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Local energy efficiency and demand-side management activities in France

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Keywords

Energy efficiency, DSM, local energy policies, local authorities, white certificates, evaluation, benchmarking, actions typology, segmentation criteria

Abstract

Recent French political decisions have tended to increase responsibilities for local authorities regarding energy issues. The main frames, which should be the basis for local energy policies and energy efficiency/demand-side management activities[1], have been identified. However, past experience has shown that theoretical opportunities do not necessarily lead to actions. This paper compiles an inventory of the local EE activities in France in order to provide an overview of what has been done from 2000 to 2004. This study indicates firstly, what kinds of actions have been done and secondly, whether the local dimension mattered. The analysis of the local dimension was made using criteria defined from the analysis of the theoretical context. The inventory also enables the definition of a practical typology for EE actions, useful for benchmarking works, for the definition of specific objectives, and then for evaluation.

Difficulties encountered in collecting data show the need for information systems, which could help for structuring action plans and for making evaluations. This process could take advantage of the future "white certificates" framework, which will change the way actions are reported. Moreover, this paper emphasises the importance of local authorities involved in 75% of the activities encountered. An evolution towards increasing involvement and transverse actions is observed, with twice as many actions taking into account the local context between 2002 and 2004. A good reason to look at the actual trends.

Introduction

As soon as energy conservation programs were developed after the oil crisis, at the end of the 70's, the local level was considered as relevant to implement some actions (GILLILAND et al – 1983). But the context for local activities (local jurisdictions, energy issues awareness, etc.) can differ a lot from one country to another, and so the results (JOERGES et al. – 1983).

Federal states such as the USA (DIETZ et al. – 1982) or Germany (HEINZELMANN – 1996) seem to have *a priori* "culturally" more tendencies for designing local policies. This trend has widened since the Rio Conference of 1992 and the development of the general concept of thinking globally and acting locally (COLLIER et al. – 1997). For example in the United Kingdom, where local energy jurisdictions were decreasing, the Home Energy Conservation Act of 1995 devolved residential energy efficiency responsibility to local government (JONES et al. – 1999).

This paper studies the case of France, which historically had a centralised energy sector and a low level of local autonomy. First the French context for local energy policies will be shortly described, to see what opportunities exist. Then an inventory of local energy efficiency (EE) activities in

1. DSM: Demand-Side Management; EE: energy efficiency (here, does not include renewable energies); in the paper the expression used will be "local EE activities"

France will be presented, to see what is actually done. The actions found have been analysed using segmentation criteria defined by crossing existing literature, analysis of the theoretical context and the data collected, in order to get a better understanding of their varied nature and the possible recent changes. The study especially focused on their local dimension.

Local Authorities and energy issues in France

In 1981, France started a general policy of decentralisation[2], which impacted energy conservation programs, an important issue during the oil crisis. Thus in 1983 the Regional Delegations of AFME were created, now called DR-ADEME[3]. The Energy Independence Plan of October 1981 suggested the creation of regional energy agencies and the development of regional energy planning (TROUSLOT – 1995).

Nowadays, only half of the regions have an energy agency, and no real regional energy plan has been implemented yet. With a few exceptions, energy efficiency issues were usually not considered as priorities by local authorities. And until the mid 90's, the local level remained used almost exclusively as a relay of national policies. In the evaluation report of the French energy efficiency policies between 1973 and 1993 (MARTIN et al – 1998), the local dimension of activities does not appear.

A NEW POLITICAL WILL FOR LOCAL INITIATIVES

It wouldn't be possible within this paper to present in details the French local institutional context. However, the main functions of local authorities for energy management may be described through recent political decisions, which were made to increase their involvement in energy policies. The present paper is a survey of these efforts.

The SSCE[4] (planning dimension)

The 1999 French law on sustainable development and territorial planning (LOADDT) created the SSCE, which was meant to be a new tool to design regional energy planning. Its document of presentation (DATAR – 2002) states "the energy policy must indeed be declined at the local level" and "must look for optimising the potentials of energy efficiency which exist at the local level". It was the synthesis of regional consultations that had been done during 2000 and 2001.The SSCE was to be linked with the financial frame CPER[5] : the update of the SSCE should be done in 2005, to prepare the next CPER for 2007. It gives to the regional organisations (Regional Council, Regional Energy Agency, etc.) a structuring function. Moreover, the SSCE stimulated the creation of Energy Regional Observatory (ORE). 10 ORE or similar bodies have been created since 2002.

The laws on the opening of the energy market

The French laws for the opening of the energy market[6] reminded the municipalities of their jurisdictions, as they own the terminal energy distribution lines. For example in rural areas, they can submit projects of EE activities for avoiding reinforcements of the grid to a special financial frame, the FACE.[7] Municipalities also organise with the State the public service of electricity (article 1, Law 2000-108) and gas (article 15, Law 2003-8).

