FROnT
FAIR RHC OPTIONS AND TRADE

# Key success factors for RHC Integrated Support Schemes

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# CONTENTS



# INTRODUCTION

Directive 2009/28/EC of the European Parliament and Council established the necessary policy framework for deployment of renewable energies for the decade 20102020. The FROnT project intends to advance the penetration of RES-H&C technologies by providing a better understanding of how to deploy renewable heat and cooling technologies in the market. In pursuit of this goal, it is important to understand the enduser key decision making factors that can improve market transparency of the costs of heating and cooling options. Furthermore, it is important to understand, which factors have been decisive in financial support schemes implemented in different countries so that they can be replicated or adapted to existing programs and different technology types.

Instruments to internalise negative externalities of energy resources extraction, transportation, transformation, and consumption, for instance through a carbon tax or the EU ETS , are not sufficient to deliver the wide range of carbon neutral technologies at the necessary scale needed to decarbonise the economy. Where technologies are not yet competitive, a “technology policy” including economic support is therefore justified, also to allow newer RES technologies to progress down the learning curve.

Against this background, support schemes for RES-H&C can be defined as instruments that to promote the use of energy from renewable sources for heating or cooling purposes. They are set up to support increased market uptake of RES-H&C technologies, to and to help correcting a number of market distortions, which can lead to unfair market competition from existing and more established forms of energy. Additionally, support schemes help boost consumer confidence in the RES-H&C technology and drive uptake to a point whereby they are considered as a reliable and secure alternative to fossil fuels.

Support schemes for RES-H&C fund technologies that do not require carbon-intensive fuel to operate. On the other hand, by displacing the use of fossil fuels, RES-H&C technologies reduce our reliance on external fuel markets. Since they involve no combustion, unlike fossil fuels plants, they emit very low levels of greenhouse gases.

This document presents a summary of Key Success Factors identified by FROnT partners during the assessment of RES-H&C schemes implemented in several European countries

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# KEY SUCCESS FACTORS

For the purpose of this report, key success factors (KSF) are factors that characterize a support scheme, making it accountable, ensuring its cost effectiveness and helping boost confidence on the RES technology supported.

In this section, we identify and discuss factors that might contribute to the success of RES-H&C schemes. The report does not grade, in any form, the listed factors. Instead, it looks at their positive aspects and evaluates how easily or difficult they can integrate a particular scheme. Following is the list of factors considered in this report:

- Contribution of different stakeholders
- Quality and performance assurance
- Transparency and measurability
- Financial adequacy and flow support rate
- Predictability, stability and time frame

## Identified Key Success Factors

### Contribution of different stakeholders

The analysis of the schemes implemented in different countries confirms the variety of factors which can contribute to the success of a particular programme. From the onset, it became clear that from a design aspect, it is important to include the wide variety of different stakeholders chiefly: Government agencies, trade organizations and industry. This is an important way to assure that different experiences are embedded in a program and relevant aspects such as equipment quality, control mechanisms and certification of professionals are integrated in the scheme. By assuring the participation of regional and local entities a valuable experience and know how on local conditions that could contribute to the increased uptake of RES-H&C.

It may be considered easier to call for the participation of specific stakeholders when the scheme is focusing on a single technology type, as was the cases for solar thermal schemes implemented in Poland and Portugal. On the other hand, the participation of different stakeholders can, sometimes, lead to difficulty in generating consensus, as there may be conflicting interests. This can happen, e.g. whenever organizations defend national products as a way of boosting national industry for a particular technology or, whenever an organization defends an exclusive technology. So, in calling for the collaboration of stakeholders, the institutions to be participating in the design of a scheme should represent a broad spectrum of interest and not a single one.

One of the three analysed Dutch schemes was designed exclusively by Government agencies, while three of the four UK schemes did have the collaboration of at least one additional entity, apart from Government agencies, on their design. The Spanish scheme was designed exclusively by the IDAE, a Government agency, although details of the consultation process that may have taken place during the design phase, was not determined by this enquiry. It is worth noting that public consultation process is another important format to involve other stakeholders in the initial phase of a scheme. It takes place when the terms of reference of a design scheme are presented in public session, workshop or any other format, allowing the participants to comment on them.

