# *Regional networks for marketing and diffusion of energy services and energy management systems in competitive energy markets*

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## 1 - SYNOPSIS

The paper indicates promising opportunities for utilities to stimulate energy efficiency in industry, and to gain competitive advantages in liberalised energy markets by intensified customer links.

## 2 - ABSTRACT

The paper describes the successful cooperation of the regional electricity utility PESAG AG with small and medium sized enterprises (SME) in the field of energy efficiency services. Experiences from realised energy conservation projects illustrate the mutual benefits for the customer (lower energy costs) and the utility (customer satisfaction and lasting relations). In the context of the recent liberalization of European energy markets, the positive example of the PESAG's Energy Efficiency Partnership indicates promising opportunities for utilities, to stimulate energy conservation in SME, to contribute to energy cost savings, and to gain competitive advantages in this target group by intensified customer links. By cooperation with universities, suppliers, consultants etc., especially regional utilities have the chance to become the driving force for the evolution of regional competence centers in the field of energy services and efficiency technologies.

## 3 - INTRODUCTION

At the beginning of the 21st century, European industry is facing a double challenge: on the one hand, all opportunities to increase productivity and to cut costs have to be taken in order to cope with rising competitive pressure on global markets. On the other hand, severe threats to regional as well as global eco-systems require a dramatic decrease in resource use in the industrialized countries in order to give room for a sustainable development in the South (Sachs et al. 1998). For both reasons, rational use of energy (RUE) is an area of central importance for industry, because the efficient use of energy contributes to lower energy costs and reduces the energy related environmental impact. In this context, a controversial debate on strategies and instruments of energy and climate policy (such as energy taxes) and on expected impacts of the recent liberalization of European energy markets take place. In this context, even contradictory positions refer to "industry" without further differentiation concerning size, structure, or frame conditions of branches and companies. In addition, most energy economic analyses focus on energy intensive branches from the basic industry (such as steel making, paper&pulp etc.). Thus, SME from less energy intensive sectors with specific features and needs are systematically neglected. This egalizing perspective, however, ignores decisive differences between largers companies and small and medium sized enterprises (SME) (Pfohl et al. 1997), which can have a significant impact on the implementation of energy conservation measures:

- compared to other cost categories, in SME energy costs are typically less than 2,5% of gross production value (DIW 1998).
- contrary to larger firms, SME rarely employ energy experts with sufficient know-how.
- manifold barriers hinder the implementation of energy efficiency measures such as information deficits, insufficient time capacity of technical personnel etc.[1]

Especially with regard to the latter aspects, a wide range of profitable but nonetheless untapped efficiency potentials can be indentified in SME - although suitable and proven technical solutions are freely available on the market. Countless technical and economic analyses in the typical areas of industrial energy use such as compressed air, motors and drives, generation of heat and cold etc indicate, that still comprehensive economically attractive opportunities can be found to reduce simultaneously energy costs and emissions.

In addition, the economic importance of SME justifies to put more emphasis on this target group. For example in the year 1996, in Germany some 2 Mio. SME counted for about 20 Mio. employees, i.e. 99,6% of all firms belong to the group of companies with less than 500 employees and less than 50 Mio. ECU turnover. Around 47% of all taxable turnovers are generated by this group, providing 68% of all jobs in the private sector. SME contribute to about 45% of the gross added value and realise 45% of gross investments (BMWi 1997).

Considering this background, the SME sector represents an intersting but nonetheless neglected field for industrial energy policy and a sleeping market for energy services. In the context of the new competitive frame of deregulated energy markets in Europe, the changing scope for utility engagement in energy efficiency activities of the SME target group is of special interest, leading to a core question:

Are there any possibilities for utilities for realising win-win-solutions in de-regulated energy markets, i.e. to gain competitive advantages by stimulating economically and ecologically sound energy efficiency projects in SME?

In this regard, the paper presents a successful example of an energy service initiative specificly addressed to the small and medium sized industry and service customers of the regional utility PESAG.

## 4 - THE PESAG'S ENERGY SERVICE OFFER

Within the context of the European directive on integrated energy markets, the new German Energy Act (April 1998) prepares the ground for full competition between electricity suppliers. As the decisive consequence for utilities, especially the important group of industrial customers gets new freedom to choose whether to stay with the old supplier or to shift to a new one with more attractive offers. Contrary to the traditional monopolistic position, utilities now experience the necessity to distinguish from competitors by convincing performance, to strive for customer satisfaction by specific products and offers, and to establish robust and lasting customer relations. How did the PESAG react to these developments?

