Energy Efficiency Networks - a Policy Instrument for Faster Diffusion of Efficient Electrical Motor Applications

Eberhard Jochem

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Jochem, E. [1,2]

[1] IREES Institute for Resource Efficiency and Energy Strategies, Karlsruhe, Germany
[2] Fraunhofer Institute of Systems and Innovation Research . Karlsruhe, Germany

Abstract. The initiators of Energy Efficiency Networks in Swiss industrial companies in the 1990s did not imagine how effective and adaptive this concept would turn out to be. This "group-based" Energy Management System EMS delivers far better and faster results than individually performed EMS and transformation activities. The professionally moderated regular exchange of experiences among the energy managers, the potential acknowledgement among them, and personal competition induces much faster implementation of energy efficient solutions. On average, network participation doubles the efficiency improvement of a company compared to individual efforts. In addition, renewable energies are significantly more applied by companies participating in these networks.
The paper reports on the potentially accelerated diffusion of high efficient electrical motor applications and on new ideas generated and implemented by network companies to reduce electricity demand of electrical applications in fields of ventilators, transport chains, and substitution of thermal separation processes by membrane technologies (a new electrical motor market).
Energy efficiency and climate protection networks are increasingly considered in European countries as an efficient policy instrument, but also in China, and other emerging countries such as Mexico, Brazil, Algeria, Tunesia, and Nigeria. Flexible electricity demand and DC-supply onsite will be additional topics of the network meetings in the coming years.

Keywords: Energy Efficiency Network; policy instrument; new efficient electrical motor systems and markets; group-based energy management system;

1 Potentials, social benefits, and obstacles

1.1 Large efficiency potentials of electrical motor applications - profitable

Many national and international studies describe the existence of large profitable energy efficiency potentials in the industrial and commercial sector, and more focused on electrical motor applications (Worrell et al. 2018; Trianni et al. 2019). This knowledge is not new but has been reported since the 1980s in Europe (Morovic et al. 1987), North America (Levine et al. 1995; Romm 1999), or Japan.

Koewener et al. (2014) concluded in their empirical analyses of 366 energy audit reports of companies in industry that more than 3,000 profitable energy efficiency investments with an average internal rate of return of 30 % could reduce the companies' final energy demand by around 10 % within four years. The internal rate of return varies from 12 % (minimum rate) to more than 100 % (see also Table 1).

Since the mid-2010s, energy prices - and particularly electricity prices - have increased more than prices of investments goods, including electrical motors and drives. These differences in price changes make energy efficient investments today even more profitable than in the past decade.

Electrical motor applications are imbedded in almost any investment, however, very often as "ancillary unit"; there are also on site infrastructures such a compressed air systems, warm water and steam distribution systems, where replacement of a low efficient motor system can be considered and implemented as a separate investment.

1.2 Large new markets of electrical motor applications

Electrical motor systems will experience additional markets of new or more power-dependent applications:

- substitution of burners in boilers or dryers by high temperature heat pumps up to 150°C and above 200°C in the future (Hoffmeister et al. 2024).
- Increased use of waste heat will contribute to additional demand in motor driven pumps and ventilators.
- Increased recycling activities will induce additional motor systems application such as shredding, on site transport, separation (including compressed air separation), mixing, and packaging).
- New processes will need pumps, turbines or ventilators, e.g. membrane techniques at low or room temperatures, substituting thermal separation processes (Schäfer/Sauer 2020), carbon capture and storage applications.
- Additional diffusion of air conditioning in buildings due to higher summer temperatures induced by climate change.
- Finally, flexible electricity demand responding to variable electricity supply and the transformation from AC- to DC-supply onsite will be a further market for intelligent and new electrical motor systems.

These new markets of motor systems may quickly develop depending on the speed of politically induced transformation of industry and economies or of climate change.

However, information - and more importantly - profound experiences on the performance of the new motor applications are scarce. So even if governments support the investment decisions by financial incentives, energy managers and production engineers are often uncertain about the risks and the benefits of the new motor-driven Technologies.

