying with the North American EPCA.

Wind turbine generators are the most common type of induction generators.



In the field of **Low Voltage AC Drives**, ABB provides high efficiency products for speed control of AC Motors, from 0.12 kW up to 5 MW.

Variable speed control is the most eco-efficient way to control fans, pumps, mixers, and conveyors. For the lower power end, ABB offers a new way to purchase products that incorporate advanced technologies with innovative services – Internet tools for online selection, instant ordering and rapid delivery.

There is also a broad range of AC drives based on the latest control technology with high static and dynamic accuracy and optional speed encoder.



Synchronous motors and generators are used in industrial and utility applications. Extensive standardization shortens delivery times and improves versatility. ABB's standard motors are ideal for applications in the petrochemical, mining, metallurgy, pulp and paper industries.

High efficiency, robust construction and quick delivery times make our synchronous generators ideal for power plants, marine and other industries.



Medium Voltage AC Drives is a product family with a broad range of technologies and application areas. Cycloconverters are used for synchronous motors from 500 to 27,000 kW and LCI-type converters for speed control and soft starting of synchronous motors up to 100,000 kW. There are also VSI-type converters for cage induction motors up to 10,000 kW.

The ABB portfolio includes an extensive **DC drive family**, featuring one of the smallest and easiest to commission units on the market. In addition, the ABB drive range is supported by a comprehensive selection of **DC motors** from 1 kW to 1 MW. Ideal for low noise and vibration, high output and cooling options for any environment.

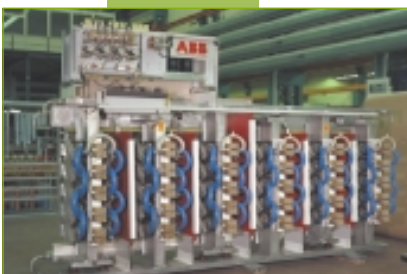


ABB Power Electronics leads the industry in high power converters, static excitation systems, and large frequency converters.

Smarter Energy, Healthier Environment

The Earth is not in the best of shape. Just listen to the news about global warming, climate change and natural catastrophes, or to the pessimist who is convinced that the world is drowning in waste. This is a bleak picture that leaves many of us feeling helpless.

At ABB, we believe that smart choices can make a difference. That there is a choice between using energy-saving machines and burdening the environment. By acting today we can have an impact on the world we leave to our children.

What can ABB and its customers do to reverse this trend? A great deal.

Today, there is conclusive evidence that the emission of greenhouse gases – especially carbon dioxide (CO₂) – is the primary cause of global warming. The burning of fossil fuels like coal is accelerating this trend by increasing CO₂ levels in the atmosphere. And no nation can turn its back on this threat. In 1997, 160 countries signed the Kyoto Protocol in which industrialized countries agreed to cut their greenhouse gas emissions by 5.2%. Interestingly enough, even a 1 kWh reduction in energy consumption will cut CO₂ emissions by 0.5 kg on average. This means that ABB is firmly committed to improving the efficiency

of its motors and drives. By investing in ABB's high-efficiency motors and drives, you are helping to combat global warming.

How are ABB's products eco-efficient?

- ABB's motors and drives have superior efficiency. You can save the environment and your money in the most effective way.
- ABB's motors and drives are designed using state-of-the-art DFE (Design for Environment) guidelines. The latest data on materials and legislation is taken into consideration.
- ABB's motors and drives include detailed recycling instructions. End-of-life products are recycled by local certified recycling partners.
- ABB provides comprehensive information on its products' environmental properties in the form of Environmental Product Declarations.
- All ABB sites designing and manufacturing motors and drives are certified as conforming to ISO 14001.

"ABB's key design objective has always been the superior efficiency of our products. Being the largest supplier of motors and drives, we are also the leading 'negawatt' supplier.

We are proud that ABB won the IEA Hi-Motors Competition, which was arranged to find electric motors with energy efficiency higher than in any motor before."

