BMZ

Federal Ministry
for Economic Cooperation
and Development

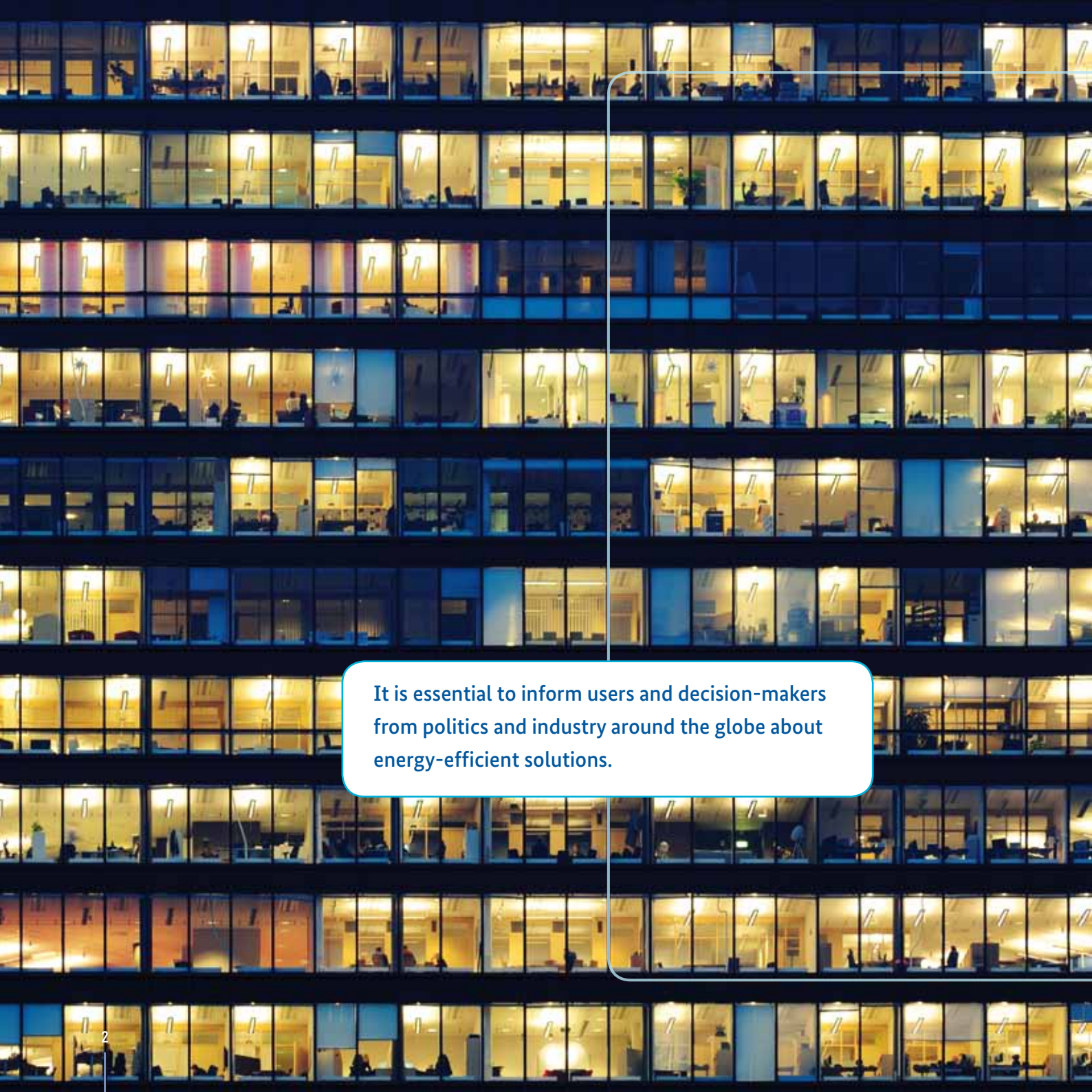
Future-Makers.
Building the future.
Let's join forces.

Electrical energy efficiency

Driving sustainable and integrated future markets worldwide

In cooperation with:

ZVEI:
Die Elektroindustrie



It is essential to inform users and decision-makers from politics and industry around the globe about energy-efficient solutions.

Strong partners worldwide for energy-efficient solutions

Energy-efficient, secure and low-emission solutions are becoming a key element in the energy and resource supplies of the ever-growing emerging economies and developing countries. The areas of application and technologies for energy efficiency are many and often complex. It is therefore essential to keep users and decision-makers from politics and industry worldwide informed about energy-efficient solutions and to bring them in contact with the relevant providers.

This includes an understanding of electrical engineering and electronic solutions that can help in using energy in a more efficient, cost-effective and climate-friendly way. This electrical energy efficiency can be applied anywhere where electricity is generated and used: in air conditioning and lighting in buildings, industrial processes, household appliances, light rail and underground trains, and in transmitting and distributing electricity, for example.

