

GA-RES

WORKING GROUP 4

RES and district heating



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In a Nutshell

This report summarises the work carried out on the topic of renewables in buildings and renewables in district heating and cooling during the Concerted Action for the Renewable Energy Sources Directive (CA-RES).

Directive 2009/28/EC, known as the Renewable Energy Sources Directive (RED) sets a target for the European Union to reach a 20% share of energy from renewable sources by 2020. Renewable energy in buildings and district heating can play a significant role in helping to reach this target and does so through Article 13 and Article 16.11 of the Directive which is summarised below:

- Art 13.3: Member States should recommend the installation of energy systems based on renewable energy and district heating and cooling when planning, designing, building and renovating industrial or residential areas. This is focussed in particular on the planning of city infrastructure.
- Art 13.4: Member States should also introduce by 31st December 2014 a requirement in their building regulations for the use of minimum levels of RE in new buildings and existing buildings subject to major renovations; although this is only ‘where appropriate’ and can be fulfilled by other means with equivalent effect.
- Art 13.5: Member States shall ensure that new public buildings and existing public buildings that are subject to major renovation, at national, regional and local level fulfil an exemplary role in the context of this Directive from 1 January 2012 onwards.
- Art 16.11: Within their National Renewable Energy Action Plans Member States should assess the necessity to build new infrastructure for district heating and cooling produced from renewable energy sources in order to achieve the 2020 national target. Following this assessment, where relevant Member States should take steps with a view to developing a district heating infrastructure.

One Topic in the Spotlight

In order to address these issues, during the course of CA-RES discussions took place on the following topics:

1. Overview of the current status and barriers to renewables in buildings and district heating
2. Non-financial measures to increase the deployment levels of renewable energy in buildings
3. Financial support schemes for renewable heat & cooling in buildings
4. Measures to promote renewable district heating and cooling
5. Harmonisation and development of a common approach, and liaison with CA EPBD (including building regulations)
6. Implementation to date and promising avenues for the future

Many of the RES Directive articles covered by this working group allow for a reasonable amount of flexibility in their implementation across MS, therefore the issues covered have been designed to be accessible and relevant to all participants in the working group. The purpose in bringing the MS together has been to identify areas of the RES Directive (within this group's scope) where there is a clear benefit for MS in exchanging experiences and discussing topics of common interest to enable a shared learning thus contributing to improved implementation of the RES Directive legislation.

In general on-site heat is expected to contribute more towards MS' 2020 targets than on-site electricity however overall, indicative responses from CA-RES attendees suggested that most MS do not expect implementation of the RES Directive articles addressed by this working group to contribute significantly to the achievement of their targets. Nevertheless the articles in question are still a priority topic for MS due to the breadth of policies and stakeholders they touch upon. The working group cuts across all buildings and their occupants and managers across the domestic, commercial and public sector. The topics covered by the working group also have clear links to aspects of the two EU Directives that deal with the energy efficiency of buildings – namely Directive 2002/91/EC, or the Energy Performance of Buildings Directive (EPBD) and Directive 2012/27/EU, or the Energy Efficiency Directive (EED). This affords opportunities for MS to integrate their renewable energy and energy efficiency policy implementation and further develop and exploit innovative financial mechanisms for the building sector.

Increasing the proportion of renewable energy in buildings, covered by Article 13 of the RES Directive, is an issue that is also addressed in two other EU directives that have a focus on reducing CO₂ emissions from buildings, in particular the EPBD and the EED. Both of which have Concerted Actions dedicated to supporting Member State implementation.¹

Harmonisation with the Concerted Action EPBD was chosen as the focus for discussion due to clear cross-cutting issues and the extensive body of work that has and is being undertaken. An analysis of overlapping areas of the EPBD and RES Directive was carried out and limited to the following points:

- EPBD requires minimum energy performance requirements for buildings to be set using a cost optimal methodology (i.e. building regulations)
- RES Directive requires MS to introduce in their building regulations and codes or by other means with equivalent effect, where appropriate, the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation.
- EPBD requires that MS should ensure that by 31 December 2020, all new buildings are nearly zero-energy buildings where the nearly zero or very low amount of energy required should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby.
- Both directives require an exemplary role for public sector buildings

Although the EPBD and RES Directive have a common goal to reduce CO₂ emissions from buildings, there is some potential for tension between the two in achieving this. Figure 1 illustrates the balance between energy efficiency and renewables in buildings: as buildings become more energy efficient, each additional energy efficiency measure will have diminishing (energy and carbon saving) returns, and renewable energy becomes relatively more cost effective.

¹ The Concerted Action for the Energy Efficiency Directive (www.esd-ca.eu) and the Concerted Action for the Energy Performance of Buildings Directive (www.epbd-ca.eu).

