Energy efficiency networks for small and medium sized enterprises – boosting the energy efficiency potential by joining forces

Albin Carlén
Swedish Energy Agency
631 04 Eskilstuna
Sweden
albin.carlen@energimyndigheten.se

Marie Rosenqvist
Swedish Energy Agency
631 04 Eskilstuna
Sweden
marie.rosenqvist@energimyndigheten.se

Svetlana Paramonova
IEI – Department of Management and Engineering (IEI), Division of Energy Systems
Linköping University
581 83 Linköping
Sweden
svetlana.paramonova@liu.se

Patrik Thollander
IEI - Department of Management and Engineering (IEI), Division of Energy Systems
Linköping University
581 83 Linköping
Sweden
patrik.thollander@liu.se

Susana Municio
CIT Industriell Energi AB
Chalmers Teknikpark
412 88 Göteborg
Sweden
municio@cit.chalmers.se

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Abstract

Small- and medium-sized enterprises (SMEs) are a cornerstone in individual economies. In terms of improved energy efficiency potentials, the relative potential for SMEs is larger than for energy-intensive companies. However, the level of deployment, remains low among industrial SMEs. This is due to various barriers such as lack of information and high transaction costs in general. The most common policy activity towards industrial SMEs is energy audit policy programs. Deployment levels from the Swedish energy audit program is roughly 50 percent of the detected cost-effective energy efficiency measures, which goes in line with results from the world's largest program, the American IAC (Industrial Assessment Center). In order to enhance deployment levels, the Swedish Energy Agency has recently started up a national energy efficiency network program for SMEs, funded by the European Regional Development Fund. The aim of this paper is to present an ex-ante evaluation of the Swedish energy efficiency networks (EENet). The paper adds value to the growing scientific literature on energy efficiency network policy evaluation in order to further enhance scientific knowledge on energy efficiency network operationalization and evaluation. Including costs for the program administration, the subsidy effectiveness varied between 1.75 and 2.03 kWh/SEK for the different analyzed scenarios. The outcome of the paper results was that the Swedish Energy Agency reduced threshold for participation in the EENet from 2 GWh/year to 1 GWh/year in annual energy use.

Introduction

Small- and medium-sized enterprises (SMEs) remain a cornerstone in individual economies. In terms of improved energy efficiency potentials, the relative energy efficiency potential of SMEs related to total energy use is larger than for energy-intensive companies (Thollander et al. 2014). However, the level of deployment, in general remains low among industrial SMEs (Anderson and Newell, 2003). This is due to various barriers such as lack of information and high transaction costs. The most common policy activity towards industrial SMEs is energy audit policy programs. Deployment levels from the Swedish energy audit program is roughly 50 percent of the identified cost-effective energy efficiency measures (Backlund and Thollander, 2015), which goes in line with results from the world's largest program, the American IAC (Industrial Assessment Center) (Anderson and Newell, 2003). For a good overview of European energy audit policy programs, please see (EC, 2016).

Apart from energy audit programs, investment subsidies also remain a policy measure for some countries (Lapillonne et al., 2015; Farla and Blok, 1995). For large and energy-intensive companies, so called Long-Term Agreements (LTA) or Voluntary Agreements (VAs), have been the major policy instrument (Rezessy and Bertoldi, 2011). VAs or LTAs normally comprise an energy audit and compulsory energy management components such as in the Swedish Program for Improving Energy Efficiency in Energy-intensive Industries (PFE), the implementation of a certified energy management system. In a sense, energy efficiency networks are a type of VA or LTA. One successful example is energy efficiency networks deployed in Switzerland in the late 1980s. These networks later spread to Germany and where a part of the model (the so-called "Learning Energy Efficiency Networks" – LEEN) was commercialized. Both the Swiss and the German networks primarily address large and medium-sized companies (Jochem & Gruber, 2007; Koewener et al., 2011; Koewener et al., 2014; Rohde et al., 2015). In Sweden, research has shown that the past energy efficiency SME networks was quite loosely structured and could not show any levels of deployment in practice, not because there were none, but rather because of lack of follow-up routines and structured evaluation methodology or demand for such (Paramonova et al., 2014). For example, in some cases, the follow-up procedures were not established on network level. In other cases, it was hard to measure performance due to rather general and not measurable goals or if the goals were set to be quite ambitious and could not be fulfilled. The lack of methodology for follow-up and evaluation strongly emphasize the need for energy policy evaluation to be conducted, both prior (ex-ante) and after (ex-post) policies such as networks are being implemented. This would also enable comparison of expected results and real outcomes in order to further improve this type of policies.

