



Energy Efficiency Series



ENERGY MANAGEMENT ACTION NETWORK (EMAK)

A scoping study investigating the establishment
and support of an international and domestic action
network of energy management in industry

INFORMATION PAPER

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INTERNATIONAL ENERGY AGENCY

The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its mandate is two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply and to advise member countries on sound energy policy.

The IEA carries out a comprehensive programme of energy co-operation among 28 advanced economies, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
 - Improve transparency of international markets through collection and analysis of energy data.
 - Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
 - Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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Executive Summary

The IEA has identified energy efficiency as essential to achieving a sustainable energy future. In order to improve energy efficiency in industry one of the priority areas for further action is the promotion of more and higher quality energy management (EM) activity. However, there are significant gaps in the current implementation of EM. One method of bridging these gaps would be the creation of an EM Action Network (EMAK) to bring practical support to energy managers, connect energy managers to energy policy makers, and interconnect these networks globally.

Many existing organisations such as the Association of Energy Engineers (AEE) and the work conducted by UNIDO already play an important role in promoting EM. However, through a series of surveys, interviews and desktop research the IEA identified a number of gaps in current EM support and practice.

These gaps include:

- The insufficient practice of cost-effective EM.
- The continued need to support improvements in the quality of EM practice.
- The need to assist EM practitioners in many parts of the world that do not have existing support structure.
- The lack of systematic connections between the EM profession and policymakers.

Could an interconnected mechanism such as EMAK be useful in complementing existing efforts and improving EM? What should EMAK do to add value to what is already available? What form should EMAK take? This scoping paper addresses these and other related questions.

Many respondents noted that an EMAK-type network could play a constructive part in bridging gaps in current implementation of EM. Meeting the needs of a broad range of objectives, EMAK could be formally structured to integrate both on-going collaborative learning and periodic events. Following the analysis conducted during this study, we conclude that EMAK could fill some of the significant gaps in EM globally if the following recommendations are adopted.

- A) The aim of EMAK should be to:
- i) Measurably increase the knowledge, skills and quality of practice of energy managers globally as well as their effectiveness through more powerful network relationships and alignment with EM systems.
 - ii) Extend the range, depth and breadth of EM policies worldwide to promote EM.
- B) The activities/tasks of EMAK should be:
- i) Auditing the current levels of knowledge, skills and quality of energy managers globally, including identifying the current level of support for high quality EM, the effectiveness of certification schemes, identification of under-utilised capacity in specific regions and an understanding of energy managers' qualifications and training experience.

- ii) Developing mechanisms to increase these elements over a five-year period including certification programmes, mentoring regimes, policy development approaches, business alliances, stakeholder round-tables and cross-sectoral network events.
 - iii) Creating evaluation systems to ensure delivery of these elements.
 - iv) Further developing sustainable pathways for increased delivery of these elements over a longer time frame by building on existing and new partnerships.
 - v) Identifying the current variations in support for energy managers among different regions.
 - vi) Ascertaining possible gaps and barriers to the development and implementation of energy policies.
- C) In the context of the scope, structure and timelines, EMAK should:
- i) Have global coverage but be focused on building capacity in those regions which are facing challenges.
 - ii) Should be a network of networks to build upon current strengths and developments internationally.
 - iii) Have three phases: set-up (18 months), implementation (24 months) and transition to financial sustainability (18 months).
- D) The general approach of EMAK should:
- i) Focus on achieving measurable benefits for energy managers, especially in their interactions with energy policy makers.
 - ii) Focus on strengthening existing, and in particular nascent, EM organisations and processes.
 - iii) Be done through partnering with existing organisations which are servicing or providing services to many regions of the world.
 - iv) Adopt a more formal approach to programme development and delivery that integrates events with on-going collaborative learning approaches.
- E) Specific tasks that would be important in the set-up and implementation of EMAK are:
- i) Continuing surveys on current needs.
 - ii) On-going discussions with regional and national organisations.
 - iii) Creation of opportunities to jointly deliver services where possible with other organisations.

It is proposed that the range of potential activities of the EMAK network should include relevant EM:

- Publications
- Web sites
- Events and conferences
- Training courses
- Certification processes
- Setting of standards and protocols
- “Train the trainer” programmes
- Mentoring programmes
- Exchange programmes
- Roundtables

- F) Membership of EMAK should include:
- i) Both individual and corporate membership categories with fees implemented after the set-up phase (18 months).
- G) Implementation of EMAK will require:
- i) That a budget for the 18-month set-up phase is allocated at the suggested rate of EUR 308,000. This would be required in two instalments; EUR 98,000 in 2009 to cover the first six months of operations and EUR 210,000 for the remainder of the project.
 - ii) That a secretariat is created to oversee the set-up phase.
 - iii) That the secretariat advertises immediately for Expressions of Interest to join the Advisory Committee.
 - iv) That a draft work plan based on the above discussion of tasks and activities for the set-up period is created by the secretariat.

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1 Introduction

The IEA acts as energy policy advisor to 28 member countries. It aims to assist members in their efforts to ensure reliable, affordable and clean energy for their citizens. In pursuing this role, the IEA has identified energy efficiency as a key component to achieving a sustainable energy future. More specifically, the IEA Secretariat has developed recommendations covering 25 fields of action across seven priority areas: cross-sectoral activity; buildings; appliances; lighting; transport; industry and power utilities. If implemented by governments globally, without delay, the IEA estimates that the proposed actions could save around 8.2 GtCO₂/year by 2030 (International Energy Agency, 2008).

One of the priority areas for further action highlighted in the IEA recommendations is the promotion of more, and higher quality, Energy Management (EM) activity (see Box 1).

EM is a loose collection of business processes, carried out at plants and firms, designed to encourage and facilitate systematic, continuous improvement in energy efficiency. It helps managers and staff to identify, carry out, monitor and learn from technical actions. Among the typical elements are: strategic plans (about what); maintenance checklists; manuals documenting projects (which projects); energy purchase, use and disposal procedures; measurement processes; performance indicators and benchmarks; progress reporting; energy coordinators; and demonstration projects (International Energy Agency Forthcoming-b).

While EM is often extremely cost-effective, there are still many EM opportunities that are left untapped. Indeed, the IEA (Forthcoming-b) estimates that further improvements and greater EM practice could deliver energy

Box 1: The IEA EM recommendations

In the IEA (2008) document 'Energy efficiency policy recommendations prepared by the IEA for the G8 under the Gleneagles Plan of Action' the IEA recommended:

- a) Governments should consider providing effective assistance in the development of EM capability through the development and maintenance of EM tools, training, certification and quality assurance.
- b) In addition, governments should encourage or require major industrial energy users to implement comprehensive EM procedures and practices that could include:
 - i) The development and adoption of a formal EM policy:
 - I. Progress with implementation of this policy should be reported to and overseen at company board level and reported in the company report.
 - II. Within this policy, companies would need to demonstrate that effective organisational structures have been put in place to ensure that decisions regarding the procurement of energy-using equipment are taken with full knowledge of the equipment's expected life-cycle costs and that procurement managers have an effective incentive to minimise the life-cycle costs of their acquisitions.
 - ii) The appointment of full-time qualified energy managers at both the enterprise and plant-specific level as appropriate; and
 - iii) The establishment of a scheme to monitor, evaluate and report industrial energy consumption and efficiency at the individual company, sector and national level.
 - I. As a part of this effort, appropriate energy performance benchmarks should be developed, monitored and reported at levels deemed suitable in each sector.

savings of 7 to 14 EJ/year globally. This is about 5 to 9% of industry's primary energy consumption and about 32% of industry's total potential energy savings from adoption of best practice commercial technologies.

One approach to tapping into this significant EM potential is an international EM Action Network (EMAK). However, before such an EMAK is established, a range of issues need to be addressed such as « would EMAK add value to what is already available? »; « what form should EMAK take? » This scoping paper aims to address these and related issues and identify if EMAK could make a useful contribution to promoting EM globally. Specifically, this report explores the following:

- Rationale for and potential place of EMAK.
- Methodology and approach to scoping EMAK.
- Possible key elements of EMAK.
- Possible governance and membership structures.
- Likely budget implications.
- Proposed timelines of set-up, implementation and transition to a self-funded model.

2 Rationale

On 23 July 2009, IEA Executive Director Nobuo Tanaka addressed the Informal Meeting of EU Energy and Environment Ministers in Åre, Sweden and called on Ministers to increase their efforts in the area of energy efficiency. Energy efficiency is a critical element of an eco-efficient economy. Mr Tanaka emphasised not only the environmental and energy security benefits of energy efficiency, but also the potential for energy efficiency initiatives to create jobs and contribute to economic growth.

The consolidated IEA recommendations to the G8 noted that "Implementation of IEA energy efficiency recommendations can lead to huge cost-effective energy and CO₂ savings. [...] Taken together, these measures set out an ambitious road map for improving energy efficiency at a global scale." (International Energy Agency, 2008).

A critical part of a country's energy efficiency portfolio is its policies relating to EM, systems and implementation in industry. A recent IEA paper (International Energy Agency Forthcoming-b) noted that "EM [is] an effective and relatively low cost systematic method for continuously improving plant-level energy efficiency. EM policies are often very effective as stand-alone programmes, but are especially useful in increasing the cost-effectiveness of the various other prescriptive and economic measures".

The IEA paper recommended a three-fold process – starting with widely-available support for EM, followed by comprehensive monitoring and concluding with strong compulsion to be used to "introduce and develop EM as a core element of countries' and companies' industrial energy efficiency strategies".

Despite the compelling arguments for greater EM, many more opportunities exist for cost-effective EM practice (International Energy Agency Forthcoming-b). The reasons for the lack of EM are clear. As with all energy efficiency actions, EM continues to face pervasive barriers including lack of access to capital for investments, insufficient information, principal-agent problems and externality costs that are not reflected in energy prices. These barriers have contributed to several pressing challenges with current EM practice including the following:

- Insufficient application of EM in cost-effective situations leading to a global untapped energy saving potential estimated at 7 to 14 EJ/year.
- Low-quality EM in many areas. Interviews conducted as part of this scoping study identified that the lack of EM activity is likely to be directly related to the lack of skilled engineers available to undertake the necessary tasks. The knowledge and skills of the people making recommendations and decisions on EM are a critical element in ensuring the effectiveness of EM. Knowledge of systems, technology, processes and implementation skills have a direct impact on the work practices of energy managers. Initial exploration suggests that these skills are at very different levels globally. Interviews with André Yatchinovski (Director for International Action at the French ADEME - Agence de l'Environnement et de la Maîtrise de l'Energie) and Linda Adams (Assistant to the Managing Director at the Centrum für Internationale Migration und Entwicklung, a joint entity between the German Federal Government and GTZ -Deutsche Gesellschaft für Technische Zusammenarbeit) confirmed that there are "multiple levels of knowledge in EM among energy specialist themselves" and that "even in developing countries, there is no one unique picture of the state of play in EM understanding".
- The need to assist EM practitioners in many parts of the world that do not have existing support structures. The level of support for EM practice varies around the world. While there is strong EM support in North America, Europe, Oceania and some parts of Asia, there is little or no support in Latin America, much of Africa and Asia.
- The lack of clear connections between the EM profession and policy makers. It appears that the connections between energy policy makers and the EM profession are currently inadequate. An indicator of this is the significant gaps in national EM-related policies. An IEA document in preparation (International Energy Agency Forthcoming-a) estimates that two-thirds of IEA member countries have gaps in their EM policy portfolio. How are we to make this connection more solid and substantial?

One way to address these EM issues could be to establish an EM network mechanism. A network mechanism is an interconnected system of people and/or things. Could such an interconnected mechanism be useful in improving EM? What would such a network mechanism do? Would this network add value to what is already available? What form should this network take?

In order to answer these questions, this scoping paper explores the current state of EM support and examines ways to improve it.

3 Aim and purpose

This scoping paper assesses the potential for the development of a global EM network, provisionally titled EMAK (Energy Management Action network). The goal is to understand the existing organisations - local, regional, national and global - that support energy managers in their roles and the services that they provide. The report also begins exploration of the regional variation in EM support and networks.

Finally, this paper presents a potential model for development of a global support network that utilises existing networks, builds on current strengths and focuses on building capacity in specific regions.

4 Audience

This report targets a range of audiences for this scoping report:

- Broadly, **all those who have an interest in improved EM** in general, which may include groups well outside the normal range of traditional EM groups, such as those non-governmental organisations (NGOs) following the climate talks or policymakers focused on developing climate change mitigation policies such as emissions trading schemes.
- In particular, **existing national and regional associations** which perform some of the roles regionally that EMAK could support: EMAK will need to consider working closely with existing organisations (such as national professional engineers and EM associations) to ensure that there is no duplication of services or processes. These organisations may also be a complementary service deliverer or may become valuable members of EMAK itself. This report explores a possible EMAK that could provide a valuable complementary global approach to individual, national and regional approaches.
- **Existing energy managers** who are interested in the development of a global network or who are looking for support in their roles: In the course of this scoping report, individual energy managers have been consulted on the potential role of EMAK. Many individual energy managers around the world could benefit from the resources of EMAK or play a role in assisting EMAK in its potential next steps, through further advice, practical help and advocacy. For example, one respondent saw EMAK as "definitely of use" in the context of South Africa's energy security driven approach. Another mentioned the potential use of EMAK for "conducting international benchmarking" of projects and competences.
- **Policy makers** involved in setting policy for EM; especially those who are trying to align their work with energy managers could be interested in the development of EMAK. For example, a Deputy Director of Public Policies on Energy Efficiency was clear that EMAK would be a valuable asset in building the EM capacity of his country. Another respondent, a Senior Policy Officer explained that a network such as EMAK would enable his country to "learn from experiences in other countries", "improve contacts and networks", and "promote EM practices in the Asia-Pacific region" as a whole.
- **Companies and institutions** trying to identify underlying supportive systems for newly employed energy managers. As employees of energy managers and implementers of EM

systems, these groups might see EMAK as a natural ally and supportive institution for improving capacity on the ground, assisting with the increased professionalization of the industry and building confidence in EM in general.

