

# Review of regional energy efficiency policies towards industrial SMEs from within Europe

Ida Johansson & Patrik Thollander  
University of Gävle  
Sweden

Dietmar Baurecht  
Regionalmanagement Burgenland GmbH  
Austria

Christian Engers  
House of Energy  
Germany

Enrique Esteban  
Agencia de Desarrollo Económico  
de La Rioja  
Spain

Maya Janssen  
Province of Groningen  
The Netherlands

Mihai Marian  
South-West Oltenia Regional Development  
Agency  
Romania

Katrin Schalk  
House of Energy  
Germany

Giovanni Scimemi  
INVITALIA for the Ministry of Economic  
Development  
Italy

## Keywords

industrial SME, energy efficiency policy, regional policies

## Abstract

Industrial SMEs represent 99 % or more of the total number of companies in most countries, and one-third of the total industrial energy use. Despite this, industrial SMEs have not received much attention both in terms of research and policies. The scientific papers published in the field covers national energy efficiency policy programs and evaluations of these, while scientific studies of regional policy programs are few. SMEs in general have a low capacity to work on improved energy efficiency, and the term SME is generally too vague to provide any guidance on how to design public policy programs. Administrative policies might be a sound approach for medium-sized enterprises but for small-sized enterprises the administrative policies could be less effective. For medium-sized and energy-intensive industrial SMEs, economic and/or regulatory incentives are important, while for small-sized and non-energy intensive industrial SMEs there is a need for a more supportive approach. The aim of this paper is to provide an overview of existing regional energy efficiency policies targeting industrial SMEs in seven selected EU member states. This overview also provides an insight of the type of policy approach (informative, economic or administrative) that is most commonly used in regional policy activities.

## Introduction

SMEs represent 99 % or more of the total number of companies in most countries, and accounts for one-third of the total industrial energy use [1]. Industrial SMEs have not been the main focus in terms of research and policies, and research and policy programs have mainly targeted energy intensive and large industries [2], even though SMEs and non-energy intensive industries have a larger relative energy efficiency potential [3]. For industrial SMEs, energy audit programs are the most common policy means [4] and a review of energy policy programs targeting industrial SMEs show that scientific studies of policy programs mainly covers energy audit programs and evaluations of these [5]. An international comparison of SME policy programs indicated that there is a non-uniform way of categorizing data, meaning that benchmarking is difficult to undertake, underlining the importance of benchmarking policy programs to be developed [6]. Conducting an energy audit is a key measure to improved energy efficiency in SMEs and energy audit programs have been established world-wide [7]. Energy efficiency networks, investment subsidies and benchmarking schemes have been recognized as suitable policies in addition to energy audit programs [8]. The primary way, nationally and internationally, has been for governments to introduce energy audit programs, as in the EU where large companies are required by law to undertake an energy audit every fourth year, or subsidized energy audits for SMEs [4]. As for the individual SME, one of the primary ways to improve energy efficiency is to work with internal energy management, however, the energy management in non-energy intensive companies and SMEs are underdeveloped [9]. Research have shown that the design of policy programs are not generalizable and should be designed to target a specific country and SME sector [5]. The first gen-

