ENERGY EVALUATION EUROPE
2020 Conference
Here East, Olympic Park, London
Monday 29 June to Wednesday 1 July 2020
Accelerating the energy transition for all: Evaluation's role in effective policy making
Formerly IEPPEC

Municipalities in focus: Evaluating the Local Authorities Guideline (LAG) within the National Climate Initiative (NCI) of Germany: challenges and findings

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ABSTRACT

Germany has approximately 11,000 municipalities which can make a significant contribution towards achieving national climate targets. The Local Authorities Guideline (LAG) of the German National Climate Initiative (NCI) has been supporting municipalities in designing and implementing climate action since 2008. The aim of the LAG is to provide targeted support to municipalities in achieving GHG mitigation and in establishing a strategic framework for effective climate protection.

Over the years, the LAG has continuously been revised and improved. It was evaluated for the first time in 2011, followed by two further evaluation periods 2012-2014 and 2015-2017. A total of more than 8,500 projects were completed by more than 3,000 municipalities. These can be allocated to more than 40 different funding areas, which belong to 5 different funding priorities. The spectrum of funding priorities ranges from initial advice, climate action concepts and climate action management, to numerous investment measures.

Due to the complexity and diversity of the LAG, the evaluation faces a number of challenges. Investment as well as informative and strategic approaches must be adequately evaluated. At the time of the evaluation there was no experience available for the evaluation of climate action concepts and climate action management.

In our paper we describe the LAG, evaluation methodologies, challenges, and selected findings of the evaluation of the strategic funding priorities. In particular, we focus on the effects of the funding of climate action concepts and climate action managers. We discuss the methodology as well as the results.

Introduction

Background and implementation of the Local Authorities Guideline (LAG) within the NCI

Local authorities in municipalities and counties can make a substantial contribution towards the target set by the Federal Government of reducing greenhouse gas emissions in Germany by 55% by 2030 and by 80 to 95% by 2050 compared with 1990 levels. As one of the Federal Government's most important funding instruments, the Local Authorities Guideline (LAG) within the National Climate Initiative (NCI) has been supporting municipalities in the design and implementation of climate protection measures since 2008.

Municipalities assume two different roles in climate action: on the one hand, they are responsible for tackling saving potentials within the municipality's range, in particular by energy efficient refurbishment of public buildings and other public infrastructure such as lighting and parts of the transport infrastructure. On the other hand, municipalities are responsible for strategic planning of climate action strategies and they are important players in motivating society to implement more climate protection activities.

However, climate protection is a voluntary task for municipalities and is not given priority in places where there is an inadequate financial situation with corresponding investment backlogs (Ziesing, H.J. 2019). That is why local authorities need support. With the LAG, they receive a specially tailored support programme that helps municipalities to fulfil both roles.

Table 1 shows the LAG's funding priorities and areas of support. Both strategic measures and investments in energy efficiency technologies are supported. The funding of strategic measures ranges from initial advice for climate action "beginner" municipalities to the preparation of integrated climate action concepts and climate action sub-concepts, and support for the implementation of concepts and measures through climate action management. An essential component of climate action management is the funding of climate action managers for up to five years. To sum up, it is possible to get funding from the LAG for the complete climate action process from the initial consultation and concept development via climate action management to investments.

Table 1: Funding priorities and funding areas of the LAG

	Funding Priorities	Funding Areas
Strategic (partly with investment, but less important)	Initial advice for climate action	Initial advice for climate action
	Development of an integrated climate action concept	Development of an integrated climate action concept
	Development of a climate action concept for a selected area of action (sub-concept)	Up to 12 different sub-concepts, such as - Climate action within the municipality's own properties - Climate-friendly mobility in municipalities - Climate protection in industrial/commercial areas - Renewable energies - Integrated heat use in communities - Green IT - Climate-friendly waste treatment - Climate-friendly water supply - Climate-friendly waste water treatment
	Climate Action Management (requirement: existing climate action concept or sub-concept for own properties, mobility or industrial/commercial areas)	- Climate action manager for implementing the climate action (sub-)concept (funding for up to three years) - Climate action manager for implementing the climate action (sub-)concept – follow-up (funding for up to two more years) - Energy saving models for schools - Selected climate protection investment (climate action manager required)
Investment	Climate Protection Investment	- Renovation of street lighting - Renovation of hall and other interior lighting - Renovation/replacement of room ventilation systems - Construction of bicycle storage facilities - Improvement of cycling infrastructure - In-situ stabilisation of landfill sites

From the start of funding in 2008 until the end of 2017, about 8,840 projects in more than 40 different funding areas, which can be assigned to 5 funding priorities, were completed. A total of about EUR 332,660,000 in funding was used to support these projects. In all funding priorities, funding is provided in the form of a non-repayable grant in varying proportions of the expenditure or costs of the project. The average funding rate for all projects is 40 percent. Investment projects receive an average of 30 percent, strategic projects an average of 66 percent. In addition to municipalities, churches, universities and "others" are also eligible to apply.

Since the launch of the LAG, the largest number of projects has been implemented in climate protection investments, providing economic incentives mainly for lighting refurbishments (approx. 5,900 indoor and street lighting projects). Since 2008, 1,800 climate action concepts (integrated and sub-concepts), 300 climate action managers and 70 climate action manager follow-ups have been financially supported (plus 80 projects of "energy saving models in schools"). Initial advice and climate action management investment have been funded in smaller numbers. (Figure 1)

Overall, 73 percent of all projects were investment projects and 27 percent strategic projects. Figure 2 additionally shows the distribution of subsidies among the funding priorities: 64 percent of the funds go to investment projects; 36 percent go to strategic projects.