The PNAEE[8]

Two measures proposed in the PNAEE have strong local impact :

- the creation of Espaces-Info Energie (EIE), neutral and local advice centers for energy issues for households and small companies or public bodies
- the OPATB[9]: operational frame proposed since 2002 by ADEME to improve energy efficiency in existing buildings. This program does not add new financial incentives for actions, but aims to optimise the use of the existing ones. In fact, it crosses existing sectorial incentive frames with a new transverse approach on a given territory. This kind of policy was suggested in 1995 by Magnin and Menanteau (MAGNIN et al. – 1995).

The first EIE were created in 2001, and more than 150 are operating today. The activities of this network were evaluated for 2002-2003 (ADEME – 2004). Their usual advising activities will not be considered in the further analysis. Similarly, Local Energy Agencies existed in France since 1994, with funding from the European Commission. 13 are active in France, and are also currently part of the EIE network. Their usual advising activities aren't reported here either. For the OPATB, the first call for proposals was in 2002 (8 projects were selected in 2002 and 7 in 2003), but the operational steps of the first selected projects began in early 2004. Therefore, activities within OPATB were not registered in our inventory. This case is similar for another recent ADEME operational frame, the ATEnEE[10] agreement.

As some operational frames are too recent to take their actions into account, it was decided to focus the description of the theoretical context on the many financial frames which are older and have stable effects (Table 1 below).

2. the local authorities in metropolitan France are: Regional Council (22 including Corsica), then Departmental Council (96), then municipalities (36.568) with no hierarchical links between and initiatives at all three levels.
3. AFME: Agence Française de la Maîtrise de l'Energie (which is now the ADEME, Agence De l'Environnement et de la Maîtrise de l'Energie, the french Environment and Energy Management Agency)
4. Schéma de Services Collectifs de l'Energie: Energy Collective Services Scheme, which applied since 2002
5. CPER: Contrat de Plan Etat-Région, State-Region agreement framework
6. law n°2000-108 of February 10th in 2000 for electricity, and law n°2003-8 of January 3rd in 2003 for gas
7. FACE: Fonds d'Amortissement des Charges d'Electrification, specific public funding for electricity rural distribution grid, financed by the Public Service of Electricity taxe on electricity price
8. PNAEE: National Program of Energy Efficiency Improvement (December 2000)
9. OPATB: Planning Operation for Energy Efficiency Improvement of Buildings
10. ATEnEE: Territorial Actions for Environment and Energy Efficiency: calls for proposal started in 2002, which aim to stimulate the new local authorities groupings so that they include environment and energy efficiency issues in their territorial policies

Table 1. Financial frames identified.

Financial frame	Main local organisations involved	Other comments
CPER (with ADEME appendix)	Regional Council and Regional Delegation of ADEME	The CPER concerns all aspects of regional policies. The ADEME appendix provides funding for projects linked with energy and environment.
EDF-ADEME agreement	Regional Delegations of EDF and ADEME	The frame is national but has regional transcription
ADEME grants	Regional Delegation of ADEME	The frame is national but its implementation is regional
FACE	Municipalities or local authority joint boards (municipalities groupings)	FACE is funded by national taxes, and rural municipalities can submit projects for financial incentives
Social Funds for Energy (FSE, now replaced by the Funds for Housing Solidarity*)	Departmental Council	This funding is used to fight fuel poverty, usually for covering unpaid electricity bills but can be used for preventive EE actions also. In 2002, the global funding used in France within the FSE represented more than 37 million euro for 247 000 files treated (EDF data)

* French Law n°2004-809

An overview of local EE activities in France

WHY MAKE AN INVENTORY ?

The existing reports on local EE activities in France mainly deal with best practice, which are sorted by cities (ADEME – 2000, ENERGIE-CITES – 2001, IEA – 2003), or by local authority functions (AIVF-CSTB – 1999). Their objective is to present case studies, to emphasise good opportunities of actions for local authorities.

Energie-Cités, a European network of municipalities involved in local energy and efficiency projects, also accomplishes a big work of benchmarking to improve the experiences sharing between European cities. A database of good practice has been in development since 1995. The case studies are divided into four main fields : Sustainable urban development, Energy efficiency, Renewable energy/CHP[11], Urban mobility. The case studies can be sorted by cities or by keywords. In the energy efficiency area, the six keywords used are : Municipal buildings and equipment, Public lighting, Housing, DSM[12], Public-private contractual relationships, and Energy services. This tool is very helpful for exchanging good practices between cities, but does not allow a real analysis of what is being done in each of the member countries. For example on the 133 experiences listed in the energy efficiency area, 14 are from France. The number of case studies presented is significant, but not sufficient to have a global overview of the French experience.

The objectives of our inventory were to define a typology to better characterize the activities, and then to make an analysis using the defined typology, firstly to know what kinds of actions have been made, and secondly to focus on the local dimension and how it mattered.

METHOD USED

How to look for information?

It was first necessary to choose a level for reporting information. The regional level was the most relevant, for two reasons: the number of regions is small enough to be covered and the regional delegations of ADEME are good contact points.