eration's policy programs for SMEs mainly consist of energy audit programs, which show a high cost-effectiveness [7]. The second generation policy approaches (energy management) also proved to be efficient, but at a higher cost per saved kWh, compared to energy audits [10]. Further, as part of the second generation policy approaches, SMEs receiving support in the form of a group of 5–12 companies (energy efficiency networks) have also shown successful results [5]. The term SME is generally too unspecific to provide any guidance on how to design the policy program but the most promising energy efficiency measures in industrial SMEs are generally found in the support processes [5]. The first European directive promoting energy efficiency in SMEs, the Energy Services Directive, came into force in 2006 [11]. Based on this, numerous EU member states introduced energy audit programs for SMEs. In 2012, a second European directive, the Energy Efficiency Directive, came into force, and energy efficiency in SMEs were encouraged further [12]. There are three types of policy instruments; administrative (e.g. rules, regulations, etc), informative (e.g. information campaigns/programs, energy audit programs etc) and economic (e.g. taxes, subsidies, financial incentives, etc) [4]. These could be used alone or in a policy-mix complementing one another. Informative policies work as a foundation in policy mixes and energy audit programs are seen to be a cost-effective policy mean. Further, administrative policies can be effective for medium-sized companies but for small companies they are less effective [13]. The majority of the research related to energy policy programs towards industrial SMEs regards national policies, and more specifically evaluations of energy audit programs [5] and research regarding regional policy programs have been scarce. The aim of this paper is to provide an overview of existing regional energy efficiency policies targeting industrial SMEs in seven selected EU member states, and provide an insight of the type of policy approach (informative, economic or administrative) that is most commonly used in regional policy activities. This study originates from the regional perspective. For an SME, whether the policy is regional or national is of lower importance. While most scientific papers, e.g. [7,14] etc., present evaluations of mostly national programs and their effects and outcomes, this paper tries to outline available regional policy programs together with national ones, and then distinguish between regional and national actions, as a way of enhancing knowledge of the regional policy perspective. This is the unique contribution from this paper.

## Methodology

This paper has been written within the EU Interreg SMEPlus-project and data was collected from regional energy efficiency program operators and administrators from seven regions within the EU; Burgenland (Austria), Groningen (The Netherlands), Gävleborg (Sweden), La Rioja (Spain), Hessen (Germany), Campania (Italy), and South-West Oltenia (Romania). Information on regional policy programs was collected through policy workshops with policy program operators and administrators between September 2019 and March 2020. In total three workshops were held, two in Sweden and one in Austria. Individual region specific reports were written in English by policy operators and administrators located in each of the individual regions studied. Prior to the workshops, a review

of the scientific papers on energy efficiency policy programs for industrial SMEs were conducted [5]. In this analysis, the various regional policies were categorized into regional or national policies using the below five major general types of energy efficiency policies:

- Policy program including energy audit components (mainly informative)
- Investment subsidies available (mainly economic)
- Energy efficiency networks offered for (for supporting energy management) (informative)
- Direct policy program available including energy management components (e.g. voluntary agreement) (mainly informative)
- Benchmarking scheme that is under operation (mainly informative)

An energy audit program is mainly of informative character. For large companies within the EU, which needs to undertake an energy audit every fourth year, audits may also be of administrative character. Investment subsidies is an economic policy instrument. Energy efficiency networks and direct policy programs including energy management components, are mainly informative instruments, and the same holds for benchmarking schemes. Under some circumstances, e.g. the law for energy audits for large companies, they may avoid an external audit if undertaking an audit within their management system (environmental or energy-related). Such policy may also be seen as administrative, i.e. law-based. The same holds for benchmarking if a national or regional EPA (Environmental Protection Agency) demand a certain level of specific energy use. In such cases, the benchmarking originates from the national environmental protective legislation that in turn often originates from the IED (Industrial Emission Directive). These five major general types of energy efficiency policies for industrial SMEs were developed and revised within IEA's research program for energy efficiency in industrial SMEs, the IEA IETS Annex XVI [15]. The policy program operators and administrators were then asked to group their available regional and national policies in accordance with these five types of energy efficiency policies. Mandatory administrative/law-based policies such as national EU Member state legislation due to IPPC (Industrial Pollution Prevention Control) and IED (Industrial Emission Directive) are excluded from the scope of this study.

## Regional energy efficiency policy programs

The text boxes on the following pages present current regional policy programs for improved energy efficiency in the respective regions.

## Analysis

The regional policies were categorized into regional or national policies according to the matrix in Table 1.

Energy audit programs seems to be under operation among most of the studied regions. However, the South-West Oltenia region has no energy audit programs targeting SMEs available, neither on regional level nor national levels. Energy audit poli-

## GÄVLEBORG, SWEDEN

The county of Gävleborg is one of Sweden's 22 counties and has approximately 287,000 inhabitants and 10 municipalities. The county is heavily industrialized and represents about 8 % (11 TWh/year) of Swedish industry's energy use [16].