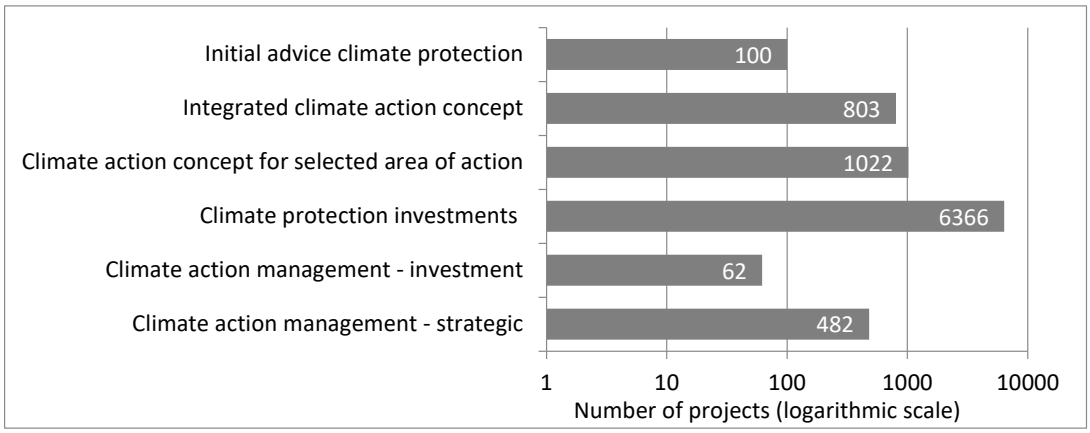

Figure 1. Number of projects by funding priority. “Climate action management” supports both investment and strategic projects. *Source:* funding data base

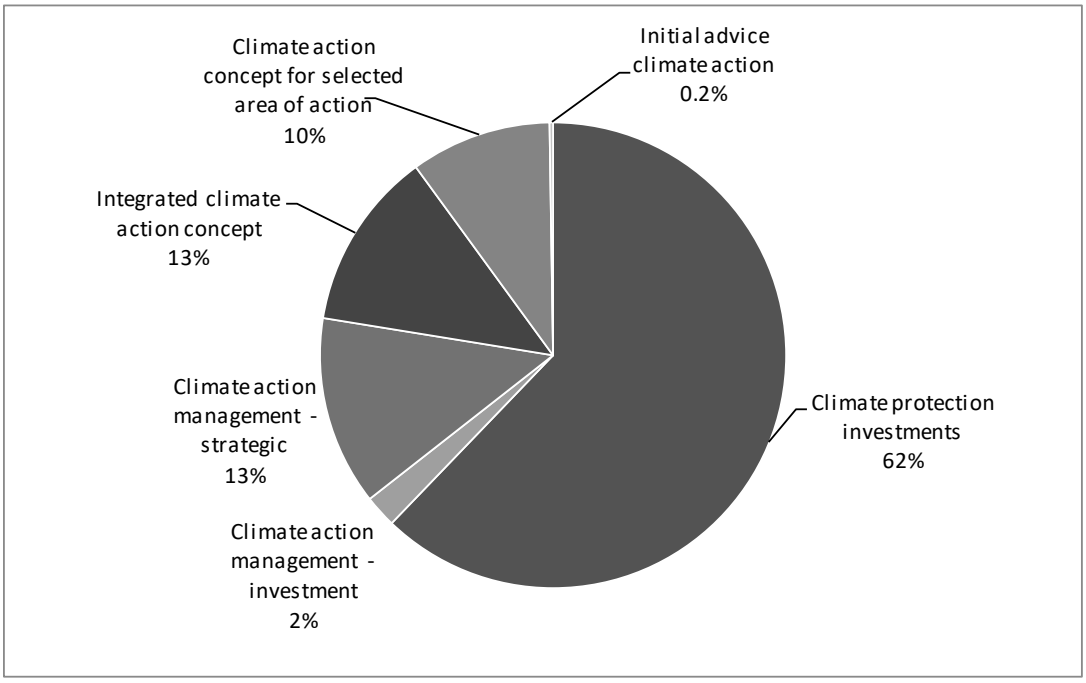

Figure 2. Share of approved funding by funding priority. “Climate action management” supports both investment and strategic projects. *Source:* funding data base

Main focus of the paper

A comprehensive performance review to evaluate the effects of the NCI to comply with national auditing requirements (Section 7 of the German Federal Budget Code of the Supreme Audit Institution) has already been carried out for three periods: 2008 to 2011, 2012 to 2014 and 2015 to 2017. The main target was to examine whether the programme objectives of the NCI have been achieved with the NCI's funding guidelines and funding

programmes, to what extent the funding has led to measurable investment incentives and/or measurable GHG reductions, and whether the funding measures were appropriate in terms of climate protection policy and were the cause of the success. Results of the evaluations are published in Schumacher et al. 2018.

In evaluating the LAG, both investments and strategic measures must be subject to a performance review. The focus of this paper is on the evaluation of the LAG's most important strategic funding areas: the development of climate action concepts and sub-concepts, and the funding of climate action managers. Integrated climate action concepts address all relevant fields of action in the municipality, sub-concepts address a specific sector. Concepts mainly comprise a description of the status quo, a GHG and energy balance and a list of measures ready for implementation. Participation and public involvement play an important role.