In a first step, the survey was made using the Internet. The sources of information covered for each region were the web-sites of the DR-ADEME, the DRIRE[13], the Regional Council, the Regional Delegation of EDF, the Local Energy Agencies and others local associations for energy efficiency or environment. Queries were also made with Google, using for each region, the following keywords (in French) : "maîtrise de la demande" (Demand-Side Management), "maîtrise de l'énergie" (energy management), "efficacité énergétique" (energy efficiency) and "économies d'énergie" (energy savings or conservation). Other local experiences were found using the search engine of "La Lettre de l'ADEME" (newsletter of ADEME) and the web-site of Energie-Cités[14]. This first step was performed in July 2004.

The amount of data was very uneven among the regions. Therefore, a first contact was made with the DR-ADEME through email. Finally to complete this work, contacts were taken by phone, mostly during December 2004.

What information to look for?

A first answer to this question is given through the keywords used with Google. However, it is difficult to define borders for the field of local EE activities. For example, should global environmental approaches (Environmental Management System or HQE[15]) be considered, or studies for energy planning? Is energy substitution a change of demand, or a change of supply? Finally it was decided to keep the additional actions[16] where energy efficiency for energy demand

11. Combined Heat and Power
12. Demand-Side Management
13. DRIRE: Regional Direction for Industries, Research and Environment (State organisation)
14. www.energie-cites.org
15. HQE (Haute Qualité Environnementale): global environmental approach for designing buildings
16. then the usual activities of ESCo were not reported, as performance contracting for example

was the main issue, focusing on the actions made between 2000 and 2004 (data for activities before 2000 were too difficult to collect).

How to structure the data found?

The level of information found was unequal. Thus it was necessary to define the items to be documented, according to the need for this study (a detailed description of these segmentation criteria is presented in the analysis part below): general description of the operation (name, short description, date, targeted area), policy instruments, targeted energy use, targeted sector, local involvement level, local authority function, objectives (general motivations and operational objectives), stakeholders involved and financial frame, results and evaluation.

Results

At the end, 210 local EE activities were found covering the 22 regions of France[17] for 2000-2004.

Obviously the survey cannot be considered exhaustive, for several reasons. First it is hard to define a well-delimited scope for this kind of survey. Second it was not possible to cover all the regions as much as wished previously. Moreover, local actions are not always subject to communication.

In this survey, it was rare to find significant quantitative data. This makes accounting and comparisons difficult. Due to the diversity of the actions, it was therefore hard to define a unit of action. Consequently the number of activities found is a subjective quantity. The 2003 annual ADEME report was taken as a comparison. In Table 2 below, each line represents an activity. The number of actions done within an activity is considered an indicator. We kept this way of accounting, which means that, in our inventory, an activity represents all the same actions done in a given sector and in a given region.

Consequently the number of activities in our inventory is not to be used as an indicator for showing the importance of local EE activities in France. However, the amount of data collected is significant. If the inventory is incomplete, the remaining actions must be rather small, as it would be surprising that no communication was made at all after an important action. Thus, it may be considered a good overview of what has been done for local EE activities during these last four years.

Table 2. Activities presented in the 2003 annual report of ADEME (p.35).

	2000-2002	2003
Industry and Agriculture		
Number of studies for decision support	1 795	550
Number of exemplary operations	142	33
Number of R&D projects	104	33
Buildings and district heating		
Number of building diagnosed	18 669	11 704
Number of exemplary operations	164	85
Number of housing improved	56 007	35 111
DSM and local energy planning		
Number of studies for decision support	89	69
Number of exemplary operations	9	15

Analysis from the information collected

As quantitative data is rare, the analysis is mainly based on qualitative components. Therefore it is necessary to define segmentation criteria to be able to sort and compare the activities found.

ACTION TYPOLOGY AND DESCRIPTION OF THE ACTIVITIES

Characterising actions needs two steps: (1) selecting a list of criteria to describe the actions, (2) defining for each criterion the list of modalities, to enable sorting within the criterion.

Criteria selection

The list of criteria was chosen to fit with the focus points of the analysis. Among the items used to structure the information collected, the criteria used for the analysis are the following:

- date: criterion to detect changes within the time covered
- policy instrument / targeted energy end-use / targeted sector: usual criteria used to study EE actions
- targeted area / local involvement level / local authority function: criteria to study the concrete local dimension of the activities found
- financial frame: criterion to study the links between stakeholders and activities

This selection of the usual criteria was compared with the typologies in the literature. The more relevant ones (SHELDRICK et al. – 1988, JOERGES et al. – 1983, DEEP[18]) were similar. In other references, the criterion "energy use" is sometimes divided in "energy end-use" and "energy efficiency solution linked". The lack of information made it impossible to keep this last criterion for analysis. In general the criteria were selected when they were also simple enough to be documented for almost all the activities found (directly from the data found, or by interpreting the available information).

"Targeted area" was chosen to have a qualitative indicator for the size of the activities. "Local authority function" is the usual criterion to present what a local authority can do (IEA – 2002). "Local involvement" is a new criterion to better understand how the local dimension matters for a local EE activity.

Method used to define the criteria modalities

The definition of the modalities was iterative. Collecting the data, the criteria were first documented for each activity, according to the information found, without using any predefined item. Then, modalities were identified. To enable a

17. metropolitan, without the Overseas Departments and Territories
18. Database on Energy Efficiency Programs : database made by the ACE³ (American Council for an Energy Efficient Economy) for the US Department of Energy (see http://www.aceee.org/new/eedb.htm)

Table 3. Inventory distribution by "date".

