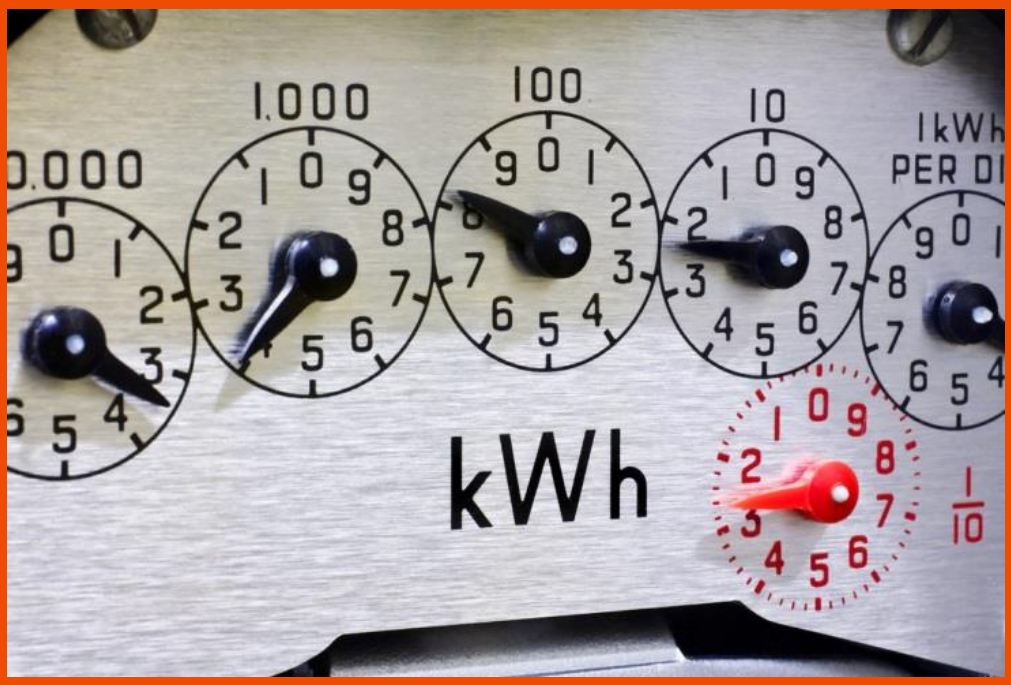
Indo-German Energy Forum Support Office



Overview Study: Promotional Schemes for Demand-Side Energy Efficiency

Ministry of Power, Government of India

Energy is Life, Conserve It (BEE)

Federal Ministry for Economic Affairs and Energy

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

Overview Study: Promotional Schemes for Demand-Side Energy Efficiency

On behalf of the Indo-German Energy Forum (IGEF)

Imprint

Publisher: Indo-German Energy Forum (IGEF)
c/o Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
1st Floor, B-5/2, Safdarjung Enclave
New Delhi
110 029, India
info@energyforum.in
http://energyforum.in/

Authors: Johannes Alexeew, Carolin Anders, Vera Buttmann, Mikael Henzler, Georg Ratjen (adelphi)

Layout: adelphi, www.adelphi.de

Photo credit (Title): Alex Yeung – shutterstock.com

Executive Summary

It is globally recognised that energy efficiency (EE) is an important and cost-effective measure for mitigating climate change, improving energy security and creating an economically and environmentally sustainable energy system.

Also, in India the growing energy demand has led the country to put more focus on the issue of energy efficiency and to implement energy saving policies. In addition to its existing efforts, India is constantly exploring new ways to tap into the huge energy saving potential which exists. Germany has great experience in energy efficiency and has successfully established a wide range of instruments for promoting energy efficiency over the recent years. This makes India and Germany ideal partners to share experiences and explore new pathways for an energy efficient future.

The present overview study is carried out within the framework of the Indo-German Energy Forum (IGEF), a cooperation between India and Germany in the field of sustainable energy production and use. The Forum was established by the German Chancellor Angela Merkel and the Indian Prime Minister Manmohan Singh in 2006 with the aim of establishing a positive environment for energy efficiency in both countries.

The study provides an overview of German promotional schemes for energy efficiency (i.e. programmes offering financial incentives to end-users for conserving energy).It examines the impact and performance of these schemes in Germany and briefly evaluates these with respect to their relevance for India. By presenting the existing schemes in Germany and examining their impact and performance, the study serves the overall aim of supporting the identification of potential future areas of closer cooperation between the two nations. The focus is placed on financial incentive mechanisms for the building and industry sectors.

The identification of the German promotional schemes and the collection of the relevant information on those schemes is being carried out via a desk study. Overall, 150 promotional programmes for energy efficiency have been identified. The political system in Germany, where several organisations at federal government and regional state level are active in the field of promoting energy efficiency, explains the large number of existing programmes. Given this number of promotional programmes, 21 clusters are built to group and assess similar programmes together. The highest number of programmes are identified in the clusters “EE refurbishment of buildings” (37) and “Implementation of EE technologies/ measures” (28).

For assessment of the clusters, a set of eight parameters has been developed and applied to reflect upon the impact, performance and overall success of the German schemes:

(1) Types of savings triggered (direct or indirect)

The parameter is used to assess whether the respective programme induces energy savings directly, for instance through supporting the energy efficient refurbishment of a building financially. Or whether the programmes trigger energy savings indirectly, for example through subsidising energy audits. The study reveals that most programmes generate savings indirectly. Only seven out of 21 programmes assessed induce direct savings.

(2) Cost-effectiveness

To evaluate the cost-effectiveness, a ratio is calculated of primary energy savings per annum achieved by the programme against annual public budget costs. Obtaining the data required is often difficult and in ten cases data cannot be found. For the remaining cases, the cost-effectiveness ranges from very low, 0.51 kWh per Euro fund invested for a programme in the cluster “Implementation of energy management systems in industry”, to 878 kWh per Euro fund invested for a programme in the cluster “Networking platforms for companies exchanging ideas on energy efficiency”. Five schemes showed a moderate cost-effectiveness of between 1 and 10 kWh savings per Euro fund invested, whereas five other programmes have a rather high cost-effectiveness of more than 10 kWh per Euro.

(3) Stimulation of investment

For this parameter, the annual public budget costs and the total investment costs triggered by the programme are used to calculate how much investment was stimulated by one Euro of public funds. Again (comparable) data is difficult to obtain. In nine out of 21 clusters data is not available. For the remaining twelve programmes assessed a broad range of stimulated investments is found. Whereas four schemes generate only small investments of between 1-2 Euros investment per Euro fund, the other programmes stimulate significant investments; most of the programmes having even more than ten Euros of investment per Euro fund. A programme in the cluster “Conduction of energy audits in industries” shows a particularly high ratio of 38.6 Euros investment per Euro fund.

(4) Job creation

The study evaluates the programmes on the job creation parameter in a qualitative manner by assessing whether the subsidised energy conservation measures implemented are labour and/or technology intensive. A programme is considered as high in terms of job creation when the measures promoted by the programme require a significant amount of human resources. An example of a labour intensive programme is the cluster “(Long-term) energy coaching/ consulting”, which provokes the generation of jobs for energy auditors and energy coaches. Programmes which mainly promote technologies are considered as medium in terms of job creation, because the manufacturing and installation of energy efficient equipment does require some labour. A programme is considered as not creating a relevant number of jobs if neither technology nor labour are required to be implemented. Six programmes come under this category, for instance a programme in the cluster “Implementation of management systems to achieve and evaluate climate and energy targets of municipalities”, where actions are mainly carried out by existing municipal and regional staff. But the majority of the programmes assessed show at least medium, in nine cases even high, levels of job creation.

(5) Continuity of energy savings

The continuity of energy savings realised by the programme indicates the time period over which the induced energy savings occur. About half (11) of the programmes assessed trigger long-term energy savings over a period of at least ten years. These long-lasting effects are typically generated by the implementation of energy efficiency technology in buildings and municipal infrastructures. Eight programmes generate savings over a medium-term period of 2-10 years, many of them being measures at an industrial level, such as changes to the equipment and machinery of industrial processes, or actions that lead to this.

(6) Capacity building

Another impact parameter is the number of stakeholder groups which increase the capacities through the implementation of the promotional programmes evaluated. Five programmes, for instance those which solely finance the implementation of a technology, are found to have no capacity building effects at all. Ten of the assessed schemes target one stakeholder group only and thus have limited capacity building effects. Yet, six programmes increase know-how on energy efficiency for a wide range of stakeholders. These include schemes particularly designed to finance broad capacity development of all relevant stakeholders for a certain area, e.g. EE training for architects, craftsmen, house-owners etc. in the building sector.

(7) Dependency on technologies or know-how

Twelve of the programmes assessed, for example programmes supporting energy management systems, are independent of any specific technology and know-how. To a certain degree this can be associated with a high level of transferability of these programmes to another context and/or country. This parameter is thus especially relevant for answering the question as to whether and which German promotional programmes might be suitable for the Indian context. On the other hand, five of the programmes assessed require the availability of specific technology which is not broadly interchangeable. They are thus considered to have comparatively lower potential for transferability.

(8) Market penetration

The market penetration of a programme is considered to be high when more than 10% of all eligible stakeholders make use of the promotional programme. A very high market penetration occurs for a programme in the cluster “construction of energy efficient buildings”. More than 66,000 applications for

subsidised loans for the construction of around 115,000 housing units were approved in 2012. Thus the programme was applied to more than 55% of all newly built residential buildings in 2012 in Germany. Nevertheless, not all programmes show such high figures for market penetration. Many programmes (10) are applied by less than 1% of all eligible stakeholders. However, it has to be noted that, due to the large number of similar promotional schemes for energy efficiency, there is competition between similar schemes and lower market penetration is achieved for these.

In terms of the clusters being relevant to India, the study examines whether there is a gap to be filled in India (do similar promotional programmes already exist in India) and whether the cluster addresses a relevant area of energy efficiency with high saving potentials. In addition, the issue of whether or not the major framework conditions required for the replication for the schemes are in place (e.g. capacities and expertise with required human resources, technologies available etc.) is examined. The assessment for relevance reveals that most of the clusters analysed are also pertinent for the Indian context. Four programmes out of these schemes are evaluated as having particularly high relevance. The cluster “construction of energy efficient buildings” for example addresses an area where no broad promotional programmes exist in India, but at the same time high saving potentials are predicted. The relevance for India is considered as being fairly low for only six clusters. The main reason for this judgment is the very specific nature of most of these programmes (e.g. the financial promotion for companies shutting down heavy loads in peaks).

Overall a number of mechanisms show a particularly high degree of success and impact on the German market and are considered as being very relevant for bringing India forward in terms of energy efficiency. These promotional mechanisms include the financial promotion of

- the construction of energy efficient buildings,
- networking platforms for companies exchanging ideas on energy efficiency,
- the implementation of energy efficient technologies or measures, and
- the conduction of energy audits in industries.

The last two mechanisms – financial promotion of energy audits in industries and the implementation of energy efficient technologies - are already being implemented in India, at least on a small scale. Also, initial initiatives are in place for incentivising the construction of energy efficient buildings too. However, to achieve a successful, broader roll-out of all of these schemes, the identification of success factors is crucial. Here it is important to examine which incentives are needed and what conditions are required to make these programmes more attractive for the respective target groups. This overview study may serve as a starting point for policy makers to broadly get involved in suitable promotional programmesby learning about the German approaches and experiences.

Table of Contents

List of figures

List of tables

List of Abbreviations

AbLaV	Ordinance on Agreements Concerning Interruptible Loads (Verordnung zu abschaltbaren Lasten)
AC	Air Conditioning
AFD	Agence française de développement
ASUE	Arbeitsgemeinschaft für sparsamen und umweltfreundlichen Energieverbrauch
BAFA	Federal Office for Customs and Export Control
BEE	Bureau of Energy Efficiency
BfEE	Bundesstelle für Energieeffizienz
BMUB	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (Bundesministeriums für Umwelt, Naturschutz, Bau und Reaktorsicherheit)
BMVI	Federal Ministry for Transport and digital Infrastructure (Bundesministeriums für Verkehr und digitale Infrastruktur)
BMWi	Federal Ministry for Economics and Energy (Bundesminister für Wirtschaft und Energie)
CHP	Combined Heat and Power
dena	German Energy Agency
DFID	Department for International Development
DSM	Demand-Side Management
EE	Energy Efficiency
eea	European Energy Awards
EMC	Energy Management Centres
EnMS	Energy Management System
ESCO	Energy Service Company
Fraunhofer ISI	Fraunhofer Institute for Systems and Innovation Research
GEDA	Gujarat Energy Development Agency
GEF	Global Environment Fund
GIZ	German Development Cooperation (Gesellschaft für Internationale Zusammenarbeit)
GWh	Giga Watt Hours
HAREDA	Haryana Energy Development Agency
HVAC	Heating, Ventilation and Air Conditioning
IBEF	India Brand Equity Foundation
IEA	International Energy Agency
IKK	Investment Credit for Municipalities
IPCC	Intergovernmental Panel on Climate Change
IREDA	India Renewable Energy Development Agency
IRENA	International Renewable Energy Agency

ISO	International Standard Organisation
JICA	Japan International Cooperation Agency
KfW	KfW Group
kW(el)	Kilo Watt electrical energy
kWh	Kilo Watt Hours
KWKG	Combined Heat and Power Law (Kraft-Waerme-Kupplungs-Gesetz)
LEEN	Learning Energy Efficiency Networks
MCA	Multi-Criteria Analysis
MEDA	Maharashtra Energy Development Agency
MKULNV	Ministry for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection of the German State of North Rhine-Westphalia
MNRE	Ministry for New and Renewable Energy India
MoP	Ministry of Power India
MSMEs	Micro, Small and Medium Enterprises
MWh	Mega Watt Hours
NEEAP	National Energy Efficiency Action Plan
NHB	National Housing Bank
NRW	North Rhine-Westphalia
O&M	Operation and Maintenance
OECD	Organisation for Economic Cooperation and Development
PCMC	Pimpri Chinchwad Municipal Corporation
PV	Photovoltaic
R&D	Research and Development
RE	Renewable Energies
SIDBI	Small Industries Development Bank of India
SME	Small and Medium Enterprises
SpaEfV	Spitzenausgleich-Effizienzsystemverordnung
STMWI	Bavarian Ministry of Economic Affairs and Media, Energy and Technology
TERI	The Energy and Resource Institute
UfU	Independent Institute for Environmental Issues
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

1 Introduction

1.1 Background

It is globally recognised that energy efficiency is an important and cost-effective measure for mitigating climate change, improving energy security and creating an economically and environmentally sustainable energy system. There is great potential for energy savings as well as the resulting benefits from reduced energy consumption in every sector - from industry, to the building and transport sectors.

Given its growing economy, India's demand for energy has been rising continuously over recent years. It more than doubled from the equivalent of 319 to 669 million tons of oil between 1990 and 2009. In combination with limited infrastructure and production capacities however, this development has led to shortages in the energy supply. Compared to energy demand which had an average annual growth rate of 4%, domestic energy production in India increased by an average of only 2.9% per annum between 1990 and 2009 (IEA 2012, p.26). In order to close the gap between energy supply and demand, India has decided to enhance its efforts in developing demand-side energy efficiency measures, in addition to extending its production capacities. Therefore, India has successfully implemented several energy saving schemes and policies over the last years. In particular, the establishment of the Energy Conservation Act in 2001 and the creation of the Bureau of Energy Efficiency (BEE) have emphasised and boosted India's efforts to promote energy efficiency measures. Promotional schemes providing (monetary and policy) incentives to energy consumers for saving energy can play an important role in overcoming energy undersupply.

In Germany, a wide range of instruments for stimulating energy efficiency has been introduced over recent years and decades. The combination of a clear-cut legal framework, progressive promotional programmes, as well as measures for market transformation and capacity building is the driving force behind the country's success in the field of energy efficiency. For example, a fully equipped German household consumed about 300 KWh/a less in 2008 than in 1995 (bund der energieverbraucher 2014). In the industry sector, 136 TWh less primary energy was consumed in 2007 compared to 1991, even though the gross value added and the production index significantly increased during this period (UBA 2011, p. 6-7). In the transport sector too energy efficiency increased by 10% for all modes of passenger transport and by around 30% for freight transport between 1995 and 2008 (UBA 2011, p.10).Germany's experience in promoting energy efficiency provides a solid base from which nations such as India could benefit and "leapfrog". Consequently Germany constitutes a competent partner for India in the area of energy efficiency.

To strengthen the cooperation between both countries in the field of sustainable energy supply and use, the German Chancellor Angela Merkel and the Indian Prime Minister Manmohan Singh established the Indo-German Energy Forum (IGEF) during the Hannover Fair in 2006. Within IGEF, the Sub-Group 3 is dealing with "Demand-Side Energy Efficiency and Low Carbon Growth Strategies". In the SUB-Group the Indian Ministry of Power (MOP) and the German Federal Ministry of Economic Affairs and Energy (BMWi), together with the Federal Ministry for the Environment, Nature Conservation, Buildings and Nuclear Safety (BMUB) are working together to put in place a positive environment for enhancing energy efficiency in their respective countries. This is achieved by facilitating a constructive dialogue between decision-makers in government and the private sector in both countries.

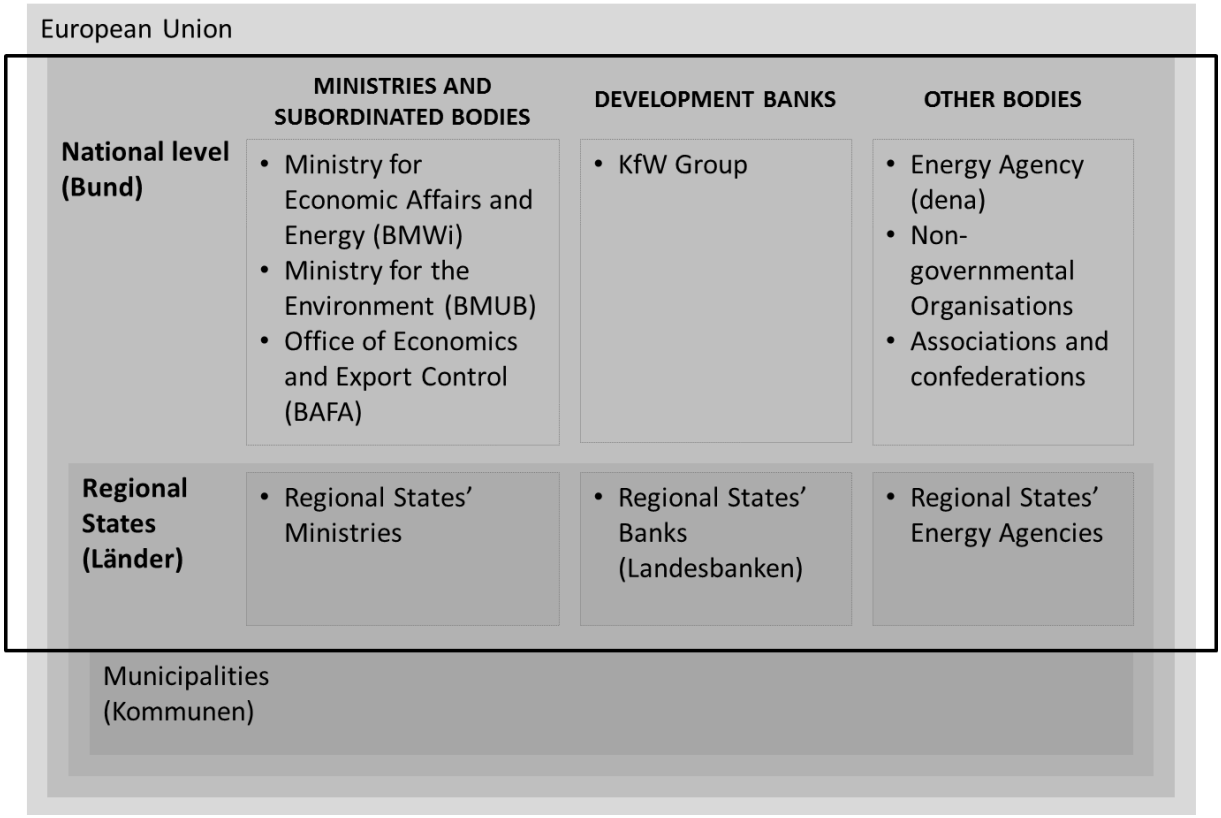
The German and Indian IGEF Sub-Group 3 counterparts identified the common interest for an overview study on existing promotional schemes for demand-side energy efficiency management in Germany. The concept and progress was discussed with the counterparts, in order to achieve the most beneficial results. The approach of the study was presented to the IGEF Support Office by adelphi, and discussed during the Sub-Group meeting on November 13, 2013, in New Delhi. A presentation demonstrating the methodology and preliminary results of the study was held on February 28th, 2014 during a joint workshop on the "Indo-German Partnership on Energy Efficiency" in New Delhi, jointly organised by the IGEF Support Office and KfW Development Bank.

1.2 German promotional system for Energy Efficiency

When looking at promotional programmes for energy efficiency in Germany, one needs to understand the underlying political system first. With Germany being a federal republic, all political processes such as legislation, participation, and also (financial) promotion are being carried out at several organizational levels. The three fundamental ones are the federal government ("Bund"), the regional states ("Länder") and the municipalities ("Kommunen"). Above all these stands the European Union (EU), whose legislation has to be translated into federal law and all subsequent legislation.

For promotional programmes in the energy sector, it is the national level (federal government) and states which are most relevant. At both levels, several entities such as ministries and their subordinate authorities, development banks, and other bodies are involved in the promotional process. The most important ministries at federal government level are the Federal Ministry for Economic Affairs and Energy (BMWi) and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). While these are primarily concerned with taking decisions on and budgeting for several promotional programmes, the Federal Office of Economics and Export Control (BAFA), a superior federal authority subordinate to the BMWi, is heavily involved with designing and implementing many of the national programmes. So is the Kreditanstalt für Wiederaufbau (KfW Group), a state owned development bank. Other relevant bodies at national level are diverse non-governmental organisations (NGOs), associations and confederations. Since 2000 a central German Energy Agency (dena) has existed .Promotional programmes from federal government level can be applied for by a variety of entities such as private persons, companies and also municipalities.

Figure 1: Promotional system for energy efficiency in Germany



Source: Authors

Bound by national law, but still largely independent, are the 16 regional states of Germany. They specify national legislation in their state legislation and have their own budgets to administer. Thus their governments and respective ministries define their own promotional programmes for energy efficiency.

The regional states also have their own implementing bodies, which include the state banks (Landesbanken). As is the case for national promotional programmes, various entities from private persons to companies and also municipalities can apply. The states, as well as some regions within the states, have their own energy agencies which are being supported by federal government money.

The municipalities are autonomous by law; also, due to their restrictive budgets, they have very few of their own promotional programmes. Municipalities are more often recipients of EE promotional programmes and apply for state and federal state level programmes.

Promotion from different political levels is in part exclusive. Often though, programmes can complement each other. Therefore state, federal state and municipal levels interlink and form a complex multi-level promotional environment.

1.3 Overall aim and objectives

The overview study has two objectives. The first objective is to identify and present the landscape of German (financial) promotional schemes for energy efficiency. The second objective is to examine the impact and performance of these schemes in Germany and to briefly give an indication of the relevance of the respective interventions for India.

As the overview study is designed as a meta-study relying on existing data - mainly from evaluation reports of individual programmes – the aim of the authors is not to (re-)evaluate existing German schemes. Instead, the main feature of the study is to apply a standardised approach to make a comparison of the impact of different German schemes.

The study examines and presents existing promotional schemes and incentives that increase the dissemination of energy efficiency measures on two levels, the federal government and the state level. By presenting existing schemes in Germany and evaluating their impact and performance, the study serves the overall aim of supporting the identification of potential future areas of closer cooperation between the two nations.

1.4 Scope of Study

Many studies and reports have been published over the last decade evaluating various promotional programmes for renewable energies and energy efficiency. However, many of the studies evaluate individual or a set of interventions without comparing their impact with other similar policies in an objective manner. So far no study has yet examined the entire German policy landscape in terms of promotional programmes for improved energy efficiency. This study closes the gap and provides an overview and analysis of all such major promotional schemes on enhanced energy efficiency and the integration of renewable energies with energy efficiency in Germany.

According to the terminology used in this study, all existing programmes in Germany providing financial incentives to energy user groups for saving and reducing their energy consumption (through interest rate subsidised loans – so called ‘soft’ loans – grants, tax reductions etc.) are considered as promotional programmes. This includes ongoing governmental and important non-governmental promotional programmes. Following this terminology and approach, conventional regulatory instruments such as codes and standards are not included as they do not (positively) promote energy efficiency but rather dictate measures to be pursued or omitted. Although the study focuses on promotional programmes, the pivotal German instruments providing non-monetary incentives through the provision of information are also partially covered by this study. The latter may also serve as best practice examples on how energy efficiency can be promoted in a non-financial manner. As impact assessments of information campaigns and awareness raising programmes are rare, difficult to create and depend to a high degree on estimations, the information programmes covered in this study are not assessed as to their impact and performance. However, short descriptions of the most important information instruments are provided.

Figure 2: The three pillars of German energy efficiency policy

The focus of the study is on industry and the building sector. Since these are the most energy intensive sectors in India they have the greatest potential for energy savings.

1.5 Content of Study

The study is structured into five parts. This first chapter introduces the reader to the aim and scope of the study.

The second chapter briefly describes the methodology and approach applied in the study. A more detailed methodology description can be found in the Annex.

Following the methodology, the results of the assessment of the German promotional schemes are presented in chapter three. Each of the promotional mechanisms is described briefly and the results of the impact assessment are presented. Furthermore, the relevance of each promotional mechanism for the Indian context is discussed briefly. Thereby factors such as the existing policy landscape, the potential for energy efficiency and the pertaining framework conditions (technological advancement and labour qualifications) are considered.

In addition to the financial incentive schemes, section four presents the most important information and awareness raising programmes in Germany.

