



# Energy Efficiency for Improving Competitiveness of SMEs

Category: Strengthening Local Economies

In Argentina and Brazil, GTZ coordinated the joint efforts of industries, public services and professional training institutions to increase the competitiveness of small and medium-sized enterprises (SME). The “training on the job” of representatives of all groups in selected demonstration units guaranteed not only the success of the technical solutions applied in participating companies, but also the broad introduction of new concepts of innovative learning. With adjustments in process organisation and/or specific investments in the production process, a multiple and



lasting direct impact has been achieved: the cutback of energy and other raw material costs as well as the improvement of production control and product quality. In addition, major global benefits coincided with the applied measures: reductions in the consumption of natural resources such as water and energy, the decrease of pollutants at local level (air, water, waste) and globally (CO<sub>2</sub>). With the demonstration units, it has again been proven that motivating SMEs to increase the process efficiency with even highly profitable measures requires additional incentives in order to change their general perception in this area of management. The incorporation of many

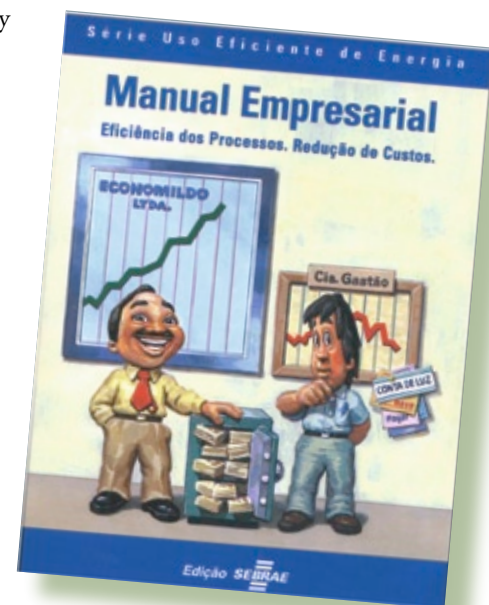
different institutions into the process of change has, in particular, increased the awareness of the individuals and their confidence in the benefits of the proposed and realised measures.

### Challenges

The global potential for reducing energy consumption is enormous. According to projections of the World Energy Assessment, it amounts to some 30–50% in developing countries. This means that expected shortages of energy supply may be made up for by merely using the energy in a more efficient way.

In industry, energy is often used very inefficiently. However, the demand for energy in this sector will continue to increase substantially due to economic growth, and therefore, investing in energy efficiency measures in this sector turns out to be especially beneficial. These investments allow enterprises to gain a competitive advantage and help to create and sustain jobs.

Invest in energy efficiency measures is still a very unusual way to increase competitiveness, even if energy consumption and related costs are high and measures are extremely profitable. This is because in general, entrepreneurs do not have sufficient knowledge about existing options and are not willing to take



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risks in areas that are outside their basic activities (such as producing and selling their products). Additionally, there is often a lack of capital for investments in efficiency measures, especially when the economic perspectives are less promising.

### Strategy

The services offered by GTZ are always tailored to the partner's specific requirements and oriented towards overcoming the existing barriers and shortcomings at different levels in a way that guarantees longlasting impacts.

Two examples are the bilateral efforts to increase energy efficiency in SMEs in Brazil and Argentina. Both are heading for the establishment of an institutional framework consisting of:

- Government agencies at national and local level, enabling them to better formulate their industrial promotion programmes and adapt them to the experiences gained during cooperation (e.g. a special programme to promote energy efficiency in SMEs; incorporation of energy efficiency into the local industrial quality standards and awards in Brazil)
- The local advisory and capacity building structure, strongly incorporated in the design and application of new training methods, thereby increasing the quality and

market of their services offered (e.g. integration of the subject energy into the training courses of regional and national training centres; training of more than 600 employees of the industry and 70 consultants; improvement of technical and economic knowledge in energy-intensive sectors such as brick building)



- Local industry, being the focus of the energy efficiency measures to increase their competitiveness, but also as providers of more efficient and productive technologies.

### Main steps

Since a lasting change of attitudes is best achieved when experiences are gained in practice, demonstration units are planned and realised in a common effort of all network participants. As a result, in both countries, energy-intensive SMEs have been selected and incorporated into a five-step demonstration process:

1. Establishing initial links between the company and local experienced consultants or branches of the national technology institutions and presenting the concept, including a first rough analysis of the production process.
2. Thereafter, an agreement is signed about the future interests and compromises within the demonstration phase. In general, such an agreement formalises the company's readiness to publicise the results of the demonstration project for a broader public, including publications and the possibility of visits of interested entrepreneurs, even the competing companies. A detailed analysis identifies the improvement measures.
3. The results of the detailed analysis are presented to the entrepreneur and a further agreement on the implementation of the measures is signed. This second agreement includes the company's obligation to implement the recommended measures as long as they are reasonable and economically viable. On the other hand, the project guarantees permanent monitoring and advice on the process of adapting the energy efficiency measures.
4. Next, the measures are implemented and their impacts are quantified.
5. Finally, the results are broadly communicated to the public, mainly using the sector-specific communication channels such as their specific publications, round-table discussions or seminars in the respective chambers, etc. A major factor for the success of the publication results, is the fact that the entrepreneurs involved actively participate: they are locally well known to the public and have greatest credibility.