Date	2000 and before	2001	2002	2003	2004 and after
Number of activities	56	53	56	86	60

(note: an activity can last several years, the modalities are not exclusive)

Table 4. Modalities for "policy instrument".

Level 1	Regulating	Inducing	Consulting	Raising Awareness
Level 2	→ obligation → standards	→ grants → soft loans → third party financing → rebate → pricing → commitment → (performance) contracting	→ energy audit → feasibility assessment and development of new efficient technologies → increasing general knowledge about energy consumption	→ information (- mass media / - exhibitions / - documentation) → demonstration → training → CFL[1] distribution → networking

[1] Compact Fluorescent Lamp

sort by criterion and to keep a good level of details, two levels of modalities were defined. The first level contains three or four global items, which enables sorting the activities by general groups. The second level is treelike which preserves the level of details found for the activity.

This first typology was compared to literature, in case important items were absent in our inventory. After correction, it was applied to the inventory. When an activity could not fit the typology, it was also corrected, following the same process.

Date

The distribution is uniform, except for 2003, where more information is available. Therefore, it is possible to study general trends for the other criteria within this time period, taking into account this difference for 2003.

Policy instrument

"Policy instrument" refers to the approach used by the organisation responsible for the activity in order to generate actions among the public targeted. The following modalities were defined from the activities found and then compared to literature (SHELDRICK et al. – 1988, JOERGES et al. – 1983, Energie-Cités web-site).

(For this study, the "regulating" instruments were considered as national, and therefore out of our scope)

The inventory distribution shows that more than half of the activities used "consulting" (126) and/or "raising awareness" (120), whereas only a fourth used "inducing". This emphasises the need for new "inducing" frames (FINON – 2003). The new white certificate system may bring a partial answer.

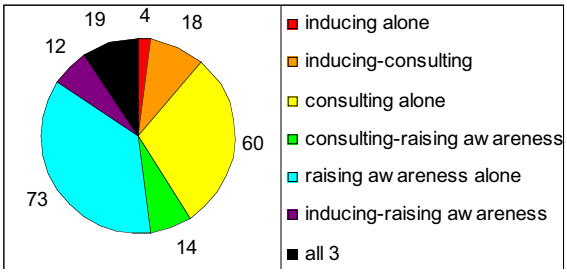

Figure 1. *Number of activities by "policy instrument" (level 1 exclusive modalities)*

As the modalities are not exclusive, it was interesting to make them exclusive using the possible combination of the level 1 modalities (see Figure 1).

As there are only three level 1 modalities, it is possible to use the primary colors to represent them, to better emphasize the crossings. It confirms the first observation: "inducing" is less used than "consulting" and "raising awareness" by a factor of two. "consulting alone" and "raising awareness alone" being the main instruments used.

To have a more accurate vision, it was also interesting to see the inventory distribution by level 2 modalities of "policy instrument" (see Table 5 below), which emphasises three groups, by decreasing frequencies: group 1 with high

Table 5. Number of activities by policy instrument (level 2 non-exclusive modalities).

inducing		consulting		raising awareness	
Grants	43	Energy audit	89	Information	82
Rebate	11	Feasability assessment	32	Training	26
Commitment	5	Knowledge of energy consumption	12	Demonstration	19
Pricing	2			Networking	14
Soft loans	2			CFL distribution	4

Table 6. Modalities for "targeted energy end-use".

Level 1	→ global action (concerning all energy uses) → targeted action (on some energy uses) → electricity uses → HVAC* uses (and non-electric industrial uses)				
Level 2 (for targeted actions)	electricity specific uses		HVAC and other uses		
	→ all → lighting → appliances → stand-by	→ computers → motors → compressed air → others	→ HVAC targeted action : - air conditioning - space heating - water heating - ventilation - building envelope	→ non-electric industrial uses : - heat - steam - cold	→ HVAC global approach (for old and new buildings)

* HVAC: Heating, Ventilating and Air Conditioning

Table 7. Number of activities by " targeted energy end-uses " (level 2 non-exclusive modalities).

Electricity uses		HVAC uses		Non electric industrial uses	
All	25	Heating	16	Cold	3
Lighting	21	Building envelope	12	Steam	2
Public lighting	15	Water heating	3		
Computers	4	Air conditioning	2		
Compressed air	4	Ventilation	1		
Appliances	3				
Stand-by	1				
All electricity specific end-uses	1				

frequency ["audit" and "information"], group 2 ["grants", "feasibility assessment", "training", "demonstration", "knowledge of energy consumption", "networking", "rebate"], and the others with low frequencies within group 3.

The comparison between activities are to be made remembering that it wasn't possible to document quantitative indicators. Looking at the modalities for "policy instruments" emphasises the interest for quantitative indicators as the number of targeted individuals, the amount of energy consumption they represent and the budget for their activity.

