

Financial Incentives for Renewable Heating and Cooling

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Executive Summary

Introduction

Financial incentive schemes (FIS) for renewable heating and cooling (RES-H: bioheat, solar thermal, geothermal) can be one decisive instrument to promote the use of RES-H and exploit the huge untapped potential of renewables in the heating and cooling sectors.

In most EU Member States, FIS to promote RES-H are in force or have been enacted. The present publication is based on the analysis of the specific studies on FIS for solar thermal, biomass and geothermal heating and cooling. Together, they include 21 case studies analysing the lessons learned from FIS in different countries and regions. The present study sums up the general principles valid for renewable heating and cooling in general.

The key lesson

The key lesson learned from this analysis is that FIS can play an important role in promoting RES-H, if they are well designed, carefully managed and accompanied by appropriate flanking measures. If they are not, their positive effect is limited and can be even counter-productive in the medium and long term. This document develops criteria for a successful design and management of FIS and flanking measures.

The key positive effects of well designed and managed financial incentive schemes are:

- Reduction of the upfront investment costs, or of the fuel costs in the case of biomass
- Psychological effect: signal of the public authority to the potential users

Justification

FIS for RES-H are justified by a number of reasons, including: positive externalities of private investments, reduction of CO₂ and other emissions, security of energy supply, local economic development, contribution to the creation of economies of scale and thus to cost reductions in the medium and long term.

By saving conventional fuels, RES-H systems have lower running costs but usually higher investment costs than a conventional heating system. With rising oil, gas and electricity prices, the timeframe for a positive return on investment is becoming shorter. In many cases, it is already well below the average lifetime of the equipment, but even payback times in the range of five years are often not enough to motivate a large number of potential users. For this reason, financial incentives alone are not sufficient and they need flanking measures.

Outline of market structure

The development of RES-H markets faces specific challenges. Nearly 90% of the heating and nearly 100% of the cooling in the EU is produced and used in single buildings, the rest being delivered through district heating and cooling networks, which however constitute an attractive market for RES-H.

On the **demand side**, policies to promote RES-H should therefore address millions of building owners and developers, construction companies, district heating operators, etc. A FIS should encourage these actors to invest and should always avoid to create the expectation that the FIS will be higher in the near future, to avoid that investment decisions are postponed, creating a stop-&-go dynamic in the market.

On the **supply side**, the very small dimension of the market for RES-H equipment in most European countries means that manufacturers are still at an early stage in the development of economies of scales. A FIS should try to encourage their investments on production lines and the distribution chain by creating a stable positive framework in the medium and long term.

Specific **professional groups** are crucial for the market development, as they represent a grey area **between supply and demand**: installers, heating engineers, architects. These groups are key influencers of the decisions of the potential users. At the same time they can have a stake in the supply side, as the added value of their services usually tends to increase if they offer renewable heating and cooling. In a positive environment, they can contribute to the market penetration of RES-H. To do so, they need first to acquire skills and experience with RES-H systems. Without these skills, they may tend to discourage potential users, thus becoming a brake for market development.

Continuity is the decisive factor

Therefore, continuity in time is the most important single element of a well designed and managed FIS for RES-H. Several examples from different countries and RES-H technologies show that discontinuous financial incentives can damage the development of healthy market structures by creating a stop-&-go market dynamic. Under such conditions, the supply side and the professional groups mentioned above are discouraged from investing. A short-timed FIS may boost demand for a while, but does not create healthy market structures. On the contrary, such a situation may lead to a proliferation of “gold-diggers”, unserious companies with a short-term perspective that tend to install bad quality systems, leading to loss of reputation of the RES-H technologies.

Principles of best practice for financial incentives for RES-H

The study develops a series of recommendations based on the principles of continuity, coherence, clear targets, simplicity, open markets and fair amounts. The main recommendations are summed up here:

- Avoid creating an incentive to postpone installation of RES-H systems: the introduction of a new FIS, or the increase of an existing one, should not be announced before they become valid.
- Within a FIS conceived to last some years, adjustments of certain conditions should be possible to adapt the FIS to the market development. The adjustments

should be discussed with market experts and be introduced aiming at minimising any negative impact on the market development.

- The parameters concerning the eligibility of specific applications, technologies, the amounts offered and the categories that may apply for the incentive should be coherent and carefully tuned. The accompanying awareness raising and training measures should be targeted accordingly.
- The procedures should be simple, both for the applicants and for the public administration.
- The amount of the subsidy should be related to the amounts of renewable energy delivered by the system. Requirements on measurement of renewable heating and cooling should be related to their costs and benefits.
- Innovative renewable heating applications, such as cooling or industrial process heat, should be awarded a specific promotion, taking into account their future potential and additional benefits.
- The FIS should not create barriers to trade within the European Union. Any technical parameter linked to the eligibility for a FIS should be strictly oriented to European standards and certification procedures, when they are available. Otherwise, a FIS can contribute to create “isolated markets” at national or even regional level, thereby increasing the costs for the users.