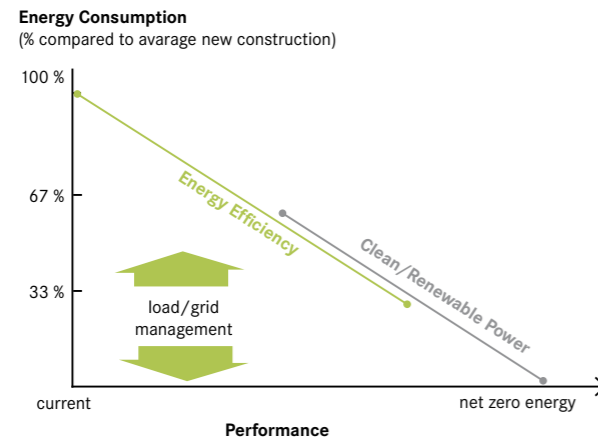


Figure 1. Relationship between energy efficiency and renewable energy.
Reference: Karsten Voss, Wuppertal University taken from slides by Per Hiselberg, Aalborg University

The CA EPBD has undertaken a comprehensive review of Member State's NZEB plans including their progress towards defining a 'nearly' zero energy building and how RE has been incorporated. The decisions made will clearly have an impact on the RE industry. For example, if a MS chooses to define a NZEB as one that meets a maximum energy demand, this may or may not include a specific requirement for RE. If the choice on how to reach that maximum energy demand is flexible then, where RE is cost effective enough, it is likely to be included by developers.

Consequently there is clearly a need for dialogue between building-related energy efficiency and on-site renewable policymakers and stakeholders at the EU and national level on what is the appropriate balance between renewable energy and energy efficiency technologies in buildings. From the renewables perspective the streamlining of legislation is important to ensure that clear signals are given to industry to enable future (buildings) renewables markets to develop to their full potential. The key is in ensuring effective communication at the nation level. In 10 Member States out of 22 Member States (43%), the decision makers and officials responsible for implementing the building regulation aspects of the RES Directive and EPBD were employed in different ministries. Implementing the relevant aspects of these two pieces of legislation in a coordinated and integrated way under these circumstances is clearly more challenging than where the responsibility lies within just one ministry.

² Heiselberg, P. (2010) NZEB Definitions and Implications. Aalborg university, Denmark. Available at: http://ene.aalto.fi/fi/ajankohtaista/uutiset/nzeb_definition.pdf

When setting building regulations EPBD requires building performance to include a numeric indicator of primary energy use, based on primary energy factors per energy carrier (both renewable and non-renewable sources). The factors take into account losses in the generation and distribution in energy generation. The value given to primary energy factors was found to be a key driver in determining how much and which renewable energy technologies are promoted. For example if the electricity energy factor set in a given MS is relatively high (e.g. 2.5), the coefficient of energy performance of a heat pump will need to be higher (e.g. 3) in order for it to be worthwhile. The primary energy factor set can influence the balance of energy efficiency versus renewables. A high electricity primary energy factor is likely to result in energy efficiency measures (reducing the energy demand of the building) being prioritised over the installation of on-site renewable energy technologies. An Ecofys report ³ (2011) argued that the primary energy factor should be recognised as a political instrument, rather than an unambiguous scientific value and therefore that it could be calculated in different ways. It warned that primary energy factors should be reviewed regularly, particularly with respect to renewables in the grid to avoid unintended consequences.

Another issue raised was the level of contribution that comes from biomass. Although biomass has low CO₂ emissions, it may not be a low carbon energy solution, depending on the energy performance calculation MS use and how they define primary energy factors. There are also longer-term sustainability concerns with biomass that MS should take into account when prioritising RE in building regulations.

In summary:

Both RES & EPBD can complement each other and help each other to achieve their respective goals (high RES / high energy performance), however coordination across responsible institutions is required to ensure this.

The more flexible the approach to RES target the more compatible this is with EPBD. However this approach is complex for both Governments and industry and can give less visibility to renewables. It requires long term market signals to be given.

Early implementation of nearly zero energy building (NZEB) will be important and will further help to give RES industry a clear, long term market signal.

Design of legislation can be streamlined at the national (and EU) level.

Where responsibility for the implementation of building regulation aspects of the RES Directive and EPBD is split between different ministries, effective coordination and communication between responsible institutions and units is vital.

³ E. Molenbroek, Stricker, E., Boermans, T., Primary energy factors for electricity in buildings – towards a flexible electricity supply. Available at: http://go.leonardo-energy.org/LaunchPEFreport_registration.html

Challenge Meets Solution

3

Below is an overview of all of the topics covered by this working group during the three year period of the CA-RES:

1. Overview of the current status and barriers to renewables in buildings and district heating.
2. Overcoming non-financial barriers to RES in Buildings (on-site RES) and District Heating.
3. Financial support schemes for renewable heat & cooling in buildings.
4. Measures to promote renewable district heating and cooling.
5. Harmonization with EPBD (discussed in Chapter 2 above).
6. Implementation to date and promising avenues for the future.