However, this overview gives a good idea of the effort distribution (what policy instruments are the most used at the local level), with two main conclusions:

- the inducing instruments are not frequently used, compared to the others
- this inventory emphasises two approaches rarely used, but which have a good potential: "pricing" used by SIEL 42[19] to avoid grid reinforcement in the Loire department, and "soft loans" used by EDF for SME-SMI that invest in high performance lighting after making a diagnosis (in the PACA region) or for households that invest in efficient heating system or for insulation works (in Canton de Lanmeur in Brittany region)

Energy end-use

The level 1 modalities are used to detect whether the activity is targeted on one or several energy end-uses, or remains a global action. The level 2 modalities were defined from the inventory and compared to the ones in the US-DEEP database.

Level 1 modalities are almost exclusive *de facto* because only four activities have targeted actions at the same time on electricity uses and on HVAC uses. More than half of the activities (114) were sorted as "global actions". This has many possible explanations, as the fact that most frequent actions are "energy audit" or "information", which are often global actions. It also emphasises the lack of definition of operational objectives, which is then a problem for evaluating the actions. Local EE activities remain too general, which can explain the difficulties of evaluation, and therefore an important lack of evaluation.

Three groups appear : group 1, the most frequent targeted used, ["all electricity uses", "lighting", "heating", "public lighting", "building envelope"], group 2 ["computers", "compressed air", appliances", "cold", "water heating", "air conditioning", "steam"] and the least frequently targeted, group 3.

Group 1 includes mainly the same end-uses as those targeted within the EESoP and EEC[20] activities in the United Kingdom (OFGEM – 2003, OFGEM – 2004). They may be the targets of the first round of the French white certificates, which should apply soon in France.

The end-uses of group 2 might be the next targets once group 1 has been exploited.

For group 3, the analysis has to be done case by case. For stand-by, the low frequency may be explained, because of

19. SIEL 42: local authorities joint board for electricity distribution in the Loire department (www.siel42.fr); the "pricing" operation was mainly an information campaign for pick/ off-pick tariffs, and programme timer installation
20. EESoP: Energy Efficiency Standard of Performance; EEC: Energy Efficiency Commitment; British energy efficiency programs for households since 1994, with obligation for energy suppliers to make energy savings

the evaluation (and therefore accounting) difficulties for such actions. For ventilation, the explanation may be the lack of information among building designers, or efficient technologies (ENERTECH – 2001).

Targeted sector

As modalities, we used the classical sectors: industry (which also includes agriculture), residential and tertiary[21]. Then "residential" was divided in "residential" (which includes all households) and "social housing" (both criteria are exclusive). Social housing is an interesting target with specific issues, such as fuel poverty, and a strong link with local authorities. "Tertiary" was also divided in "private tertiary" and "public sector", because of the importance of the public sector in France. Two "parallel" modalities were added: "specific public(s)" to detect the activities for a special category within the sectors defined, and "transverse" to detect the activities which aim at several sectors at once.

A bias of information may exist for this distribution, because actions in industry and in private tertiary are less subjected to wide communication. Therefore this distribution is not to be used to detect if more activities are made in a sector, but as a description of the inventory.

However this distribution emphasises that only a fourth of the activities aims at specific publics, except for "social housing" and "private tertiary".

Except "residential" and "social housing" (a "residential" activity can not also be "social housing", and vice-versa), the modalities were not exclusive. Thirty activities were transverse.

Financial frame

The modalities were first defined from the analysis of the theoretical context. The number of modalities was subjective, because of the large diversity of the possible financial frame. This criterion was actually used to compare the theoretical context with the activities found. The selection of these modalities was used to study the importance of three stakeholders: EDF, ADEME and the Regional Council. The FACE was also kept to study the importance of this specific funding for the electricity rural distribution grid, an issue municipalities are responsible for.

The four modalities with EDF, ADEME and/or Regional Council involved incorporate 70% of the activities, which confirms they are the main financial stakeholders for local EE activities. This comment has to be qualified because these stakeholders were also the main sources of information. For some regions, other sources appeared to be interesting, with case by case financial frames.

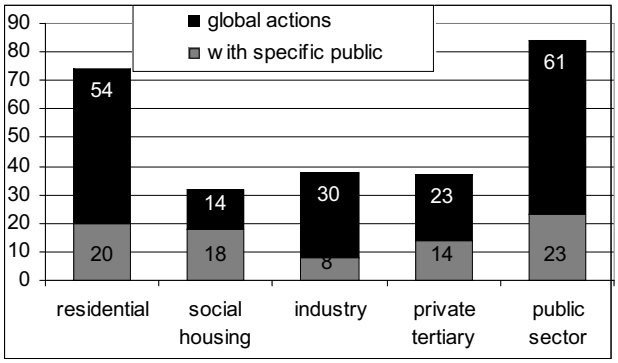

Figure 2. *Number of activities by "targeted sector".*

Moreover, in "others", 19 activities used one of the four main frames we defined, combined with other existing frames, such as European Commission funding. Within the 35 remaining frames, the most frequent are: special frames for activities against fuel poverty, frames of the local energy agencies and frames involving Departmental Council or municipalities groupings.

To complete this analysis, it would be interesting to study the correlation with the importance of the main national networks of local stakeholders as Energie-Cités, AMORCE, etc.