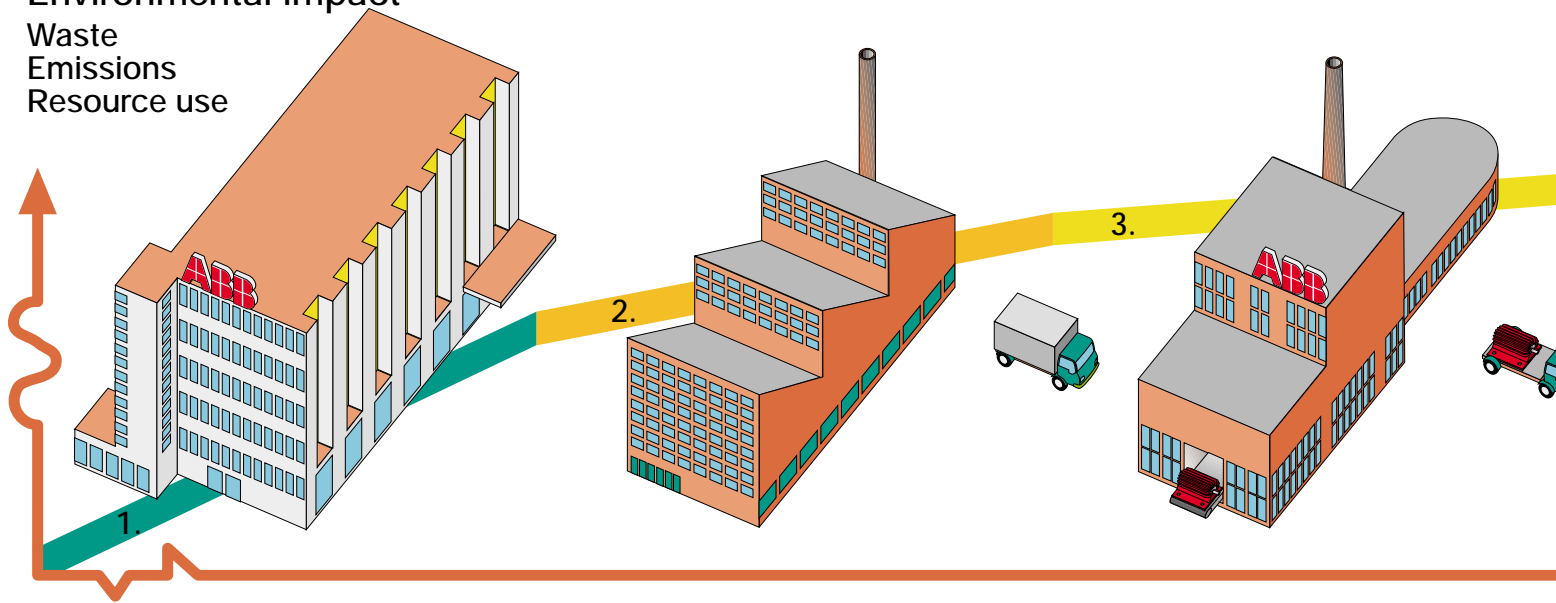


Jouko Karvinen
Head of ABB's Automation Technology
Products



Environmental impact

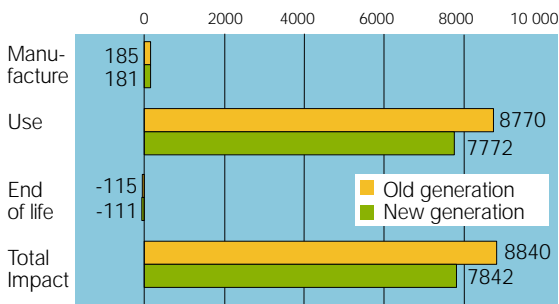
Waste
Emissions
Resource use



1. Product development

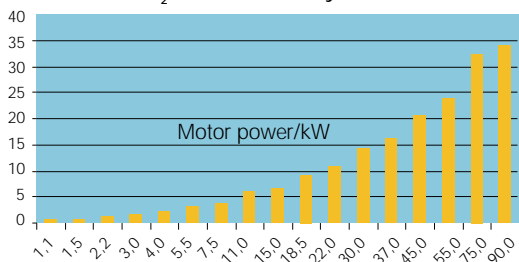
- Improving the efficiency of ABB electric motors, generators and drives is a core development objective.
- Life cycle assessment (LCA) is used extensively to reduce lifetime environmental impact. 98-99% of all lifetime environmental loading is caused by energy consumption during the usage phase.

The environmental impact of electric motors



The environmental impact of the redesigned electric motor was reduced by over 10%, from 8840 to 7842 ELU units.

Reduced CO₂ emissions tons/year



The efficiency of motors and drives has improved over the last 15 years. Replacing an old motor+drive with new ABB Hi-Eff products reduces CO₂ emissions during energy production.

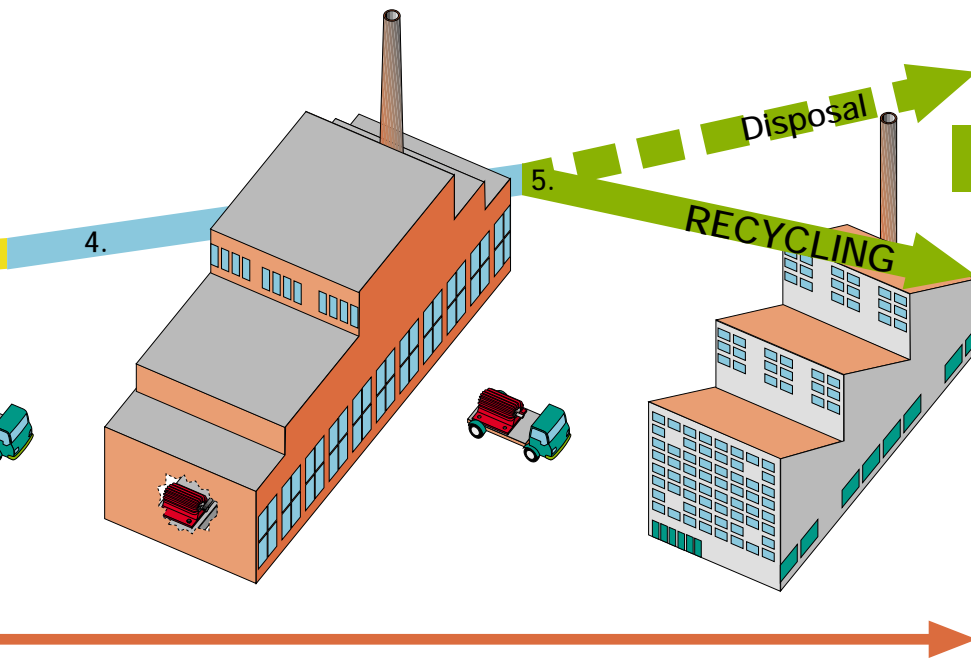
- ABB's design guidelines cover the complete product life cycle, from minimizing the use of materials and material choices to reducing energy consumption in the manufacturing and transportation of products. This also entails a long-term commitment to waste reduction and to the reuse and recycling of components.

2. Incoming material

- Suppliers are involved in the development of ABB's products and services. A key priority is the environmental impact of material choices and component construction.
- Material and end-products are packaged in reusable plywood, plastic and cardboard boxes specially designed for each component. The boxes make 50-100 trips per year between ABB and the supplier. The end result is minimal packaging waste.
- Bulk transportation of components from a limited number of suppliers.
- Vehicle emissions reduced by combining incoming shipments.

The component boxes used at ABB Industry, Helsinki, Finland.