Member States provided input on these topics via a series of questionnaires and other data collection methods, the results of which were summarized, discussed and further elaborated with participants during each of the six CA-RES meetings. This report provides a concise, public summary of the work of this group over the entire course of the CA-RES.

3.1 Overview of the current status and barriers to renewables in buildings and district heating – September 2010

The working group topic began by focussing on what MS considered to be the key barriers to increasing the share of renewable energy in buildings and renewable district heating and cooling. It looked at on-site renewable electricity, on-site renewable heating and cooling and renewable energy in district heating. Barriers were divided into financial and non-financial. The barriers discussed were wide-ranging and can be grouped into the following categories:

Non-financial

- Lack of knowledge, and information, guidance and training to overcome this for installers, manufacturers, architects, policy makers, property owners, tenants and the public in general.
- Lack of quality assurance and certification schemes/distrust in installers and products.
- Issues with regulations, standards and administrative procedures.
- Conflicts between renewable district heating and on-site technologies at the building level.
- Wider environmental issues, for example sustainable production, sustainable sourcing and the impact of importing of biofuel.
- Overlap with other directives/legislation e.g.
 - EU/National level environmental protection
 - Energy efficiency
 - Regional/local level spatial/planning regulations

- Difficulties in changing/adapting incumbent systems and infrastructure.
- Split incentives for building owner vs. building tenant and coordination/ responsibility issues in multifamily buildings.
- Grid capacity and access.

Financial

The principle barrier was the high cost of renewable energy versus conventional energy sources and fossil fuels in terms of production, installation and maintenance costs, leading to long payback times on investment.

The most commonly experienced non-financial barriers were lack of information, knowledge and understanding among the public, industry and policy makers.

Discussions on this topic led to discussions about possible measures to overcome barriers identified. These included:

- Media/information campaigns using websites, leaflets, news articles and conferences to improve public understanding of renewable technologies.
- Provision of free advice.
- More detailed and nationally standardised planning guidance and long term urban planning to avoid conflicts between renewable district heating and on-site heating.
- Creation of one-stop-shops for authorisation of bigger installations.
- Simplifying approvals procedures for small installers.
- Introduction of installer training and certification schemes.
- Establishing a minimum level of renewable technologies in buildings.
- Regulation, education and allowing landlords to increase rent to increase the uptake of RE in rented buildings.
- Investment in the grid to ensure sufficient capacity.
- Research into storage of excess electricity.
- Measures to overcome financial barriers, the most common of which were feed-in tariffs and grants to overcome the high cost of renewable energy technologies in comparison to conventional fossil fuelled energy sources.

Participants were asked about development of on-site renewable energy policies and delivery and the extent to which they had the means of quantifying renewable on-site generation and progress towards targets. The responses suggest that renewables in buildings and district heating are not expected to deliver very significant shares of the overall renewables growth required to meet the 2020 targets. However the topic was still considered important by participants for the reasons already stated in section 1, page 4 of this report.

3.1.1 Member State's experiences and good practices

The key challenges

Funding was seen as a key challenge when designing measures to remove both the financial and non-financial barriers. This was in the context of the financial crisis which has affected the building market, and led to a lack of stable financial support, and difficulties in financing measures such as advisory services and subsidies.

Lessons learnt

There was a clear need for research and development and demonstration projects to understand the effectiveness of different financing schemes ensure cost effectiveness and provide best practice examples. Other common lessons learned can be summarised as follows:

- Keeping schemes simple.
- Ensuring good project planning.
- Securing guaranteed and long term funding.
- Ensuring legislative backing for policies.
- Long term measures and use of economic instruments.
- Building from small steps followed up with more extensive measures.

As this was the first exchange between participants within this working group, examples of lessons learnt were kept at the general level. The most common successful measures were financial schemes, including capital grants, feed in tariffs and tax relief. Education, training and certification schemes were also considered successful measures.

