

Better technology for a better world

Electricity makes life more comfortable – all around the globe
Friedrich Pinnekamp

Comfort provides us with the freedom to develop skills and capabilities to improve our quality of life. The perception of comfort depends very much on a person's starting point: For those who once had to walk kilometers to fetch drinking water, comfort can be a running source of fresh water at home. Similarly, for people who previously had to open their blinds by hand, comfort can be opening the blinds with the touch of a button.

With a functioning infrastructure – for example, water supply or blind control – people can devote more time to developing further and finding creative means toward new levels of comfort. To foster this move toward increasing comfort and with it the quality of life for everyone in the world, huge investments in reliable infrastructure are necessary. ABB has a broad portfolio of products and systems to provide major parts of this infrastructure, especially in terms of power and productivity. With its local presence in all parts of the world, ABB can directly respond to the different needs and so contribute to a better world.

Every year, statistics are presented that rank the nations according to their per capita income, and the spread of the scale is very wide, with a factor of more than 100 between the lowest and the highest income. Irrespective of the absolute level of this income, the strive for growth and economic welfare is present everywhere.

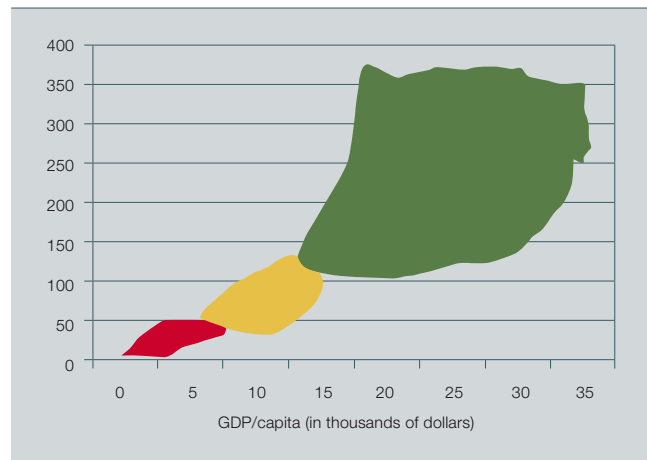
The requirements for this ongoing growth are different, however, for the poor and the rich countries. **1** shows a schematic presentation of the gross domestic product (in purchasing power parity) and its connection to the energy consumption per capita. Economies move from the lower left to the upper right in this presentation when measured over the years.

In the low-income economies (below \$ 5,000 per capita), the growth of the gross domestic product (GDP) is almost linearly connected to the energy consumption of the respective society. When industrialization with increasing need for energy takes off, the growing infrastructure increases the comfort of the people.

This trend continues until industrialization is close to complete. When, in economies above \$ 15,000 per capita income, the growth shifts over to more value-adding from service, the increase in energy requirement is less pronounced, even though the growth of infrastructure (with lower energy need) is ongoing.

Among the different forms of energy used to provide a better infrastructure and increase comfort, electricity plays an extraordinary role. Electrical energy can be used in almost all applications to facilitate the lives of the people so that it has become the most versatile form of energy available. It helps to pump water, transport people, light hospitals and run medical equipment, operate computers and mobile communication, energize factories, optimize production processes and heat houses. Electrical energy is the infrastructure making the

1 The coupling of energy production and gross domestic product



larger contribution to people's comfort. However, to make this change, it is a necessary but not sufficient boundary condition¹⁾.

Successful projects

As a provider of products and systems for modern electrical energy, ABB has long promoted the access to electricity in developing countries.

Following the successful launch of a rural electrification scheme in a remote location in southern Tanzania, the program was recently extended to Rajasthan in western India. The project – based on public–private partnerships – has brought together ABB, the state government of Rajasthan and a non-governmental organization (NGO) to provide power to desert hamlets. The program started by providing one hamlet with power generated by solar

panels, and has been extended to four more hamlets covering 500 households.

In ABB's original Access to Electricity project in a Tanzanian village, electrification has led to economic, social and environmental gains over the past two years **2**. A total of 15 businesses, including a guest house, food stores and clothes shops have sprung up in the village, compared with just three prior to electrification. Other recent advances include:

- 25 new homes underscoring economic gains and local immigration
- More homes connected to the mini-grid, based on the diesel generator donated by ABB, and a new water pump
- Children who are able to study after dark are passing school exams in increasing numbers
- Training on limiting hunting and sustainable logging

ABB partners with the global conservation organization WWF and local authorities on the project.

