



www.serid.ait.ac.th/seric

The Case of Energy Agencies: German Experiences and Lessons Learnt for Thailand and Asia (December 2006)

Christoph Menke

Abstract - Providing efficient energy service is often more economical than building a new power plant or deliver more energy for heating, lighting and cooling needs. Nevertheless, the shift towards more efficient technologies is not automatic, due to a number of barriers such as lack of information about energy efficient technologies and experiences with their implementation, lack of skilled and trained personal, lack of capital among potential investors, conflicting interests between investor and users, and a lack of financial or other incentives for decision-makers. Renewable energy technologies such as Solar Home Systems face similar barriers to their implementation. Often energy supply is subsidized and external costs are not included in the pricing, leading to distortion and an underinvestment in energy efficient technologies.

Most of these barriers can be overcome when you bundle knowledge, information, and project management skills in adequate institutions. Government and their direct institutions usually do not have the capacities to fulfill this task effectively and efficiently.

In Germany, as in other countries, this led to the idea of founding energy agencies (EA) many years ago. These energy agencies have many advantages in handling the "four A" (Awareness, Acceptance, Affordability and Access) and other problems successful sustainable energy policies have to cope with.

The focus of this paper is to present an overview of German experiences with different concepts of energy agencies. It will describe their institutional structures, their fields of activity as well as their finances and last but not least: the justification for their establishment. The paper will conclude with lessons learnt and recommendations for the establishment of energy agencies in Asia, especially in Thailand.

Keywords—Energy agencies, Energy efficiency policy, German experience, Lessons learnt.

1. INTRODUCTION TO ENERGY AGENCIES (EAS) IN GERMANY

The first energy agency in Germany was founded in 1987 in the "Saarland", one of the 15 federal states of the Federal Republic of Germany. Shortly after several initiatives in other federal states followed (e.g. HessenEnergie, Berlin Energy Agency, EA Lower Saxony). The latest counts of Berlin Energy Agency (Geißler 2005) yields in a number of 9 federal agencies and around 25 regional and local energy agencies, including the "Deutsche Energie Agentur (dena)", the new German national energy agency, which was founded in 2001 (www.deutsche-energie-agentur.de). The regional and local EAs have created as well an independent national coordinating organization, the "Verein der Energie-Agenturen-Deutschlands eaD eV" (www.ea-d.net) which supports the cooperation among regional EAs and helps to replicate and disseminate successful programs in other EAs. It serves as an information platform for the EAs and communities, which want to plan and implement energy efficiency programs. (A complete listing of German EAs is available under

(www.berliner-e-agentur.de) there under links to energy agencies.)

Starting in 1995, the European Community has supported through its SAVE - program the implementation of local EAs, mostly on a communal level. Due to that program their number has grown on the European level to more than 141. There is as well a European organization of regional EAs called FEDARENE (www.fedarene.org) which coordinated the information exchange among the European EAs.

2. WHAT IS AN ENERGY AGENCY?

There is no homogenous definition of an EA. An "agency" can be defined as "active force/operation", or as "an organization that offers a particular kind of assistance", or as "an administrative division of government with specific functions". All of these definitions indicate an active mediation and representative role regarding energy issues. Energy agencies act as links, mediators and as realizing organization in the context of governments, enterprises and financing institutions. Their aim is to promote three general objectives of energy policy: a secure, an economically viable and an environmentally friendly energy supply.

They achieve these goals by carrying out information and motivation campaigns, supporting the launch of innovative services and technologies, offering consulting services, running model projects and/or as well selling environmentally friendly energy.

Prof. Dr.-Ing. Christoph Menke is attached to the Joint Graduate School of Energy and Environment (JGSEE), King Mongkut's University of Technology Thonburi, 91 Prach-Uthit Road, Tungkrui, Bangkok 10140, Thailand. Tel.: + 66(0)2-470-8339, Fax: + 66(0)2-470 8355, E-mail: menke@jgsee.kmutt.ac.th or menke@fh-trier.de

In this context institutions, which provide merely financial support to subsidy beneficiaries but have no specialized personal to assist in energy consultant services, as it is the case with state or support banks. They are not considered to be an EA. A more detailed description of typical fields of activities will be given in the next section. The fields of activity also depend on the institutional background and financial support of their owners/shareholder, which will also be investigated in the next section.



Fig. 1. Map of German Energy Agencies (Based on Clausnitzer/Münc 1998).