Kinds of financial incentives

These are the main kinds of FIS for RES-H used so far in Europe:

- Direct grants
- Tax breaks (direct and indirect taxes)
- Loans at privileged rates
- Incentive linked to housing subsidies

The study analyses their strengths and weaknesses, but does not recommend any specific one. If the principles of best practice discussed above are fulfilled, each kind of FIS can be successful.

Applying the Polluter Pays Principle

How and from whom should the money necessary for the FIS be gathered?

The way how this question is answered is decisive for the continuity of the FIS, which again is a key factor of success. As long as the FIS is based on public budget, the continuation of the FIS depends on the development of public finances.

In the RES-E sector, it is common to finance feed-in tariffs with a small levy applied on the users of electricity. An analogous system for RES-H is suggested, where the costs of the FIS are covered by the wholesalers of non renewable heating fuels, who then pass the costs on the final users. A variation of this can be a tradable certificate system, though it is not recommended due to its complexity and the consequent uncertainty about the value of the FIS in the future. FIS financed through the general energy taxation are also possible.

Flanking measures

In order to tackle the non economic barriers to growth for RES-H, FIS should always be accompanied by other measures:

- Awareness raising campaigns targeted to the general public and to specific groups of potential users
- Specific training and awareness raising of the key professional groups relevant for market development (installers, heating engineers, roofers in the case of solar thermal, architects etc)
- Visible demonstration projects of innovative RES-H technologies such as cooling, industrial process heat or desalination
- R&D programs to foster technological development
- Reduction of administrative barriers
- Support for work to create, improve and harmonise standards and certification procedures

Financial incentives and binding obligations

In Spain and in a growing number of other countries, regions and municipalities, binding regulations are being approved or discussed. Such obligations usually define a share of the heat demand that must be covered with solar or other renewables, in new buildings or buildings undergoing major renovation.

Where such obligations exist, financial incentive schemes should be maintained for the non-obliged sectors, that constitute the largest part of the demand for heating and cooling. At the same, FIS can be carefully adapted to the obliged sectors, for example awarding an incentive only if a higher share of the heat demand than foreseen in the obligation is covered by renewables.

Such renewable heating obligations should be considered everywhere, because the costs for RES-H systems are much lower in new buildings than in retrofitting (see detailed discussion in the study “Best practice regulations for renewable heat in Europe”, which is being produced within the same project (K4RES-H) as the present study.

Introduction

The present study is a tool to support the design of effective Financial Incentive Schemes (FIS) for renewable heating and cooling (RES-H). It is targeted at legislators, public administrations, energy agencies, NGOs, industry associations, market actors and any person or institution involved in the design and implementation of policies to promote RES-H.

The present study is produced within the framework of the project Key Issues for Renewable Heat in Europe (K4RES-H), co-financed by the Intelligent Energy – Europe Programme of the European Commission and coordinated by ESTIF (European Solar Thermal Industry Federation), one of the associations member of EREC.

Within the K4RES-H project, guidelines for best-practice policies for the promotion of renewable heating and cooling are developed. The projects is structured along five key issues:

- Setting verifiable targets
- Quantifying energy delivery of individual installations
- Regulations promoting or hampering the market development
- Financial incentives
- Specific policies for innovative applications, such as renewable cooling

The studies on these issues will be resumed in an Action Plan for Renewable Heating and Cooling in Europe.

The present work builds upon three parallel studies on financial incentive schemes for the individual RES-H technologies, edited respectively by the European associations ESTIF (solar thermal), AEBIOM (biomass) and EGEC (geothermal) within the K4RES-H project. Each of the technology studies contains a number of case studies on specific FIS in different countries, as well as conclusions and recommendations on best practice FIS for each technology.

The present study draws general conclusions, valid for renewable heating and cooling as a whole.

All project documents can be downloaded at the main project website:

www.erec-renewables.org/projects/proj_K4_RES-H_homepage.htm

Many persons and organisations have been involved in the production of the work presented here, including the staff and the members of EREC, ESTIF, AEBIOM and EGEC, as well as many experts with experts from energy agencies, NGOs, regulators and public authorities at local, regional, national and European level, installer organisations and others who have contributed with their advice and opinions. Though it is impossible to mention all of them, our thanks go to each person and institution who contributed to this study.

Of course, EREC remains solely responsible for the contents and for any possible mistake or omission.

Aim and structure of this study

FIS for different RES-H technologies have so far been implemented at local, regional and national level. The recommendations of this study are mainly oriented to these levels of policy making. However the issues reviewed in this study also have a European dimension, as the discussion about a future EU Directive to promote renewable heating and cooling has been boosted by the resolution approved by the European Parliament on 14 February 2006, and the European Commission is currently examining possible measures to promote RES-H at EU level.

The guidelines developed here should be helpful also for discussion in countries outside the European Union, since the dynamic of RES-H market development is often similar in many other countries.

The study is based on existing experience with FIS for RES-H, in a number of countries. It looks both at best-practice FIS that have reached their goals and at schemes or elements of schemes, which have either partially or completely failed. The study defines elements of best practice for this type of instrument that can play a decisive role in increasing the use of renewable heating and thus reducing our dependency on gas, oil and electricity for heating and cooling purposes.