The German Federal Ministry for Economic Cooperation and Development (BMZ) is helping stimulate and promote increased awareness of and expertise in electrical energy efficiency. This is because the Federal Government has put energy efficiency at the top of its international and development cooperation agenda in order to mainstream sustainable energy supply and business practices that conserve resources in partner countries worldwide.

To achieve this, BMZ has been working more closely with the electrical industry, which in Germany is represented by the German Electrical and Electronic Manufacturers' Association (ZVEI) e.V. This also includes sending a development cooperation scout to ZVEI to serve as liaison between development policy, partner countries and the electrical industry.

In this brochure, BMZ provides an overview on the following topics for decision-makers and managers from politics and industry in these regions, as well as local multipliers, such as training institutes, economic development agencies, German representations and foreign chambers of commerce.

- What role does electrical energy efficiency play for emerging economies and developing countries (pages 4–7)?
- How do development cooperation organisations and the electrical industry work together (pages 8–9)?
- Who makes up the German electrical industry (pages 10–11)?
- In what areas can electrical energy efficiency measures be implemented (pages 12–19)?
- What recommendations, partnerships and support programmes are available for planning and investing in energy efficiency (pages 20–21)?
- Where to find find further information and contacts (pages 22–23)?

Challenges and opportunities: global energy efficiency in the future

Countries such as India, China, Peru, Nigeria and South Africa, in common with many industrialised nations, face great challenges in driving future growth and social development. If sustainable prosperity is to be achieved, it must be decoupled from resource and energy consumption, which simply continues to rise instead of becoming more intelligent.

Often in these countries, growth is accompanied by a huge rise in energy demand. However, the power plants there are often outdated, electricity grids overloaded and power failures frequent. On top of that are the expensive imports of coal, oil and gas for energy supply and rising emissions. This presents great risks to the future of the economy and society in these regions.

According to the calculations of the International Energy Agency (IEA), emerging economies and developing countries will account for 90 per cent of the additional energy demand in the coming years and global energy demand will once again grow by a third by 2030.

Currently, over half of the primary energy sources being used worldwide, such as coal, wood or crude oil, are lost in the conversion processes during the production, transfer and use of energy – often unnecessarily. And they hold enormous potential for energy savings. This must be intensively harnessed if global energy consumption is to be reduced over the long term.

Technologies and solutions that can improve energy efficiency are therefore extremely important. They help to limit hefty investments in new power plants, increase the sustainability and security of the energy supply, and are also drivers of growth.

Why electrical energy efficiency?

Products and solutions for an efficient energy supply have myriad uses, ranging from building insulation to combined heat and power generation, or the use of industrial waste heat. But their potential needs to be exploited much further. This includes electrical engineering and electronic technologies that use electrical energy highly efficiently. And they also have manyfold applications in emerging economies and developing countries, for example in energy-saving electrical drives for industry use, modern lighting in shopping centres, low-energy air conditioning in office buildings or control and metering technologies for transmitting energy without loss. Modern energy-efficient electrical devices often enable many countries to make technological advances, for example when a country not only upgrades its outdated power lines, but designs its supply system as a smart grid from the start. The electricity supply and demand can be predicted and accurately matched. In this way, modern electrical intelligence and efficiency help to reduce losses in the electricity grid and cut consumption levels.

Such electrical energy efficiency solutions are therefore making important contributions to a more sustainable use of energy and resources. The necessary competencies are being pooled by the electricity industry. The following pages will show where these are being used for electricity supply, transport, industry, buildings and households.

Germany supports emerging economies and developing countries in producing energy more efficiently and using it more wisely

German development cooperation – represented by the Federal Ministry for Economic Cooperation and Development (BMZ) and its implementing organisations – promotes energy efficiency in emerging economies and developing countries as a core requirement for achieving a sustainable energy supply and economy. Energy efficiency measures are often more cost-effective to implement in these countries than in many industrialised countries and they present multiple advantages. Energy efficiency is not just about improving energy security and climate change mitigation in countries like Brazil, Morocco, Indonesia, Ukraine or South Africa. Poorer countries – with growing energy demand – pay disproportionately high amounts for energy and often use energy sources with low energy yields. Economies in these regions therefore benefit, saving money through more efficient energy consumption, or as a result of jobs created from investment in energy efficiency.

German development cooperation promotes energy efficiency

German development policy promotes energy efficiency projects and investment in partner countries. The aim is to mainstream technologies and establish the necessary regulatory frameworks, financing options, expertise and business models. For putting this into practice, BMZ provides financial and advisory support to its partner governments, their implementing agencies, as well as to craft and industrial business. In this way, BMZ supports energy efficiency from beginning to end: The modernisation of coal-fired power plants with high-efficiency steam turbines is just as important in the support framework as energy-efficient upgrades of electricity grids to minimise transmission losses and ensure an uninterrupted power supply. Furthermore, BMZ promotes building insulation and the use of district heating and cogeneration to improve energy yields.