Two strictly regional entities, Region Gävleborg (RG) and the county administrative board (CAB), are leading of the regional energy policy activities. Further, the Swedish Agency for Economic and Regional Growth (SAERG) has regional anchoring via the NUTS II-region that the Gävleborg county belongs to. This agency distributes the EU regional structural funds.

A last regional actor is the regional energy agency (REA), that supports the transition towards a sustainable energy system via various programs and initiatives. This REA acts as the regional arm of the Swedish Energy Agency, i.e. the national authority. In Gävleborg, the REA is under the umbrella of the RG but this differs between counties.

### Regional investment subsidies and funds (economic)

No strictly regional fund for energy efficiency investments are offered. However, SMEs can apply

for investments via the RG's funding programs and via SAERG's funding programs.

### Regional administrative/regulative policies

CAB oversees the law enforcement of the Swedish Environmental code. For low environmental polluting companies, e.g. most SMEs, law enforcement also lies on municipality level. Such law enforcement can include a demand for an SMEs to submit an energy audit report or submit an energy plan to the CAB. No follow up or evaluation is being done from of this type of policy.

### Regional informative policies

When an SME has carried out an energy audit supported by the national energy audit scheme, the regional energy agency in the county can support the SMEs in applying for further investment funds [17].

Local climate and energy consultancy is offered on a municipality level, which, in theory, includes SMEs, but in reality, is mostly targets individual citizens and house owners.

### Regional energy audit programs (informative)

No strictly regional energy audit program exists. However, the REA supports the Swedish Energy

Agency in marketing of their national energy audit scheme.

Further, the CAB may also, via law enforcement, demand an energy audit to be handed in to the CAB.

### Regional energy efficiency networks (informative)

University of Gävle administrates various energy efficiency projects and programs, where one program targeted specifically industrial SMEs. The program, called Energig, reached out to more than 40 companies. Groups of about 5–10 companies per network were formed, each of these were supported by a network coordinator and an energy expert. The network period begins with the companies conducting an energy audit and then the companies meet regularly for a period of three to four years. In total seven networks were under operation between 2015–2019.

Enerlean is a spin-off to Energig where, via networks, energy management via lean is advocated with a total of 20 companies in 2 networks running 2019–2022.

## BURGENLAND, AUSTRIA

Burgenland has approximately 284,900 inhabitants. The capital is Eisenstadt. After Lower Austria, Burgenland is the most important wine region in Austria. Another important economic factor is summer tourism. Tourism is one of the important income (around 3 million overnight stays, 2018). Burgenland is a European pioneer in the field of wind energy.

### Regional investment subsidies and funds (economic)

No strictly regional fund for energy efficiency investments are offered. Therefore "EUB – Energie und Umweltberatung (Energy and Environmental Consulting) is the Burgenland regional program within the framework of "Umweltförderung Inland" (UFI). This regional program offers targeted, expanded information campaigns and advisory services to enterprises, communities, schools and associations in Burgenland. The aim of the program is to improve the performance of the Burgenland in the areas of environment, energy and sustainability through advice and to motivate them to invest accordingly.

According to "2050 – Burgenland's climate and energy strategy", the evaluation of the roof and open spaces of public buildings for PV should

be carried out in the short term until 2025 and subsequently expanded step by step.

Accordingly, a new support package was launched in January 2020. Municipalities should play a pioneering role in the areas of energy generation, renovation and mobility, and the state will support them with a new support package in the future. Funding can be applied for at the Forschung Burgenland GmbH using the application form available for this purpose. The application must be submitted to the funding agency before the project begins.

Operational investments in renewable energy sources and energy efficiency can be obtained from Kommunkredit. This involves investments in the expansion, use and use of renewable energies in companies, investments in the economical use of resources and energy, investments in the replacement of fossil fuels with simultaneous energy saving, air conditioning and cooling, thermal building renovation, new buildings in low-energy construction and raw material management.

### Regional administrative/regulative policies

The Burgenland Ecological Promotion Act [18] aims at promoting renewable energy sources, new technologies for the generation of green

electricity and at increasing energy efficiency. In addition, the establishment of the Burgenland eco-energy fund has been decided. The instruments and measures that are formulated in the "2050 – Burgenland's Climate & Energy Strategy" are diverse and range from the implementation of energy accounting in communities to various efficiency measures for companies to the numerous measures that are taken by the population can.