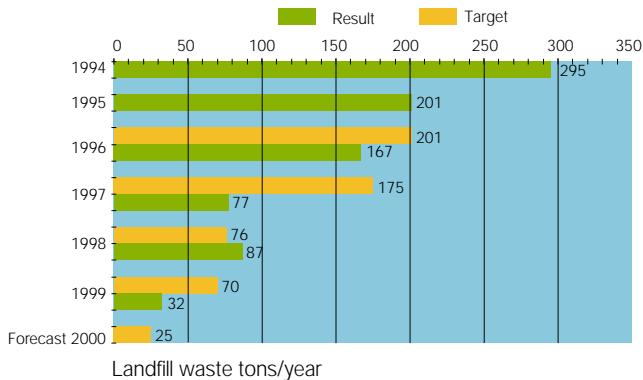
5. End of life

- Recycling instructions are included with all ABB products.
- A network of certified recycling partners.
- Convenient recycling – only one type of plastics and easy-to-separate parts.
- Over 90% of components can be recycled.

3. Manufacturing

- ABB is dedicated to minimizing production waste.

The decrease in landfill waste at ABB Motors in Västerås, Sweden



- ABB motor and generator factories have changed or are changing to solvent-free paints. Conventional paints emit volatile organic compounds (VOC) which react with heat and sunlight to form harmful oxidants such as ozone.

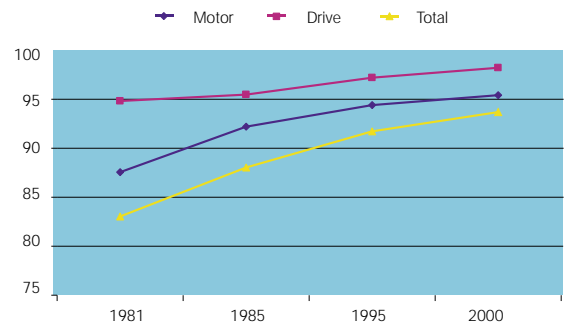


Solvent-free paint improves the working environment in Birr, Switzerland.

4. Usage phase

- 98-99% of lifetime environmental loading is caused by energy consumption during the usage phase.
- Lower energy consumption reduces greenhouse gas (GHG) emissions in power production.
- Lower operating temperatures extend motor and drive lifetime.
- Reduced noise level.

Improved motor and drive efficiency (%)



Environmental Product Declarations

How much air pollution is caused by an electric motor or drive? How does the manufacture and use of electric motors and drives affect water quality? Or influence global warming? These were some of the questions ABB asked itself when it decided to assess and improve the environmental impact of its electric motors and drives.

The solution was to provide Environmental Product Declarations (EPDs) for all core ABB products. EPDs describe the environmental aspects and impacts of a product line over its entire life cycle.

The EPD program aims

- to enable ABB designers to assess and improve the environmental performance of a product over its full life cycle
- to facilitate a sound comparison of the environmental performance of alternative products, using available environmental criteria
- to provide ABB's customers with LCA data of ABB products to facilitate environmental assessments of their processes
- to promote the environmental performance of ABB products and services among its stakeholders and to enhance ABB's business

The declarations are based on Life Cycle Assessment (LCA) studies and conform to ISO 14025.

EPDs are certified by an independent certifying body such as BVQI, which checks that key environmental issues are taken into account and all data has been calculated properly.

At the end of 2000, about 15 EPDs had been provided for electric machines, drives and power electronics products. New EPDs are under development.



ABB is preparing EPDs for all core products.

Winning Motors From ABB

Higher efficiency spells lower energy consumption

Motors account for about 65% of industrial energy consumption. Even a small increase in motor efficiency can make a big difference in annual energy consumption, especially if the motor is in continuous use.

Boosting efficiency

Efficiency measures how well a motor converts electrical energy to useful work. As motors lose energy as heat, reducing heat output improves not only efficiency but also motor lifetime.

EU efficiency classes

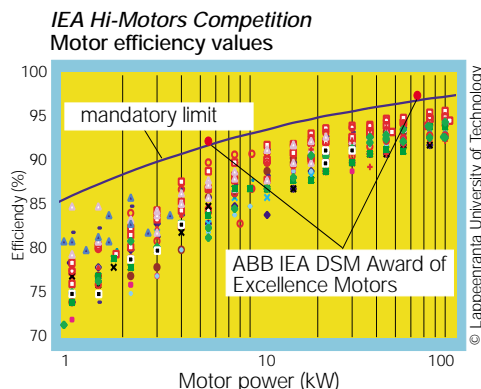
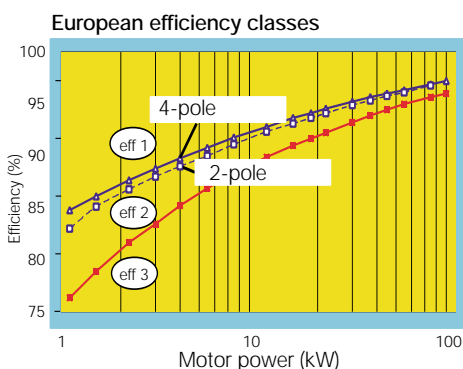
The agreement between the European Commission and CEMEP, a major motor manufacturer's forum, establishes three efficiency classes: eff1, eff2 and eff3. The highest efficiency level is eff1. This new efficiency classification applies to electric motors manufactured in Europe, from 1.1 to 90 kW. ABB has a full range of motors in eff1, and no motors in the lowest class, eff3. In 1998, about 80% of all motors sold in the EU were in the eff3 class. The agreement is part of a European effort to reduce CO₂ emissions and to protect the environment. It also aims to improve the competitiveness of European industries by boosting their energy efficiency.

EPCA requirements for US and Canada

The recently amended American Energy Policy and Conservation Act (EPCA) stipulates that electric motors in the range 0.7 to 150 kW (1-200 hp) meet specified energy efficiency standards. This applies to electric motors that are sold in the United States. In Canada, the legislation is referred to as the "Energy Efficiency Regulations" and "Canada's Energy Efficiency Act." ABB stocks motors that comply with these requirements.