These strategic projects have a central role in the funding portfolio of the LAG, and their evaluation presents a particular challenge. Strategic projects do not cause any directly and immediately measurable greenhouse gas reductions like investments. Rather, they provide targeted support for municipalities to build a strategic framework for effective climate action, in which citizens and all municipal actors can be involved. A methodology for determining this impact has not yet been standardised and there is little experience in this field.

In this paper both the methodology and selected results of the evaluation are introduced and discussed. The paper focuses on the impact of “soft criteria” of funding of integrated climate action concepts, the sub-concepts “integrated heat use” and “mobility”, and of climate action managers. The paper deals with projects that were completed between the start of LAG funding in 2008 and the end of 2017.

Methodology

Since the LAG has been evaluated as part of the NCI, a systematic theory-based methodology has been developed to fit all guidelines under the NCI. This approach includes the definition of main criteria for the evaluation which have been derived from the stated objectives in the NCI. In designing the criteria and respective indicators, the recommendation of the European Commission (2005) that objectives and indicators should meet SMART and RACER characteristics have been considered (Schumacher et al. 2018).

The criteria chosen for the evaluation of the NCI were: (i) GHG emission reduction, (ii) feasibility, transferability and visibility (developed from the criterion “model character”), (iii) broad impact, (iv) continuity, and (v) economic effects. Additionally, for the evaluation of the LAG, and especially for the evaluation of climate action concepts and climate action managers, two more criteria were introduced: (vi) implementation of concepts and measures; related effects, and (vii) concept quality (for concepts only). It was expected that the quality of the concepts and sub-concepts would be assessed differently by the municipalities and the evaluators. Both were therefore analysed separately.

For each criterion, key questions were developed and relevant data for answering these questions were collected and analysed. Table 2 shows criteria, key questions and data sources for evaluating climate action concepts and the work of climate action managers. Where necessary the key questions were translated into a framework consisting of sub-criteria and indicators. The main data bases for the evaluation were the funding database and the final reports of the grant recipients. Furthermore, empirical surveys were conducted: Municipalities that have drawn up an integrated concept funded by the LAG were interviewed with the help of a standardised online questionnaire. Similar surveys were also conducted for selected sub-concepts of particular strategic relevance. At the time of the survey the concept development had taken place between 9 years and about 1 year earlier. Table 3 shows the population and sample sizes of the surveys. In addition, a sample of 20 concepts and 20 sub-concepts each was reviewed in detail and evaluated with regard to completeness and various quality aspects.

In the survey of municipalities with an integrated concept, it was possible to implement a control group approach, as the respondents included both municipalities with climate action managers and municipalities without.

Table 2. Criteria, key questions and data sources for evaluating climate action concepts and sub-concepts, and the work of climate action managers

No	Criterion / indicator	Key questions	Data collection method / data source
(i)	GHG emission reduction	- For investments only: How much GHG emissions could be reduced?	- Incalculable, partly qualitative assessment
(ii)	Feasibility, transferability and visibility	- Can the project be replicated by other communities/stakeholders? - Is there a need for replication?	- Evaluation of the final reports of grant recipients
(iii)	Broad impact	- Which share of the target group was reached? - Is the geographical distribution of funds and activities balanced?	- Evaluation of the funding database
(iv)	Continuity	- Are there plans to continue the intervention after the end of funding? - Have structures, tools and databases been established? - Will the responsible personnel be taken over? - Are funds available for continuing the intervention after the end of funding?	- Evaluation of the final reports of grant recipients - Guideline-based interviews with climate action managers - Survey of municipal grant recipients
(v)	Economic effects	- What employment effects were triggered? - To what extent have additional resources been mobilised by the LAG? - To what extent did financial resources for external services flow into the region?	- Evaluation of the funding database and of the final reports of grant recipients
(vi)	Implementation of concepts and measures, and related effects	- Is there a political decision to implement the concept? - To what extent will the concept be implemented and monitored? Does this depend on the position of a climate action manager? - Has the development of the concept increased the relevance of climate action in the municipality? - Is the climate action manager firmly placed in the administration of the municipality? - Is climate action embedded in administrative processes (climate protection mainstreaming)? - Have new climate protection projects emerged beyond the concept?	- Survey of municipal grant recipients - Evaluation of the final reports of grant recipients - Guideline-based interviews with climate action managers
(vii)	a)_Concept quality from the perspective of the municipality	- Is the concept considered to be helpful, practical and implementation-oriented? - Were local conditions considered? - Are the measures described in a sufficient level of detail?	- Survey of municipal grant recipients
	b)_Concept quality from the perspective of the evaluation	- To what extent does the concept meet funding requirements? - Does the concept identify or take into account saving potentials of GHG emissions, energy efficiency and the use of renewable energies? - Has a participation process been documented? - Have relevant stakeholders been networked?	- Detailed review and matrix-based comparison of integrated climate action concepts and selected sub-concepts

Furthermore, ten selected climate action managers, whose funding had expired and who were still employed in the once funded municipality, were interviewed by telephone using a semi-structured survey guideline. The aim of the interviews was to obtain detailed information on the range of tasks of climate action managers in order to get a better sense of the role climate action managers play in local administration and what effects their activities (can) have. The interview partners were found through personal contacts of members in the consortium.