Targeted area

The modalities were defined following the administrative divisions. The main objective of these criteria was to give a qualitative indicator for the size of the activities, and to study the level of territory involved. But here the territory levels are not connected with the corresponding local authorities: "region" doesn't mean "regional council" but the territory of the region, etc. In a further study, it would be interesting to divide this criteria in a quantitative indicator as the population concerned and in another criteria "local authorities involved", which also may directly be linked with "local authority function".

Table 8. Number of activities by "financial frame".

CPER	EDF-ADEME agreement	EDF-ADEME-Regional Council agreement	ADEME	FACE	Others
36	22	39	49	13	54

Table 9. Number of activities by "targeted area".

Region	Departement	Municipalitie(s)*	Ponctual
121	34	38	15

* municipality or municipalities grouping

21. transportation is out of the scope of this study

The modalities are exclusive (this criteria could not be documented only for two activities). The regional level appears to be the most frequent. There are several explanations. First, most of the local financial frames are defined at this level. Second, this modality also takes into account all the activities where no specific area was defined.

Local involvement level

The objective of this criteria is to study the involvement of local organisations (local authorities and others) in the EE activities. The modalities were defined to describe an increasing level of involvement. The term "public management" refers to the management of the energy bills of local authorities or their responsibility for the electricity distribution grid. As they are basic jurisdictions for local authorities, it was considered as the lowest level of involvement. Then "relay" refers to the relay of a national program, or any activity which is not lead by a local organisation (note: here the Regional Delegations of ADEME were not considered as local organisation, except when they made original activities outside the scope of the usual ADEME frames). Then "local initiative" means that a local organisation is leading the activity (even if the activity was "created" nationally). Finally the highest level of involvement is "local context" which means that the local context was taken into account while designing the activity. Examples below illustrate these definitions:

Example 1: an activity such as a local authority which just takes advantage of the ADEME frame to make an energy audit of its buildings is interpreted as "public management" and "relay".

Example 2: an activity such as a local authority which creates a network of energy managers for public buildings is interpreted as "public management" and "local initiative".

Example 3: an activity such as actions lead by a local organisation to fight fuel poverty in a specific area where it was detected as an important issue is interpreted as "local initiative" and "local context".

The modalities are not exclusive. For example, when a local authority manages its energy bills or the distribution grid applying original actions with EE components, then it can also be considered as a "local initiative", and maybe with "local context" as well.

Table 10. Number of activities by "local involvement level".

Public management	Relay	Local initiative	Local context
78	83	160	89

Table 11. Number of activities by "local authority function".

No function	Energy consumer	Energy Distributing	Stimulating
55	68	17	105

Most of the activities have a high level of local involvement, since more than 75% are "local initiative". All "local context" activities are also "local initiative" which means that the local context is not really taken into account without a local involvement. It confirms the main ideas presented in the SSCE.

Local authority function

Usually the description of the local authority functions for energy management is used to present what they can do for energy efficiency within this scope (AIVF-CSTB – 1999, IEA – 2002, AMORCE – 2004). Here the same usual modalities were used not to present what can be done, but to study what is actually done.

Two functions of local authorities were not reported in this study. First, energy producer, which focused on actions in energy demand. Second, urban planning policies. This last function is very important, as the choices involved (housing density, etc.) have direct and strong impacts on energy consumption (MARTIN et al – 1998). But these policies just started to integrate energy issues, for example thanks to the ATEnEE operations. However integration of energy issues in urban planning should be an important action field where local authorities should involve themselves more (CSTB – 2001).

Only a fourth of the activities didn't involve local authorities, which emphasises they are important stakeholders for local EE activities. However the low frequency of "energy distributing" has to be stressed as it is one of the main jurisdictions of local authorities for energy management. Even though they have this responsibility, this is not a usual action field yet. On the contrary, more "stimulating" activities occurred, although no clear local jurisdictions are defined in this area.

The number of activities as "energy consumer" should be completed by quantitative indicators, so that it can emphasises which part of the public buildings and facilities (public lighting, etc.) was improved to be energy efficient and which part remains to be improved. For example how many high schools[22] have effective energy management. It could then be used to evaluate the EE potential of the public sector, which is an interesting deposit, as local authorities can directly act on it (BORG et al – 2003). It could also be used to develop networking such as Ecocampus for the universities (see www.ecocampus.net).

CROSS-ANALYSIS BETWEEN CRITERIA

The main interest of an analysis from structured qualitative data is to study the links between the different criteria, whether they are dependent, and if so, to look for explanations. The method used was, in general, based on a statistical independence test: the distribution of a criterion within the entire inventory was compared to the distributions of this given criterion among the modalities of another criterion. When significant deviations were observed, it stressed the existence of links between both criteria. Hypotheses were made to explain these links.

22. in France the high schools belong to Regional Council

Table 12 . Selection of criteria combinations.