Definition of Financial Incentives Schemes

Within the K4RES-H project, following definition of financial incentives is used:

Financial Incentive Schemes (FIS) include any public policy giving a financial advantage to those who invest in or operate renewable heating and/or cooling (RES-H) system.

Financial Incentive Schemes (FIS) do not include public policies that support the creation of public goods, giving an indirect financial advantage to the renewable heating market, for instance an awareness raising campaign financed by public money or a program to subsidise training of craftsmen or R&D funds, etc. Obviously, these instruments create an indirect financial advantage for the companies involved in the market and this advantage is then transferred to the users. However, such instruments are not considered here as FIS, but as necessary flanking measures. The analysis below is limited to FIS as defined here.

Definition of Renewable Heating and Cooling (RES-H)

This study looks at heating and cooling provided from renewable energy sources, including solar thermal, biomass heat and geothermal energy. For a more detailed

**Financial incentives for renewable heating and cooling:
Introduction**

Project "Key Issues for Renewable Heat in Europe" (K4RES-H), EIE/04/204/S07.38607



discussion of their specific boundaries, please refer to the relative technology studies within the K4RES-H project.

Renewable cooling is the renewable fraction of the cooling provided through thermally driven cooling machines based on solar and/or biomass energy, as well as the renewable fraction of cooling obtained directly from the ground or the sea water.

The use of heat from cogeneration devices and of waste heat from industrial processes does not constitute an exception: it can be considered renewable only if the original energy source is renewable (sustainable biomass or geothermal energy). Fossil fuel based cogeneration or waste heat of fossil origin are not renewable, though their use is certainly desirable within a strategy for energy efficiency.

Electrical heating or cooling are not considered as renewable. There can be exceptional cases where electrical heating or cooling devices are in practice using only renewable energy sources, i.e. within isolated electrical networks that are fully based on renewable electricity. However, in these cases financial incentives should already be foreseen within the promotion of renewable electricity. Therefore, these cases are not considered in the present study.

Justifications of Financial Incentive Schemes

This study is focused on creating guidelines for best practice Financial Incentive Schemes (FIS) to promote renewable heating and cooling (RES-H). Whilst there is no space for an in–depth analysis of the benefits of RES-H, it is nevertheless appropriate to remind the main reasons justifying the implementation of FIS for RES-H.

External utility of the private investment

The private investment creates external utilities: society benefits from the reduction of emissions and other external costs linked with the use of oil, gas or electricity for heating or cooling purposes. The financial incentive rewards the private investors for these positive externalities.

Security of energy supply

By decreasing the dependency on imported and scarce energy sources, every RES-H system reduces the need to take public measures such as strategic energy reserves, investment on infrastructure for transport of energy sources, diplomatic and military costs. By increasing indigenous energy supply, in the long-term a financial incentive for RES-H can be cheaper than alternative measures.

Gaps in market development within the EU

For each RES-H technology there are huge gaps in market development between different European countries. If the whole EU was at the same level per capita as the most advanced countries today, the European market for RES-H devices would be more or less ten times bigger than it is now. Also in the most advanced countries, the technical potential for RES-H use is far from being exploited. It is possible and necessary to correct this unbalance by promoting RES-H markets in the countries lagging behind.

Creating economies of scale

The potential for economies of scale are substantial, not only in manufacturing but also for subsequent steps of the value chain, e.g. in areas like marketing and distribution, system design, installation, customer care, etc, usually delivered at a local and regional level. FIS help creating economies of scale, thus reducing the price of RES-H energy in the medium term.

Support to meet the burden of upfront investment costs

Private investors can be discouraged by the high rate of upfront investment costs as compared with a conventional heating or cooling system. Reducing this financial and partly psychological burden encourages investments in RES-H. This can make possible a number of investments that are economically sound from the point of view of society:

where the time for return on investment is shorter than the lifetime of the system, that also provides a substantial benefit in terms of energy savings.

Replacing imported fuels with local jobs

The largest part of the RES-H devices installed in Europe are produced within the European Union. The technological leadership of the European RES-H industry is a good reason to believe that this will not change, But even it would, a substantial part of the turnover linked to the installation of a RES-H system is inherently local: design, installation, training, marketing and distribution. And also concerning the bioheat fuels, there is a huge potential for converting the EU agricultural and forestry sectors to support a massive growth in the use of bioheat.

A FIS for RES-H creates therefore benefits for the regional and the European economy while reducing the need for imports of fossil fuels and uranium.

Psychological effect: positive signal from the public authority

The fact that a public authority gives a financial incentive gives a positive signal to the citizens, concretely showing the public support for this kind of investment. This builds market confidence in both the technology and the installers supported by the FIS.

FIS as a marketing tool

The existence of a FIS can be one of several methods for marketing solar thermal products. FIS should always be accompanied by a public awareness raising campaign. At the same time, private market operators will communicate the FIS to their customers. In some cases, the financial incentive is not very high, but its existence motivates the general public because of the "should not be missed" feeling operating in a similar manner to a discount campaign.