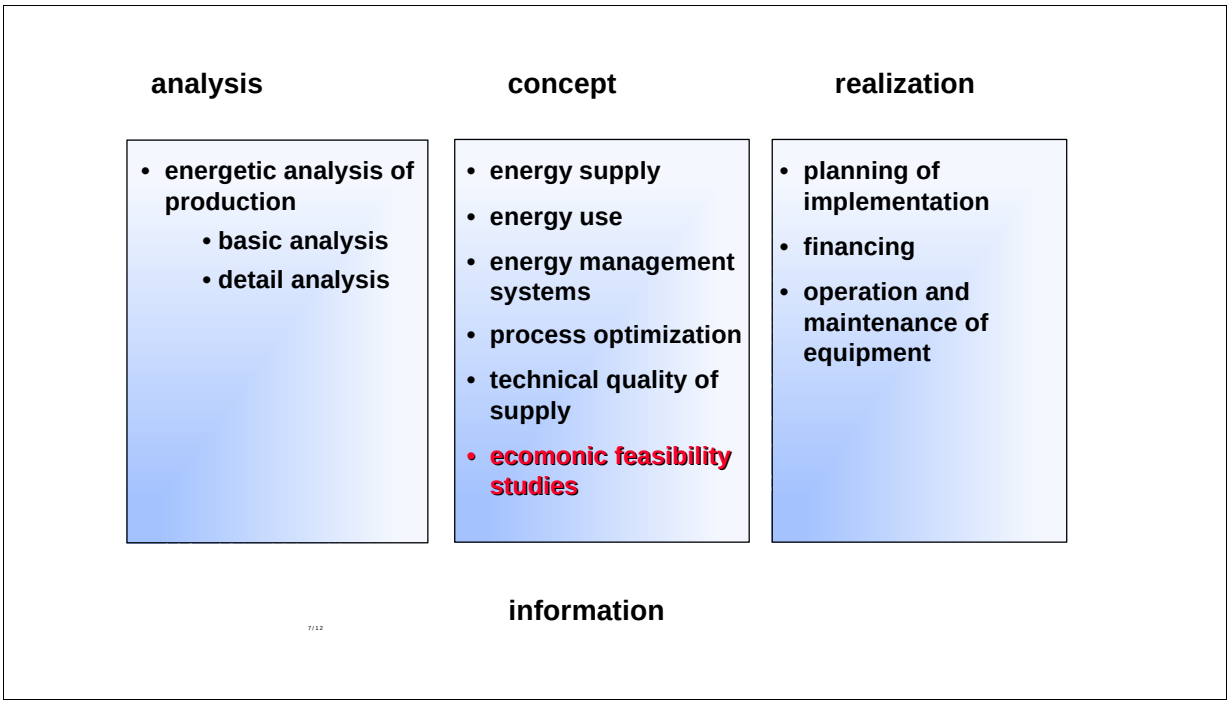
The PESAG AG is a regional electricity utility with some 360 employees, located in Paderborn in the central western part of Germany. Serving as a pure distributor without own generation capacity, in 1997 she delivered 2.222 GWh to her 360.000 customers. The share of industrial customers is more than 50% and industry in the region is characterised by typical SME, which points at the relevance of this target group for the PESAG's business strategy. In preparation to competition, during the last years PESAG has developped and implemented an industry-oriented business strategy which is based on the three cornerstones price, quality, services:

- It can be expected, that competing for industrial customers, **electricity prices per kWh** will play the central role (Löbbe, Kalny 1997). At the moment, the PESAG benefits from a favourable starting position, because since years, she is among the cheapest electricity suppliers for industry in Germany, and currently she holds a second position in the national ranking of the German association of energy consumers (VEA). Further rationalization efforts should contribute to defend this position.
- The **quality of electricity supply** in terms of supply security and voltage is of high relevance for many industrial companies. However, most of the industrial customers tend to consider high supply quality as a mandatory precondition which is taken for granted. Thus, the future importance of quality as a means for competitive differentiation is questionable. Anyhow, in the past PESAG could reduce disruptions in electricity supply to a minimum, so that in this area no major scope for further improvements can be identified.

- Contrary to price and technical quality, however, **energy related services** represent a wide area for distinction from competitors and therefore, a re-orientation of the PESAG's busines strategy took place with regard to these promising opportunities to enlarge the core business of electricity supply.

As conceptual foundation (Bergelt, Schwarze 1997), the PESAG's energy service strategy focuses on the **integrated analysis and optimisation of the firm's energy system**. All activities are orientated to the general principle that a comprehensive analysis and minimisation of the firm's demand for heat, cold etc. has to take place before any energy generation units and supply infrastructure such as CHP or cooling aggregates are planned. By this approach, all energy conservation potentials can be taken into account, so that planning mistakes and over-sizing of equipment can be avoided, which otherwise would have caused unnecessarily high investment costs and needless waste of energy and resources.

To operationalise this principle, PESAG designed an energy service offer with special regard to the specific problems of SME such as the initiation and management of energy efficiency projects (Fig. 1). Taking the rising number of price (re-)negotiations as an occasion for acquisition, these services are actively promoted by extensive marketing campaigns and sold together with electricity to the customers. Special emphasis is put on communicating the net benefit to the SME, e.g. through lower energy bills, better product quality etc. It is the purpose to convince the customer to accept the service offer as a compensation for price reductions and to enter the service cooperation as a core contribution to durable supplier-customer relations.