- **Future potential funders of EMAK.** Establishing and operating an EMAK would require considerable resources. Before any potential funders would commit to resourcing EMAK, it is important that a scoping study of this nature is completed to address the questions that those funders could have.

4.1 Methodology and Approach

This scoping paper adopted a three-tiered approach to investigating the usefulness or otherwise of EMAK.

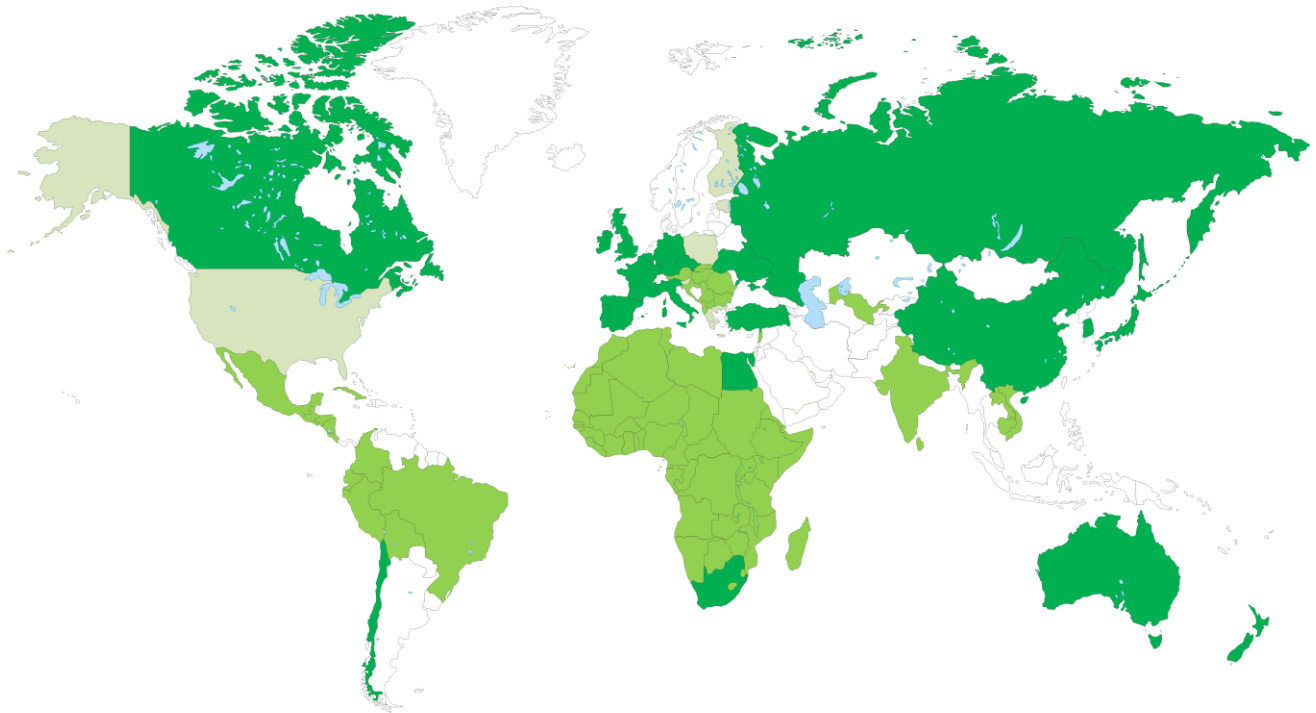
First, a series of information surveys to individual energy managers and policy makers were sent to around the world. The surveys and results have been collated and fed into the analysis of this paper. The surveys have provided a useful base upon which further information can be developed. In the context of this study, they have helped to begin a map of current support systems for energy managers globally. Surveys were sent to energy managers and policy makers on the basis of professional area of expertise, geographical diversity and diversity in membership size. Thirteen energy managers and 9 policy makers responded. A copy of the questionnaires is available in Annex B, survey results and comments are in Annex D.




Second, a series of telephone conversations and in-person interviews were conducted with individual energy managers and policy makers from around the world to gauge their individual judgements about elements of EMAK, such as the need for training, regional variation on certification of energy managers and so on. These interviews were crucial in testing some of the assumptions behind the surveys as well as supplementing survey responses to difficult challenges such as the depth and breadth of current support systems. Interviews were conducted with 17 individuals on the basis of contacts from existing IEA networks and referrals. A list of interviewees is attached in Annex A.

Third, desktop research was conducted of existing national and regional associations to discover existing systems of support and cross-reference organisational programmes. Research was conducted according to a wide variety of criteria, including associations (national, regional, local), keywords (certification, energy manager, network, professionals), geographical coverage, etc. A list of organisations, certifications and training programmes identified in the course of this research is attached in Annex C.

Figure 1 provides an indication of the coverage of the survey and interview information gathered.

Figure 1: Coverage of survey and interview information gathered



-  Countries where individuals were surveyed and/or interviewed
-  Countries covered by UNIDO RECP or the African Union (which provided for interviewees)
-  Countries in which desktop research identified organisations and/or certification schemes

5 What could be the contribution of EMAK to the EM challenges?

This scoping paper examines the concept of a network mechanism provisionally titled EM Action NetworkK (EMAK). This could focus the EM industry and other relevant parties on the practices, knowledge, skills and quality of energy managers globally; the links to other sectors; the bridge to energy policy makers; and the implementation role in EM systems.

5.1 What networks already exist?

Initial explorations suggest that there is no current global mechanism that can assist energy managers to perform all of the above functions, though there are a few important developments and organisations that could be critical partners in EMAK. Three such potential partners are noted here. More detail of other organisations is in Annex C.

5.1.1 The Association of Energy Engineers (AEE)

The AEE provides members with a source of information on the fields of energy efficiency, utility deregulation, facility management, plant engineering, and environmental compliance. With a full array of information outreach programmes from technical seminars, conferences and books to critical buyer-seller networking tradeshows, job listings, and certification programmes, the AEE offers a variety of information resource tools. As a growing membership organisation, the overall strength of the AEE is highlighted by a strong membership base of over 9500 professionals and recognized certification programmes (see Box 2).

The AEE is a growing body - it represents perhaps around 10% of energy managers globally - that could be supported further in its work by EMAK, especially in regions where the AEE is currently under-represented.

5.1.2 UNIDO

UN Industrial Development Organisation (UNIDO) and (UN Environment Programme) UNEP cooperate to advance sustainable industrial development and consumption and production in developing and transition countries. Specifically, their joint Programme on Resource Efficient and Cleaner Production (RECP) aims to improve resource efficiency and environmental performance of businesses and other organisations.

Box 2: Energy efficiency professionals needed over next five years

There is going to be a shortage of qualified energy efficiency and renewable energy professionals over the next five years in the US, according to a survey by the [Association of Energy Engineers](#) (AEE). The AEE, which represents over 9 500 professionals, surveyed around 10% of their members experienced in the energy sector from companies such as Toyota, 3M and General Motors.

The survey found that 72% of respondents believe that there will be a shortfall in qualified professionals in coming years. A state- and nationwide training programme is needed, say a majority of those surveyed, particularly in the building and construction, renewable electricity generation and transport sectors. Not only does the energy efficiency and renewables sector look set for a major boom in coming years, but nearly half of existing professionals will be due to retire over the next decade.

“The need to develop qualified energy professionals servicing the green energy marketplace has never been greater,” says Albert Thumann, executive director of the AEE. “There need to be funds available for continuing education programmes provided by professional associations,” he adds, “[and] funding to develop energy engineering undergraduate curriculum and scholarships for students to attend energy efficiency and renewable energy programmes.”

UNIDO and UNEP develop and strengthen national capacities for delivering RECP services to businesses, governments and other organisations. This enables them to implement RECP concepts, methods, techniques and policies and thereby reduces their pollution and waste intensities and improves efficiency of their natural resource use. In addition, UNIDO and UNEP operate and contribute to regional and global networks to transfer knowledge and technology efficiently, both South-South and North-North.

The RECP programme is based on achievements and lessons learnt from National Cleaner Production Centres (NCPCs) established since 1994. The option of NCPCs becoming membership-based is currently being investigated by UNIDO experts. Activities are underway in 40 countries. These have put Cleaner Production (CP) on the agenda of industry and government, trained technical staff and fostered implementation of CP options and policy change.

The current RECP programme provides a strategic and coherent framework for upscaling and mainstreaming of activities and results of NCPCs, nationally, regionally and globally.

Specifically, some of the following key deliverables are expected:

- One global and three regional networks of RECP services providers will be established/strengthened, serving as effective platforms for knowledge management and South-North-South collaboration in technology and knowledge transfer.
- Training programmes run by more than 500 experts (trained as trainers through regional Training-the-Trainers programmes) will be organised on the basis of five toolkits and training manuals to be developed.
- A global knowledge management system supported by regional and national nodes will be established to facilitate knowledge exchange and the transfer of environmental sound technologies.

A discussion took place with René van Berkel (Head of Unit, Cleaner and Sustainable Production, UNIDO) on possible involvement/alignment of UNIDO with EMAK. Mr. van Berkel expressed his interest in "investigating how to integrate (RECP-related) work into EMAK".

5.1.3 IPEEC

In June 2008, the International Partnership for Energy Efficiency Cooperation (IPEEC) was established at the G8 Energy Ministerial meeting hosted by Japan. The Partnership will add value to existing structures and agreements that tackle energy efficiency, its purpose being to facilitate those actions that yield high energy efficiency gains and improvements, and where the participating countries see an added value for themselves and therefore choose to take action in the areas of their interest on a voluntary basis.

The objectives of the IPEEC are to:

- Secure a clearer picture of international action on energy efficiency.
- Enable the development of a shared and strategic view covering these activities.
- Identify jointly the possible collaboration actions and maximise the impact and synergies of their individual national actions.

The IPEEC will draw on the expertise and work undertaken by international organisations and financial institutions, research organisations, the private sector and support public- private partnerships. An initial work programme includes:

- Building an inventory on existing national and multilateral efforts on energy efficiency improvements.
- Sharing of best practices on programme development, public procurement, industrial plant audits, training and public awareness efforts.
- Identifying areas of joint actions to facilitate energy efficiency improvement, including joint work for global transition to energy efficient lighting technologies.

As being a government initiative, IPEEC could provide a useful vehicle for assisting an EMAK to connect with policy makers. In this way, EMAK could also support IPEEC to achieve its aims, especially in the sharing of best practices.

6 Approach

This scoping paper focuses on exploring the development of a robust business rationale for the creation of EMAK. This business rationale needs to be based upon:

- A clearly defined role for EMAK: is there a need that is not being filled by other organisations?
- An effective approach that meets that need: does the proposal meet all of the needs as identified?
- An underlying model that ensures the future of EMAK: can the proposed approach be financially sustainable over time?

This reassuring is used so that the proposal can be developed and can be tested against alternatives.

Following this pathway, the key elements of a network that will be examined are:

- What form should EMAK take?
- What could the aims of EMAK be?
- What are the appropriate goals and possible objectives of EMAK?
- What is the suitable scope of mandate for EMAK?

6.1 What form should EMAK take?

There are a range of forms that EMAK could take. On the one hand, EMAK could simply be an annual conference – or series of conferences – allowing energy managers and policy makers to gather together, exchange ideas and compare notes. The World Energy Congress, a triennial event, is an example. This has the advantage of being administratively easy and achieves the aim of building bridges, however temporary, among the parties.

The main disadvantage is the lack of continuity between events – and participants may want to be able to interact beyond the confines of the events itself. Additionally, the capacity building of both energy managers and the organisations that support them requires more regular interaction.

The alternative, is to undertake a formal integrated approach that uses events to bring together the various on-going learning approaches – regional, collaborative, cross-sectoral and so on – in a coherent and systematic way. The disadvantage of this approach is that it consumes more resources and requires more co-ordination. The advantage is that it is an effective way to achieve all of the objectives of EMAK and has a deeper and greater lasting impact.

It is recommended that EMAK adopt a more formal approach to programme development and delivery that integrates events with on-going collaborative learning approaches.

6.2 Aim and objectives of EMAK

What should the overall aims of EMAK be? The criteria could be that EMAK broadly complement other organisations, meet unmet needs or fill gaps and address regional variation. Therefore, EMAK aims could broadly support the thrust of EM, with a focus on the connection between EM

systems and specific energy managers. EMAK could play a part in promoting best practice EM globally.

Additionally, EMAK may focus on specific regions which are currently under-resourced in support systems for energy managers. Interviews confirmed that African countries, to the notable exception of South Africa, lacked both EM systems and "professionals to implement the very idea of EM itself". Similarly, in the Ukraine, the hiring of energy managers in industry is only starting and is still largely under-structured in terms of networks and organisations.