Mongolia: faster success, remarkable results

In Mongolia, it costs less than a third of what it would cost in Germany to carry out energy-efficient refurbishment of a residential building. In addition, it reduces CO_2 emissions by an extra third.

Energy efficiency measures are often more cost-effective to implement in emerging economies and developing countries than in many industrialised countries.

More cooperation for energy efficiency worldwide

In its support for energy efficiency around the globe, Germany also relies on partnerships with manufacturers and service providers.

With its core competencies in electrical energy efficiency, also the electrical industry is an important partner. Small and medium-sized enterprises as well as big industry offer a quantity of modern, innovative technologies and expertise that enable to use energy, being an expensive commodity, in an efficient and climate-friendly way around the world.

The cooperation between BMZ and ZVEI (German Electrical and Electronic Manufacturers' Association e.V.) is also making a contribution by seconding a development cooperation scout from BMZ to ZVEI as an expert in development policy. This allows for a stronger interplay between development policy, German foreign trade initiatives, the electrical industry and partner countries. In addition, politicians, users and investors in Asia, Latin America and Africa are better equipped with information to design solutions for electrical energy efficiency in their countries.

Cooperation and support for good business in energy efficiency

Companies in the electrical sector can take advantage of BMZ support programmes to ensure that cooperation and business activities for electrical energy efficiency materialise in these markets. These programmes cover a wide range of activities, including cooperation projects and feasibility studies, financing and guarantees for investments in modernising or creating new businesses, as well as advice on recruiting and training experts in emerging economies and developing countries.

Overview of BMZ programmes for the private sector:

www.bmz.de/wirtschaft

or in English:

www.bmz.de/en/what_we_do/issues/wirtschaft/privatwirtschaft/index.html

In the BMZ programme develoPPP.de that aims to foster development partnerships with the private sector economic support and development cooperation are directly intertwined. Companies from Germany and other European countries implement cooperation projects in developing countries and emerging economies that benefit all sides. They use BMZ co-financing of up to EUR 200,000, as well as technical and country expertise and development cooperation networks. In this way, they can reduce the costs and risks involved in entering or positioning themselves in new markets. At the same time, the companies impart know-how, create jobs and introduce sustainable technologies. Examples include improving energy efficiency in electricity grids in Nigeria, energy-saving street lights in Indonesia or energy-efficient retrofitting of wastewater treatment plants in Brazil. This contributes to German development policy goals, and partner countries also benefit through economic expertise, modern technologies and improved market and investment conditions.

www.develoPPP.de provides information on the quarterly develoPPP.de ideas competition, eligibility, conditions for support and example projects with companies around the globe. As such this information source also serves helpful for initiating more projects on mainstreaming technologies and expertise on electrical energy efficiency in international markets.

develoPPP.de

Core competencies and facts

The electrical industry – comprising the electrical engineering and electronics industries – is crucial in all areas of business and life around the world. With its cross-cutting technologies, it creates connections through reliable and environmentally friendly electricity transmission and distribution systems, and by providing medical technology, microelectronic components, electrical household appliances, and communication and consumer electronics. As the biggest economic sector in the world, it acts as a motor for technological advancement, innovation, economic growth, and social welfare.

In Germany, the electrical industry generates a yearly turnover of approximately EUR 170 billion (2012) and, with exports totalling EUR 160 billion (2012), it is one of the strongest export sectors in Germany. The global market for electrical and electronic products is the biggest product market worldwide with a volume of approx. EUR 3.4 trillion (2011). In Germany, ZVEI (German Electrical and Electronic Manufacturers' Association e.V.) represents around 1,600 firms in the electrical industry.

The ZVEI Buyers' Guide is an overview of the entire product spectrum in the electrical sector. Available in five languages, the catalogue lets users search for German manufacturers and suppliers.

www.german-electronicindustry.com

These include manufacturers of system solutions, suppliers of product components, implementers of large infrastructure projects and service providers. Energy efficiency is one of the electrical industry's core competencies. Companies in the electrical industry have always invested in the research and development of innovative, energy smart and climate-friendly technologies. For example, today they offer products and applications around the globe that reduce energy costs and advance efforts towards mitigating climate change – everywhere where energy is being produced, converted, distributed, and consumed in industry, households or in the public sector. In Germany alone, replacing old drives, lighting, refrigerators and freezers with new energy-efficient ones can save more than 100 billion kilowatt hours per year. The range of applications described on the following pages for electrical energy efficiency solutions which can also be implemented in Latin America, Africa and Asia demonstrates that the electrical industry can make important contributions in key areas of life and work. They can ensure higher quality in communication and medical supplies, enhance security, promote economic growth and climate change mitigation. And above all they increase energy efficiency in the industry and for supply of water, mobility and energy.