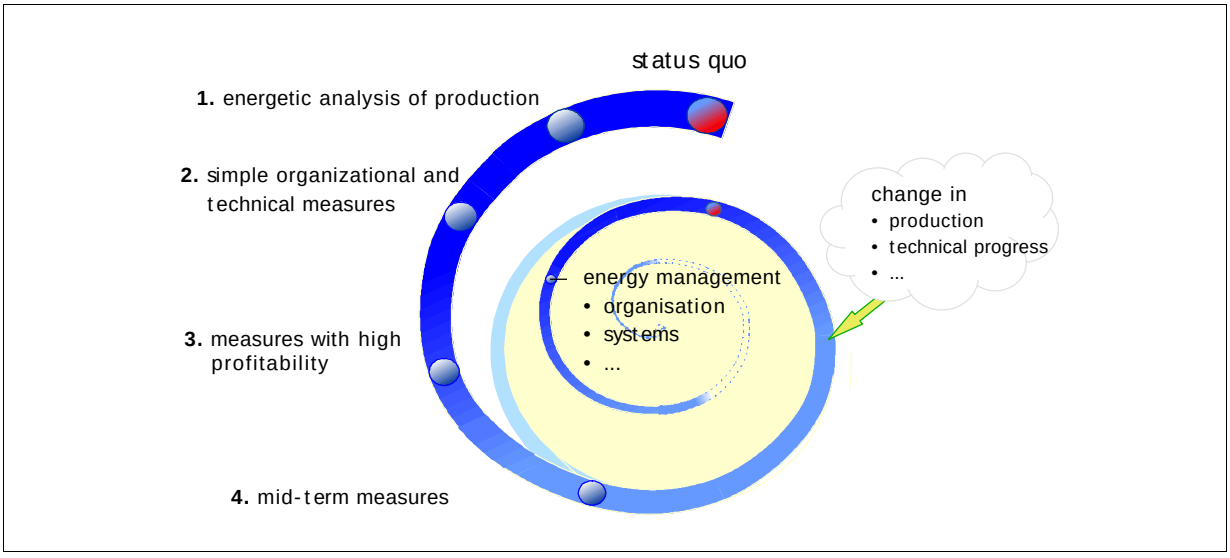

***Figure†1: Energy service offer by PESAG***

Beside energetic analyses, the offer includes energy concepts to optimise the energy supply infrastructure and energy consuming equipment, energy management systems, process optimisation and economic feasibility studies. If desired by the customer, PESAG assists the SME during the realisation e.g. through concrete planning of implementation steps, project management, financing (contracting), and operation and maintenance. In addition, energy related information is provided by seminars, publications etc. All in all, the energy service approach aims to establish a process of long-term cooperative action with the customer, which can be characterised by the following main features:

- Within the energy service offer, **analyses of the SME's energy system** play a prominent role. The implementation of energetic analysis depends on a complete documentation and processing of all relevant energy data (Mauch 1998). Based on the resulting picture of the status-quo, energy conservation potentials can be identified and profitable measures can be recommended. Depending on the energetic status-quo and the customer's preferences, two modes of analyses are offered: in most smaller companies, the major

problems and most important measures can be identified by a basic audit. For larger firms or more energy intensive production process, however, additional investigations and precise measurements will be required within the frame of a detailled audit. Experience from completed analyses indicate, that often the costs for an analysis can be shortly recovered by direct savings from immediate measures, mainly by good housekeeping (idle running of equipment, leckage of pressured air systems etc.).

- An energetic analysis generates an overview in all possible energy efficiency measures in the SME. When summing up the total effort needed to realise all these options at one stroke, however, in most cases the needed personnel and technical capacity is far beyond the scope of SME. Therefore, the concrete planning of the implementation schedule has to follow a **gradual approach with long-term orientation** which respects the financial and personnel limitations of the firm (Köllinger et al. 1998). Building on the hitherto experiences, the PESAG tries to distinguish the identified options into manageable sub-projects and their successive realisation, and the implementation path usually taken is organized as follows (see Fig. 2):




***Figure†2: Stepwise and ongoing optimisation of the company's energy system***

- In line with the energetic analysis, immediate measures are implemented which require simple organisational changes and little technical efforts (e.g. adjustment of existing control devices, maintenance of pressured air systems). The measures usually pay off very rapidly and often cover the expenses for the analyses, too.
- As a next step, distinct technical measures such as investments in waste heat recovery, lighting systems etc. are taken. Here, the PESAG provides assistance for project specification and management.
- Finally, the energetic optimisation is completed by comprehensive mid-term measures e.g. concerning changes in production processes or building's retrofit. The profitability of these options often depends on regular investment activities such as periodical re-investment in production technologies, shift of products, move to another location etc.

- Through realisation of all measures identified by the energetic analyses, the company achieves a temporarily energy efficient level of production and operation. However, the situation might change e.g. if economic parameters alter due to energy price changes or if technical and organisational innovations offer new profitable opportunities. In this moment, an adaptation of the energy system would be recommended but in many cases the firm remains passive and lets the chance pass by. In order to recognise and benefit from emerging opportunities, an **"infrastructure" for continuous energy savings** is needed. This can be provided by energy management systems due to their monitoring and control function. Complemented by organisational measures such as explicit introduction of energy responsibilities, detailled controlling of energy costs, energy related training etc., such an infrastructure provides the necessary impulses and background for ongoing activities. The PESAG is putting increasing emphasis on these aspects of continuous activity and perpetuation of engagement.

Compared to the traditional attitude of electric utilities of producing and selling only "kWh", the energy service approach represents an remarkable re-orientation of business strategies. Obviously such a shift of focus cannot be accomplished by one stroke. It is a distinct feature of the PESAG story, that for six years now the energy service strategy has been elaborated gradually but consequently, so that the present success is based on a sound and organic growth of engagement. Starting in 1993, the first pilot studies and projects have been carried out by graduate students which were supervised by PESAG and university staff. Since then, the approach has permantely refined and expanded in a very pragmatic manner, and implementation results, new ideas and proposals have directly been translated into concrete pilot projects, which served as a foundation of new products and service offers. In addition to the fact that PESAG's top management devoted extra manpower and training to the consulting personnel - the **"Energy Efficiency Partnership"**, a cooperation with regional partners was of crucial importance for the lasting and growing success. Beside regional universities, consultants and technology suppliers, the collaboration with the Westfälische Umweltzentrum (WUZ), a consulting body at the University of Paderborn, can be seen as the core of the cooperation modell. In the last years, all analytic and engineering tasks have been centrally coordinated by PESAG and performed by the engineers of the WUZ. Recently, the cooperation entered a new stage of professionalisation by creation of the new energy service company ENEX, which transfers engineering know-how of the university and the WUZ to a market-orientated enterprise, which is prepared for further growth of business opportunities.