The development of the evaluation methodology was preceded by a literature review to check whether references from comparable evaluations could be used. By the time the methodology was developed there had been only a few studies dealing with issues that affected this evaluation. Amorim (2014), for example, explores the content of various Sustainable Energy Action Plans (SEAPs) required by the Covenant of Mayors. The progress of implementing the measures must be monitored and evaluated individually by the cities. A comparison of SEAPs of different cities within a higher-level evaluation process has not been undertaken so far.

Later a number of papers followed: Uitto (ed.) et al (2017) addresses a number of questions related to evaluations of climate change action for sustainable development, and Ortego et al (2018) put a focus on energy scenarios for cities to achieve environmental commitments, which are also part of climate action concepts within the LAG. However, support programmes for municipalities generally promote energy efficiency measures rather than strategic measures (e.g. Rossi et al. 2017). Support programmes comparable with the LAG or evaluations of comparable funding priorities have not been found.

Table 3. Population and sample size of the surveys

	Integrated climate action concept	Sub-concept integrated heat use	Sub-concept mobility
Number of projects (municipalities only)	696	74	67
Sample size (number of respondents/share of respondents)	305 municipalities / 44%	42 municipalities / 57%	49 municipalities / 73%

Results

Effects and implementation of concepts and measures

In the online survey, more than half of the municipalities state that the relevance of climate protection in local politics has increased with the development of an integrated concept. In every third municipality, climate protection was already highly relevant before, so that this relevance did not increase any further.

The development process of concepts also has an impact on the climate policy of the municipality if it leads to a discussion in municipal bodies. In the case of integrated climate action concepts, around 63 percent of grant recipients had already discussed the concepts in the municipal bodies at the time of the final report, while the figure was as high as 70 percent in the case of sub-concepts for mobility and only 30 percent for sub-concepts for heat use. In the vast majority of municipalities, however, the discussion was still planned at the time of the survey.

According to the results of the interviews with climate action managers, the impact of their work can be described as follows: They have an impact on the urban community through press and public relations work, high-profile actions, campaigns and websites, and they have an impact on local politics and the administration through the coordination of steering and working groups, advisory boards and through reporting to elected representatives on committees. Climate action managers facilitate professional exchange and promote projects by organising networks and specialist groups, specialist events, excursions and lectures. By implementing numerous educational projects in schools and daycare centres, they also contribute significantly to the

environmental education of children and thus to raising awareness of the issue of climate protection among young people. They implement climate protection measures included in concepts and beyond, for which they raise additional funds from national, federal and EU funding programmes. In this way, they ensure that more funds are requested in these programmes. Overall, they contribute significantly to the implementation of climate action policy in the municipality.

The prerequisite for the implementation of concepts is a political decision on implementation, which should be taken by the local council. The results of the survey show that this was done in the majority of municipalities with integrated concepts and with sub-concepts for mobility. In the case of sub-concepts for heat use, implementation had been formally decided in 2 out of 5 municipalities. Almost every second sub-concept for heat use had been submitted for information only (figure 3).

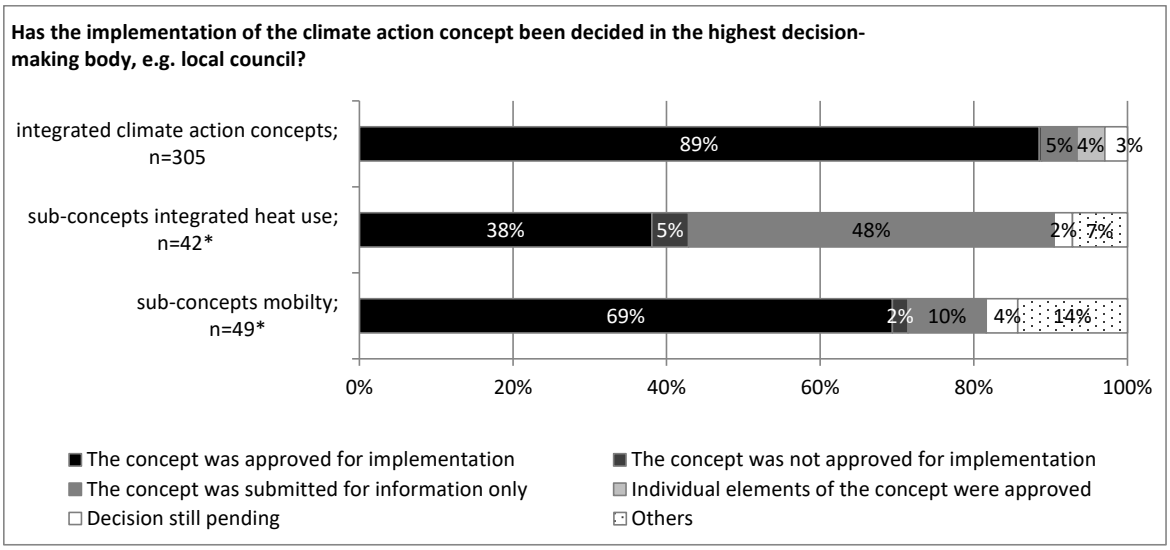

Figure 3. Share of municipalities where the climate action concept was decided upon in the highest decision-making body. *Source:* Surveys of the municipalities. *results not representative