ABB Motors wins efficiency competition

ABB Motors has won the International Energy Agency's (IEA) Hi-Motors Competition in 1999. The competition jury set out to find electric motors that cut losses by 25-50% compared to average motors. Two motors from ABB met these demanding requirements and were awarded the IEA Award of Excellence.



Outokumpu is a versatile metals group operating worldwide. Outokumpu focuses on base metals production, stainless steel, copper products and technology, and underscores the crucial importance of its customers, good profitability and responsibility for the environment.

The Kokkola zinc smelter in Finland belongs to Outokumpu's Metallurgy business area. The capacity of the Kokkola zinc plant has been steadily increased. When the latest expansion comes on stream in 2001, the plant's annual capacity will increase by 15% to 260,000 tons of zinc metal. The Kokkola plant is one of the world's most efficient and profitable zinc smelters, and its versatility enables the use of different raw materials.

"Leaching and purification are a demanding process for any electric motor," says Olli Järvi, electrification manager of zinc plant expansion. "Our motors are running on continuous duty, and a breakdown is always expensive. A high efficiency level is necessary for running the process economically. It also guarantees that the motors are cooler than before and that the windings and bearings last longer. ABB has a good range of motors that comply with eff1, the EU efficiency classification."

Why Use Variable Speed Drives?

Material volume varies in many processes

Since input and output vary in most machines and processes, it is crucial that there is some kind of process control. A key concern is maintaining constant output during disturbances such as water pressure variation.



Figure 1. In domestic buildings, the fresh water pump's variable output flow is controlled according to water consumption, which is low at night but high in the mornings and evenings. If you are showering, it is important that water flow and temperature are constant. As a result, disturbances such as water pressure variation must be countered by an effective process control.

Variable speed drives optimize process performance

Most machines that are driven by electric motors are selected according to maximum need. This means that the motor is oversized and inefficient. Variable speed drives optimize process performance by effectively responding to variable material flow. The end result is improved process control and greater energy savings.

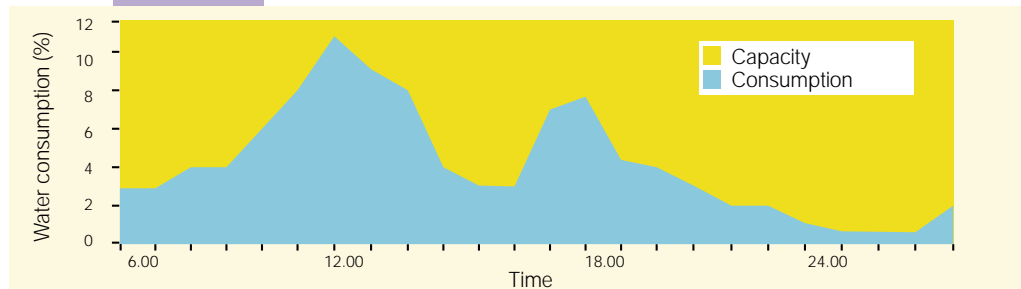


Figure 2. The average water consumption in a city can be less than 50% of maximum capacity. If the control method is based on mechanical throttling with the motor running at full speed, the system efficiency is low. Imagine controlling the speed of your car by braking only. By using variable motor speeds that match process requirements, you can improve system efficiency.

AC drive system

An AC drive system is an AC motor controlled by a frequency converter, which is a power electronic device that can change the motor supply frequency steplessly from zero up to the line supply frequency. This type of AC drive can be connected to most rotating machines, thereby improving process control flexibility, accuracy, productivity, reliability and energy efficiency.

Leading the market in eco-efficiency

AC drives are one of the most eco-efficient products on the market. It is estimated that ABB AC drives reduce annual energy consumption by 46,000 GWh as compared with traditional control methods like throttling. This corresponds to 38 million tons of CO₂.

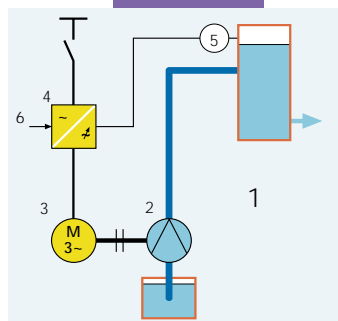


Figure 3. A simple process control solution with an AC drive.

- 1 = Water pumping system
- 2 = Pump
- 3 = AC motor
- 4 = Frequency converter
- 5 = Water pressure transmitter
- 6 = Setpoint signal for the water pressure

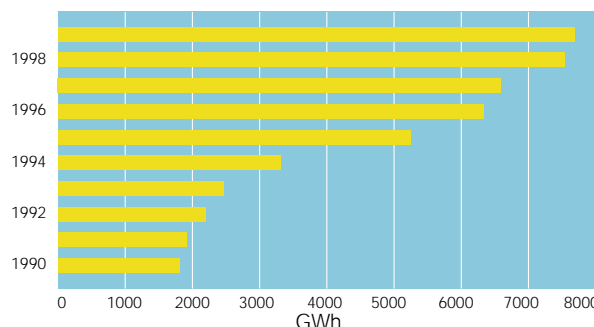


Figure 4. The estimated energy savings in pump and fan applications with ABB AC Drives delivered between 1990 and 1999 is in total 46,000 GWh.

Speed control of pumps and fans with variable flow saves energy

A pump is selected according to the maximum flow requirement Q_1 in Figures 5 and 6. The average need Q_2 is usually much lower. The traditional flow control method is throttling, though it causes major pressure loss in the pump and in the throttling valve. Power consumption is area P in Figure 5.

An AC drive follows the pumping system requirements and causes no additional pressure loss in pump or valve. The variable speed control can therefore save 30% to 70% energy compared with throttling.

Figure 5. Throttling is a pump flow control method used with fixed speed motors.