3.2 Overcoming non-financial barriers to RES in Buildings (on-site RES) and District Heating

Following on from the first discussions the next topic looked specifically at the non-financial barriers, and identified measures to overcome these. The barriers were summarised as follows (Figure 2):

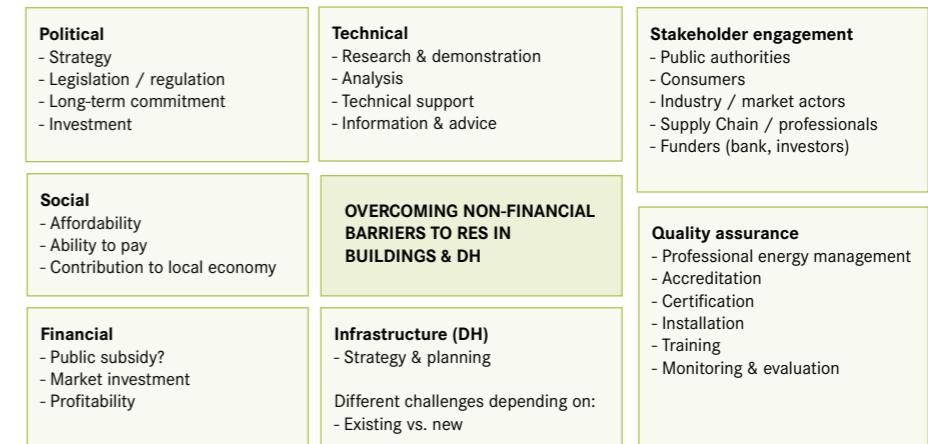


Figure 2 Overview of the non-financial barriers to renewable energy in buildings and district heating

Measures or programmes in place in MS to overcome the non-financial barriers can be broadly divided into three categories:

- a) Legislative.
- b) Technical and consultancy support.
- c) Advice information, awareness and labelling.

A. Legislative measures

Legislative measures help to address several non-financial barriers, and primarily give market certainty on a government's position in relation to on-site renewable energy. Some MS have begun to put legislation in place requiring the installation of renewable energy technologies, primarily for new buildings. Legislation has also been introduced to reduce the administrative and/or financial burden of installing renewable energy, and connecting to the grid or heat network in particular.

B. Technical and consultancy support

Technical and consultancy support address the barriers associated with lack of knowledge, information, guidance and training for installers, manufacturers, architects and property owners. This can be broadly divided again into support for different audiences:

Support for LAs/municipalities: Schemes focussed on helping LAs to plan district heating installations and provide technical support and consultancy on how to go about setting up a project.

Support for communities/householders/industry: This type of scheme is fairly common with some schemes providing information for consumers and communities, some offering tailored advice to householders and some giving more technical and project management support. There were also schemes that sought to bring together the right expertise for a project.

Research and strategies: Case studies or research to showing how to overcome barriers to the uptake of renewable energy technologies and district heating.

C. Advice information, awareness and labelling

There is still a lack of knowledge and understanding among the public about renewable energy, coupled with a lack of quality assurance and trust in installers and products. To overcome this many MS have implemented large scale information and awareness campaigns. To build trust in equipment and installers some MS have / are developing labels or standards for renewable energy and district heating, carrying out in-situ tests or trials of equipment and / or have exemplar properties where people can learn more about the various renewable technologies.

3.2.1 Sharing of Member State's experience and good practice

A detailed exchange of experiences took place, focusing on examples of good practice to address non-financial barriers.

Example from the UK: National heat map for England (Figure 3)

- **Barriers:** Lack of detailed planning guidance on renewable district heating schemes.
 - Long term urban planning needed to avoid conflicts between renewable district heating and onsite heating. More detailed and nationally standardised planning guidance needed.
- **Relevant RES Directive article:** Art. 13.3: Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas.



Figure 3 schematic from the heat map for England

The national heat map has increased local authority awareness and understanding of where heat demand exists and provides local authorities with a tool to support strategy, energy master-planning, and local planning decisions. It identifies where best to install district heating networks, but by default, can also show lowest density areas. By identifying sources of heat supply as well as demand, e.g. biomass or energy from waste, it can also increase renewables in district heating. It shows developers where best to route networks (although it is not intended to replace feasibility studies) for district heating.

The heat map is based on modelled estimates of annual heat demand at address level in England. This map allows users to investigate energy use at buildings and street level, supporting the development of local, low-carbon decentralised energy projects across the country. The Heat policy paper published by the Department of Energy and Climate Change has further boosted confidence to the market on the UK's commitment to district heating going forward. More information: <http://tools.decc.gov.uk/nationalheatmap/>

Example from Finland: Heat entrepreneur scheme

- **Barriers:** Lack of knowledge, and a lack of information, guidance and training to overcome this for installers, manufacturers, architects, policy makers (local and national), property owners, tenants and the public in general; high cost of renewable energy versus conventional energy sources and lack of financial support.
- **Relevant RES Directive article:** 13.3 Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas.

Finland has more than 500 locations run by heat entrepreneurs. Heat entrepreneurs supply heat to large buildings or a small local network of houses whose owners are not ready or capable, or do not have the knowledge to produce the heat themselves. The district heating schemes mainly use fuels based on wood and in addition to procuring the wood they also run, or work with a cooperative to run the district heating systems.