Based on these considerations, EMAK aims should include:

- Measurably increasing the knowledge, skills and quality of practice of energy managers globally as well as their effectiveness through more powerful network relationships and alignment with EM systems.
- Extending the range, depth and breadth of EM policies worldwide to promote EM.

Based on these overall aims, this report proposes that more specific objectives for EMAK should include:

- Auditing the current levels of knowledge, skills and quality of energy managers globally, including identifying the current level of support for high quality EM, the effectiveness of certification schemes, identification of under-utilised capacity in specific regions and an understanding of energy managers' qualifications and training experience.
- Developing mechanisms to increase these elements over a five-year period including certification programmes, mentoring regimes, policy development approaches, business alliances, stakeholder round-tables and cross-sectoral network events.
- Creating evaluation systems to ensure delivery of these elements.
- Further developing sustainable pathways for increased delivery of these elements over a longer time-frame by building on existing and new partnerships.
- Identifying the current variations in support for energy managers among different regions.
- Ascertaining possible gaps and barriers to the development and implementation of energy policies.

One key performance indicator for judging the success of EMAK could be the number of key players (members, funders, IEA, etc) who can demonstrate the business rationale for investing in increased EM knowledge, skills and quality of energy managers globally and their more effective relationships to other stakeholders, the enhanced policy development and implementation environment and the implementation of EM systems.

The initial focus for EMAK could be on those regions where EM systems are being introduced and, therefore, there is potential unmet demand for training and networking. This would particularly focus on Latin America, much of Africa and large parts of Asia.

One approach to EM training might also be in the formal aspects of certification, which allows a more global, standardised methodology to be utilised. At the moment, there are several certification systems, none of which have a mandate to ensure agreement on basic methodologies, standards of compliance, training curriculum or cross-referencing to other systems. The significant growth of new schemes (two have recently been launched: the Certified

Sustainable Development Professional and the Certified Carbon Reduction Manager) is also a risk of proliferating standards.

Additionally, some overlap exists within organisations: for example, the AEE 14 different certification schemes have significant overlap. And, finally, some countries have set their own standards for internal reasons; this may also contribute in the long term to differing standards. Clearly, the risk is that the implementation of EM itself is damaged by incompatible standards, poor or varying quality of professional qualifications and subsequent lack of individual and organisational capacity for attaining best practice.

EMAK's focus with certification could be on providing a global underpinning standard, aligned with modularised, easily-replicated open-source curriculum for use by regions.

6.3 Scope and project tasks

The scope of EMAK could be delineated in three ways:

- Geographically.
- The client group.
- The adopted set of activities.

6.3.1 Geography

Analysis of the responses from surveys and interviews and initial desktop reviews of materials show that the level of EM performance and organisational support differs markedly between regions. For example, although effective EM organisations exist in North America, Oceania and some parts of Asia, there is reduced capacity in Latin America, much of Africa and Asia.

Countries also differ in their level of policy support for EM. For example, a forthcoming IEA publication identifies that almost half of the IEA countries have significant gaps in their EM policy portfolios. Specifically, most of these countries lacked policies that incentivised the use of EM in large industrial establishments.

These policy and support system gaps could potentially be filled by a global EMAK. EMAK should focus on strengthening existing, and in particular nascent, EM organisations and processes. Africa is very poor in regional initiatives on energy efficiency and only a few countries are starting concerted programmes. The lack of a regional or global approach causes certain countries such as Egypt to call upon various initiatives without a united front or single thought-out process (Egypt hosts the AEE Certified Energy Manager (CEM) certification programmes, a Gesellschaft für Technische Zusammenarbeit (GTZ) international cooperation programme and a UNIDO National Cleaner Production Center at the same time).

One valuable way of proceeding may be to use partnering as a key approach. For example, partnering could be initiated with existing organisations which are servicing or providing services to many regions of the world and putting in place specific EMAK activities in regions - for example Latin America or Eastern Europe - where there are still nascent organisations. A focus would be appropriate on key regions which are seen to currently need more input in terms of EM skills and

knowledge or where the capacity of the current organisations trying to fill that need is being challenged.

6.3.2 Potential activities of the network

The network should focus on achieving measurable benefits to both energy managers and their interactions with energy policy makers.

When we look at existing member benefits from similar associations, all have some systems of useful information delivery. In most cases they communicate via newspapers, magazines, and periodical information (by post, by email) or databases or library systems on the internet. Members may also have access to direct expert advice or a consultation service and rental service of some equipment needed by their profession.

Other functions that many organisations offer include seminars and training courses, which are offered by half of the sample associations.

A virtual networking system is offered by 70% of the sample associations so that members can contact other professionals. The members can access to specially prepared member directories online and search appropriately. One association has a unique scheme which gives a chance for members to partner with others for specific or more complex assignments.

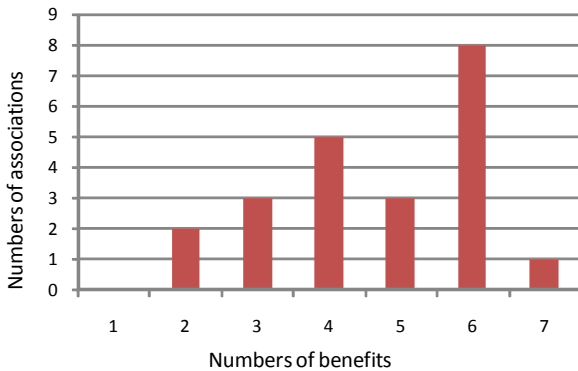
A quarter of the sample associations have certification schemes (or special support for external certification schemes).

Career opportunities are promoted by some associations: job advertisements for members; career advice; access to a web-site on which members can put their CV to advertise themselves; and a searching system for external clients (non-members) to find appropriate professionals to meet their specific needs.

A scholarship scheme exists in a few associations. For example, up to USD 250,000 is awarded to IEEE Student members (undergraduates or graduate students) every year. The Association of Energy Engineers (AEE) has a body for furthering education in energy and management, the Foundation of the AEE. It has awarded a total of USD 450,000 in funds for use by outstanding students.

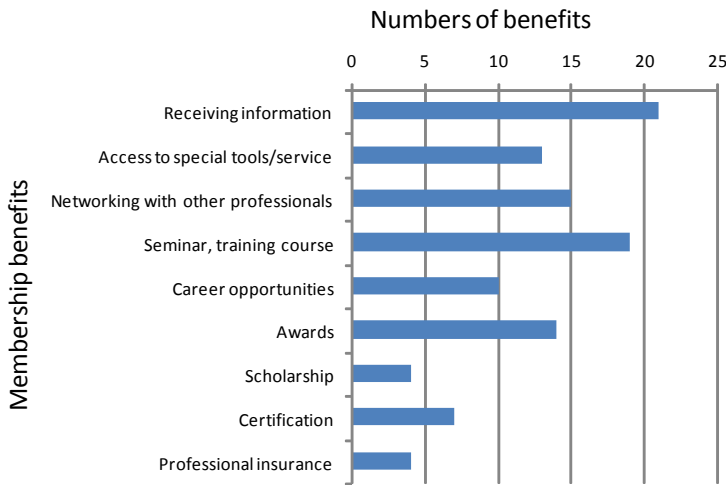
Some associations have introduced or provide a link to insurance services, including car and life insurance. Among them, some associations provide professional insurance such as professional liability insurance for engineering and for self-employed individuals; legal counsel to represent members; and coverage of defence costs to licensing board. Figure 1 shows distribution of numbers of identical benefits served by associations. The majority among sampled associations is six services and average is approximately five.

Figure 2: Number of benefits offered by similar associations



Source: IEA Survey

Figure 3: Numbers of membership benefits in sampled professional associations by benefit



Source: IEA Survey

6.4 Tasks

Specific tasks that would be important in the set-up and implementation of EMAK would be:

- Continuing surveys on current needs.
- On-going discussions with regional and national organisations.
- Creation of opportunities to jointly deliver services where possible with other organisations.

Box 3: Bilateral country exchanges on energy efficiency improvements for South Africa: the Japanese experience and cooperation

Following a country to country engagement between Japan and South Africa and an exchange visit in which the NBI participated on behalf of the Accord signatories, South Africa hosted a Japanese group of energy specialists in November 2008. Their objective was to assess potential for energy efficiency improvements, energy policy application and establish possible future energy efficiency co-operation. The initial interaction with business, government, various agencies and academic institutions was sealed with a return visit in January 2009. The Japanese group consisted of the Japan International Cooperation Agency, The Institute of Energy Economics, Japan (IEEJ) and the Tokyo Electric Power Company, Inc. The delegation was headed by Takeo Suzuki, a professional engineer with the IEEJ.

Due to the success of the first meeting, the NBI was subsequently requested to facilitate a feedback seminar on 27 January 2009. The main aim was to present feedback to the energy players that participated in the November 2008 study.

That the potential range of activities reflects the balance required to support individuals with both information provision and opportunities for collaborative learning. Information provision is generally viewed as a critical element of building capacity, especially when allied to formal training systems and certification.

Knowledge of innovative technologies, current uses, learning from other energy managers in the field, etc, are the basic building blocks of improved practice. These essential elements should be disseminated through web-sites and material publications.

Collaborative learning occurs at workshops and events where the mix of ideas and people provides new possibilities. The opportunities to exchange ideas and to understand different ways of thinking are effectively achieved through events, workshops and roundtables.

A stream of EMAK learning could be added to existing conferences and events in the first 18 months (at least) to add to existing networks and provide a broad-brush marketing of EMAK to energy managers and policy makers. This could focus on a regional perspective, inter-relationships between energy managers and policy makers or support programmes for new EM systems.

It would then be possible to conduct stand-alone EMAK events which integrate with the other capacity-building activities, such as training and identification, translation and replication of best practice.

The range of potential activities of the EMAK network would include:

- **Publications:** interviewees noted that there is a large need for transferrable case studies, insights into problem-solving actions, identification of practical best practice approaches and materials translated into relevant local languages.
- **Web sites:** virtual access to materials and networking tools is a given but a simple site that focuses on substantive information is a key enabling mechanism for potential EMAK participants; initial desktop research shows that <www.emak.net> has not yet been taken.
- **Events and conferences:** such meetings could focus on a) adjuncts to existing conferences and events and b) when appropriate, specific EMAK conferences; these could also include

Box 4: Example of EM training opportunity

In response to a growing business need, Coastal Training Technologies and DuPont Safety Resources have collaborated to produce a new training programme titled 'Energy Smart.' Available on DVD, this is the first course in Coastal's upcoming 'DuPont EM eLearning Series.' It is available for a free 15-day preview and will soon be released in Coastal's award-winning ClarityNet® online courseware.

Energy Smart helps promote general energy awareness and includes energy-saving tips that translate into real savings for an organisation. It aims to change the misconception that energy is "just there" and encourages employees to treat energy costs with the same fiscal assertiveness as any other business expense. Content contributions by DuPont energy engineers and consultants are based on DuPont's successful EM experience that has resulted in USD 3 billion in cumulative energy savings since 1990.

The new offering applies a three-pronged approach to EM and presents a compelling business rationale for its adoption. It explains the impact of EM on the economy, environment, customer interface, energy independence and emerging technologies. It also shows how every employee can improve energy efficiency, citing low-cost, easy-to-implement best practices of energy-efficient organisations.

Energy Smart is the first of 16 courses in Coastal's soon-to-be-released DuPont EM eLearning Series. Coming this fall, these online courses cover the energy-efficient use of industrial equipment and systems. Titles include: EM Best Practices, Energy System Instrumentation and Controls, Theory of Steam Generation, Fuels and the Combustion Process, Boilers and Auxiliaries, Emission Control and Ash Handling, and others.

conferences or events such as the annual Conference of Parties (COP) that cover a wider area than just EM.

- **Training courses:** a less final approach could be developed but focus on key under-utilised regions and build on existing educational approaches.
- **Certification process:** extension of existing processes such as the AEE's certification approach to a broader community.
- **Setting of standards and protocols:** creation of an important benchmark for the introduction of new approaches in regions where there is currently little support for EM or where there will be new systems such as ISO 50001 introduced over the coming year. A representative from KEMCO (South Korea) mentioned for instance that the Korean government was "likely to introduce ISO 50001 by the end of 2010".
- **Train the trainer programmes:** this could be a useful strategy to extend the reach of EMAK early in regions where there are few expert resources. Rene van Berkel (UNIDO) mentioned the possibility of an "alignment of UNIDO with EMAK"; such an alignment could take place in the field of training the trainers for instance.
- **Mentoring programmes:** bilateral and multilateral interactions between peers are well-researched mechanisms for supporting professional development. One interviewee at the NGO ClimateWorks emphasised the important role of cooperation between peers. The UK Carbon Trust is understood to have established direct links with Chinese companies to help train their energy managers. Similarly, Japan and South Africa have developed a useful partnership to drive energy efficiency across different sectors in South Africa.
- **Exchange programmes:** focus on delivering expertise and experience to new regions with minimal costs by exchanging staff for short periods of time. A French respondent explained how exchange programmes and loan of experts was delivering effective results. The German GTZ-CIM Returning Experts Programme follows the same logic.
- **Roundtables:** this mechanism could assist policy makers to engage directly with energy managers and their issues in constructive and useful dialogue.