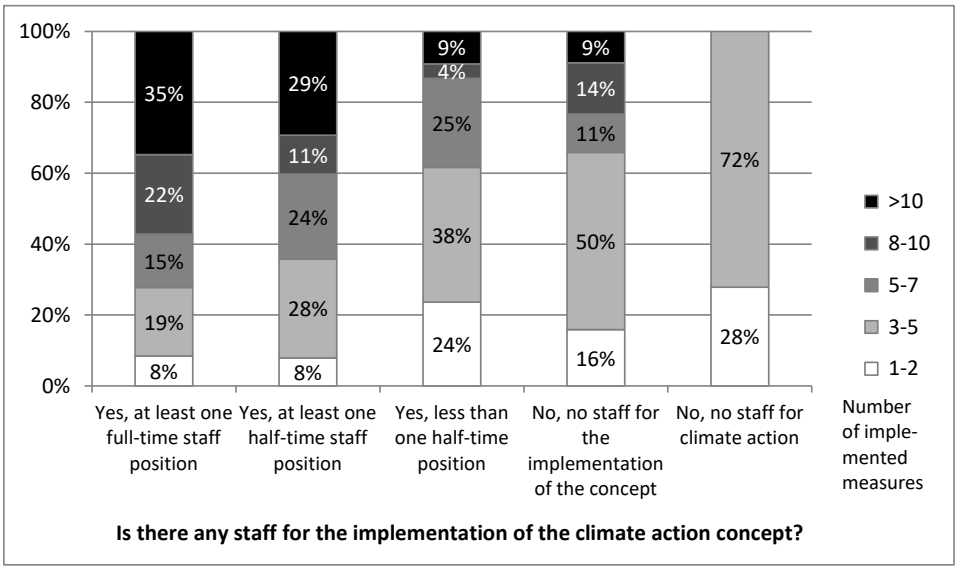

Figure 4. Number of climate action measures of the integrated concept implemented in relation to available staff (n=269). *Source:* Surveys of the municipalities.

When asked whether measures from the integrated concept had already been implemented, 85 percent of those surveyed answered yes, 5 percent had not yet implemented any measures and another 5 percent had implemented measures that had not been included in the concept (5 percent “other”). 20 out of 42 municipalities with a sub-concept for heat use had already implemented measures, while 14 municipalities had not yet implemented any measures. 3 out of 49 municipalities with a sub-concept for mobility stated that no measures had been implemented at all.

Figure 4 shows for municipalities with integrated concepts that there is a significant correlation between the implementation of climate protection measures and the personnel available: Municipalities with a climate action manager implement significantly more measures than municipalities without. Unsurprisingly, the amount of weekly working time of the climate action manager also plays a major role: The more working time is available, the more measures can be implemented.

Quality of concepts

Concept quality from the perspective of the municipalities. The majority of respondents rate the concept or sub-concept developed as an important and helpful instrument for implementing climate policy in the municipality (figure 5). The highest level of agreement with this statement is found with regard to integrated concepts at 78 percent (true and rather true), followed by sub-concepts for mobility at 72 percent. For the sub-concepts "heat use" the approval rate was still at 60 percent.

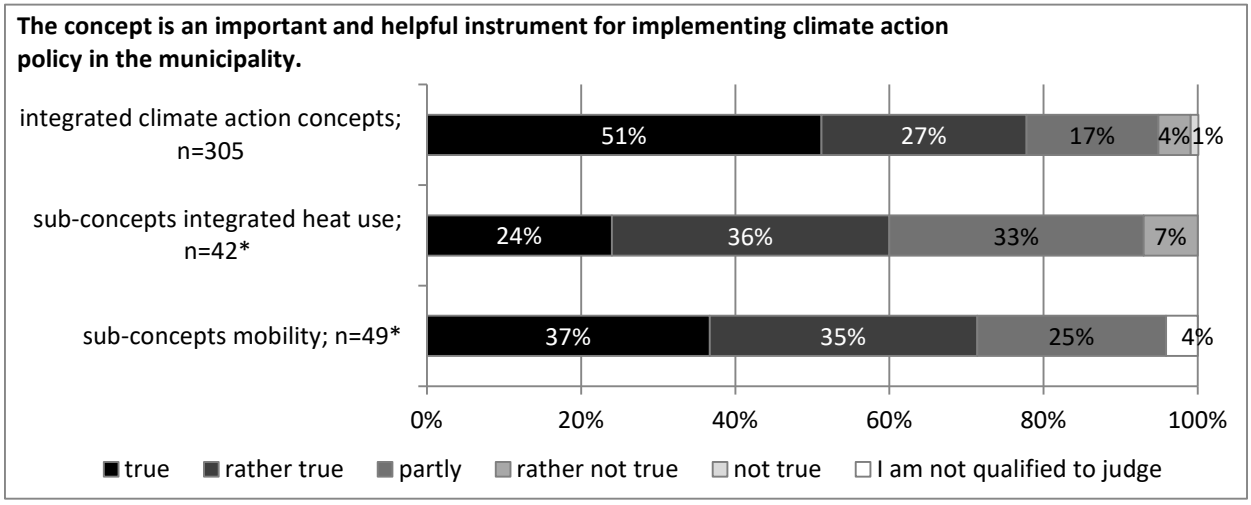

Figure 5. Evaluation of the applicability of the concept from the perspective of the municipality. *Source:* Surveys of the municipalities. *results not representative

The quality of the integrated concepts is evaluated positively by the recipients of funding: More than 70 percent of the respondents consider it to be implementation-oriented and relevant in practice, while 85 percent consider it to take into account the specific conditions in the municipality. 4 out of 5 municipalities believe that municipal and regional actors were sufficiently involved in the development of the concept, public participation was sufficient, and measures were sufficiently described in the concept (figure 6). Almost 56 percent of the municipalities also state that the concept is a good planning instrument, and almost 13 percent that it is a very good planning instrument.