The economic dimension

The increase of oil, gas and electricity prices is quickly improving the economic performance of RES-H systems and this is reflected by their market growth. However, due the very low starting level of market penetration and to the non-financial barriers to growth, without promotion policies it will take a very long time before the potential for RES-H use is exploited. During this time, we would continue to burn huge amounts of precious fossil fuels to produce heat that can be easily obtained from renewable energy sources.

For a detailed analysis of the economics of each different RES-H technologies, please refer to the specific studies (see introduction). The main common point of all RES-H technologies, is that they have higher upfront investment costs but lower running costs, compared with conventional heating systems.

This high share of upfront investment costs is a major barrier to growth and the main justification for the need of Financial Incentive Schemes. It must be noted that there are million of buildings in Europe, where a RES-H system has a positive return on

investment at the current prices of conventional heating energy. However, the experience shows that even in case of payback times in the range of five years, many potential investments do not materialise. The reasons for this are manifold: lack of awareness, the difficulty of changing traditional technology patterns in the building sector (see below), the short windows of opportunity (see above) and, on the financial side, the fact that the many private actors pretend a very short return on investment.

A successful FIS to promote RES-H can not be based on a simple equation aiming at making the investment profitable, for following reasons:

- the main variable is in fact unknown, namely the price of conventional heating sources during the next 10-20 years
- based on the experience of the last years there are good reasons to assume that most people tend to assume stable energy prices when deciding on their heating system
- many potential investors, and particularly households, tend to discount future running costs as compared with immediate investment costs
- the financial dimension is only one of the main barriers to growth (see above and below)

Therefore, it is recommended to design FIS for RES-H on the basis of targets for market growth and to orientate the amounts and the conditions of the incentive to the level necessary to achieve the targets.

By favouring a sustained market growth for several years, a FIS can contribute to achieve a critical mass of the market that then becomes self-sustained, as happened for instance in Greece with subsidies for solar thermal in the 1980s and 1990s.

Outline of market structure and barriers to growth

There is a broad experience and a consistent scientific literature about financial incentives to promote renewable electricity (RES-E). The common elements between RES-E and renewable heating and cooling (RES-H) are on one hand the urgent need to reduce our dependency from scarce, imported and polluting conventional energy sources and on the other hand the large unexploited potential for renewable energy use, and therefore the high remaining potential for economies of scale and cost reductions.

However, the market deployment of renewables in the heating sector follows very different paths than in the electricity sector, and financial incentives should be therefore designed paying careful attention to the specific opportunities and barriers to growth in the heating sector.

A largely decentralised market involving millions of actors

The development of RES-H markets faces specific challenges. Currently, nearly 90% of the heating and nearly 100% of the cooling in the EU is produced and used in single buildings, the rest being delivered through district heating and cooling networks. The present study looks only at the decentralised market in single buildings.

Short windows of opportunity

It is cheaper and often technically more efficient to install a RES-H system in new buildings than in existing buildings. This is particularly relevant for solar thermal and geothermal systems, that usually entail an adaptation of the heating storage and/or distribution system (tank, piping, control station) and works on the roof or respectively underground.

In existing buildings, occasions like the replacement of the heating system or the refurbishing of the roof offer an opportunity to reduce the additional cost of a RES-H system. But these occasions occur only every 15-20 years.

These short windows of opportunities should be taken into consideration when designing Financial incentives (FIS) for RES-H.

In the case of **new buildings**, there is a strong case for the introduction of binding regulations, making the use of renewable heating obligatory, like in Spain¹. However, even where such obligations exist, they usually will only oblige to cover only a minimum share of the heating demand (typically only domestic hot water), as they address all buildings. However, in many obliged buildings, a much higher share of the overall heating and cooling demand (including space heating) can be covered by renewables on a voluntary basis. Therefore, financial incentives should be conceived to promote a higher voluntary use of RES-H, even under an obligation.

In the case of **existing buildings**, it must be considered that anytime a heating system and/or of the roof are refurbished without installing a RES-H system, an occasion is lost which will not occur again for decades. Therefore, financial incentives should be conceived to make sure that, at least in these occasions, most potential investors don't miss this opportunity.

The driving forces in the market

On the **demand side**, policies to promote RES-H should address millions of building owners and developers, construction companies, district heating operators, etc. From their perspective, the economic aspect (see below in detail) is only one of the barriers to a wider use of RES-H. Other barriers are lack of awareness, the fact that RES-H is in most countries not offered as a standard option by the construction industry and the heating and cooling designers, which results in higher transaction costs than for the conventional options based on fossil fuels and/or electricity.

A FIS for RES-H should encourage the actors on the demand side to invest in RES-H systems. The FIS should give enough incentive to overcome the financial as well as the other barriers mentioned. It should always be avoided that the actors on the

¹ Please, refer to the parallel study on Regulations for RES-H produced within the same project K4RES-H.

demand side expect that a new or a higher FIS will be introduced in the near future, otherwise investment decisions may be postponed, creating a stop-&-go dynamic in the market.