	: no dependence observed	+	: possible dependences
++	: some dependences observed	+++	: strong dependence observed

	instrument	end-use	sector	financial frame	targeted area	local involvement	Local authority function
date			(for trends)			(for trends)	(for trends)
instrument		++	+++			+++	
end-use			++				
sector					++		
financial frame						+++	
targeted area						++	+
local involvement							+++

However all crossings of criteria are not useful and some could have no real meaning. The following selection was made among the 28 possible combinations, for 8 criteria (the studied ones are in black, see Table 12):

Combinations between the "usual" criteria ("policy instrument" / "energy end-use" / "targeted sector")

The inducing activities are targeted on an energy use
There is no significant link between "policy instrument" and "energy end-use" except for ["inducing" and "targeted action"]. 80% of the "inducing" activities are "targeted actions" (45% for the whole inventory), and in the reverse, 50% of the "targeted actions" used an "inducing" instrument (28% for the whole inventory). An explanation is that the financial incentives are often proposed for a defined action, including a given technology, and therefore are targeted on an energy end-use.

The targeted sector influences the choice of the policy instrument
Significant deviations emphasise a strong dependence between "policy instrument" and "sector", in both directions. The favoured combinations are ["industry"-"tertiary" and "consulting"] and ["residential" and "raising awareness"]. In fact, "consulting" is more adapted for a defined aim such as "industry" and "tertiary", whereas "raising awareness" enables to reach diffuse deposits.

Activities targeted on special sectorial aims tend to use more audit or training…
If activities targeted on an end-use have a link with "inducing" instruments, this is not true for activities with special sectorial aims. A crossing between "specific publics" and the level 2 modalities of "policy instrument" emphasises that this kind of activities are more associated with "training" (at 37%) and "energy audit" (at 31%), all the "training" activities aiming at "specific public". Indeed an instrument which cannot reach a large population is more often targeted on a specific group, even if it can be proposed to a global population, such as grants in the industry for example.

…and to aim at all energy end-use
No significant deviations were observed between "energy end-use" and "targeted sector" except for ["global action" and "specific publics"]. When a special sectorial aim was defined, the activity then deals with all possible end-uses (at 64%). As the means used are higher (by concerned person), the activities are designed to cover a wider range of end-uses.

Distribution of the specific energy end-use targets among the sectors
Activities on lighting are distributed in all sectors. They may already be considered as usual in industry and tertiary. This consideration could be used as a "proof" for encouraging households to use efficient lighting.

Activities on building envelopes are also distributed in all sectors. And as the technologies used are mostly the same for all sectors, transverse activities are adapted, as for example the OPATB.

At the opposite, activities on "computers" are only in tertiary, where this deposit is more important and focused.

Combinations with the local dimension criteria: analysis of stakeholders' context
Local dimension criteria are "targeted area", "local involvement level" and "local authority function". "Financial frame" was also considered here as it is an important criterion to study the stakeholders' context.

The financial frame tends to influence the level of local involvement
When the financial frame is nationally defined as for "ADEME alone" (even if the grants are then distributed locally), the local involvement remains to be a "relay" (at 71%). At the opposite, when the frame is negotiated locally, and involving all of the three main stakeholders (EDF, ADEME and Regional Council), local involvement is high, taking into account the local context at 80%. Thus it seems interesting that local organisations take part in the negotiation for the financial frame in order to involve them more in the resulting activities.

No links between "financial frame" and "local authorities function"
Except for ["FACE" - "energy distributing"], which is a logical combination as FACE was created for electricity distribution issues, the financial frames are not usually designed for a specific function, and mutually, no function uses more one of the financial frames.

The better defined the targeted area is, the stronger the local involvement
"Department" and "municipalitie(s)" are associated with "local initiatives" respectively at 85% and 90%: when the area is well-defined, then the local involvement is stronger.

The involvement of local authorities anchors the activities in a territory…
Some deviations are observed crossing "local authorities function" with "targeted area" but it should be confirmed after the redefinition of the criteria "targeted area" in "local authority involved". 73% of the activities where "no local authorities function" is involved corresponds to the "regional" level, which is the territory level for poorly defined areas. This trend means that the involvement of local authorities anchors the activities in a given territory.

…and leads to take into account the local context
The activities where local authorities are "stimulating actions" or "energy distributing" are respectively at 98% and 100% "local initiatives", and at 67% and 100% "local context". Therefore these functions are associated with a high level of involvement. This emphasises the interest of local activities as mentioned in literature (JOERGES et al. – 1983, MAGNIN et al. – 1995), and in the political decisions such as SSCE.

The local involvement level influences the choice of the policy instrument
Significant deviations are observed, in both senses. The favoured combinations are: ["public management"-"relay" and "consulting"] and ["local initiative"-"local context" and "raising awareness"-"inducing"]. In fact "consulting" activities are usually linked with ADEME, as decision-making aid activities are the core of its general policy (ADEME – 2003). Whereas "raising awareness" and "inducing" activities are more designed through co-operations.

RECENT CHANGES

The evolution of the number of activities by date was analysed for some criteria, taking into account that, in the inventory, 2003 includes more activities than the other years.

Targeted sector

The objective was to see whether there are more transverse activities in the more recent years (7 in "2000 and before", 10 in 2001, 15 in 2004). This trend can be noticed, but lightly. It should be confirmed when recent new frames, OPATB or ATEnEE agreements, enter in operational steps.