6.4.1 Two focus areas for EMAK

Improving the knowledge, skills and quality of energy managers

This objective focuses on the actual competencies of energy managers as they are able to practice them in their business. Discussions with representatives from Finland's MOTIVA OY (the government-owned company acting as national agency for energy efficiency) have highlighted the importance of information exchange of experiences in EM systems and standards. Actions that underpin this objective could include:

- Auditing the current levels of knowledge, skills and quality of energy managers globally.
- Developing mechanisms to increase these elements over a five-year period including certification programmes, mentoring regimes, policy development approaches, business alliances, network events and so on.
- Creating evaluation systems to ensure delivery of these elements.
- Further developing sustainable pathways for increased delivery of these elements over a longer time-frame.

A bridge between energy managers and policy makers

This objective focuses on the interactions between these two groups, on the basis that both are critical for the quality performance of EM as a whole. Surveyed energy managers and policy

makers (such as Federica Stabile at ENEA in Italy) detailed how an international network could bridge the gap between policy and practice by "promoting the role of energy manager by means of new programmes, tools, legislative regulations, supporting schemes, etc". Actions that underpin this objective could include:

- Building upon specific current interactions of organisations and individuals including national, regional and international conference, and other events.
- Identifying occasions to conduct network interactions at broad occasions such as the annual Conference of Parties (COP).
- Exchanging information and materials.
- Creating linkages between the performance criteria for both parties so that an aligned benefit can be developed for both groups.

6.5 Timelines

Based on experience with past global networks, it is unlikely that a global EMAK mechanism of this potential scale and scope could be implemented to a stage where it is self-funding in less than three years. Such a network will require robust establishment, relationship development, and development of services (cycles of training and events, etc). On the other hand, a timeframe that is too long would reduce confidence that EMAK is focused on being financially sustainable.

It is suggested that an establishment period of around five years would allow both of these views to be considered, but still give a reasonably tight timeframe to the period of time during which there would need to be a significant external investment.

Thus development and lead times, therefore, for the set-up and implementation of such a global network are suggested to be five years at a minimum, with an opportunity to assess progress and provide a clear decision on progress towards achieving the objectives after a stage of 18 months.

This would allow for the following:

- An 18-month network set-up time during which the key containers of membership development, partnership development, aligned training, auditing existing practices, web-site set-up and so on would be implemented.
- A 24-month development phase for further implementation of these elements would be accelerated and finally evaluated.
- An 18-month transition phase during which the network would become sustainable beyond the five-years through institutional, financial and membership strategies.

6.6 Structure and governance

6.6.1 Participant structures

There are three possible participant structures:

- Individual members
- Organisational members
- Both individual and organisation members

Individual members

This model is useful for involving individuals in specific countries where EM organisations are in their infancy or non-existent. This does not work so effectively where these organisations already exist as EMAK may be seen to be in direct competition or at least duplicating services. Consideration might be given to approaches that allow duplicate membership of organisations where appropriate.

Organisational members

This model aligns with organisations that already exist and encourages the creation of more such regional organisations. It could even involve global organisations that have a more limited mandate - for example, where energy efficiency is not the core focus of the group. Where there are no organisations, this model becomes a little unwieldy.

Both individual and organisational members

This hybrid model has organisations as participants where they exist and individuals as participants where they do not. Clear criteria need to be developed to ensure disputes are sorted out in terms of competing groups or insubstantial mandates. This approach could also assist in the development of partnership proposals with these organisations.

6.6.2 Global Structures

There are a range of potential global structures for EMAK. In this paper, we consider the following three:

- A "hub and spoke" secretariat.
- A decentralised regional model.
- A "network of networks" approach.

Hub and spoke

This model of organisation has a strong central secretariat in one location with direct control over regional or more diffuse groups or individual members. It is typical of start-up approaches - it maximises control from one source. It relies heavily on a focused secretariat with centralised tasks. The Clinton Foundation is an example.

The advantages of this approach include:

- Branding can be protected.
- Authority flows one way and is relatively easy to enforce.
- Messages are consistent.
- A consistent strategic direction can be maintained.

The disadvantages include:

- Problems in translation of concepts and trips across regional areas were mentioned as "cultural and systemic similarities in energy efficiency" between countries of the Asian region - these similarities may be starkly different to those in, say, the USA.
- Political issues with control from afar - there may be other political issues that over-ride the goodwill of this model.

- Potential for duplication of and competition with other regional efforts, especially for local sources of funds or expertise.

Decentralised by regions

In the EMAK context, this would be a relatively autonomous grouping of regional bodies (where they exist) or members in ad-hoc groups. In this model, there is a small central secretariat which provides little authority. It relies heavily on strong regional input. The World Wildlife Fund (WWF) is an example.

The advantages of this model include:

- Building on local regional organisational strengths.
- Opportunity for local innovation.
- Ability to decentralise core tasks (such as training or certification) to regional bodies set up to do the work.

The disadvantages include:

- Potential mismatch across regions.
- Danger of competition between regions.
- Loss of branding and programme consistency.
- Possibility of individual regions developing their own different approaches.

Network of networks

This approach is a hybrid model of the first two structures described above. It has a secretariat acting as a communication facilitator, but the regions are providing the core of the activity. It is typically modelled on a web where in many ways there is no actual centre but simply an interweaving of different authorities and negotiated approaches. It relies heavily on standards and protocols and strong communication. The internet itself is an example.

The advantages of this model are:

- Ability to adapt to changing environments.
- Capacity to build on regional strength and minimise competition.
- Potential to focus on underutilised sections or regions to increase capacity.

The disadvantages include:

- Potential to wander away from the core mission.
- Need to maintain strong and regular communication across all participant organisations and members.
- Needs a "meta-brand" or "co-brand" with regional identities.

This report recommends the network of networks model, as it best manages the need to build on existing strengths, avoid duplication and achieve relatively quick gains over the coming five-year period.

6.7 Membership

It is suggested that EMAK would require a three-tier membership model comprising:

- Governments
- Organisations
- Individuals

With a three-tier membership approach, it is recommended that:

- The set-up phase has a small advisory committee possibly selected by the IEA on the basis of Expressions of Interest and is regionally diverse, comprising any major energy manager network as appropriate.
- The implementation phase has an elected committee from members who have joined within the 18-month set-up period.
- That this committee become a board to a separately autonomous network over the remaining 18 months.

Existing professional associations have some requirements for membership such as:

- Education background – academic degree.
- Practical experiences (year) in required field.
- Affiliations (occupation) in related organisation/institute.

Strict member schemes, e.g., requiring higher education or long practical experiences, can create many hurdles to membership. On the other hand, such higher membership category gives them other benefits such as not having to pay for a full seminar/workshop fee.

There are several conceivable membership categories or combinations of membership categories. But here we suggest that EMAK could have at least full and corporate membership.

Organisations and individuals would become eligible for membership of EMAK if their activities are principally or substantially dealing with EM or policy development. Any imbalances that this broad definition may contribute to could be evaluated after 18 months.

Membership of the organisation could be free for the first 18-month set-up period. This would allow the network to establish its value in the marketplace and to understand the likely economic base. The implementation phase would involve the introduction of membership fees, with a variety of levels of access depending upon association status and the GDP of the country.

Organisations would be a critical part of the EMAK network, as they are seen as the implementing arm where appropriate. As part of the development phase, Expressions of Interest (EoI) could be sought from existing organisations already identified and - through referrals - to other relevant organisations. The EoIs could identify opportunities for aligned services, existing programmes that could be extended geographically or sectorally, input to standards and protocols as needed, and available resources and catchments of existing expertise for mentoring and partnering in other regions. They could also become a valuable source of advice and support from within the industry of energy managers.

For example, the Joint US China Co-operation on Clean Energy provides not only programmes on the ground to Chinese cities but practical training for Mayors, which could be easily augmented by practical support for municipal energy managers.

In countries currently lacking the appropriate EM organisations - in Chile, for example - there are numbers of energy managers that might be interested to seek individual membership of EMAK. These individuals could be recruited through referrals from policy managers, identified staff in large companies (especially the mining and manufacturing industries) and advertisement. These individuals could participate in training and mentoring approaches as well as benefit directly from the publications and web-site materials.

An estimate of potential numbers of members for EMAK was developed in an IEA internal discussion paper. The assumptions were the following:

- Members should be energy managers (existing or prospective).
- 40 managers for 1 million kl- oil eq.

Estimations: Approximately 85 000 energy managers exist in the world and 66 000 of these are in the OECD and five major developing countries. If one quarter of the energy managers join EMAK, possible EMAK members are estimated at around 21 000 in the world and 16 500 in OECD and five major developing countries.

	Industry consumption (ktoe)	Industry consumption (Million kl oil eq.)	Estimated numbers of energy managers
OECD North America	353 599	382	15 293
OECD Pacific	142 074	154	6 145
OECD Europe	295 680	320	12 788
China	431 335	466	18 656
Brazil	68 403	74	2 958
India	97 714	106	4 226
Russia	122 630	133	5 304
South Africa	21 081	23	912
Sub total			66 283
Rest of world	434 818	470	18 806
Energy managers in total			85 089

Source: IEA survey

If we now assume that many of the OECD and five major developing countries will be covered by organisations, then we still have a potential individual membership catchment of nearly 20 000 people.

6.8 Governance structures

The main governance challenge for EMAK is to ensure legitimacy within the potential multiple approaches from existing national and regional organisations and other global agencies. Ultimately, this means a reasonably representative advisory committee of both existing organisations and individuals in key areas.

Most of associations investigated here have a body which oversees policy. It is usually called a committee, advisory board, executive board or council and consists of 10 to 20 members. In some associations, they are periodically elected by members, through an online and mailing system. Board members comprise members of the association, external consultants, and others belonging to companies.

The structure of members varies by associations; for example, ACCA (the Association of Chartered Certified Accountants) has a council consisting of 30 to 40 members and regulatory board of ten persons. The board provides oversight of regulatory and disciplinary activities, and reports to the Council on the fairness and impartiality of these activities. For associations which have broad themes or which are international, there are often topic committee or region chapters. In the case of regional chapters, they have members on the board from each region as representatives.

During the proposed set-up phase (see below), it is suggested that the board be advisory, as it is essentially appointed. Once the implementation phase commences, the board could become a more formal, elected body.

6.9 Budget for EMAK network

External support for EMAK would be needed at the set-up and implementation phases, though it could ultimately diminish beyond that period of time. Further income streams could come from a range of sources, including membership and training fees, partnership projects and licensing of protocols and standards.

Membership fees could be on a two-tier basis as discussed above, in line with common organisational practice and the strategy that is being suggested here. For example, the AEE -with about 10% of energy managers as members- has an individual fee ranging from EUR 10 per year for students and retirees to EUR 122 for full members. Their corporate membership rate is EUR 876 per year, with reductions for individual members of the corporation. Individual members of EMAK would probably come from developing countries in the first instance (as they are likely to be the least supported at the moment), so it is probable that the individual fee cannot be more than EUR 122. Corporate membership is also set relatively low. On these numbers, membership would be unlikely to be a significant component of the income stream of EMAK.

Training fees seem to be generally based on a cost-recovery basis. Although, there may be opportunities to increase this, at this stage (and certainly over the set-up and transition phases), this seems unlikely to be a significant stream.

Partnership projects with other organisations are an effective and well-demonstrated method to achieve projects. They typically pay for themselves. They may well be able to generate significant activities' funding, depending upon the relationships that are developed. This seems to imply that they will become more active after the set-up period has been completed.

One potential area that interviewees have been interested in is the development, marketing and possible licensing of protocols and standards. This could generate activity funds for on-going research and development.

The focus, then, should be on keeping overheads and transaction costs to a minimum as it is uncertain as to how much significant funding can be achieved in the long term.

6.9.1 Next Steps

Considering the potential benefits of EMAK outlined above, the next question might be: what would be the steps in designing, setting-up and implementing this network? Following the consultation and research of this scoping paper, a broad three-step roadmap as described here would be appropriate for further discussion.

a) Set-up phase (18 months)

Tasks and resources:

Set-up of governance system	EUR 30,000
Surveys and audits	EUR 30,000
Publications	EUR 30,000
R&D standards/protocols	EUR 30,000
Website	EUR 30,000
Training courses set-up	EUR 23,000
Major event	EUR 90,000
<u>Project administration</u>	<u>EUR 45,000</u>
Total	EUR 308,000

The total cost for the 18-month set-up phase is EUR 308,000. At this stage, there is unlikely to be much income to offset these costs.

b) Implementation phase (24 months)

Tasks and resources:

Implementation of governance system	EUR 60,000
Surveys and audits	EUR 30,000
Publications	EUR 60,000
R&D standards/protocols	EUR 60,000
Website	EUR 30,000
Training courses implementation	EUR 60,000
Major event	EUR 120,000
<u>Project administration</u>	<u>EUR 60,000</u>
Total	EUR 480,000

Resources: the total cost for the 18-month implementation phase is EUR 480,000. Some costs could be recovered through charging modest membership fees, training fees and licensing of standards and protocols.

Transition to financial sustainability phase (18 months)

Implementation of governance system	EUR 30,000
Publications	EUR 30,000
R&D standards/protocols	EUR 30,000
Website	EUR 30,000
Training courses implementation	EUR 30,000
Major event	EUR 60,000
<u>Project administration</u>	<u>EUR 45,000</u>
Total	EUR 255,000

NB: At least half or more of amount would be offset directly by income with the aim that all costs would be covered from the end of the transition phase.

Resources: the total cost for the 18-month transition to financial sustainability phase is EUR 255,000.

The total cost of the three stages would be EUR 1,043,000 over five years.