Energy-efficient electricity grids – secure and sustainable power supply

Light, heat, cooling, communications devices, small electrical tools or entire machine fleets: around the world, for all this a connection to a power supply as reliable and efficient as possible is required, whether through a large-scale electricity grid or small independent supply systems. Large amounts of energy are lost in the conversion, transmission and power distribution processes between the electricity-generating plant – such as a wind farm – and the end user. In some large, sparsely populated countries where electricity has to be transported over long distances to major consumption centres, up to 30 per cent of electricity is lost in the grid.

Such losses demonstrate how important it is to build electricity grids in a more energy efficient way. This will not only bring about substantial savings for the economy, but also reduce dependency on expensive energy imports and cut climate-damaging emissions.

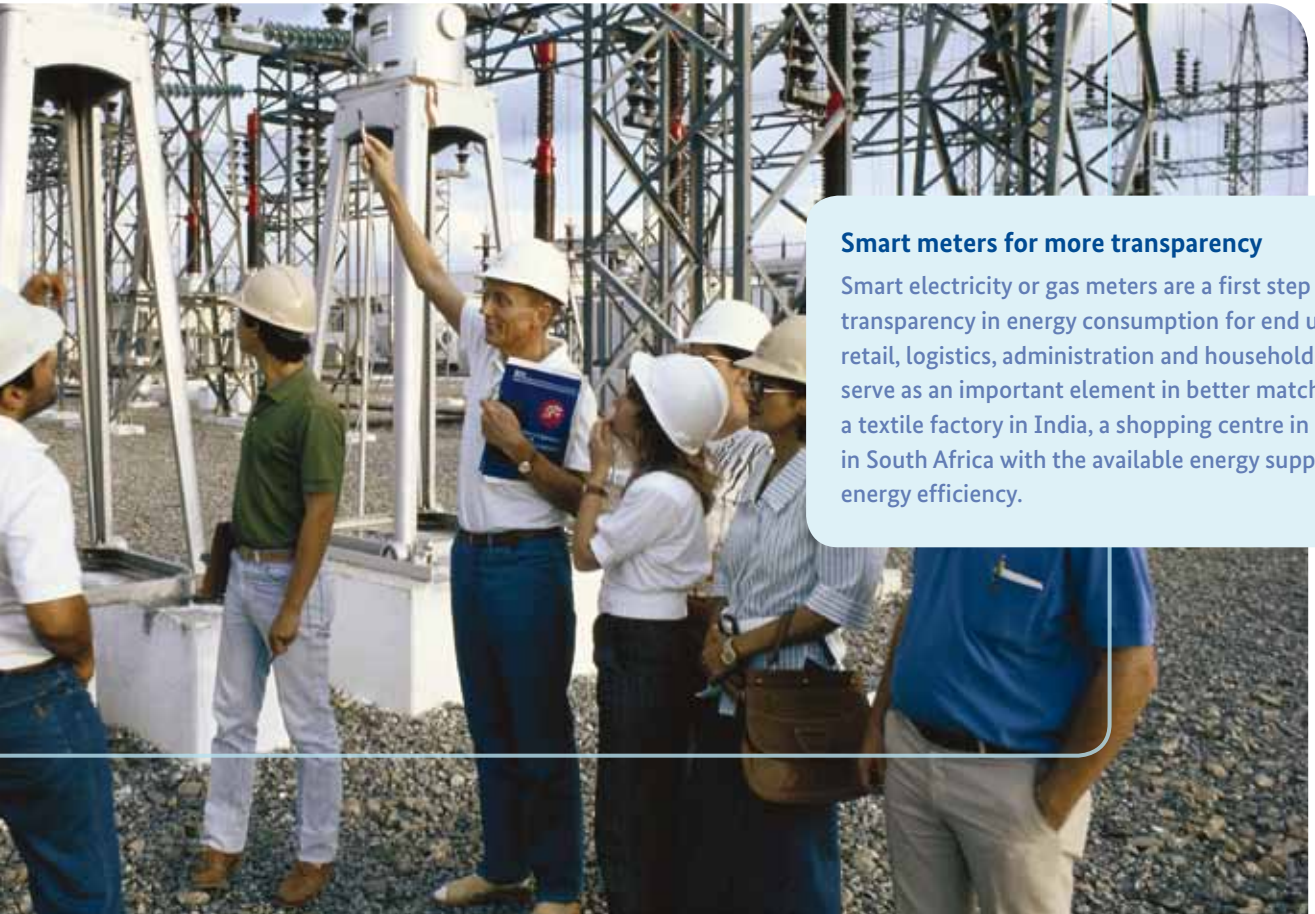
First steps for more efficiency in electricity grids

Modern robust control technologies can lead to improved data and load management in grids. This helps to match energy supply and demand at any given moment. National regulatory agencies can also guide the electricity regulation process early on. It is crucial that they set good incentives for efficiency – for example through consumption-based tariffs – as well as determine new grid requirents which refer to the steadily increasing feed-in of electricity from renewable sources.