The sub-concept “heat use” is evaluated differently by the grant recipients. Several quality aspects of the concept are assessed predominantly positively. However, only about every second municipality describes the concept as practically relevant (20 of 42) and 25 out of 42 as implementation-oriented. 22 out of 42 see the

public as sufficiently involved (figure 7). Overall, only about every third of those surveyed rates the suitability as a planning instrument as "very good" or "good", about two out of five rate it as "partly suitable".

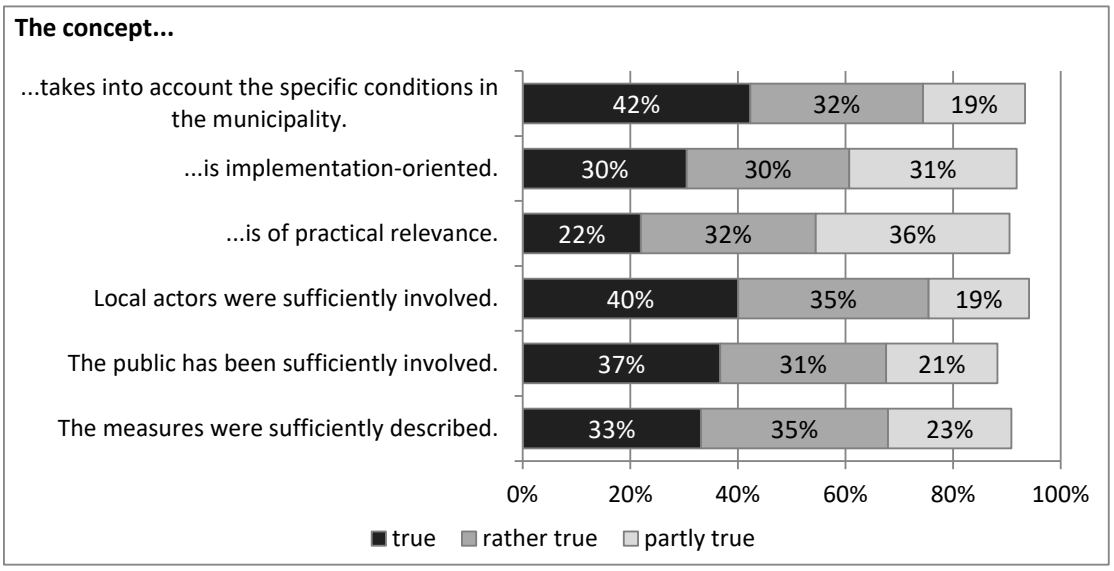

Figure 6. Evaluation of the quality of integrated concepts from the perspective of the municipality. *Source*: Survey of the municipalities

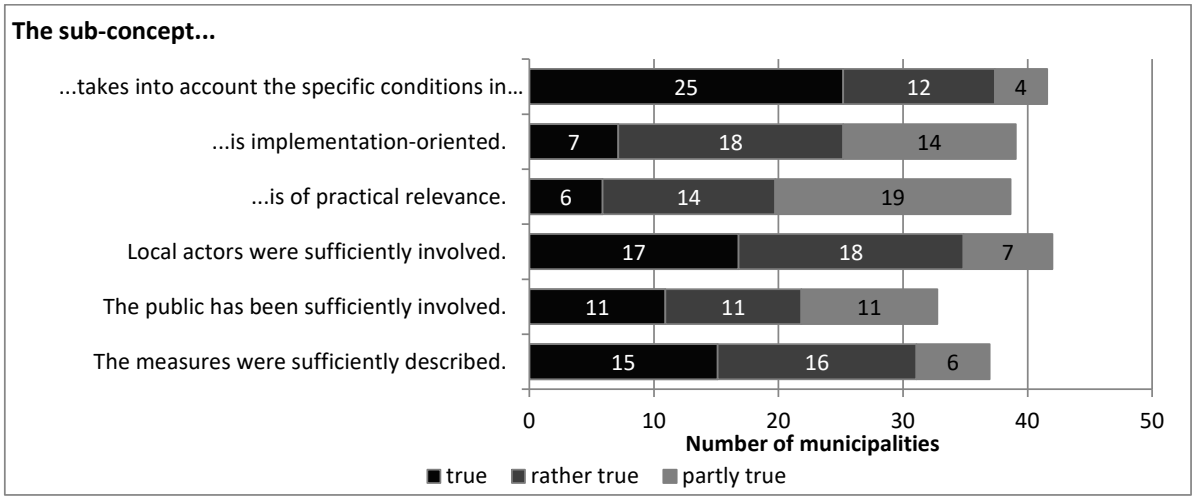

Figure 7. Evaluation of the quality of sub-concepts for heat use from the perspective of the municipality. n=42. *Source:* Survey of the municipality

The quality of the sub-concepts for mobility is predominantly assessed positively as well. In retrospect, 10 out of 49 grant recipients rate the quality as "very good", 28 out of 49 as "good", and 9 out of 49 as "medium". Nobody rates the quality as "bad" or "very bad" (the rest "do not know"). The clear majority of the 49 municipalities (at least 35 of them) evaluate the sub-concept “mobility” positively regarding the aspects shown in figures 6 and 7. The survey also shows that essential fields of action are addressed by measures. Local actors were involved in the concept development in all municipalities, while only a third of municipalities also involved surrounding communities.