1.3 Co-Benefits for companies and the national economy

Besides the immediate, financial benefits of more efficient energy use recent research points to co-benefits that should be considered by companies (Berger et al. 2021). They assist a comprehensive evaluation of energy efficiency investments and the imbedded motor applications. This concept takes into account the three following aspects generally align with top management's interest:

(1) contribution of energy efficiency projects to reductions of total production cost (besides energy costs, e.g. less discharges, less cost of the exhaust gas treatment),

(2) the impact on and improvement to value proposition (e.g. continuous product quality in cases of improved temperature control or timing), and

(3) risk reduction and improved working environment (e.g. less noise, or less hot working conditions lead to less accidents or illness of workers or improve their comfort).

In addition to this business economics' perspective, micro- and macroeconomic issues may be important. An intensive implementation of new energy efficient solutions in an economy will create additional business opportunities for companies in industry, construction, services, crafts and the energy service sector (EnAW 2015). Increasing demand and application of the new motor application will contribute to the learning effect and reduce the investment by economies of scale (Jakob and Madlener 2004). Efficient use of electricity also improves the electricity system development and security of a country supplying saved electricity from renewables to other users.

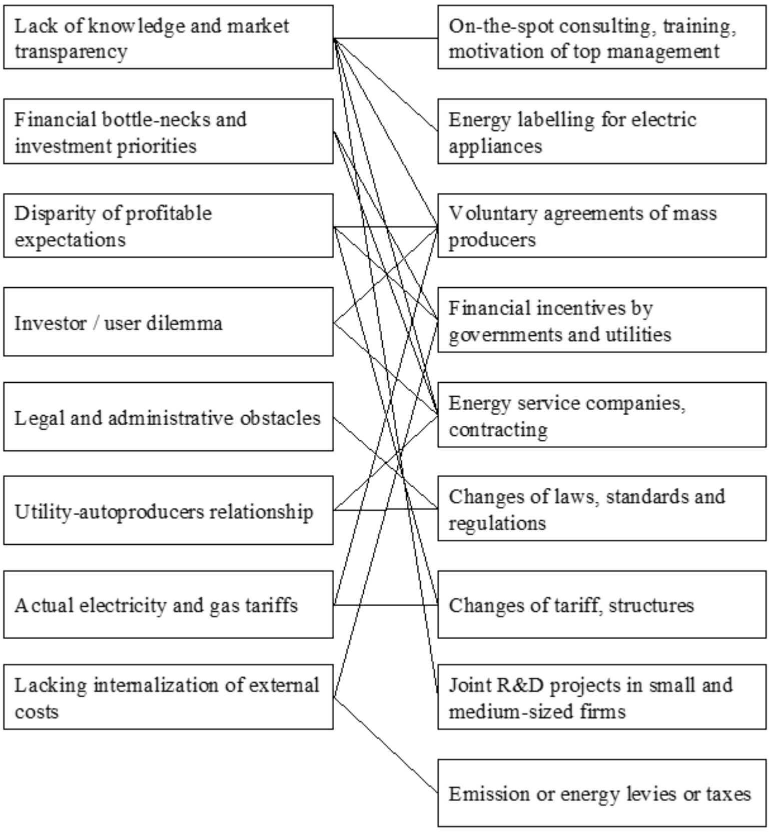
From the macroeconomic perspective, additional jobs in consulting, construction, manufacturing, banking, contracting, maintenance, and research will be created by raising the demand for energy-efficient solutions and reducing energy imports. In addition, highly efficient products and plants may increase the export potential of manufacturing industries. The International Energy Agency (IEA, 2014) concludes a broad range of potential positive impacts on the economy, society, and the environment of a country: a potential to support economic growth while reducing energy demand, as large energy imports are substituted by domestically produced investment goods and services. The induced economic growth enhances social development, speeds up environmental and climate protection, and supports sustainability tendencies.

1.4 Obstacles and unused supporting factors

In theory, given all the benefits of energy efficiency - including efficient motor systems - at the business, micro- and macro-economic levels, a perfect market would optimally allocate the rewards from these energy-efficient solutions. In practice, however, researchers and consulting engineers observed many obstacles and market imperfections that prevent profitable energy-efficient solutions from being fully realized since four decades (Jochem/Gruber 1990; Sorrell et al., 2004). This phenomenon has also been described as the energy efficiency gap.