Usually the entrepreneurs take all the risk of setting up the scheme, and therefore take the majority of the income generated from the scheme. Nevertheless the income to the local economy from the scheme is often quite significant. Feasibility studies are undertaken by local energy advisors, who promote the plant in the region and help to find entrepreneurs and to engage the local communities. There can be resistance to new plants, however this decreases if the local community is benefitting directly from the scheme. In some schemes the ownership of the scheme can transfer to the community after the investor or entrepreneur has recovered their investment.

3.3 Financial support schemes for renewable heat and cooling in buildings

Participants reported that in the majority of instances across Europe on-site renewable energy costs more and is considered a higher risk investment than traditional fossil fuels. Therefore financial incentives are currently utilised to encourage the uptake of renewable energy for heating and cooling in buildings.

Almost all MS have some financial support scheme in place, demonstrating that renewables still require some level of support and are not yet the norm across Europe. Analysis of the schemes showed that over half of the support schemes are grants (52%) with loans (14%) and a combination of financial support schemes (14%) being the second most common schemes in place (Figure 4). At the time of discussion most MS who participated in the exchange of experiences on this topic were considering how to create support schemes that access private sector investment at the time of discussion.

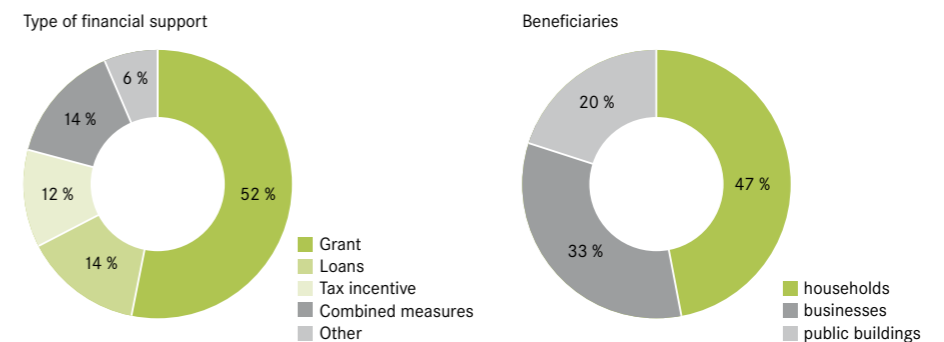


Figure 4 Type of financial support schemes and beneficiaries of those schemes (n=42)

The focus of the majority of the schemes identified was on support for households (47%) with businesses second (33%) and public buildings third (20%). The focus on domestic and industrial beneficiaries was due to the fact that their emissions often constitute the greatest proportion of CO₂ emissions in MS. It was suggested by CA-RES participants that financial incentives were not always the best way to promote the uptake of renewable energy technologies in Government buildings and this could be more effectively carried out through legislation. Most MS required RE technologies to be compliant with technical specifications to qualify for support schemes, some of which went beyond EU standards e.g. solar keymark for solar thermal.

3.3.1 Member State's experience and good practice

Balancing budget certainty with achievement of renewables targets is difficult. Grant schemes are the most common form of financial support due to the fact that it is possible to limit and have control over their budget, which was seen by many MS participants as essential. With a tariff system or a tax incentive it is impossible to control the level of take up, and therefore cost, within a scheme.

However, grant schemes do not come without their own challenges. Installation costs are frequently inflated by the market (the provision of independent advice is a common solution cited to overcome this challenge) and schemes can close suddenly when funding runs out. This affects market and end-user confidence which is dependent on a long-time stable support framework that can be harmed by stop-and-go support or sudden, unforeseen changes in schemes. ‘Feed in tariff’ style schemes give the market a greater confidence as payments continue over a longer time span, however uncertainty that such schemes will continue as planned also exists.

Experience regarding the type of incentive or level of funding point to the need for a nationally tailored solution, rather than a one size fits all approach. Options should be tested with the target market to establish the most appropriate measure/s and may not always follow a logical path - for example consumers may prefer money off a particularly unpopular tax rather than receiving direct grant money.

There is now increasing interest amongst MS authorities in how to most effectively combine different types of incentives to ensure stable development towards (buildings) renewables targets. One important issue is whether and how to use new innovative finance mechanisms such as tariff based systems or public/private partnerships to attract additional private sector investment.

3.4 Measures to promote renewables in district heating and cooling

The deployment levels of district heating and cooling in buildings across Europe varies, as does the level of renewables within those heating and cooling networks. Some MS have large district heating systems, some of which are relatively old as they were linked to industry that has since declined leaving legacy district heating systems in need of updating. In those MS who participated in the exchange of experience on this topic where there is little or no district heating, many have no plans to increase this provision with only a few looking to increase significantly. Conversely some MS have well-established district heating markets which can be market-led with little intervention by national or local governments, or can be driven by the public sector.