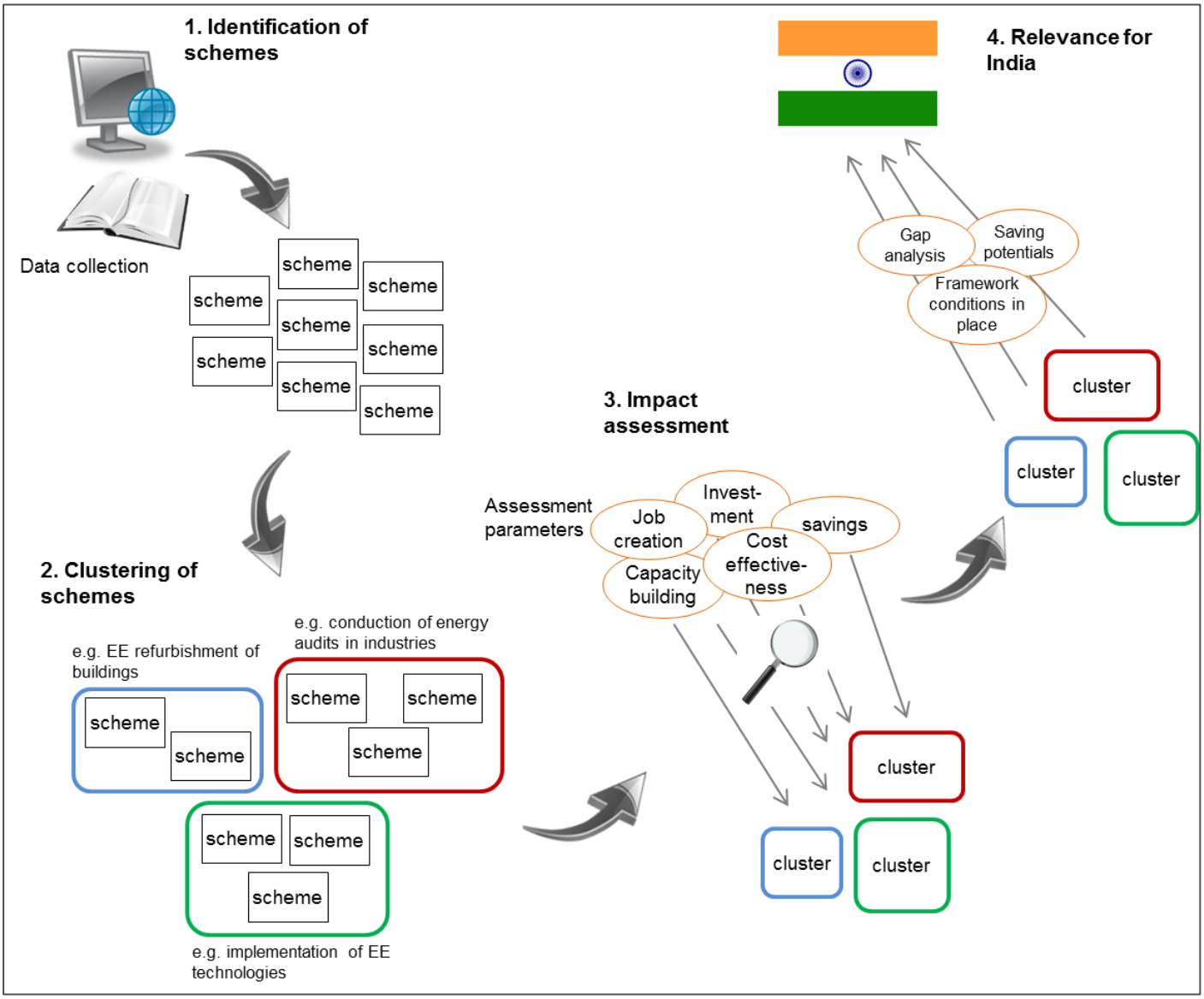
The fifth and last chapter summarises the findings of the study.

The annex provides a full list of all promotional programmes for energy efficiency identified in Germany as well as further information on the assessment process.

2 Methodological Approach

The following chapter gives a brief overview of the methodology applied. A more detailed description of the methodology can be found in Annex 1. Illustrating the approach, the overview figure below presents the methodology and workflow used for this study.

Figure 3: Methodology applied for the study



Identification of schemes

The identification of the German promotional schemes and the collection of the relevant information on those schemes were done via a desk study. Overall 150 promotional programmes at national and state level for energy efficiency implemented and offered by different governmental and non-governmental bodies were identified. All programmes identified are listed in Annex 2.

Clustering of schemes

Given the large number of promotional programmes identified, in many cases very similar, clusters were formed in a second stage. Programmes with the same or a similar promotional mechanism were grouped together into the same cluster. For example all programmes promoting the construction of

energy efficient buildings - either by loans or grants - at national or state level were consolidated into one cluster. The resulting clusters are presented in the table below.

Table 1: List of identified clusters of financial promotional programmes

	Cluster name	No. of schemes in cluster
1.	Construction of energy efficient buildings	10
2.	Energy efficient refurbishment of buildings	37
3.	Planning /supervision of energy efficient refurbishment	7
4.	Implementation of energy efficient technologies / measures	28
5.	Establishment of monitoring / measurement systems	4
6.	Conduction of energy audits in buildings	11
7.	Conduction of energy audits in industries	5
8.	(Long-term) energy coaching / consulting	2
9.	Conduction of EE training	5
10.	Networking platforms for companies exchanging ideas on energy efficiency	2
11.	Implementation of energy management systems in industries	7
12.	Implementation of management systems for achieving and evaluating climate and energy targets for municipalities	1
13.	Development of climate / energy concepts in municipalities	4
14.	Employment of an energy manager in public entities	3
15.	Foundation of regional energy agencies	2
16.	Financial incentives for schools to save energy	1
17.	Installation of load management systems	1
18.	Companies shutting down heavy loads in peak load times	1
19.	Installation of energy storage systems	4
20.	Installation of cogeneration of heat and power	10
21.	Implementation of heating / cooling network solutions	4

Impact assessment

To determine the success and impact of the promotional programmes in Germany, a set of eight parameters was developed to evaluate the schemes. Objective criteria, i.e. values and corresponding definitions, were defined to measure the achievement of the programmes on each of the parameters. The criteria were determined in such a way that the analysed programmes were able to score one to three plusses (+) for each of the eight parameters. All the clusters were then systematically analysed using the defined set of parameters. For clusters consisting of several programmes with the same promotional mechanism, the most relevant scheme in Germany was chosen as a representative programme and analysed.

The table below presents the parameter used to assess the schemes as well as the operationalisation and the criteria defined for the evaluation of each parameter. A more in depth description of the parameters is given in Annex 1.

Table 2: Assessment parameters applied for impact assessment of promotional programmes

Parameter	Direct vs. indirect savings	Cost effectiveness of savings	Stimulation of investment	Job creation	Dependency on technologies	Continuity of energy savings	Capacity building	Market penetration
Definition of parameter	Energy Savings generated directly or indirectly from programme	Energy savings (direct or indirect) per unit (€) of fund provided	Stimulated investment (in technologies or services) per unit (€) of fund provided	Extent of new jobs created through programme	Dependency of the programme on particular technologies	Period over which energy savings are generated	Number of stakeholder groups which benefit from capacity building	Share of eligible stakeholders participating in programme per year
+++	direct & indirect energy savings	more than 10 kWh / €	> 10 € (investment) / € (fund)	high labour intensity	not dependent on any technology	long-term period (> 10 years)	capacity building of several stakeholder groups	more than 10% of eligible stakeholders use programme
++	direct energy savings	1-10 kWh / €	2-10 € (investment) / € (fund)	low labour and technology intensity **or** high technology intensity	required technologies are well substitutable	medium-term period (2-10 years)	capacity building of two stakeholder groups	1-10% of eligible stakeholders use programme
+	indirect energy savings	0-1 kWh / €	1-2 € (investment) / € (fund)	low labour or low technology intensity	dependent on particular technology	once-only or very short-term period (< 2 years)	capacity building of one stakeholder group	less than 1% of eligible stakeholders use programme

Relevance of promotional mechanism to India

Subsequent to the impact assessment, each programme was assessed according to its relevance for India in a qualitative, descriptive and indicative manner. Whether there is a gap to be filled in India was examined (do similar promotional programmes already exist in India) and whether the cluster addresses a relevant area of energy efficiency with high saving potentials. Additionally, whether or not the major framework conditions required for the replication for the schemes are in place was examined (e.g. capacities and expertise with required human resources, technologies available etc.).

3 Assessment of Financial Promotional Mechanisms

As mentioned above, one representative scheme for each cluster was evaluated[1] according to the assessment parameters determined. The following chapter provides the results of the analysis of the 21 promotional clusters that were identified.

3.1 Construction of energy efficient buildings

Description of cluster

The cluster "construction of energy efficient buildings" comprises ten programmes. Half of the programmes address the construction of residential buildings, the remaining target other building types, such as commercial and municipal buildings. Some programmes have further restrictions on the specific eligible target group, such as families and elderly people. The promotional mechanism applied is mainly the provision of low-interest loans; in some cases (additionally) a grant is provided. The programmes that focus exclusively on promoting the construction of energy efficient buildings are funded by KfW. They are implemented through the state banks at national level and state level. The other programmes in the cluster do not just promote the construction of EE buildings, but also promote other energy efficiency measures (mostly in the industrial sector).

Impact assessment of programme analysed

The *KfW Energy Efficient Construction Programme*[2] is the most common and best-known programme in the cluster and is taken as an example for the evaluation. It was established under the name *Ecologic Construction Programme* in 2006 and subsequently renamed as the programme focuses on the financing of energy efficiency elements. The *Energy Efficient Construction Programme* provides low interest, long-term loans and grants for the construction of residential buildings achieving the *KfW Efficiency House Standard*. *KfW Efficiency House Standards* are based on and go significantly beyond the National Building Codes (BMWi, 2014).

The KfW programme creates direct energy savings, because the measures financed are directly incorporated into the new buildings (++).In terms of cost-effectiveness, energy savings per Euro of fund invested can only be estimated, since data available on invested public funds is combined for both KfW programmes, *Energy Efficient Construction* and *Energy Efficient Refurbishment*(see 3.2). In 2012, the two programmes jointly achieved energy savings of approximately 2,623 GWh, whereas public funds of about € 1,420 million were used to provide the financial incentives to the building owners (Diefenbach et al; 2013)[3]. Thereby the cost-effectiveness is of a medium level, with a ratio of 1.85 kWh savings per Euro fund (++). The continuity of the savings is likely to be high with a building's life cycle being around 50years[4] (+++).

Stimulation of investment is high too: As mentioned above, funds of € 1,420 million were spent for the two KfW programmes in 2012. **Leveraged investment amounted to € 21,555 million** for *Energy Efficient Construction* and **€ 5,405 million** for *Energy Efficient Refurbishment* (Diefenbach et al., 2013), resulting in a combined ratio of € 19 investment per Euro for both programmes (+++). As re-

[1] Whenever evaluation reports or other publicly available documents were used to gather the data for the assessment, sources are provided in the text. If no sources are provided, the information was directly obtained from the project implementers, in most cases through telephone interviews.

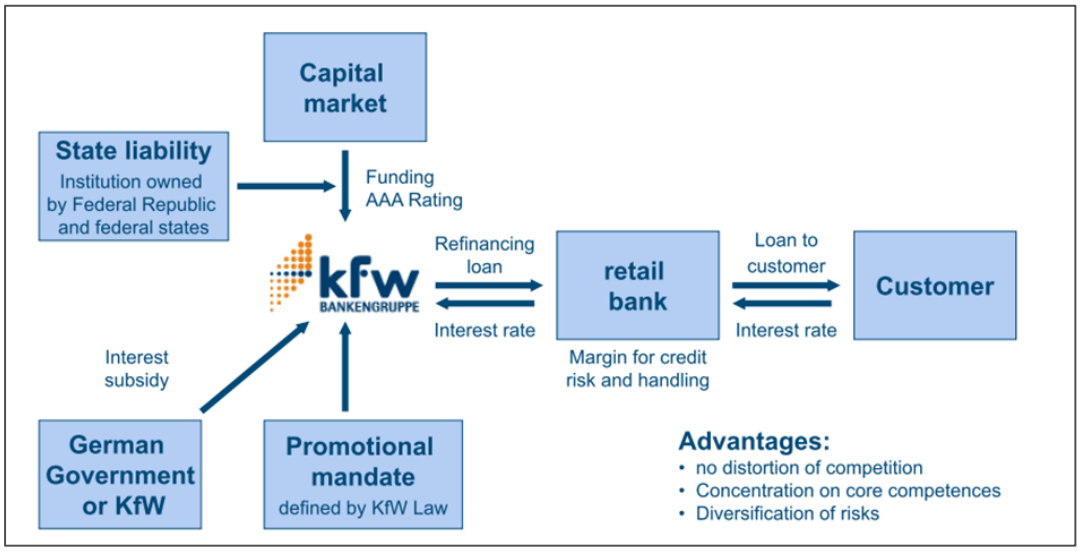
[2]For more information: in English: Energy Efficient Construction ; in German (contains more information): Energieeffizientes Bauen

[3] Energy savings per year are given since most literature only provides date on yearly savings. The authors are aware that life cycle savings might be a more applicable and relevant information but since life cycles differ from one programme to another yearly savings are more comparable.

[4] §7 (4) EStG assumes the average useful life of residential buildings whose construction was finished after 1924 to be 50 years

gards job creation, the programme does not create additional labour for constructing EE buildings in comparison with the baseline scenario of a less energy efficient building which necessitates employing developers, architects and engineers. Nevertheless, additional jobs are created due to the production and development of new EE technologies for the building sector (++).

Figure 4: Loan process for KfW Energy Efficient Construction and Refurbishment Programmes



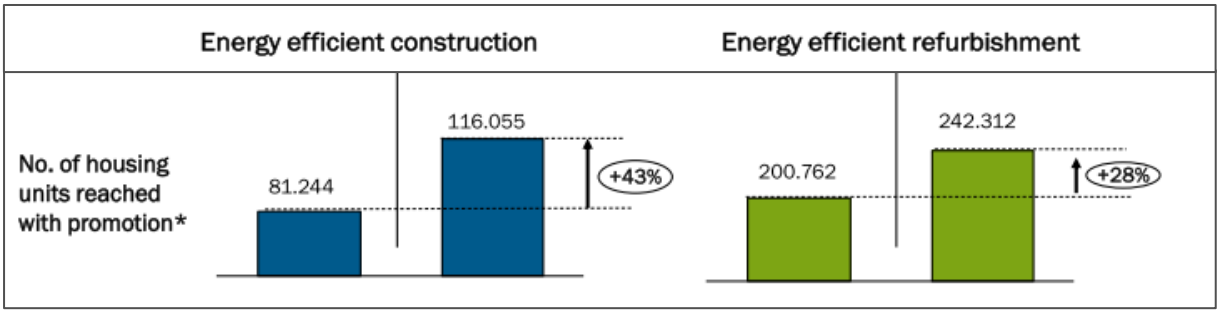
Source: Gumb & Hennes 2012

The programme type depends to a certain degree on the availability of specific EE technology. Notably, if high energy savings are envisaged, particular technologies need to be available (state of the art insulation, EE windows, heating systems etc.).However, in general the EE technologies applied can be selected from a wide variety of different options and are interchangeable (++). Capacity building occurs for many stakeholder groups involved such as investors, developers and architects, engineers and construction workers (+++). The programme shows a very high rate of market penetration in Germany: More than **66,000 applications were approved in 2012** for around 115,000 housing units. Thus the **programme was used in more than 55% of all newly built residential buildings** in 2012 (+++).

Table 3.1: Assessment results for the financial promotion of constructing energy efficient buildings

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	++	+++	++	++	+++	+++	+++

Figure 5: Loan commitment for energy efficient construction and refurbishment for 2011 and 2012



Source: Dorendorf 2013

Relevance for India

Energy consumption in the (residential building) sector is steadily increasing in India and the demand for energy intensive appliances (particularly ACs) is growing dramatically. Furthermore, it is estimated that around 70 to 80 percent of Indian construction by 2030 is yet to be built (McKinsey Global Institute 2010). And so the residential buildings sector is of increasing importance in India's efforts to save energy. There is however still no dedicated scheme providing financial support in the form of loans or grants to building/apartment owners for the construction of energy efficient buildings in India. Some local authorities (e.g. The Pimpri Chinchwad Municipal Corporation (PCMC)) provide or are planning to provide concessions on property tax for green buildings. Besides the small impact of such activities - due to the limited outreach of single municipalities - these incentives cannot solely be linked to energy savings, but rather to the overall environmental benefit of buildings. Another relevant activity by India in addressing the construction of energy efficient buildings through financial instruments is the *Energy Efficient Homes Programme* implemented by the National Housing Bank of India (NHB) and supported by the German Government through KfW Development Bank. The programme provides concessions to banks and housing finance companies for the refinancing of their loans in certified energy efficient housing developments. Even though the programme is trying to transfer Germany's experiences to the Indian market, this still does not answer the question of how the concessions could be passed through to the final home loan borrowers in the certified buildings. Nevertheless, the *Energy Efficient Homes Programme* could serve as a starting point for a larger scale financial promotion scheme in India. Furthermore, the *Energy Efficient Homes Programme* has started to shape the required framework for such a broad promotional programme for EE construction. In the context of the programme stakeholders such as architects, developers and bankers have been trained on energy efficiency issues in the residential building sector and a general awareness on this topic has been fostered. Initial pilot projects have been implemented and the technology for energy efficiency in residential buildings is widely available in India. Overall the relevance of such programmes for India is considered to be very high, and the framework conditions required for financial promotional programmes do exist in India.

3.2 Energy efficient refurbishment of buildings

Description of cluster

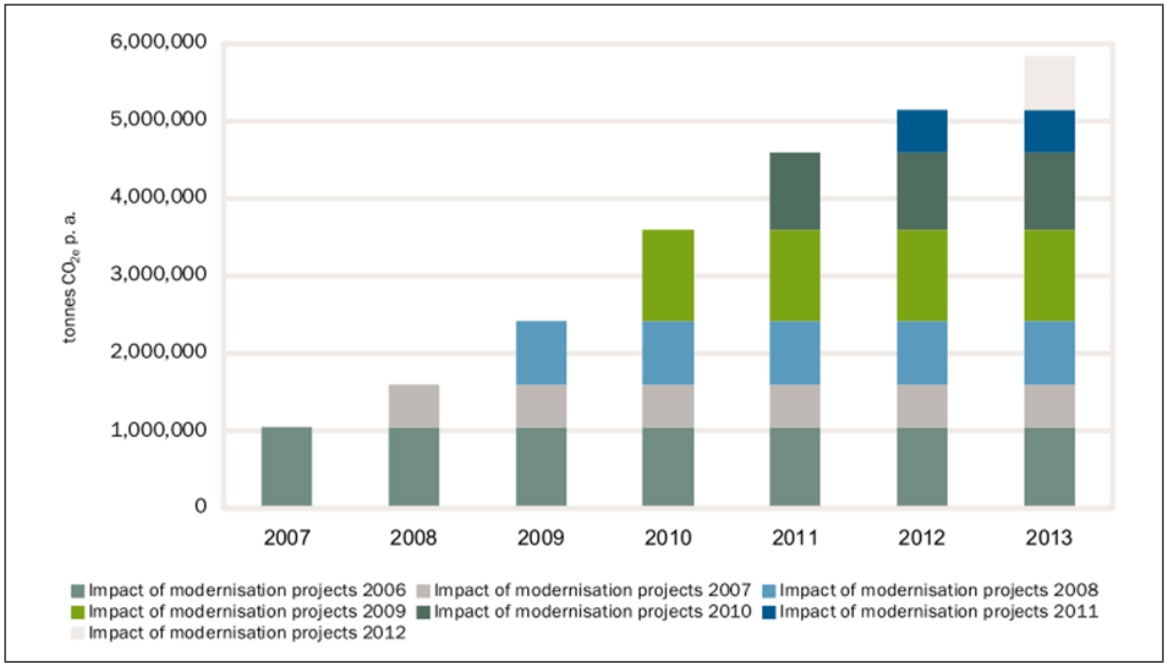
The energy-related refurbishment of buildings is actively promoted by 37 promotional schemes in Germany. Therefore it is the most widespread promotional mechanism for demand-side energy efficiency management in Germany. The main funding body behind the programmes is the KfW, but the programmes are also implemented by the state-level banks in all of the German states, which in some cases add an extra incentive to the promotional scheme offered by KfW. The eligible stakeholders for these programmes include corporate clients, municipalities, public entities, private individuals and also associations. The promotional incentives offered in this cluster are low-interest loans and grants.

Impact assessment of programme analysed

The national *Energy Efficient Refurbishment Programme*[5] by KfW is the "mother" of the EE refurbishment programmes in Germany and offers low-interest, long-term loans combined with repayment subsidies for renovation measures in existing residential buildings. It continues the efforts of the previous *CO_2-Building-Modernisation Programme (CO_2-Gebäudesanierungsprogramm)* which became an element of the *National Climate Protection Programme* in 2001. However KfW has been financing energy efficiency and emission reduction programmes for buildings since 1990 (Clausnitzer et al., 2007). Promotional loans are available for single measures and for comprehensive refurbishment to reach the certified *KfW Efficiency House Standard*. Depending on the level of the *KfW Efficiency House Standard* achieved, a repayment subsidy is provided of up to 17.5% of the loan amount. Whilst the main programme focuses on buildings that are used for residential purposes, there are just a few extensions of the programme, for instance for public buildings and historic landmarks.

[5]For more information: in English: Energy Efficient Refurbishment; in German Energieeffizient Sanieren

Figure 6: Accumulated CO_2 reduction from 2006 to 2012 (tonnes p.a.)



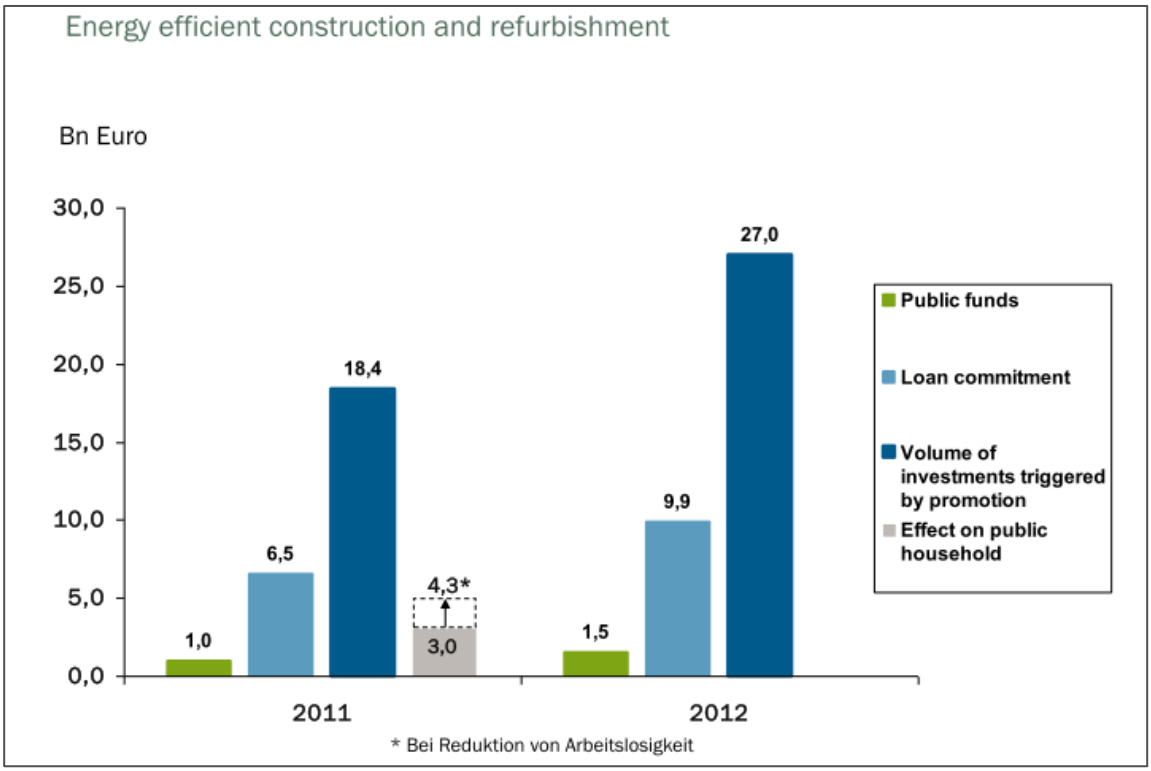
Source: KfW 2013b

The KfW programme generates direct energy savings by promoting measures which lead directly to reduced energy consumption in the buildings (++). As mentioned above, data on energy savings exists for both the KfW *EE Refurbishment and EE Construction Programme* as a whole. In 2012 savings of 2,623 GWh were achieved for both programmes while **€ 1,420 million of public funds was spent** (for both programmes as well). The resulting combined cost-effectiveness ratio for both programmes is thus 1.85 kWh per Euro fund invested (++).The continuity of energy savings is a long-term process because EE measures in buildings are assumed to last for more than 30 years (+++).With € 1,420 million of funds and an overall investment volume of about € 27,060 million in 2012 for both programmes (Diefenbach et al., 2013), an **investment ratio of € 19 per Euro fund invested** is calculated (+++). Technologies or materials needed for energy-related refurbishment (insulation material, windows, etc.) are available from many vendors and are generally easily substitutable, thereby lowering the dependency on technologies for this programme (++). The scheme is very labour intensive as architects, engineers, building developers and craftsmen are required for the modernisation of buildings (+++). Capacity building efforts take place for several stakeholder groups, including the inhabitants of the buildings (end-users), investors as well as the engineers and all those involved in implementing the EE rehabilitation. All stakeholder groups ideally learn and gain from the experience of the architects in terms of energy efficiency measures (+++).So far **242,000 residential units have been refurbished** through this scheme (Diefenbach et al., 2013) and nearly **50% of all refurbished buildings** in 2012 in Germany have made use of the programme (+++).

Table 3.2: Assessment results for the financial promotion of energy efficient refurbishment of buildings

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	++	+++	+++	++	+++	+++	+++

Figure 7: Leverage effect on private investments



Source: Dorendorf 2013

Relevance for India

At present there is no promotional programme in India which directly encourages EE refurbishment in buildings. The main reason for this is that most of the building stock in India is either new or yet to be constructed (as mentioned above around 60-70% of the building stock in India is still to be constructed by the year 2030). According to a report India will add 700 million to 900 million square meters of residential and commercial space annually by 2030 (Hendricks, Ogden and Bovarnick, 2014).

Nevertheless, even though the efficiency of India's building stock will mainly be determined by the buildings yet to be constructed, inefficiencies in the existing building stock result in major energy losses due to the current levels of energy consumption in the building sector which already comprises around 33% of India's total energy consumption (Rajan Rawal et al, 2012).Therefore a promotional EE refurbishment programme, particularly promoting easy to implement technological measures, such as EE glazing, is considered relevant for the Indian (residential) building sector in particular.

3.3 Planning / supervision of energy efficient refurbishment

Description of cluster

This cluster covers the financial promotion of the planning and supervision of energy efficient modernisation and refurbishment programmes. Eight programmes of this type currently exist in Germany, half of them targeting the residential building sector. The other four programmes address commercial buildings, the industry or do not specify a target group. Most of the programmes offer grants, with a large majority of these implemented at federal state level. The programmes provided at national level are funded by KfW, whilst the ones at state level are funded by the federal state's development banks (Landesbanken) such as Hamburg Investment Bank (IFB HH), Landesförderinstitut Mecklenburg-Vorpommern (LFI) or Investment Bank Lower-Saxony (NBank).