## 5 - COOPERATION PAYS - SOME LESSONS LEARNED FROM THE CASE STUDIES

How does the concrete implemetation of the energy service strategy look like? In order to give an impression on the concrete work and scope of PESAG's engagement, this section presents three examples of successful cooperation projects. They illustrate some essential aspects of the approach, which turned out to be major factors of success.

### 5.1. Results from selected examples for successful cooperation

*5.1.1. Example 1:Energy management system in the plastic recycling company Höku*

Since 20 years, Höku is working on plastic processing and the recycling of pure PVC waste from window, foil and chip card production. Due to a strong growth of the national recycling market, production capacity has been continiously expanded, and in 1995, the move to a new location was inevitable. At the moment, the firm counts nearly 100 employees and is processing some 10.000 t of PVC waste. In line with the planning of the electricity supply infrastructure for the new production location, an energetic analysis was initiated by the PESAG. At that point, the gas fired heating system was already planned, but the company owner could be convinced to wait for the results of an energy audit. The documentation of the status-quo identified several conservation options. First, a remarkable amount of waste heat from the extruders was not used. Second, shredders and mills with high electrical power demand were erratically switched following the spontaneous requirements of the production process, which - combined with useless idle running - caused unneccesary energy consumption and thus costs. In addition, the lighting system of the production building was permanently in use without taking daylight nor real working hours into account. With regard to the identified opportunities, a two-step energy concept was elaborated by the PESAG:

1) In the first step, four cooling aggregates have been converted to heat pumps, which use the waste heat from the extruders for space heating of the production and storage buildings (11.000 $m^2$). Due to the waste heat recovery concept, the installation of the gas-fired heating system could be cancelled, so that over 63.000 ECU investment costs for the gas fired heating vessel could be avoided. Further annual savings amount to more than 18.000 ECU fuel cost per year (700.000 kWh/a natural gas).
2) In the second step, an innovative energy management system was developped, tested and implemented, which had to serve the following functions:

- cut of excessive peak load
- prevention of idle running of equipment
- control and manage the HVAC and lighting system according to daylight conditions and working shifts
- cost transparency for all energy and material flows
- documentation of operation hours as basis for preventive maintenace
- supervision of operation status of equipment and alert function for technical faults

Due to the positive experiences from the first sub-project and the resulting confidence into PESAG's competence, the company owner agreed to touch sensitive areas of production (such as shredders and extruders), and to take the risk of a R&D cooperation with the PESAG and the regional technology firm Weidmüller. The implemented LONWorks-technology (Local Operating Network, Müller 1991) allows to design decentral energy management systems specificly for the needs of SME (Alewelt, Schwarze 1996). The new energy mangement system induced annual savings of some 16.000 ECU/a by peak load reduction of 150 kW (-15%), and 3.700 ECU/a less electricity costs (no idle running, lighting). Furthermore it provides better cost transparency for electricity, space heating, water, and reduces O&M costs through preventive maintenance (e.g. documentation of operation hours of shredder for just in time replacement of cutters). In total, the measures described contributed to a reduction of yearly energy costs by 12% and CO2 emission by 200 t. The flexible and decentral design of the LON-structure enables a continiously optimisation of the energy management system and permanent adaption to changing production conditions. In this respect, a learning energy efficiency infrastructure has been introduced which will serve as basis for future improvements and cost reductions.

*5.1.2. Example 2:Strategic selection of Bette as pilot case study*

Bette is a medium sized producer (220 employees) of baths, which is following a distinct niche strategy focussing on the high price market segment. Established in 1952, nowadays the company is run by a charismatic co-owner-manager. He is representing a classical type of enterpreneur with centralised power and competences, but at the same time with social responsibility - and he is the president of the regional chamber of industry and commerce. Attracted by a probably significant multiplication and marketing effect, the PESAG was striving for a common pilot project with this particular firm from the very beginning of the energy efficiency partnership. After certain reluctance, a first pre-audit could be conducted by a student, which provided an unexpected interim success of detecting large energy saving potentials with low effort (e.g. in the field of pressured air leckages). These experiences served as an "eye-opener" for the manager, and convinced him to agree in further analyses and cooperation. A recent, comprehensive study of the energy system identified remarkable energy efficiency options, which are planned to be tackled in the near future (Tab. 1).