The knowledge of and/or ability to calculate the amount of renewables in district heating and cooling varies significantly. Where smaller and/or unregulated markets exist it is frequently

difficult to accurately quantify the amount of renewables, and it is mainly where there are established district heating networks that it is possible to calculate these amounts. There are four key parties involved with district heating: local authorities or public authorities, decision makers, end users and the private sector (DH operators, network operators etc.). Depending on the current levels of district heating within a country, different parties require different levels of support. In general, end consumers and local authorities seem to require the most support, in particular to educate them about the benefits of district heating. In the case of local authorities support to access or develop technical expertise is also required. The ambition for renewable district heating and cooling varied greatly depending on current infrastructure and geographical conditions, although two thirds of those CA-RES representatives who participated in the working group stated they did have defined targets for renewables in district heating and/or cooling:

Defined RES targets in DHC

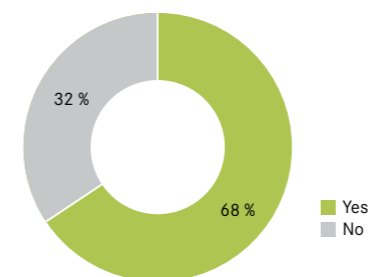


Figure 5a: MS with defined renewable targets for DH/C

Responsible body for DH

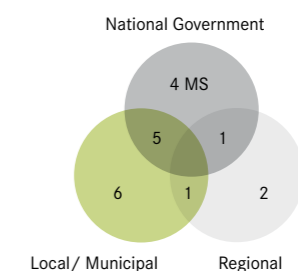


Figure 5b: Responsible bodies

One challenge highlighted in Figure 5b is that responsibility for fulfilling the RES Directive lies at the national level whilst responsibility for district heating and cooling is often split between national, regional and local bodies. For district heating and cooling assessment to be carried out at national level the necessary funds must be made available. It was suggested that national governments are best placed to drive quality management to ensure that planning, construction and operation of schemes are of a good quality, whilst local or regional bodies are best placed to drive the increase in renewable district heating or cooling. The French national assessment example below demonstrates how this can be achieved:

- **Example from France:** National district heating assessment
- **Barriers:** Lack of detailed planning guidance on renewable district heating schemes. Long term urban planning needed to avoid conflicts between renewable district heating and on-site heating. More detailed and nationally standardised planning guidance needed
- **Relevant RES Directive articles:** 13.3 Member States shall recommend... to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas. 13.4: Member States shall introduce in their building regulations and codes appropriate measures in order to increase the share of all kinds of energy from renewable sources... 16.11: Member States ... shall assess the necessity to build new infrastructure for district heating and cooling produced from renewable energy sources... Subject to that assessment, Member States shall...take steps ...to developing a district heating infrastructure ...

In France local authorities are responsible for the public distribution of heating and cooling. A national level assessment of heat demand, especially in district heating was carried out in 2009 to evaluate the need for new infrastructure and following this a target for 3.3 Mtoe of renewable energy in district heating was set. The assessment linked the national and local level needs, but allowed regions to set their own targets, and took into account different schemes at all levels, as outlined in Figure 6:

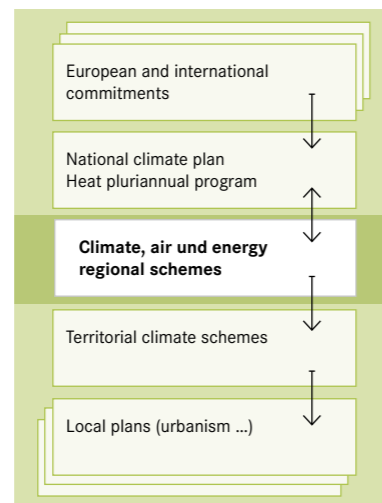


Figure 6 link between local, national and EU level renewable DH policy in France

The assessment has helped identify drivers to promote district heating, for example RE DH provides four times more jobs locally compared to the fossil fuel equivalent. The assessment will be repeated every five years.

Barriers & recommends

Due to the nature of district heating, issues regarding grid access and pricing were areas that CA-RES attendees highlighted for careful consideration. Where an established district heating market exists, some representatives noted that there were perceived problems with the transparency of prices and regulation was being used to increase transparency. Regarding 3rd party access to the district heating network, the possibility of prioritising renewable energy (for new plants) should be considered as well as potential future curtailment issues, although these are not specifically addressed in the directive.

Support is required to ensure DH remains competitive in the future as demand reduces due to increased energy efficiency. Potential solutions include cogeneration, combinations of technologies, lower temperature pipes, and by linking to waste heat sources. When considering future DH plants the issue of how to link these to existing networks should be taken into account in advance including setting technical standards, regulations and whether RE should be prioritised for connection, as is done for electricity. Mandatory connections to DH networks can be contentious.