Impact assessment of programme analysed

The KfW programme *Energy Efficient Refurbishment – Construction Monitoring*[6] was evaluated for this cluster. It is only available in combination with the main *Energy Efficient Refurbishment Programme* (see 3.2) and has been supplementing the programme since 2013 (KfW, 2014a). The promotional scheme for construction monitoring provides grants to cover the additional costs for professional planning, and in particular the supervision and final verification of the implementation of the energy efficiency measures in the refurbishment process. The aim of the programme is to increase the energy efficiency provisions to a maximum level, by supporting the best possible independent monitoring and quality control through the engagement of third party energy experts.

Energy savings resulting of the programme are indirect, because services rather than any direct measures are promoted (+). The programme aims to increase the effectiveness of the funding within the *Energy Efficient Refurbishment* programme. In 2013 **6,566 applications** for construction monitoring were received and **funds of € 13 million** were provided. However, there is *no data* available on the additional energy savings resulting just from the monitoring component. As the programme concerns energy efficiency in buildings, additional savings are expected to be sustained over a long-term period (+++). The € 13 million of funds disbursed leveraged an investment volume to the tune of € 27 million (mainly the investments for the charges for the external auditor) - a ratio of € 2 investment per Euro of funding provided (+).The programme is labour intensive because new jobs are created for architects and auditors, both of whom are needed to monitor the construction process (+++).From a technological risk point of view the programme can easily be implemented in other contexts because it is not dependent on any specific technology (+++). Capacity building effects due to the programme are significant: architects, engineers and residents benefit from the knowledge the external supervisors contribute to the rehabilitation process (+++).The construction monitoring was **applied by approximately 10% of the KfW loans** in 2012. The scheme therefore has medium market penetration (++).

Table 3.3: Assessment results for the financial promotion of planning/supervision of energy efficient refurbishment

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	+	+++	+++	+++	+++	++

Relevance for India

There are no programmes in India that particularly promote the supervision of energy efficient rehabilitation processes. Even though some programmes in India financially promote energy efficient rehabilitation and refurbishment in several fields (e.g. EE modernisation in SMEs), no dedicated funds are known to the authors to be available particularly for the (third party) supervision of these measures in buildings.

However, it can be clearly seen that EE rehabilitation and modernisation is gaining momentum in India. Presently the focus is on commercial industries, but a large potential exists for penetration in other sectors, such as the residential building sector. Since the additional impact of such extra and external supervision of EE rehabilitation is not being explored in-depth, such promotional scheme for external supervision of EE rehabilitation seems to be less relevant for India at the moment.

[6] For more information (in German only): Energieeffizient Sanieren – Baubegleitung

3.4 Implementation of energy efficient technologies / measures

Description of cluster

The cluster iImplementation of energy efficient technologies / measures" is the second largest cluster with 28 programmes in Germany. The state and also the national level programmes in the cluster generally promote the implementation of different technologies and measures that enhance energy efficiency. The programmes jointly finance a broad range of cross-cutting EE measures in a certain sector (e.g. production equipment for SME) or in a specific region (e.g. state-level, municipality), or for a certain energy usage purpose (e.g. heating). The promotional mechanisms consist of loans and grants that are provided at state level by the federal states or state banks and at national level by KfW, the Environment Ministry, the Ministry of Economics and Technology and the BAFA. Whilst most of the programmes target the implementation of EE technologies in industrial and commercial enterprises, others also offer funds to municipalities, public facilities and municipal associations.

Impact assessment of programme analysed

For this cluster, the *Investment grant programme for the application of highly efficient cross-cutting technologies in SMEs*[7] provided by the BAFA since the end of 2012 (BAFA, 2012) was evaluated. The scheme promotes stand-alone measures such as the replacement of cross-sectional equipment and machinery with more efficient ones including pumps, electrical motors, ventilation systems, air pressure systems, heat recovery systems and lighting systems.

The programme results in direct energy savings through the implementation of new technologies and the replacement of older ones, with the former continuing over the life cycle of the technology which is usually medium-term (++). In 2013 about 1,000 applications were granted and € 9.5 million were provided as subsidies (BAFA, 2013). According to a study by Prognos (2012), over the same period of time around **194 GWh of energy was saved** due to the implementation of the programme. Thus the cost-effectiveness of this scheme is high with **20.42 kWh saved per Euro of fund provided** (+++). The measures implemented are subsidised with grants of 30% of the investment costs for SMEs and 20% for big enterprises. Assuming an even share of 50% of the funds was disbursed to SMEs and the other 50% to non SMEs, an overall **investment of around € 38 million was leveraged** (BMWi, 2014). Thus the resulting ratio for stimulation of investment is € 4 per Euro fund provided (++). No direct capacity buildings effects have been undertaken by the scheme and job creation is medium (++). Some jobs are generated for installing the measures promoted whilst more labour is required for manufacturing the EE technologies. Since the scheme promotes a large variety of different technologies and measures that are mostly substitutable, the technological dependency is expected to be medium (++). With 1,000 applications in 2013 compared to the estimated total number of SMEs of 3.7 million in 2013 (IfM 2011), the market penetration is fairly low (significantly less than 1%: +). However, we should bear in mind that the large number of promotional schemes in this field generally leads to lower market penetration for each of the schemes.

Table 3.4: Assessment results for the financial promotion of implementing energy efficient technologies/measures

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	+++	++	++	++	++	none	+

[7]For more information: iepd.iipnetwork.org or in German: www.bafa.de

Relevance for India

There are several programmes in India which promote a wide range of EE technologies and provide the necessary financial support. Whereas some programmes focus on a very specific technology type (e.g. cooking stoves), several promote a wide spectrum of energy-efficient technologies implemented in various sectors (e.g. energy-efficient production equipment in industry). Generally, the programmes address industries (particularly SMEs), municipalities and individual households. Some programmes, such as the World Bank-GEF's EE and RE in MSMEs, MNRE- RE, BEE-super-efficient fans etc., are grant or subsidy-based, whereas some others provide soft loans or tax rebates (e.g. SIDBI EE programmes supported by KfW Development Bank, JICA, French Development Agency (AFD), and DFID). All these programmes are implemented at national level through various state agencies or development banks such as SIDBI and IREDA. The fact that a number of such programmes exist in India indicates a high relevance of broadly targeted financial promotional programmes for EE technologies / equipment for several sectors and applications. However, it is advisable to examine the potential for additional cross-cutting programmes, in order to fully tap into energy efficiency potentials in energy intensive sectors, particularly the industrial sector.

3.5 Establishment of monitoring / measurement systems

Description of cluster

The cluster "establishment of monitoring / measurement systems" is comprised of four similar schemes in Germany. The programmes promote the installation of energy monitoring and measurement systems through loans and grants in public entities, municipal associations, industries (particularly SMEs) and public buildings. However, we should note that the establishment of controlling and metering systems is only one of several components of each of the four programmes. There is no programme that solely promotes the establishment of controlling and metering systems. Two of the programmes are funded and implemented by KfW, one by BAFA and the fourth one by the Federal state of North Rhine-Westphalia.

Impact assessment of programme analysed

The BAFA programme[8] was chosen for the analysis since it promotes the implementation of energy management systems. Monitoring and measurement systems are types of measures that are subsidised under the programme. The financial support in the form of a grant for monitoring and measurement technology is provided to the industrial sector: up to 20% of the costs for the metering equipment with an upper limit of € 8,000. The technologies funded need to be used appropriately for at least three years.

Energy savings gained from the installation of a monitoring or measurement system are indirect in nature since the system does not directly lower consumption or save energy as a stand-alone measure (+). As the mechanism is only a component of a wider programme, there is no specific data available on the actual savings achieved or on the amount of funds invested for such purpose. Nevertheless, approximately € 1.5 million of funds will be used in 2014. However, this amount is not only going to be used for measurement devices, but also for the other components of the programme. Since investments in metering devices are promoted with a maximum of 20%, at least **€ 5 overall investment is leveraged per Euro of fund invested** (++). The continuity of savings generated by monitoring and measurement systems is expected to occur in the medium term based on the life cycle of such systems (++). The fruits of capacity building efforts can be seen in the industries that adapt their energy consumption behaviour according to the inefficiencies detected as a result of the controlling systems (+). Job creation through this scheme is rather low. In addition the scheme does not require the availability of any particular technology, thus technology intensity is low too. No new jobs are needed for running the system, but some labour is required for installing and programming the software (+). The programme is dependent on specific monitoring and measurement technology that might not be avail-

[8]For more information (in German only): www.bafa.de

able everywhere (+). The programme was initiated in mid-2013, and only 9 applications for funds for monitoring equipment have been received so far. Considering the nationwide target group, the market penetration is very low (+).

Table 3.5: Assessment results for the financial promotion of establishing monitoring/measurement systems

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	++	+	+	++	+	+

Relevance for India

The concept of increased monitoring and measurement of energy consumption has recently gained momentum in India. Nevertheless, there is no programme in India that particularly promotes the installation of such energy monitoring and measurement equipment. Since monitoring and measurement of energy consumption are prerequisites for identifying inefficiencies in energy consumption, a broader use of monitoring/measurement equipment is considered relevant in India. Promoting such equipment financially should ideally be combined with existing promotional schemes for EE in the SMEs/industry sector. These existing schemes may also include monitoring and measurement equipment as an integral part of the scheme, for example, the KfW-SIDBI or JICA-SIDBI lines of credit each have a list of EE measures that are eligible under the line of credit, and so there is an opportunity to add energy monitoring equipment to the list (SIDBI, 2012).

3.6 Conduction of energy audits in buildings

Description of cluster

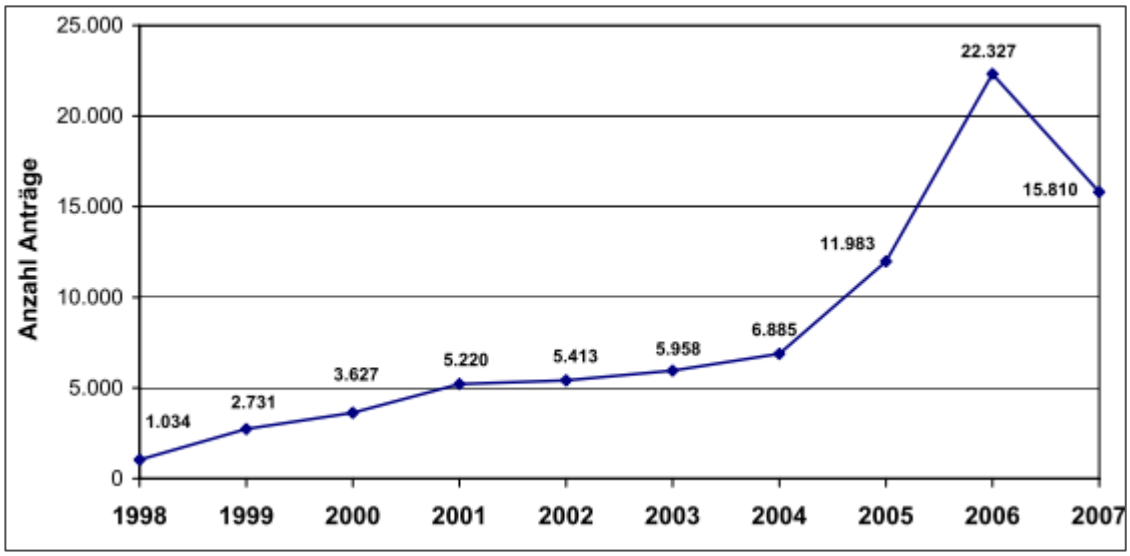
The cluster “conduction of energy audits in buildings” is comprised of eleven similar programmes in Germany, many of which target residential buildings. Commercial, industrial, public and other types of buildings are targeted by a number of programmes too. Some programmes are intended for low-income housing or specific target groups, e.g. associations. About half of the programmes operate at national level, with the others operating at federal state level. They are implemented by very diverse institutions, the majority of which are federal state banks, yet there are also others, for instance the Federation of German Consumer Organisations and the Caritas. In addition to general energy efficiency audits, some programmes pay particular attention to issues such as the use of renewable energy solutions or specific energy consumption areas, such as heating. All programmes provide grants to promote such energy audits.

Impact assessment of programme analysed

The programme analysed is the *Promotion of on-site Energy Audits for Residential Buildings*[9] funded by the Federal Office of Economics and Export Control (BAFA).The scheme has existed since 1998 and over the years no major changes in the programme’s approach have been heard of. But due to its success it has been extended over the years. Audits are conducted on-site and are concluded with a detailed report. Auditors receive a grant of € 400 for both detached and semi-detached houses, and € 500 for apartment houses. The contribution of the house owners or residents has to be at least as high as the grant.

[9]For more information (in German only): www.bafa.de

Figure 8: Development of applications for the BAFA promotional programme "Energy Audits in Buildings"



Source: Duscha et al., 2008

Energy savings are indirect, because the programme does not finance any technologies (+). The last in-depth evaluation of savings took place in 2005 when 12,000 audits were conducted. Energy savings of 5,300 kWh per year in detached and semi-detached houses and 8,800 kWh per year in apartment houses can be traced back to these audits, resulting in a **total of 77,700 MWh of energy savings per year**. As of 2005, funds of **€ 3.5 million were invested** with a high cost-effectiveness of **22.2 kWh saved per Euro fund invested**(+++).As it is difficult to estimate the sustainability of savings made through behavioural change, the latter being strongly dependent on the context, the continuity of the energy savings resulting from behavioural changes has not been assessed. However, savings resulting from the implementation of concrete technological measures (insulation, windows, HVAC etc.) in the building context are retained for a long period of time (+++). An evaluation report of 2008 showed that € 7,193 investments in technology were triggered per audit (Duscha et al., 2008). In 2013, one audit was promoted with approximately € 500 (maximum 50% of the overall audit costs) (BMWi, 2014). This leads to a ratio of at least **€ 16 overall investment per Euro fund** (+++). As audits are labour intensive the scheme promotes the creation of new jobs such as auditors and consultants (+++). The scheme is not dependent on technologies, thereby minimising the risks of implementing it in other countries (+++). Capacity building takes place for the residents of the buildings that are audited, since part of the audits includes recommendations from the auditors on behavioural changes (+). With 12,000 applications in 2013, only 0.03% of all housing units in Germany (41 million) used the programme. The number of participants went down from previous years possibly because of higher shares of self-payments required from the residents (+).

Table 3.6: Assessment results for the financial promotion of conducting energy audits in buildings

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	+++	+++	+++	+++	+++	+	+

Relevance for India

As mentioned above, increased EE in buildings is very important for India, as around 33% of the total energy in India is consumed by the building sector (Rawal et al. 2012). Given the rapid urbanisation and the population growth beyond 1.25 billion, it is of utmost importance and a great challenge for the

Indian government to manage energy demand and to ensure an adequate and reliable energy supply. As per the ECO-III energy assessment guide report (USAID, 2009), energy audit studies conducted in several office buildings, public buildings, hospitals and hotels in India indicated an energy savings potential of 20-50% in electricity consuming activities, such as lighting, cooling, ventilation etc. This shows that energy audits in the building sector are particularly relevant for India, since they uncover huge energy saving potentials.

There are a few similar programmes implemented at state level in India similar to those of the cluster "financial promotion of conducting energy audits in buildings". State agency schemes in India include those by the Maharashtra Energy Development Agency (MEDA), the Gujarat Energy Development Agency (GEDA) and the Haryana Energy Development Agency (HAREDA). These programmes are targeted at commercial buildings, public buildings and institutions. For instance, the programme offered by HAREDA of the Haryana state government, provides financial incentives for conducting energy audits in private, governmental, semi-governmental, industrial and commercial buildings. The audits need to be carried out by BEE empowered ESCOs or BEE certified energy auditors. In addition, the implementation of energy efficiency measures resulting from the audit findings is promoted. Under the scheme building owners receive financial assistance of 50% of the costs of an *Investment Grade Energy Audit* with a maximum limit of Rs. 50,000/-, provided that they implement the measure recommended by the audit report (HAREDA, 2010). The state level interventions are a good starting point for the financial promotion of energy audits in the building sector. However, there is a need for wider coverage (more sectors such as school and college buildings and other public entities) of energy audits in buildings at national and also state level in India. There is still huge potential to carry out energy audits in the building sector. Widening the coverage of promotional schemes for energy audits in buildings requires the qualification and also a sufficient number of specialised energy auditors in India. Secondly, there has been a lack of awareness and insufficient information of the energy audit process amongst building owners and residents. A lack of awareness of the importance of energy audits as a useful tool for saving energy in the building sector has also played its part. To sum up, such programmes are considered relevant and it is recommended that the initial efforts in this direction are expanded.

3.7 Conduction of energy audits in industries

Description of cluster

The cluster "conduction of energy audits in industries" includes five programmes that financially support the conduction of energy audits in the industrial sector. The programmes are mainly funded by the federal states and are implemented by federal state banks or, in one case, by a Federal state level ministry. At national level the programmes are implemented by a consulting agency and by the KfW. Three of the five programmes focus on SMEs, while the others focus on the industrial sector as a whole. The financial support is provided through grants in all cases. The schemes generally aim for audits on energy efficiency, and in some cases, set a special focus on renewable energies too.

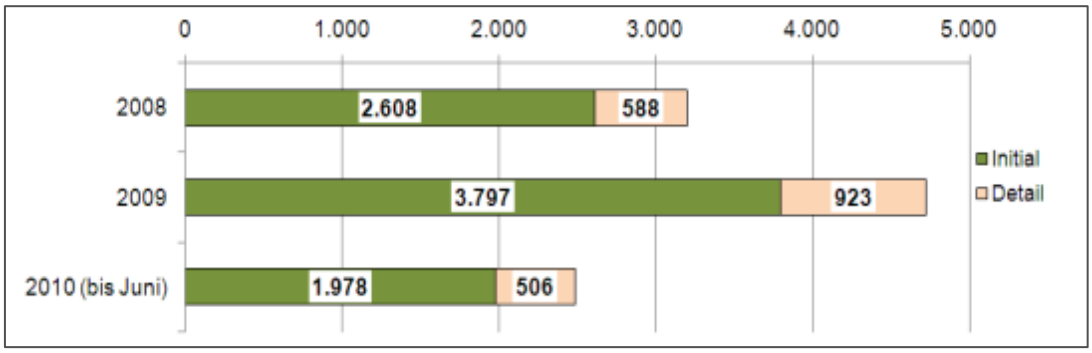
Impact assessment of programme analysed

The programme evaluated is the national promotional scheme for energy audits in SMEs[10] by the KfW. The promotion of energy audits in industries started in 2008 as a sub-scheme of the *KfW Sonderfonds Energieeffizienz*, where it proved effective in accelerating the energy efficiency in SMEs. From 2012, after a positive evaluation, the audits were exclusively promoted by the scheme *KfW Energy Audits for SMEs*. The programme addresses the SMEs with energy costs of at least € 5,000 per year. SMEs with energy costs of less than € 5,000 are not eligible under the programme. The audits promoted comprise an initial consultation in which the status quo is described, deficiencies are identified and measures for energy efficiency are proposed, and followed up by a detailed consultation in which the analysis is expanded and specified. The grants for the audits amount up to 80% of the

[10]For more information: in English: http://www.buildup.eu or in German: www.kfw.de

costs, and a maximum of € 1,280 for the initial consultation and 60% of the costs, and a maximum of € 4,800 for the detailed consultation.

Figure 9: Confirmed application for energy audits in industries for 2008, 2009 and Jan-June2010



Source: Frahm et al. 2010

As only the audits and not the implementation of energy efficiency measures are promoted, savings triggered by the programme are indirect (+). In 2009, a total of 4,720 applications for audits were approved with one audit resulting in an average of 2.8 EE measures. According to an evaluation report on the programme, an average EE measure is estimated to save 68,500 kWh of energy per year (Frahm et al., 2010). Hence the **total amount of energy savings in 2009 is calculated to be 870 GWh**. Grants amounted to € 8.2 million, resulting in a very high cost-effectiveness ratio of **106.09 kWh per Euro funded** (+++) (Frahm et al., 2010). The continuity of energy savings due to behavioural change cannot easily be estimated since the latter is strongly dependent on the context. But the technological changes that occur due to the audits are likely to last for a medium-term period. Technological renewal in the industry is likely to happen every few years and energy savings can be expected to last for this period, over the entire life cycle of the industrial equipment (++).In addition, the programme has very high stimulation of investment. An evaluation report of 2009 showed **annual investments of € 302 million in energy efficiency measures** in addition to **€ 14.9 million invested in personnel costs** for audits. With invested funds of € 8.2 million (Frahm et al., 2010), the resulting ratio is **€ 38.6 investments per Euro of fund provided** (+++). Job creation has also been a positive aspect of the programme because the audits are labour intensive (+++). As the audits depend almost exclusively on human resources and not on technology, the dependency on technology for this scheme is very low (+++). Capacity building effects occur only for one stakeholder group i.e. the industrial staff, since capacities of the energy auditors are a prerequisite and should already exist before the start of the programme (+).The programme has high numbers of applications, but related to the huge numbers of SMEs in Germany (more 3.5 million, including very small enterprises and freelancers), only 0.1% carry out an energy audit every year –a low market penetration (+).

Table 3.7: Assessment result for the financial promotion of conducting energy audits in industries

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	+++	+++	+++	+++	++	+	+

Relevance for India

Energy audits in the industrial sector are usually one of the most important energy conservation measures applied throughout the world as industries are the main energy consumers. As per TERI, the industrial sector consumes about half of the total commercial energy available in India. Out of this, over 70% is consumed by energy-intensive industries such as producers of fertilisers, aluminium, textiles, cement, iron and steel, and paper. Studies revealed that between 15 and 25% of this demand

could be avoided (TERI, 2014). Energy audits are therefore crucial measures for identifying unnecessary energy consumption in industries. Furthermore, the promotion of energy audits through financial incentives has significant impact in raising awareness, focusing the attention of the industry on a higher uptake of cost-effective energy efficiency opportunities.

Programmes in India financed by international donor agencies provide funds for energy audits in specific clusters in India (e.g. World Bank – GEF Project "Financing Energy Efficiency at MSMEs"). Except for the audits implemented in the context of such development programmes, the costs of energy audits in industries in India are borne by the enterprises themselves. The Central government, through the BEE, has conducted studies and also provides support in the form of reports and guidelines to the industries that require mandatory energy audits, the savings potential of that particular sector, targeted machinery and equipment and how an energy audit should be conducted. In addition, the BEE trains and qualifies the energy auditors (through the National Productivity Council), and provides a list of certified auditors/ESCOs eligible to conduct the audits. However, there are some state government agencies in India that provide financial incentives for energy audits in industries or SMEs such as MEDA, HAREDA etc. MEDA for example provides a subsidy of Rs.3000/-per unit (SME) for undertaking a walk-through energy audit. As of March 2011, 312 SMEs were covered under this scheme. In addition, banks and institutions such as the Small Industries Development Bank of India (SIDBI) and the Indian Renewable Energy Development Agency (IREDA) indirectly promote such activities and provide financing for energy efficient equipment and machinery through promotional loans. Overall all necessary preconditions (particularly a sufficient number of well qualified auditors) for widening the implementation of energy audits exist in India. National level programmes that subsidise and promote the undertaking of audits and that could be applicable for all industries can boost this development, and so programmes such as these with financial support in this area are considered highly relevant for India.

3.8 (Long-term) energy coaching / consulting

Description of cluster

Only two programmes are clustered under "(long-term) energy coaching / consulting". Both the programmes provide grants to the industrial sector, to SMEs in particular. The programmes are funded by the investment bank of Sachsen-Anhalt and the European Social Fund. One of the programmes promotes consultation for SMEs in all sorts of environmental resource efficiency issues too. The other is more specific and supports coaching with a focus on electro-mobility, renewable energies and energy efficiency (ESF 2007-2013).

Impact assessment of programme analysed

The programme evaluated is implemented by the State Bank of Baden-Württemberg through the European Social Fund and supports SMEs in Baden-Württemberg[11]. The activity promoted (energy coaching/consulting) goes far beyond the scope of conventional energy audits. The aim of the energy coaching is not only to uncover the potential for energy savings in the production processes of the SMEs, but also to redirect and focus their economic activity towards energy efficiency and to considering energy efficiency as a holistic approach. Up to 50% of the costs of commissioning an external and certified coach are granted. The maximum funding for each of the areas is € 6,000 while the maximum duration is 15 working days, with each day having eight working hours.

The programme fosters capacity building, and so energy savings are indirect (+). Since the programme has only been running for just over a year now, very limited data is available so far. Savings have not yet been quantified, therefore the cost-effectiveness and the stimulation of investment cannot be estimated (no data). Funds of € 204,000 were distributed for 34 coaching units on energy efficiency that are all expected to lead to innovative changes. The period throughout which energy savings occur is estimated as being long because long-term and strategic energy efficiency concepts are a require-

[11]For more information (in German only): www.esf-bw.de

ment of being eligible for funding (+++). Labour intensity of the programme is very high because jobs are generated for energy auditors and energy coaches (+++). As the programme promotes a service – the coaching – and is not dependent on technologies, the dependency on technology of the scheme is low (+++). Capacity building occurs for one stakeholder group - the industrial staff of the participating SME (+). Market penetration and particular reputation is difficult to assess after just one year, but only 47 SMEs in all of Baden-Württemberg have applied so far, constituting a market penetration rate of significantly less than 1%.

Table 3.8: Assessment results for the financial promotion of (long-term) energy coaching/consulting

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	no data	+++	+++	+++	+	+

Relevance for India

There is no programme in India promoting long-term energy coaching or consultation that goes significantly beyond the scope of basic energy audits. However, energy consulting is considered as a relevant field of activity since a huge knowledge gap exists in terms of potential for energy efficiency as well as in the implementation and management capabilities of the enterprises concerned here. At the same time, well qualified experts in energy efficiency are available who can share their experiences in consultation dialogue with companies, provided they are adequately paid for such services. Financial promotional schemes for energy coaching or energy consulting might therefore be relevant to help close this knowledge gap, provided that the demand for such services in India is sufficient.

3.9 Conduction of energy efficiency training

Description of cluster

The programmes in the cluster “conduction of energy efficiency training” subsidise capacity building training and workshops on energy efficiency measures in the industrial and the buildings sector through grants. The five programmes that exist in this cluster are funded both from the national budget, such as the Federal Environment Ministry (BMUB) and the Federal Office for Economics and Export Control (BAFA), and by the state level organisations and ministries. Those eligible for receiving the funds are educational and research facilities, public entities, municipalities and also enterprises and private individuals. Whilst some programmes focus on a particular sector, such as sustainable energy consumption in buildings, others are set up with a wider scope and provide training in the field of energy, climate and environmental protection. Some programmes subsidise the training by up to 100%, while others require a certain portion of the funds to be invested by the interested and/or eligible participants to the programmes.