### Regional informative policies

Local authority climate and energy consultancy is offered on a municipality level and also includes SMEs. In Burgenland, the seven climate and energy model regions (KEMs) with their 72 participating municipalities currently play an exemplary pioneering role in the expansion of renewable energy sources, the reduction of energy consumption, sustainable action in the areas of construction, mobility and agriculture. In addition, various stakeholders received a comprehensive climate and energy consultation for communities in Burgenland in the strategy process "2050 – Burgenland's climate and energy strategy" [19]. An awareness-raising and educational offensive to help communities, companies and individuals is to be created.

## HESSEN, GERMANY

The federal state of Hessen has approximately 6.3 million inhabitants and consists of 21 counties and 5 independent towns. The energy policy activities are led by the Ministry of Economics, Energy, Transport and Housing (HMWEVW). Several regional actors support the transition towards a sustainable energy system via various programs, projects and initiatives, such as the energy agency of the state of Hessen (LandesEnergieAgentur – LEA) and the House of Energy e.V. (HoE).

### Regional investment subsidies and funds (economic)

In general, funds for investments for innovative technologies and efficiency measures are based on the Hessian Energy Future law (HEG) via HMWEVW financed through national and European funding (ERDF).

Especially for energy efficiency measures in SMEs Hessen has setup the initiative “Hessische Initiative für Energieberatung im Mittelstand (HIEM) – Hessian initiative for energy-consulting for SMEs”. The most important module is the regional PIUS program. PIUS stands for production-integrated environmental protection (“Produktionsintegrierter Umweltschutz”). It consists of PIUS-Consulting and PIUS-Invest which offers a grant of up to 30 % with a maximum of 500,000 Euros. Projects will be supported with 1 Euro for every kilogram of CO<sub>2</sub> saved [20].

### Regional informative policies

The HMWEVW has its own online-platform to inform the public about the topic energy, called energy-land Hessen.

The LEA has created the project “Hessische Initiative für Energieberatung im Mittelstand

(HIEM) – Hessian initiative for energy-consulting for SMEs”. The HIEM is a platform which offers an overview on the different policies and programs.

### Regional energy audit programs (informative)

The HIEM offers a free “stimulus” energy consulting. The PIUS-Beratung advisory service funds external expertise for SMEs. Advisors point out how to optimise production processes and identify potential savings in order to improve energy and resource efficiency [21].

### Regional energy efficiency networks (informative)

The LEA coordinates the initiative “HessEEN – Hessische Energieeffizienz-Netzwerke” (Hessian energy efficiency networks). In January 2020, there are 10 energy efficiency networks in Hessen [22].

## CAMPANIA, ITALY

Campania is a region in Southern Italy. As of 2018, the region has a population of around 5.8 million people, making it the third most populous region of Italy. Its total area of 13,590 km<sup>2</sup> makes it the most densely populated region in the country. The number of economic activities in Campania is low (51 enterprises per 1,000 inhabitants vs. 63.8 in Italy). The regional industry specialisations are the agro-food industry, the manufacturing of metal products, automotive industrial production as well as a significant aerospace industry.

### Regional investment subsidies and funds (economic)

During the past programming period, 2007–2013, the Ministry for the Economic Development had an Operating Program financed by ERDF 2007–2013, called *POI Energie rinnovabili e risparmio energetico FESR 2007–2013*, purposely made for stimulating the use of renewable energies, energy efficiency and energy savings. This program, with a financial endowment of 1.071 billion euro, financed 1,887 projects of public administrations and enterprises of the so called “Convergence Regions” (Calabria, Campania, Apulia, Sicily). The investments made with the resources of the Program concerned: energy efficiency and the production of energy from renewable sources,

support for investments, strengthening the network, carrying out studies and assessing the potential for energy development. In particular, it offered various instruments like subsidies, non-repayable loans, mortgages based on rotative funds, in order to favour the substitution of energy consuming machines and instruments, the installation of solar panels, the adoption of thermal coats, the production of energy for self-consumption, the building of biomass plants, etc.