Reliable energy supply in India

In the Andhra Pradesh province, farmers have to artificially irrigate their fields. The electricity grid that supplies the water pumps is in poor condition. Up to 30 per cent of the energy is lost. German support is helping replace the power lines and increase the voltage in the supply grid. 50,000 new transformers are being installed. This enables more than 100,000 irrigation pumps to access a reliable power supply, lowers energy loss considerably, and reduces climate-damaging carbon dioxide emissions by one million tonnes.

Places where grids are outdated or where the establishment of a modern energy supply is still in its early stages also enable emerging economies and developing countries as mentioned before to make a technological leap by using smart grids in the way Europe is already planning. Renewable energies play a driving role for such developments in many countries. This influx of renewable energies requires that energy supply and demand are managed intelligently and as efficiently as possible in future. In that way it is possible to rethink the entire energy supply process, moving away from relying solely on centralised energy production and unidirectional flow and instead establishing efficient, more decentralised and smart supply structures. Smart grids are a key element in combining the benefits of renewable energy and energy efficiency. And as such they promote the progress for a sustainable energy supply in Asia, Latin America and Africa.



Smart meters for more transparency

Smart electricity or gas meters are a first step towards more transparency in energy consumption for end users in industry, retail, logistics, administration and households. Smart meters can serve as an important element in better matching the demand of a textile factory in India, a shopping centre in Chile or a hospital in South Africa with the available energy supply, thus boosting energy efficiency.

Energy efficiency gains through automation

For many industry sectors and businesses, energy accounts for between 30 and 50 per cent of production costs, making energy consumption a considerable cost factor. This is also being felt in energy-intensive companies in emerging economies and developing countries. The textile, food, metal and chemical industries are growing steadily, increasing their energy demands for manufacturing and processing. With its automation technologies presenting great potential for energy savings, the electrical industry can make a valuable contribution for these challenges.

Energy-efficient automation in the paper industry

Energy-efficient, speed-controlled drives for a pulper (agitation vat used to break down pulp and recycled paper) with 400 kilowatts of power reduced energy demand in the paper industry by 40 per cent. The EUR 65,000 investment in the energy-efficient drive was offset by annual savings of EUR 68,000 in energy costs, meaning that the investment paid for itself in one year.

Automation is becoming more and more important in all industries and trades, public buildings and facilities. Electrical drives provide energy to power pumps, ventilation and conveyor processes. These electric motors account for up to two thirds of industrial electricity consumption in many countries. This means that energy-efficient drives can have a significant impact. Energy-efficient electric motors use speed control to supply the exactly required operating power or are designed from the outset to operate with low energy consumption.

Measuring, monitoring and control technologies are an equally important element of automation. They help to precisely monitor operating processes based on electricity, oil, gas, water or compressed air so that they run at very low consumption rates. This enables energy savings of 15 percent or more, lowering operating costs in the medium term. Automation technologies can help companies to reduce the amount of electricity-consuming failures and to ensure higher process quality. Companies also benefit from improved competitiveness, conserving resources and mitigating climate change. For energy-intensive companies, this adds up to savings of millions of euros and several tonnes of CO_2 per year.

Energy-efficient electrical drives and control technologies are essential in industrial processes, public utilities and power plants, as well as production halls and other buildings that require energy for lighting, ventilation or lifts (for further information on building automation see page 17).

Electrical energy efficiency pays off in the long term

Growing global competition means that investments in energy-efficient solutions such as energy-saving motors and modern control technologies must also pay off economically. Energy efficiency investments only make sense if amortisation is not calculated on the basis of procurement price alone.

Instead, all costs throughout the entire life cycle of an appliance or system – including maintenance costs – must be taken into account for a 15 or 20 year operating life. This is the only way how investment decision-makers can see the profitability of their investment resulting from significantly reduced energy costs throughout the efficient technology's life cycle. Facing increasing energy prices, such longer-term cost savings through energy-efficient equipment and systems are becoming more and more important.

It is essential to take into account the entire life cycle of a device or system over a 15 to 20-year operating life.

Precise answers to investment questions

Anyone planning to invest in energy-efficient machinery can use life-cycle costing to compare and evaluate the costs and benefits to their business of energy efficiency measures. ZVEI and the auditing company Deloitte have jointly developed an adequate method for this known as the LCE tool (lifecycle cost evaluation tool). It provides decision-makers from industry, business and the public sector with transparent figures on cost reduction and energy savings. This helps them to choose more easily between conventional technologies and energy-efficient alternatives.

The LCE tool can be applied for multiple uses whether it is for procuring single efficiency equipment (such as electric motors) or investing in entire systems.

The LCE tool can produce surprising results and helps in making decisions on energy efficiency investments. It is available at no cost at

http://www.zvei.org/Themen/Energieeffizienz/Seiten/Lifecycle-Cost-Evaluation-(LCE).aspx

(Tool and Flyer also in English).