Current research of Swedish energy efficiency networks includes Paramonova et al. (2014a)'s study mapping and evaluating the current energy efficiency networks for SMEs in place in Sweden. The number of networks in 2014 was about 30. Yet another paper by the same authors are elaborating on the theoretical understanding of the network governance model with special emphasize on double-loop learning (Paramonova & Thollander, 2014). In short, it means that by participating in a network companies receive information on and on about potential measures and as a result adopt measures over time. The study of energy efficiency implementation regards both measures already known and previously unknown. The know measures have remained unimplemented, partly due to lack of understanding and incentives. Newly spotted measures are found during the network period. Thanks to experience exchange, expert input, and growing own expertise, etc. The research shows that learning increase with periodical information via network meetings (Paramonova & Thollander, 2014). Finally, an overview of energy efficiency networks among Swedish energy-intensive industry was presented by Ivner et al. (2014) presenting four on-going networks of which three were sector-specific and one was for companies taken part in the Swedish VA. Notably, the network studied in this paper only regards SMEs. The reason for that is the Energy Efficiency Directive (EED) demands energy audits for large companies and thus, energy audits cannot be included as a major component as is the case for the Swedish energy efficiency SME network. An alternative model for that can be networks as a commercial offer, e.g. Koewener et al. (2011) and Koewener et al., (2014)

In Sweden, the current industrial energy end-use energy policy mix consist of the Swedish Environmental Code, the law for energy audits for large companies, an energy audit program for SMEs and a newly started energy efficiency networks project for SMEs. The newly started energy efficiency networks were largely designed in order to enhance deployment levels, and which in part is based on the German LEEN (Learning Energy Efficiency Networks). The idea behind the German approach to make several companies continuously meet and work together on improvement of their energy efficiency under coordination of experts within the field. The administrative functions are thus outsourced to coordinators which leads to reduction of transaction costs and risks (Koewener, et al., 2011).

The EENet is managed by the Swedish Energy Agency, together with 23 public cooperation partners consisting of county administrative boards and regional energy agencies. A designated coordinator of each cooperation partner operates one to a few regional networks which in total adds up of 40 national energy networks. An estimated 400 companies will participate in the project. EENet supports companies in their work to implement energy efficiency measures. The method is based on a combination of education activities, experience exchange and individual company support from experienced energy consultants. The program had initially two requirements that the companies must meet to participate in the networks. Firstly, they had to be SMEs according to the EU definition and secondly they had to have an energy use over 2 GWh per year. The threshold of 2 GWh/year of annual energy use was decided internally at the Swedish Energy Agency and primarily was thought to secure a good subsidy effectiveness of the policy. However, due to the outcome of the presented calculations in this paper the Swedish Energy Agency has reduced threshold for participation in the EENet from 2 GWh/year to 1 GWh/year in annual energy use.

The aim of this paper is to present an ex-ante evaluation of the Swedish energy efficiency network project operated by the Swedish Energy Agency. Historically, scientific contributions have so far mainly been written of the German existing and forthcoming energy efficiency networks (Rohde et al., 2015; Koewener et al., 2014; Ringel et al., 2016). The paper adds value to the growing scientific literature on energy efficiency network policy evaluation in order to further enhance scientific knowledge on energy efficiency network operationalization and evaluation.

Method

Prior to the launch of the first SME energy audit policy program in Sweden, an ex-ante evaluation was conducted based on a previous regional program, Project Highland. The ex-ante evaluation outlined a deployment level of 0.7–1.4 TWh/year in improved annual energy end-use (Thollander and Dotzauer, 2010). The evaluation solely comprised only industrial companies. Before the launch of the program, the scope slightly changed and other companies were allowed to participate as well. This led to a lower deployment level than what the ex-ante evaluation stated. However, if only studying the industrial part of the program, which was the basis for the ex-ante evaluation, the evaluation did remain valid, i.e. if 1,000 industrial companies had conducted audits where deployment levels were higher than for service companies, and farms etc. (Backlund, 2014).