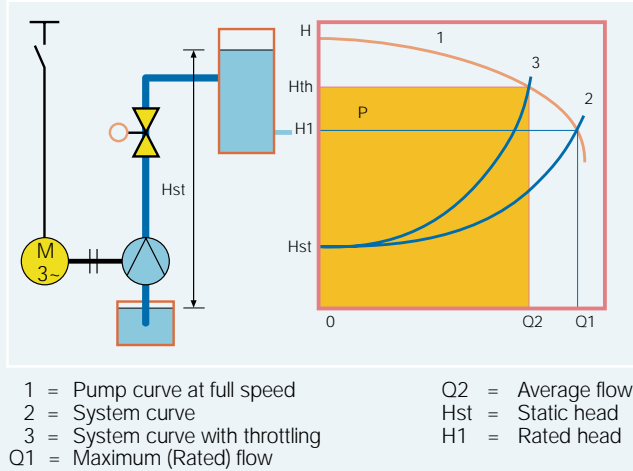
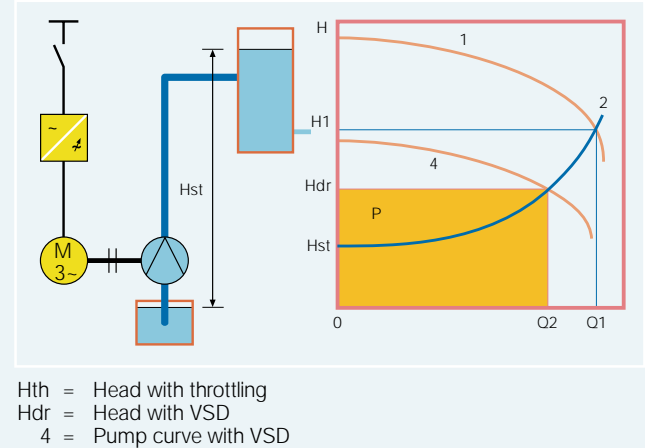
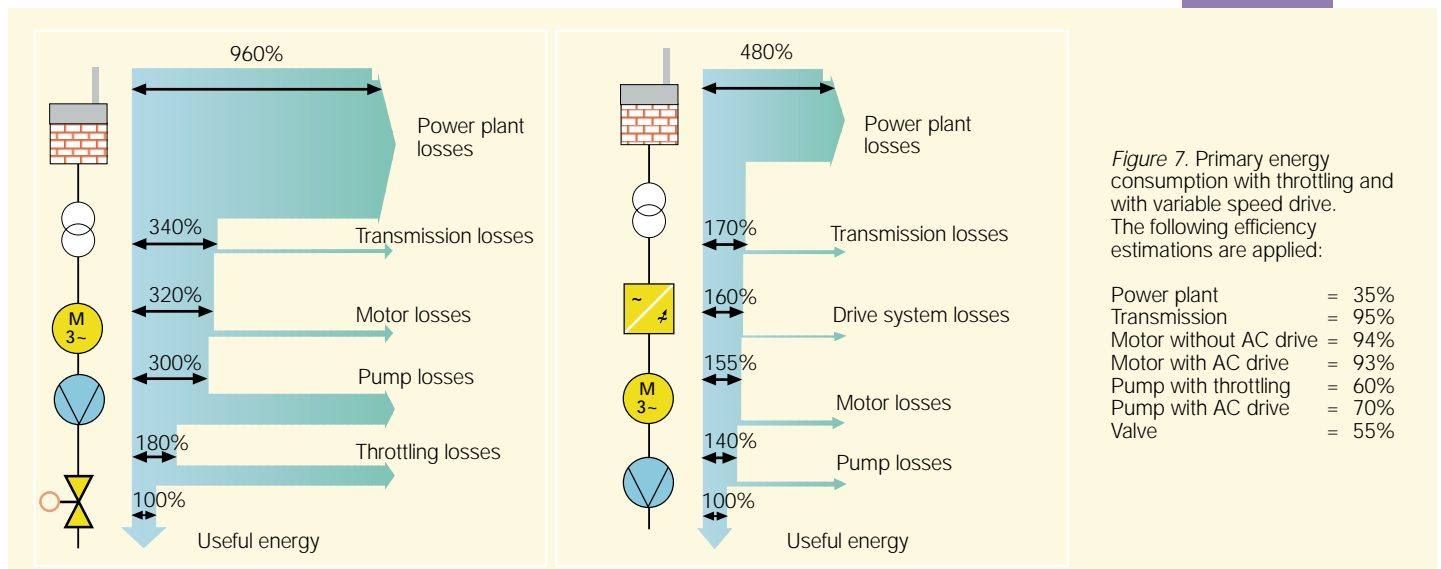


Figure 6. Variable speed drive (VSD) is a pump flow control method varying pump speed according to demand.



Improved demand side efficiency saves primary energy

Using efficient technology at the customer site can increase efficiency from 30% to 60%. This means a drastic reduction in primary energy consumption, from 960% to 480%. In other words, a variable speed drive can save about five times more energy than is actually needed.



Raisio Malt Saves Energy by Upgrading Its ABB Drives



Seppo Näreoja,
Maintenance Manager,
Raisio

In April 2000, **Raisio Malt** replaced the fan drives for two of its kilns with new ABB drives. The original fan drives had also been supplied by ABB in the early 1980s. The rationale was that the upgrade would minimize operation interruptions, generate energy savings and lead to environmental benefits.

The drive upgrade has reduced energy consumption from 5,245 kWh to 4,755 kWh, or 490 kWh per drying batch. As 360 batches are dried annually, the total savings are 176,400 kWh. Seppo Näreoja, Maintenance Manager at Raisio, is also pleased that annual CO₂ emissions for a single kiln fan have decreased by about 90 tons. Lower electricity costs mean that the payback period for the investment is about three years.

The net benefit is an environmentally friendly plant with lower operational costs.