Energy efficiency in wastewater treatment plants pays off in the long term

A wastewater treatment plant in Germany demonstrates the advantages of the LCE tool. The tool compares the current equipment with an energy-saving pump drive for circulating the wastewater. The cost-effectiveness of retrofitting the systems becomes obvious: over the 24-year operating life of the system, energy savings amount to around EUR 11,300 per year in system operation and maintenance.

Energy efficiency advances for urban infrastructure and buildings around the world

Cities and municipalities around the world require more and more low-emission as well as energy and resource efficient solutions for energy and water supply, mobility, waste management systems, and for living and working spaces. In particular in metropolises in emerging economies and developing countries this is becoming more critical, as economic growth and jobs are pulling more and more people into the developed regions. 2.3 billion people live in the cities of emerging and developing countries alone. This figure is estimated to climb to 5 billion by 2030. Electrical energy efficiency and intelligence can make an important contribution to establishing a sustainable supply infrastructure in the growing cities and regions of our world.

Saving energy through building automation

Building automation saves up to 30 per cent of heating energy in office buildings and almost 40 per cent in hotels and restaurants , without sacrificing comfort or changing the building envelope.

Another example is building ventilation. Low-consumption electrical drives can replace energy-intensive ventilation fans. Based on a low energy use, they open and close windows when needed, thus controlling air circulation.

An established energy management can help to systematically plan, manage and optimise energy use in buildings, factories or other facilities.

Potential for savings through intelligent building automation

Office buildings, schools, industrial buildings, shopping centres, apartment buildings and hospitals across the globe hold great potential for substancially lowering energy consumption. Solutions are not necessarily high-tech. A natural ventilation system, even when electronically operated, is one example. The key component is an intelligent building automation system in which all supply processes in the building (heating, cooling, ventilation, lighting and hot water supply) are linked. This eliminates hefty losses through oversized air conditioning systems or permanent lighting. An important element in building automation is standardised energy management (e.g. based on ISO 50001) in the building.

Spot on – energy savings in public lighting

There is enormous potential for energy savings in lighting for streets, plazas, shopping centres and public buildings such as offices and schools. In many countries, lighting systems in towns and cities are outdated. The modern lighting systems of today use only a fraction of the energy that was needed 20 to 30 years ago. Energy-efficient lighting systems such as LED or on-demand lighting reduce energy consumption by 80 per cent and are very low-maintenance. This means not only significant cost savings for city budgets and operating companies, but also improved lighting quality, enhanced security for the public and optimised carbon footprints. Modernising street and building lighting is therefore a worthwhile investment in the sustainability of modern infrastructure in cities and municipalities around the world.

Double the impact for lighting

If outdated mercury vapour lamps in street lights are not simply replaced by LED technology, but also disposed of properly, cities and municipalities also benefit from the positive impact on the environment.

Mobility and private consumers: moving ahead for an energy efficient future across the globe

Electrical energy efficiency solutions also make important contributions to mobility and transport. They will become more and more crucial in the coming years given the growing, high-emission transport systems in many metropolises in Asia, Latin America, Africa and Arab countries. This includes electromobility using electric cars, buses or scooters, along with the electrical energy storage systems they need. Also low-emission propulsion systems such as fuel cells can play a greater role in future transport systems in many countries.

In rail transport, energy-saving electric trains achieve high efficiency, too. Examples include trams and underground trains that recover braking energy, thus reducing their energy consumption by up to 50 per cent. Lightweight trains are another example. They consume around 30 per cent less energy and most are over 90 per cent recyclable.

In many countries where income and prosperity are rising, private users and households are also becoming a relevant factor in energy consumption and for energy efficiency. Energy-saving lighting technologies, household appliances such as refrigerators and communication electronics (computers, televisions and hi-fi devices) show high demand in India, Mexico, South Africa, Ghana and Vietnam. Energy-saving electronics that offer the user clear efficiency advantages help combine sustainable prosperity with energy and resource conservation.

Our recommendations – your decision

The previous pages have shown that electrical energy efficiency has enormous potential for cost savings and climate change mitigation while promoting sustainable economic growth, innovation and a modern supply infrastructure.

By 2020, the turnover from green technologies around the world will climb to EUR 2.2 trillion, which is more than double of its present value. The strongest growth is in the market volume of energy efficiency products and services.

Emerging economies and developing countries, which will have to steadily invest in the supply infrastructures for their growing cities and industry in the coming years, benefit by setting the course towards energy efficiency early on.

The following recommendations provide initial guidance for planning and decision processes so that political and private-sector decision-makers can steer their investments, as well as knowledge transfer and legal frameworks, in the right direction.