In this paper an ex-ante evaluation of the Swedish energy efficiency network program released by the Swedish Energy Agency is made. An impact assessment is conducted by using Equation 1 (Vine 2010):

Net Energy Savings = *Gross Energy savings*
– *Savings not caused by the program (free-riding)*
+ *Additional savings* + *Non-participant spill-over* (Eq. 1)

Net Energy Savings = impact of the program;

Table 1. The scenarios at hand.

	Limit for energy use	Number of networks
Baseline	2 GWh/year	40 networks
Scenario 1	1,5 GWh/year	40 networks
Scenario 2	1 GWh/year	40 networks
Scenario 3	2 GWh/year	30 networks
Scenario 3a	1,5 GWh/year	30 networks
Scenario 3b	1 GWh/year	30 networks
Scenario 4	2 GWh/year	20 networks
Scenario 4a	1,5 GWh/year	20 networks
Scenario 4b	1 GWh/year	20 networks

Gross Energy savings = savings without regard to free-rider, additionality effects and spill-over (non-participating actors savings);

Savings not caused by the program (free-riding) = savings that would have been carried out anyway, without the state intervention;

Additional savings (additionality effects) = savings implemented in addition to those reported due to the intervention;

Non-participant spill-over (non-participating actors savings) = savings that occur outside of the program.

The subsidy effectiveness in turn is based on the impact of the project versus the public money spent on the project. The impact can in turn be calculated over several years using for example NPV (Net Present Value) or simply be calculated based on annual energy savings.

THE SWEDISH ENERGY AUDIT PROGRAM DATABASE

The ex-ante calculations of the EENet's impact evaluation have been implemented on the basis of data from the existing database from the Swedish Energy Audit Program (SEAP), where quality controlled implemented energy audits are compiled and stored. The database includes 713 SMEs both from industrial and service sectors for the time range between 2010 and 2014. The companies in the dataset have a total energy use of 5,370 GWh/year. The total reported energy savings potential for the companies was 589 GWh/year. From 37 company visits and interviews conducted with 37 corporate energy managers, the free-rider and spill-over effects are estimated to be 5 % and 22 % respectively. This results in net energy savings of 340 GWh/year or 58 % of the reported energy savings are being realized. This is consistent with the results from the American IAC (Anderson and Newell, 2002) based on 16,000 completed energy audits, where 50 % of the proposed measures have been realized.

SCENARIOS AND ASSUMPTIONS MADE

The calculations use a baseline scenario. According to this, a participating company should belong to the SME definition, and use at least 2 GWh per year, which was a requirement for the company to participate in the EENet. A total number of 40 are planned that will comprise 400 companies, i.e. an average of 10 companies per network. The membership fee for a company to participate in a network is 10,000 SEK/year[1]. The operational costs of the Swedish Energy Agency for running the networks comprise 84 MSEK, and in addition, administrative costs are 11.5 MSEK. The membership fees, which each member company pays annually, provide revenue to the project. When this is included in the cost calculations, this result in the total subsidy costs for the Energy Agency of 79.5 MSEK (including the membership fee).

The requirement for 2 GWh/year of annual energy end-use created problems when it turned out that the number of companies in Sweden that met these criteria were not as large as previously estimated. It was therefore necessary to estimate what impact a reduction in the limit of energy end-use would result in. Based on that, four different scenarios are analyzed:

The calculations are made based on several assumptions. The first is that the participation in EENet provides 50 % more improved energy efficiency compared to a stand-alone energy audit. Based on the evaluated German energy efficiency networks, it is shown that participation in networks provides a double outcome of saved kWh compared to a stand-alone energy audit (Koewener et al., 2011). The reason that this ex-ante evaluation assumes a more pessimistic outcome is that the German networks are very structured and implemented primarily at larger companies. The estimation made is that Swedish SMEs are likely to have difficulty to achieve twice the energy savings. This assumption is backed up by Backlund et al. (2012b) where it was found that the estimated non-technical energy efficiency potential was lower in relative terms than for technical measures. The estimation that about 50 % higher outcome compared to a stand-alone energy audit may thus considered to be reasonable.