On the **supply side**, the very small dimension of the market for RES-H equipment in most European countries means that manufacturers are still at an early stage in the development of economies of scales. Moreover, there are huge gaps between different EU Member States in the level of market development. The most extreme example is solar thermal, where roughly three quarters of the whole European market is concentrated in three countries only (Germany, Austria and Greece). This means that in most European countries there is a significant potential for economies of scale not only in the production lines, but also in the area of marketing, distribution and training at local or national level.

A FIS should try to encourage long term investments of the RES-H industry in the production lines, in research and development and in the distribution chain by creating a stable positive framework in the medium and long term in a wide area, at least at national level and possibly throughout the European Union. FIS that are limited to a local area and/or short term oriented may boost the demand but do not create the necessary security to encourage massive investment of the industry.

Specific **professional groups** are crucial for the market development, as they represent a grey area **between supply and demand**: installers, heating engineers, architects. These groups are key influencers of the decisions of the potential users.

They can have a stake in the supply side, as the added value of their services usually tends to increase when a RES-H system is installed, as compared with the simpler conventional heating system.

Therefore, in a positive environment where the market is already developed, these professional groups can contribute to the further market penetration of RES-H, by giving positive advice to their customers or even becoming proactive in the marketing of RES-H technologies.

However, the precondition for a positive role of these professional groups is that they have acquired skills and experience with RES-H systems. In most European countries and regions, this is not yet the case. As long as most installers, heating engineers and architects are not familiar with RES-H systems, they do not proactively offer such solutions to their customers or they even discourage them, to avoid having to deal with technologies they do not master. Even worse, it may happen that RES-H systems are installed by people who have not an appropriate training, resulting in bad quality installations that can damage the reputation of the technology.

This dynamic is one important explanation of the huge gaps in the market development among different EU Member States and even among different regions in the same country. It is a chicken-and-egg problem, because these decisive professional groups have no incentive to invest time and money in training for RES-H technologies, as long as there is not a sufficient market for services related to them; on the other hand, this very lack of training causes a lack of motivation of the influencing professional groups, which in turn is a cause of the lack of demand.

Financial Incentive Schemes (FIS) for RES-H should take into consideration the dynamic analysed here. They should not only provide an incentive for the demand side to purchase RES-H systems and for the supply side to invest in the production lines and in

the distribution chains. They should also provide an incentive for the installers, heating engineers and architects to invest time and money to get acquainted with the RES-H technologies.

On one hand, a good FIS for RES-H should always be accompanied by awareness raising campaign and training programs for the key professional groups involved. On the other hand, the best way to mobilise them is to give a credible political message that the RES-H market is going to grow in the medium and long term, thus putting these professional groups before the choice of become competent in RES-H technologies or loosing substantial market shares.

First conclusion: Continuity is the decisive factor

Continuity in time is the most important single element of a well designed and managed FIS for RES-H.

Several examples from different countries and RES-H technologies show that discontinuous financial incentives can damage the development of healthy market structures by creating a stop-&-go market dynamic. On the demand side, after the expiration of a short-timed FIS, there can be the expectation that a new one might be introduced again in the near future. This can lead to a widespread inclination to postpone purchase decisions.

A short-timed FIS may boost demand for a while, but the supply side and the professional groups mentioned above are not encouraged to invest in the long term. On the contrary, such a situation may lead to a proliferation of “gold-diggers”, unserious companies with a short-term perspective that tend to install bad quality systems, leading to loss of reputation of the RES-H technologies.

The first and main recommendation of the present study is, therefore, that FIS for RES-H should be planned to last several years under predictable conditions. While it may be necessary to adapt some aspects of the FIS during this time, all actors involved (customers, suppliers and professional groups) should be given the possibility to plan their investments, in order to favour the development of healthy market structures.

Principles of best practice Financial Incentives Schemes

The specific studies on FIS for solar thermal, bioheat and geothermal heat produced within the K4RES-H project have identified a number of recommendations for best practice FIS to promote RES-H. This section of the present document recapitulates the general points applicable to RES-H in general, following the principles of continuity, coherence, clear targets, simplicity, open markets and fair amounts.

Continuity

As mentioned above, a FIS should be planned to last for several years, with conditions as stable as possible. Abrupt interruptions and reintroductions of the incentive should be avoided. Decreasing levels of incentives are compatible with this principle.

It should be carefully avoided to create situations in which potential investors are in practice encouraged to postpone their investment decisions. This happens when there is an expectation that a new, or a higher FIS will be introduced in the foreseeable time. Ideally, the FIS should not be announced before it enters in vigour. As this may not be possible, the potential beneficiaries of the announcement should be assured that the incentive will be awarded retroactively to the systems installed after the first announcement. Following this logic, the conditions for eligibility for the FIS should be published as soon as possible after the first announcement.

Within a FIS conceived to last some years, procedures to adapt certain conditions and possibly the amounts of the incentive should be foreseen, in order to adapt the FIS to the market development. The adjustments should be discussed with market experts and be introduced aiming at minimising any negative impact on the market development.