**Table 1: Results of the energetic analysis at Bette**

| type of measure | investment costs (EURO) | final energy savings (kWh/a) | energy cost savings (EURO/a) |
|---|---|---|---|
| good housekeeping | neglible | 225.000 | ca. 4.000 |
| waste heat recovery (compressors) | 19.200 | 625.000 | 11.100 |
| waste heat recovery (surface treament) | 67.500 | 2.060.000 | 36.900 |
| monitoring&control of heat station | 81.700 | 400.000 | ca. 7.200 |
| **total** | **168.400** | **3.010.000** | **59.200** |
| planning costs | 21.400 | | |

Apart from these energy savings, this example is of special importance for the understanding of the strategic marketing effort of PESAG. Through continuing communication, marketing and acquisition efforts, PESAG got access to this particular firm, which then served as an outstanding best-practise example to the regional target group. At various occasions such as business receptions, executive meetings etc., PESAG was able to present the company owner and chamber president as a speaker, telling his own positive experiences with the initiative and the service offer. Beside a high persuasion power of this special example, the marketing effect was multiplied by the usual interest of the regional media in key figures from the region.

### *5.1.3. Example 3:Optimisation of electric foundry and surface treatment in the metal processing company FSB*

Employing totally 720 employees at two production plants, FSB is using mainly state of the art technologies to produce door handles and fittings of aluminium, brass and high grade steel. Up to now, energy analyses have put emphasis on the very energy intensive production of aluminium handles consisting of the melting of delivered aluminium ingots, foundry of handles, mechanical processing and the final surface refinement by an eloxal process. As a first step, the electric aluminium foundry has been optimised (Schardt, Schwarze 1996). The central melting by inductance was replaced by decentral melting by resistance heating, the ovens were modernised and a facility mangement system for equipment control was introduced. The following results could be achieved:

- decrease of electricity consumption by 250.000 kWh/a
- reduction of CO2 emissions by 145 t/a
- reduction of electricity peak load by more than 300 kW (-25%)
- decrease in specific energy consumption by 18%
- energy cost savings of some 32.000 ECU/a
- increase in quality through less wastage (from 6,1% down to 4,3%)
- higher work security (no more on-site movements of hot aluminium)
- rationalisation by automatic management and control of equipment
- improved maintenance of ovens
- cost transparency concerning energy and water consumption

Immediately after the first project in 1996, preparations for the planning of a new eloxal process started. With regard to the yearly operation time of 5000 h, FSB considered to install a block type CHP module, but at this stage options for the rational use of energy - e.g. by internal waste heat recovery - were hardly taken into account by the technology suppliers. For that reason, PESAG proposed a detailled energy analysis in order to minimise the energy demand of the process, and, thus, to prevent a costly over-dimensioning of the CHP module. Centrally coordinated by the PESAG, a R&D consortium worked out a detailled and optimised energy concept (ELOX 2000) which includes all components of the eloxal process as well as other waste heat sources. The energy system of the surrounding infrastructure such as space heating, ventilation, warm water, lighting, energy management was integrated into the planning, so that the energy demand for heating and cooling can be significantly reduced (Schardt, Schwarze 1998):

- coverage and wall insulation of heated baths decrease the heat demand of the process by 35% compared to the reference case (reduction of energy costs by some 20.000 ECU/a)
- recycling of wast heat covers the total low temperature heat demand (<40°C) without additional fuel consumption (reduction of energy costs by more than 5.500 ECU/a)
- the heat buffer simultaneously fullfill cooling functions without further electricity use, the remaining cooling systems could be reduced in size and costs
- support of the space heating system by low temperature wast heat by 40% (reduction in fuel costs of more than 15.000 ECU/a)
- a retrofit of the lighting system with use of dayligh reduces the electricity consumption by 20-60 % (reduction of energy costs by some 2.000 ECU/a)

The concept ELOX 2000 is a striking example how to reduce energy consumption and prevent oversizing of energy infrastructure by cooperative and integrated planning from the very beginning (Tab. 2). At the moment, the project has reached its final realisation phase and a start of operation is expected for summer 1999. Follow up projects of the consortium are planned concerning the integration of the eloxal process and the rest of production in a new energy management infrastructure based on the mentioned LONWorks.

**Tab. 2: Comparison of the energy concept ELOX 2000 with reference plant**

| | ***reference process*** | | ***optimised process*** | | ***savings*** | |
|---|---|---|---|---|---|---|
| | GWh/a | t $CO_2$/a | GWh/a | t $CO_2$/a | GWh/a | t $CO_2$/a |
| **baths** | 2,2 | 540 | 1 | 240 | 1,2 | 300 |
| **heaters** | 1,2 | 300 | < 0,1 | 10 | 1,2 | 290 |
| **total** | **3,4** | **840** | **1** | **250** | **2,4** | **590** |

### 5.2. What can be learned from the case studies for the set up, the communication and the marketing of energy services in the SME sector?

When looking at the various cases, some general characteristics and process factors can be found which appear to be typical for successful cooperation with SME - although the firms contacted so far vary in terms of green company culture, energy experiences, personnel capacities or technical know-how. PESAG's experiences with the marketing of energy services to SME emphasise, that successful energy efficiency activities are determined by a mulititude of influencing factors. Contrary to a widespread and simplifying assumption, the realisation of a conservation measure does not exclusively depend on the economic perception of profitability but has to be understood as a process of communication, social interaction and relation-building over time (cf. InterSEE 1998). The following aspects turned out to be of major importance:

- The cooperation of the PESAG team, the WUZ consultants and others together with the SME staff represents an intervention into the social and organisational structures of the SME. Within the course of an energy analysis, thus, the smooth collaboration of all actors involved in the auditing process is of paramount importance in order to get a comprehensive knowledge on practical problems, hidden potentials and appropriate solutions. For that reason, communication and participation of the firm personnel has to be ensured on all hierarchical levels:
  - The internal key actors - mostly technical managers - have to perceive energy efficiency as an important issue of personal responsibility, which motivates them to push energy conservation measures personally.
  - Sooner or later, energy efficiency projects have to receive the commitment of top management, which requires extensive and directed work of persuasion (see Bette case study).
  - All staff members have to be ready for external inputs and proposals, this holds for example for the (lower) technical personnel which sometimes refuses cooperation because they fear control and supervision by experts from outside In this case, all participants have to be aware about inevitable frictions in collaboration and the resulting need to demonstrate patience, engagement and readiness for discussion until the problem is settled.
- The PESAG took benefit from a traditionally intense communication with their customers. Through regulation talks and on-site visits they got hold of favourable occasions for intervention such as regular investments, move to new locations, new buildings, shift of production programm etc. In these cases, the effort and costs for energy efficiency measures can be significantly reduced (see Höku case study). In this regard, a holistic understanding of the firm’s energy system and a consideration of (qualitative) positive side effects such as gains in productivity, work security, motivation etc. contribute to a comprehensive exploitation of energy and cost saving potentials (see FSB case study).
- The SME target group hardly undertakes energy efficiency measures on its own. Very often, the PESAG gave the decisive kick to start action (see Höku). Corresponding to this inertia, the energy service offer has to be actively promoted and communicated to the target group in the region. By the help of a considerable marketing effort by media campaigns, regular business executive meetings and deliberate use of

multiplicators, the PESAG initiative has been disseminated (see Bette). During the last months, the movement gains momentum and an increasing stream of self-motivated requests can be noticed (cf. Fig. 4 in section 5.3).

- From the very beginning, the energy service apporach is directed to long-term cooperation and lasting customer relations. On the base of personal contacts and suitable start projects of feasible size, trust and confidence can grow as necessary precondition for further and more intensified collaboration (see Höku and FSB case). Through appropriate sub-projects, in the SME energy related know-how can be build up successively, and their successful completion allows an evaluation and documentation of (interim) results and a feedback of success. This is a crucial precondition for on increase in staff's motivation, identification and engagement, which fosters further activity.

### 5.3. Overall results and future prospects

Looking at the record of case studies, successful examples of quite different nature can be found, which provide an extensive pool of information. Typical for organic developments, however, a systematic and methodological sound evaluation has been neglected during the first period of growth. For this reason, a database for a systematic economic and ecological evaluation of project performance is still under construction which will enable a more profound basis of future strategies of marketing and expansion. At the time being, thus, a comparision of recent projects with former activities is not possible due to the insufficient methodologies of documentation of early projects during the start period. So far, a first sample of 12 completed case studies has been evaluated, which demonstrate the economic benefit of the enerrgy service offer for the customer. In most of the 12 cases depicted in Fig. 3 (next page), significant saving could have been achieved with acceptable pay-back times of 2-3 years.

The positive feedback and a rising acceptance of the energy service offer indicate (Fig. 4, next page), that the chosen approach could have been communicated to the industrial customers and have met an evolving demand (e.g. 64 % of all industrial customers expressed a serious interest in energetic analyses). All in all, some 60 projects (analyses and implementations) have been concluded end of 1998, and another 100 new activities are planned for 1999.

In order to expand the initiative, PESAG is working on an extension of the energy service offer with special regard to new target groups such as services. For example, an initiative "Hospital 2000" has been launched which is specificly dedicated to the 26 hospitals and spas of the regional health sector. As a further area of activitiy, PESAG is coordinating technical RT&D in the field of electronic energy management systems, which promises to gain increasing importance.