The second assumption is applied to additional energy audits performed as a result of participation in EENet. Since a number of the energy audits within the SEAP were carried out some years ago, there is a need for some of them to be updated. These are to be carried out by an energy expert assigning to each network. These new energy audits are done without the energy audit support by energy experts in the network and are expected to provide an additional 25 % of more efficient outcome compared to the results from the energy audits. Even more restrictive approach is that these new audits that will be conducted as a consequence of EENet are instead seen as an effect of the Swedish Energy Audit Program from 2015–2019.

1. 1 EUR ≈ 10 SEK, 1 USD ≈ 9 SEK.

Results

BASELINE SCENARIO

328 companies were selected from the Swedish Energy Audit database. These 328 companies have a total energy use of 3,960 GWh/year. Total energy savings from these companies were equivalent to 184 GWh/year. An estimated energy saving from the SEAP per company is then equal to around 560 MWh/year. According to the assumptions, participation in the network results in another 50 % energy efficiency improvement or 280 MWh/year, and a further 25 % energy savings from additional energy audits or 140 MWh/year. Thus summing up 140 MWh/year and 280 MWh/year provides 420 MWh/year per company. With a target comprising 400 companies, this corresponds then to estimated energy savings through EENet of 168 GWh/year (112 GWh/year energy savings due to the networks as well as 56 GWh/year due to energy savings from additional energy audits). In summary, this results in a subsidy effectiveness of EENet equivalent to approximately 2.47 kWh/SEK, excluding administrative costs. The subsidy effectiveness including the administrative costs will thus be 2.11 kWh/SEK. The calculations of this are found in Table 2.

SCENARIO 1: HOW DOES THE SUBSIDY EFFECTIVENESS CHANGE IF THE LIMIT FOR ENERGY USE IS CHANGED TO 1.5 GWH?

403 companies with a total energy use of 4,090 GWh/year and a total energy savings from the SEAP equivalent to 213 GWh/year fall below the Scenario 1's criteria. An estimated energy saving from the SEAP per company is then equal to around 530 MWh/year. According to the assumptions, participation in the network results in another 50 % energy efficiency improvement or 265 MWh/year, and a further 25 % energy savings from additional energy audits or 132 MWh/year (397 MWh/year per company). With a target comprising 400 companies, this corresponds then to estimated energy savings through EENet of 159 GWh/year (106 GWh/year energy savings due to the networks as well as 53 GWh/year due to energy savings from additional energy audits). In summary, this results in a subsidy effectiveness of EENet equivalent to approximately 2.34 kWh/SEK, excluding administrative costs. The subsidy effectiveness including the administrative costs will thus be 2.0 kWh/SEK. The calculations of this are found in Table 2.

SCENARIO 2: HOW DOES THE SUBSIDY EFFECTIVENESS CHANGE IF THE LIMIT FOR ENERGY USE IS CHANGED TO 1 GWH?

499 companies with a total energy use of 4,209 GWh/year and a total energy savings from the SEAP equivalent to 268 GWh/year fall below the Scenario 2's criteria. An estimated energy saving from the SEAP per company is then equal to around 538 MWh/year. According to the assumptions, participation in the network results in another 50 % energy efficiency improvement or 269 MWh/year, and a further 25 % energy savings from additional energy audits or 134 MWh/year (403 MWh/year per company). With a target comprising 400 companies, this corresponds then to estimated energy savings through EENet of 161 GWh/year (107 GWh/year energy savings due to the networks as well as 54 GWh/year due to energy savings from additional energy audits). In summary, this results in a subsidy effectiveness of EENet equivalent to approximately 2.37 kWh/SEK, excluding administrative costs. The subsidy effectiveness including the administrative costs will thus be 2.03 kWh/SEK. The calculations of this are found in Table 2.