3. TYPICAL FIELDS OF ACTIVITIES OF GERMAN EAS

To categorize, two major types of EAs can be distinguished, although in reality, there is a flowing transition between the two groups:

- 1) *Information and motivation (I&M EAs)* oriented agencies, including communal and SAVE energy agencies, and
- 2) Agencies with a strong entrepreneurial focus, which sell *consulting services and/or act as energy service companies (C&E EAs)*.

The following list gives an overview of typical tasks carried out by EAs, sorted by the above mentioned grouping.

Information & Motivation (I&M) Energy Agencies Carryout:

- Information and motivation services for municipalities, governments and enterprises on rational energy supply, efficient energy use and renewable energies,

- public awareness and image campaigns, i.e. energy efficiency labels,
- initial and branch consultations through preliminary and detailed analyses,
- networking and support for other EAs, including those in other central and eastern European Countries (i.e. OPET – Organizations promoting Energy Technologies)
- lectures, capacity building and qualification measures,
- promotion of innovative technologies, i.e. biomass or solar energy
- mediation services (i.e. technical advisors and expert engineers or energy service companies) and
- providing sponsoring funds for research.

I&M EAs may also offer services to government and policy institutions, such as:

- conception and processing of subsidy and support programs,
- consulting and support for regional or federal energy governments, and
- evaluation of energy policy measures.

The second category of energy agencies, the *C&E EAs* offer:

- market-based and cost-covering consulting services, in competition to other consultants (e.g. implementation of third party financing models),
- ESCo activities, including development, planning, realization, financing and operation of decentralized heating and power units for building supply (i.e. CHP systems for hospitals).

In between the clear cut I&M and C&E activities, *both EAs* also can offer services, like:

- energy management and reporting for municipalities and enterprises,
- energy supply concepts for municipalities and enterprises
- energetic optimization of urban planning guidelines,
- supply of buildings and district heating/cooling concepts,
- design of organizational and financial structures (i.e. ESCo models, wind power funds, ...)
- development of energy service products.

Energy Agencies Offer their Services Primarily to:

- Small and medium sized businesses (i.e. hotels, private business, like private swimming pools, which are heated in Germany or manufacturing plants),
- States and municipalities in their role as building owners (public offices, schools or hospitals),
- Housing companies (energy supply concepts, district heating/cooling),
- Multipliers such as engineers, architects or warehouses in the case of I&M activities.
- Private households are the target group for many I&M-campaigns as well as for energy audits carried out by small and communal EAs.

In many cases, I&M EAs prepare the ground for introducing innovative energy services to the market. Thus they support other business groups such as manufacturers, the appliance industry and engineers.

4. SELECTED PROJECTS AND TYPICAL ACTIVITIES

Some more detailed presentations of selected projects and typical activities of the different types of EAs are:

a) Capacity Building - IMPULSE Program (Energy Agency North-Rhine Westphalia, EA NRW, www.ea-nrw.de)

The EA NRW is a good example for an I&M EA. It runs e.g. an impulse program (REN Impuls -Program). The impulse program is an initiative for capacity building and know how transfer all around energy with a strong focus on real-world relevance. Its goal is to promote energy efficiency and the use of renewable energy sources.

The program is divided into two sectors:

- 1) The sector "Building and Energy" deals with energy and environmental balances and analyses for existing and new buildings, with a focus on energy saving technologies. It is being supported by the state ministry for urban planning, housing, culture and sports.
- 2) The second sector "Rational Use of Electricity" offers know-how and ideas for electrical energy efficiency and economical energy management. It is being supported by the federal state ministry for economics and middle classes, energy and transport.

In the framework of its impulse program, EA NRW offers a total of roughly 50 different seminars on the above mentioned themes, including instruction material, participants- and lecturer documents as well as marketing material. EA NRW provides lecturers to all capacity building institutions including in house and institutional organizers. Target groups are being addressed effectively through applied trainings and hands-on activities. Costs are limited to lecturer fees, room rents and catering. In addition, EA NRW offers services such as the organization of conferences, workshops, excursions and in-house motivation campaigns.

Example seminars include:

- Bakeries: energy consumption analyses and reduction of operational cost
- Architectural impulses: a discussion forum on energy efficient and ecologically sound architecture
- Electric Drives: Design and operation with integrated energy- and cost optimization

The impulse program does not intend to compete with other capacity building organizations. Moreover, it wants to support sustainable innovations and prepare the ground and market entry for new economic opportunities in NRW with the ultimate goal to support an efficient and economic use of energy.

b) Performance Contracting, Third Party Financing and Public Private Partnership (Berlin Energy Agency, BE)

The performance contracting projects managed by the Berlin Energy Agency (BE) (www.berliner-agentur.de), the so-called Energy Saving Partnerships, show that energy efficiency measures in public buildings can be implemented even without requiring financial commitments of the building owner. Performance contracting helps to overcome budgetary problems, in particular in view of the financial situation of municipalities and investment requirements in public buildings in general.