The experience of the German *Marktanzreizprogramm*, a FIS for RES-H that has continuously been in place continuously since 1999 (see the studies on the single RES-H technologies), shows an important learning curve in the way how these adaptations have been managed by the public authority in consultation with the industry associations: in the early phase of the program, some changes lead to significant problems in the market. More recently, these changes have been implemented more smoothly.

Coherence

The design of a FIS for RES-H entails the definition of a number of parameters such as the eligibility of specific applications and technologies, the kind of subjects eligible to apply, technical parameters and definitions and last but not least the amounts offered. All these parameters should be carefully tuned to make sure they are coherent with each other and with the aims of the FIS. To achieve this, a close collaboration of the public authorities with industry associations and with market experts is strictly necessary.

The lack of coherence between some key parameters of the FIS has led in some cases to its complete failure, i.e. to a complete lack of applications. For instance, a regional FIS for solar thermal requested a monitoring system even for very small installations that usually do not include it. At the same time, the time for applications was limited to two months, during the summer break, and this excluded large systems that usually have a longer planning time. In this case, there was hardly any application and the budget of the FIS remained unspent. However, this created the expectation in the local market that a new FIS could be introduced in the future, probably resulting in a wait-and-see attitude of potential customers (see case studies in the solar thermal study).

Clear target

A FIS for RES-H can be “generalist”, i.e. targeted at all possible RES-H applications and any category of investors, or it can be focused on specific technologies, applications, or category of investors. Both approaches can be successful or fail.

In case of a “generalist” FIS, it should be ensured that the officers managing the FIS have the sources to cope with a range of different situations and kinds of applicants. If some of the parameters of a “generalist” FIS in practice exclude a part of the potential technologies or applicants, the FIS gives an implicit message that these excluded sectors are not worth to be supported, which may reduce the willingness to invest of potential customers.

In case of a focused FIS, it should be avoided to create the impression in the general public that RES-H can be reasonably used only in the cases where the FIS is awarded. The specific target public should be well informed about the existence of the FIS within a wider awareness raising campaign for RES-H.

Simplicity

The procedures should be as simple as possible, both for the applicants and for the public administration.

When FIS exist at different political levels (local, regional, national), they should be coordinated as much as possible. In the ideal case, the user should deal with only one application, opening the door to any financial incentive available. For instance, a regional government could simply decide to add some money to an existing national incentive.

Where this is practically or legally not possible, it should be in any case avoided to establish different technical parameters for the incentive at national, regional or local level. When this happens, the potential purchasers are confused and the transactions become too high. Moreover, different technical parameters may lead to barriers to trade within the same country, as certain products may be eligible in a region but not in another one.

Open markets

The technical parameters linked to the eligibility for a FIS should be strictly oriented to European standards and certification procedures, when they are available. Otherwise, a FIS can contribute to create “isolated markets” at national or even regional level, thereby increasing the costs for the users.

The manufacturers of hardware or, in the case of bioheat, of renewable fuels are in practice out of the market in a specific region or country, if their products do not comply with the technical parameters defined in the FIS. This creates a disincentive to operate at international level and SMEs may be forced to limit their range of activity. The companies operating at international level charge on their customers the costs of dealing with multiple technical parameters. Moreover, the need of repeating the certification procedure or even the tests lead to delays in the introduction of new products. Therefore, whenever a FIS defines technical parameters that are not in line with the European standards and certification procedures, the citizens of that country or region face higher costs and they may have no access to the latest products developed in other countries or regions.

Fair amounts of incentive

It is recommended to design FIS for RES-H on the basis of targets for market growth and to orientate the amounts and the conditions of the incentive to the level necessary to achieve the targets.

The level of the incentive should not be too high, as the savings of conventional energy should be the main driver of the purchasing decision. However, if the incentive is too low, the transaction costs for the beneficiary (application etc) and for the public administration risk to become higher than the value of the awarded incentive, and the FIS may not reach the desired effects on market growth.

The amount of the subsidy should be related to the amounts of renewable energy delivered by the system. In the past, there have been some FIS that awarded a fixed amount for each system installed, regardless of its size and quality. Such a FIS provides an incentive to install very small and cheap systems, that will deliver a correspondingly low amount of renewable heating.

Therefore, it is recommended to link the amount of the incentive to the assumed or measured amount of renewable energy provided by the system. In this way, the FIS adds on the natural incentive for the private investor to maximise the energy yield of the RES-H system to be installed

However, the requirements on measurement of renewable heating and cooling should be related to their costs and benefits. Different than in the electricity sector, exact measuring of energy is not usual in the heating sector. For instance, the sharing of the heating bills in multifamily residential buildings with a central heating system is often based on very approximate measuring, or in some cases even simply on the surface of the apartments. If a FIS for RES-H sets excessive measurement requirements, it may end creating costs and hurdles not justified by the direct benefit of the measurement.