Impact assessment of programme analysed

The *IMPULS Programme for Qualification*[12] by the Hamburg Investment Bank was analysed. The programme promotes the organisation of training seminars on sustainable building, efficient energy supply and the enhanced application of renewable energies in the building sector. It targets architects, engineers, energy consultants, developers, investors, building owners and teaching staff. Institutions for advanced training in the city of Hamburg are eligible for this scheme. The funds consist of a basic sum of money to be allocated based on the duration of the seminar and the fixed payments per partic-

[12] For more information (in German only): Info brochure by IFBHH

ipant. The programme was launched in 2009, and has been providing such funding since the beginning of 2010 (Behörde für Stadtentwicklung und Umwelt Hamburg, 2009). Upon completion of the first phase of the programme in 2013, the decision was made to extend the scheme for an indefinite period, with funds being provided each year by the Senate of Hamburg.

The energy savings resulting from this scheme are generated indirectly (+).So far however, no explicit assessment of the energy savings has been carried out, therefore the cost-effectiveness cannot be calculated (no data). The same applies to the stimulation of investment, where no data is currently available (no data). Given the great variety of stakeholders which this programme concerns, the capacity building impacts are considered as high (+++). The continuation of the savings is, as for all capacity building measures, difficult to assess. Whilst capacity building that occurs over a longer period of time may be more effective and may achieve positive changes in the participants' behaviour, short-term or one-off capacity building measures such as workshop training courses may not have such long-term impact on the participants – in most cases the participants eventually return to their old habits. Energy savings from one-off training courses are considered to occur moreover in the short-term (+). In terms of job creation, the programme is considered as labour intensive because new jobs are created for experts who conduct such training courses (+++). Because the scheme does not require any specific technologies it is classified as having very low technological dependency (+++).Even though the programme is open to several stakeholders, the market penetration of the programme is fairly low with about 2,500 participants in 2013 (+).

Table 3.9: Assessment results for the financial promotion of conducting energy efficiency trainings

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	no data	+++	+++	+	+++	+

Relevance for India

There are many programmes in India at both national and state level which provide full or partial financial assistance for EE training, aimed at industry (including SMEs), and the building sector. The chief coordinating agency for such activities is the Indian Ministry of Power which operates through the implementing section of the BEE. The BEE coordinates with the state agencies or the development banks, such as IREDA, NHB, SIDBI etc. Many EE training programmes are part of specific international agencies/development bank (World Bank, JICA, GIZ, KFW, USAID, etc.) funded projects. BEE regularly conducts fully/partially funded training programmes throughout the country for energy professionals across various sectors. It organised an international training programme for certified energy auditors/managers in Japan in 2013. Training courses have also been presented to building professionals through the USAID ECO-III project (USAID, 2009). Several training courses on EE in buildings and EE designs are being offered to builders across the country through the NHB-KFW funded EE Homes programmes (NHB, 2013). MSME energy efficiency finance workshops were conducted for bankers across the country in 2013, through a GIZ funded project (GIZ, 2013). However, all of these training courses are conducted on the initiative of government bodies or donor agencies. Currently there is no general fund or programme providing financial support to conduct a wide spectrum of training courses on energy efficiency as a part of an independent initiative, which is eligible for any Indian entity.

Such a programme would provide additional incentives and motivation for research institutes, consultancy firms, and non-governmental organisations to develop and implement such training programmes on EE topics. Consequently this scheme is considered as relevant.

3.10 Networking platforms for companies exchanging ideas on energy efficiency

Description of cluster

The cluster "networking platforms for companies exchanging ideas on energy efficiency" is comprised of two programmes that provide grants for establishing networks and platforms where companies have the chance to exchange ideas on energy efficiency issues. Energy efficiency networks have a long tradition and originate in Switzerland (1980s). The mechanism was transferred to Germany by the *Modell Hohenlohe* (2002), and then turned into a larger promotional scheme in 2009, the *30 Pilot Networks Programme* which promotes local energy efficiency networks (ENAMO, 2012). The programmes are funded by the Ministry of the Environment, Climate Protection and the Energy Sector of the state of Baden-Württemberg and by the German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt), which was founded on the basis of a national law and is one of Europe's largest foundations promoting innovative and exemplary environmental projects.

Impact assessment of programme analysed

The programme analysed is the *30 Pilot Networks Programme*[13], implemented by Learning Energy Efficiency Networks (LEEN) GmbH, a private project implementing body established especially for the Learning Energy Efficiency Networks management system. It promotes the creation of energy efficiency networks, which are guided by experienced energy experts. Each network consists of ten to twelve highly energy intensive companies that jointly develop ways to reduce transaction costs, to overcome barriers and identify innovations leading to more energy efficiency. The participants are preselected and the duration of the project is limited to five years.

The energy efficiency networks are a platform for the exchange of information and capacity building, i.e. the programme only generates energy savings indirectly (+).To estimate the cost-effectiveness of the programme, values were taken from one of the 30 networks that were being evaluated. It led to annual savings of 29,000 MWh for the ten participating companies. Assuming that the funds of € 10 million for all networks were distributed equally, around **878 kWh were saved per Euro of fund provided** (+++). The continuity of the savings caused by behavioural change is difficult to assess since the latter is dependent on the context in which the evaluation is being made. Savings due to technological changes can be expected to last for the medium-term based on the life cycle of industrial equipment (++). To calculate the stimulation on further investment, it is again assumed that € 10 million funds were distributed equally among the 30 networks. An energy efficiency network in Karlsruhe leveraged an amount of € 11,384,800 of investments (Stadt Karlsruhe - Umwelt- und Arbeitsschutz, 2013) – leading to an **investment ratio of € 34.15 invested per Euro of funding provided** (+++). Job creation is moderate for this programme. Energy experts who manage the networks and provide the information are needed. Furthermore, the networks eventually lead to the implementation of an identified technology solution. Thus additional jobs are created in the field of production and manufacturing of energy efficient equipment as well as in assembling these technologies. Overall the job creation impact (experts & technology) is seen as good (++). Capacity building is high for the stakeholder groups of highly energy intensive industries (+). The programme promotes social networking and does not primarily require any technology. The scheme's dependency on technology is therefore fairly low, or in other words the programme is very much independent of the availability of specific technologies (+++). As mentioned above, funding for pilot schemes was available for only a limited number of participants (approximately 360) and only large-sized enterprises were eligible to apply (+).

[13]For more information: leen.de/en/

Table 3.10: Assessment results for the financial promotion of networking platforms for companies exchanging ideas on energy efficiency

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	+++	+++	++	+++	++	+	+

Relevance for India

There is no programme in India that financially promotes the networking activities of companies to exchange ideas on energy efficiency. However, the relevance for such networking as described in the cluster above is considered as very high for India. Just like Germany, India has a significant number of energy intensive companies (identified as "designated consumers" under the Energy Conservation Act (Ministry of Law, Justice and Company Affairs 2001) for the PAT scheme) operating in different sectors. Many have experience in the successful implementation of energy efficiency measures that could be shared in such networks. Currently only limited stimuli are in place for companies to create knowledge exchange networks.

Thus a promotional programme that supports networking among enterprises could be very useful for the energy intensive industries in India to provide incentives for exchanging ideas on how to reduce energy demand and cut emissions. The energy intensive industries (designated consumers) show particular potential for such a network.

3.11 Implementation of energy management systems in industries

Description of cluster

The cluster "implementation of energy management systems in industries" combines seven programmes, implemented at both national and state level. The programmes are funded by the federal states, and at national level by the KfW and the BAFA. The promotional mechanisms mostly include grants, whilst the KfW programme provides low-interest loans. The different programmes are targeted at industrial enterprises (SMEs as well as large-sized enterprises). However, some of the programmes are also aimed at municipalities, municipal bodies, educational facilities and associations.

Impact assessment of programme analysed

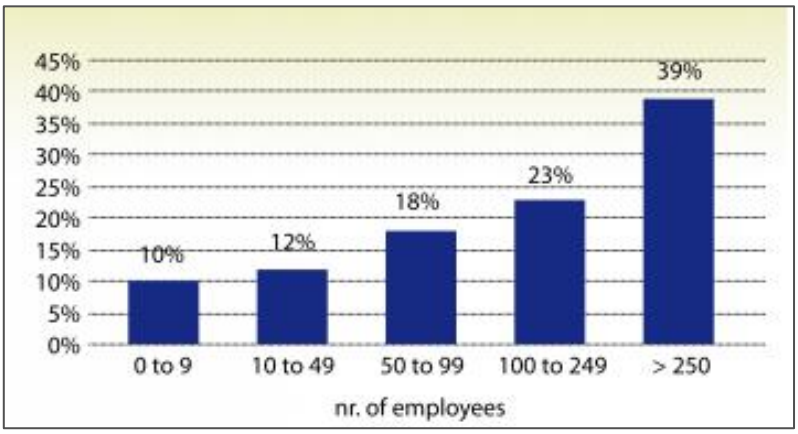
The scheme assessed is the national "*Spitzenausgleich-Effizienzsystem-verordnung (SpaEfV)*"[14] which provides tax exemptions on energy taxes to energy-intensive enterprises which implement energy management systems (EnMS). Enterprises within the manufacturing industry who display evidence of the implementation of an EnMS (for SMEs regular energy audits are sufficient), are eligible to receive such tax refunds against their energy costs. This regulation has become stricter since 2013. Before 2013 the tax benefits were provided to all enterprises exceeding a specific minimum level of energy consumption, independently of any evidence of an EnMS. Since 2013 only enterprises implementing EnMS are eligible for the tax exemptions.

Energy savings through the *SpaEfV* are indirect since only the implementation of EnMS and not the energy saving measures themselves are promoted (+).The refunds for electricity and **energy taxes** for 2011 were estimated to amount **up to € 2,245 million for 96,857 enterprises** (Neuhoff et al., 2013), meaning that each company received on average € 23,179 of tax rebates. As no current data is available, this number is used representatively for the year 2013, even though the amount of tax reductions

[14] For more information (in German only): SpaEfV

is estimated to be higher than the previous years as more industries coming under this scheme were (partially) exempted from energy taxes.

Figure 10: Share of companies implementing EnMS in Europe in relation to size



Source: Change 2013

Documented estimates state that the implementation of EnMS as required by the *SpaEfV* leads to average annual energy savings of 1.3% in manufacturing industries (Prognos 2013). This estimate results in total energy savings of 4.1 PJ or 1,138 GWh per year (Prognos 2013), leading to a cost-effectiveness ratio of 0.51 kWh savings per Euro tax reduction (+). The relatively low ratio shows that the *SpaEfV* is not just primarily an instrument for cost-effectively increasing energy efficiency, but also for strengthening the competitiveness of German industry. However, the energy savings achieved are expected to last over the life cycle of the industrial technologies implemented as a consequence of the establishment of energy management systems (++). There is no data available on stimulated investments (no data). On the other hand, the programme can be expected to generate many jobs, because auditors and energy managers are necessary for setting up and monitoring the EnMS (+++). EnMS generally are not dependent on the availability of any specific or sophisticated technology (+++). Capacity building takes place for the industrial enterprises, since implementing EnMS means that energy-related challenges and the identification of saving potential (+) have to be dealt with. Since the instrument's main focus is to ensure the competiveness of energy intense German industry, with 96,857 enterprises using the tax refunds of the *SpaEfV* the market penetration of the programme is medium given the large number of eligible enterprises in Germany.

Table 3.11: Assessment results for the financial promotion of implementing energy management systems in industries

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	+	no data	+++	+++	++	+	++

Relevance for India

There are no national programmes in India which financially incentivise the adoption of energy management systems in industries. However, a GEF funded project approved in the year 2012 aims to promote energy efficiency by introducing the energy management standard ISO 50001, integrating system optimisation practices in industries and facilitating the formation of technology incubators to catalyse innovation and knowledge transfer for cross-cutting technologies (GEF, 2012). Whilst the GEF project is a first step towards this, there is no general programme in place offering financial support to companies opting for an energy management system. As a result only a few companies in In-

dia have implemented EnMS based on ISO 50001. This is the current scenario in the country, despite all major institutions involved in energy efficiency activities in India (particularly the BEE) recognising the high relevance for implementing an effective Energy Management System (EnMS) to allow organisations in the country to identify, monitor and improve their energy resources, thereby ensuring sustainability. Together with other national and international agencies BEE is already working hard in this area. A promotional programme providing financial incentives for industries to implement an energy management system is thus currently very relevant for India.

3.12 Implementation of management systems for achieving and evaluating climate and energy targets for municipalities

Description of cluster

The only programme in this cluster promotes the implementation of a management system for achieving and evaluating climate and energy targets for municipalities[15]. Since the year 2000 the German Federal State of North Rhine-Westphalia (NRW) has offered financial incentives for municipalities and municipalities qualifying for the European Energy Award (eea)[16], a European management system standard for municipal energy saving and climate change mitigation activities (Bundesgeschäftsstelle European Energy Award, 2013). A grant is provided to set up an energy team, which is responsible for:

- carrying out an analysis of the status quo in terms of energy intensity;
- formulating energy policy objectives;
- carrying out an external audit and regular monitoring for a period of four years.

This support can be prolonged for another three years and bonuses can be received for special achievements. The amount of funding depends on the size of the municipality or the region. Applicants have to be located in NRW region, and the decision to carry out the certification process has to be taken by the municipality governing body responsible.

Impact assessment of programme

As the scheme does not promote direct measures but more the certification processes, the resulting energy savings are indirect (+). The annual energy savings achieved in municipal buildings and facilities over recent years amount to 109,050 MWh for all municipalities applying the eea in NRW. Figures are not available for the overall investment stimulated. Nevertheless, the new installation of solar PV systems and wind power plants, triggered by the energy awards, resulted in investments of € 58.7 million alone between 2004 and 2010, slightly less than € 10 million per year (Bundesgeschäftsstelle European Energy Award, 2013). Unfortunately, no data is publicly available on the amount of public funds invested into the programme. Therefore the cost-effectiveness and the investment leveraged per Euro of funds provided could not be determined for this programme (no data). Nevertheless, the savings achieved are expected to be sustained over a long period of time since the changes in municipal infrastructure and buildings resulting from the implementation of a management system endure over a long-term period (+++). In addition, municipalities that have been implementing the eea over several years are achieving higher energy savings than those that have just started the process (Bundesgeschäftsstelle European Energy Award, 2013). The labour intensity of the programme is low because actions are mainly carried out by existing municipal and regional staff and only very few new jobs are created through the scheme (+). Implementation depends almost entirely on human and not technical resources; therefore the scheme has a low dependency on technology (+++). Capacity building effects are remarkable for one stakeholder group, namely the staff of municipal and regional authorities, since in order to fulfil the requirements of the eea they have to spend a considerable amount of time finding solutions on how to improve the energy intensity in their municipalities (+). All the municipalities and regions of NRW (100 municipalities in total) can apply for this scheme. The number of

[15]For more Information on the promotional programme (in German only): www.energieagentur.nrw.de
[16]Information on the European Energy Awards: www.european-energy-award.org

applicants has been more or less constant for three to four years now, and about 30% of all municipalities of NRW participate and receive funds from the programme, which is considered as high market penetration (+++).

Table 3.12: Assessment results for the financial promotion of implementing management systems to achieve and evaluate climate and energy targets of municipalities

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	no data	+	+++	+++	+	+++

Relevance for India

In actual terms no financial programme exists in India that particularly targets the implementation of management systems for achieving and evaluating climate and energy targets for municipalities. Since climate change mitigation and energy saving measures in India at municipality level are not currently triggered through the development of proper energy/climate management systems (incl. energy strategies, reviewing processes, energy teams etc.), financial promotional programmes for municipal energy management schemes seem to be less relevant at the moment. However, pilot programmes implementing the first energy/climate management systems could stimulate and thereby pave the way for future promotional programmes of this type.

3.13 Development of climate / energy concepts in municipalities

Description of cluster

This cluster comprises promotional mechanisms which financially support the development of climate and energy concepts at municipality level. In Germany four such programmes exist; two at national level and two at federal state level. The programmes are funded by the state governments, the KfW and the Federal Environment Ministry. All of the programmes provide grants for developing climate and energy concepts for public infrastructure and buildings of cultural, social, educational and religious organisations.

Impact assessment of programme analysed

The programme evaluated for this cluster, the *Energy-oriented Urban Rehabilitation Grant for Local Infrastructure Concepts and Rehabilitation Managers*[17] by KfW, is a successive programme of the KfW *Kommunalkredit* that started in 2008. In 2013 the supporting conditions were improved in order to account for the low market penetration of the programme. The scheme is aimed at municipal bodies. The programme has two components: one promoting the development of integrated concepts to foster energy efficiency in municipal infrastructure (incl. residential buildings and the heating supply at district level), and the other promoting the employment of an energy manager (the second component, the financial promotion of the employment of an energy manager is addressed in cluster 3.14). An energy concept has to be developed within one year of the application. Only then are 65% of the (personnel) costs covered (BMWi, 2014).

Since grants are provided for the development of a concept and not for the implementation of concrete measures, the savings achieved are indirect (+). As mentioned above, the programme consists of two components. Data on funds is only available for the programme as a whole. In 2013, 123 grants of a

[17]For more information: in German www.kfw.de, in English PowerPoint Presentation

total amount of € 6 million were disbursed (KfW, 2013). Savings triggered by the programme amounted to approximately 11.1 GWh (Prognos, 2013), resulting in a cost-effectiveness ratio of 1.85 kWh per Euro fund (++). The continuity of savings is very high, because changes in public infrastructure and buildings are sustained over a long period of time (+++). No data is publicly available for the stimulation of investment. Job creation is low because existing municipality staff are involved and so no or only very few new jobs are expected to be generated (+). Requiring no specific technologies, the dependency on technology of the scheme is very low. The scheme is thus easily transferable to other (countries) contexts (+++). Capacity building takes place for the staff of municipal authorities since they need to learn how to deal with energy-related challenges (+).The programme is generally open to all German municipalities. With 123 applications between November 2011 and 2012, about 1% of all German municipalities (11,197) applied, so market penetration is medium (++).

Table 3.13: Assessment results for the financial promotion of developing climate/energy concepts in municipalities

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	++	no data	+	+++	+++	+	++

Relevance for India

Programmes like those in the German cluster "financial promotion of development of energy/climate concepts at municipality level" do not exist in India. Also, the development of comprehensive energy (efficiency) concepts is not very common at municipality level in India. Therefore this cluster has only limited relevance to the current situation in India. Pilot projects could serve as a starting point for the development of municipal energy concepts. Broad programmes providing financial incentives to municipalities in India would only be relevant at a later stage after the successful completion of first pilots.

3.14 Employment of an energy manager in public entities

Description of cluster

The cluster "employment of an energy manager in public entities" consists of three programmes – two at national level offered by KfW and the Environment Ministry and one by the federal state of North Rhine-Westphalia. All three schemes offer financial assistance in the form of grants for employing energy managers in municipalities, public entities, universities, and associations. Energy managers are permanent staff in municipalities who manage the development of integrated municipal energy concepts that formulate objectives as well as strategies in order to improve the energy efficiency of buildings and the infrastructure. Besides initiating processes for the concept's implementation, their main tasks are to coordinate the relevant actors and to provide advisory on energy-related questions to all municipality departments.

Impact assessment of programme analysed

The programme analysed, *Energy-Oriented Urban Rehabilitation Grants for Local Infrastructure Concepts and Rehabilitation Managers*[18], offered by KfW, is the successor to the previous programmes supporting the elaboration of urban energy concepts since 2008. Since 2013 the KfW programme has also financed personnel costs for an energy manager in municipalities (component B of programme – see cluster 3.13 for the energy concept component). Eligible applicants are municipal enterprises,

[18]For more information: in German www.kfw.de, in English PowerPoint Presentation

housing corporations and owners of large residential buildings. The costs for energy managers are subsidised by up to 65% over a period of three years. The maximum grant amount for energy managers is € 150,000 (BMWi, 2014).

Data on energy savings and funds spent is only available for the programme as a whole (component A and B – see previous cluster). In 2013, 123 grants were sanctioned totalling an amount of € 6 million according to the KfW programme evaluation report (KfW, 2013). At the same time the grants triggered energy savings of about 11.1 GWh (Prognos, 2013). The cost-effectiveness is therefore 1.85 kWh per Euro fund invested (++). The savings generated through the employment of an energy manager are indirect (+), whilst the continuity of the savings triggered – mostly achieved on municipal infrastructure - are considered as a long-term impact (+++). Capacity building only takes place for the energy managers (+), whilst the scheme is labour intensive since all the money is invested in new jobs created for energy managers (+++). Since the scheme is not dependent on any technology and promotes direct employment, the technology risk for the scheme is low (+++). Given the large amount of potentially eligible municipalities under the programme (ca. 11.197), the rate of application is medium with 123 applications between November 2011 and November 2012 (++). There is no available data on the stimulation of investment.

Table 3.14: Assessment results for the financial promotion of employing an energy manager in public entities

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on tech-nologies	Continuity of savings	Capacity Building	Market penetration
+	++	no data	+++	+++	+++	+	++

Relevance for India

There is no scheme in India that financially promotes the employment of energy managers in public entities. So far India's efforts focus on the qualification of energy managers in (energy intensive) industries, where the employment of energy managers is mandatory for the designated consumers (Ministry of Law, Justice and Company Affairs 2001) under the PAT scheme. However, energy managers are not yet employed in public entities, such as municipalities, schools, universities etc. Given the high energy savings potentials in such locations, particularly in the public infrastructure, employing energy managers could support the identification and the subsequent realisation of potential energy savings in the public building stock. A promotional programme that incentivises the employment of an energy manager is thus considered relevant for India.

3.15 Foundation of regional energy agencies

Description of cluster

The programmes in the cluster "foundation of regional energy agencies" provide financial support in the form of grants to municipalities setting up the energy agencies. The grants cover the material and personnel costs of the newly founded energy agencies as well as costs for capacity building. In Germany two promotional schemes exist with the same promotional mechanism, funded by the Federal State of Bavaria and the state bank of Baden-Württemberg.

Impact assessment of programme analysed

The programme analysed by the Free State of Bavaria[19] has been providing funding for such activities since the end of 2011 (STMWI, 2011). So far no information is available on the funds spent, energy savings achieved and investment triggered since the programme has not yet been evaluated and also there are no monitoring systems for monitoring this kind of data. However, the continuity of the energy savings, despite being indirect (+), is assumed to be high because activities at community level reach a large number of people and are expected to have a higher impact on citizens than one-off capacity building activities (behaviour change depends to a large extent on social influence which is high in a community project) (+++). The same holds for the capacity building effects - energy agencies address a variety of stakeholders in several sectors (+++). Setting up an energy agency requires no technology, (+++) but creates new jobs, both in its administration and also for energy specialists. Therefore the scheme is considered to be labour intensive (+++). As mentioned above, the programme is still in its early phases and so no data is available on the number of energy agencies set up so far.

Table 3.15: Assessment results for the financial promotion of the foundation of regional energy agencies

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no data	no data	+++	+++	+++	+++	no data

Relevance for India

There is no programme in India that provides financial support in the form of grants to municipalities setting up energy agencies. The state designated agencies coordinate energy efficiency efforts at state level, and a few states are about to establish their own energy management centres (EMC) (e.g. Kerala is the first state in India to establish an EMC at state level aiming primarily to remould and instrumentalise the energy sector as a catalyst in promoting a development process which is ecologically sustainable (Energy Management Center-Kerala, 2014)). No energy agencies exist at local/community level.

All energy programme activities (policy, planning, promotion, implementation etc.) take place at just two stages, at national level (BEE, MNRE, Ministry of Power), and at state level (state nodal agencies, energy departments, CPCB). There are still several stages or requirements which are cumbersome and time intensive between the state and the end user. Even at local village/community/district level an intermediate energy agency could make the task of implementing various government programmes faster, and the coordination among these agencies could be significantly improved. Awareness raising could be better adapted to suit the local conditions. The financial promotion of such an energy agency concept at local level could totally transform the energy landscape of the country. Such a programme is therefore considered relevant for India.

3.16 Financial incentives for schools to save energy

Description of cluster

The cluster “financial incentives for schools to save energy” comprises only one programme. The *Fifty/Fifty – Energy saving at schools project*[20] funded by state government budgets and implemented by the Independent Institute for Environmental Issues (UfU) provides financial incentives in terms of rewards for schools for lowering their energy consumption. Energy saving as a topic has been included

[19] For more information (in German only): www.stmwi.bayern.de
[20] For more information: Energy savings in schools

in the curricula of German schools since the early 1990s. Building on the experiences of those early actions, the scheme *Fifty/Fifty* was first started in 1994 in the schools in Hamburg. Since then the scheme has been optimised, and is now implemented in all of Germany's 16 federal states due to the good reputation and success of the scheme (Kern et al., 2000). The project provides both educational and technical support to schools to raise awareness on energy efficiency among its staff and students. Its main aim is behavioural change as well as the implementation of simple technical EE measures. By adapting their energy consumption behaviour the schools can keep 50% of the monetary savings at the end of the year.

Impact assessment of programme

More than 3,500 schools all over the country participate in the programme, which amounts to **about 10%** of all German schools and so has a high market penetration (++). The indirect savings generated through capacity building efforts and behavioural change (+) amount to an average of 110 MWh of energy savings per school per year. At the same time only about € 2,000 of funds from the state level budgets are provided to every participating school for small technical measures and for energy management consulting. Thus the resulting **cost-effectiveness ratio of 55 kWh per Euro invested** is high for this programme (+++)[21]. The stimulation of investment is considered as fairly low since the funds are invested mainly for capacity building measures for school students and staff (+). The programme requires no pre-existing technologies and so has a low degree of dependency on technology (+++). The inclusive nature of the programme, involving all students, teachers and school administrative staff, results in high capacity building effects for a number of stakeholder groups (+++). Since the continuity of savings is difficult to assess for capacity building programmes, it is however, assumed that training the school children to save energy may have a long lasting impact provided the learned behaviour is retained (++). In terms of job creation however, the programme has a low impact since the existing teachers and school staff provide awareness raising, and only a few jobs are created in terms of external educators and energy consultants (+).

Table 3.16: Assessment results for the financial incentives for schools to save energy

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	+++	+	+	+++	++	+++	++

Relevance for India

Presently there is no programme in India that offers financial incentives for EE in schools, either at central or state level. But indirectly there are awareness programmes at national and state levels which encourage EE issues in schools, and all energy-related issues are covered at a basic level in the primary and middle school curriculum, with greater depth at high school. BEE runs a national programme for schools in association with TERI aimed at sensitising the school children regarding energy issues and environmental concerns (TERI 2006). Gujarat energy development agency has a unique programme, known as BIRD, on how to make a school green. As part of the programme the school children worked on activities for conducting audits – electrical energy, energy in buildings and water consumption - and surveys – waste, air pollution and transport, land and biodiversity of the school - as a case study (GEDA, 2014). Tata Power has started the Tata Power Energy Club, an initiative that focuses on bringing about a first-hand realisation of the energy crisis in Mumbai city through the eyes of school children (TATA, 2014).