Therefore, the contribution of GTZ and its partner institutions to the demonstration units concentrates on

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supervising the overall process and covering the costs resulting from the consulting services. The lion's share of the overall costs is always covered by the companies themselves, including travel and lodging costs of the consultants and the implementation costs.

### Benefits and Impacts

These demonstration units have already resulted in impressive impacts on energy consumption patterns, pollution and other macroeconomic parameters.

- In Brazil's state Rio de Janeiro, various industries of the brick production, bakery and tyre remoulding sectors have been incorporated as demonstration units. Although energy intensity of the participating sectors varied considerably, between 5% (tyre remoulding), 15% (bakeries) and even 40% (brick production), with investments in modern drying equipment or ovens, a reduction of energy consumption (fuels and/or electricity) between 15 and 45% has been achieved, resulting in significant savings in energy costs, since the costs of the long-lasting investments had payback times as short as 2 years. Simultaneously, impressive improvements have been achieved in the production processes, such as improving product quality or reducing losses due to quality failure. Simultaneously, significant reductions in pollution were encountered, such as e.g. reductions in the emission of CO<sub>2</sub> approximately 70%.

Taking only five demonstration projects into account, some 6,000 tonnes of CO<sub>2</sub> per year have been saved. In 2000, for the first time, the savings of the measures and additional revenues from product improvements and reductions of production losses of the five demonstration projects (approximately € 330,000) surpassed the contribution of German cooperation (€ 300,000).

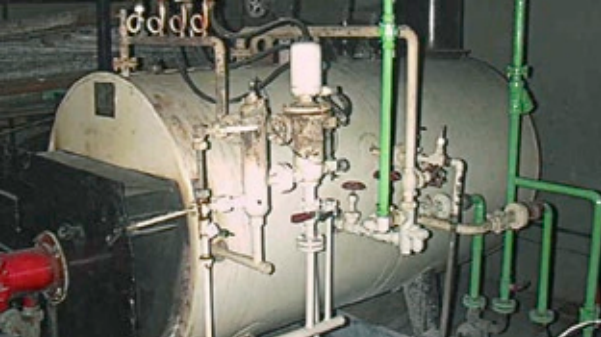
- In Argentina, the dairy and meat processing industry was the focus of the demonstration units. In these SME sectors in particular, the intelligent organisation of the production process is often a major potential for efficiency measures, apart from investments in efficient technologies. Therefore, a significant increase in productivity may be achieved with relatively low investment costs, so that payback times are even lower (very often immediately or within less than a year). Besides important reductions in energy consumption in the order of more than 30%, the lowering of raw water consumption contributes to a reduction in environmental impacts.

### Lessons learnt

The effort to convince SMEs of the benefits of applying energy efficiency measures within their companies has to take into account various circumstances, regarding different areas of action, such as for example:

- Especially when energy intensity is not very high (energy costs less than 15% of the overall production costs), changes in general macroeconomic variables such as energy tariffs or taxes do not always have a great influence on the cost structure. Therefore, other arguments such as the security of energy supply or a general understanding of the relationships between energy input, productivity, product quality, competitiveness and environmental impacts seem to have a major influence on the entrepreneurs' decision making.
- Even if economic arguments clearly favour energy efficiency measures, decisionmakers in SMEs are often reluctant to introduce changes. Therefore, a long-term oriented (external) assistance is necessary to effectively promote energy efficiency measures.





Investigation of energy losses in boilers by using heat measurement methods

- Such external assistance is necessary for a first analysis; it must take into account the specific problems of the sector and should be cheap. Therefore, support from outside is necessary.
- The lack of information and know-ledge about existing options to increase energy efficiency and lack of experience in their implementation are a greater obstacle than the availability of (internal or external) capital. Therefore, programmes of dissemination of successful measures in

a specific sector and region are essential for a broader spread of knowledge. Credibility increases substantially if local entrepreneurs are reporting about their success. Therefore, it is very important to establish an adequate institutional platform and find and include interested entrepreneurs who are willing to share the information.

„As we see it, the Efficient Use of Energy Programme is a matter of survival for our company. It is obvious that a small company cannot implement major changes without the partnership of highly competent institutions. Our company knew how to take advantage of this opportunity, which is so rare in our country.”

Vicente Barbosa Lima,  
Director of Cerâmica Argibem Ltda.



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