• Case facts

– Industry process:	<i>Malt kilning</i>
– Application:	<i>Centrifugal fan</i>
– Capacity:	<i>60 tons/day</i>
– Operating:	<i>360 batches/year</i>
– Old system:	<i>5,245 kWh/batch</i>
– New system:	<i>4,755 kWh/batch</i>
– Energy saving:	<i>176,400 kWh/year</i>
– Saving %:	<i>about 9%</i>
– CO ₂ reduction:	<i>88 tons/year</i>

Raisio Malt is part of Raisio Group, a Finnish enterprise operating in the margarine, grain and chemical industries with an annual capacity of 105,000 tons malt.



DSM Buys High-Efficiency Motors and Drives

A remarkable cost difference

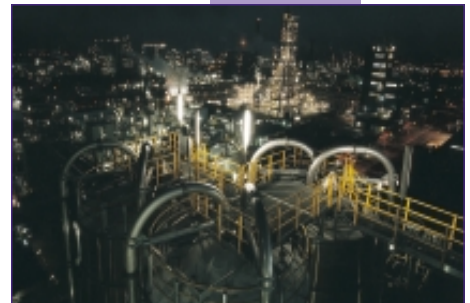
“When deciding on motor purchases or overhauls, our company considers not only motor prices, but also the capital loss for motors over the next four years,” says Maintenance Engineer Peter Pieters.

“We have determined that overhauled motors are less energy efficient than new motors. If we compare a new high-efficiency motor with an old motor, we find a remarkable cost difference. Interestingly, the energy efficiency of the old motor also decreased after overhauling. This means that the more expensive high-efficiency motor costs less in the long run – investment, lifespan of bearings, and energy loss. And since we have a couple of ten thousands motors at DSM global, this is a major reduction in annual costs.”

Committed to a better environment

“DSM is committed to the reduction of energy consumption. By improving the energy efficiency of our motors and equipment and energy resources like steam and electricity, we are contributing to a better environment,” adds Ben Obdam, Manager of Electrical Engineering and Consultancy at DSM.

DSM is a highly integrated group of companies that is active worldwide in life science products, performance materials, polymers and industrial chemicals. The group has annual sales of EUR 6.3 billion and employs about 22,000 people at more than 200 sites worldwide. DSM focuses on advanced chemical and biotechnological products and performance materials in which the company holds global leadership positions.



DSM management signing a contract with ABB Motors.

Energy-Saving Solution for Oil Terminals

Vopak ENOC Fujairah Ltd. in Fujairah, the United Arab Emirates, is a company constructing and managing oil tank terminals around the world. Two years ago the company built a new pumping system for its oil terminal in Fujairah. This greenfield project included the installation of 20 centrifugal 350 kW pumps for oil blending, tank transfer and export.

ABB solution is praised for its simplicity and clarity

It was agreed early on in the project that the new system would also include a variable speed drive solution for fluctuating flow rates and two 1200 kVA diesel generators as power sources.

After carefully reviewing the project requirements, ABB put forward its proposal: the ACS 600 MultiDrive System with common DC Bus (2 x 1,400 kVA inputs and 20 x 350 kW inverter outputs) and a direct connection between the generators and the drive. Impressed with the solution's simplicity and clarity, Vopak ENOC Fujairah Ltd purchased the ACS 600 MultiDrive System because it enhanced system versatility and user-friendliness while reducing energy consumption.

Safe flow rates with ABB drives

"We load petroleum products into ships. Since the ships docking at our terminal vary in size, we have to ensure definite and safe flow rates. An abnormal fluctuation can lead to serious accidents. With the ABB variable speed drives, we are able to control the flow rate effectively and safely," says Terminal Engineer A. Beer Ali.

"The installation of variable speed drives has greatly reduced the number of valves for regulating oil flow. That's why it's a money-saving solution. Also, there is less valve maintenance. The more valves you have, the more flange and gland leaks you have."

Benefits

- Flexible pump operations and selection
- Less equipment and moving electrical components
- User friendly and effective
- Energy saving



A. Beer Ali, Terminal Engineer, Vopak ENOC Fujairah Ltd.



• Case facts:

- | | |
|------------------------------|--|
| - Industry process: | <i>Oil pumping, blending and storing</i> |
| - Application: | <i>Centrifugal pumps, 20 units</i> |
| - Capacity: | <i>1500 m³/h, each pump</i> |
| - Operating: | <i>300 hours/year</i> |
| - Old system, throttling: | <i>20 x 88,000 = 1,760,000 kWh/year</i> |
| - New system, AC drives: | <i>20 x 59,000 = 1,180,000 kWh/year</i> |
| - Energy saving: | <i>580,000 kWh/year</i> |
| - Saving %: | <i>about 33%</i> |
| - CO ₂ reduction: | <i>290 tons/year</i> |

Vopak ENOC Fujairah Terminal

Harnessing the Power of Nature

Wind power is an ideal way to reduce CO₂ emissions in energy production. A renewable resource with none of the drawbacks of fossil fuels, the wind you feel is the future of sustainable energy production.

Powering a nation with wind

Denmark is leading the way in the use of wind energy. Wind power covers 10% of electricity consumption in Denmark, and the forecast is that this figure will increase to 14% by 2003. Even now offshore wind farms could handle 40% of the country's electricity consumption. A truly impressive feat.