Local involvement level

No conclusion can be made for "public management" and "relay". At the opposite, "local initiative" and "local context" are significantly increasing. The growth for "local context" is more recent and more important: the number of "local context" is twice for 2004 than for the years before.

These trends have to be confirmed with quantitative indicators, and following what happens in the coming years. However it should be interesting to look for what takes part in these changes: works within the SSCE? the will of local authorities to react after the opening of the market? the new frames proposed by ADEME? works within stakeholder networks? the evolution of energy prices ?

Local authorities function

The observations are similar to the ones for "local involvement level". No conclusion can be made for "no function" and "energy consumer". But "energy distributing" and "stimulating" are significantly increasing, the growth being more recent and important for "energy distributing", as the number of these activities is three times more in 2004 than in the past years (but it remains the less represented function). These findings emphasise again the links between "local authorities function" and "local involvement level". This also confirms the trends shown above.

Concrete examples of recent changes

The inventory also enabled to detect concrete examples for these changes:

- the Aquitaine region has for several years a strong activity of energy audits for local authorities ; it was selected in 2002 as the pilot region for the new frame OPATB, and started this process for four territories. This is an example of change from "public management" to "local initiative" with transverse actions.
- the revival of local authority joint board for energy distribution: the new agreement between ADEME and FNCCR[23] shows an interest to increase their activities. It is confirmed by the number of demands for DSM activities accepted by FACE: any in 2001 and 2002, one in 2003, and 7 in 2004.
- two large local EE programs started recently: the Eco-Energy Plan in the PACA region in 2002, and another program in the Lot department in 2004. For both cases, the origin of the programs is a local concert to find alternatives to new high voltage transportation lines.

Conclusions

The difficulties encountered in collecting data for local EE activities emphasise a lack of evaluation, as keeping an inventory of existing and past actions may be the first step of an evaluation process. Although this approach is not far from the mind[24], it is not fully exploited, mainly because of a lack of human resources. Indeed this task is often supposed to be completed by the same people already managing the activities. Unfortunately, they can rarely save time for this.

This study gives a good overview of what has been done in the last four years for local EE activities in France. The survey done collected a considerable amount of data.

23. FNCCR : national federation of the local authority joint board for energy and water distribution
24. ADEME uses a software (LISA) to register all the actions they support. However this procedure seems to be perceived more as an administrative obligation, than benchmarking opportunity. For example LISA is used to make the annual report for the State-ADEME agreement (ADEME 2003). A comparison between the data collected by LISA and our inventory could be interesting.

Main results

First, the selection of criteria with defined modalities enabled structuring of the data collected. This iterative work may be useful to build a collective memory, benchmarking, and to help better define the objectives while designing the actions, which is necessary to make evaluation easier.

The review of the inventory distribution by criterion gave a more accurate description of what kinds of local EE activities have been done and how. The main findings are the low frequency of activities using "inducing" instruments (28%), and the high frequency of local initiatives (76%), which stressed the importance of the involvement of local authorities in local activities.

Then the combination of the criteria enabled the detection of links between them, such as the dependencies between the policy instruments and the targeted sector. One of the main findings here is the importance to define precisely the targeted area and to involve local authorities in order to anchor the activities in a given territory and then to take into account the local context, which is the main interest of local activities (JOERGES et al. – 1983, MAGNIN et al. – 1995).

Finally, trends were observed during the last four years, especially an increase in the involvement of local organisations in local EE activities.

Prospects for further studies

First, within the inventory made, it would be interesting to study in more detail the special activities, such as:

- the transverse activities : what are they used for? what do the transverse aspects bring?
- the actions with specific publics (for sector or for energy end-use): are actions with specific targets more efficient? What specific actions could be easily developed? Among these actions are for example the training of social workers, or specific energy management guidebooks (for example for hotel or school managers)
- the activities with a high level of local involvement but without any real function for local authorities: this point could be used to detect other dynamic stakeholders, such as the public social housing organisation OPAC 38[25]

Secondly, this could be useful to reinforce a bottom-up approach for designing EE activities, which already exists among stakeholder networks as Energie-Cités, AMORCE, AIVF or RARE[26].

Furthermore, an important criterion could not be treated within this paper, but would be interesting for further studies: the objectives. The survey done for the inventory already enables the definition of four modalities for EE specific objectives: energy savings / load management and reduction / energy bills reducing / Greenhouse effect emissions.

In addition, this kind of inventory could be added to other benchmarking works such as the database of Energie-Cités, which are useful decision-making aid tools for local authorities.

Finally, the analysis of the criteria emphasises the need for quantitative indicators, especially to describe the size of the activities. Such indicators could be the financial means involved, the number of households or targeted companies linked with the amount of energy consumption they represent, etc. They could be the first components of an evaluation process, which should then provide quantitative data for the activity results. This process could take advantage of the future white certificate framework, much like the new Home Energy Efficiency Database does from the Energy Efficiency Commitment in the United Kingdom. This iterative process of continuous improvement will reach a major milestone when it is possible to use the results to detect the most efficient activities for a given context. This approach will then be fully sustainable.

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