The Energy Savings Partnership developed by Berlin Energy Agency and the Berlin Senate Administration for Urban Development is a model for efficient energy saving services (performance contracting). It aims at exploiting the existent energy savings potential of a so-called "building pool" that is composed of various objects. The necessary investments are done by a private Energy Service Company, the contractor, and are refinanced by the saved in energy costs.

The public customer selects some of his buildings for the pool, e. g. town halls, schools, kindergartens and/or other public buildings. The contractor or the energy saving partner, respectively, takes over the financing, planning, implementation and maintenance of the energy saving measures. He invests in energy saving measures and takes care of the buildings during the whole contractual period. The energy (cost) savings are shared between both partners. As a result, both the customer and the contractor and last but not least the environment benefit from the model.

c) Capacity Building, Information and Initial Energy Auditing for Air Compressors (dena and several energy efficiency institutions)

The electricity consumption for compressed air applications totals approx. 14 TWh per year in Germany and 80 TWh in the EU. An EU study was able to show that economic energy saving potentials of more than 30 % exist which, in Germany alone, correspond to the output of 2 coal-fired power stations or a total amount of electricity of approx. 5 TWh. It was the objective of the campaign "Druckluft effizient" to activate these saving potentials. A large share of these potentials should be achieved by using a wide variety of activities. Among others, the campaign offers compressed air benchmarking and a free compressed air audit campaign. The aim is to show companies the saving potentials not just qualitatively but also quantitatively. Publishing the results should encourage the implementation of measures in other companies of various sectors. The saving potentials determined lie between 10 and 65 % and it was ascertained that, in many cases, savings could already be identified during an on-site inspection even without measurement devices. The Benchmarking, started at the end of 2003 as well and helped to clarify shortcomings in compressed air systems. The campaign was conducted by the German Energy Agency (dena), the Fraunhofer Institute Systems

and Innovation Research (Fraunhofer ISI, project management), and the Federation of the Engineering Industries (VDMA) with the support of the Federal Ministry for Economics and Labour (BMWA) and several manufacturer of air compressor systems. It shows, that a joint well targeted program can achieve substantial savings if proactive institutions are involved (Radgen 2004).

5. INSTITUTIONAL BACKGROUNDS AND FINANCIAL STRUCTURES OF GERMAN ENERGY AGENCIES

On a territorial/geographical level three groups of EAs can be distinguished:

- Regional or federal state energy agencies
- Local, communal and SAVE-agencies and
- National energy agencies

In Germany the regional agencies form the core of the EA network. Their foundation typically goes back to an initiative of the federal state parliament or a government institution. In most cases the establishment of the EA was realized in conjunction with the regional power supply company and/or a banking institution in order to share costs but also to assure the involvement of other key actors. Despite the liberalization Germany still has a system of decentralized electricity supply companies on regional and local levels (up to 750 utilities).

In the case of Berlin Energy Agency Ltd (BE), the City/State of Berlin, the "Deutsche Ausgleichsbank DtA" (a business start-up and SME promotion bank of the German Federal Government) and BEWAG (Berlin power utility) hold equal shares. This is also labeled as public-private-partnership.

Only three EAs are exclusively owned by regional authorities, e.g. the EA of North Rhine-Westphalia (EANRW). In the case of "Klimaschutz- und Energieagentur Baden-Württemberg (KEA)", the majority of the shares are held by the federal state of "Baden-Württemberg", and the remaining shares by a selected group of regional actors, such as the federal state bank, the Chamber of Industry and Commerce and an environmental protection federation.

Local and communal agencies typically have close ties with a city or district and other local actors. For example, "Energieberatung Prenzlauer Berg e.V. (EbPb)" is a local SAVE EA with only four employees, based in a central district of Berlin. Funding members are the district municipality, the local managers association, Berlin Energy Agency, S.T.E.R.N. (an urban planning institution) and a few others. In the case of "Klimaschutz- und Energieberatungsagentur Heidelberg-Nachbargemeinden gGmbH (KliBA)", Heidelberg and surrounding municipalities support the agency.