3.5 Implementation to date and promising avenues for the future

Implementation to date

The working group discussed the best practice implementation of Article 13 and 16.11The changes that have taken place in on-site renewable energy over the past three years. The picture across Europe was found to be mixed. It was generally agreed that the market for some on-site technologies (solar photovoltaic in particular and solar thermal in some MS) has matured. Despite many barriers being overcome, the uncertainty caused by changes or reductions to subsidies for on-site renewable energy (that many MS have had to make) was identified as a new barrier that has made it harder to bring about rapid market development. Increasing the proportion of on-site heat remains a challenge for many MS. The fragmented and inherent difficulties of developing a heat market along with technological barriers such as differing levels of maturity and transportation and storage are the key challenges faced.

To assess the state of market development for different heat technologies and help MS to identify next steps, the market for on-site heat technologies was looked in the context of the market transformation curve or adoption curve based on Rogers (1995)², which is a commonly

² Rogers, E.M. (1995) Diffusion of innovation. (4th ed.)The Free Press, New York.

used approach to look at the uptake and lifecycle of new technologies or services. It divides society into five groups from 'innovators', who are likely to invest in new technologies, through to the late 'majority' and 'laggards' who are unlikely to take up new technology unless they see everyone else has done it or they are forced to. In particular the working group looked at work done by the Local Energy Efficiency Project³ which is based on work by Les Robinson⁴ to overlay the different type of measures required to engage each of five audiences in the curve. Example measures for each audience are shown below the market transformation curve in Figure 7.

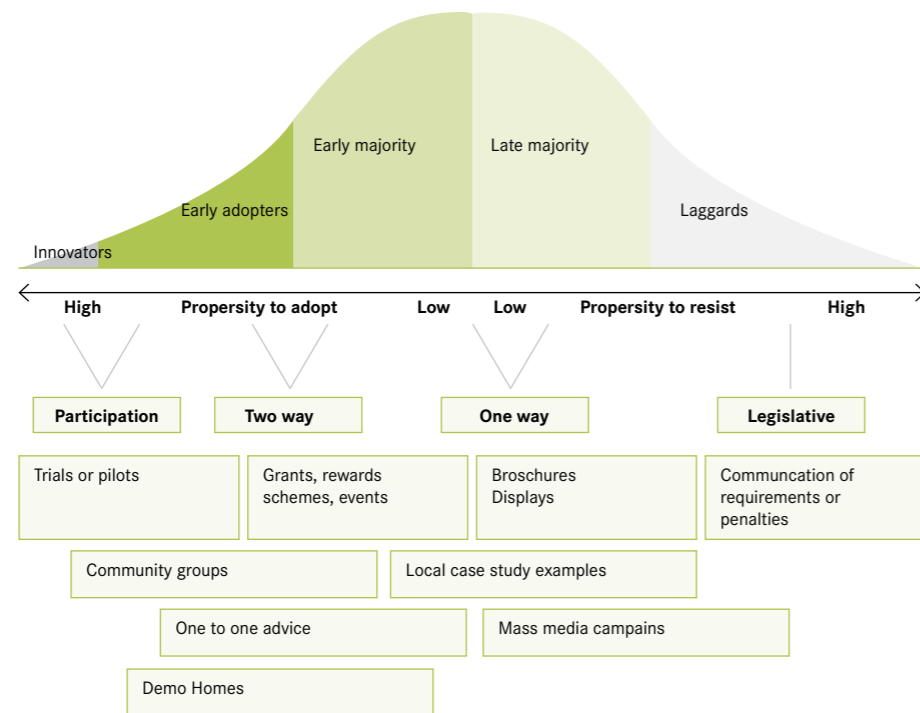


Figure 7 the market transformation curve including example measures targeted to each audience (Reference: LEEP Project, 2013).

³ LEEP Project. (2013) Creating a sustainable and replicable large-scale local authority led residential eco-refurbishment program. Accessed through: <http://www.energysavingtrust.org.uk/Publications2/Local-delivery/Funding-and-finance/Local-Energy-Efficiency-Project-LEEP-three-page-summary>

⁴ Les Robinson. Diffusion of Innovation Training. Available at: <http://www.enablingchange.com.au/>

By mapping the current market for renewable heat technologies in different MS against the market transformation curve, and making projections for where each MS needs to be by 2020 in order to reach their targets, it was possible to identify the types of measures that could be most effective in driving consumer uptake of the various on-site renewable heat technologies across different MS.

Nearly zero energy building update from CA EPBD

Previous discussions had identified that “the nearly zero or very low amount of energy required [by NZEBs] should be covered to a very significant extent by energy from renewable sources, including energy from renewable sources produced on-site or nearby”. This was an area of interest to CA-RES participants. Therefore an update on the work of the CA EPBD was given, showcasing posters that gave a detailed overview of those 6 MS which have legally defined an NZEB, and requirements for renewable energy.