### Quality and performance assurance

An important aspect considered in this inquiry was the inclusion of energy efficiency aspects on the design of the schemes. Since the objective of any RES-H&C scheme is to achieve improved energy efficiency, increase the proportion of heat that is generated from renewable sources and encourage the switch from fossil fuels, it is important that support schemes should implement some degree of energy efficiency measures as a

prerequisite. Among the schemes analysed, the UK´s RHI domestic scheme is the only one to consider 'Energy Performance Certificate' to identify the heat demand of the property. It is expected that the incorporation of RESH technology on building requirements of member states, fulfilling one of the obligations of the Directive2009/28/EC, which obliges countries to use obligations for renewable heating, could help attain a minimum share of RES-H&C in the building sector. Another important aspect that makes the integration of building efficiency in a scheme very interesting is that fitting of any RES-H&C solution can be best achieved in new construction rather than during retrofitting of a building and, the final cost can be greatly influenced. The referred reasons demonstrate that integrating energy efficiency in building requirement should be considered a key success factor.

Sometimes building requirements are designed in such a way that the minimum share can impede the integration of RES-H&C technology, since by fulfilling the minimum requirements the full potential for the integration of RES technology can be withhold for many years.

Adequate heating systems and insulation can also be paramount to the success of a RES-H&C scheme considering that RES-H&C applications only operate effectively when incorporated into the design of the system. For example, when evaluating the overall heat delivered by a Ground Source Heat Pump to a house with inadequate heating system design and insulation. This fact reveals that the schemes should also integrate aspects related to overall system performance. One way to achieve this would be to specify a minimum level of building energy performance before support can be offered. . Another option would be to conduct a building energy performance audit prior to any form of support offered

It should be stated that energy efficiency requirements can be integrated in almost all RES-H&C support schemes.

Whilst the issue of available local energy resource was not specifically considered in this report? , the UK´s RHI support scheme does consider this feature and encourages candidates of RES-H&C support schemes to consider the type of RES fuel available to them. For example, in rural offgas grid and sparsely populated areas, consumers are encourage to use individual or shared low carbon heating systems such as renewable heating systems. On the other hand, for the nondomestic RHI high density urban areas are considered better suited to heat networks powered from renewable sources. The RHI support (domestic and nondomestic) for projects is conditional on microgeneration Certification Scheme (MCS), a recognised quality assurance scheme that certifies microgeneration technologies and installer standards to produce electricity and heat from renewable sources.

Any scheme being designed should consider that the integration of the geographical considerations will most likely contribute to the success of the program since it will try to match the resource availability with other constrains such as accessibility and quality of heat distribution infrastructure. On the other hand, the construction of new infrastructure for natural gas distribution should also be evaluated and additional information should be gathered to evaluate how this new infrastructure can hamper the penetration of RES-H&C technologies. Therefore, it is not just the geographical availability of the energy resources that should be considered but also all relevant elements relating to energy usage in a particular region. This evaluation becomes a very important element whenever RES heat networks schemes are to be considered.

Apart from the design aspects of the schemes, an evaluation of how the schemes were controlled was also looked at. Some of the analysed schemes considered certified equipment as an essential requisite and most did consider that only certified professionals could take part in their implementation. Again, a reference should be made to the MCS in which installation companies have to

make sure that they sell their products and services to consumers appropriately, without miss selling or misleading a consumer. Installer certification includes assessing the supply, design, installation, settowork, and commissioning of renewable microgeneration technologies. These two aspects, the quality of products and competence of installers in the renewable technology sector are vital to assure consumer protection. Certification of equipment and professional constitutes the basic of such guarantees and it is recommended that any implemented scheme should integrate them. If the RES-H&C industry is to grow, installers and products that they offer must be seen as the preferred options in the market place.

In contrast to the UK schemes, inexistence of professional structures to execute the RES installations was detected in some of the analysed schemes. Considering that for some renewable technologies there is little or no evidence to demonstrate the reallife performance of working systems, and the fact that RES technologies are to compete with established technologies, it is important that a certain guarantee is provided to endusers of these technologies.

In fact, some recently concluded IEE projects such as QualiCert[1], Install+RES[2] or GEOTRAINET[3] provide a vast array of training material, showing that training is an essential element in the drive for better penetration of RES-H&C technologies in the market. Low number of trained professionals in the market can be a significant barrier to the rapid penetration of RES-H&C technology.