In the case of large heating systems, where measurement devices are installed anyway, the FIS can be based on the measured amounts, though it must be evaluated if the uncertainty and the transaction costs for both sides (the beneficiary and the public administration) linked with payment after the measurement are justified.

For small systems, however, exact measurement is not a standard feature of RES-H systems because its costs are higher than the technical benefit. From a technical point of view, a function control is in many cases more appropriate. Therefore, for small RES-H systems, it is recommended to link the financial incentive with the calculated energy output based on the installed capacity or other simple parameters.

Kinds of Incentives

During the last decade, the political and academic debate about the policies to promote renewable electricity has been very much focused on the choice of the instrument, for instance feed-in tariffs vs. quotas with tendering.

This issue comes only at a late stage in the present document, because we consider it secondary in the case of renewable heating and cooling.

The main kinds of FIS for RES-H used so far in Europe can be useful to develop the market are:

**Financial incentives for renewable heating and cooling:
Kinds of Incentives**

Project “Key Issues for Renewable Heat in Europe” (K4RES-H), EIE/04/204/S07.38607



- Direct grants for RES-H
- Tax reductions (direct taxes)
- Tax reductions (indirect taxes)
- Loans at privileged rates
- Incentive linked to housing subsidies

The principles of best practice discussed above can and should be applied to any of these kinds of FIS for RES-H. Each of them can be successfully used to promote the use of RES-H, though they have different strengths and weaknesses.

Direct grants

This is the most widely used kind of FIS in Europe so far. Some of them were very successful, other were a complete failure (see case studies). Among the positive elements of this system as such there is the positive psychological effect on the investors, particularly households, when they receive a positive sum from the public authority: the incentive is very tangible. Direct grants can be awarded to any kind of potential user of RES-H systems, including those who are unable or unwilling to benefit from tax breaks or privileged loans.

Direct grants also have some weaknesses. The administration costs, both for the public authority and for the beneficiaries, are higher than in the case of tax breaks. Direct grants are usually most exposed to interruptions or shortenings due to the lack of available funds to cover the grant (see more detailed considerations below, in the chapter “Applying the Polluter Pays Principle”).

Tax reductions (direct taxes)

Tax breaks schemes can be very successful, like in the case of the reduction of the personal income tax applied in France since 2005. A main advantage is the low cost of administration. However, a scheme based on a reduction of the income tax excludes all those subject that, for whatever reason, do not have to pay this tax. Moreover, such a scheme is socially unequal, as it privileges high income households.

Tax breaks schemes tend to be less exposed to the instability related to the availability of public budget. Once the decision is taken, the incentive remains available at least for one fiscal year, though also tax breaks are in fact negotiable at every annual budget decision (see more detailed considerations below).

Tax reductions (indirect taxes)

VAT reductions can be a powerful way of supporting RES-H, as most potential investors are private persons who cannot recharge VAT on others. Several EU Member States countries apply a reduced VAT rate on electricity and/or gas consumption, but the full VAT on investments in RES-H systems or energy efficiency measures. This is in practice an incentive to increase energy consumption, instead of decreasing it.

It would be therefore appropriate to amend the EC Directive 388/77 regulating the VAT issues in the EU internal market. An explicit provision should be introduced, allowing Member States to apply a reduced VAT rate on the products and services in the fields of

renewable heating and cooling and energy efficiency, as well as for biomass heating fuels. A reduced VAT rate is currently allowed for electricity and gas consumption as well as for “Supply, construction, renovation and alteration of housing provided as part of a social policy”. The latter provision has been used by some Member States reduced VAT rates for a range of products and services, including also RES-H systems. However, such a reduction is not focused and does not differentiate between products that create higher energy consumption or renewable energy products.

Privileged loans

In principle, a privileged loan is a very appropriate way of rewarding an investment that produces energy and thereby financial savings for a long period of time. However, this kind of FIS has not been used very often so far.

The largest number of RES-H systems sold in Europe until now consists of small or very small systems purchased by private households. It is currently unusual for them to finance their investment in RES-H systems by taking loans. Other markets, like cars or household appliances show that private households can be motivated to purchase products on credit, but it will take time to change this behavioural pattern. Moreover, the private financing sector is currently not offering credit for investments in small RES-H systems, probably because the small size of the market does not yet justify the creation of standard procedures for credit.

But also the public institutions providing credit for renewable energy or energy efficiency projects, including those who are targeting developing countries, often exclude de facto leave small RES-H systems aside, as their size remains below the minimal thresholds of eligibility for credit. A privileged loan scheme can help in creating standard procedures for providing credit, that then could be applied also by the private financing sector.

However, for the time being, privileged loans from or through public financial institutions are likely to be an effective instrument to promote the use of RES-H only in the case of larger RES-H systems, particularly when purchased by companies. It would be necessary to motivate the international financing institutions providing credit to developing countries to adapt their loan programs to the specific needs of small scale RES-H systems.

Incentives linked to housing subsidies or regulations

In some countries or regions, there are subsidies for the construction of new residential buildings. Some Austrian regions awarding provide incentives for energy efficiency and renewable heating measures. Such schemes are contributing to the very high market penetration of RES-H systems in these regions.