Last but not least, on the national level, the "Deutsche Energie Agentur Ltd (dena)" was established in early 2001 in a joint effort of the German Federal Government and the "Kreditanstalt für Wiederaufbau (KfW)", a national promotion bank. The Federal Government is being represented through the Federal Minister of Economics and Technology in agreement with the Federal Ministry of

Transport, Building and Housing and the Federal Environmental Ministry.

To summarize, there is no single and particular organizational model that served as a standard for any newly founded agency. On the contrary, each of the German energy agencies apparently has its own profile and design which fits to the respective specific framework.

Employees: The number of employees' ranges from two to forty with basically three categories: Small agencies have two to four employees, medium sized ones an average of 8, whereas the big players range between 25 to 40. The professional background of the employees emphasizes on engineering and economics. In the past few years professionals in public relations affairs have gained higher weight. Legal advice is typically sought from external sources.

For a more detailed survey of the different EAs and their shareholder constellations I recommend (Clausnitzer/Münch 1998) and (Clausnitzer/Hille 1993).

Relations between EA: The relationship between the different EAs does not follow strict patterns. Their interaction is best characterized as an informal network. Only two years ago the Association of German EAs (EAD) was founded to better express their interests on a national level.

The regional agencies hold regular meetings twice a year to share their experiences. Of course, cases of close project oriented co-operations between individual EAs exist, particularly in the European framework to apply for EU programs. Co-operation generally depends on the degree of competition in similar fields of activities. Here again, I&M EAs have more co-operations than the more competition-oriented C&E EAs.

The national EA dena communicates and cooperates with the local and state agencies by tendering and contracting them for selected consulting services and expertise. The dena also acts as a multiplier of regional experiences on a national level and intends to act as a network centre in order to connect potential partners.

Legal status and organizational structure: Regarding the legal status, EAs are usually a company with limited liability (Ltd), with only a few exceptions. The organizational structure mostly depends on the degree of its commercial orientation towards profit-making. The more an EA is oriented towards commercial profits, the more it is likely to be organized as a Ltd. The Ltd status is also generally preferred for liability reasons. Smaller EAs are often organized as associations.

All legal structures include a supervising or steering committee (a supervising committee, a supervisory board or a board of heads of the association) to involve their shareholders in strategic questions and controlling. On the operational level, the management of the EA usually acts independently.

Financial structure: The financial structure of the German EAs varies from agency to agency. Only few

agencies focus to a high degree on profits, but the same time they all work strictly cost oriented and need to stay within their budgets.

Corresponding to the two types of EA with regard to their activities (see chapter 3.) there are basically two ways of financing:

1) Complete or partial funding from public sources. Such financing is generally restricted to I&M EAs. However, a one hundred percent financing from public sources is the rare exception.

2) (Project) Financing by the way of orders. Commissioners are enterprises, utilities, municipalities, states and ministries or building owners in the case of energy supply services. Most EAs have to acquire commissions in order to financially survive.

For the implementation phase of a new energy agency, an initial financial support is unavoidable. It could take the form of lost government grants, accumulated deficits, loans and advances, or allowances from EU support programs and so on. This period typically lasts in between two to four years.

The activities of I&M EAs can hardly be financed through self generated income. Such EAs will remain dependent on continuous financial support even after the implementation and set-up phase. To give some rough numbers for Germany, the EA NRW the biggest German regional EA with 43 employees, receives the highest public financing with a yearly budget of roughly 6 million € (around 300 million Bath) from the Federal State; this equals 0.35 € (less than 18 Bath) per inhabitant and year. The KliBA receives 0.5 € (25 Bath) per inhabitant and year from its member municipalities.

A significant number of the smaller and communal agencies have received funding from the European Community through its SAVE-II-Program. The support is limited to a set-up period of three years and amounts to roughly 50 000 € per year. The EU requires this sum to be co-funded by local sources. Independently from this start-up funding, the EU commissions extensive consulting contracts to EAs through its energy saving as well as its research and development programs.

Shareholder structure and fields of activity: The shareholder structure of an EA finds its clear reflex in both its financial structure and in the fields of activity. For example, the federal state owned EA NRW predominantly runs information and motivation campaigns for energy saving and energy efficiency measures. Their service is in many cases nearly free of charge or costs only small fees. National state owned agencies engage in national campaigns for renewable energy, energy efficiency and combined heat and power (CHP), political consulting, coordination between different acting partners as well as organization of and participation in international activities.

In general, the corporate objective of EAs with a mixture of public and private ownership is to promote energy savings through targeted consulting activities and energy services. Some EAs also act as energy services company (ESCO) for the energy supply of buildings.