A challenge was the quality of traffic data used. Almost half of the respondents state that the data was sufficient in terms of quantity and that it was of high quality. However, seven out of 49 say that important data was missing and six out of 49 say that the analyses were very much based on assumptions and estimates.

Quality from the evaluators' perspective. From the evaluators' point of view, the quality of the concepts varies. The majority of the integrated concepts include the elements considered necessary for a climate protection concept and required for funding (e.g. energy and GHG balances, scenarios, and a catalogue of measures). Overall, the climate-relevant sectors (mobility, services/industry, public real estate, private households, and energy supply) are sufficiently covered in the integrated climate protection concepts examined and are included in the energy and GHG balances. However, the level of detail differs greatly. The data quality and the methodology for the balances are rated as less good in some cases.

The lists of measures in the integrated concepts vary widely in scope, both in terms of the number of measures and in their description. In the concepts examined, the number of measures ranged from 17 to 183. Measures are usually explained, but the level of detail and regional/local adaptation varies considerably, and the GHG-saving potential of the measures is not always shown.

As regards sub-concepts for heat use the data basis of the concept is not always presented. For example, not all concepts in the sample include a complete and transparent energy and GHG balance, an analysis of the heating infrastructure or of the spatial distribution of the energy sources. Four concepts do not include a tabular catalogue of measures at all, and in another case only fields of action are listed instead of measures. Furthermore, in six concepts no spatial heat supply options were presented. Only in few cases are the measures prioritised, costs and investments listed, or the economic efficiency is assessed. Only three concepts indicate energy savings in addition to the expected GHG savings. The origin of the data is presented transparently only in a few cases.

Only half of the sub-concepts for mobility reviewed include both an energy balance and a GHG balance; the energy balance is often missing.

Stakeholder participation was documented in 18 of the concepts reviewed. The lists of measures vary in scope; in the concepts examined they comprise between ten measures and about 50 measures. Usually, the measures are explained in fact sheets. The content of the catalogues of measures also varies: the measures are either structured according to transport modes (cycling, public transport, etc.) or according to the type of measure, such as relating to infrastructure, management and behaviour, transport offer, or information/motivation.

In eight concepts GHG reduction through the measures is qualitatively assessed, in 14 concepts the measures are prioritised, and in 13 out of 20 concepts the costs of measures are shown. The survey results show that in 12 of the 49 municipalities surveyed the transport planning authority was not involved in developing the mobility concept. The environmental authority was not involved either in 2 out of 5 of the municipalities surveyed, and transport companies were not involved in 3 out of 5 cases.

Feasibility, transferability and visibility, broad impact, and continuity

For the LAG, the feasibility of the individual funding priorities has already been proven, as this is a broad funding programme. The transferability is also assessed as given for all LAG funding priorities as these are usually transferable to similar target groups, and the number of municipalities e.g. without concepts and climate action management is still high. On the basis of the information provided by the beneficiaries in the final reports, the visibility of the strategic funding priorities is rated as good to very good overall. However, no statement can be made about the response from the public and the target groups.

The reach of the LAG can be rated as good for municipalities and very good for districts, as 30 percent of the municipalities and 70 percent of districts have been supported. The distribution of subsidies among federal states is very diverse. Even within federal states there are large regional differences, and in some cases, there are still large "white spots" without subsidies. The reasons for this are difficult to determine, but efforts should

continue to learn more about the reasons and to convince municipalities that have not yet applied for funding. Federal states in eastern Germany, in particular Saxony, Thuringia, and Saxony-Anhalt, as well as the city states of Hamburg and Berlin have far below-average values for per capita subsidies. Federal states with the highest level of subsidies per capita are Schleswig-Holstein, Rhineland-Palatinate, Lower Saxony, Saarland and Hesse.

Integrated climate action concepts and sub-concepts usually create data bases for greenhouse gas reduction, which facilitate the implementation of measures and support continuity. In addition, the recommendations for measures tailored to the respective municipalities provide a sound basis for decision-making by local players. In this way, they contribute towards a stabilisation of climate protection efforts. With climate action managers, a position is created that enables the development of climate action competencies. 73 percent of the municipalities supported stated in their final reports that they planned to take on staff to continue the implementation process after the end of the support phase, thus enabling the work to be continued.

Conclusion

The evaluation of "soft criteria" for strategic, non-investment measures is a challenge - both the identification of suitable criteria and data collection. The comprehensive mix of methods chosen in the evaluation presented in this paper allows to make statements on the defined key questions and criteria. However, as regards the number of funded projects which was sometimes quite small, representativeness has not been achieved, especially in the case of climate action sub-concepts. In this case, a complete survey would be necessary, but this is difficult or even impossible to undertake and it would require many resources, respectively.

Conducting online surveys bears the risk of distorting results, as people who have a certain attitude towards the topic may be more likely to participate. This risk is assessed as rather low in the survey carried out, as it is not expected that there will be great differences in attitudes in the municipalities supported. For surveys in the municipalities, often contact persons for the interviews are difficult to identify, respective inquiries are usually forwarded to the climate action manager or similar personnel. Interviewing climate action managers carries the risk of not receiving objective answers. Different motivations can lead to a bias in the answers and results.

In general, a control group approach, i.e. a survey of municipalities with a climate action concept or climate action management and a survey of a control group without a climate action concept or climate action management would be more promising. However, this involves a significantly higher effort. In particular, the selection and survey of the control group is likely to prove costly.