SCENARIO 3: HOW DOES THE SUBSIDY EFFECTIVENESS CHANGE IF THE PROJECT ONLY REACHES 30 NETWORKS? (THE LOWER LIMIT FOR ENERGY USE IS 2 GWH/YEAR)

328 companies with a total energy use of 3,960 GWh/year and a total energy savings from the SEAP equivalent to 184 GWh/year fall below the Scenario 3's criteria. An estimated energy saving from the SEAP per company is then equal to around 560 MWh/year. According to the assumptions, participation in the network results in another 50 % energy efficiency improvement or 280 MWh/year, and a further 25 % energy savings from additional energy audits or 140 MWh/year (420 MWh/year per company). With a target comprising 300 companies, this corresponds then to estimated energy savings through EENet of 126 GWh/year (84 GWh/year energy savings due to the networks as well as 42 GWh/year due to energy savings from additional energy audits). In summary, this results in a subsidy effectiveness of EENet equivalent to approximately 2.47 kWh/SEK, excluding administrative costs. The subsidy effectiveness including the administrative costs will thus be 2.02 kWh/SEK. The calculations of Scenario 3a, b are the same and are found in Table 2.

SCENARIO 4: HOW DOES THE SUBSIDY EFFECTIVENESS CHANGE IF THE PROJECT ONLY REACHES 20 NETWORKS? (THE BASIC LIMIT FOR ENERGY CONSUMPTION 2 GWH/YEAR)

328 companies with a total energy use of 3,960 GWh/year and a total energy savings from the SEAP equivalent to 184 GWh/year fall below the Scenario 4's criteria. An estimated energy saving from the SEAP per company is then equal to around 560 MWh/year. According to the assumptions, participation in the network results in another 50 % energy efficiency improvement or 280 MWh/year, and a further 25 % energy savings from additional energy audits or 140 MWh/year (420 MWh/year per company). With a target comprising 200 companies, this corresponds then to estimated energy savings through EENet of 84 GWh/year (56 GWh/year energy savings due to the networks as well as 28 GWh/year due to energy savings from additional energy audits). In summary, this results in a subsidy effectiveness of EENet equivalent to approximately 2.47 kWh/SEK, excluding administrative costs. The subsidy effectiveness including the administrative costs will thus be 1.85 kWh/SEK. The calculations of Scenarios 4a, b are performed according to the same principles and are found in Table 2.

In Table 1, the scenario calculations are presented together also with a brief presentation of the outcome of the first five-year program period of the Swedish Voluntary Agreements Program, PFE (Program for Energy Efficiency for Energy-intensive companies). The reason for comparing this program with the PFE is that the PFE, apart from the Swedish Energy Audit program, has been the major industrial energy efficiency policy in Sweden 2004–2014. Data for the PFE comes from the Swedish Energy Agency and the evaluation of PFE by Stenqvist and Nilsson (2012), who estimated the free-rider coefficient for the PFE-program to be between 0 and 50 %.

Table 2. Ex-ante calculations of the Swedish national energy network project (EENet) calculated under different scenarios.