To strengthen the demand for energy-efficient electrical machines and systems:

- Improve the regulatory framework for energy efficiency investments and establish planning security – for both national and international investors;
- Create an environment that promotes 'clean and small' solutions instead of only 'big and heavy' technologies;
- Offer incentive programmes for companies that invest in energy-efficient technologies or introduce energy management systems into businesses;
- Design funding and offsetting instruments for energy efficiency investments.

When planning a tender – whether for energy supply, market square lighting or equipment for an urban hospital:

- Make integration of life-cycle cost evaluations (LCEs) for energy and resource consumption a statutory requirement for public tendering processes. This gives energy efficiency a higher priority in planning processes and economic assessments;
- Use the life-cycle cost evaluation tool (LCE tool) to support investment decisions (www.zvei.org/Themen/Energieeffizienz/Seiten/Lifecycle-Cost-Evaluation-%28LCE%29.aspx);
- Ensure that international standards that promote energy-efficient solutions and energy management systems in plants, buildings and products are consistently applied in tendering processes;

- Make simple planning tools available to industry as well as planning and construction authorities to facilitate early assessment of investments in energy-efficient systems or buildings. The LCE tool is a good example (www.zvei.org/Themen/Energieeffizienz/Seiten/Lifecycle-Cost-Evaluation-%28LCE%29.aspx);
- Invitations to tender should call for long-term use strategies with low operating costs for buildings or plants so that the energy efficiency gains are reflected in the investor's return-on-investment (resolving the user/investor dilemma);
- Support financing options for investments in energy-efficient technologies and develop them further with local banks and financing institutes (e.g. loans for energy-efficient refurbishment projects);
- Include energy efficiency in the curricula of vocational schools, schools of applied sciences and universities.

If a company is seeking decision-making assistance for energy-efficiency investments:

- Switch your focus from short-term payoff expectations to a life-cycle cost view, where investments in energy-efficient products and solutions have to pay off over their operating life;
- Use instruments that assist with life-cycle cost evaluations (LCE) for making energy efficiency decisions and when considering bids (e.g. ZVEI's LCE tool: www.zvei.org/Themen/Energieeffizienz/Seiten/Lifecycle-Cost-Evaluation-%28LCE%29.aspx).

If there is interest abroad in German expertise on energy efficiency:

- Establish early contact with German embassies and foreign chambers of commerce or other German institutions abroad (e.g. GIZ, KfW, DEG or Germany Trade & Invest). These provide support in the form of expertise, contacts as well as financing and cooperation options related to energy efficiency (see 'Contacts' on page 23).

When researching support, financing or partnerships for energy efficiency investments in companies:

- Establish contact with BMZ or either GIZ, DEG and sequa for develoPPP (development partnerships with the private sector) or other cooperation projects on energy efficiency (www.develoPPP.de);
- Establish contacts with local banks and international financial institutions (e.g. International Finance Corporation, DEG or regional development banks) to find out about the availability of energy efficiency loans or other investment and financing aids.

Further reading and resources

BMZ Strategy Paper: Forms of Development Cooperation. Involving the Private Sector:
www.bmz.de/en/publications/type_of_publication/strategies/Strategiepapier306_05_2011.pdf

develoPPP – development partnerships with the private sector in markets in emerging economies and developing countries:
www.developpp.de/en

ZVEI: White Paper on Energy Efficiency: Generating, Distributing and Using Energy Intelligently. ZVEI, Frankfurt am Main, Second edition 2010 or online: www.en-q.de/whitebook.html.

ZVEI Buyer's Guide (in cooperation with the Sachon Publishing Group):
www.zvei-einkaufsfuehrer.de/cl/sid.php?f_a=lc&f_lang=eng

ZVEI Lifecycle Cost Evaluation (LCE) (Tool and Flyer also in English)::
www.zvei.org/Themen/Energieeffizienz/Seiten/Lifecycle-Cost-Evaluation-%28LCE%29.aspx

Sources

BMZ website: www.bmz.de/de/was_wir_machen/themen/energie/energieeffizienz/index.html

BMZ press release: http://www.bmz.de/en/press/aktuelleMeldungen/2012/April/20120426_pm_102_energie/index.html

EPO (in German): www.epo.de/index.php?option=com_content&view=article&id=8347:bmz-unterstreicht-hohe-relevanz-von-energieeffizienz&catid=87&Itemid=34

German Electrical and Electronic Industry – Facts; ZVEI, Frankfurt am Main, 2012

White Paper on Energy Efficiency: Generating, Distributing and Using Energy Intelligently; ZVEI, Frankfurt am Main, Second edition 2010, ISBN: 978-3-00-030796-6 (www.en-q.de/whitebook.html)

ZVEI Jahresbericht: Netz. Werk. Zukunft. Visionen schaffen – Impulse geben. Jahresbericht 2011–2012 (in German), Published March 2012; www.zvei.org/Verband/Publikationen/Seiten/Jahresbericht-2011-2012.aspx