However, the evaluation showed that the strategic funding areas of the LAG have a considerable impact on the local implementation of the energy system transformation in the municipalities and on raising public awareness. Usually, the development of concepts leads to climate action being better perceived in local politics, gaining greater relevance and stimulating discussion in political bodies. Furthermore, the majority of local authorities rate the concepts developed as good to very good planning instruments, which is a prerequisite for their impact and implementation.

The number of measures implemented varies. Various obstacles, often including personnel restrictions, prevent the implementation of measures. The existence of a climate action manager in the municipality is usually accompanied by a higher level of commitment in the implementation of measures, monitoring of implementation and the continuity of climate action projects beyond the funded concept. The quality of the catalogue of measures was not examined in detail in the previous evaluation for resource reasons. However, this will be part of the current evaluation phase to be carried out in 2020.

The managers make a significant contribution towards the implementation of climate action policy in local politics and administration. Through their work, they have an impact both internally and externally on the urban community.

A positive conclusion can be drawn regarding the quality of the concepts from the perspective of the municipalities. The overwhelming majority of those surveyed assessed the concepts and sub-concepts positively in various respects, although there are differences between the individual funding areas examined, and the funding recipients also see potential for quality improvement in individual aspects.

From the point of view of the evaluators, there is a clear potential for improvement in some of the concepts, particularly with regard to completeness, the quality of energy and GHG balances and scenarios and the catalogue of measures.

Integrated climate action concepts are predominantly suitable as a guide for acting persons. Despite some weaknesses, they are a helpful compilation of issues and approaches relating to climate action in a municipality. For the mobility sub-concepts there is potential for improvement, especially with regard to the data quality for the GHG balance and the balance itself. It is also noticeable that a surprisingly high share of specialist authorities and/or transport companies was not involved in the concept development. There is a significant potential for improvement for the sub-concepts of heat use. The contents of these sub-concepts vary widely. For the individual components, from the GHG balance to the measures, a wide variety of standards can be found. The overall development of a detailed planning instrument with spatial representation of heat requirements and renewable heat potentials should be continued in order to better prepare and facilitate the implementation of measures.

Ultimately, all concepts should ensure a good balance between the preparation of balances and scenarios and the development of measures - the focus should be on developing climate action measures that are ready for implementation.

Among the recommendations from the present work for future evaluations of this kind are the following: On the one hand it is very helpful for the evaluation to define concrete, quantifiable funding targets wherever possible as early as in the design of the funding programme, also for strategic funding priorities. This should facilitate a comparison with the targets during the evaluation. On the other hand, from the evaluators' point of view, a strengthening of the empirical approach, and in particular of the control group approach whilst evaluating strategic funding priorities, would enable even clearer statements to be made in the context of the evaluation. Appropriate resources are necessary for this. In addition, more qualitative research should be done to better understand local contexts and to investigate why things work and why they do not work. These insights would be helpful for the evaluation.

Acknowledgements

The authors would like to thank the Ministry of Environment for commissioning the evaluation. We would particularly like to thank Mr. Adrian Saupe for his helpful and always constructive cooperation, as well as the staff of the project management agency Jülich and all colleagues involved for their support.

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ANNEX

Table 4. Impact chain for climate action concepts and sub-concepts

	Input	Specification of the intervention(s)	Output	Outcome	Direct impact (after implementation of measures)	Indirect impact (after implementation of measures)
Description	Grant for the development of an integrated climate action concept or sub-concept	Data collection, energy and GHG balancing, Information and participation of relevant actors, Information of the public, Introduction of climate action management, Detailed analyses	Implementable concept with catalogue of measures, schedule of designed emission reductions Participation of relevant stakeholders partly controlling concept Press reports, public relations Partly municipal council resolution on implementation / reduction target	Data basis for municipal climate action Guidance on the implementation of measures Continuation and expansion of climate action Raising public awareness Motivation of other actors	Reduction of emissions Energy cost savings Role model effect Public investments / acquiring of further funding Employment effects and regional added value	Indirect emission reduction through replication effects Private investments / acquiring of further funding Improving the environmental compatibility, security and economic efficiency of energy supply
Performance Indicator	Funding volume (Euro) Own resources used (Euro) Funding rate (%)		Number of projects supported Regional distribution Target group coverage Number of actors involved Designed energy consumption and emission reductions	Number of measures planned for implementation Quality of the concepts Scope/quality of public relations work	Final energy saving Annual emission reduction Reduction of emissions over lifetime	Indirect final energy saving Indirect reduction of emissions (no quantification possible)

Table 5. Impact chain for climate action managers

	Input	Specification of the intervention(s)	Output	Outcome	Direct Impact	Indirect impact
Description	Grant towards the costs of establishing a climate action manager	Project management for the implementation of the climate action concept Internal administrative information and moderation Collection and evaluation of data Networking, public relations	Technical contributions Events, conferences press work, public relations, website design	Implementation of measures from the concept Competence development Administrative capacity building Raising public awareness	Reduction of emissions Energy cost savings Role model effect Public investments / acquiring of further subsidies	Indirect emission reduction through replication effects Private investments / acquiring further subsidies Improvement of environmental compatibility, security of supply, economic efficiency of energy supply
Performance Indicator	Funding volume (Euro) Own resources used (Euro) Funding rate (%)		Number of projects supported Regional distribution Target group coverage Number of media used for public relations Number of participants at events	Number of measures implemented	Amount of the emission reduction triggered by the measures implemented Amount of further acquired subsidies	Indirect final energy saving Indirect reduction of emissions (no quantification possible)