Although, in principle, the types of obstacles and market imperfections are universal, their importance differs among sectors, social groups, institutions, countries, and world regions, depending on many factors including technical education and training, entrepreneurial traditions, the availability of capital, and existing legislation (Trianni et al. 2016; see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

- *Lack of attention, knowledge, knowhow and technical skills and unspecified transaction costs are of great importance, particularly in cases of new products and technologies.* This implies that investors and energy users are able to get to know and understand the benefits of technical efficiency improvements as well as to evaluate the possible risks against perceived benefits. This also implies that investors or users have to be prepared to realize improvements and to give themselves time to absorb new information and to evaluate the innovations (Levine et al. 1995; Sioshansi 1991). Small and medium-sized companies, or small public administrations do not have enough knowledge about the possibilities and risks of energy savings or sufficient technical skills to implement them. Managers, preoccupied with daily routines and core business areas, are able to only engage in the most important and immediate tasks



Source: Jochem et al. 2000

Figure 1.Obstacles and market imperfections of energy efficient solutions and related policies a scheme for policy options and integrated efficiency policies

(Ramesohl 1999). Energy efficient motor systems with its minor role in running a business or its potential to reduce only a small share of the electricity costs of total production costs, is placed on the back burner in many companies.

- *Small companies may also face a lack of flexibility of capital, or they may follow historically or socially formed investment patterns*. Even if they acquire the knowledge they need, their own capital may be limited and additional credit may be considered as too expensive. Especially if interest rates are high, small firms tend to accept higher current costs instead of a later energy profit.
- *Relying on - mostly not existing - investment risk decisions and neglecting the profitability of energy efficient investments* still is today a major obstacle. Energy consumers demand payback periods of between one and three years, which are equivalent to an internal rate-of-return of about 30 % to 50 % in cases of long lasting investment goods like electrical motor systems (DeCanio 1998; Schröter et al. 2009). This rate-of-return expectation rules out highly profitable efficiency investments - including efficient electrical motor systems and favors - mostly not quantitatively specified by the management - in high electricity bills.

The continued analyses of obstacles in industry and commerce led to further proposals for policy measures as more and more obstacles were identified that can only be overcome with bundles of policies. But even the effectiveness of policy bundles for industry or electrical motor systems may differ from country to country (Stechemesser et al. 2024).

Existing analyses on obstacles of energy efficient solutions focus on informational and business economics issues such as financial incentives, consulting, standardization (eco-design) for mass-produced products like electrical motors, energy management systems such as ISO 50001 or national energy management standards such as the DIN EN 16247-1 for performing energy audits. But these policies do not consider behavioural, socio-psychological, and social aspects.

2 Energy efficiency and climate protection networks - an underestimated policy instrument

One way of addressing the dilemma of large profitable energy efficiency potentials and the various obstacles and unused supporting factors are the "*Learning Energy Efficiency Networks" (LEEN).* Energy management systems work on an individual basis. The energy manager of on industrial site, the consulting engineer or the auditor may not be well informed about all possible options of efficient energy use and new energy efficient solutions. They may have little knowledge of thermodynamics, of the new processes using electrical motors, of electrical systems, or electronic control and communication systems. Often, practical experience of the new processes and electrical motor applications may be even more important to specify existing risks of the investments.

2.1 The concept of learning energy efficiency networks (LEEN)

The concept of the Learning Energy Efficiency Network had its origins in a group of Zürich entrepreneurs in 1985 (Bürki 1999) and was further developed in the 1990s in the Swiss industry. Since 2002, the format has been adopted to the situation in Germany

(Gruber and Jochem 2007). In this scheme, between 10 and 15 energy managers of companies in a region come together and agree on a joint energy efficiency target and CO_2 mitigation target for the network, which should be achieved within about four years. Prior to this, specially trained consultant engineers have analysed the energy efficiency potentials in the participating companies, and each company has to set itself a respective target. At around four meetings per year, the measures already implemented by a participating company are inspected and the experience gained is shared during the meetings moderated by a specialized moderator. In addition, external experts are invited to talk about new and interesting energy efficiency technologies, their economics ad possible funding by public sources. The topics are suggested by the consulting engineer and decided by the participating companies. Plans for future efficiency investments and related knowhow is exchanged among the participants in each meeting.