	Baseline scenario	Scenario 1	Scenario 2	Scenario 3	Scenario 3a	Scenario 3b	Scenario 4	Scenario 4a	Scenario 4b	
Number of related companies (EKC)	328	403	499	328	403	499	328	403	499	companies
Energy end-use	3 960 674	4 090 038	4 208 727	3 960 674	4 090 038	4 208 727	3 960 674	4 090 038	4 208 727	GWh/year
Governmental costs for energy audit	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	27 000	SEK
Total governmental costs for energy audits for all companies	8 856 000	10 881 000	13 473 000	8 856 000	10 881 000	13 473 000	8 856 000	10 881 000	13 473 000	SEK
Total net energy savings for all companies from EKC	183 680 247	213 545 864	268 331 676	183 680 247	213 545 864	268 331 676	183 680 247	213 545 864	268 331 676	kWh/year
Net energy savings per company from EKC	560 001	529 890	537 739	560 001	529 890	537 739	560 001	529 890	537 739	kWh/year
Implemented energy savings EKC, 100%	560 001	529 890	537 739	560 001	529 890	537 739	560 001	529 890	537 739	kWh/year
Extra energy savings due to network (assuming 50% extra energy efficiency compared to energy audit)	280 000	264 945	268 869	280 000	264 945	268 869	280 000	264 945	268 869	kWh/year
Planned number of companies	400	400	400	300	300	300	200	200	200	companies
Costs per network (data from the SEA)	2 100 000	2 100 000	2 100 000	2 100 000	2 100 000	2 100 000	2 100 000	2 100 000	2 100 000	SEK per network
Number of networks	40	40	40	30	30	30	20	20	20	networks
Total costs, all networks	84 000 000	84 000 000	84 000 000	63 000 000	63 000 000	63 000 000	42 000 000	42 000 000	42 000 000	SEK
Companies' membership fee during 4 years (10 000 SEK/year)	40 000	40 000	40 000	40 000	40 000	40 000	40 000	40 000	40 000	SEK
Total costs, all networks, incl. membership fee 10 000 SEK/year (40 000 SEK during 4 years)	68 000 000	68 000 000	68 000 000	51 000 000	51 000 000	51 000 000	34 000 000	34 000 000	34 000 000	SEK
Costs per company incl. membership fee 10 000 SEK/year	170 000	170 000	170 000	170 000	170 000	170 000	170 000	170 000	170 000	SEK
Expected net energy savings/company from networking (calculated from EKC)	280 000	264 945	268 869	280 000	264 945	268 869	280 000	264 945	268 869	kWh/year
Subsidy effectiveness, network	1,65	1,56	1,58	1,65	1,56	1,58	1,65	1,56	1,58	kWh/SEK
Expected net energy savings/company if 25% makes an updated energy audit with an expert	140 000	132 473	134 435	140 000	132 473	134 435	140 000	132 473	134 435	kWh/year
Subsidy effectiveness if 25% makes an updated energy audit with an expert	0,82	0,78	0,79	0,82	0,78	0,79	0,82	0,78	0,79	kWh/SEK
Expected net energy savings, total outcome	420 001	397 418	403 304	420 001	397 418	403 304	420 001	397 418	403 304	kWh/year
Subsidy effectiveness, network, total outcome	2,47	2,34	2,37	2,47	2,34	2,37	2,47	2,34	2,37	kWh/SEK
Administrative costs, total	11 460 000	11 460 000	11 460 000	11 460 000	11 460 000	11 460 000	11 460 000	11 460 000	11 460 000	SEK
Administrative costs per company	28 650	28 650	28 650	38 200	38 200	38 200	57 300	57 300	57 300	SEK
Total costs, network + administration	79 460 000	79 460 000	79 460 000	62 460 000	62 460 000	62 460 000	45 460 000	45 460 000	45 460 000	SEK
Total costs per company, network + administration	198 650	198 650	198 650	208 200	208 200	208 200	227 300	227 300	227 300	
Total subsidy effectiveness, incl. administration	2,11	2,00	2,03	2,02	1,91	1,94	1,85	1,75	1,77	kWh/SEK
Net energy savings via network, total outcome GWh/year	168	159	161	126	119	121	84	79	81	GWh/year
PFE (5 year 150 MSEK/year tax relief)	750									MSEK
Outcome, PFE elektricity + other measures (1,45 TWh/year + 0,8 TWh/year)	2 250									GWh/year
Total outcome, subsidy effectiveness, PFE	3,00									kWh/SEK

Concluding Discussion

In this paper, an ex-ante evaluation of the Swedish EENet has been done and the subsidy effectiveness of the project based on different scenarios was calculated. Including costs for the project administration, the subsidy effectiveness varies between 1.75 and 2.03 kWh/SEK for the different scenarios (see Figure 1). This is consistent with the Swedish Voluntary Agreements Program, PFE (Program for Energy Efficiency for Energy-intensive companies) which is a policy programs that like the EENet also addresses energy management practices (Table 2). The PFE showed a subsidy effectiveness (only tax relief) of 0.97–1.93 kWh/year. If the cost of the administration is included, this number is decreased slightly but negligible, this is because only the tax relieves for the PFE amounted to about 150 million/year.

The calculations have been very important for developing the objectives of the EENet policy project and formed the basis for discussion when the need arose to revise them. The calculations will also be used in the continuing work within the project to monitor how we are doing in relation to the objectives. The ex-ante evaluation will be updated when more information about the companies involved in the project and what potential they have for improving energy efficiency will be available. Furthermore, estimates will be useful also when performance monitoring. Figure 1 below displays the major results of the paper.