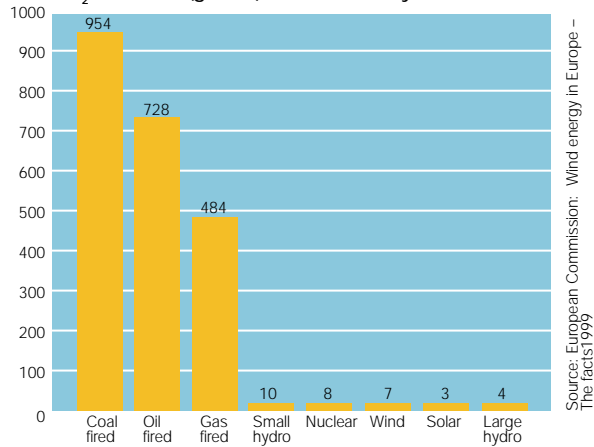
ABB electrifies your wind power

ABB is the world's leading manufacturer of generators for wind turbines. Over 25% of wind turbines worldwide use ABB's generators. With more than 20 years of experience in wind energy applications, ABB offers a broad range of products and services for wind power developers. You can choose from generators, converters, transformers, switch gears, cables, electrification solutions, contracting, and wind farm services.

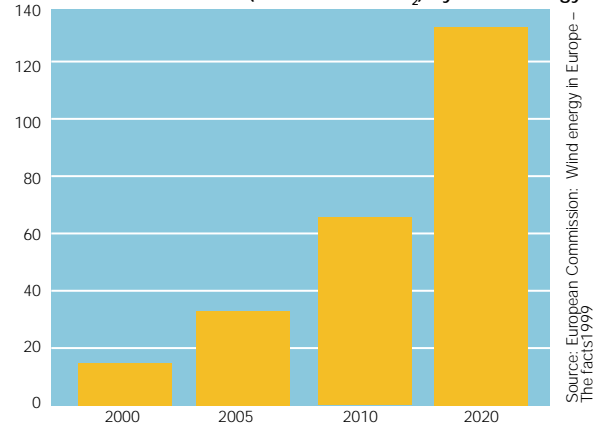
ABB provides 25% of the world's wind turbine generators.



CO₂ Emission (g/kWh) from Electricity Generation Technologies



Reduced Emissions (millions tons CO₂) by Wind Energy in EU (Estimate)



Lone Star's Semi-Dry Operation

When the expansion of **Lone Star Industries' Greencastle, Ind., USA** cement plant was completed in early June 2000, the facility was distinguished by how it has nearly doubled its production capacity, from 750,000 to 1.3 million tpy. "The semi-dry process not only allows us to double production at the Greencastle facility, but provides an environmentally sound alternative to achieving the stringent emission levels imposed by both federal and state regulations," says **Dave Puzan**, plant manager.

Motors and motor drives are absolutely critical in optimizing uptime. "We have upgraded many of our electrical motors to higher-efficiency motors in the last decade," says **George Glassburn**, electrical superintendent. "We have installed 40 variable speed drives from ABB on key motors throughout the entire plant. These are critical pieces of equipment that we cannot stand to have a failure with, because any one piece in a sequence of electrical equipment can take us down."

The standard AC drive in the plant powers motors that range from 3 hp (feeder weights) to 800 hp (the ID fan drawing air through the kiln into the stack). "The same type of drives are used to control these motors across different functions. Such standardization, from a practical and operational point of view, provides multiple benefits," says **Ross Tennis**, chief electrician at the plant. Since the drives share a common operating platform, the electrical technicians can be trained once but operate drives throughout the plant. That reduces training time and minimizes mistakes. "And because there's a set of like motors and like drives, it also reduces the number of spare parts you need," Tennis adds. "New AC drives, including ABB's ACS 600 controllers, also are *smart*. They are easy to install, set up, and start up; and through features like direct torque control, they can sense what motors can and cannot do."

"By the time this plant is completed, we're going to have over 19,000 hp on line," notes Glassburn. "That eats up kilowatts and costs you money, even here, where we enjoy competitively priced electricity. If you save 1% of your consumption a year, that is a significant savings. If you do that with a higher-efficiency motor, putting in an AC drive that controls a motor right to the rpm you need, that saves energy."



Cement plant at Greencastle, Indiana, USA

ABB Propulsion Drive Systems Reduce the Environmental Load on the Seven Seas

For more than half a century, ABB has provided the world's ship-builders with state-of-the-art electric propulsion drives for luxury cruise liners, ro-ro vessels, tankers, offshore oil and special-purpose vessels. Frequency converters contribute to the optimum operation of the main diesel engines, reducing fuel consumption and the load on the environment.

Improved fuel economy with frequency converters

A diesel-electric propulsion system employs a power plant, typically consisting of up to six diesel generators which power one or two electric propulsion motors. Power and speed control of the propulsion motors is achieved by frequency converters. As the diesel engines run at a constant speed and can be started or stopped according to the actual power requirement at any time, they can be operated close to their optimum efficiency. This improves fuel economy and reduces the exhaust gas emissions.

With diesel-electric propulsion systems, the emissions of nitrogen oxides (NO_x) are considerably lower than those of conventional diesel-mechanical systems. In addition, the wear and maintenance requirements of the diesel engines are significantly reduced.

Azipod® propulsion enhances maneuverability and reduces fuel consumption

A recent innovation developed together by ABB and Kvaerner Masa-Yards is **Azipod®**, a podded propulsion unit azimuthing through 360 degrees. It incorporates an electric motor, located inside the pod, which drives the propeller directly through a short shaft. The motor is controlled by a frequency converter with full and smooth torque available in both directions. This enhances the hydrodynamic efficiency and maneuverability of the ship and reduces the time needed to steer the ship inside the harbour area.

The world's largest cruise vessel "Voyager of the Seas" and her sisterships have three 14 MW Azipod® propulsion systems. "Azipods have extremely good fuel efficiency. The saving is around 10-15% compared with conventional propellers, resulting on lower emissions," says Harri Kulovaara, Senior Vice President of Royal Caribbean International.

Azipod® is a registered trademark of ABB Industry Oy.



Voyager of the Seas



Azipod® power range starts at 400 kW and reaches 38 MW.



Product Replacement and Recycling



The efficiency of old drives and motors is being assessed.