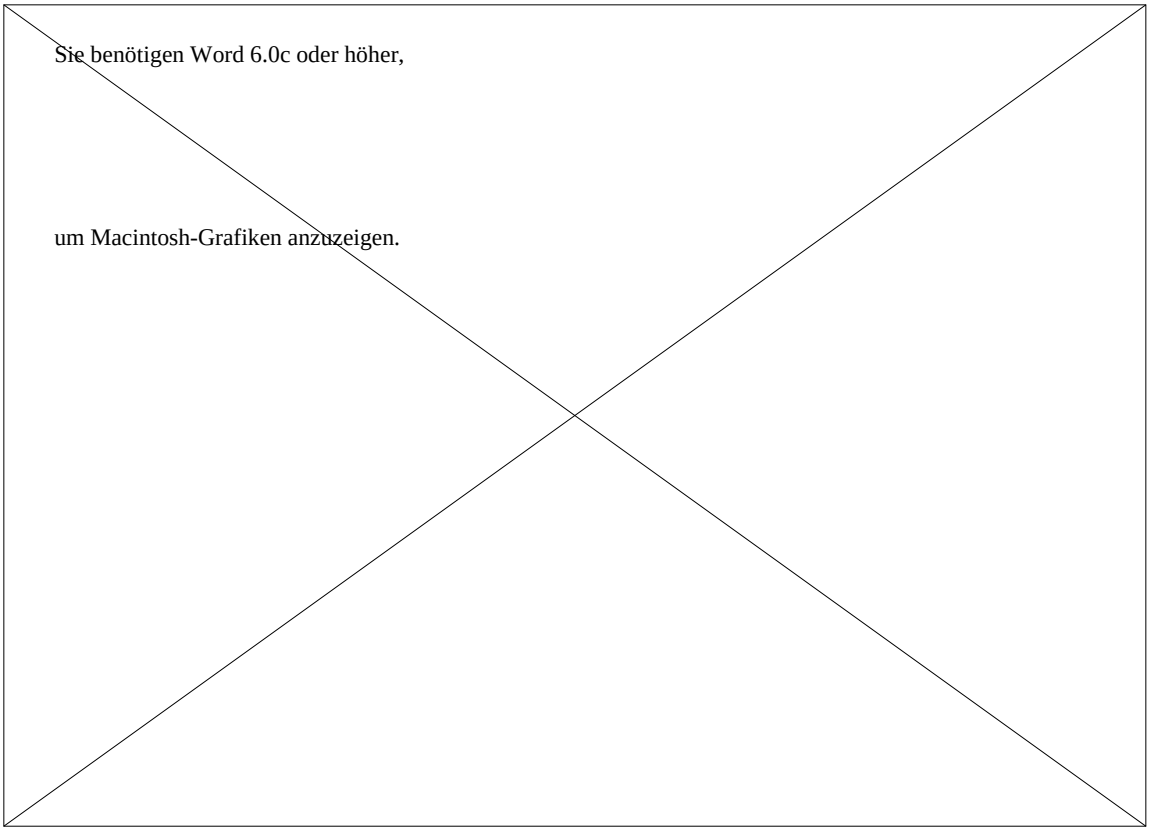



***Figure 2:*** *Economic performance of 12 case studies*

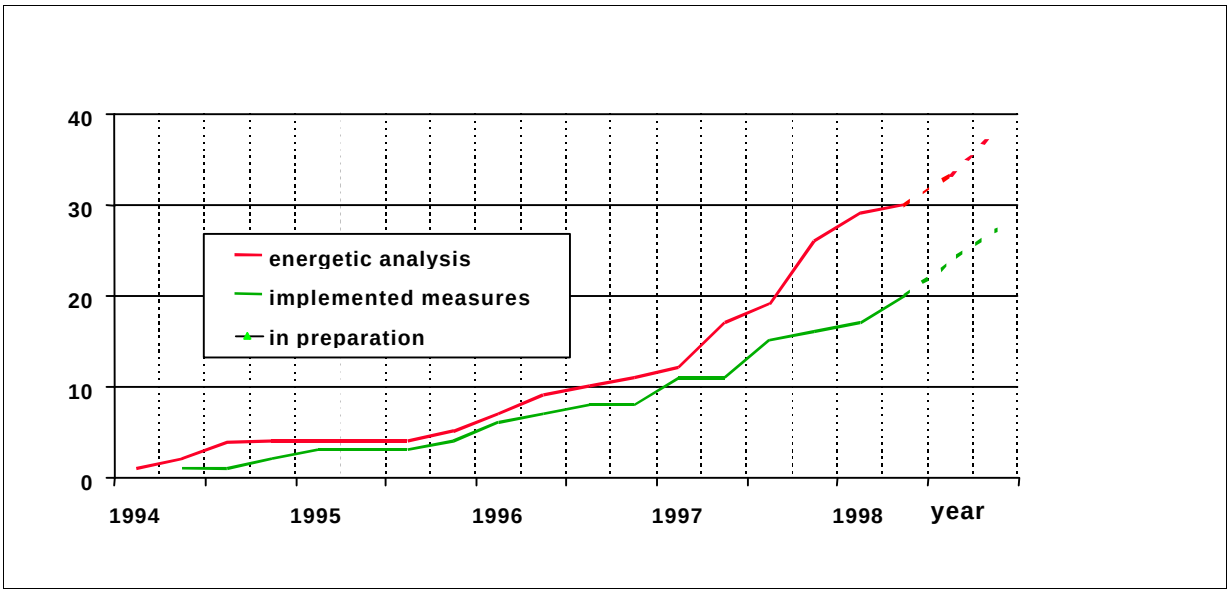



***Figure 4:*** *Total number of energy efficiency projects until end of 1998*

## 6 - WIN-WIN SITUATIONS DEPEND ON AN INTEGRATED UNDERSTANDING OF COMPETITIVE ENERGY MARKETS

The Energy Efficiency partnership of the PESAG gives a convincing example for benefits which occur both for utilities and the industrial customer - a "win-win-constellation" under competitive framework conditions:

- Obviously, SME gain through support for reducing their energy costs (higher competitivity) and decreasing their environmental impact (enterpreneural responsibility for climate and resource protection). Additionally, the service offer corresponds to the general trend towards outsourcing and consultancy.
- Contrary to common suspicion, the PESAG, too, takes profit from supporting energy efficiency projects. First of all, cooperations within the frame of energy service intensify the links to her industrial customers which will emerge as a paramount competitive advantage in future energy markets. In addition, integrated approaches for optimising industrial energy systems offer various innovative electricity applications (process technology, control devices, waste heat recovery etc.), which contribute to significant reductions in energy consumption and emissions[2]. Further benefits result from gains in creditibility and image, especially in the field of a regional and ecological responsibility of the utility.