7 Recommendations

Surveys, interviews and desktop researches suggest that there is a significant gap in support systems underpinning EM (EM) for energy managers and links to energy policy makers, including the insufficient practice of cost-effective EM, the continued need to support improvements in the quality of EM practice, the need to assist EM practitioners in many parts of the world that do not have existing support structures and the lack of systematic connections between the EM profession and policymakers.

The aim of this paper was to explore one method of bridging this gap through the creation of an EM Action Network (EMAK). This network would bring practical support to energy managers, connect energy managers to energy policy makers, and interconnect these networks globally. Interviewees in some specific regions were also keen for mechanisms to support the introduction of EM systems in general.

Following the analysis conducted during this study, we conclude that EMAK could fill some of the significant gaps in EM globally if the following recommendations are adopted:

- A) The aim of EMAK should be to:
 - i) Measurably increase the knowledge, skills and quality of practice of energy managers globally as well as their effectiveness through more powerful network relationships and alignment with EM systems.
 - ii) Extend the range, depth and breadth of EM policies worldwide to promote EM.

- B) The objectives of EMAK should be:
 - i) Auditing the current levels of knowledge, skills and quality of energy managers globally, including identifying the current level of support for high quality EM, the effectiveness of certification schemes, identification of under-utilised capacity in specific regions and an understanding of energy managers' qualifications and training experience.
 - ii) Developing mechanisms to increase these elements over a five-year period including certification programmes, mentoring regimes, policy development approaches, business alliances, stakeholder round-tables and cross-sectoral network events.
 - iii) Creating evaluation systems to ensure delivery of these elements.
 - iv) Further developing sustainable pathways for increased delivery of these elements over a longer time frame by building on existing and new partnerships.
 - v) Identifying the current variations in support for energy managers among different regions.
 - vi) Ascertaining possible gaps and barriers to the development and implementation of energy policies.

- C) The scope, structure and timelines of EMAK:
 - i) EMAK should have global coverage but be focused on building capacity in those regions which are facing challenges.
 - ii) The structure of EMAK would be as a network of networks to build upon current strengths and developments internationally.
 - iii) EMAK should have three phases: set-up (18 months), implementation (24 months) and transition to financial sustainability (18 months).

D) General approach of EMAK should:

- i) Focus on achieving measurable benefits to both energy managers and their interactions with energy policy makers.
- ii) Focus on strengthening existing, and in particular nascent, EM organisations and processes.
- iii) Be done through partnering with existing organisations which are servicing or providing services to many regions of the world.
- iv) Adopt a more formal approach to programme development and delivery that integrates events with on-going collaborative learning approaches.

E) Tasks of EMAK

Specific tasks that would be important in the set-up and implementation of EMAK are:

- i) Continuing surveys on current needs.
- ii) On-going discussions with regional and national organisations.
- iii) Creation of opportunities to jointly deliver services where possible with other organisations.

It is proposed that the range of potential activities of the EMAK network should include relevant EM:

- Publications
- Web sites
- Events and conferences
- Training courses
- Certification processes
- Setting of standards and protocols
- Train the trainer programmes
- Mentoring programmes
- Exchange programmes
- Roundtables.

F) Membership of EMAK should include:

- i) Both individual and corporate membership categories with fees implemented after the set-up phase (18 months).

G) Implementation of EMAK will require:

- i) That a budget for the 18-month set-up phase is allocated at the suggested rate of EUR 308,000. This would be required in two instalments; EUR 98,000 in 2009 to cover the first six months of operations and EUR 210,000 for the remainder of the project.
- ii) That a secretariat is created to oversee the set-up phase.
- iii) That the secretariat advertises immediately for Expressions of Interest to join the Advisory Committee.

That a draft workplan based on the above discussion of tasks and activities for the set-up period is created by the secretariat.

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International Energy Agency, Forthcoming-b, Information paper - Energy efficiency policies and measures for industry with case study of EM best practices, OECD/IEA, Paris.

Annex A: List of interviews taken

Building on - and complementing - the responses received from surveyed policy makers and energy engineers, phone interviews were conducted during the month of August 2009 with various individuals involved in EM in order to further explore the potential for an EMAK.

NAME	POSITION	ORGANISATION	DATE OF INTERVIEW
ADAMS Linda	Assistant to the Managing Director	Centre for International Migration and Development/GTZ (Germany)	Wednesday 19 August 2009
AUGER Benjamin	Journalist	Africa Intelligence	Wednesday 19 August 2009
CASS William	Main Energy Manager	FirstRand Group (South Africa)	Wednesday 26 August 2009
DURREY Hélène	Strategic Accounts Director	Dalkia	Monday 24 August 2009
JACQUES Ivan		PPEE (Chile)	Wednesday 19 August 2009
KOPETS Anatoliy	Executive Director	Energy Efficient Cities of Ukraine	Tuesday 18 August 2009
LIU Peggy	Executive Officer	JUCCCE (China)	Thursday 20 August 2009
MARZOUK Atef	Policy Officer Renewable Energy	African Union	Wednesday 19 August 2009
PARK Jungwook	Director of Energy Efficiency Division	Ministry of Knowledge Economy (South Korea)	Friday 14 August 2009
PARK Yun Kyong	Assistant Manager – Carbon Market Department	KEMCO (South Korea)	Tuesday 18 August 2009
REINAUD Julia	Programme Manager	ClimateWorks	Tuesday 18 August 2009
RUSHMERE Sara	Electricity Efficiency Campaign Manager	City of Cape Town (South Africa)	Monday 17 August 2009
VAN BERKEL René	Unit Chief - Cleaner and Sustainable Production Unit	UNIDO	Tuesday 25 August 2009
VASSEUR Nathalie	Strategic Programmes Director	Dalkia	Wednesday 2 September 2009
VENTER Jean	Managing Director	South African National Energy Association (South Africa)	Tuesday 18 August 2009
YACHINOVSKI André	Director for International Relations	ADEME (France)	Wednesday 19 August 2009

Annex B: Questionnaire templates

Two separate questionnaires were sent to both policy makers and energy managers. Contacts were mainly provided for by IEA staff. We received completed questionnaires from 13 energy managers and 9 policy makers.

A) Questionnaire for energy managers

1. What certification or qualifications do you have as an energy manager?

2. Does your qualification assist you in your career?

Why? _____

3. To your knowledge, are there EM networks operating in your country/region?

(Y / N)

a. If yes:

i. Which are these networks? _____

ii. Are you a member of a network already? (Y / N)

If yes, why did you join this network?

iii. What are the benefits of this network?

b. If no:

i. Would you be interested in joining a local or regional EM network?

ii. Would you be interested in joining an international EM network?

iii. What activities could such networks undertake?

1. Local/regional (list)

_____, _____, _____

2. International (list)

_____, _____, _____

iv. What benefits would you get from such networks? (list)

1. Local/regional (list)

_____, _____, _____

2. International (list)

_____, _____, _____

4. Considering an international EM network:

a. What is the maximum you would be willing to pay in annual subscriptions (membership cost)?

[REDACTED]
b. Should the membership of this international network be restricted to EM professionals? (Y / N)

1. If yes, why? Restricted to whom?

[REDACTED]

2. If no, why?

[REDACTED]

5. Governance and Board (i.e. who discusses and decides how to run operations)

a. Which members do you think should be in the Board: professional members in network; outside consultants; company representatives; policy makers; others? Why?

Answer [REDACTED]

Why? [REDACTED]

b. How should members of the Board be selected? Periodical elections from all members in network; or a transparent process required, but election from all members not necessary; or others? Why?

Answer [REDACTED]

Why? [REDACTED]

c. Would you consider being involved in any capacity in the governance/structure of the EMAK? Why? In what capacity?

[REDACTED]

B) Questionnaire for policy makers

1. In your country, are there associations or networks for energy managers? If no, why?

[REDACTED]

2. If a regional or an international EM network was established:

a. What activities should such a network undertake?

b. What benefits would your country get from such a network?

[REDACTED]

3. Considering an international EM network, should the membership of this network be restricted to EM professionals? (Y / N)

1. If yes, why? Restricted to whom?

[REDACTED]

2. If no, why?

[REDACTED]

4. Structure of board members (i.e. who discusses and decides how to run operations)

1. How many members would you consider should be in the Board (e.g. less than 10, from 10 to 20)

Why? _____

2. Which members would you consider should be in the Board: professional members in network; outside consultants; company representatives; policy makers; others? Why?

3. How would board members be selected? Periodical elections from all members in network; or a transparent process required, but election from all members not necessary; or others? Why?

5. Which possible areas of cooperation would you identify between your national entity for energy efficiency and/or EM (agency, government-owned company, etc) and the EMAK initiative?

Annex C: List of organisations involved in EM, Certifications and EM Training

The following lists some of the major organisations, networks, certifications schemes (competences and systems) and training opportunities already existing for EM at the international, regional, national and sometimes local levels. The latter category is chiefly introduced here as a list of examples, far from encompassing all local EM associations. For each organisation, purposes, services and membership size are detailed when the information was available. Purposes and missions of these organisations were most often taken from the organisations website in their own words.

International level

Associations and networks of energy managers/auditors

- **The Energy Institute [EI]¹:**
 - **Purpose:** “Providing an independent focal point and a powerful voice to engage business and industry, government, academia and the public, the EI promotes the safe, environmentally responsible and efficient supply and use of energy in all its forms and applications.”
 - **Services:** “the EI addresses the depth and breadth of energy and the energy system, from upstream and downstream hydrocarbons and other primary fuels and renewables, to power generation, transmission and distribution to sustainable development, demand side management and energy efficiency. The EI also offers learning and networking opportunities to support career development.”
 - **Membership:** membership of over 14 000 individuals and 300 companies across 100 countries.

- **The Association of Energy Engineers [AEE]²** is the closest body to an international network of energy managers/auditors. However, the AEE does not target EM only.
 - **Purpose:** “to promote the scientific and educational interests of those engaged in the energy industry and to foster action for Sustainable Development.”
 - **Services:** “AEE offers a full array of informational outreach programs including seminars (live and internet based), conferences, journals, books, and certification programs. The AEE *Energy Insight* is an online newsletter that focuses on the accomplishment of the Association and its members. AEE also publishes three technical journals: Energy Engineering, Strategic Planning for Energy & the Environment, and Cogeneration & Distributed Generation Journal. These publications are complimentary to all AEE members. The Foundation of the Association of Energy Engineers is a non-profit organisation that is dedicated

¹ <http://www.energyinst.org.uk/>

² <http://www.aeecenter.org/>

to furthering education in energy and management. To date, the Foundation has awarded over USD 480,000 in scholarships for use by outstanding students.”

- Membership: 9500 members in 73 countries, 67 local and regional chapters worldwide.
- **The International Association for Energy Economics [IAEE]³:**
 - Purpose: the IAEE “provides an interdisciplinary forum for the exchange of ideas, experiences and issues among professionals interested in the field of energy economics. The IEAA facilitates worldwide information flow and exchange of ideas on energy issues, high quality research, development and education of students and energy professionals”.
 - Services: “The IAEE publishes two periodicals. The *Energy Journal* is a quarterly publication sent to all members. The IAEE *Newsletter* covers the latest information on the Association, and contains topical articles of interest to a general audience interested in the energy field. A membership directory is available to members online. International Conferences are held each year and usually there are regional meetings hosted by IAEE Affiliates as well. ”
 - Membership: 3400 members in 70 countries, 30 national affiliates.
- **The World Energy Council [WEC]⁴:**
 - Purpose: The WEC “*promotes the sustainable supply and use of energy for the greatest benefit of all*”.
 - Services: “Every three years, the WEC holds the World Energy Congress, a major global energy event attracting 4000+ delegates. The next Congress will be held in Montreal in September, 2010.”
 - Membership: member committees in more than 90 countries.
- **Best Practices and Technology foundation** (final name still to be confirmed) – by ClimateWorks:
 - Purpose: “To progress implementation of energy efficiency policies worldwide”.
 - Services: 20 to 30 professionals in a few countries (offices in Paris, London, Brussels, San Francisco and probably China, Mexico) will be in charge of identifying and recruiting energy managers, auditors and policy makers to implement industry-oriented energy efficiency policies that were successful in a country into another country. ClimateWorks will work directly with national governments to identify their needs.
 - Membership: recruited energy managers will not be “members” of the foundation, only contracted on an ad-hoc basis.

³ <http://www.iaee.org/>

⁴ <http://www.worldenergy.org/>

- The **Institute of Electrical and Electronics Engineers [IEEE]**⁵ is the biggest association of engineers identified in this study. It is a generalist association (i.e. not working specifically on EM).
 - Purpose: IEEE's core purpose is “to foster technological innovation and excellence for the benefit of humanity. IEEE will be essential to the global technical community and to technical professionals everywhere, and be universally recognised for the contributions of technology and of technical professionals in improving global conditions.”
 - Services: “Bringing members access to the industry's most essential technical information, networking opportunities, career development tools.” In addition, the IEEE Foundation manages more than 80 funds to help further the scientific and educational purposes of the IEEE.
 - Membership: more than 375 000 members in more than 160 countries; 45 percent of whom are from outside the United States; more than 80 000 student members; 329 sections in ten geographic regions worldwide; 1860 chapters that unite local members with similar technical interests.