Social relations such as competitive behaviour, mutual esteem and acceptance not only play a role between enterprises, but also internally within a company. Efforts to improve energy efficiency are influenced by the intrinsic motivation of companies' actors (energy managers, production engineers) and decision makers, the interaction between those responsible for energy and the management, the internal stimuli of key actors and their prestige and persuasive power (Schmid 2004). The socio-psychological concept of collaboration in the efficiency networks is based on three social factors:

- Collective intelligence and social learning instead of individual intelligence,
- group motivation by mutual acknowledgment of the energy managers participating in the meetings and site visits,
- friendly competition among the energy managers and eventually among the management of the participating companies.

Collective intelligence as a phenomenon has already been described in various ways (Bachmann, 2019). Under certain conditions groups achieve better results than individuals. This refers, e.g., to different levels of expertise that are compensated for in the group through good cooperation, or to the influence of individual members with special expertise on the group. Important factors supporting good results in small groups are personal interaction abilities, trust, motivation, and attention (Salminen 2012).

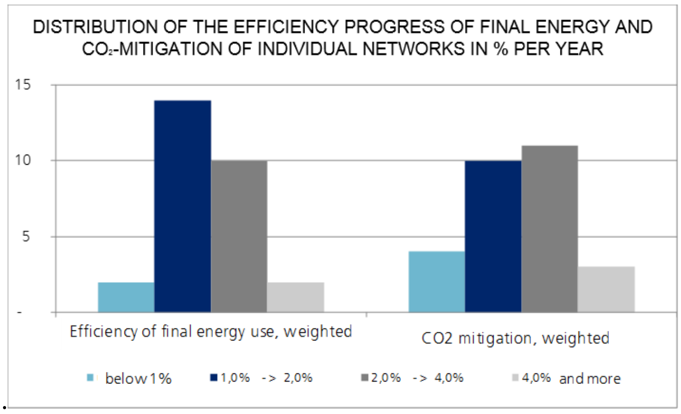
Group motivation can be reached by social dynamics such as mutual affirmation and acknowledgement among the energy managers of the participating companies. Social cohesion after 10 meetings or more as well as responsibility and sanctions once a common target has been agreed do motivate the participating energy managers. In addition, individual professional careers by sharing their new knowledge (gained during the meetings) with colleagues or with the management with regard to a positive public image and acceptance of the company may be of influence (Schmid 2004).

The efficiency and mitigation targets of the network are introduced for internal use generating a team spirit and an *atmosphere of playful competition* among the energy managers and eventually their management. They are also externally used for marketing of the participating companies and the network, to demonstrate their engagement in climate protection and resource efficiency. The moderator leading the network meetings plays an important role in developing an atmosphere of friendly competition.

2.2 Empirical evidence of accelerated diffusion of energy efficient solutions, including electrical motor systems

The energy savings achieved by 330 companies of 28 Learning EENs (LEENs) within four years amounted on average to 2.3 % per year. The average CO_2 emission reduction was slightly higher (by 2.4 % per year) due to substitution of heating oil by natural gas, of fossil fuels by modern forms of wood use, or slightly increasing shares of green electricity. In absolute terms, the average yearly savings achieved after three to four years were 2.7 GWh/a per participating company and 33 GWh/a final energy per EEN of large companies (on average: 12 participants per network). Networks of small and medium sized companies achieved results by a factor of eight lower on average (4 GWh/a for ten participants per network). However, the distribution of the yearly energy efficiency improvements and CO_2 mitigation results varied substantially among 28 evaluated networks (see Figure 2):

- two networks achieved less than 1 % annual energy efficiency improvements; the reasons are manifold; e.g. highly energy-intensive participants dominate the improvements, knowledge und engagement of the consulting engineer und the moderator, present investment priorities of participating companies, etc.
- half of the sample (14) achieved average improvements between 1 and 2 %;
- ten networks managed to achieve 2 to 4 % yearly efficiency progress and even two networks more than 4 % annually. Again, many reasons explain the success: e.g. participating company began their efficiency policy with the start of the network, high knowledge and engagement of the consulting engineer and the moderator, very engaged energy managers, family owned companies, etc.