[21] With 50% of monetary savings directly flowing back into the state budgets, the net invested public funds can be even considered as being negative, since the money saved exceeds the funds spent manifold.

A national study estimated that there are 230 million children studying in 1.3 million schools across the country (Learnmile, 2012). Therefore any measure addressing awareness raising efforts for school kids has a great potential for dissemination of proper behavioural changes for conserving energy. In addition, inefficient energy use in schools is a particularly severe challenge in India. Thus the replication of the German programme for incentivising energy savings by allowing schools to keep a certain share of their savings for other school activities is also considered relevant to India.

3.17 Installation of load management systems

Description of cluster

The cluster "installation of load management systems" covers just one programme, the *Investivkredit Energie Programm*[22], which was implemented in 2008 and was funded by the LfA Promotional Bank, Bavaria with loans from the KfW. Amongst other things the programme promotes the installation of power and load management systems in Bavarian SMEs through promotional loans (subsidised interest rates). A requirement is verification by an independent auditor that the load management system leads to energy savings of a minimum of 20%. The amount funded can be up to 100% of the costs for implementing a load management system (BMWi, 2014).

Impact assessment of programme

Savings generated through the installation of load management systems applied at company level lead to direct energy savings if the energy demands of different equipment is coordinated through such systems (++). However, no data is available on the cost effectiveness and also on the stimulation of investment of the programme. The continuity of energy savings is considered as medium-term based on the life cycle of load management systems in industry (++). Effects on job creation are fairly low because no extra labour is required to administer the system and only a few jobs are created for the development of the systems (+). Capacity building effects are fairly low since only one stakeholder group, i.e. industry, is affected and increases its capacities in the field of EE (+). Since the programme is technology intensive and depends on the local availability of suitable load management systems, it is more difficult to implement it in other countries with different technological conditions (+). According to the programme evaluations, only a few installations have been implemented so far, and so market penetration for the programme is significantly less than 5% (+).

Table 3.17: Assessment results for the financial promotion of installing load management systems

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	no data	no data	+	+	++	+	+

Relevance in India

There is no programme in India that promotes the installation of load management systems in industry. But there are financial incentive schemes for the industry sector (particularly the SMEs) which promote equipment purchase/replacement measures, which could include load management systems. For example, the KFW-SIDBI or JICA-SIDBI line of credit has a list of checked EE measures, and there is an opportunity for incorporating load management systems into the list.

A good load management system offers efficient energy usage by optimising, controlling and monitoring energy consumption. However, since the primary aim of load management is moreover the mini-

[22]For more information (in German only): Leaflet Investivkredit Energie

misation of peak loads and the coordinated integration of renewable energies, the relevance of such load management systems and the need for providing financial promotion for the adoption of such measures is considered low.

3.18 Companies shutting down heavy loads in peak load times

Description of cluster

This cluster covers financial promotion for companies which agree to shut down heavy loads during peak times. One promotional scheme exists which incentivises companies to shut down loads – the *Regulation on Agreements on Interruptible Loads*[23] *(Verordnung zu abschaltbaren Lasten, AbLaV)*. It is a federal law which was enacted in 2013 (EEP Consulting, 2013). Since the beginning of 2014 it has set out a framework for offering financial rewards to an industrial enterprise, which registers and thereby agrees to shut down heavy loads in times of very high demand for grid power. Implementation, starting from the handling of applications to the control and regulation of supply and demand to the payment procedures, rests with the transmission system operators. Every month the operator tenders 1,500 MW of electricity which can be switched off immediately, and 1,500 MW which can be switched off quickly. To take part in the bidding process enterprises have to pre-qualify by proving that the load to be switched off is large enough and must guarantee that their facilities are appropriate. As these preconditions are high, only four framework contracts currently exist and only technical units of 818 MW can be shut down. The participating enterprises are paid € 2,500 for every MW they offer to dispense with and € 100-400 for every MWh they actually dispense with during peaks.

Even though this programme can be considered as an energy efficiency programme, since shutting down heavy loads at peak times contributes to making inefficient standby power plants obsolete, the programme also serves other aims. Reducing the peak loads increases grid and supply security too. Furthermore, the increased flexibility in the grid allows for better integration of renewable energies. Thus it can be concluded that this programme aims to integrate renewable energies and energy efficiency.

Impact assessment of programme

Shifting energy demand to off-peak times helps reduce the number of inefficient standby power plants required and their related energy losses. This mechanism subsequently results in direct energy savings (++). Data to make a precise statement regarding quantification of the resultant energy savings and the funds invested is not available though. Therefore no estimate of the cost-effectiveness of the programme can be made (no data). The continuity of savings is low because savings only occur during the period when the energy loads are switched off (+). Investment is stimulated through the programme because control, regulation and communication systems are required to facilitate the shut-offs. But these investments are assumed to be low in relation to the funds (+).Job creation mainly occurs with reference to setting up and programming the required control systems. Job creation impact is therefore very low (+).Since the scheme depends on bi-directional meters that can respond to shut-off notices, the programme is dependent on one or more specific technologies (+). There is no capacity building as the participating industries do not gain any knowledge on improving their energy intensity. As mentioned above, market penetration is low because of the high requirements for bidders (+).

[23] For more information: www.amprion.net/en/interruptible-loads; in German Verordnung zu abschaltbaren Lasten

Table 3.18: Assessment results for the financial promotion of companies shutting down heavy loads in peaks

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	no data	+	+	+	+	none	+

Relevance for India

There is no financial promotional scheme for companies to shut down heavy loads during peak periods as such in India. However, such a programme could be very effective for the demand side management for the Indian power sector. Black-outs and peak shortages are big problems which the Indian power sector continues to struggle with. This is primarily due to the constant gap between the demand and supply of electrical power. According to the Economic Survey of India (National Informatics Centre and Ministry of Finance, 2013), there was an average of 9% peak shortage during the period 2007-2012. A presentation by the India Brand Equity Foundation (IBEF) (2013) reports peak power requirements as standing at 130 GW compared to a capacity of 116 GW in 2012. Thus in general the programmes providing financial incentives for companies to shut down heavy loads at peak periods are considered relevant in India. However, the programme is considered less relevant from the energy efficiency point of view. This is because the scheme primarily aims at the minimisation of peak loads and the integration of renewable energies, whilst the German experience shows that the logistical and technical implementation of such programmes is quite sophisticated and the application of such a programme is in fact limited to a few heavy energy consuming industries.

3.19 Installation of energy storage systems

Description of cluster

Within the cluster “installation of energy storage systems” four programmes exist in Germany. Three are implemented and funded by state level institutions. The fourth is provided nationwide by KfW. The target groups vary according to programmes. Whilst one programme promotes research facilities and focuses more on model concept projects, another one targets the industrial sector and private investors. Municipalities are eligible for three out of the four programmes. The promotional instruments of the schemes consist of loans and grants.

Impact assessment of programme analysed

The programme analysed in this cluster is the *IKK – Municipal Energy Supply programme*[24] by the KfW. Since 2013 a new component of the programme offers financial promotion for the construction and extension of decentralised energy storage systems. Municipalities and municipal associations receive promotional loans of up to 100% of the fundable investment costs (KfW, 2014b). The advantage of storage systems is that the energy produced by the renewable energy applications (mainly photovoltaic and wind) can be stored during periods of over-supply and also released whenever renewable energy sources produce less electricity. The stand-by conventional power plants are benched and the energy losses of standby operation can be reduced. This cross-cutting scheme also combines elements of energy efficiency and integration of renewable energies.

Energy savings from storage systems are direct since the losses from the operation of stand-by power facilities can be reduced (++). In terms of cost-effectiveness and stimulation of investment no data was available for assessing the two parameters, since energy savings are not monitored for the installation

[24]For more information (in German only): www.kfw.de

of energy storage systems because the primary goal of these systems is moreover the integration of renewable energies and ensuring grid security. The continuity of energy savings depends on the life cycle of the storage systems which are on average considered as medium-term (++). Whilst the scheme itself is not very labour intensive, a lot of R&D is undertaken in this field, requiring engineers and scientists as well as some labour for manufacturing and installing the storage systems (++). Specific capacity development effects are not triggered by the scheme since it only promotes the installation of energy storage systems which doesn't include any capacity development component. In general this scheme very much depends on the availability of functional and effective energy storage systems. Since effective energy storage systems are still in the early phases of their development and are still being optimised, with the technologies and know-how not being available globally, the scheme is dependent on the availability of technology (+). Since the project is new no data on market penetration is available.

Table 3.19: Assessment results for the financial promotion of installing energy storage systems

Direct vs. indirect savings	Cost effective-ness	Stimulation of invest-ment	Job creation	Dependency on tech-nologies	Continuity of savings	Capacity Building	Market penetration
++	no data	no data	++	+	++	none	no data

Relevance for India

At present there is no programme in India that promotes the installation of energy storage systems, although the relevance of energy storage systems in India is considered high. India consistently suffers from power shortages as well as high transmission and distribution losses. The access to energy is quite limited in many of the rural areas. Rural micro-grids need well-planned grid integration strategies and energy storage systems which provide of a consistent and uninterrupted source of power. The renewable energy capacity of the country is constantly expanding (RE constituted 12.36% of total installed capacity in 2013 (MoP, 2013a)), and smart grid and electric vehicle initiatives have been launched. Energy storage is poised to play a crucial role in the future. This important aspect was particularly acknowledged in 2013 when the government launched the Smart Grid Vision for the country. It emphasises the well-established government framework and systems for energy storage facilities throughout the country (MoP 2013b). A financial programme promoting such energy storage systems could complement India's efforts to increase the energy security of its citizens, and so is considered as quite relevant.

3.20 Installation of cogeneration of heat and power

Description of cluster

The cluster "installation of cogeneration of heat and power" comprises ten programmes in Germany. The programmes in the cluster provide financial incentives for industrial enterprises, public entities and municipalities which implement and use Combined Heat and Power (CHP) technologies. The funding institutions are the federal states and also the KfW and the European Union through the European Fund for Regional Development. The overarching framework for the financial incentives is the *Combined Heat and Power* (*CHP) Law*[25] of the German government which was first implemented in 2002, and has since then been continuously optimized (KWKG, 2002). The financial incentives provided by the different programmes include soft loans and grants for the installation of CHP systems as well as rewards for energy recovered through such installations.

[25]For more information: iepd.iipnetwork.org; in German KWKG

Impact assessment of programme analysed

The *CHP Law* in Germany, as the scheme analysed for this cluster, is a national scheme for enterprises, municipalities, public entities, private individuals and associations which connect CHP facilities to the grid. The grid operator is obligated not only to give preferential access to the electricity from CHP systems by law, but also to pay market price for the electricity plus a premium to the CHP operator/owner.

The energy savings from CHP systems are direct because energy losses are significantly reduced through the combined production of heat and power (++). The funds spent in 2012 for the programme amounted **up to € 234 million** (Amprion et al., 3013), whilst at the same time around **360 GWh of primary energy was saved** (Prognos, 2012). Thus the cost-effectiveness of the programme is good, with a ratio of 3.4 kWh saved per Euro of fund invested (++). The continuity of the savings is based on the life cycle of CHP facilities which is usually around 15 years (+++). Data on triggered investment is not publicly available. However, with a "KWK-Premium" of 5.11 Cent per kWh(el) generated within the first 30,000 full-load operation hours (KWKG 2002), a medium-sized 30 kW(el) cogeneration plant would receive overall funds of € 46,000. The overall investment and maintenance costs for a cogeneration plant of 30 kW(el) are approximately € 82,000 (ASUE 2011). On this basis the overall investment/fund ratio is € 1.8 per Euro of fund invested (+). However, the scheme is not very labour intensive since for the other schemes financing the promotion of EE equipment qualified personnel are needed to manufacture and install the systems (++). There are no particular capacity building effects through this scheme and the programme is dependent on some very specific technologies (+). So far, around 5,577 CHP plants have been implemented in Germany. Compared to the fact that the scheme is open to a variety of sectors and players, the market penetration is fairly low (+).

Table 3.20: Assessment results for the financial promotion of installing cogeneration of heat and power

Direct vs. indirect savings	Cost effectiveness	Stimulation of investment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
++	++	+	++	+	+++	none	+

Relevance for India

There are two programmes in India which provide financial incentives for the implementation of cogeneration projects. The first is the MNRE's central financial and fiscal incentive scheme for the Bagasse Cogeneration projects, by private/joint cooperation public sector sugar mills (MNRE 2014). MNRE provides a maximum capital subsidy support of 8 crore INR (1 million Euros) per project. The second scheme is IREDA's loan-based financial assistance scheme for the biomass/bagasse based cogeneration projects. Specific advantages of IREDA over the financial products of other FIs and banks include the extra grace period after commissioning, larger implementation schedule of 3 years as well as knowledge and experience sharing in respect of best project implementation process, including technical guidance (Venkateswara Rao 2012).

These two schemes reflect the huge potential in India, especially for biomass and bagasse based cogeneration. India and Brazil are the world's largest cane growers. One third of the world's centrifugal sugar production is based in India, Brazil, USA or China (Fairtrade Foundation, 2013). As of January 2014, bagasse based cogeneration accounts for 8.32% of the total installed grid interactive power in India (MNRE 2014b). Furthermore, India has a huge base of industries which need electricity and heat simultaneously, such as sugar, pulp and paper, as well as textile industries where cogeneration significantly increases the overall energy efficiency of the process. Since the advantages of cogeneration are also achieved with cogeneration based on energy sources other than biomass, the extension of India's scheme to CHP based on other energy sources would further boost the energy efficiency in these sectors. Promotional programmes incentivising the installation of CHP independently of the energy source used are therefore deemed relevant for India.

3.21 Implementation of heating / cooling network solutions

Description of cluster

There are four similar programmes in Germany which were clustered into the "implementation of heating / cooling network solutions". The programmes promote the implementation of heating and cooling networks utilising waste heat or cold streams from power utilities and industrial equipment through financial incentives in the form of loans and grants. Two of the programmes are funded by the state ministry of Saarland, one by the national budget (and implemented by BAFA) and another one through KfW. The programmes target municipalities, industrial enterprises and commercial companies such as hotel facilities and public entities.

Impact assessment of programme analysed

The programme analysed for this cluster is the *CHP Law* by the German Parliament. The promotion of heating network solutions was already integrated into the *CHP Law* in 2009, whilst cooling networks were integrated in 2012 (BAFA, 2014). Besides promoting the implementation of CHP projects, the law also offers grants for the installation and extension of heating and cooling networks provided that at least 60% of the heat supplied by the network is generated by CHP plants. In addition it is a requirement that at least one end-user is connected to the network who is neither the owner nor the operator of the CHP plant. The grant amount depends on the nominal diameter of the heat conduction pipe. For a diameter of up to 100 millimetres € 100 per meter is granted or a maximum of 40% of the investment costs. For diameters with more than 100 millimetres, 30% of the investment costs are granted (KWKG, 2002).

The energy savings generated by the mechanism are indirect since the scheme only enables the transmission of efficiently produced energy (+). Even though data is available on the total funds invested for the networks, the cost-effectiveness cannot be assessed since no direct energy savings can be defined. The heating systems are merely a means of transport for efficiently produced energy, and installation of a network does not automatically lead to energy savings. Therefore the cost-effectiveness is not an applicable parameter for this cluster. However, in 2009 and 2010 around **1,033 new heating networks** were built with annual **funds of € 32 million** (Prognos, 2013). The stimulation of investment is considered as medium with € 231 million invested in 2009/2010 and € 64 million funded in the same time period, resulting in an overall ratio of € 3.6 investment per Euro of funds provided (++). This programme does not entail any capacity building effects. There is barely any labour required; however, being a technology intensive scheme, some jobs are created as the components are manufactured and the networks are installed (++). The technologies and components required are easily substitutable, and so the scheme is not particularly dependent on any specific technology (++).The rate of market penetration of the scheme is difficult to assess. Even though absolute numbers of applications exist, the overall potentials for applications of heating and network solutions are not known. Thus a ratio of actual applications / possible applications cannot be formed. Nevertheless, if the roughly 5,500 existing CHP facilities are considered as potential areas for network solutions, **about 20%** of these facilities applied for funds under the programme and the market penetration is therefore fairly high (+++).

Table 3.21: Assessment results for the financial promotion of implementing heating/cooling network solutions

Direct vs. indirect savings	Cost effectiveness	Stimulation of investment	Job creation	Dependency on technologies	Continuity of savings	Capacity Building	Market penetration
+	no applicable	++	++	++	+++	none	+++

Relevance for India

At present there is no prevalent scheme in India which promotes heating/cooling network solutions by providing any policy or financial incentives amongst the municipalities or any other sector at central or state level.

Nevertheless there is a huge potential for developing a district/community level cooling and heating networks in India. A study by Sarnaik and Chavan (2013), suggests that a district cooling system can offer significant benefits to a community. The three groups most likely to benefit from district energy in a community are property/building owners (eliminating onsite chiller O&M, wider choice of fuel input, enhanced reliability etc.), municipalities (infrastructure addition, cash flow attraction, better resource and energy utilisation etc.) and society at large (energy needs, environment protection etc.). Thus it makes sense to financially promote heating/cooling network systems in the country. It would not only contribute to a stable infrastructure in the country, but also would also lower the country's heating and cooling loads with less damage to the environment. The best starting point could be the municipalities and institutions at the district level.

4 Awareness Raising Programmes

Besides promotional schemes providing financial incentives to several stakeholders, several publicly funded information platforms and tools exist in Germany which promote the dissemination of relevant information for EE in several sectors (industries, buildings etc.). Even though these information tools do not come directly within the scope of the study, it was decided to briefly illustrate the central information programmes – however an impact assessment was not conducted. In addition to financial incentive programmes, the information and awareness raising programmes are a central pillar of the national energy efficiency strategy of the German government. In this chapter, the most important information and awareness raising programmes in Germany are presented.

4.1 Online portal for energy efficient buildings

There are several online platforms for energy efficiency in buildings available in Germany. The online portals provide comprehensive information, advice and guidelines on EE in buildings. The most relevant online portal in this category is the *Zukunft Haus* platform, funded and implemented by the German Energy Agency (dena). The platform is targeted at end-users wanting to improve the energy efficiency of their buildings. The portal's aim is to provide cost-effective energy saving possibilities for new constructions or the refurbishment of existing buildings. The website offers a wide array of information, including different databases for promotional programmes, recommended energy auditors, examples of energy efficient buildings, step-by-step guidelines for construction and refurbishment projects, energy saving tips and also all the relevant regulations and laws supporting EE in buildings in Germany. In addition, information on events, further links, and a large number of documents on similar issues can also be found.

Link to programme: www.zukunft-haus.info

Other online platforms include the *Klima-sucht-Schutz* by co2online, a non-profit consulting company, funded by the Federal Environment Ministry (BMUB), and the *mission E* by the Federal Institute for Real Estate. *mission E* is a campaign aimed at increasing sensitivity regarding energy efficiency in the behaviour of staff of public entities. Both websites provide useful recommendations and advice for reducing heat and energy consumption permanently whilst maintaining comfort levels.

Klima-sucht-Schutz: www.klima-sucht-schutz.de/

mission E: missione.bundesimmobilien.de/

4.2 Online toolkit for energy management systems

The online toolkit, *Mod.eem,* promotes the adoption of the Energy Management Systems by German companies by providing means for lowering the effort required for implementation. Requirements of the ISO 50001 standard have been presented online since interactive online checklists have been created which document the implementation process step by step. Participating companies can enter and check their implementation status via a computer, tablet or smartphone. The *Mod.eem* also provides a module for monitoring the energy consumption. The development of a toolkit was started in 2009 and since then it has been continuously improved. The toolkit has been applied by several hundred companies across Germany. These companies can also participate free of charge. *Mod.eem* is carried out by the Energy Agency of NRW and jointly financed by the Ministry for Climate Protection, Environment, Agriculture, Nature Conservation and Consumer Protection of the German State of North Rhine-Westphalia (MKULNV) and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

Link to programme: www.modeem.de/default.asp

4.3 Free of charge energy saving information hotline

The German Energy Agency (dena) provides an information hotline on a free of charge basis for all issues related to energy efficiency and renewable energies. The hotline is available nationwide between 7 am and 8 pm five days a week, and answers questions on energy certificates for buildings, energy efficient modernisation, as well as options and potential for saving energy in the household. In addition, the hotline also addresses issues on renewable energies such as solar, wind and hydropower, biomass and geothermal power and gives information on promotional schemes and the political framework for renewable energy and energy efficiency. The hotline is open for all sectors and a very wide range of stakeholders.

Link to the website of the energy hotline: www.thema-energie.de/service/energie-hotline.html

4.4 Online portal for energy efficient industries

In addition to providing private end-users with valuable information on how to save energy in their households, as part of dena's *Energy Efficiency Initiative* it provides information on energy efficiency for commerce and industry through an online portal. Through the online portal, dena provides information on energy efficient lighting at manufacturing facilities and on insulation applications for industrial technological facilities. It further helps industries and commercial enterprises to understand and implement energy management systems. The online initiative is funded by the Federal Ministry for Economic Affairs and Energy (BMWi). A newsletter provides users with information on current events and new developments in legislation, promotional programmes and technologies. In addition users are able to ask particular questions using an online form. A special web tool equips users with all the necessary information on how to implement energy management systems and the steps that need to be taken.

Link to web portal: www.stromeffizienz.de/industrie-gewerbe.html

4.5 Online portal for benchmarks of energy consumption for heating

The web portal *Heizspiegel* administered by co2online and funded by the BMUB is a campaign towards lowering heating costs for tenants and building owners. The campaign has the following objectives:

- avoiding 160,000 tons of CO_2-eq emissions per year,
- employing 40,000 heating auditors
- triggering a heat-technology modernisation resulting in € 860 million of investments, and
- creating 12,000 person years of new jobs.

The campaign has been informing end-users about the energy saving potentials with regards to heating since 2004. The main activities of the campaign are:

- to provide heat audits – currently funded by the Federal Environment Ministry (BMUB) – for residents to check if the heating costs and energy consumption of the heating systems are appropriate or not.
- to offer benchmarks of consumption patterns for different regions of Germany.
- to advise on energy saving potentials, environmentally friendly heating sources and EE heating for residents.

So far, 85 municipal and regional *Heizspiegel* (heating benchmarks) have been developed, with regional and local benchmarks on energy consumption through heating. With the online application,

Heat Check users can identify the thermo-technical characteristics of their buildings, and check whether or not their heating costs and energy consumption are commensurate.

Link to online portal: www.heizspiegel.de/

4.6 Online portal for contracting in buildings

The "*Competence Centre on Contracting in the Buildings Sector"* is a central online platform for information, consulting and knowledge exchange on issues regarding energy contracting models. The online portal was founded by the German Energy Agency (dena) and was funded by the Federal Ministry for Transport and Digital Infrastructure (BMVI). The general objective was to give public sector entities an understanding of contracting systems and procedures. The competence centre serves as a central information access point for facility managers, building authorities and decision makers at federal, state and municipal level on all issues regarding contracting systems and procedures. In addition, the competence centre also provides assistance and supervision for the planning and implementation of contracting projects for federal properties.

The initial consulting service provided by the competence centre is free of charge for the user and they have the opportunity to directly get in touch with experts via telephone or a contact form. The online portal further offers best-practices of contracting projects and information on state regulations regarding budget laws, different contracting models, as well as useful tips and guidelines and practical support for energy contracting.

Link to online portal: www.kompetenzzentrum-contracting.de

4.7 Mandatory requirement of energy performance certificates

The *German Energy Savings Ordinance* implementing the *European Energy Performance of Buildings Directive* has constantly been adapted and revised over recent decades to increase the energy efficiency of buildings. The ordinance primarily sets standards for newly constructed and modernised buildings in terms of the requirements for insulation and primary energy consumption, as well as HVAC systems.

Since it was last revised in early 2014, the ordinance requires the issuance of energy performance certificates for buildings that are listed in real estate advertisements in newspapers. The energy performance certificates have to be shared by the house/flat owners with potential buyers or tenants. Enterprises with a high number of public visitors and having an area more than 500 m^2 are also required to publicly display their energy performance certificates. The aim of the ordinance is to guarantee more transparency for energy consumption in buildings and raise awareness amongst end-users, investors and housing companies for low energy houses and energy efficient systems in buildings.

5 Summary and Future Work

The study presented the German landscape of incentive and information programmes which promote energy efficiency in the building and industrial sector. By collecting information on German financial promotional schemes for energy efficiency and analysing them in terms of impact and performance as well as transferability to India the study contributes to the objective of the Indo-German Energy Forum to determine potential areas of closer cooperation between India and Germany in the future.

The study identified 150 financial incentive schemes in Germany which promote energy efficiency in buildings and industry. Due to the large number of schemes 21 clusters were formed to group programmes with the same promotional mechanism together. The study showed that most programmes available in Germany promote "EE refurbishment of buildings", with 37 similar programmes in one cluster, and "the implementation of EE technologies and measures", with 28 similar programmes. A set of eight parameters was developed for assessing the impact and performance of each mechanism. By analysing each of the 21 mechanisms on the basis of the eight assessment parameters the following results were obtained:

- *Types of savings triggered (direct or indirect)*: As the study revealed, most of the German promotional programmes result in indirect savings. Direct savings are generated only through seven of the 21 programmes.
- *Cost-effectiveness:* Due to the unavailability of data the cost-effectiveness could not be calculated for ten of the mechanisms. Only one programme scored a low cost-effectiveness ratio, with 0.51 kWk per Euro fund invested. Out of the remaining eleven programmes, five schemes showed a moderate cost-effectiveness of between 1 and 10 kWh savings per Euro fund invested. The other five programmes have a fairly high cost-effectiveness of more than 10 kWh per Euro.
- *Stimulation of investment:* As comparable data was difficult to obtain the parameter could not be determined for nine of the 21 programmes. For the remaining programmes a wide range of results were found. Most of the schemes however stimulate high investments of more than ten Euros per Euro fund. A particularly high ratio of 38.6 Euros investment per Euro fund was obtained for the programme "Conduction of energy audits in industry" because the programme extensively stimulates implementation of EE technologies.
- *Job creation:* The schemes analysed also showed different results for the parameter of new jobs created through a programme. Six of the programmes do not create any jobs. However, with nine programmes requiring human capacity to be implemented, a large share of the schemes analysed were considered as very labour intensive.
- *Continuity of energy savings*: The study showed that half of the programmes analysed result in long-term energy savings. This includes programmes that promote EE measures in buildings and public infrastructure. Another eight programmes, mostly those that promote measures in industry, encourage savings over a medium term of two to ten years.
- *Capacity building:* Whilst five of the programmes were found to have no capacity building effects at all, since they solely finance the implementation of a technology, ten programmes enhance the know-how on energy efficiency of one stakeholder group and six address even more stakeholder groups.
- *Dependency on technologies or know-how:* More than half of the programmes assessed do not depend on the availability of any technologies or specific know-how. An example of such a mechanism is the promotion of energy management systems. To a certain degree such mechanisms can be considered as having a high degree of transferability to another country as no preconditions are required. On the other hand, five of the programmes assessed require the availability of specific technology which is not broadly interchangeable and are thus considered to have a comparably lower potential for transferability.
- *Market penetration:* One programme promoting the construction of energy efficient buildings showed a particularly high degree of market penetration, with more than 55%. Nevertheless, al-

most half of the programmes are implemented by less than 1% of all eligible stakeholders. This is partially due to the large amount of similar schemes on the German market and the large number of eligible stakeholders.