- The **Institution of Engineering and Technology [IET]**⁶ is a generalist association.
 - Purpose: “Sharing and advancing knowledge throughout the global Science, Engineering and Technology (SET) community to enhance people’s lives around the world.” The IET “provides a global knowledge network to facilitate the exchange of ideas and promote the positive role of science, engineering and technology in the world.”
 - Services: “*Virtual library* provides online access to searchable collections of thousands of full-text books, journals, magazines and reports; Library online catalogue to search for book and journal titles in the collections; Archives online catalogue holds details of the collections, series and items within the National Archive for Electrical Science and Technology (NAEST), the Special Collection Manuscripts (SCMSS), and the Image Collection; Research service to locate information on technologies, market and company data, products and suppliers; Book loans and free of charge global postal loan service; Awards; Scholarships”.
 - Membership: more than 150 000 members in 127 countries and offices in Europe, North America and Asia-Pacific.

⁵ <http://www.ieee.org/>

⁶ <http://www.theiet.org/>

Training and competences certifications

- The **Certified Energy Manager [CEM]** certification scheme - by the Association of Energy Engineers [AEE]:
 - The AEE is the biggest private player on the EM certification scene. It has certified 15 000 professionals in 14 different areas of certification - including 6000 professionals as part of its main Certified Energy Manager [CEM] certification - in 23 countries (incl. the US) since 1981.
 - Geographical coverage and expansion: China hosted its first CEM course in July 2008, Hong-Kong hosted its first Certified Carbon Auditor certification examination in May 2008. The AEE also offers the CEM (i.e. seminars and examination facilities) in Canada, Ireland, Egypt, Mexico and South Africa. Other certifications are usually available in a maximum of 2 of these countries outside the US. The US Agency for International Development has used the Certified Energy Managers program to develop the energy efficiency infrastructure in Egypt, Romania, Bulgaria, Armenia, Hungary, Ukraine, Poland, India and Jamaica.
 - A spin-off of the CEM was created for professionals-to-be who are still in training [the Energy Manager in Training certification – EMIT].
 - Two certifications have recently been launched: the Certified Sustainable Development Professional [CSDP] and the Certified Carbon Reduction Manager [CRM].
 - Partnerships and alliances: in 2005, the AEE has established a partnership with EnergyStar to offer a Green Building Engineer [GBE] certification which will support validation of the EPA-EnergyStar's Statements of Energy Performance.
 - The AEE mentions that the number of companies and institutions asking job-seekers to be CEM certified is growing, but exact figures and trends are not publicly available.
 - The AEE charges two fees to candidates for certification: a fee to have the right to take the examination + a fee to take preliminary, mandatory courses. The fees for the courses/seminars are up to five times higher than the fee for the exam itself (e.g. of the CSDP: EUR 200 to take the exam, EUR 1000 to take the preliminary seminar).
 - Figures on the ratio of candidates vs. eventually certified candidates are not publicly available.
 - Details on the exact origin of the certified managers are not publicly available (the AEE only mentions “23 countries”).
- **Qualifying Technicians and Technical Trainers** - by GTZ with the Centrum für Internationale Migration und Entwicklung [CIM]:
 - Initiative by the German Organisation for Technological Cooperation (GTZ) to train energy managers in developing countries.
 - 2 sub-programmes: German technicians sent to developing countries and “returning experts” (i.e. training of technicians from developing countries in Germany).

- 800 technicians trained or sent each year; it was not possible to obtain details on the exact number of experts trained specifically in energy efficiency.
- CIM and GTZ foster “Centers for Energy Efficiency” in host countries (e.g. Egypt).
- **RECP/Training the Trainers regional programmes, by UNIDO⁷:**
 - Purpose: Training of trainers in EM for medium and large companies in developing countries. “UNIDO and UNEP cooperate to advance sustainable industrial development and consumption and production in developing and transition countries. Specifically, their joint Programme on Resource Efficient and Cleaner Production [RECP] aims to improve resource efficiency and environmental performance of businesses and other organisations. UNIDO and UNEP therefore develop and strengthen national capacities for delivering RECP services to businesses, governments and other organisations. This programme is based on achievements and lessons learnt from National Cleaner Production Centres (NCPCs) established since 1994” [the option of NCPCs becoming membership-based is currently being investigated by UNIDO experts]. “Activities are underway in 40 countries. These have put Cleaner Production (CP) on the agenda of industry and government, trained technical staff and fostered implementation of CP options and policy change. The current RECP Programme provides a strategic and coherent framework for upscaling and mainstreaming of activities and results of NCPCs, nationally, regionally and globally.”
 - The following key deliverables are expected: “- One global and three regional networks of RECP services providers established/strengthened and serve as effective platforms for knowledge management and South-North-South collaboration in technology and knowledge transfer. - More than 500 experts trained as trainers through regional Training the Trainers programmes that will be organised on the basis of five toolkits and training manuals to be developed. - A global knowledge management system supported by regional and national nodes established to facilitate knowledge exchange and the transfer of environmental sound technologies.”
 - Programme partly designed by the Lawrence Berkeley National Laboratory.

⁷ Full list of contacts available on:

http://www.unido.org/fileadmin/user_media/UNIDO_Header_Site/Subsites/RECP_Network_Contacts_Aug_09.pdf

EM Systems certifications

- **ISO 50001 [PC 242] EM certification⁸** - by the International Organisation for Standardisation [ISO]:
 - A certification under development that will address:
 - Harmonised terminology, calculation methods and indicators.
 - EM Systems.
 - Standards for assessment and ratings (of both buildings and industrial plants).
 - Methodology: “The standard will be based on the continual improvement and Plan-Do-Check-Act approach utilized in ISO 9001 and ISO 14001 to provide compatibility and integration opportunities”.
 - ISO has cooperated on this new certification with the following players:
 - The IEA (joint position paper “International Standards to develop and promote energy efficiency and renewable sources” (in support of the G8 plan of action); IEA experts said to be participating in ISO forums dealing with ISO strategy; ISO experts said to be invited to contribute to IEA initiatives).
 - The World Energy Council through the World Energy Congress [WEC] (International Standards Workshop at the WEC Congress, Rome 2007).
 - UNIDO (UNIDO’s *initiative in support of the development of an international ISO EM Standard* since July 2008 – UNIDO has since then organised an event in China in April 2008 to support ISO’s forthcoming 50001 certification).

⁸ <http://www.iso.org/iso/pressrelease.htm?refid=Ref1157>

Regional level

Associations and networks of energy managers/auditors

Africa

No regional organisations for EM exist in Africa⁹.

North-America (US + Canada)

- The **National Society of Professional Engineers [NSPE]**¹⁰ is a generalist association for engineers:
 - Purpose: “Through education, licensure advocacy, leadership training, multi-disciplinary networking, and outreach, NSPE enhances the image of its members and their ability to ethically and professionally practice engineering.”
 - Services: news of the profession: PE magazine, members-only e-newsletters, continuing Education Licensure programs, online courses, career advancement (online job board; the *NSPE Engineering Income & Salary Survey*), networking opportunities, professional growth, advocacy & outreach.
 - Membership: approximately 45 000 professional engineers and those on the path to licensure; 96% are professional or engineer interns, many with other professional licenses and certifications in fields such as land surveying, fire protection, environmental engineering, and forensics.

Europe

- The **European Network for Energy Efficiency [TIC]**¹¹:
 - Purpose: “The European thematic network “ICT for energy efficiency” aims at federating a wide variety of stakeholders initially from 10 European countries to develop common understanding of good practices in the field of ICT applied to energy efficiency in cities. The approach will focus on what has been done and what can be done in urban areas, places where the issue of energy efficiency is particularly crucial. The concept and reality of sustainable cities will be discussed and challenged through three working groups and the creation of a social network and best practices platform.”
 - Services: no traditional membership-based mechanisms and benefits.
 - Membership: stakeholders in 10 European countries.
 - The project officially started on the 1st October 2008. Inaugural conference: 18 March 2009 (Brussels).

⁹ Interview with Atef Mazrouk (African Union)

¹⁰ <http://www.nspe.org/>

¹¹ http://www.acidd.com/UPLOAD/rubrique/pages/133/133_rubrique.php

Training and competences certifications

Africa

There is no regional action in either training or certification of energy managers¹².

Europe

- **ManagEnergy¹³:**
 - Purpose: ManagEnergy “is an initiative of the European Commission Directorate-General for Energy and Transport, which aims to support the work of actors working on energy efficiency and renewable energies at the local and regional level.”
 - Services: “The main tools are training, workshops, online events, monthly newsletter. Additionally information is provided on case studies, good practice, European legislation and programmes. ManagEnergy’s website includes a partner search system with some 4000 organisations, including 380 energy agencies, which can provide valuable expertise and partnerships on energy activities at local and regional levels.”

- **European Energy Manager certificate [EUREM]¹⁴** – by the EU’s Intelligent Energy – Europe programme [IEE]:
 - Purpose: the EU-project "Training and Network of European EnergyManagers - EUREM.NET" “pursues the aim of expanding the successful, 2003-2005 European EnergyManager training programme EUREM to nine further EU countries. Within the training each participant develops a concrete energy concept to improve the company's energy performance. The aim is to save about 400 MWh/a and concerning 20,000 EUR/a by each participant.” EU funding will stop after 2009 (typical IEE funding period). Discussions are ongoing regarding the format under which the scheme will be continued.
 - Coverage: 13 EU countries, links with China have been reported¹⁵.

Middle-East

- **Qualifying Technicians and Technical Trainers**, by CIM-GTZ (*see above*).

¹² Interview with Atef Mazrouk (African Union)

¹³ <http://www.managenergy.net>

¹⁴ <http://www.energymanager.eu/> + <http://www.european-energymanager.net/>

¹⁵ <http://www.actu-cci.com/news/700/>

North-America (US + Canada)

- National licenses: The National Society of Professional Engineers [NSPE] only accepts members who hold a valid **license** as a **Professional Engineer** in the US or Canada or an **Engineer-in-training certification**.

EM Systems certifications

Europe

- **Eco-Management and Audit Scheme [EMAS]¹⁶:**
 - Purpose: the EU Eco-Management and Audit Scheme (EMAS) is a management tool for companies and other organisations to evaluate, report and improve their environmental performance. The scheme has been available for participation by companies since 1995 and was originally restricted to companies in industrial sectors. Since 2001, EMAS has been open to all economic sectors including public and private services. In July 2008, the European Commission proposed to revise EMAS to increase the participation of companies and reduce the administrative burden and costs, particularly for small and medium sized enterprises (SMEs). On 2 April 2009, the Council and the European Parliament reached agreement on a text for the revised EMAS Regulation. Formal adoption of the regulation, its publication in the Official Journal and entry into force is expected to happen at the end of 2009.

National level

Associations and networks of energy managers/auditors

Australia

- The **Association of Professional Engineers, Scientists & Managers, Australia [APESMA]¹⁷:**
 - Purpose: “To protect & advance the employment, social & economic interests of members”.
 - Services: seminars, networking opportunities, publications, career opportunities.
 - Membership: 25 000 members in Australia + 15 000 student members.

¹⁶ http://ec.europa.eu/environment/emas/index_en.htm

¹⁷ <http://www.apesma.asn.au/>

Canada

- The **Energy Managers Network [EMN]**¹⁸, by the Canadian Industry Program for Energy Conservation [CIPEC], itself offered by NRCan/Office for Energy Efficiency):
 - Purpose: “The goal of the CIPEC Energy Managers Network is to develop a knowledge-sharing and learning network for industrial EM practitioners.”
 - Services: “In addition to participating in meetings, members gain access to technical guides, case studies and discussion boards.”
 - Membership: dedicated to industrial EM practitioners. “Consultants and educators are welcome to apply for limited EMN membership privileges.” Exact membership size unknown.

Germany

- The **Association for Electrical, Electronic & Information Technologies [VDE]**¹⁹:
 - Purpose: the VDE “is one of the largest technical and scientific associations in Europe. [Its] ultimate goal is to ensure the ongoing development of various technologies and encourage their applications in a wide variety of industries.” Means: “promoting the national and international transfer of technical know-how: by supporting the education and training of new generations of talents and, by participating in political decision-making on education and research”.
 - Services: “backing educational and career development with a broad program of conferences, symposia and seminars.”
 - Membership: 34 000 members (mostly in Germany) Training and competences certifications, represented in Berlin and Brussels and in 29 branch offices throughout Germany.

India

- The **Indian Association of EM Professionals [IAEMP]**²⁰:
 - Purpose: the Indian Association of EM Professionals (IAEMP) is “a group of highly qualified, committed and dynamic conscience keepers to nation on energy matters. IAEMP has energy professionals thriving for a sole objective of working towards making India Energy Independent by 2022.”
 - Services: “National Level Seminars on “Energy Efficiency and EC Act, 2001” at Hyderabad, several activities to educate households on practical energy saving ideas at homes and, the monthly magazine *The Urja Watch*.”
 - Membership: 2000 Energy managers/ auditors/ professionals.

- The **Society of Energy Engineers and Managers [SEEM]**²¹:

¹⁸ <http://oee.nrcan.gc.ca/industrial/technical-info/emn/index.cfm?attr=24>

¹⁹ <http://www.vde.com/en/Pages/Homepage.aspx>

²⁰ <http://iaemp.org/>

- Purpose: the SEEM's mission is "to apply the professional knowledge and expertise of its members to foster energy efficiency in all sectors of the economy and to facilitate and aid in policy level interventions to circumvent the bottlenecks for speedy implementation of energy conservation efforts, encourage and assist in implementation of programmes related to the objective of improvement of energy efficiency by conducting energy audits and implementing the recommendations arising thereof."
- Services: "Dissemination of information regarding energy efficiency techniques, tools, practices and processes through various media including publications, exhibitions, also, organisation of technical digest service, technical enquiry service, documentation centre and library; facilitation of technical exchange by organising energy conservation / management teams in organisations and by arranging inter plant visits; organisation of energy related training/ courses of various levels of management operatives, technicians, etc."
- Membership: membership to the SEEM is open to anyone "Certified as Energy Manager and/ or Energy Auditor by the Bureau of Energy Efficiency" [see in Annex 4 – the BEE implements a local version of the AEE's CEM certification scheme].
- The SEEM was initiated with a cooperation agreement between the French ADEME and the Indian government, now autonomous²².