The National Operational Program Enterprises and Competitiveness 2014–2020 (PON IC) intervenes with a total allocation of approximately 2.3 billion euros for the strengthening of businesses of the Mezzogiorno (Southern Italy and Islands), as a key element of Italian industrial policy in a logic of territorial rebalancing and convergence between Mezzogiorno-Center-North. The Program intends to increase investments in key sectors in the less developed regions (Basilicata, Calabria, Campania, Puglia, Sicily) and in transition regions (Abruzzo, Molise, Sardinia), contributing to the objective of bringing the relative weight of the manufacturing sector to the European GDP from 15.6 % in 2011 to 20 % by 2020 and thus supporting a lasting development process of the entire entrepreneurial system of the country.

### Regional informative policies

Consumer information and training programs, already started, will be perfected in the period 2021–2030 to promote users’ awareness of energy savings and to encourage the behavioural change.

### Regional energy audit programs (informative)

The Legislative Decree 102/2014 (art. 8, comma 10) reserves up to EUR 15 million per year over the period 2014–2020 for the co-financing of regional programs aimed at supporting the implementation of energy diagnosis or the adoption of management systems compliant with ISO 50001 in SMEs. It is estimated that 15,000 SMEs will be involved per year and just as many energy efficiency projects will be originated by energy diagnosis.

In collaboration with the main involved stakeholders, ENEA proposed an innovative scheme to analyse the energy structure of the audited production site, starting with the definition of a tree scheme which, by means of a multi-level procedure, allows to better define the energy performance of a plant or productive site, for each energy vector (electric, thermal, steam, hot water, etc.) purchased and used in the examined site, distinguishing annual consumption by the different users in the site itself.

## GRONINGEN, THE NETHERLANDS

The Netherlands consists of 12 provinces. The province of Groningen forms the northern region, together with its neighboring provinces Fryslan (to the west) and Drenthe (to the south). This region works together on many levels and subjects, energy and climate is one of them.

The province of Groningen has a population of 593,000 inhabitants and consists of 12 municipalities of which its capital, the City of Groningen, has the most inhabitants.

### Regional investment subsidies and funds (economic)

There is a revolving fund in Groningen from which companies can get a loan for sustainability measures like energy saving, energy efficiency, sustainable energy and so on. This is not a

subsidy but a loan. Aside from this there are no further regional investment subsidies or funds.

### Regional administrative/regulative policies

The province of Groningen as governmental entity has its own administrative and regulative tasks and policies. The regulative policy is based on national law. In the case of energy efficiency this is the Environmental Law (Wet Milieubeheer). The province and the counties have tasks in law enforcement: for low polluting companies it is a municipal competence; for the high polluting and high risk companies the competence lays at provincial or even at national level.

The administrative policies are based on the plans made by the elected Provincial Execu-

tive. The elections are every 4 years so every 4 years a new plan with new focus is written. The provincial tasks are partly based on these 4 yearly plans.

### Regional informative policies

The previous 4 years, the region focused on law enforcement. The next 4 years will be focusing more on helping companies after law enforcement and taking even further steps towards a carbon emission free future.

For this a new policy is developed, together with the county of Groningen and business clubs (in which companies are united). This new policy, or platform, is called Smart Business Groningen, starting in the county of Groningen but will be expanding it to the rest of the province.

## SOUTH-WEST OLTENIA REGION, ROMANIA

The South-West Oltenia Region is located in the southwest of Romania and has a surface of 29,212 km<sup>2</sup>, representing 12.3 % of the country. It is divided in five counties, namely: Dolj, Gorj, Mehedinți, Olt and Valcea and its largest city is Craiova. In 2018, according to Eurostat (2019) there were 1,949,940 inhabitants.

The region has traditional industries such as: automotive, tractors, cars, airplanes, agricultural and heavy machinery, metallurgy (aluminium), oil and gas extraction, chemical industry, processing of oil, electrical engineering, electronics, machine tools, shipbuilding, wagon manufacturing, etc.