In terms of relevance of the clusters to India, the study showed that most of the clusters analysed are also pertinent within the Indian context. Among these schemes, four programmes are evaluated as having particularly high relevance. The cluster “construction of energy efficient buildings” for example addresses an area where no broad promotional programmes exist in India, but at the same time high saving potentials are predicted. The relevance for India is considered as fairly low for only six clusters. The main reason for this judgment is the very specific nature of most of these programmes (e.g. the financial promotion for companies shutting down heavy loads in peaks).

Table 4 on the next page provides an overview of the 21 clusters, including the results of the assessment and the relevance of each mechanism for India.

It should be kept in mind that the assessment should be regarded as an indicative evaluation and guideline only. It was the authors’ intention to veer away from classifying promotional schemes into good and bad. Given the availability of information and the type of data used for the assessment, a programme that received a high assessment score does not necessarily mean it is better than others with lower scores. This study did not intend to cover all the potential parameters that determine the success of the programmes studied here. Instead the study limited itself to applying a number of suitable and general parameters. This standardisation impedes the recognition of specific advantages or strengths of different programmes.

Nevertheless a number of programmes show a high degree of impact and have performed very well in Germany. At the same time, given the similarity of the Indian scenario to the German one, these types of programmes are deemed to be very relevant for bringing India forward in terms of energy efficiency. These promotional mechanisms include:

- Networking platforms for companies exchanging ideas on energy efficiency
- Construction of EE buildings
- Implementation of EE technologies / measures
- Conduction of energy audits in industries

The last two schemes on energy audits in industries and the implementation of EE technologies are already being implemented in India. Some initiatives exist to incentivise the construction of energy efficient buildings. However, to achieve a successful, broader roll-out of all of these three programmes at national and at state level, the identification of success factors is crucial. For nationwide implementation of these programmes in India it is important to examine which of all the possible incentives are actually needed and what conditions are required to make these programmes more attractive to the respective target groups. This study makes its contribution by identifying those schemes relevant for the Indian market and makes a first step towards identifying their success factors.

In order to confirm and further elaborate the results of this study, joint workshops with Indian partners and policy makers responsible for energy efficiency could be organised. In cooperation with the Indian partners, the estimation of the relevance of the schemes for India could be further expanded and their replicability discussed more intensely. The promotional programmes that seem most adequate and suitable for the country from an Indian point of view could be identified through such activities. In the next step, the selected promotional programmes could then be analysed in depth in terms of their potential design (incentive mechanism, extent of financial incentives, most suitable implementing agencies etc.) for a successful replication that takes into account the existing conditions in India.

Table 4: Overview impact assessment for all 21 clusters

Promotional schemes / Parameters	Direct vs. in-direct savings	Cost effectiveness	Stimulation of investment	Job creation	Dependency on technology	Continuity of savings	Capacity Building	Market penetration	Relevance
Construction of EE buildings	++	++	+++	++	++	+++	+++	+++	High relevance
EE refurbishment of buildings	++	++	+++	+++	++	+++	+++	+++	Relevant
Planning /supervision of EE refurbishment	+	no data	+	+++	+++	+++	+++	++	Less relevant
Implementation of EE technologies / measures	++	+++	++	++	++	++	none	+	High relevance (programmes already existing)
Establishment of monitoring / measurement systems	+	no data	++	+	+	++	+	+	Relevant
Conduction of energy audits in buildings	+	+++	+++	+++	+++	+++	+	+	Relevant (pro-grammes al-ready existing)
Conduction of energy audits in industries	+	+++	+++	+++	+++	++	+	+	High relevance (programmes already existing)
(Long-term) energy coaching / consulting	+	no data	no data	+++	+++	+++	+	+	Relevant
Conduction of EE trainings	+	no data	no data	+++	+++	+	+++	+	Less relevant
Networking platforms for companies exchanging ideas on EE	+	+++	+++	++	+++	++	+	+	High relevance
Implementation of energy management system in industries	+	+	no data	+++	+++	++	+	++	Relevant
Implementation of management systems for achieving and evaluating climate and energy targets for municipalities	+	no data	no data	+	+++	+++	+	+++	Less relevant
Development of climate / energy concepts in municipalities	+	++	no data	+	+++	+++	+	++	Less relevant

Employment of an energy manager in public entities	+	++	no data	+++	+++	+++	+	++	Relevant
Foundation of regional energy agencies	+	no data	no data	+++	+++	+++	+++	no data	Relevant
Financial incentives for schools to save energy	+	+++	+	+	+++	++	+++	++	Relevant
Installation of load management systems	++	no data	no data	+	+	++	+	+	Less relevant
Companies shutting down heavy loads in peak load times	++	no data	+	+	+	+	none	+	Less relevant
Installation of energy storage systems	++	no data	no data	++	+	++	none	no data	Relevant
Installation of cogeneration of heat and power	++	++	+	++	+	+++	none	+	Relevant
Implementation of heating / cooling network solutions	+	not applica-ble	++	++	++	+++	none	+++	Relevant

6 Bibliography

Amprion; 50 hertz; Transnet BW and Tennet 2013: *Kraft-Wärme-Kopplulngsgesetz (KWK-G),* Jahresabrechnung 01.01.-31.12.2013, 25. October 2013, http://www.netztransparenz.de/de/file/KWK-G_JA2012.pdf, visited on 20.03.2014

Arbeitsgemeinschaft für sparsamen und umweltfreundlichen Energieverbrauch e.V. (ASUE) 2011: BHKW-Kenndaten 2011, http://asue.de/cms/upload/broschueren/2011/bhkw-kenndaten/asue-bhkw-kenndaten-0311.pdf, viewed on 25.03.2014

Architekten- und Stadtplanerkammer Hessen 2014: FAQs zur Vor-Ort-Beratung, http://www.akh.de/bauherren/leistungen-ihres-architekten/energieberater/gefoerderte-vor-ort-beratung-durch-die-bafa/, visited on 05.03.2014

BAFA 2012: *BAFA setzt neues Förderprogramm für hocheffiziente Querschnittstechnologien im Mittelstand um*, Pressemitteilung, www.bafa.de, visted on 12.03.2014

BAFA 2014: Bundesamt für Wirtschaft und Ausfuhrkontrolle, www.bafa.de, visited on 22.01.2014

BAFA 2014: Evaluation der Energiesparberatung vor Ort – Endbericht, http://www.bafa.de/bafa/de/energie/energiesparberatung/publikationen/sonstiges/evaluation_vor_ort_beratung_2014.pdf, visited on 02.08.2014

BAFA and BfEE 2011: *Second National Energy Efficiency Action Plan (NEEAP) of the Federal Republic of Germany - Pursuant to the EU Directive on Energy End-use Efficiency and Energy Services (2006/32/EC),* Federal Ministry for Economics and Technology, October 2011

Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie 2011: *Grundsätze zur Förderung der Gründung von Energieagenturen in Bayern*, November 2011, http://www.stmwi.bayern.de/fileadmin/user_upload/stmwivt/Themen/Foerderprogramme/Dokumente/Foerdergrundsaetze_Energieagenturen.pdf, visited on 12.03.2014

Behörde für Stadtentwicklung und Umwelt Hamburg 2009: *Klimaschutzprogramm IMPULS - Programm zur Qualifizierung,* Hamburg, 21. December 2009, http://epub.sub.uni-hamburg.de/epub/volltexte/2012/13986/pdf/foerder_impuls.pdf, visited 12.03.2014

BMWi 2014: *Förderdatenbank – Förderprogramme und Financhilfen des Bundes, der Länder und der EU,* http://www.foerderdatenbank.de/

Bundesgeschäftsstelle European Energy Award 2013: http://www.european-energy-a-ward.de/media/usermedia/files/Oeffentliche_Downloads/Presse/Pressemitteilungen/Bundesweit/2013-07-15_Pressemitteilung_Evaluierung-NRW.doc, visited on 11.03.2014

Change 2013: *Energy Efficiency in SMEs: Success Factors and Obstacles*, March 2013

Clausnitzer, K-D. et al. 2007: *Ermittlung von Effekten des KfW-CO2-Gebäudesanierungsprogramms - Entwicklung der Methodik und Ergebnisse der Berichtsperioden 2005 und 2006*, KfW Bankengruppe, Frankfurt, July 2007, https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Effekte-CO2-Gebaeudesanierung-2005-und-2006.pdf, visited on 12.03.2014

Diefenbach, N. et al. 2011: *Monitoring der KfW-Programme „Energieeffizient Sanieren" 2010 und „Ökologisch / Energieeffizient Bauen" 2006 – 2010*, KfW Bankengruppe, 23. November 2011, https://www.kfw.de/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-Energieeffizient-Sanieren-2010-Bauen-2006-bis-2010.pdf, visited on 12.03.2014

Diefenbach, N. et al. 2013: *Monitoring der KfW-Programme „Energieeffizient Sanieren" und „Energieeffizient Bauen" 2012,* KfW Bankengruppe, 14. November 2013, https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-EBS-2012.pdf, visited on 06.03.2014

Dorendorf, B. 2013: *Promotional programmes for energy efficiency in the housing sector*. Key principles and key results, Presentation at the CA EED meeting in Dublin, 26 March 2013

Duscha, M. et al. 2008: *Evaluation des Förderprogramms „Energieeinsparberatung vor Ort",* Schlussbericht, ifeu - Institut für Energie- und Umweltforschung GmbH im Auftrag des Bundesministerium für Wirtschaft und Technologie, Heidelberg, Juni 2008, http://www.bafa.de/bafa/de/energie/energiesparberatung/publikationen/sonstiges/energie_vob_ifeu_evaluation_schlussbericht_06.pdf, visited on 04.03.2014

Ecologic 2014: *Evaluierung der EU-Finanzierung für Energieagenturen,* http://www.ecologic.eu/de/3210, visited on 04.03.2014

EEP Consulting 2013: http://www.eep-energy.eu/abschalt-umlage-%E2%80%9Everordnung-zu-abschaltbaren-lasten-ablav-erhoht-strompreise-in-deutschland/, visited on 11.03.2014

ENAMO 2012: Lernendes Energie Effizienz Netzwerk, http://www.enamo.com/Services/LEEN/Lernendes-Energie-Effizienz-Netzwerk.html;c=1, visited 12.03.2014

Energy Management Center-Kerala 2014: www.keralaenergy.gov.in, visited on 22.03.2014

Fairtrade Foundation 2013: *Fairtrade and Sugar,* Commodity Briefing, January 2013, http://www.fairtrade.net/fileadmin/user_upload/content/2009/resources/2013_Fairtrade_and_Sugar_Briefing.pdf, visited on 17.03.2014

Forum European Energy Award e.V. 2013: *Activity Report for 2012*, Zürich, May 2013

Frahm, B-J. et al. 2010: *Evaluation des Förderprogramms „Energieeffizienzberatung" als eine Komponente des Sonderfonds' Energieeffizienz in kleinen und mittleren Unternehmen (KMU)*, Schlussbericht, Institut für Ressourceneffizienz und Energiestrategien GmbH (IREES) and Fraunhofer-Institut für System- und Innovationsforschung ISI, Karlsruhe, 18. November 2010, p.87 http://www.isi.fraunhofer.de/isi-media/docs/e/de/publikationen/evaluation-foerderprogramm-energieeffizienzberatung.pdf, visited 24.02.2014

GEDA 2014: Gujarat Energy Development Agency, Bal Urja Rakshak Dal Programme, http://geda.gujarat.gov.in/media/Energy_Outreach_%20Achievements_2012-13.pdf, visited on 16.03.2014

GEF 2012: *Promoting industrial energy efficiency through energy management standard, system optimization and technology incubation*, Project Identification Form, http://www.thegef.org/gef/sites/thegef.org/files/gef_prj_docs/GEFProjectDocuments/Climate%20Change/India%20-%20%284893%29%20-%20Promoting%20industrial%20energy%20efficiency%20through%20ene/India%20GEF-5%20PIF_10April2012%20_2_.pdf, visited on 22.03.2014

GIZ 2013: *Strengthening Indian MSME - MSME Umbrella Programme*, GIZ Newsletter June 2013, http://www.giz.de/en/downloads/giz2013-en-newsletter-msme2.pdf, visited on 21.03.2014

Gumb, G. & Hennes, R. 2012: *Promoting Building Efficiency in Germany*, KfW Bankengruppe, Workshop Financing Energy Efficiency in Buildings, Frankfurt,16.02.2012

HAREDA 2010: *Scheme on Promotion of Energy Audits in Private, Govt. Semi Govt. Industrial, Institutional, Commercial Buildings*, http://hareda.gov.in/?model=pages&nid=151, visited on 20.03.2014

Hendricks B., Ogden, P. and Bovarnick, B 2014: *Built-In Savings, A U.S.-India Partnership on Energy-Efficient Buildings*, Center for American Progress, March 13, 2014, http://www.americanprogress.org/wp-content/uploads/2014/03/IndiaPartnership.pdf, visited on 20.03.2014

IBEF 2013: India Brand Equity Foundation, Presentation from August 2013, http://www.ibef.org/download/power-august-2013.pdf, visited on 17.03.2014

IEA 2012: Understanding Energy Challenges in India – Policies, Players and Issues, http://www.iea.org/publications/freepublications/publication/India_study_FINAL_WEB.pdf, visited on 02.08.2014

IfM 2011: KMU in Deutschland gemäß der KMU-Definition des IfM Bonn, http://www.ifm-bonn.org/fileadmin/data/redaktion/statistik/unternehmensbestand/dokumente/KMU-D_2004-2013_IfM-Def.pdf, visited on 02.08.2014

Indo-German Energy Forum (IGEF) 2014: http://www.energyforum.in/, visited on 20.03.2014

Kern, B. et al. 2000: *Evaluation des Projektes fifty/fifty in Berlin,* Energiesparende Interessen-gemeinschaft" e.V and Unabhängiges Insitute für Umweltfragen e.V., http://www.ufu.de/media/content/files/Fachgebiete/Klimaschutz/fifty-fifty/fifty_fifty_berlin.pdf, visited on 12.03.2014

KfW 2007: *Impuls*, Ausgabe November 2007, http://www.hk24.de/linkableblob/hhihk24/innovation/downloads/356944/.8./data/KfW_Impuls_Spezial_EEF-data.pdf visited on 12.03.2014

KfW 2008: *KfW-Förderung für den Bereich der kommunalen Infrastruktur - Energieeffizienz und energetische Gebäudesanierung*, http://www.hessenenergie.de/Downloads/Dl-Nach/dln-fkom/dln-fkom-pdfs/KfW_Foerd-08.pdf, visited on 12.03.2014

KfW 2013a: *Förderreport*, KfW Bankengruppe, Frankfurt a.M., December 2013

KfW 2013b: Focus on Economics, No 14, 17 January 2013, KfW programmes on energy-efficient housing substantially contribute to the German energy turnaround

KfW, 2014a: Kreditanstalt für Wiederaufbau, www.kfw.de, visited on 20.01.2014

KfW, 2014b: Energieeffizient Sanieren – Baubegleitung, www.kfw.de, visited on 12.03.2014

KfW, 2014c: IKK - Kommunale Energieversorgung, www.kfw.de, visited on 12.03.2014

Kok, M.; Metz, B.; Verhagen, J. and Van Rooijen, S. 2008: Integrating development and climate policies: national and international benefits, *Climate Policy*, Volume 8, Issue 2, Special Issue: Development policy as a way to manage climate change risks, pages 103-118

Kraft-Wärme-Kopplungsgesetz vom 19. März 2002 (BGBl. I S. 1092), das zuletzt durch Artikel 4 Absatz 77 des Gesetzes vom 7. August 2013 (BGBl. I S. 3154) geändert worden ist, http://www.gesetze-im-internet.de/kwkg_2002/__7a.html, viewed on 20.03.2014

Learnmile 2012: *Enrolment in schools rises 14% to 23 crore*, News, http://www.learnmile.com/news.html, visited on 17.03.2014

Løken, E. 2005: Use of multicriteria decision analysis methods for energy planning problems, *Renewable and Sustainable Energy Reviews*, Volume 11, Issue 7, September 2007, Pages 1584–1595, Elsevier

McKinsey Global Institute 2010: India's urban awakening: Building inclusive cities, sustaining economic growth, http://www.mckinsey.com/insights/urbanization/urban_awakening_in_india, visited on 02.08.2014

Ministry of Law, Justice and Company Affairs 2001: *The Energy Conservation Act 2001,* No. 52 of 2001, New Delhi, 01 October 2001, http://powermin.nic.in/acts_notification/pdf/ecact2001.pdf, visited on 22.03.2014

Mitchell, C. et al. 2011: *Special Report on Renewable Energy Sources and Climate Change Mitigation*, Chapter 11: Policy, Financing and Implementation, IPCC, 2011

MNRE 2014a: *Biomass Power and Cogeneration Programme*, http://www.mnre.gov.in/schemes/grid-connected/biomass-powercogen, visited on 17.03.2014

MNRE 2014b: *Physical progress (Achievements),* http://www.mnre.gov.in/mission-and-vision-2/achievements/, visited on 17.03.2014

Monteiro da Silva, S. and Guedes de Almeida, M. 2010: *Using a Multi-Criteria Analysis to Select Design Alternatives Aiming Energy Efficiency and IEQ*, EuroSun 2010 – International Conference on Solar Heating, Cooling and Buildings. Graz, Austria.

MoP 2013a: *Power Sector at a glance*, http://powermin.nic.in/JSP_SERVLETS/internal.jsp, visited on 17.03.2014

MoP 2013b: *Smart Grid Vision and Roadmap for India*, 12 August 2013, http://www.smartgridnews.com/artman/uploads/2/SmartGridVision-India_1_.pdf, visited on 17.03.2014

National Housing Bank of India (NHB) 2013: *Energy Efficient Homes Programme*, http://www.ee-homes.com, visited on 18.03.2014

National Informatics Centre and Ministry of Finance 2013: *Economic Survey 2012-13*, Chapter 11, Energy, Infrastructure and Communications, http://indiabudget.nic.in/survey.asp, visited on 17.03.2014

Neuhoff, K. et al. 2013: *Politikberatung kompakt 75 – Vorschlag für die zukünftige Ausgestaltung der Ausnahmen für die Industrie bei der EEG-Umlage*, Berlin, November 2013, http://www.diw.de/documents/publikationen/73/diw_01.c.431913.de/diwkompakt_2013-075.pdf, visited on 05.03.2014

OECD/IEA 2014: *Energy Efficiency – Policies and Measures Database*, http://www.iea.org/policiesandmeasures/energyefficiency, viewed on 15.02.2014

Pires Neves, L. et al. 2005: *Development of multicriteria models to classify energy efficiency alternatives*, University of Coimbra and INESC Coimbra

Prognos 2013: *Endenergieeinsparziel gem. Art. 7 EED und Abschätzung der durch politische Maßnahmen erreichbaren Energieeinsparungen*, Endbericht, Berlin, 05. February 2013

Rawal, R. et al. 2012: Energy Code Enforcement for Beginners: A Tiered Approach to Energy Code in India, CEPT University, http://www.aceee.org/files/proceedings/2012/data/papers/0193-000113.pdf

Sarnaik, R.H. and Chavan , D.J. 2013: "District Cooling System", as HVAC system of Sustainable India, *International Journal of Innovations in Engineering and Technology (IJIET),* Vol. 2 Issue 1 February 2013

Schlomann, B. et al. 2012: *Energy Efficiency Policies and Measures in Germany*, Fraunhofer Institute for Systems and Innovation Research, Karlsruhe, November 2012

SIDBI 2012: http://www.sidbi.in, visited on 25.03.2014

Sovacool, B., H. Lindboe and O. Odgaard 2008: Is the Danish Renewable Energy Model Replicable for Other Countries?, *The Electricity Journal*, Vol. 21, No. 2, pp. 27-38.

Stadt Karlsruhe Umwelt- und Arbeitsschutz 2013: EnergieEffizienz Netzwerk Karlsruhe, Mehr Kosteneinsparung und Klimaschutz durch Erfahrungsaustausch, Dokumentation der geförderten Pilotphase 2009 bis 2013, Karlsruhe Juli 2013, http://www.karlsruhe.de/b3/natur_und_umwelt/klimaschutz/Klimaprojekte/een-ka/HF_sections/content/ZZlcZ8OCmjcYPW/ZZlcZsHbLgkaIy/Abschlussbericht_EEN_web.pdf, visited 05.03.2014

TATA 2014: *School Energy Conservation,* Tata Power Energy Club, http://www.tatapower.com/school-energy-conservation.aspx, visited on 17.03.2014

TERI 2006: *BEACON - Building Energy Awareness on Conservation*, Programme brochure, http://edugreen.teri.res.in/BEE2.pdf, 16.03.2014

TERI 2014: *Industrial Energy Efficiency and Sustainable Technologies,* http://www.teriin.org/index.php?option=com_division&task=view_area&id=14, visited on 16.03.2014

Tholen, L.; Kiyar, D.; Venjakob, M.; Xia, C.; Thomas, S. and Aydin, V. 2013: *What makes a good policy? Guidance for assessing and implementing energy efficiency policies*, Wuppertal institute for Climate, Environment and Energy

UBA 2011: Energieeffizienz in Zahlen – Endbericht, http://www.umweltbundesamt.de/sites/default/files/medien/461/publikationen/4136.pdf, visited on 02.08.2014

United Nations Framework Convention on Climate Change (UNFCCC) 2010: *Multicriteria Analysis (MCA),* Compendium on methods and tools to evaluate impacts of, and vulnerability and adaptation to, climate change.

USAID 2009: *Energy Assessment Guide for Commercial Buildings*, ECO-III Project, International Resources Group, New Delhi, India, July 2010, http://www.beeindia.in/schemes/documents/ecbc/eco3/ecbc/Energy%20Assessment%20Guide%20for%20Buildings.pdf, visited on 18.03.2014

Venkateswara Rao, B. 2012: *Financing of Biomass Power Projects - Experience of IREDA*, Presentation at Conclave on India –Africa Project Partnership, New Delhi, 19 March 2013,

Vreuls, H. 2005: *Evaluating Energy Efficiency Policy Measures & DSM Programmes*, Volume I, Evaluation Guidebook based on national case studies & national and international experiences, International Energy Agency

Zeuner, J. 2013: *Herausforderungen der Energiewende annehmen - Finanzierung von erneuerbarer Energie, effizientem Einsatz, Batteriespeichersystemen und Gebäudesanierungen - Gezielt fördern* Börsen-Zeitung No. 127, P. B 4, 6.7.2013, https://www.boersen-zeitung.de/ajax/bzpro_artikel.php?objt_id=2013127806&anzeige=1&subm=&li=312&divname=contentarea_artikel, visited on 12.03.2014

7 Annex

7.1 Annex 1: Methodology

7.1.1 Mapping of German promotional programmes

For well-illustrated mapping of the relevant German promotional programmes, suitable categories were identified for describing the design of the programmes. In order to enable standardised mapping of all the programmes, general categories were chosen that were applicable to different programme types. The following categories were used to illustrate the programme design:

C1: Name of programme (German and English)

C2: Specific action implemented/measure promoted: *e.g. energy audits in buildings, energy management systems in industries*

C3: General promotional mechanism of programme: *e.g. grants, loans, provision of information*

C4: Targeted sector of programme: *e.g. industry, buildings*

C5: Level of implementation: *state level, national level*

C6: Funding institution

C7: Implementing institution

Collecting the information on relevant German promotional schemes for the industry and building sectors in accordance to the above described categories was done via secondary sources. In order to provide a comprehensive overview on existing German promotional schemes at national and state level, information was gathered from various sources available.

The main sources for information on national and state level promotional schemes for energy efficiency and the integration of renewable energies with energy efficiency are as follows:

- The National Energy Efficiency Action Plan (NEEAP 2) (BAFA & BfEE, 2011)
- Funding database on national and state level promotional schemes (BMWi, 2014)
- IEA Energy Efficiency Policies and Measures Database (OECD/IEA, 2014)
- Fraunhofer Institute for Systems and Innovation Research (ISI), *Energy Efficiency Policies and Measures in Germany*, (Schlomann, B. et al., 2012)

For more detailed information:

- Websites of funding bodies such as BAFA and KfW (BAFA, 2014; KfW, 2014a)

Overall 150 promotional programmes for energy efficiency implemented and offered by different governmental and non-governmental bodies were identified and information on these programmes was collected. All programmes are listed in Annex 2.

7.1.2 Clustering the German programmes

Many of the programmes identified are of the same or similar kind and have the same objective and purpose. For example, several programmes in Germany financially promote the construction of energy efficient buildings or the conduction of energy audits. In order to increase the user-friendliness of the study and to avoid unnecessary duplication in the assessment, the promotional programmes identified were clustered into groups of programmes promoting the same action. In other words, similar schemes that are provided by different funding bodies were consolidated (e.g. schemes for subsidies for the construction of energy efficient buildings of different national and state level authorities were

allocated to the cluster “Financial promotion of conducting energy audits in buildings”). Programmes may appear in several clusters, especially if they promote more than one activity or serve several purposes[26]. Accordingly, 21 clusters were identified and the programmes assigned to the relevant clusters. The resulting clusters are presented in Chapter 2.

7.1.3 Multi-criteria analysis and identification of parameters for assessment of impact and performance

Multi-criteria analysis (MCA) is a common approach used for structured and transparent decision making on the basis of highly complex information and multiple objectives (Monteiro da Silva & Guedes de Almeida, 2010). MCA has been widely used in the field of energy planning (Løken, 2005), climate change impact evaluation (UNFCCC, 2010) and even in classifying energy efficiency alternatives (Pires Neves et al., 2005). Whilst a traditional cost-benefit analysis is limited to economic factors, the MCA approach includes other aspects, such as social and ecological factors too. The UNFCCC defines the multi-criteria analysis as “a type of decision analysis tool that is particularly applicable in cases where a single-criterion approach (such as cost-benefit analysis) falls short, especially where significant environmental and social impacts cannot be assigned monetary values” (UNFCCC 2010).