Ireland

- **Engineers Ireland²³** :

- Purpose: generalist association. Mission: "to promote knowledge of engineering. To establish and maintain standards of professional engineering and engineering education. To provide opportunities for Continuing Professional Development (CPD) for engineers. Also, to maintain standards of professional ethics and conduct. Ensure that professional titles are granted to qualified candidates and act as the authoritative voice of the engineering profession in Ireland."
- Services: "Continuing Professional Development (CPD) training, programme accreditation, CPD best practice for engineering employers, a national and regional programme of CPD-approved evening lectures and seminars, meeting room and conference facility hire, library and reading room with access to all our engineering literature, publications such as the Engineers Journal, Engineering Life, e-zines, academic reviews, technical papers and government submissions, career advice."
- Membership: 24 000 members.

²¹ <http://www.energyprofessional.in/home.php>

²² Interview with Andre Yatchinovski (ADEME)

²³ <http://www.iei.ie/>

Nepal

- The **Flensburg Association for EM [FAEM-Nepal]**²⁴:
 - Purpose: “The Flensburg Association for EM-Nepal (FAEM-Nepal) is an association formed by Nepalese students who have studied at the University of Flensburg, Germany, as well as other students who have studied energy-related courses in other German Universities. It is an independent, service-oriented institution established to bring both former and current Nepalese students from these Universities together in one forum to work towards sustainable EM solutions.”
 - Services: FAEM-Nepal with support from German Academic Exchange Program (DAAD) organised a seminar on “Role of Renewable Energy and Sustainable Development Agenda for Nepal” from 13 to 15 May 2004 in Kathmandu, Nepal. FAEM Nepal has conducted research and consulting services for different energy related projects like (see full list on website).
 - Membership: approximately 30 members.

New-Zealand

- The **EM Association of New Zealand [EMANZ]**²⁵ [established by the Institution of Professional Engineers New Zealand - IPENZ - and EECA]:
 - Purpose: “The EM Association of New Zealand (Inc) is a Collaborating Technical Society with the Institution of Professional Engineers New Zealand (IPENZ). EMANZ membership is open to all people and organisations in the EM industry whatever their backgrounds, as well as catering for professional engineers. The EM Association of New Zealand will work towards ensuring that a continuing high standard of expertise in EM and energy efficiency related services are available to industry, commerce and the public of New Zealand.”
 - Services: “Training & personal development through seminars, peer support, access to lessons learnt by other practitioners, shared cost of information, networking.”
 - Membership: approximately 200 individual and company members.

South Africa

- The **South African EM Association [SEMA]**²⁶:
 - Purpose: the primary focus of the organisation is to create awareness of the economic and environmental benefits of EM and assist with the implementation of sound EM practices.

²⁴ <http://www.faemnepal.org.np/>

²⁵ <http://www.ema.org.nz/>

²⁶ <http://www.sema.uct.ac.za/>

- Services: conduct basic energy audits, educate energy users, introduce new technology, provide a forum for the exchange of information, help establish dialogue between industry and government, and offer energy service organisations an introduction through its trade directory.
- Membership: unknown.
- The **South Africa National Association for Energy Efficiency [SANAEE]²⁷ [WEC local chapter]**:
 - Purpose: “SANAEE represents a hub for the exchange of energy related information between South Africans and between South Africa and players internationally, via the World Energy Council networks. In so doing, SANAEE stimulates original thought and catalyses transformation of the Energy Sector.”
 - Services: “Energy Award”, technical site visits, newsletter, business briefings, membership contact list, WEC Study programmes, dinners, branding.
 - Membership: unknown.

South Korea

- The **Korean Association of Energy Auditors**:
 - Publicly available information could not be found.

Sri Lanka

- The **Sri Lanka Energy Managers Association [SLEMA]²⁸**:
 - Purpose: “To serve as a forum for information exchange on EM practices. To encourage and promote EM practices in Sri Lanka. To provide adequate and up-to-date information on effective EM techniques. To encourage consultancy services on EM.”
 - Services: “Offer facilities to obtain updated information on energy efficiency; provide opportunities for participating in local and foreign training programs and opportunities to participate in projects, consultancy assignments handled by SLEMA; offer facility to hire measuring instruments required for energy related studies/auditing at a reasonable fee”. Additionally, SLEMA “regularly conducts extensive training courses, research, general awareness programs and consultancy in energy and related fields. SLEMA also participates in international and regional research projects on energy planning, management and environment impacts of energy conservation.”
 - Membership: unknown.

UK

- **United Kingdom Association of Professional Engineers [UKAPE]²⁹**:

²⁷ <http://www.sanea.org.za/>

²⁸ <http://www.slema.org.lk/>

- Purpose: “UKAPE’s immediate aim is to help [its] members in their day-to-day working lives. UKAPE’s long-term aim is also to improve the status of both the individual and the profession. UKAPE also seeks to influence the engineering profession and has members who participate in governing the engineering profession and sit on councils of the engineering institutions. UKAPE lobbies government on behalf of [its] members.”
 - Services: expert advice and representation on all aspects of professional working life, both in the UK and overseas, free and expert legal representation, access to a national network of experienced Regional Officers, regular communications and meetings also, unrivalled education facilities at our residential training college, extensive membership benefits and services package, free 24-hour Legal Helpline for queries and advice for you and your family.
 - Membership: unknown.
- The **Network of Energy Efficiency in the Process Industry**³⁰, by the Engineering and Physical Sciences Research Council [EPSRC]:
 - This network will be funded by EPSRC between June 2009 and May 2012 [project led by the University of Newcastle].
 - Purpose: “The network will forge close links and work with industry, academia, government (national and local) and NGOs to support the maximisation of energy recovery, plant efficiency improvements, reduce CO₂ emissions and use of cleaner, more secure fuel sources.”
 - Services: “Outputs will include the establishment of a sustainable network, development of a network website, repository of resources, forum groups for strategic discussion, a report on Grand Challenges which will identify a long-term research vision and future needs analysis and a final report. The network will operate via a series of industry and researcher forums, conferences, short courses and sandpits.”
 - The **Energy Services and Technology Association [ESTA]**³¹:
 - Purpose: ESTA “is the UK’s leading EM industry association. ESTA focuses on demand side energy efficiency of buildings, building services and process services. ESTA considers issues beyond pure energy consumption to those systems and processes that influence the whole life cost of a building.”
 - Services: primarily a network of companies, ESTA features actions targeting individuals (see certifications section below)

²⁹ <http://www.ukape.org.uk/>

³⁰ <http://gow.epsrc.ac.uk/ViewGrant.aspx?GrantRef=EP/G059284/1>

³¹ <http://www.esta.org.uk/>

- Membership: over 100 suppliers of products and services covering energy efficient monitoring, control, operation and management of buildings, building services and process services.

US

- The **Association of Energy Service Professionals [AESP]**³²:
 - Purpose: “AESP is a member-based association dedicated to improving the delivery and implementation of energy efficiency, EM and distributed renewable resources. AESP promotes the transfer of knowledge and experience.”
 - Services: “AESP provides professional development programs, a network of energy practitioners National Conferences, Brown Bag Seminars, Education, Training and Professional Papers for all levels of experience providing tangible, actionable information helping everyone do their jobs more effectively.”
 - Membership: 1400 members. AESP members work in the energy services industry and represent electric and natural gas utilities, public benefits associations, regulatory and non-profit entities, vendors, manufacturers and consulting firms.

Ukraine

No association of energy managers per se exists in Ukraine (an information confirmed by Mr Vasyl Stepanenko), although big companies are reported to have recently started to hire dedicated energy managers.

- The **Association of Energy Auditors of Ukraine**:
 - The existence of this association was reported by one of our interviewees. More details could not be obtained in due timing.
 - Purpose: active in the municipal sector

Training and competences certifications

African countries

Ghana, Nigeria and Togo were starting to design energy efficiency policies for industry, but overall certifications and training are largely inexistent³³.

Canada

- The **Training Tomorrow's Energy Managers** programme, by Ontario Power Authority's.

³² <http://www.aesp.org/>

³³ Interview with Benjamin Auger, Africa Intelligence

China

- The French ADEME is about to start a training programme for energy managers in industry in China.
- The UK Carbon Trust is possibly providing the Chinese government with energy managers and possibly training.
- Japan's ECCJ is reported to be working with the NDRC in China to train energy managers, through IPEEC (Julia Reinaud, confirms Nigel).

India

- **National Certification Examination for Energy Managers and Energy Auditors**³⁴:
 - Carried out by the National Productivity Council – NPC, selected as National Certifying Agency by the Bureau of Energy Efficiency.
- In India, through a U.S. Agency for International Development (USAID) program initiated in 2003, AEE developed the country specific curricula to train and certify energy managers in response to government's implementation of the Indian Energy Act. The Bureau of Energy Efficiency operates the Certified Energy Manager in India and has trained and certified hundreds of CEMs.

France

- **Auditeur Interne Environnement** – by Association Française de Normalisation [Afnor].³⁵
- **Certification d'Auditeur ICA Environnement** – by Afnor.³⁶
- **Responsable Environnement** – by Afnor.³⁷

New-Zealand

- **Accredited Energy Auditors**:
 - Certification offered by the EM Association of New Zealand [EMANZ, see above].

South Africa

South African interviewees stated that there is no certification for energy managers in South Africa.

Sri Lanka

- **National Diploma in Technology** awarded by a recognized university in Sri Lanka.

³⁴ <http://www.em-ea.org/faq.asp>

³⁵ <http://www.afnor.org/certification/cc027>

³⁶ <http://www.afnor.org/certification/ica001>

³⁷ <http://www.afnor.org/certification/cc022>

Turkey

- **Energy Manager Certificate**, awarded by the national administration for Energy [EIE].

UK

- The **Energy Manager of the Year Award**, by ESTA.
- The **Quidos** Accreditation scheme for energy managers³⁸.
- **Professional development programmes** offered by the AESP.

Ukraine

Interviewees reported no national certification scheme, but mentioned that the most common qualification for energy engineers and technicians were recognized university diplomas from several cities (e.g. courses in EM offered by the **Technical University of Kyev**).

Vietnam

- **NRTeam** – Research centre training energy managers in industry, programme offered by ADEME (now ended).

EM Systems certifications

Several national certifications for EMS exist. See annex D below for analysis.

Local level

Associations and networks of energy managers/auditors

Alsace (France)

- **Association des Professionnels de l'Énergie [COPROTEC]³⁹**, created by the Chamber of Commerce and Industry of Alsace [CCI Alsace]:
 - Purpose: to “Promote energy-related professions, quality assurance in EM and develop of network of trained professionals”.
 - Services: trains professionals and students in renewable energy and EM; establishes contacts between the trained individuals and small and medium companies in the area.
 - Membership: unknown.

³⁸ http://www.guidos.co.uk/accreditation_overview.html

³⁹ <http://www.coprogez.com/Structure/association.php>

Québec

- **Association Québécoise pour la Maîtrise de l'Énergie [AQME]⁴⁰:**
 - Purpose: share experience of its members, disseminate knowledge among its members, identify funding opportunities for projects of interest to members, advocating its members' positions to the Provincial and local governments, facilitating networking.
 - Services: training centre (offers certifications including the AEE's CEM, but also the certification of the Canadian Coalition for Geothermal Energy); information seminars; dinners; newsletter; publications; grants for young professionals/students.
 - Membership: approximately 700 members.

Oregon

- The **Oregon Association of Professional Energy Managers [Oregon APEM]⁴¹:**
 - Purpose: "The OAPEM is a partnership of business, government and utilities. Oregon APEM seeks to advance the understanding and practice of efficient energy use through forums, newsletters, facility tours, and face-to-face dialogue. Oregon APEM provides a forum for energy and resource management professionals in Oregon and Southwest Washington to share information and to grow professionally. The Association's mission is to help [its] members improve their organisations' competitiveness by facilitating the exchange of the latest practical information on managing energy and other resources."
 - Services: "Members pay a reduced rate to attend the issue forums, featuring expert speakers and ample time for networking with other energy and resource management professionals. Members receive the quarterly Oregon APEM Newsletter free of charge. Members are listed in the annual "Who's Who" directory and receive a free copy. Members are eligible for the Energy Manager of the Year Award."
 - Membership: unknown.

South Carolina

- The **Association of South Carolina Energy Managers [ASCEM]⁴²:**
 - Purpose: "The ASCEM provides information to members to foster a common EM program for South Carolina. The ASCEM consolidates experience, knowledge, and interest in the field of EM, disseminates information, shares strategies for the financing, and, implements energy efficiency projects."
 - Services: offers the *South Carolina Accredited Commercial Energy Manager exam* and AEE's CEM, conferences, scholarship for students⁴³.

⁴⁰ <http://www.aqme.org>

⁴¹ <http://oregonapem.org/>

⁴² <http://www.energy.sc.gov/index.aspx?m=14>

- Membership: unknown.