At regional level, there are no dedicated entities to manage energy efficiency policy instruments, but there are many stakeholders that are involved in the process of implementing energy efficiency measures. Most important are: County and Local Councils, Craiova Territorial Inspection as Territorial Office subordinated to

the National Regulatory Authority for Energy (NRAE). Also, the South-West Oltenia Regional Development Agency acts as Intermediate Body for managing structural funds in the region, which finances both public and private beneficiaries for improving energy efficiency.

### Regional investment subsidies and funds (economic)

The main regional investment funds available for energy efficiency measures for SMEs are the ones offered through the Regional Operational Program 2014–2020, managed by the SWO RDA. These measures are complementary and included in development projects for increasing the competitiveness of SMEs.

Also, energy efficiency projects is financed by the Romanian Fund for Energy Efficiency, and Energy Efficiency Finance Facility (EEFF) – European funding program “fast track” – quickly used by private companies to invest in equip-

ment, technology or rehabilitation of buildings in order to improve energy efficiency. EEFF is structured as credit line based on grants established from the EC and EBRD funds that is carried out through six Romanian banks and it was designed for the private companies.

### Regional informative policies

At regional level, the most important policy instruments addressing the energy efficiency in SMEs, is represented by the Priority Investments 2.1A, dedicated to the development of small enterprises and also 2.2 – Support for the creation and extension of advanced production capacities and development of services, dedicated to all categories of SMEs. The particularity of this policy instruments is that they are not binding but act as recommendation to the investment plan of the companies, thus being weighted as a percentage of the total budget of the financing project.

## LA RIOJA, SPAIN

Spain is divided in 17 Autonomous Communities. The Autonomous Community of La Rioja is the smallest with a total population of around 315,675 inhabitants and a surface of 5,045 km<sup>2</sup>.

Based on the first estimation addressed by Eurostat (2019), the contributions of the different sectors to the regional gross value added (GVA) in 2017 were: agriculture 5.0 %, industry (including manufacturing) 55.1 %, construction 6.3 % and services 33.6 %. The industrial sector constitutes the cornerstone of the regional economy due to its contribution to the production, employment generation and links to the primary sector, which is another essential element of the economic activity of La Rioja. The last economic industrial report of the Central Directory of Companies (DIRCE in Spanish) in 2018, elaborated annually by INE, revealed that 2,389 companies of La Rioja are related to industry from a total of 23,197 active companies, representing 10.3 % of the total companies.

At regional level, the recently created Regional Directorate for Energetic Transition and Climate Change is responsible for the development of regional policies but currently lacks human re-

sources to deploy and monitor policies. Current regional energy policy is conducted through the La Rioja Regional Operational Program of the European Regional Development Fund 2014–2020 that stated the establishment of regional grants for promoting energy efficiency and renewable energy use in enterprises, especially SMEs and supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector [23].

### Regional investment subsidies and funds (economic)

Regional grants are managed by the Economic Development Agency of La Rioja (ADER).

ADER is in charge of the execution of the Regional Operational Program of the European Regional Development Fund 2014–2020 Axe 4b ‘Promotion of energy efficiency and use of renewable energies’. This is made through the definition, publication and management of regional grants addressed to regional companies and aimed at supporting the promotion of renewable energies, energy-saving and efficiency and protection of the environment.

Regional grants titled “Energy and Environment” offers a grant of around 20 % for efficient energy projects, with a maximum of €200,000 per project [24].

Apart from regional funds, ADER is also in charge of managing in La Rioja the national fund grants for energy efficiency actions in the industrial sector launched by the Institute for the Diversification and Saving of Energy (IDAE), body assigned to the Ministry for the Ecological Transition through the Secretary of State for Energy. This national fund is aimed at energy efficiency actions in SMEs and large industrial companies and offers grants up to 30 % for the *Improvement of technology in industrial processes and equipment* with a minimum eligible investment of €150,000 and for the *Implantation of energy efficiency systems and projects of energy saving and energy efficiency* with a minimum eligible investment of €30,000.

### Regional energy audit programs (informative)

ADER offers regional grants for energy audits. These grants cover up to 50 % of the cost up to €15,000. The energy audit must contain minimum contents published in the annex of the call.