Source: Fraunhofer ISI and IREES 2014

Fig. 2. Distribution of average yearly savings and yearly CO_2 mitigation effects of 28 EENs .

An analysis of 3,580 efficiency investments in cross cutting technologies planned in the four years investment period identified 2,128 investments in electrical motor systems in almost 600 participating companies. Process cooling and electrical motors lead the number of profitable investments planned, while electrical motors and compressed air systems showed the best average profitability. Process cooling and ventilation achieved the highest average savings (see Table 1).

Table 1: Efficiency potentials of 3,580 identified investments of cross cutting technologies - cases, average savings and profitability of electric motor systems

Parameter	Electrical motors	Compressed air systems	Ventilation	Space cooling	Process cooling
Number of profitable investments ' (IRR >12%)	570	532	300	136	590
Average savings per investment MWh/a	180	146	360	110	735
Average IRR in %	41	45	35	22	31

Source: Dütschke, et al. 2026

As the participants were in most cases manufacturing companies and non-basic materials industries, the baseline of the "autonomous" energy efficiency progress is about 1 % annually. The additional rate of improvement can be largely attributed to the participation in the networks as "gross effect". Of course, some other policy instruments like financial incentives or ecodesign standards also contributed to the good performance of the participating companies. The net effect of the network's impact is unclear.

However, additional evaluations by telephone interviews and questionnaires underline the effective and accelerating role of the energy efficiency networks: New ideas for energy efficient solutions in production processes or in own products have been observed in quite a few companies participating in EENs (e.g. substantially improved small pumps and ventilator systems for freezers in super markets).

A first indication of the effectiveness additional impacts induced by participating in EENs can be derived from an evaluation by Chassein et al. (2018) (see Table 2):

- 78 % of the measures implemented by 85 interviewed companies participating in EENs since three years, were identified and implemented in addition to the measures suggested by foregoing audits,
- 45 % of the 85 companies said that they implemented measures because of their participation in their EEN (see Table 1).
- One third of the companies confirmed that the energy consultancy had a significant impact on the selection of their measures to be implemented and the level of investment.

Table 2 *: Impact of LEENs on energy efficiency measures undertaken by participating companies*

How do the following statements apply to your company?	yes	no	I can not say	no answer
Suggestions from the energy efficiency network were implemented in investments or organizational measures	78 %	14 %	5 %	4 %
Some of the implemented efficiency measures would not have been implemented without participation in network	45 %	40 %	11 %	5 %
The energy consultancy had a significant impact on the selection of measures to be implemented and the level of investment	34 %	53 %	9 %	4 %

Source: Chassein et al. 2018

In quite a few regional EENs, production sites of industrial groups participated in one or two networks. As they realised the unexpected fast energy cost reductions due to the participation, some groups started their group-internal EEN. Examples in Germany are Procter&Gamble, Evobus, Miele, BSH, Bosch, ThyssenKrupp, METRO (from the Swiss experience) and EnBW (from its own experience as network operator and moderator). Recently, the Fraunhofer Society, a large institution of applied research in Germany, started four company-internal climate protection networks.

In many cases, the formation of group-internal EEN is accompanied by an energy efficiency and/or CO_2 saving target set by the board. In these cases, the energy managers receive more than average attention by the board and the controller; the board often allocates increasing budgets for the highly profitable energy efficiency investments.

Scope 3 emissions from upstream and downstream processes are an integral part of the now labelled "Energy Efficiency and Climate Protection Networks" since the early 2020s.

The costs of operating an energy efficiency and climate protection network can be covered by the participants as the participation fee represents only a small share of the total energy cost savings. Therefore, operating energy efficiency and climate protection networks offers the opportunity to make it a business case. However, the crucial challenge of the business is the initiation of a network, the acquisition of the participants in particular. As the format of the network is often unknown prices for network participation are cost-oriented and the margins low.

The business case of initiating and operating this network format has been taken up by consulting companies, energy agencies, utilities, and energy service companies, depending on political boundary conditions and entrepreneurial priorities.