Texas

- The **Texas Energy Managers Association [TEMA]**⁴⁴:
 - Purpose: “To serve publicly-funded institutions: public schools, hospitals, state and local governments, and public institutions of higher learning by providing training in EM and program design; to establish the highest standard of ethics and efficiency in EM methods and practices for the needs of the State of Texas. To provide a consolidation of experience, knowledge and interest in the field of EM. To serve as an instrument for the dissemination of information related to EM or the administration of EM. To share strategies for the financing and implementation of energy efficiency, ultimately, to save energy and Texas taxpayer money! [sic].”
 - Services: networking opportunities (regional meetings, annual conference), training workshops, website, newsletter.
 - Membership: unknown.

Training and competences certifications

Alsace (France)

- Courses and seminars offered by the Association des Professionnels de l’Energie [COPROTEC].

Maine

- **Certificate in Energy and Environmental Management [CEEM]**, by the Lawrence Technological University.

Western US

- **Certificate Program in Energy Resource Management** – by University of California in Davies.
- **Professional Certificate in Green EM** – by San Diego State University⁴⁵.
- **EM Certificate** – by University of Nevada in Reno⁴⁶:
 - Launched in 2009. EUR 925.

⁴³ http://www.energy.sc.gov/publications/scholarship_information.pdf

⁴⁴ <http://www.texasema.org/>

⁴⁵ http://www.ces.sdsu.edu/green_energy.html

⁴⁶ <http://www.sierraangels.com/unrem/>

North-western US

- EM Certification [EMC], - *by* Northwest Energy Education Institute [NEEI] (details available in previous file).

EM Systems certifications

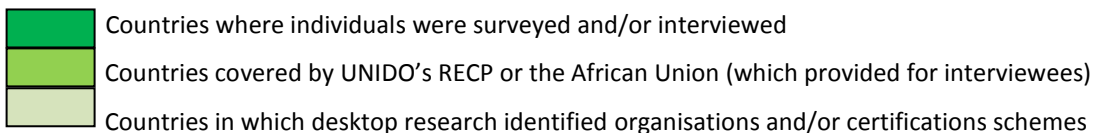
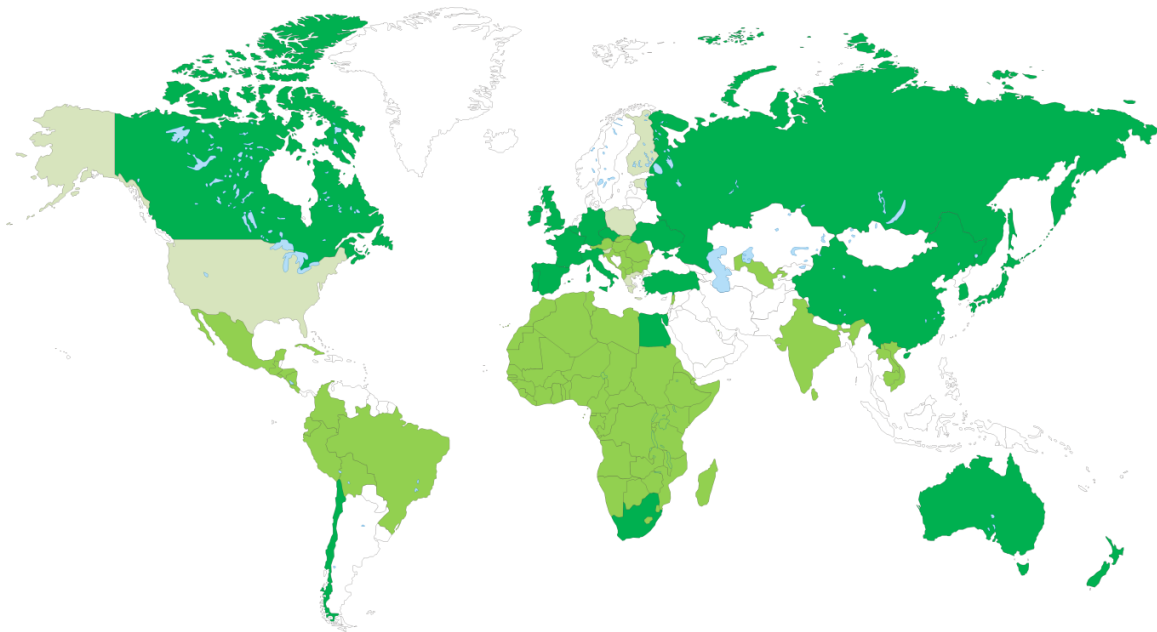
Limerick (Ireland)

- **Certification for EM Systems in Small and Medium Enterprises** (offered by the Local Energy Agency of Limerick).

Annex D: Analysis of the survey, interviews and desktop research

Geographical coverage of interviews and survey responses

Nine policy makers and thirteen energy managers from twelve different countries responded to the written questionnaire sent out in June 2009. Responses were received from individuals in Australia, Belgium, Canada, Czech Republic, Ireland, Italy, Japan, Portugal, New Zealand, Spain, Turkey and the United Kingdom. Seventeen phone and in person interviews were then conducted. Overall, thirty-nine individuals from twenty countries on all continents contributed their responses to this scoping study. The situation in regions such as Africa, the United States and parts of the European Union was indirectly assessed in interviews, and further analysed by means of desktop research.



Coverage by existing associations of energy managers

On the international level

There is no international association for energy managers *per se*. Several associations and networks exist, among them the Association of Energy Engineers [AEE], which address either individuals or both individuals and companies, but none of them targets energy managers solely.

World congresses such as the World Energy Congress organised by the World Energy Council provide for “one off” meetings of EM professionals, but the WEC for instance does not provide the benefits of a traditional, year-round active membership-based association.

International entities targeting energy efficiency are most often think-tanks and research groups, such as the International Association for Energy Economics. Their capacity to influence policy making is restricted by their proportionally small membership.

On the contrary, large organisations in terms of membership (e.g. the Institute of Electrical and Electronics Engineers – IEEE) are not specialized enough in EM to offer their energy managers members the degree of priority and attention they deserve.

On the regional level

Stand-alone regional EM associations are very rare and do not fully qualify as regional organisations (e.g. the NSPE - National Society of Professional Engineers – is essentially a US-based organisation).

The EU hosts a few dedicated pilot networks funded by the European Commission, as well as lobbying groups (industry associations).

The actors most active on the regional level appear to be the regional chapters of such international associations as the AEE or the IEEE.

On the national level

National associations of energy managers were frequently identified. Their members are most often energy managers themselves, but also companies active in EM (e.g., the Association of Energy Service Professionals – AESP in the US).

The UK based Energy Services and Technology Association [ESTA] is an interesting mix of membership open to EM companies only with a focus on the role of individual energy managers: ESTA indeed awards the title of “Energy Manager of the Year” to an individual energy manager every year. The Oregon Association of Professional Energy Managers [Oregon APEM] also offers this service.

National EM associations in developing countries appear to be currently booming. Although the practical work carried by these organisations is often very similar, the motivations behind their establishment can vary. Current developments in India are particularly interesting in this respect. On the one hand, the Indian Association of EM Professionals is an effort of Indian

nationals concerned with ultimately political goals (“ensuring India’s energy self-sufficiency by 2022”). The Society of Energy Engineers and Managers, on the other hand, is an entity established in the framework of an international cooperation agreement between India and an occidental country (in this case, France). The goals of the SEEM, although ambitious, do not comprise political statements.

On the local level

Local associations of energy managers sampled in this report are a mix of local practitioners, small and medium companies and sometimes representatives from the local civil society. In one case at least (the Association Québécoise pour la Maîtrise de l’Energie – AQME), NGOs are also members of a local EM association.

Local EM associations often appear to have been established to support local economic activity. For instance, the Alsatian [France] COPROTEC was established by the regional Chamber of Commerce and Industry to provide local companies with both information on best practices and trained local staff. Other local organisations run either formal courses or ad-hoc “training workshops”.

The development of organisations of energy managers sometimes follows top-down or bottom-up logics. For instance, the Flensburg Association for EM [FAEM-Nepal] emerged in a German university to progressively include all Nepalese students in EM from Germany. Although the future of the association remains to be written, this says a lot on the potential for bottom-up initiatives in developing countries. It is expected that EMAK could play an important role in supporting such local enthusiasm up to the national/international levels.

On the contrary, the Certification for EM Systems in Small and Medium Enterprises is offered at the local level by the Local Energy Agency of Limerick, an EU-funded agency.

Analysis of the responses to the surveys and interviews, and expectations from an EMAK

On training and competences certifications in EM

Interviews conducted as part of this scoping study identified that the lack of EM activity is likely to be directly related to be lack of skilled engineers available to undertake the necessary tasks. For instance, Nathalie Vasseur, Strategic Programmes Director at Dalkia, confirmed a “strong shortage of qualified manpower in Eastern Europe, specifically in Poland and Czech Republic, compared to the needs in EM in those countries”. It was also suggested by several interviewees (Ivan Jaques, Atef Mazrouk, Hélène Durrey) that Latin America and Africa face similar shortages of qualified manpower, even though the general level of qualification of engineers and technicians in these regions might be lower than in Eastern Europe.

Surveyed policy makers, such as Emily Kennedy in Australia, all acknowledged that “professional development opportunities for energy managers” were a critical element in ensuring the effectiveness of EM and should be a priority of EMAK. Five out of nine policy makers surveyed spontaneously suggested that EMAK should directly address the issue of the level of qualification (different wordings were used: “Knowledge”, “Professional development”, “Skills”,

“Comparison of different experiences”, “Sharing lessons learned”, “Organise training courses”, etc).

Interviews and surveys have generally confirmed that knowledge of systems, technology, processes and implementation skills have a direct impact on the work practices of energy managers. Initial exploration suggests that these skills are at very different levels globally. Interviews with André Yatchinovski (Director for International Action at the French ADEME - Agence de l'Environnement et de la Maîtrise de l'Energie) and Linda Adams (Assistant to the Managing Director at the Centrum für internationale Migration und Entwicklung, a joint entity between the German Federal Government and GTZ - Deutsche Gesellschaft für Technische Zusammenarbeit) confirmed that there are "multiple levels of knowledge in EM among energy specialist themselves" and that "even in developing countries, there is no one unique picture of the state of play in EM understanding".

Several interviewees reported that their primary qualification in EM was a university degree recognized by their national State (e.g., “MSC in Renewable Energy and EM”). Some of them have complemented their university degree with a formal, national certification (e.g. the *SEI EM training* in Ireland and similar certificates in Turkey).

Every energy manager surveyed to the notable exception of one reported that their certifications in energy efficiency had proved useful in their careers. The one exception reported that the core of his activity had shifted from EM per se to larger environmental management concerns.

Desktop research had tended to prove that several national players (GTZ for Germany, ADEME for France, CarbonTrust for the UK, possibly SenterNovem for the Netherlands, etc) are “competing” to provide training for energy managers in foreign countries. GTZ seems to be the best implemented of all. These programmes (GTZ, ADEME, etc) are always run within the framework of bilateral governmental agreements.

Beyond national players, UNIDO has a large network of countries as part of its RECP “Training the Trainers” sub-programme. Some countries, especially developing countries, accommodate several of these initiatives (e.g. Egypt hosts UNIDO, GTZ and AEE programmes).

On connections between policy makers and the EM profession

Although some survey participants have mentioned efforts by their national government to encourage the development of EM skills in industry (e.g. the National Energy Efficiency Skills Initiative in Australia), several participants have reported that the EM profession was not taken into account enough by policy makers at all levels of governance.

One policy maker actually suggested that EMAK serve as a direct bridge between energy managers in the field and policy makers by “cooperating with [...] national organisations to strengthen the role of energy managers”. For another participant, EMAK should not even restrict itself to bridging the EM profession with policy makers at the national government, but also with “CEO’s, academic institutions and [...] the general public”. Furthermore, EMAK was conceived by some as a way to “connecting national industry with the international community”

in general, something that was deemed as lacking at the moment (another respondent used the words “linking the profession with the wider political process”).

Three policy makers saw beyond the mere connection between the EM profession and policy makers at all levels. They consider that EMAK should “raise the profile” of the EM profession and be the “high-level voice” for the latter.

On sharing experience and best practices

By far, the exchange of experiences and best practices was the item most-often sought by survey respondents. All of them, policy makers and energy managers alike have mentioned this point in one way or another and how EMAK would be helpful in this regard. The very words “Best practices” themselves were used by six policy makers and three energy managers. One interviewee raised the concern that the sharing of best practices would be problematic with regard to confidentiality issues.

Yet the added-value of EMAK, one survey respondent said, would not only reside in developing the exchange of best practices between different regions of the world and different categories of interested parties, but also and above all in providing a “one-stop-shop of case-studies and best practices”. In other words, it was suggested that the information is not necessarily lacking, but it is very dispersed at the moment. The idea of a “common website” for all interested parties was also suggested.

On EM Systems Certifications

There appears to be only one EM Systems certification (ISO’s 50001 – in development). This certification is promoted by UNIDO and several national governments (US; Brazil - through the Association of Technical Standardization –ABNT) are supporting ISO’s forthcoming 50001 [PC 242] EM certification since 2008.

Yet, several countries have been reported as being reluctant to implement it and are said to be unwilling to switch from their own national EMS certification schemes. Russia’s take on international standards and dissemination of its own national standards to neighbouring countries was reported as being highly tainted with politics. A third category of countries, including Korea, have not yet taken a position but are expected to be supporting ISO 50001 when the latter comes to fruition.



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