The supply of electricity to a remote hamlet in India also is helping people earn more and is facilitating children's education. The hamlet's inhabitants who are mainly tailors can now work longer and their children can also study at night.

2 Modern energy services to transform people's lives [1]

Energy service needed	Current energy options	Modern energy options
Lighting	→ Oil/kerosene lamps	→ Off-grid electricity (solar, hydro, wind)
Cooked food	→ Wood/charcoal stove	→ Improved cookstoves/ LP Gas and kerosene
Pumped water	→ Surface/tube well	→ Electric pumps
Refrigeration	→ Grid/diesel power or nothing	→ Off-grid electricity (solar, hydro, wind)
Telecommunications	→ Grid/diesel power or nothing	→ Battery charger/off-grid electricity
Transportation	→ Human/animal-powered vehicles	→ Motorized vehicles
Agro-processing	→ Human/animal-powered devices	→ Multi-functional platform/micro-hydro

Footnote

¹⁾ Even with sufficient electrical infrastructure, life cannot be comfortable when other aspects of life are unfavorable. War, disease, suppression or terrorism are only some important factors influencing the perceived comfort of the individual.

A world of difference

ABB has signed an agreement with the Chinese province of Guangdong, the country's largest by GDP, to provide advice about ways to improve the energy efficiency of companies in the region. The five-year agreement, signed in 2006, aims to help Guangdong achieve its goal of reducing energy consumption by 16 percent per unit of GDP by 2010. The authorities will promote cooperation between ABB and more than 1,000 companies with high energy consumption. ABB will conduct energy conservation audits for companies that request them and help the companies to implement energy-saving measures. The energy saved can be used to increase the supply of electricity and the subsequent comfort.

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Comfort on a global scale

While ABB contributes with technology to increase the comfort of people in the LDCs, it has a large portfolio of products and services to lift the perceived comfort of people in the emerging and developed economies.

Take transport, for example. A century ago, traveling comfort increased significantly when trains became widely

available in Europe and the United States. Decades later, trains still started with a bump and jolt and one had to hold on tight not to be sent flying. ABB's frequency converters make a world of difference in comfort today. Besides these frequency converters, ABB supplies many other train components. For example, ABB supplied the traction transformer that the TGV, the world's fastest train, used on its record-breaking run. And more mun-

danely, the opening of borders has resulted in the increasing demand for trains that work on different power supplies. ABB makes the transformers and converters of innovative trains that can – and do – go anywhere.

The comfort of ships as a means of transport has increased dramatically as well. Ships equipped with ABB's Azipod® and ABB turbochargers per-

Factbox Access to electricity is crucial

In July 2007, the United Nations Ministerial Conference of the Least Developed Countries (LDCs) stated the following in connection with their meeting in Istanbul [1]:

"The energy challenges that underlie the Millennium Development Goals (MDG) achievement are best illustrated by the number of people who do not have access to modern energy services. It is estimated that worldwide there are 2.5 billion people who rely on traditional fuels such as wood, charcoal, and dung as their principal source of energy for cooking and heating. Almost 1.6 billion people have no access to electricity. In light of these daunting figures, energy's important role in underpinning MDG achievement is now being recognized by the international development community. This is due to the fact that energy is a prerequisite for meeting all of the MDGs because of its inherent linkage with poverty alleviation, education, gender equity, health, and the protection of the environment. Although there is no MDG explicitly on energy, it is now recognized that the MDGs cannot be met without expanding access to affordable and reliable energy services for the poor and unserved.

"Energy is central to practically all aspects of our lives, including access to water, agricultural productivity, healthcare, education, job creation, gender equality and environmental sustainability. Yet, millions of households in the developing world still lack access to safe and reliable energy and pay high prices for poor-quality substitutes. Moreover, poor people spend much of their income on energy services. This amounts to more than a third of household expenditures in some countries. They also devote a large portion of another important asset, their time, to energy-related activities – for example, women and young girls spend upwards of six hours a day gathering fuelwood and water, cooking, and agro-processing. In Sub-Saharan Africa, only 8 percent of the rural population has access to electricity while 90 percent of the population still relies on traditional fuels for cooking.