The methodological approach for the impact assessment that was applied in this study is based on the multi-criteria analysis approach and was adapted to fulfil the particular objectives of this study. However, a crucial requirement for an MCA is the availability of data for evaluating the impact of promotional schemes. Therefore data availability can become a major barrier in the assessment process. The data in this study is largely based on publicly available information from evaluation reports on the promotional schemes. In order to also evaluate promotional programmes for which no detailed data was publicly available, the funding or implementing bodies of the programme were interviewed.

To identify the most suitable parameters for the impact assessment, a literature review was conducted. The evaluation of energy policies in general is a well-documented and widely analysed field. Even though policies for the deployment of renewable energy and for the promotion of energy efficiency have fundamentally different objectives, many of the principles for policy assessment are of an interdisciplinary nature and can thus be applied for evaluating all kinds of policies.

A number of studies were analysed which assessed both renewable energy and energy efficiency policies in terms of their success and their policy design. The studies assessed policy effects and success factors of good practice policies on the basis of a number of different principles. The most commonly used principles that were identified based on the literature review include:

- Inputs: Resources (human, financial, other) required to support a policy measure or programme (Vreuls, 2005).
- Outputs: Products, goods and services produced through programme/project activities which reach participating organisations and individuals (Vreuls, 2005).
- Outcomes or results: Changes that occur from the use of outputs. Outcomes may be intended and unintended, positive and negative. Outcomes fall along a continuum from immediate (initial, short-term) to intermediate (medium-term) to final outcomes (long-term) (Vreuls, 2005).
- Impacts: Social, economic, civic and/or environmental consequences of the policy. Impacts tend to be long-term elements and may be equated with goals. Impacts may be positive, negative and/or neutral, intended or unintended (Vreuls, 2005).
- Appropriate design: Policy is designed to address all relevant market actors and the most relevant barriers and incentives and avoids negative side effects (Tholen et al., 2013).
- Effectiveness: Extent to which objectives were achieved (Mitchell et al., 2011; Tholen et al., 2013).

[26] One programme might for example provide financial support for the conduction of an energy audit in industries and at the same time might offer loans for the implementation of the measures identified during the audit. Therefore, such programmes were listed in more than one cluster. In the case of the above example the programme would be listed in the two clusters « financial promotion of energy audits in industries» and «financial promotion of implementing EE measures and technologies».

- Efficiency: Achievement of objectives at lowest costs (Mitchell et al., 2011).
- Equity: Distributional consequences of a policy, e.g. distribution of costs and benefits, extent to which it allows the participation of a wide range of different stakeholders (Mitchell et al., 2011).
- Institutional feasibility: Extent to which a policy instrument is likely to be viewed as legitimate, gain acceptance, be adopted and implemented (Mitchell et al., 2011).
- Replicability: Extent to which a successful policy can be reproduced by another country (IRENA, 2012).

Since replicability is an important criterion, particularly for this study, it must be noted that assessing the replicability of a promotional programme for another country cannot be done using a single indicator (IRENA, 2012).

The factors as listed above are merely principles on which the promotional programmes have been assessed. The assessment parameters depend on the aim of the assessment and the type of policy being looked at and so have to be selected. Thus the principles identified in the literature were used as guidelines and served as a basis for developing suitable parameters for this study. As already mentioned, the availability of data constitutes a great barrier for the assessment process. Therefore, the public availability of data played a crucial role in identifying appropriate parameters.

In general for the purpose of this study parameters need to be relatively unspecific, simple to measure and applicable for various programmes and across the different target sectors (i.e., buildings and industry).The parameters were chosen to create a straightforward evaluation process and to present the most relevant aspects of a programme such as effectiveness, economic impact and performance[27].

The following parameters were identified as being most suitable for evaluating the impact and overall success of the German promotional schemes:

- **Direct vs. indirect energy savings:** Types of savings generated through the programme (direct or indirect).
- **Cost effectiveness:** Amount of energy savings achieved through fund/costs of the programme.
- **Stimulation of investment:** Amount of investment leveraged by the programmes in relation to the required funds.
- **Continuity of energy savings:** Time-span over which all energy savings are realised (independent of the continuation of the programme).
- **Job creation:** New jobs created for the implementation of the programme.
- **Dependency on technologies:** Dependency on particular technologies or know-how for its successful implementation.
- **Capacity building effects:** Number of stakeholder groups that benefit from capacity building through the programme.
- **Market penetration:** Share of eligible target groups that use or apply the programme.
- **Particular reputation:** Particular awards or praised by experts or well-known public reputation.

[27] It should be noted that the identification and development of parameters was carried out by acknowledging trade-offs between scientific precision and practicability. The authors are aware that the identification and development of suitable parameters requires a thorough scientific approach. Parameters provided in this study neither make a claim to be complete nor does the applied approach for identifying parameters claim to be impeccable. For follow-up or similar studies further parameters could be developed in workshops and be scientifically tested. However, for the purpose of this study the parameters identified are considered to be appropriate and adequate.

7.1.4 Operationalisation of parameters

In order to evaluate the impact and success of the promotional programmes a mechanism was determined for the operationalisation of the parameters described in the section above. Objective criteria were defined to measure the achievement of the respective parameters for each programme. In other words, values and corresponding definitions were determined for each parameter to enable an objective assessment of each programme. Wherever possible, quantitative values were preferred over qualitative data. However, by definition not all the parameters selected can be measured in a quantitative manner (e.g. job creation or dependency on technology). For some of the parameters quantitative data is not available, or programme-specific data is not comparable (e.g., some of the programme evaluation reports provide data on job creation, however this data is obtained by applying entirely different approaches and methods and so is not comparable).

The criteria for distributing values were defined in such a way that one to three plusses (+) could be allocated for each parameter. The assessment parameters and corresponding criteria for allocating values to each cluster are:

- **Direct vs. indirect energy savings:** Indirect savings are those arising from measures that do not directly result in reduced energy consumption, but rather point out the savings potential or the areas where savings can be achieved. Such measures include all systems that assess, control, and monitor energy consumption patterns as well as capacity building initiatives. Direct savings were considered since all such savings result from the programmes that promote the implementation, exchange or construction of energy efficient technologies. Programmes that only achieve indirect savings were evaluated with one plus (+), because the actual achievement of these savings depend on various factors (e.g. willingness of energy users to implement measures detected). Programmes generating direct savings received two pluses (++), whereas programmes resulting in both direct and indirect savings were allocated three pluses (+++).
- **Cost-effectiveness:** Figures for primary energy savings per annum achieved by the evaluated programmes and annual public budget costs were used to calculate the ratio “achieved energy savings per € fund invested” as a determinant of cost-effectiveness. To define the ranges of the cost-effectiveness ratios for each of the three possible values (+,++, and +++), all cost-effectiveness ratios for all evaluated programmes were calculated in a first step. Based on the overall spectrum of ratios, suitable ranges were chosen in a manner so that approximately the same number of programmes achieved lowest, medium, and highest evaluation in this parameter.
- **Continuity of energy savings:** The continuity of energy savings considered the time period over which energy savings resulting from the promotional programme occur, even after the programmes are terminated. Implementing energy efficiency technology in buildings and municipal infrastructures were considered to have the most long-lasting impacts amongst the measures investigated in this study (up to 30-40 years). Therefore all programmes promoting a direct or indirect measure that eventually led to technological implementations in buildings or the infrastructure at municipal level were considered as long-term. These programmes therefore received the highest values. Energy efficiency measures at industrial level, i.e. changes to the equipment and machinery of industrial processes that led to energy savings over the entire life time of the energy efficient machinery or equipment were considered to have impacts over a medium-term. Because such industrial equipment is assumed to have a service life of up to 10 years. Energy savings with a short-term continuity were considered unsustainable due to the one-off capacity building efforts. Such capacity building measures include one-off training courses or measures which immediately cease to generate energy savings after the programme comes to an end (such as load shedding, where savings only occur for the time the heavy loads are shut down).
- **Stimulation of investment:** To calculate the stimulation of investment, the annual public budget costs and the amount of total investment costs (investment in both equipment and services) triggered by the programme were used to calculate how much investment was stimulated per Euro of public fund invested. The ranges for each of the three values of the investment ratio (+, ++, and +++) were defined according to the spectrum of actual investment ratios calculated for all the programmes. The ranges were then set to make sure there were a similar number of programmes for each of the low, medium and high values.

- **Job creation:** Since the absolute number of new jobs created by a promotional programme are rarely monitored and reported, the different approaches for estimating job creation effects were applied to the small number of evaluation reports already available and a qualitative evaluation of this parameter had to be developed. It was therefore decided to evaluate this parameter according to whether a programme was labour and/or technology intensive. A programme was considered labour intensive when the implementation of the programme and the measures promoted by the programme required a significant amount of human capacities and at the same time created new jobs (+++). Programmes that mainly promote technologies, on the other hand, and are not labour intensive were rated lower with two pluses (++) because although these programmes do not foster the creation of new jobs, the manufacturing and installation of energy efficient equipment and the components needed to implement energy efficiency measures require some labour as well. A programme was not considered labour intensive if the staff that are already employed or that would have been employed anyway, are responsible for implementing the measure promoted. Few programmes are neither technology nor labour intensive, and which therefore create only very few or no jobs in any field. These programmes were allocated the lowest value with only one plus (+).
- **Dependency on technologies:** To a certain degree the dependency of a promotional scheme on technology can be associated with the replicability of that programme to another context and/or country. The availability of a specific technology is often a prerequisite for the success of a promotional programme. The degree to which a programme depends on the availability of a certain technology and its related know-how is therefore an important parameter. In order to assess this parameter, initially the programme was checked to determine whether it required the availability of any specific technology or not in the first place. If this was the case, the dependency on technology was considered high (+). If programmes depend on technologies, yet the technologies are broadly interchangeable, then the technology dependency of these programmes was considered medium (++). The programmes not requiring any (specific) technology, such as programmes supporting management systems etc., were considered as highly independent of technology (+++).
- **Capacity building effects:** This parameter indicates how many stakeholder groups have an increased know-how of energy efficiency as a result of a promotional programme. In this case, only the stakeholders that were directly affected by the programme were considered. Furthermore, only capacity building resulting from the implementation of the programmes was considered. In other words, the know-how required and the expertise being a prerequisite for the implementation were not considered (e.g. energy auditors require a certain degree of expertise to successfully implement energy audits, however this expertise has to be developed prior to the implementation phase of energy audits and is thus not a result of the programme itself). The authors do however know that due to the multiplier effect and due to the nature of some programmes with large public awareness levels, the capacity building impacts might be more extensive than indicated in the assessment. With some programmes being targeted at a specific group, the capacity building impacts were considered to be limited. These include programmes that promote certain measures in the industrial sector for example, where only industrial end-users benefit from the capacity building efforts. Yet other programmes have capacity effects for a wider range of stakeholders. These include those measures that are implemented at community level and have a large public awareness level. Some programmes, on the other hand, did not have any capacity building impacts. These include those that solely focus on implementing a technology or a technological measure. The rating allocated, eventually depended on the number of stakeholders benefitting from capacity building efforts, and accordingly one (+), two (++) or more groups (+++) were affected.
- **Market penetration:** Market penetration considers the performance of the programmes according to the degree in which they are used or applied by the targeted groups. This information was not always available, and so estimations had to be made. In some cases absolute numbers of the programme applications were available which were consequently put into relation to the overall size of the targeted group. Market penetration was indicated as a percentage share of the total target group. The ranges > 1%, 1-10% and <10%, were chosen according to the results received for the market shares of the different programmes and based on the overall spectrum of ratios chosen in a manner whereby approximately the same number of programmes achieved lowest, medium, and highest evaluation in this parameter

7.1.5 Systematic analysis of German schemes

All the clusters of financial promotional schemes that were identified were systematically analysed using the defined set of parameters and corresponding quantitative and qualitative assessment criteria. For clusters consisting of several programmes with the same promotional mechanism, a representative programme was chosen and analysed. The identification of the representative programmes for each cluster with more than one scheme was done according to the relevance of the programmes in Germany. The following selection criteria determining the relevance in Germany were applied in the following order:

1. A national scheme was chosen over a state-level scheme, since national schemes generally have a wider impact and are addressed to a larger target group. In addition it is easier to find more detailed information on national than on state-level programmes.
2. A self-contained programme was chosen over a scheme where the mechanism was only one component because comprehensive schemes containing different mechanisms mostly have information and data on the entire scheme, e.g. energy savings achieved through the whole scheme but no information on savings for one particular component of the scheme.

Figure 11: Example of representative programme for a cluster

Cluster: Construction of Energy Efficient Buildings	
Short Description	**Level of Implementation**
Loans for energy efficient buildings: Brandenburg	State Level
KfW Energy-efficient Construction: Germany	National Level
Financing Energy Efficiency – Construction: Baden-Württemberg	State Level
Sub-scheme within the programme for market launch progres.nrw : NRW	State Level
Business loan for energy efficiency: Niedersachsen	State Level

Some of the information required on the parameters was gathered from publicly available evaluation reports and available studies as stated below.

1. A useful report was the Evaluation Study by Prognos (2012) containing comprehensive information on energy savings of a large number of German promotional schemes and partially about the information on the funds spent. The report can be downloaded at https://www.bmwi.de/BMWi/Redaktion/PDF/Publikationen/Studien/endenergieeinsparziel-abschaetzung-der-durch-politische-massnahmen-erreichbaren-energieeinsparungen,property=pdf,bereich=bmwi2012,sprache=de,rwb=true.pdf (in German only)
2. Another reliable publicly available source for information was the KfW Förderreport (2013) containing data on the subsidies and funds spent for all promotional programmes by the KfW. The database can be found at https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Monitoring-EBS-2012.pdf

In addition telephone interviews were conducted with scheme implementers and funding institutions to obtain more information. In cases where no data was available or no expert assessment was possible, a zero value was applied.

7.1.6 Relevance of programmes for India

The relevance and potential for replication of (political) instruments in other countries is a highly discussed topic in the literature, e.g. *Integrating development and climate policies: national and international benefits* (Kok et al., 2008) or a study on the replication of the Danish renewable energy model in the US (Sovacool et al., 2008). Most authors agree that assessing the replicability of a promotional programme for another country cannot be done by looking at one single indicator (IRENA, 2012). Sovacool (2008) even states that replicability cannot be associated with a policy instrument; rather it is a consequence of the compatibility of a range of issues.

To comprehensively assess the replicability of a programme for a country, the possibilities and given conditions of the targeted country concerned need to be analysed, and it must be verified as such that the factors that led to the programme being successful in the first place exist in the target country (IRENA, 2012). This assessment can only be done for each promotional programme individually, because universally applicable parameters for the assessment and comparison of transferability cannot be determined[28]. With this in mind it was decided not to rank the clusters of promotional programmes from good to bad or successful to unsuccessful according to their potential for replication. Ranking the schemes in such a way would influence the reader to a certain degree, and so it was decided to leave the potential of replication and transferability up to the reader's own assessment. Each programme's relevance for India was hence assessed in a qualitative, descriptive and indicative manner. The issue of whether there is a gap to be filled in India was examined (do similar promotional programmes already exist in India) and whether the cluster addresses a relevant area of energy efficiency with high saving potentials. Additionally, the issue of whether or not the major framework conditions required for the replication for the schemes are in place was examined (e.g. capacities and expertise with required human resources, technologies available etc.).

[28] Or the determination of such parameters would at least require plenty of theoretical research and goes far beyond the scope of this study.

7.2 Annex 2: List of all identified promotional programmes

Table 5: Overview all promotional programmes identified in Germany

German name of programme	English name of programme	Promotional mechanism	Name of funding institution(s)	Name of implementing institution(s)	Target sector	Action implemented/ measure promoted	Level of implementation
Construction of energy efficient buildings							
Brandenburg-Kredit Energieeffizienter Wohnungsbau	Loans for Energy Efficient Building for the State of Brandenburg	grant	KfW; Investment Bank of Brandenburg (ILB)	Investment Bank of Brandenburg (ILB)	buildings - residential	Construction of EE buildings	state (Brandenburg)
Energieeffizienzfinanzierung - Bauen	Financing Energy Efficiency - Construction	loan and grant combination	KfW; L-Bank	L-Bank	buildings - residential	Construction of EE buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - ELR-Kombi	Financing Energy Efficiency - ELR-Kombi	loan	KfW ; L-Bank	L-Bank	industries - SMEs	Construction of EE buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (GU)	Financing Energy Efficiency - Larger Enterprises	loan	L-Bank	L-Bank	industries - all	Construction of EE buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (KMU)	Financing Energy Efficiency - SMEs	loan	KfW ; L-Bank	L-Bank	industries - SMEs	Construction of EE buildings	state (Baden-Württemberg)
Mietwohnraum-Förderprogramm der L-Bank - Energieeffizientes Bauen	Programme for the Support of Rental Housing of the State's Bank - Energy Efficient Construction	loan	KfW ; L-Bank	L-Bank	buildings - residential	Construction of EE buildings	state (Baden-Württemberg)
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the Rational Use of Energy, Renewable Energies and Energy Saving - Part of the Programme for Market Launch	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	all	Construction of EE buildings	state (North Rhine-Westphalia)
Thüringer Familienbaudarlehen und Thüringer Modernisierungsdarlehen	Construction and Refurbishment Loans for Families	loan	Thüringer Aufbaubank (TAB)	Thüringer Aufbaubank (TAB)	buildings - residential	Construction of EE buildings	state (Thuringia)

Unternehmerkredit Energieeffizienz Niedersachsen	Business Loan for Energy Efficiency Niedersachsen	grant	State of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	all	Construction of EE buildings	state (Lower-Saxony)
Energieeffizient Bauen	KfW Energy-efficient Construction	loan	KfW	KfW and state banks	buildings - residential	Construction of EE Buildings	national
EE refurbishment of buildings							
Bayerisches Modernisierungsprogramm (BayModR)	Bavarian Modernisation programme (BayModR)	loan	State of Bavaria	Oberste Baubehörde im Bayerischen Staatsministerium des Innern, für Bau und Verkehr; Bayerische Landesbodenkreditanstalt (BayernLabo)	buildings - residential	Refurbishment of Buildings	state (Bavaria)
Brandenburg-Kredit Energieeffizienter Wohnungsbau	Loans for energy efficient building for the state of Brandenburg	grant	KfW ; Investment Bank of Brandenburg (ILB)	Investment Bank of Brandenburg (ILB)	buildings - residential	Refurbishment of Buildings	state (Brandenburg)
Energetische Sanierung von Wohnraum	energy-oriented housing renovation	loan	State of Saxony	Sächsische Aufbaubank - Förderbank - (SAB)	buildings - residential	Refurbishment of Buildings	state (Saxony)
Energieeffizienzdarlehen Niedersachsen	energy efficiency loan Niedersachsen	grant	State of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	buildings - residential	Refurbishment of Buildings	state (Lower-Saxony)
Energieeffizienzfinanzierung - ELR-Kombi	Financing Energy Efficiency - ELR-Kombi	loan	KfW Investment Bank; L-Bank	L-Bank	industries - SMEs	Refurbishment of Buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (GU)	Financing Energy Efficiency - larger Enterprises	loan	L-Bank	L-Bank	industries - all	Refurbishment of Buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (KMU)	Financing Energy Efficiency - SMEs	loan	KfW; L-Bank	L-Bank	industries - SMEs	Refurbishment of Buildings	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Sanieren	Financing Energy Efficiency - Renovation	loan and grant combination	KfW; L-Bank	L-Bank	buildings - residential	Refurbishment of Buildings	state (Baden-Württemberg)
Energiekredit Kommunal Bayern	Municipal Energy loan Bavaria	loan	KfW; Bayerische Landesbodenkreditanstalt (BayernLabo)	Bayerische Landesbodenkreditanstalt (BayernLabo)	buildings - public/ municipalities	Refurbishment of Buildings	state (Bavaria)

Förderrichtlinie Wärmeschutz im Gebäudebestand	Funding Directive for Heat Protection in Buildings	grant	City of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - residential	Refurbishment of Buildings	state (Hamburg)
Förderung der energetisch optimierten Modernisierung von Wohngebäuden und ausgewählten Nichtwohngebäuden	Supporting the energetically optimised modernisation of residential buildings and selected non-residential buildings	grant	State of Hesse	State Ministry for Environment, Energy, Agriculture and Consumer Protection of Hesse	buildings - all	Refurbishment of Buildings	state (Hesse)
Förderung der energetischen Modernisierung von kommunalen Nichtwohngebäuden der sozialen Infrastruktur sowie von kommunalen Verwaltungsgebäuden	Supporting the energy-related modernisation of municipal non-residential buildings of the social infrastructure and of municipal administration buildings	grant	State of Hesse	Wirtschafts- und Infrastrukturbank Hessen (WIBank)	buildings - public/ municipalities	Refurbishment of Buildings	state (Hesse)
Förderung energetischer und altersgerechter Wohnraummodernisierung (Sachsen-Anhalt MODERN)	Loans for energetic and age-based modernisation of residential buildings	loan	KfW; Investment Bank of Saxony-Anhalt (IB)	Investment Bank of Saxony-Anhalt (IB)	buildings - residential	Refurbishment of Buildings	state (Saxony-Anhalt)
Förderung von Investitionen zur Steigerung der Energieeffizienz, zur Nutzung erneuerbarer Energien und zum Klimaschutz in Kindertagesstätten und Schulen des Landes Sachsen-Anhalt (STARK III - EFRE)	Supporting investments for the increase of energy efficiency, for the use of renewable energies and for climate protection in Kinder gardens and schools in the federal state of Sachsen-Anhalt (STARK III - EFRE)	grant	state of Saxony-Anhalt	Investment Bank of Saxony-Anhalt(IB)	buildings - public/municipalities	Refurbishment of Buildings	state (Saxony-Anhalt)
IBB Energetische Gebäudesanierung	IBB energy-oriented renovation of buildings	loan	KfW, Investment Bank Berlin (IBB)	Investment Bank Berlin (IBB)	buildings - residential	Refurbishment of Buildings	state (Berlin)
IBB WEG-Finanzierung - Finanzierung von Maßnahmen am Gemeinschaftseigentum	Financing of measures for common property	loan	KfW, Investment Bank Berlin (IBB)	Investment Bank Berlin (IBB)	buildings - residential	Refurbishment of Buildings	state (Berlin)
IBB Wohnraum modernisieren	IBB modernisation of housing	loan	KfW, Investment Bank Berlin (IBB)	Investment Bank Berlin (IBB)	buildings - residential	Refurbishment of Buildings	state (Berlin)

IKK/IKU - Energetische Stadtsanierung - Energieeffizient Sanieren	IKK/IKU - Energy-oriented Urban Rehabilitation - energy efficient rehabilitation	loan and grant combination	KfW	KfW	buildings - public/ municipalities	Refurbishment of Buildings	national
Klima Plus Saar	Climate Plus Saar	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	buildings - all	Refurbishment of Buildings	State (Saarland)
Klimaschutzmaßnahmen im Rahmen der Modernisierung und Instandsetzung von Eigenwohnraum (Thüringer Modernisierungsdarlehen - Öko-Plus - Effizienzhausförderung)	Refurbishment loans ECO plus	loan	Thüringer Aufbaubank (TAB)	Thüringer Aufbaubank (TAB)	buildings - residential	Refurbishment of Buildings	state (Thuringia)
Klimaschutz-Plus - Allgemeiner Programmteil - CO2-Minderungsprogramm	Climate Protection Plus - General Part of the Programme - Programme for the Reduction of CO2	grant	State of Baden-Württemberg	L-Bank	all - except households	Refurbishment of Buildings	state (Baden-Württemberg)
Landeswohnraumförderungsprogramm - Modernisierungsförderung Wohnungseigentümergemeinschaften	Programme of the federal state for the support of housing - support of modernisation by apartment owner municipalities	loan	KfW; L-Bank	L-Bank	buildings - residential	Refurbishment of Buildings	state (Baden-Württemberg)
Mietwohnraum-Förderprogramm der L-Bank - Energieeffizientes Sanieren / Altersgerecht Umbauen	Programme for the support of rental housing of the state's bank - energy efficient refurbishment / age-appropriate rebuilding	loan	KfW; L-Bank	L-Bank	buildings - residential	Refurbishment of Buildings	state (Baden-Württemberg)
Modernisierung und Instandsetzung von Mietwohnungen (ThürModR-Mietwohnungen)	Modernisation and restoration of rental apartments (ThürModR-Mietwohnungen)	loan	State of Thuringia	Thüringer Landesverwaltungsamt (TLVwA)	buildings - residential	Refurbishment of Buildings	state (Thuringia)
Modernisierung von Mietwohnungen	Modernisation of rental housing	grant	State of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - residential	Refurbishment of Buildings	state (Hamburg)

Modernisierung von Nichtwohngebäuden	Modernisation of non-residential housing	grant	State of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - commercial	Refurbishment of Buildings	state (Hamburg)
Modernisierung von Nichtwohngebäuden	Modernisation of non-residential housing	grant	State of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - commercial	Refurbishment of Buildings	state (Hamburg)
Modernisierungs- und Instandsetzungsmaßnahmen an Wohngebäuden in Sanierungsgebieten	Modernisation and restoration measures to residential buildings in rehabilitation areas	grant	Hamburg Investment Bank (IFB HH)	Hamburg Investment Bank (IFB HH)	buildings - residential	Refurbishment of Buildings	state (Hamburg)
NRW.BANK Gebäudesanierung	NRW.BANK Refurbishment of buildings	loan	NRW.BANK	NRW.BANK	buildings - residential	Refurbishment of Buildings	state (North Rhine-Westphalia)
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the rational use of energy, renewable energies and energy saving - part of the programme for market launch	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	all	Refurbishment of Buildings	state (North Rhine-Westphalia)
Sondervermögen Energetische Sanierung von Schulen und Kindertageseinrichtungen	Special fund for the energy-related renovation of schools and Kinder gardens	grant	State of Schleswig-Holstein	Investment Bank Schleswig-Holstein (IB)	buildings - public/ municipalities	Refurbishment of Buildings	state (Schleswig-Holstein)
Thüringer Familienbaudarlehen und Thüringer Modernisierungsdarlehen	Building and refurbishment loans for families	loan	Thüringer Aufbaubank (TAB)	Thüringer Aufbaubank (TAB)	buildings - residential	Refurbishment of Buildings	state (Thuringia)
Unternehmerkredit Energieeffizienz Niedersachsen	business loan for energy efficiency Niedersachsen	grant	state of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	all	Refurbishment of Buildings	state (Lower-Saxony)
Wärmeschutz im Wohngebäudebestand	Programme for solar thermal systems and heating	grant	BAFA	BAFA	buildings - residential	Refurbishment of Buildings	state (Bremen)
Wohnungsbauförderung - Modernisierungsförderung	Funding for residential building and modernisation	grant	City of Bremen	Bremer Aufbau-Bank GmbH; Senator für Umwelt, Bau und Verkehr	buildings - residential	Refurbishment of Buildings	state (Bremen)