2.3 Implementation of energy efficiency networks in different countries

This format of learning networks (LEEN) was also modified for small enterprises and local authorities (in Germany), and spread to Austria, Sweden (Palm and Backman 2020), France, Ukraine, Serbia, China and, in the late 2010s, to countries in South and Central America (Brazil and Mexico), Asia and Africa (Algeria, Tunisia, Morocco, and Nigeria) (Durand and Damian 2019). The diffusion of the LEEN format in emerging countries was - and still is - sponsored by the Energy Partnership Programme implemented by Germany's Federal Ministry of Economics and Climate Protection.

Due to the success in Switzerland, Germany, and Sweden (for SMEs), the idea of the energy efficiency networks spread to many other countries and was implemented in various formats. Durand and Damian (2019) listed 1,295 EENs across all continents, with more than 15,000 participating companies using different standards (such as LEEN, Ökoprofit, REEF or others) worldwide. Many of them are found in China, the United States, and Mexico. They originated from different initiatives of institutions, associations, agencies and companies (IPEEC 2016). However, the different formats of efficiency networks and their policy boundaries resulted in quite different impacts (see also below).

2.4 The role of policy boundaries

The type of energy efficiency network, its initiation, standards, and development depend on the energy and climate policy boundary conditions in the various countries:

- An example is the exemption from the high CO_2 surcharge in Switzerland when companies join an energy efficiency network. The CO_2 law leads to government involvement in setting the standard, how to operate the networks and how to monitor the results. Until the end of 2014, this task was performed by the Energy Agency of the private sector (EnAW) as a mediator between government and the Swiss industry. Since 2015, a second institution has been able to set up networks under similar conditions. In the latest revision of the Swiss CO_2-law, energy efficiency networks may agree to a groupwise CO_2- and efficiency target in order to get a CO_2-tax exemption (Eidgenossenschaft 2022). This boosts mitigation and networks.
- In contrast to Switzerland, Germany's voluntary agreement allows a large variety of network standards, as the government did not rule on a specific performance standard, but negotiated a minimum standard with defined criteria (e.g. minimum duration: two years; minimum number of participants (5 to 8); no specific certification of the consulting engineer or the moderator). Any institution or company can initiate and operate an energy efficiency network. There is an obligatory monitoring on the savings of each participant, however, aspects of duration of the measures' impact, of the effect of growing or shrinking production or varying weather are not included in the monitoring calculation scheme (Initiative of Energy Efficiency and Climate Protection Networks.

- The agreement with 22 business associations was to establish and operate approx. 500 energy efficiency networks between 2015 and 2020. The government expected energy savings of 75 PJ primary energy (gross, i.e. including autonomous technical progress) and reductions of CO_2 emissions by 5 million tonnes per year, gross). By the end of 2020, none of the targets were reached: about 300 initiated efficiency networks reduced CO_2 emissions by some 4 million tonnes of CO_2 and the energy efficiency target was failed by probably 40 % (Barckhausen et al. 2022). The agreement was renewed in 2021 aiming for the initiation of additional 300 to 350 energy efficiency and climate protection networks, gross final energy savings of 9 to 11 TWh/ a in 2025 and 5 to 6 million tonnes of CO_2 emissions per year less in 2025 compared to 2020 (BMWi and BMU 2020). External specialised experts can be booked free of charge for presentations in the network meetings.
- In Austria, the parliament decided in August 2014 that utilities and other energy suppliers must demonstrate energy efficiency measures equivalent to 0.6% of their previous year's sales. As energy efficiency networks promise a high rate of progress in improving energy efficiency, Austrian utilities adopted the idea of energy efficiency networks from Germany (mainly the LEEN MS) to achieve these savings among end users and other consumers and report the results to the government. The diffusion of energy efficiency networks has been rather moderate here because it is permitted to bank any energy saved above the 0.6 % savings (which is very easy in industry).
- In China, the central government decided in 2011 to ask the State Grid Company of China to set up energy efficiency networks in Chinese industry. For each installed energy efficiency network, the State Grid would acknowledge a 0.3 % improvement in energy efficiency without any monitoring. German network experts trained 50 Chinese engineers and 50 moderators in 2012 and 2013. In 2015, China has reported 573 operating energy efficiency networks. However, their performance was rather low based on the insights into the process at the State Grid Company during the trainee programme and the results of the exams after the trainee programme. By the end of 2016, many energy efficiency networks had stopped operating because the maximum share that can be accounted for by operating energy efficiency networks is 5 % of the total savings State Grid has to achieve among its customers.