The outcome of the presented calculations was that the Swedish Energy Agency, based on these results, could motivate a reduced threshold for participation in the EENet from 2 GWh/year to 1 GWh/year in annual energy use. Unlike most policy evaluation that are summative in character, either ex-ante or ex-post, this type of formative policy evaluation, is most likely highly effective if maintaining and improving energy efficiency policy subsidy-effectiveness. Based on this paper, the authors suggest further research to be conducted in the area of formative energy efficiency policy evaluation. The calculations showed that the reduction of threshold value could be made without a reduction of the goal for total energy savings for the whole project. The alternative to the reduction of threshold was a reduction of participating companies, from 400 companies to 300 or 200 companies, due to the lake of companies that for filled all the requirements for participation in the networks. The calculation showed clearly that the reduction of companies would be a much more inefficient way that reduced energy savings for the whole project.

Over the years, the Swedish Energy Agency has gained significant experience in industrial energy policy administration and operation, e.g. The Swedish PFE and the Swedish Energy Audit Program (SEAP). In the design of the SEAP, an ex-ante evaluation was also conducted, and the design involved Energy Agency officials, consultants (technical and law) as well as one researcher. This model has also inspired the design of the EENet. One general finding from this paper in order to achieve improved industrial energy efficiency policy-making for governmental bodies, is not to only include consultants, but also to include scientific input in the deployment of new policies when such is needed. Such input when designing and evaluating policies is currently taking place within for example the EU, but is seldom done in close cooperation where, e.g. reports or scientific papers are published together. Moreover, seldom are such studies being undertaken formatively.

In order to achieve formative policy evaluation in early states of energy efficiency policy design when such is need, two important requirements needs to be fulfilled. First, an understanding is needed of the usefulness of scientific input on behalf of the governmental body officials, in this case officials from the Swedish Energy Agency. Second, it demands researchers

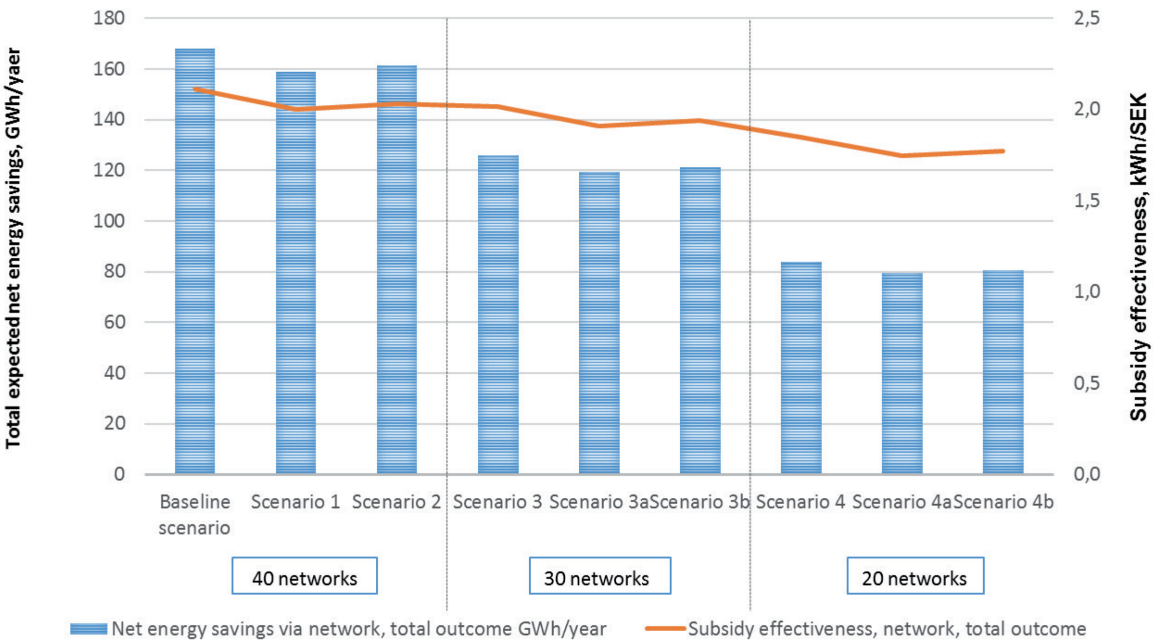

Figure 1. Total expected energy savings from participating in the Swedish EENet and the projects' subsidy effectiveness for different scenarios.

who are willing to respond affirmatively to an inquiry from a governmental body and step-aside for some time from their own research activity and instead support the governmental body in the design, and fine-tuning of public energy policy instruments. This paper has been a humble attempt into moving in this direction.

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