Save energy, conserve valuable raw materials and reduce waste sent to landfills

Although ABB's motors and drives are designed for a long, trouble-free life, it is useful to test your equipment from time to time. New technologies offer considerable savings and reduce the environmental load of your motors and drives.

Green Replacement Program

The basis for this program is a site survey of the customer premises. ABB's experts inspect the customer's electric drives and motors, analyze the collected data and identify the potential for energy conservation. ABB then puts forward their product replacement proposal, which specifies energy-saving measures.

The efficiency of motors and drives has increased dramatically since the 1980s. If the equipment is in continuous use and over 10 years old, the product replacement is economically justified.

Product takeback

ABB is implementing a network of certified partners who are authorized to dispose of ABB products. These partners adhere to the recycling instructions laid down by ABB. In practice, the amount of recycled or recovered products varies between country and region.

Recycling reduces the amount of waste sent to landfills and conserves raw materials and energy.



End-of-life drives parts are sorted into ten different categories.

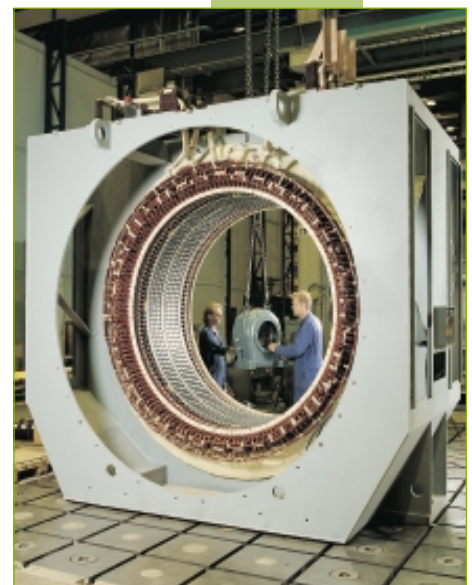
ABB's Environmental Policy

As a signatory of the ICC (International Chamber of Commerce) Business Charter for Sustainable Development, ABB has based its environmental policy directly on the Charter's 16 principles for environmental management. At ABB, environmental protection and sustainable development are core values that guide all corporate operations.

We contribute to sustainable development in four distinct ways:

- Development and manufacture of eco-efficient products and systems
- Exchange of advanced technology with emerging markets
- Improvement of our own environmental performance
- Involvement in common efforts to protect the environment

Sustainable development is an integral part of our business approach, which aims to maintain a balance between social, economic and environmental priorities.



Glossary

AC. Alternating current.

Carbon dioxide, CO₂. A colorless and, at room temperature, gaseous substance found in the atmosphere. Human activities, especially the burning of fossil fuels, can increase levels of carbon dioxide in the atmosphere, which is believed to affect the climate. The primary greenhouse gas is carbon dioxide.

CEMEP. European Committee of Manufacturers of Electrical Machines and Power Electronics.

DC. Direct current.

ELU, Environmental Load Unit. The measurement unit used in the EPS method. One ELU corresponds approximately to one USD.

EPCA (or EPAct). The American Energy Policy and Conservation Act.

EPD, Environmental Product Declaration. A description of the environmental performance of a product, system or service over its entire life cycle, from raw material acquisition, manufacturing and use to waste disposal and decommissioning. ABB's EPDs are based on full life cycle assessments as specified in ISO 14025.

EPS, Environmental Priority Strategies in product design. A method for the weighing of the environmental impact of products over their entire life cycle on biodiversity, human health, production capacity of ecosystems and depletion of non-renewable resources. Based on the willingness of OECD countries to support environmental protection.

EU. European Union.

Greenhouse effect. The effect that certain variable constituents of the Earth's lower atmosphere have on surface temperatures. Greenhouse gases keep ground temperatures at a global average of approximately 15 °C. In their absence, the global average would be below the freezing point of water. Environmental scientists are concerned that changes in the atmosphere's CO₂ content, caused by human activities, could have a dangerous warming effect on the Earth's atmosphere.

Greenhouse gases. Gases that contribute to the greenhouse effect and global warming. Key examples are carbon dioxide (CO₂), water vapor (H₂O), methane (CH₄), nitrous oxide (N₂O), chlorofluoro-carbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbon (PFCs), and sulfur hexafluoride (SF₆).

HV. High voltage.

ICC, International Chamber of Commerce. A non-governmental organization, that serves world business by promoting trade and investment and the free market system. Founded in 1919, the ICC helps the international business community to develop solutions for environmental problems, while ensuring that intergovernmental organizations concerned with the environment consider business views.

IEA, The International Energy Agency. An autonomous agency for the exchange of energy information, linked with the Organization for Economic Co-operation and Development (OECD).

ISO 14000. A series of international standards for environmental management systems, life cycle assessment, environmental auditing of processes, environmental labeling, environmental performance evaluation and terms and definitions.

Kyoto Protocol. A legally binding agreement under which industrialized countries will reduce their collective greenhouse gas emissions by 5.2%. The agreement was reached in Kyoto on December 11, 1997, at a meeting arranged by UNEP, and attended by delegates from 160 nations.

LCA, Life cycle assessment. A management tool for appraising and quantifying the total environmental impact of products or activities over their entire lifetime by analyzing the entire life cycle of particular materials, processes, products, technologies, services or activities. Life cycle assessment comprises three complementary components: inventory analysis, impact analysis and improvement analysis.

LCI. Load commutated inverter.

LV. Low voltage.

Negawatt. Energy saving, “negative energy consumption”.

VSI. Voltage source inverter.

Other ABB Environmental Documents

- ABB Annual Sustainability Report
- Compendium of environmental knowledge
- ABB AC Drives Environment-Saving Speed Control
- ABB Motors - Winners in the IEA Hi-Motors Competition
- Environmental Product Declarations (EPDs)
- Recycling instructions
- PC based tools for choosing energy efficient products
- Fact Files
 - European agreement on low voltage electric motor efficiency
 - Electric motor efficiency requirements in North America



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