Although the energy and climate policy boundary conditions of a country co-determine the quality and performance of energy efficiency networks in industry and the service sector, the authors are convinced that both the quality and impacts of energy efficiency networks will continue to rise in any country, mainly due to the benefits realised by the participating companies, but also due to the consulting engineers, the network operators, and the manufacturers of energy efficient equipment.

3 Conclusions and suggestions

An accelerated diffusion of high efficient electrical motor systems in industry and commerce is important regarding

- the potential of stabilising or slightly reducing electricity cost of production in times of increasing electricity prices in many countries,
- the impact of reducing the additional electricity demand of electrical motor systems in new areas of application (e.g. heat pumps, use of waste heat, increased recycling, carbon capture and storage), but also increasing use of air conditioning due to climate change,
- the impact of reducing the investments in electricity production by renewables due to saved electricity.

EENs simultaneously address several obstacles (e.g. lack of information and experience, considering the profitability of investments, not only the risks). They also address often unused supporting factors (e.g. swarm intelligence, increased acknowledgement and motivation of energy managers by colleagues, the board, or the management, orientation on joint targets or possible awards).

The group dynamics often lead to new ideas of energy efficient solutions. While 100 efficiency measures are implemented in the participating companies, 60 new ideas are generated in an atmosphere of innovation within the network (Köwener et al. 2014). Empirical results support the observations of network teams that participating companies realise faster progress in energy efficiency and the use of renewables than non-participants.

The crucial challenge is the initiation of a network, in particular the acquisition of the participating companies. Very often, they do not know this network format and hesitate to sign a contract for three or four years. The findings suggest that additional activities and improvements may accelerate the foundation of EENs (and the implementation of high efficient electrical motor systems). The author suggests the following points:

- Promotion of the concept of EENs through a larger, branch cross cutting, and an intensive information campaign. This also implies the need for an important budget for professional marketing and advertising.
- Patrons, institutional multipliers, utilities, industrial associations, and chambers of commerce as well as energy agencies can take up an important supporting role as a trustful personality or institution to convince the companies to join an EEN.
- The benefits of the EENs - the intended short-term and the indirect long-term impacts – are proven and obvious, but they still need to be specified and promoted with a higher intensity and more precisely conveyed to companies, including convincing examples to reach and convince the decision makers in the companies.
- It should become more attractive for companies to combine an energy management system (EMS) following ISO 50001/50003 and EEN activities.

- Governments should consider incentives (e.g. financial for small and medium sized companies like in Sweden (Palm and Backman 2020)) or exemptions from CO_2 surcharges (like in Switzerland) or from other taxes or fees.

Unfortunately, the benefits and advantages of EENs have been noticed by only a few governments or public and private institutions with missions to support industry and commerce. They still have to be informed about this effective policy instrument accelerating the diffusion of energy efficient solutions (including efficient electrical motor systems) and the use of renewables.

In fact, policy makers, institutional multipliers, utilities, industrial associations, and chambers of commerce not familiar with the extremely motivating dynamics of the mutual exchange of experiences among energy managers underestimate the benefits and their potential of fast progress of efficient energy use and implementation of renewables in EENs. However, 85 % of the energy managers participating in the networks are enthusiastic about their learning effects and the site visits at each meeting (Chassein et al. 2018).

There are EENs in Switzerland, Germany, and Austria that are operating more than 10 years; there are network companies which reduced their specific energy consumption by more than 50 % within about 10 years (Durand et al. 2018). Some of them emit today no CO_2 at scope 1 and scope 2 level, and are urging their suppliers to reduce their carbon footprint.

The concept is permanently further developed including new topics such as scope 3-emissions, new energy and production technologies important for the transition of industry, and several aspects of sustainability reporting and related new standards. The Working Group of Energy Efficiency and Climate Protection Networks Germany (AGEEN 2024) offers training courses to consulting engineers, moderators, and network managers and performs a yearly meeting to exchange the experiences and plans of present and future activities in the networks.

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