Main Findings and Achievements

4

The main findings from the working group on renewable energy in district heating and renewable energy in buildings are summarised below.

The nature of Articles 13.2 - 13.6 and 16.11 of the RES Directive covered by this working group have led to discussions that focussed on identifying good practice and highlighting those schemes or measures in MS that are highly replicable, go beyond the requirements of the directive, or link in with requirements from other directives in order to achieve the goals of the RES Directive.

Making the case for RE in district heating. It will be important to enable innovation in DH such as cogeneration, combinations of technologies and harmonisation with other directives e.g. EPBD, Waste Directives, Energy Efficiency Directive to ensure it remains competitive as energy demand reduces in line with other policy goals.

Clear roles and responsibilities of national, regional and local governments are required for district heating implementation as responsibility for DH can cut across all three. At the national level government may be best placed to oversee quality management to ensure that planning, construction and operation of schemes are of a good quality.

Public authorities are key actors for the promotion of RE in district heating and cooling. In all Member States, public authorities perform a vital role in planning and implementing RE in district heating and cooling. In order to do so they need access to technical expertise and funding, for both feasibility studies and implementation of projects. With the right expertise and feasibility funding, sound business cases can be developed for either investment of public funds or to attract investment from private operators.

Consistent funding for renewable energy can be difficult to balance with budget certainty. The type and longevity of fiscal support provided by MS often depends on the political landscape and decisions made by the financial ministry. There is a trade-off between complexity of the scheme and administrative costs – generally, the more complex the financial incentive the higher the administrative costs will be.

Attracting private sector investment is becoming increasingly important. With the current economic climate MS are looking towards solutions that make use of innovative finance mechanisms that attract private sector investment. However the priorities and needs of the private sector and the public sector can be difficult to unite.

EU legislation on energy in buildings offers a hook for increasing the share of renewable energy. There are active discussions regarding cost optimality and the definition of nearly zero energy buildings within the EPBD community and, as a result of these, decisions will be made (at the national, regional and local level) that could affect the share of renewable energy.

The public sector has an important role to play in leading the move to a low carbon building stock in Europe as defined in three key directives: RES Directive, EPBD & EED. There are clear benefits to be reaped from taking a coordinated approach to the implementation of these three Directives at the national level – and clear (economic) advantages from making efficient and effective use of the available public resources.

The Way Ahead

Promising avenues for the future

Future CA-RES II work will build on the work carried out during the first phase, where on-site heat has consistently been found to be a greater challenge compared to electricity. An exercise was carried out in the final discussions of CA-RES I to prioritise those topics of greatest importance to CA-RES attendees. The top three are outlined below:

1. Innovative financial measures

To create a mature market for on-site renewable heat technology it is necessary to move away from public subsidies and towards private sector investment, particularly when developing on-site renewable energy projects at scale. And with the current economic situation in many MS, this is becoming increasingly important. This could involve work on issues such as how to involve banks in financing or how to make best use of loans or funds (EU or national) and build on the work previously carried out by the CA EED and CA ESD previously who have explored this issue for energy efficiency.

2. Certification and qualification of installers

This issue has been addressed by the working group on information and training schemes where some good progress has been made. However the challenge of attaining mutual recognition of training/qualification schemes across Europe is still significant. A range of other challenges also exist for training and qualification including disqualification, links to other EU legislation, compliance and linking to business.

3. Renewables in buildings

Tackling the building stock in MS is a complex challenge, involving a large range of stakeholders. Coupling this with an immature on-site heat technology market creates a challenge in achieving articles 13.3, 13.4 and 13.5 – for example which technologies should be prioritised and what is the evidence base, how to treat new vs. existing stock, what sort of requirements should be introduced etc. For this topic, CA-RES should aim to continue to work closely with the CA EPBD and to look at collaborating with CA EED where there is added value.



Abbreviations

Abbreviation	Full name
CA-RES	Concerted Action on the Renewable Energy Sources Directive
CA EPBD	Concerted Action for the Energy Performance of Buildings Directive
CA EED	Concerted Action for the Energy Efficiency Directive
CA ESD	Concerted Action for the Energy Services Directive
MS	Member States
RE	Renewable Energy
RES	Renewable Energy sources
EED	Energy Efficiency Directive
EPBD	Energy Performance of Buildings Directive
NZEB	Nearly zero energy building



This is a public CA-RES report

The Concerted Action to support the implementation of the RES Directive 2009/28/EC (CA-RES) was launched with the participation of the responsible authorities from 30 EU countries and supported by Intelligent Energy Europe (IEE) in July 2010 to provide a structured and confidential dialogue on how to address the cost-effective implementation of the RES Directive 2009/28/EC.

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