Zukunftsenergieprogramm kommunal (ZEP-kommunal)	municipal Future energy Programme (ZEP-Kommunal)	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	buildings - public/ municipalities	Refurbishment of Buildings	state (Saarland)
Energieeffizient Sanieren	Energy-efficient renovations	loan	KfW	KfW and state banks	buildings - residential	Refurbishment of Buildings	national
Planning /supervision of energy efficient refurbishment							
Energetische Sanierung von Wohnraum	Energy-oriented Renovation of Housing	grant	State of Saxony	Sächsische Aufbaubank - Förderbank - (SAB)	buildings - residential	Planning/supervision of modernisation / rehabilitation	state (Saxony)
Energieeffizienzdarlehen Niedersachsen	Energy Efficiency Loan Niedersachsen	grant	State of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	buildings - residential	Planning/supervision of modernisation / rehabilitation	state (Lower-Saxony)
Förderrichtlinie Wärmeschutz im Gebäudebestand	Funding Directive for Heat Protection in Buildings	grant	City of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - residential	Planning/supervision of modernisation / rehabilitation	state (Hamburg)
KfW-Energieeffizienzprogramm	KfW - Energy Efficiency Programme	loan	KfW	KfW	industries - all	Planning/supervision of modernisation / rehabilitation	national
Klimaschutz-Förderrichtlinie	Climate Protection Funding Directive	grant	state of Mecklenburg-Vorpommern	Landesförderinstitut Mecklenburg-Vorpommern (LFI)	all	Planning/supervision of modernisation / rehabilitation	state (Mecklenburg-Vorpommern)
Modernisierung von Nichtwohngebäuden	Modernisation of Non-residential Housing	grant	state of Hamburg	Hamburg Investment Bank (IFB Hamburg)	buildings - commercial	Planning/supervision of modernisation / rehabilitation	state (Hamburg)
Unternehmerkredit Energieeffizienz Niedersachsen	Business Loan for Energy Efficiency Niedersachsen	grant	State of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	all	Planning/supervision of modernisation / rehabilitation	state (Lower-Saxony)
Energieeffizient Sanieren - Baubegleitung	Energy-efficient Rehabilitation - Construction Monitoring	grant	KfW	KfW Investment Bank	buildings - residential	Planning/supervision of modernisation / rehabilitation	national
Implementation of EE technologies / measures							

Bayerisches Umweltkreditprogramm / Ökokredit	Bavarian Programme for Environment Loans / Eco Loans	loan	State of Bavaria	LfA Förderbank Bayern	industries - SMEs	Installation of EE technologies	state (Bavaria)
Energieeffizienz und Klimaschutz	Energy Efficiency and Climate Protection	grant	State of Saxony	Sächsische Aufbaubank - Förderbank - (SAB)	all	Installation of EE technologies	state (Saxony)
Energieeffizienzfinanzierung - ELR-Kombi	Financing Energy Efficiency - ELR-Kombi	loan	KfW; L-Bank	L-Bank	industries - SMEs	Installation of EE technologies	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (GU)	Financing Energy Efficiency - Larger Enterprises	loan	L-Bank	L-Bank	industries - all	Installation of EE technologies	state (Baden-Württemberg)
Energieeffizienzfinanzierung - Mittelstand (KMU)	Financing Energy Efficiency - SMEs	loan	KfW; L-Bank	L-Bank	industries - SMEs	Installation of EE technologies	state (Baden-Württemberg)
Erneuerbare Energien, Energieeffizienz und Versorgungssicherheit (RENplus)	Renewable Energies, Energy Efficiency and Security of Supply (RENplus)	grant	State of Brandenburg	Investment Bank of Brandenburg (ILB)	all	Installation of EE technologies	state (Brandenburg)
Ersatz von Elektroheizungen	Replacement of Electronic Heating Systems	grant	State of Bremen	swb Vertrieb Bremen GmbH	all	Installation of EE technologies	state (Bremen)
Förderprogramm für kommunalen Klimaschutz - Klimaschutz mit System	Programme for Municipal Climate Protection - Systematic Climate Protection	grant	State of Baden-Württemberg	KEA Klimaschutz- und Energieagentur Baden-Württemberg GmbH	all	Installation of EE technologies	state (Baden-Württemberg)
Förderung von energieeffizienten und klimaschonenden Produktionsprozessen	Supporting Energy Efficient and Climatefriendly Production Processes	grant	Federal Ministry for Economics and Energy	Federal Ministry for Economics and Energy	industries - all	Installation of EE technologies	national
Investivkredit Energie	Investivkredit Energie	loan	KfW; Bayerische Landesbodenkreditanstalt (BayernLabo)	Bayerische Landesbodenkreditanstalt (BayernLabo)	industries - SMEs	Installation of EE technologies	state (Bavaria)
KfW-Energieeffizienzprogramm	KfW - Energy Efficiency Programme	loan	KfW	KfW	industries - all	Installation of EE technologies	national

KfW-Finanzierungsinitiative Energiewende	KfW - Initiative for Financing the Turnaround in Energy Policy	loan	KfW	KfW	industries - all	Installation of EE technologies	national
Klima Plus Saar	Climate Plus Saar	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	industries - SMEs	Installation of EE technologies	state (Saarland)
Klimaschutz-Darlehensprogramm	Programme for Climate Protection Loans	loan	State of Mecklenburg-Vorpommern	Landesförderinstitut Mecklenburg-Vorpommern (LFI)	all	Installation of EE technologies	state (Mecklenburg-Vorpommern)
Klimaschutz-Förderrichtlinie	Climate Protection Funding Directive	grant	State of Mecklenburg-Vorpommern	Landesförderinstitut Mecklenburg-Vorpommern (LFI)	all	Installation of EE technologies	state (Mecklenburg-Vorpommern)
Klimaschutzinitiative - Maßnahmen an gewerblichen Kälteanlagen	Climate Protection Initiative - Measures to Commercial Refrigeration Systems	grant	BMUB	BAFA	industries - all	Installation of EE technologies	national
Klimaschutzinitiative - Maßnahmen an gewerblichen Kälteanlagen	Climate Protection Initiative - Measures to Commercial Refrigeration Systems	grant	BMUB	BAFA	industries - all	Installation of EE technologies	national
Klimaschutzkredit für kleine und mittlere Unternehmen	Climate Protection Loans for SMEs	loan	City of Hamburg	Hamburg Investment Bank (IFB HH)	industries - SMEs	Installation of EE technologies	state (Hamburg)
Klimaschutz-Plus - Kommunaler Programmteil - CO_2-Minderungsprogramm	Climate Protection Plus - Municipal Part of the Programme - Programme for the Reduction of CO_2	grant	State of Baden-Württemberg	L-Bank	all - except households	Installation of EE technologies	state (Baden-Württemberg)
Klimaschutz-Plus - Programmteil für Vereine - CO2-Minderungsprogramm	Climate Protection Plus - Municipal Part of the Programme - Programme for Municipal Structure, Qualification and Consulting	grant	State of Baden-Württemberg	L-Bank	buildings - public/ municipalities	Installation of EE technologies	state (Baden-Württemberg)
NRW.BANK Effizienzkredit	NRW.BANK Efficiency Loan	loan	NRW.BANK	NRW.BANK	industries - all	Installation of EE technologies	state (North Rhine-Westphalia)

progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the Rational Use of Energy, Renewable Energies and Energy Saving - Part of the Programme for Market Launch	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	all	Installation of EE technologies	state (North Rhine-Westphalia)
Richtlinien zum Hessischen Energiegesetz - Vorhaben sparsame Energienutzung	Directive to the Hessian Energy Act - Projects for Reduced Energy Consumption	grant	State of Hesse	hessenENERGIE Gesellschaft für rationelle Energienutzung mbH	all	Installation of EE technologies	state (Hesse)
Sparsame und rationelle Energienutzung und -umwandlung in Industrie und Gewerbe (REN-Richtlinie)	Economical and Rational Use and Transformation of Energy in Trade and Industry (REN-Directive)	grant	City of Bremen	State Ministry for Environment, Building and Transport	all	Installation of EE technologies	state (Bremen)
Unternehmen für Ressourcenschutz	Enterprises for Resource Protection	grant	State of Hamburg	Behörde für Stadtentwicklung und Umwelt	industries - all	Installation of EE technologies	state (Hamburg)
Unternehmerkredit Energieeffizienz Niedersachsen	Business Loan for Energy Efficiency Niedersachsen	grant	state of Lower-Saxony	Investment Bank Lower-Saxony (NBank)	all	Installation of EE technologies	state (Lower-Saxony)
Zinszuschüsse für Investitionen im Bereich der Energieeffizienz und der Energieversorgung	Subsidised Loans for Investments in Energy Efficiency and Energy Supply	grant	state (Rhineland-Palatinate)	Energy Agency Rhineland-Palatinate GmbH	all	Installation of EE technologies	state (Rhineland-Palatinate)
Investitionszuschüsse zum Einsatz hocheffizienter Querschnittstechnologien im Mittelstand	Investment Grants for the Application of Highly Efficient Cross-cutting Technologies in SMEs	grant	BAFA	BAFA	industries - SMEs	Installation of EE technologies	national
Establishment of a monitoring / measuring system							
IKK/IKU - Energetische Stadtsanierung - Quartiersversorgung	IKK/IKU - Energy-oriented Urban Rehabilitation - local infrastructures	loan	KfW	KfW	buildings - public/ municipalities	Establishment of Energy Controlling/Metering	national
IKK/IKU - Kommunale Energieversorgung	IKK/IKU - Municipal Energy Supply	loan	KfW	KfW	buildings - public/	Establishment of Energy Control-	national

					municipalities	ling/Metering	
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the rational use of energy, renewable energies and energy saving - part of the programme for market launch	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	all	Establishment of Energy Controlling/Metering	state (North Rhine-Westphalia)
Förderung von Energiemanagementsystemen	Supporting energy management systems	grant	BAFA	BAFA	industries - SMEs	Establishment of Energy Controlling/Metering	national
Conduction of energy audits in buildings							
Stromsparcheck einkommensschwache Haushalte	Check on Energy Savings in Low-income Households	grant	BMUB	Deutschen Caritasverband e.V. (DCV)	buildings - residential	Conduction of EE Audits	national
Energieberatung für Effizienz und Optimierung (ENEO)	Energy Consulting for Efficiency and Optimisation (ENEO)	grant	IBB	IBB	buildings - residential	Conduction of EE Audits	state (Berlin)
Energieberatung der Verbraucherzentralen	Energy Consulting of Consumer Organisations	grant	BMWi	Verbraucherzentrale Bundesverband e.V.	buildings - residential	Conduction of EE Audits	national
Klimaschutz-Plus - Allgemeiner Programmteil - Beratungsprogramm	Climate Protection Plus - General Part of the Programme - Consulting Programme	grant	State Ministry for Environment, Climate and Energy Economics of Baden-Württemberg	L-Bank	industries - SMEs	Conduction of EE Audits	state (Baden-Württemberg)
Klimaschutz-Plus - Programmteil für Vereine - Beratungsprogramm	Climate Protection Plus - Part of the Programme for Associations - Consulting Programme	grant	State Ministry for Environment, Climate and Energy Economics of Baden-Württemberg	L-Bank	buildings - public/ municipalities	Conduction of EE Audits	state (Baden-Württemberg)
Förderrichtlinie Hamburger Energiepass	Directive for the Support of the Energy Certificate Hamburg	grant	Hamburg Investment Bank (IFB HH)	Hamburg Investment Bank (IFB HH)	buildings - residential	Conduction of EE Audits	state (Hesse)

Klimaschutz-Plus - Kommunaler Programmteil - Kommunales Struktur-, Qualifizierungs- und Beratungsprogramm	Climate Protection Plus - Part of the Programme for Municipalities - Qualification and Consulting Programme	grant	State of Baden-Württemberg	L-Bank	buildings - public/ municipalities	Conduction of EE Audits	state (Baden-Württemberg)
Modernisierung von Nichtwohngebäuden	Modernisation of Non-residential Housing	grant	State of Hamburg	Hamburg Investment Bank (IFB HH)	buildings - commercial	Conduction of EE Audits	state (Hamburg)
Förderung von Maßnahmen des Klimaschutzes und der erneuerbaren Energien (Sachsen-Anhalt KLIMA)	Support of Measures of Climate Protection and Renewable Energies (Sachsen-Anhalt KLIMA)	grant	State of Saxony-Anhalt	Investment Bank of Saxony-Anhalt (IB)	all	Conduction of EE Audits	state (Saxony-Anhalt)
Sparsame und rationelle Energienutzung und -umwandlung in Industrie und Gewerbe (REN-Richtlinie)	Economical and Rational Use and Transformation of Energy in Trade and Industry (REN-Directive)	grant	City of Bremen	State Ministry for Environment, Building and Transport	all	Conduction of EE Audits	state (Bremen)
BAFA Vor-Ort Beratung	BAFA On-site Consulting	grant	BMWi	BAFA	buildings - residential	Conduction of EE Audits	national
Conduction of energy audits in industries							
Impulsgespräche zur Energieeffizienz	Initial consultation for Energy Efficiency	grant	BMWi	RKW	industries - SMEs	Conduction of EE Audits	national
Energieeffizienzmaßnahmen in KMU	Energy Efficiency Measures in SMEs	grant	State of Thuringia	Thüringer Aufbaubank (TAB)	industries - SMEs	Conduction of EE Audits	state (Thuringia)
Förderung von Maßnahmen des Klimaschutzes und der erneuerbaren Energien (Sachsen-Anhalt KLIMA)	Support of measures of Climate Protection and Renewable Energies (Sachsen-Anhalt KLIMA)	grant	State of Saxony-Anhalt	Investment Bank of Saxony-Anhalt (IB)	all	Conduction of EE Audits	state (Saxony-Anhalt)
Sparsame und rationelle Energienutzung und -umwandlung in Industrie und Gewerbe (REN-Richtlinie)	Economical and Rational Use and Transformation of Energy in Trade and Industry (REN-Directive)	grant	City of Bremen	State Ministry for Environment, Building and Transport	all	Conduction of EE Audits	state (Bremen)
Förderung von Energieberatungen im Mittelstand	Support of Energy Audits in MEs	grant	KfW	KfW Investment Bank	industries - SMEs	Conduction of EE Audits	national
(Long-term) energy coaching / consulting							

Beratungshilfeprogramm	Support for Consulting Programme	grant	Investment Bank of Saxony-Anhalt (IB)	Investment Bank of Saxony-Anhalt (IB)	industries - SMEs	Conduction of EE Coaching	state (Saxony-Anhalt)
Förderprogramm Coaching - Schwerpunkt Elektromobilität, Erneuerbare Energien und Energieeffizienz (ESF 2007-2013)	Support Programme Coaching - Focus Electromobility, Renewable Energies and Energy Efficiency (ESF 2007-2013)	grant	European Social Fund	L-Bank	industries - SMEs	Conduction of EE coaching	state (Baden-Württemberg)
Conduction of EE training							
Förderrichtlinien und Grundsätze für Projekte der EKSH	Funding Directive and principles for projects of EKSH	Capacity Building - Workshops/Trainings (subsidized by grants)	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	buildings - public/ municipalities	Conduction of trainings for EE	state (Schleswig-Holstein)
Förderung unternehmerischen Know-hows durch Informations- und Schulungsveranstaltungen sowie Workshops	Supporting Business Know-how with Information Events and Workshops	Capacity Building - Workshops/Trainings (subsidized by grants)	BAFA / European Social Fund	BAFA	industries - all	Conduction of trainings for EE	national
Klimaschutzinitiative - Klimaschutzprojekte für die Bereiche Wirtschaft, Kommunen, Verbraucher und Bildung	Climate Protection Initiative - Climate Protection Projects for the Economy, Municipalities, Consumers and Education	Capacity Building - Workshops/Trainings (subsidized by grants)	BMUB	Projektträger Jülich (PtJ)	all	Conduction of trainings for EE	national
Richtlinien zum Hessischen Energiegesetz - Vorhaben Qualifikation	Directive to the Hessian Energy Act	Capacity Building - Workshops/Trainings (subsidized by grants)	State Ministry for Environment, Energy, Agriculture and Consumer Protection of Hesse; Wirtschafts- und Infrastrukturbank Hessen	public	industries - all	Conduction of trainings for EE	state (Hesse)

IMPULS-Programm zur Qualifizierung	IMPULS - Programme for Qualification	Capacity Building - Workshops/Trainings (subsidized by grants)	Hamburg Investment Bank (IFB HH)	Hamburg Investment Bank (IFB HH)	industries - all	Conduction of trainings for EE	state (Hamburg)
Networking platforms for companies exchanging ideas on EE							
Klimaschutz-Plus - Allgemeiner Programmteil - Beratungsprogramm	Climate Protection Plus - General Part of the Programme - Consulting Programme	grant	State Ministry for Environment, Climate and Energy Economics of Baden-Württemberg	L-Bank	industries - SMEs	Conduction of EE Networks (Exchange of Experience)	state (Baden-Württemberg)
Lernende EnergieEffizienz-Netzwerke	Learning Energy Efficiency Networks	grant	DBU	IREES GmbH /Fraunhofer ISI	industries - all	Conduction of EE networks (Exchange of Experience)	national
Implementation of energy management systems in industries							
EMAS im Konvoi	EMAS in a Convoy	grant	State Ministry for Environment, Climate and Energy Economics of Baden-Württemberg	-	all - except households	Implementation of Energy Management Systems (continuous activity)	state (Baden-Württemberg)
Erneuerbare Energien, Energieeffizienz und Versorgungssicherheit (RENplus)	Renewable Energies, Energy Efficiency and Security of Supply (RENplus)	grant	State of Brandenburg	Investment Bank of Brandenburg (ILB)	all	Implementation of Energy Management Systems (continuous activity)	state (Brandenburg)
Förderung von Energiemanagementsystemen	Support of Energy Management Systems	grant	BAFA	BAFA	industries - SMEs	Implementation of Energy Management Systems (continuous activity)	national
KfW-Energieeffizienzprogramm	KfW - Energy Efficiency Programme	loan	KfW	KfW	industries - all	Implementation of Energy Management Systems (continuous activity)	national
Mittelstandsförderung - Umweltmanagement	Support of SMEs - Environmental Management	grant	State of Saxony	Sächsische Aufbaubank - Förderbank - (SAB)	industries - SMEs	Implementation of Energy Management Systems (continuous	state (Saxony)

						activity)	
Nachhaltige Entwicklung	Sustainable Development	grant	State of Thuringia	State Ministry for Agriculture, Forestry, Environment and Nature Conservation of Thuringia	all	Implementation of Energy Management Systems (continuous activity)	state (Thuringia)
SpaEfV - und freiwillige Vereinbarung der Industrie	Ordinance regarding Tax Incentives for Companies that apply Energy Management	tax benefits	SpaEfV-framework	Main Customs Office at BAFA	industries - all	Implementation of Energy Management Systems (continuous activity)	national
Implementation of management systems for achieving and evaluating climate and energy targets for municipalities							
Förderung des European Energy Award (eea)	Promotion of the European Energy Award (eea)	grant	State of North Rhine-Westphalia	Energy Agency NRW; Projektträger Energie, Technologie, Nachhaltigkeit (PT ETN)	all	Establishment and Certification of Energy Management System for municipalities	state (North Rhine-Westphalia)
Development of climate / energy concepts in municipalities							
CO_2-Minderungsprogramm	Programme for the Reduction of CO_2	grant	State of Bavaria	Bavarian State Office for Environment	buildings - public/ municipalities	Development of Energy Concepts	state (Bavaria)
Klimaschutzinitiative - Klimaschutzprojekte in sozialen, kulturellen und öffentlichen Einrichtungen	Climate Protection Initiative - Climate Protection Projects in Social, Cultural and Public Institutions	grant	BMUB	Projektträger Jülich (PtJ)	buildings - public/ municipalities	Development of Energy Concepts	national
Zukunftsenergieprogramm kommunal (ZEP-kommunal)	Municipal Future Energy Programme (ZEP-Kommunal)	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	buildings - public/ municipalities	Development of Energy Concepts	state (Saarland)
Energetische Stadtsanierung - Zuschüsse für integrierte Quartierskonzepte und Sanierungsmanager	Energy-oriented Urban Rehabilitation - Grants for Local Infrastructure Concepts and Rehabilitation Managers	grant	KfW	KfW	buildings - public/ municipalities	Development of Energy Concepts	national

Employment of an energy manager in public entities							
Förderung des European Energy Award (eea)	Support of the European Energy Award (eea)	grant	State of North Rhine-Westphalia	Energy Agency NRW; Projektträger Energie, Technologie, Nachhaltigkeit (PT ETN)	buildings - public/ municipalities	Employment of an energy manager	state (North Rhine-Westphalia)
Klimaschutzinitiative - Klimaschutzprojekte in sozialen, kulturellen und öffentlichen Einrichtungen	Climate Protection Initiative - Climate Protection Projects in Social, Cultural and Public Institutions	grant	BMUB	Projektträger Jülich (PtJ)	buildings - public/ municipalities	Employment of an energy manager	national
Energetische Stadtsanierung - Zuschüsse für integrierte Quartierskonzepte und Sanierungsmanager	Energy-oriented Urban Rehabilitation - Grants for Local Infrastructure Concepts and Rehabilitation Managers	grant	KfW	KfW	buildings - public/ municipalities	Employment of energy manager	national
Foundation of regional energy agencies							
Klimaschutz-Plus - Kommunaler Programmteil - Kommunales Struktur-, Qualifizierungs- und Beratungsprogramm	Climate Protection Plus - Municipal Part of the Programme - Programme for Municipal Structure, Qualification and Consultation	grant	State of Baden-Württemberg	L-Bank	buildings - public/ municipalities	Foundation of Energy Agencies	state (Baden-Württemberg)
Förderung der Gründung von Energieagenturen	Supporting the foundation of Energy Agencies	grant	state of Bavaria	Regional Governments	buildings - public/ municipalities	Foundation of Energy Agencies	state (Bavaria)
Financial incentives for schools to save energy							
Fifty/Fifty	Fifty/Fifty – incentive schemes for schools to save energy	reward	BMUB, municipalities, administrative districts	UfU	other	EE user behaviour/awareness raising	national
Installation of load management systems							
Investivkredit Energie	Investivkredit Energie	loan	KfW; Bayerische Landesbodenkreditanstalt (BayernLabo)	Bayerische Landesbodenkreditanstalt (BayernLabo)	industries - SMEs	Installation of Load Management System	state (Bavaria)

Companies shutting down heavy loads in peak load times							
Verordnung zu abschaltbaren Lasten (AbLaV)	Regulatory Basis for Demand Side Management	reward	National Budget	German Parliament /Legislative	industries - all	Conduction of Demand Side Management for heavy industries	national
Installation of of energy storage systems							
Förderrichtlinien und Grundsätze für Projekte der EKSH	Funding Directive and principles for projects of EKSH	grant	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	buildings - public/municipalities	Installation of Energy Storage	state (Schleswig-Holstein)
NRW.BANK Energieinfrastruktur	NRW.BANK Energy infrastructure	loan	NRW.BANK	NRW.BANK	all	Installation of Energy Storage	state (North Rhine-Westphalia)
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the rational use of energy, renewable energies and energy saving - part of the programme for market launch	grant	state of North Rhine-Westphalia	Regional Government of Arnsberg	all	Installation of Energy Storage	state (North Rhine-Westphalia)
IKK/IKU - Kommunale Energieversorgung	IKK/IKU - Municipal Energy Supply	loan	KfW	KfW	buildings - public/ municipalities	Installation of Energy Storage	national
Installation of cogeneration of heat and power							
Einführung von Mikro-KWK-Anlagen in den Markt	Market launch of micro cogeneration plants	grant	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	Association for Energy and Climate Protection Schleswig-Holstein GmbH (EKSH)	all	Installation of Cogeneration of Heat and Power	state (Schleswig-Holstein)
IKK/IKU - Energetische Stadtsanierung - Quartiersversorgung	IKK/IKU - Energy-oriented Urban Rehabilitation - local infrastructures	loan	KfW	KfW	buildings - public/ municipalities	Installation of Cogeneration of Heat and Power	national
Klima Plus Saar	Climate Plus Saar	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	all	Installation of Cogeneration of Heat and Power	state (Saarland)

Klimaschutzinitiative - Mini-KWK-Anlagen	Climate Protection Initiative - Mini cogeneration plants	grant	BMUB	BAFA	all	Installation of Cogeneration of Heat and Power	national
NRW/EU KWK-Investitionskredit	NRW/EU KWK - Investment loan	loan	State of North Rhine-Westphalia; European Union	NRW.BANK	industries - all	Installation of Cogeneration of Heat and Power	state (North Rhine-Westphalia)
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich KWK	progres.nrw - Programme for the rational use of energy, renewable energies and energy saving - part of the programme for cogeneration	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	industries - SMEs	Installation of Cogeneration of Heat and Power	state (North Rhine-Westphalia)
progres.nrw - Programm für Rationelle Energieverwendung, Regenerative Energien und Energiesparen - Programmbereich Markteinführung	progres.nrw - Programme for the rational use of energy, renewable energies and energy saving - part of the programme for market launch	grant	State of North Rhine-Westphalia	Regional Government of Arnsberg	all	Installation of Cogeneration of Heat and Power	state (North Rhine-Westphalia)
Sparsame und rationelle Energienutzung und -umwandlung in Industrie und Gewerbe (REN-Richtlinie)	Economical and rational use and transformation of energy in trade and industry (REN-Directive)	grant	City of Bremen	State Ministry for Environment, Building and Transport	all	Installation of Cogeneration of Heat and Power	state (Bremen)
Zukunftsenergieprogramm kommunal (ZEP-kommunal)	municipal Future energy Programme (ZEP-Kommunal)	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	buildings - public/ municipalities	Installation of Cogeneration of Heat and Power	state (Saarland)
KWKG	CHP Law (Combined Heat & Power)	reward	KWKG-framework	German Parliament/ Legislative	all	Installation of Cogeneration of Heat and Power	national
Implementation of heating / cooling network solutions							
IKK/IKU - Energetische Stadtsanierung - Quartiersversorgung	IKK/IKU - Energy-oriented Urban Rehabilitation - local infrastructures	loan	KfW	KfW	buildings - public/ municipalities	Installation of heating / cooling networks	national

Klima Plus Saar	Climate Plus Saar	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	all	Installation of heating / cooling networks	state (Saarland)
Zukunftsenergieprogramm kommunal (ZEP-kommunal)	municipal Future energy Programme (ZEP-Kommunal)	grant	State of Saarland	State Ministry for Economics, Labour, Energy and Transport	buildings - public/ municipalities	Installation of heating / cooling networks	state (Saarland)
KWKG	CHP Law (Combined Heat & Power)	grant	KWKG-framework	German Parliament/ Legislative	all	Installation of heating / cooling networks	national