## Transparency and measurability

Schemes should consider, whenever appropriate, the possibility of integrating a random audit of installations. It should be noted that most of the analysed schemes did not consider this possibility. In addition to random audit checks on installer standards, schemes should consider lessons learnt from insitu trials. In situ trials are critical in helping to build consumer confidence in RES technologies and therefore helping to foster a virtuous circle of understanding, trust and growth within the sector. Insitu trials are important elements to ensuring that consumers can access indepth advice and support founded on robust evidence.

Random audit is a different form of evaluating not only the quality of the installations but also the performance of the installers. It can be directed to a particular technology or to a particular region so that specific industry weaknesses can be identified and addressed, increasing confidence amongst industry participants and consumers.

It should be noted that incorporating random audits into a scheme may not be economically viable for smaller scale installations, such as single home installations.

Metering and monitoring services are may also important elements that when effectively incorporated in a particular scheme can help the RES-H&C gain a better foothold in the market. In fact some schemes analysed do incorporate metering and monitoring. Just as the schemes supporting RESE, RES-H&C could also use metering and monitoring, whenever adequate, to account for the energy been delivered by the system. Moreover, metering and monitoring are consider robust factors that only reward the correct quantity of heat or an equivalent energy being delivered. Therefore, metering allows a scheme to support renewable heat where the heat generated is usable, therefore avoiding the heat need that would otherwise have been met through fossil fuels. In tariff based systems such as the RHI in UK, Metering metering also allows support of useful heat and would not incentivize the deliberate wasting of heat or heat generated simply to meet a heat load which would not otherwise have existed had the incentive not been in place. Such cases can include when heat is unnecessarily vented into the

[1] www.qualicert-project.eu
[2] www.resinstaller.eu
[3] www.geotrainet.eu

atmosphere, where a heat requirement has been created artificially in order to claim the incentive.

Care should be taken so that the metering process is not allowed to provide double incentives for the same unit of energy/heat. This can happen when the meter reading reuse condensates in a process to make the system more efficient. This is made easier since the Directive 2004/22/EC of the European Parliament and of the Council of 31 March 2004 on measuring instruments details the performance specifications for heat, gas and electric meters. Monitoring can also be achieved by conducting online surveys in which applicants will answer concrete questions about their equipment performance. This information could complement any metering and allows the institution in charge of the scheme to learn more about RES technologies.

The efficiency of the support schemes must be monitored to be sure it works properly and to adpot corrective measures when necessary. The final goal being to end this SS as the market barriers identified is removed.

## Financial adequacy and flow support rate

Although we try to answer the issue of financial adequacy in the analysed schemes, it was not possible to collect information that will allow for the comparison of economic incentives provided for specific RES technologies and the average generation costs to monitor whether financial support levels are well suited to the actual support requirements of a given technology. The analysis revealed that low funding was the characteristics of about 8 analysed schemes. In any case, the most important aspect is that the funding level should not drive up the installation costs.

If the financing is not adequate, most likely RES-H&C schemes will not help the technology gain foothold within the market. In some cases low financing will exacerbate the investment that the industry might mobilize for the scheme. When this happens, a new planning system will have to be put in place costing money and other resources, further inhibiting industry from displacing finances to other areas of economic activity.

On the other hand, if the level of support is way above the required, two things might happen. The final cost of equipment might be fixed at higher level, compromising the uptake of RES-H&C solutions in the general market and, a reduced number of total installations. Moreover, additional finances to fix eventual problems that might come up during the implementation of the scheme might not be available.

Whenever a support scheme contemplates multiple technologies, it becomes useful for support levels to be differentiated so that individual barriersrequirements of each technology can be best addressedmatched. In doing so, care should be taken not to make the scheme too complex or to increase its management costs and reduce efficiency.

Apart from financial adequacy, the flow support rate can also be an important factor in analysing a particular scheme. The flow support should be looked at in order to evaluate the level of support during different period of the running scheme. The flow support has to be modulated as to take into consideration the possibility of bigger expenditure on the first year or a constant support along the running of the scheme. It can also be modulated in such a faction that there is a constant decrease along the years of the program. It should also be calibrated to avoid abrupt interruption of the support program. It should be calibrated in function of a well study scenario in order to reduce the chances of defrauding expectations on the part of potential candidate. Usually the evaluation of previous or other programs implemented in a given geographical area will help on the setting up of the flow support.