WORLD ENERGY OUTLOOK 2012. Fact sheet: How will global energy markets evolve to 2035?; International Energy Agency (IEA), 2012; www.worldenergyoutlook.org/media/weowebsite/2012/factsheets.pdf

WORLD ENERGY OUTLOOK 2011. Fact sheet: How will global energy markets evolve to 2035?; International Energy Agency (IEA), 2011; www.worldenergyoutlook.org/media/weowebsite/factsheets/factsheets.pdf

Contacts

BMZ – German Federal Ministry for Economic Cooperation and Development

BMZ Service Point for Cooperation with the Private Sector
Dahlmannstraße 4, 53113 Bonn, Germany
T +49 (0)228 9 95 35-3131
E Wirtschaft-Kontakt@bmz.bund.de
I www.bmz.de

GIZ – Deutsche Gesellschaft für Internationale Zusammenarbeit (giz) GmbH

Dag-Hammarskjöld-Weg 1-5, 65760 Eschborn, Germany
T +49 (0)6196 79-0
F +49 (0)6196 79-1115
E info@giz.de oder
wirtschaftskooperation@giz.de
I www.giz.de

KfW Bankengruppe

Palmengartenstraße 5-9, 60325 Frankfurt am Main, Germany
T +49 (0)69 74 31-4260
F +49 (0)69 74 31-3796
E info@kfw-Entwicklungsbank.de
I www.kfw-entwicklungsbank.de

DEG – Deutsche Investitions- und Entwicklungsgesellschaft mbH

Kämmergasse 22, 50676 Köln, Germany and
Postfach 10 09 61, 50449 Köln, Germany
T +49 (0)221 4986-0
F +49 (0)221 4986-1290
E info@deginvest.de
I www.deginvest.de

Sequa gGmbH – Partner of German business

Contakt: Alexanderstraße 10, 53111 Bonn, Germany
T +49 (0)228 98238-0
F +49 (0)228 98238-19
E info@sequa.de
I www.sequa.de

German Chambers of Commerce (AHK)

www.ahk.de – Overview of all contact information of German Chambers of Commerce worldwide

Development policy experts serving as contacts in German Chambers of Commerce in Africa, Asia, Latin America, Central and Eastern Europe, Central Asia and the Middle East:
www.giz.de/Wirtschaft/de/html/1433.html

In Germany: Association of German Chambers of Commerce and Industry (Deutscher Industrie- und Handelskammertag – DIHK) e.V., Breite Straße 29, 10178 Berlin, Germany

T +49 (0)30 20308-0
F +49 (0)30 20308-1000
E info@dihk.de
I www.dihk.de

GTAI – Germany Trade & Invest, Gesellschaft für Außenwirtschaft und Standortmarketing mbH

Villemombler Straße 76, 53123 Bonn, Germany
T +49 (0)228 24993-0
F +49 (0)228 24993-212
E info@gtai.de
I www.gtai.de

German embassies and foreign offices

Overview of all German foreign offices:
www.auswaertiges-amt.de/DE/Laenderinformationen/03-WebseitenAV/Uebersicht_node.html

ZVEI – German Electrical and Electronic Manufacturers' Association

Department International Trade & Future Markets
Lyoner Straße 9, 60528 Frankfurt am Main, Germany
T +49 (0)69 6302-235
F +49 (0)69 6302-344
E aussenwirtschaft@zvei.org oder zvei@zvei.org
I www.zvei.org/MaerkteRecht/Aussenhandel/Seiten/default.aspx oder www.zvei.org

Electrical energy efficiency boosts …

…economic efficiency and climate protection;

…lighting quality for streets, schools and residential buildings;

…user-oriented air conditioning in offices and hospitals;

…cooling, cooking and communication, whether in remote villages or bustling cities;

…precision in the food and metal industries;

…the use of renewable energy without energy loss;

…low-carbon road and rail transport;

…storage of valuable energy;

…energy-efficient lifts and escalators;

…and much more in life and work around the world.

Publishing details

Published by:
German Federal Ministry for Economic Cooperation and Development (BMZ)

In cooperation with:
ZVEI – German Electrical and Electronic Manufacturers' Association

Published in:
May 2013

Printing:
Top Kopie GmbH

Design:
designwerk, Nikolai Krasomil

Text:
Diana Kraft-Schäfer

Photo credits:
Page 1: ©iStockphoto.com/loveguli
Page 2: ©iStockphoto.com/olaser
Page 4: ©iStockphoto.com/123ArtistImages
Page 5: ©iStockphoto.com/gkaya
Page 7: GIZ
Page 9: GIZ/Dirk Ostermeier
Page 10/11: ZVEI/Petra Mancuso
Page 12/13: GIZ/Rau
Page 15: ©iStockphoto.com/wakila and Ingo Bartussek
Page 16/17: GIZ/Mona Choueiri
Page 18: GIZ/Kamikazz
Page 19: ©iStockphoto.com/amphotora and GIZ/Florian Kopp
Page 24: GIZ