The incentive can be in the form of additional amounts if certain criteria are met (Region of Salzburg). Alternatively, a certain share of heating from renewable sources can be defined as a necessary condition for awarding the housing subsidy, as it is being discussed in the region of Styria. In the latter case, the financial incentives functions almost as an obligation, because people intending to build their new home “can not afford” to miss the subsidy. Another form of indirect financial incentive linked to housing

regulation is used for example in some Italian communes, that increase the allowed construction volume if RES-H systems are installed.

Applying the Polluter Pays Principle

A FIS for RES-H implies that money is made available to cover its costs. Who and how should pay for this?

The need for continuous availability of funds

As discussed above, the continuity of a FIS is a key condition for success. Discontinuous FIS may even be counterproductive, as they create a stop-&-go market dynamic, preventing the creation of healthy market structures.

Therefore, it is essential to plan FIS that last several years under predictable conditions. The limit of the available budget has been a main reason for discontinuity in FIS for RES-H in the past, often leading to FIS with a very short validity or to their abrupt interruption. When conceiving a FIS for RES-H, it is important to foresee ways of funding it for several years, also taking into account the possible increase in the number of applicants as a consequence of the desired market growth.

Learning from renewable electricity

In principle, the best solution would be to finance the FIS, with revenues coming not from the public budget, but from the users of non renewable heating. This is common in the renewable electricity (RES-E) sector, where several countries and most notably Germany finance their feed-in tariffs through a small fee paid by the electricity users. Such a scheme is in line with the Polluter Pays Principle and allows for a substantial promotion of renewables without consequences for the public budget and with a very low impact on the overall electricity costs of the final users. It also reinforces the positive effects of the FIS for renewables, as it also (very slightly) disincentives the consumption of electricity.

In the renewable heating sector, the revenues could come from the wholesalers of heating fuels, that would pass the cost on the final users. The wholesalers could be obliged by law to transfer the necessary amounts to an agency that distributes the incentive to the owners or operators of RES-H systems, following the principles of best practice described above. Such a "bonus system" is currently being discussed in Germany as a possible option for the Renewable Heating Law mentioned in the program of the federal government coalition that came to power in 2005.

Tradable certificates

A variation can be based on tradable certificates: the providers of fossil fuels and/or electricity are obliged to surrender a politically determined quota of tradable certificates, which are awarded to the operators of RES-H systems, according to their size and

productivity. Such a system has been recently introduced in Italy, but it is too early to evaluate its results. The advantage of tradable certificate schemes should be that the market should find the cheapest ways to reach the desired quota of RES-H energy. However, tradable certificate systems imply uncertainty about the effective incentive to be earned in the future, as the prices of the certificates can fluctuate substantially. Moreover, such systems are complex and cause significant transaction costs, particularly in the case of RES-H where the beneficiaries of the certificates should be a very large number of building owners. Also taking into consideration the frequent problems which have occurred in tradable certificate schemes in other sectors, such a system can not be recommended for renewable heating and cooling.

General energy taxation

Another way of applying the Polluter Pays Principle is the direct taxation of non renewable energy consumption for heating purposes. By increasing the costs of conventional heating, the competitiveness of RES-H is improved. In some Scandinavian countries, this has been sufficient to stimulate the growth of biomass heating, for which the direct comparison of the fuel costs is most evident for the users. However, a general energy taxation has no direct effect on the non-financial barriers to growth for RES-H, as discussed above.

Therefore, even where a direct taxation on non renewable heating fuels exists, it is recommended to enact a direct FIS to promote RES-H.

Of course, FIS for RES-H can be financed by tax revenues through the public budget. This was so far almost always the case. In some countries, it is legally possible to determine in advance the allocation of certain tax revenues. Where this is possible, it is certainly an interesting option to finance a FIS for RES-H with the revenues of taxes on conventional heating fuels.

Support policies beyond financial incentive schemes

The present study focuses on FIS. However, as discussed above, there are important non-financial barriers to the growth of RES-H use. Therefore, a successful FIS should always be accompanied by other measures carefully tuned, within a long term plan with the aim of a full exploitation of the large potential for RES-H. In short, we recommend to consider following measures:

- Awareness raising campaigns targeted to the general public and/or to specific categories of potential users that a benefit from the FIS
- Specific awareness raising and training targeted at the key professional groups that influence the market (installers, heating engineers, architects, roofers for the case of solar thermal)
- Large scale demonstration programs, widespread at local level, focused on the innovative applications that are not yet established in the market, like renewable

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- cooling, industrial process heat etc (see the specific study on innovative applications produced within the K4RES-H project)
- R&D programs to tackle the key technological challenges in the short and in the long term.
 - Binding regulations making obligatory to cover a minimal share of the heating demand with renewables in new buildings (see the specific study on regulations produced within the K4RES-H project)
 - Reduction of administrative barriers
 - Enhanced support for the harmonisation of standards and certification procedures at European level, to promote a large and open European market for renewable heating devices and fuels