6. LESSONS LEARNT

The independent evaluation of EAs in Germany done in the late nineties has shown that EAs are a necessary precondition to achieve success in targeted energy efficiency programs especially for the SME sector, the public sector (especially for public buildings) and the housing development sector (Clausnitzer 1998, Clausnitzer 1993). The level of activities in the area of energy efficiency in the different regions of Germany is often related to the existence of a regional or local energy agency.

The EAs serve as initiator, as coordinator and as mediator in the programs. They are well received by most stakeholders and they are recognized as “honorable brokers” between the different players in the energy market.

Only with constant well targeted public awareness programs, constant training and capacity building for the different players in the energy field and highly visible campaigns the untapped potential of energy efficiency can be realized in most sectors of the economy.

The key to their success is in their regional and local networking with the local administration/government, the local energy utilities, the local private sector business (like consulting engineers, technicians, craftsmen, suppliers, etc.) and the target groups.

Their independence in planning and implementing energy efficiency programs, well targeted for the different sectors is the other key to success. If they have to act as a governmental department they would lack the operational freedom to achieve their objectives. As they are limited companies they have to operate efficiently and effectively.

Their independence from direct interest from the utility side and from the supplier side enables them to play the role as “honorable broker” in the mediation among the various stakeholders. This role is often crucial in the discussion process of private and public institutions investing in energy efficiency.

7. RECOMMENDATIONS FOR THE ESTABLISHMENT OF ENERGY AGENCIES IN ASIA, ESPECIALLY IN THAILAND

The following theses and questions are intended to serve as ideas to be considered if independent Energy Agencies are planned to erect in Asia, especially in Thailand. They can serve as guidelines for a preparation phase of an energy agency.

Geographical scope: A national EA needs a different setting as compared to a regional EA or a local Energy Centre: On which geographical level is the EA supposed to act? Is it intended to support and handle energy-related policies and programs on a national and regional level, or shall the focus be on local or regional topics?

Focus areas: Without a clear outline of tasks and goals any implementation effort is bound to fail. Shall the agency be responsible for public interest programs, for information and motivation campaigns, or is it supposed to run independent and economically viable projects?

Business plan: A carefully drafted financial business plan is crucial for the success of an EA: What are the financial requirements for the envisaged fields of activity? What revenue can be gained and what is the forecast for salaries, rents and material costs etc? What legal status suits best for the envisaged fields of activity?

Funding: Funding needs are directly related to the chosen focus areas of an EA. An EA with a focus on information and motivation activities will need continuous financial support from government or other sources.

Strong partners and Shareholders: Successful Energy Agencies need strong partners in their background: Which important societal stakeholder shall be gained to serve as a partner and shareholder of the EA and to support their goals?

Composition of Partners: The shareholders of the EA have a strong impact on its fields of activity. A diverse and broad membership structure, preferably a public-private-partnership of three to five partners suits best for independence, flexibility and development potentials. A very close relationship to government organizations bears the danger to get caught in their bureaucracy.

ACKNOWLEDGEMENTS

The author would like to thank Mr. Geissler Managing Director of from the Berliner Energie Agentur for the discussion on this subject and Mr. Jan Rey, former member of the Berliner Energie Agentur, as his ideas on German EAs, presented in a workshop in South Africa in 2002, are served as an valuable input in this paper for Thailand.

REFERENCES

- [1] Clausnitzer, Klaus-Dieter; Münch, Dagmar. 1998. Energieagenturen 1998, hrsg.vom Bremer Energie-Institut, Bremen.
- [2] Clausnitzer, Klaus-Dieter; Hille, Maren. 1998. Bestandsaufnahme der Arbeit von Energieagenturen. In: Werkstattberichte, Nr. 1, hrsg. vom Bremer Energie-Institut, Bremen 1993.
- [3] Geißler, Michael, Kallmann, Kerstin. 2001. Grundlagenrecherche und Entwurf der Aufgaben einer Bundesinstitution zur Förderung von Klimaschutz und Energieeffizienz. Projektbericht der Berliner Energieagentur GmbH im Auftrag des Umweltbundesamtes, unveröffentlichtes Manuskript, Berlin 2001.
- [4] Geissler, Michael. 2005. Energy Agencies and their part in energy services, 1. International ESCO conference, October 20, 2005, Bangkok, Thailand.
- [5] Radgen, Peter. 2004. Compressed Air System Audits and Benchmarking, Results from the German Compressed Air Campaign "Druckluft effizient", (internal report ISI FHG Karlsruhe 2004).