"Having access to modern energy services can make a real difference to poor people's lives [2]. Therefore, developing a new approach, where access to energy services is acknowledged not just as an outcome, but also as an actual driver of development, will be crucial if energy is to play a more prominent role in strategies aimed at achieving the MDGs and making globalization work for the LDCs."

³ Local shops are staying open longer in Ngarambe thanks to the extra four hours of power provided daily by a generator.



	Millennium Development Goals (2000)
Goal 1	Eradicate extreme poverty and hunger
Goal 2	Achieve universal primary education
Goal 3	Promote gender equality and empower women
Goal 4	Reduce child mortality
Goal 5	Improve maternal health
Goal 6	Combat HIV/AIDS, malaria and other diseases
Goal 7	Ensure environmental sustainability
Goal 8	Develop a global partnership for development

mit journeys to be made faster and with less fuel. So whether you're just waiting for goods, or maybe going on a cruise or even planning a polar expedition, ABB is keeping your ambitions afloat.

Another means of transport are elevators. Modern elevators take comfort to a higher level. By eliminating bumps and jolts, ABB drives make elevators more comfortable, while at the same time reducing power consumption. But there is more to the story than boring office elevators – for example, a ship hoist that lets you take a boat trip across Canada.

With growing income, the demands on infrastructure are increasing. Electrical energy supply is no longer an issue in developed countries (if they can avoid blackouts), but the quality requirements of electricity are getting tighter. ABB's contributions include silent transformers with an unprecedented noise level and hidden advantages: Few people think overhead cables improve the landscape. ABB technology is making it possible to move them underground. Windmills too, are a controversial subject and are not appreciated by people who have them in their own backyards. Thanks to ABB technology, they can go out to sea and so not be seen.

The safety and automation level in building installations has reached a very high standard. ABB's smart home automation system has taken luxury living to new heights in the award-winning 50-story Le Rêve (The Dream) Tower, one of the most exclusive

addresses in Dubai and the first smart home built in the Middle East ⁴.

ABB's i-bus EIB/KNX smart home system, which uses wireless touch screens, enables residents to control all the functions of their homes, including lighting, air conditioning, curtains and water heater temperature in any room, and from any room. The ability to control energy-intensive functions, such as air conditioning and lighting in each room, reduces power consumption and carbon dioxide emissions, and makes it one of the most energy-efficient building automation systems on the market. It is one of the most widely used intelligent installation systems in the world, and the leading smart building system in the Middle East and Africa.

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It's not just about electrical power. ABB has numerous solutions for the management of other utilities. In the domain of water supplies, for example, ABB produces the drives that deliver the right pressure as needed. The company also supports water utilities through a plethora of products ranging from humble flow meters to advanced process-control systems. And even if people in developed countries are used to it: Fresh water is a comfort.

Protection against natural disasters is a basic human need. We want early warnings about the next big hurricane to save our lives. But also on a more indulgent comfort level, people might like to check the weather when they take vacations. Satellites equipped with ABB instruments are delivering better predictions. And satellites equipped with ABB interferometers are keeping a close check on air quality as well. Like water, clean air is a comfort.

For many people, daily work is not only a necessary duty but also an enriching life activity. The more creative people can be at work, the more comfortable they feel. Again, technology is the key to providing a comfortable working environment. ABB automation systems take away the burden of administrative efforts of operators and support the data analysis of complex processes. Robots help with more mechanical tasks and even the programming of robots is easier than ever before. Ultimately, it is technology, tools and versatile energy that provide people with the freedom to develop further – and that is comfort.

⁴ Le Rêve Tower in Dubai



Friedrich Pinnekamp

ABB Corporate Research
Zürich, Switzerland
friedrich.pinnekamp@ch.abb.com

Reference

- [1] Energizing the least developed countries to achieve the millennium development goals: the challenges and opportunities of globalization. United National Ministerial Conference of the Least Developed Countries Issues Paper, July 2007, Istanbul.