Table 1. Summary of available regional and national policy types.

	Gävleborg, Sweden	Burgenland, Austria	Hessen, Germany	Campania, Italy	Groningen, The Netherlands	South-West Oltenia, Romania	La Rioja, Spain
Policy program including energy audit components	Regional and National	Regional and National	Regional and National	National	Regional and National	–	Regional and National
Investment subsidies available	Regional and National	Regional and National	Regional and National	Regional and National	–	Regional and National	Regional and National
Energy efficiency networks offered (for supporting energy management)	Regional and National	Regional and National	Regional and National	–	–	–	–
Direct policy program available including energy management components	Only large companies	Obligatory only for large companies, recommended and partly funded also for SME	Only for energy-intensive companies	Only for energy-intensive companies	National	Only for energy intensive companies	National
Benchmarking scheme that is under operation	–	–	–	–	National, for ETS and energy companies	–	–



cy programs are the foremost type of policy for industrial SMEs and also seems to be the most cost-effective policy program [4]. Energy efficiency network program on the contrary has been suggested as effective policy means towards industrial SMEs [25, 26]. This may be seen as a second generation of policy programs for SMEs, also including energy management support. However, energy efficiency networks seem to only be under operation as a regional and national policy means in Sweden, Austria and Germany. Energy efficiency networks is a way of serving industrial SMEs as a form of an insourced energy management service. Regarding policy means for industrial SMEs which includes management components (apart from being gained via an energy efficiency network), seems to only be available for large and/or energy-intensive companies.

Analysing Table 1, informative policy programs in the form of energy audit programs seems to exist in most of the studied regions. More advanced informative policy programs such as benchmarking schemes seems to not be under operation among the studied countries and regions, apart for national EU ETS and energy companies in The Netherlands. However, this quite complex type of informative policy as outlined by Thollander et al. 2015 [6], is highly needed in order for correct information of energy use etc to be available for SMEs. Moreover, as indicated in Table 1, many less complex policy programs like energy audit programs are available.

## Concluding discussion

The aim of this paper was to provide an overview of existing regional energy efficiency policies targeting industrial SMEs in seven selected regions among some selected EU member states. Previous research has indicated that national energy audit policy programs is the most common policy program for SMEs [7]. Also, a more recent type of policy programs for SMEs are energy efficiency networks [5]. Most studies with a few exceptions [27], study national energy policy programs, and the scientific studies on programs on a regional level are scarce. That is one of the unique contributions with this paper studying also regional energy policy programs for SMEs. Results indicate that the policy means differs between the regions but also show some similarities. All regions provide some general information campaigns for industrial SMEs and most also have energy audit programs in place, either regional or national, while the more the policies move towards detailed more advanced takes such as energy management and benchmarking schemes, no such policy programs seems to be in place.

From our study it is possible to draw the conclusions that

- Six out of seven regions have policy programs including energy audit components
- Six out of seven regions have investment subsidies available
- Three out of seven regions offer energy efficiency networks
- Five out of seven regions only offer direct policy program (including energy management components) for large and/or energy intensive companies, and none of the regions offer this for SMEs
- None of the seven regions have benchmarking schemes available for SMEs

Support for energy management in SMEs in forms of energy efficiency networks is only available in Sweden, Austria and Germany among the studied regions and counties. Energy efficiency networks provide vital support and services needed for SMEs to successfully implement energy efficiency measures on site as a follow-up from stand-alone energy audits, and it is recommended that pilot networks are considered to be introduced in the other studied regions as well where these are currently not available. The same holds also in general for any region, in the EU and abroad where major improvements of energy efficiency among industrial SMEs are sought after.

What this study has highlighted is that by comparing regional policy programs available for SMEs, there is for several of the regions, a vast array of more voluntary policy programs to be deployed, e.g. benchmarking schemes.

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## Acknowledgments

The study has been carried out under the SMEPlus project financed by the European Commission within the INTERREG Europe program. The authors would like to thank the European Commission for their financial support. We also warmly thank the anonymous reviewers for their good input and constructive suggestions.