Moreover, the PESAG case clearly demonstrates, that a basic precondition for a realisation of mutual benefits for industrial customers, utilities and the environment has to be seen in an **integrated understanding of energy services and competition in energy markets**. Such an intergrated understanding has little in common with the prevailing short-sighted price-dumping attitude, enforcing a race to the bottom line of economic and ecological rationality. By the contrary, from an integrated perspective, energy prices *per se* cannot be the only strategic variable. The firm's yearly energy bill - which is the ultimate factor of competitiveness - is not exclusively driven by energy prices, because to large extent it depends on the transformation efficiency within the company's energy system. Therefore, industrial customers are not interested in energy in and of itself. What they need for their production purposes are energy related functions such as well tempered rooms, cooled storages, moved semi-products, lightened work places, communication etc. (see Fig. 5 below). Final energy carriers such as electricity or gas are purchased in order to be transformed within the firm's energy system (heaters, compressors, light bulbs etc.) into useful energy which serves the given demand for energy related functions.

Accordingly, a holistic perspective is required which focuses on the minimisation of the firm's total energy inputs and costs to serve their given demand for energy related functions. This minimisation should include all transformation steps in the sense of :

- an intelligent use of ⇨ adequately dimensioned, highly efficient components ⇨ which are properly run and maintained ⇨ together with the choice of cheap energy suppliers.

In this context, the company has to solve a multi-dimensional optimisation problem concerning the optimal mix of

- energy technologies,
- energy services (such as auditing, planning, operation & maintenance, consumption monitoring & management, training & qualification etc.), and
- energy inputs (electricity, gas, oil etc.).

Hence, a strategy to increase competitiveness in SME cannot be restricted to cheap end-use prices but has to built on the **competition for the intelligent and cost-minimized provision and use of useful energy**.

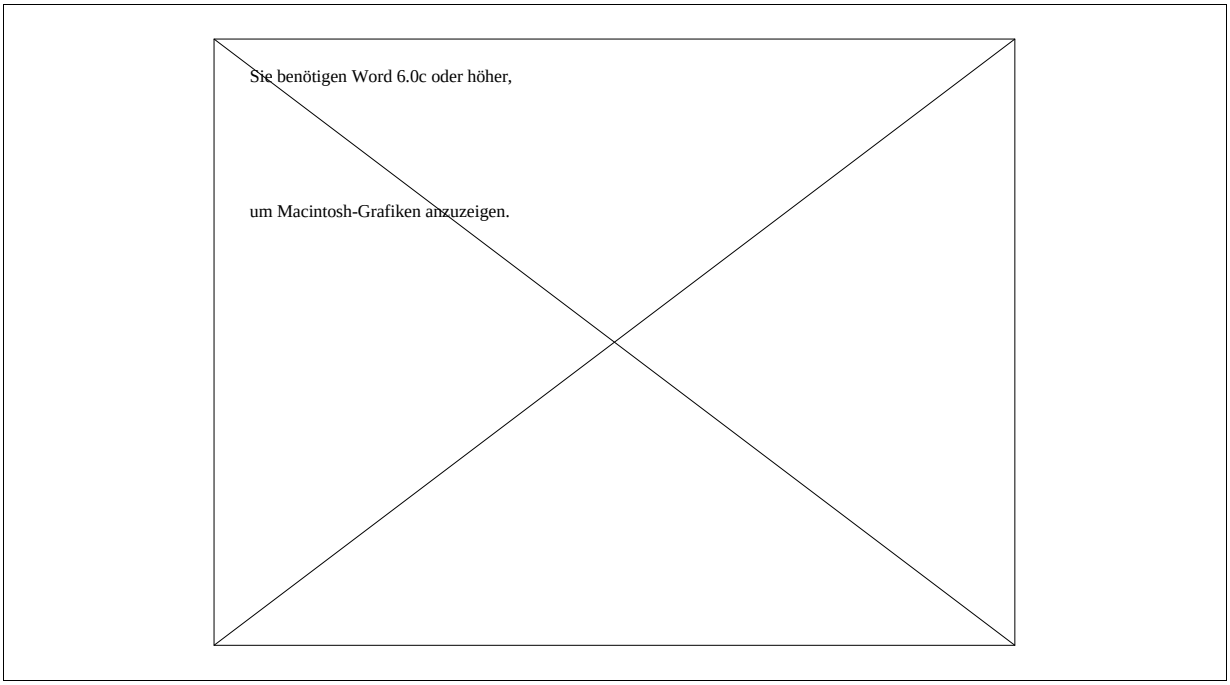



***Figure 5:*** *Integrated optimisation of industrial energy systems*

## 7 - CONCLUSIONS

The PESAG's Energy Efficiency Partnership is an example for a translation of the integrated understanding of energy market competition into a concrete - and successful - business strategy of a regional utility. As described, even in times of de-regulation, growing competition and increasing strategic uncertainty on energy markets, manifold opportunities for "win-win-solutions" can be realised, if utilities and industrial customers take their double responsibility for climate and resource protection and preserving competitiveness for serious. In this regard, especially energy services offer an opportunity to utilities to trigger energy conservation activity in SME, to realise net benefits for the firm, and, thus, to achieve competitive advantages by intensified customer links. In cooperation with universities, suppliers, consultants, regional agencies etc., therefore, utilities can serve as important driving forces to establish and expand regional initiatives in the domains of energy services and efficiency technologies.

## 8 - ENDNOTES

(1) Hermes et al. 1998, Enquete 1995, Gruber, Brand, 1991, Energie und Klima 1990

(2) Any final evaluation of technical alternatives, however, has to take place on the level of primary energy inputs, i.e. counting for transformation losses in the electricity sector.

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