### Predictability, stability and time frame

Complementing the financial adequacy feature is the predictability of a support scheme. Considering that the main objective of the financial incentive is to mitigate the risks and provide more certainty about their return, projects that may last several years, e.g. grid construction for district heating, need to have mechanisms for payment levels adjustments clearly communicated so that investors can more easily assess their risks. Investors will feel more comfortable with their investment decisions if they are provided more information about financial incentives over a long period of time. In other words, long term incentives should be stable so that the decision making process can be captured in formulas, allowing investors and developers to know when and how an incentive may be altered.

It was clear that some of the implemented schemes have a time frame for support that, if not followed by new schemes, could lead to a potential stopandgo policy, creating uncertainty for potential investors. This is clearly the case of Portugal, where Medida Solar 2009 was not followed by any other important RESH, due to financial difficulties that the country has been facing for the last 5 years. The case of RHI can also be highlighted: it was announced but implemented only 1 year after, so investors had to face one year of uncertainty.

In general, most schemes analysed do run beyond the 5 years period. This might be the time frame that most suits the RES-H&C investor, considering that some are new solutions to potential investors who will have to evaluate other components of the solution, such as return of investment, before making a final decision.

## Additional elements

### Flanking measures

Market study carried out in WP4 of the FROnT project refers that 68% of the respondents in the residential sector identified reliability and security as the main criterions when selecting renewable heating and cooling system. This finding reveals that RES-H&C systems need to offer the same level of reliability as carbon base technology so that they can have the same level of acceptance from a potential buyer. Considering that RES-H&C are most of the time deprecated over carbon base HC systems, additional effort has to be made to promote them, focusing at consumer still outstanding misunderstandings and doubts about their performance and the persistence claim that RES-H&C are still unproven technologies. It would be interesting if the structure of support schemes can integrate other mechanisms, financing models and innovative business models.

It appears that setting a support scheme for RES-H&C will require additional support measures to be put in place for the supply chain to ensure they can deliver. The additional support measures will help the supply chain deliver affordable, robust, reliable and efficient installations. If this is to happen the support scheme has to be complemented with strong verification system such as certification of installations. In fact there are existing European Norms for the certification of some of the RES-H&C custom made systems. The certification of custom made system might be more important for some markets than others. Markets with lower up take, probably indicating barriers related to low consumer knowledge and confidence in these technologies, will most likely require a full implementation of the certification scheme coupled with support scheme. Markets with high uptake might require less certification and probably less support schemes.

There is also a clear need to create some sort of registration mechanism for professionals and in-

stallations, also to be implemented with the support scheme. The registration will allow the consumers to register their complaints and someone to attend to their claims and ensure that they are resolved. With such a structure in place, it is expected that the consumer confidence in the technology will likely suffer some improvement. A well designed and implemented custom made system certification will help reduce the number of complaints fed into the registration system. By reducing the number of complaints the number of contentious verification of installations will be reduced and the related costs.

The registration of RES-H&C systems can be done in such a faction that it will allow the establishment of communication lines between the institution in charging of its implementation and the consumer. This communication line will allow consumers to receive short notice on the time frame for equipment maintenance, it will permit the registration of maintenance details been carried out in a system.

Consumers will have a reliable source not only to identify the installer closer to their area of residence but also to have access to a list of installer who have no outstanding claims from clients. It will allow the production of reliable indicators such as typical maintenance cost, cost per installed power, cost per thermal heat generated, time duration per maintenance act and per RES-H&C options, and components most likely to be substituted per RES-H&C technology. This information can be available to help consumer select heating/cooling option. The acquire information will also help deterred practices of overselling, since reliable and structured information will be available for any potential HC buyer.

Policy Makers will be supported on robust and sound evidence of market needs and constraints. By knowing where the installations are sited at, Policy Makers will have an important element to help decide how the funds of the support schemes are distributed per region and technology. The information on the performance of the installers will help on the design of training materials based primarily on information gathered on the field.

The support schemes coupled with certification and registration of installations will help consumer access indepth advice based on robust evidence and provide evidence to demonstrate the reallife performance of working systems.

The design and implementation of a scheme should also include information on “break away time”, defined as the time when the market uptake of a given technology attains levels of maturity that will permit the lowering of incentive levels and finally its termination, supporting the claim that support schemes cannot be maintained indefinitely.

Additionally, the design of new support schemes should consider the integration of new financing models and innovative business models.

The primary objective of support schemes is to compensate for market failures and unfair competition. They are also intended to favour the deployment of a given technology by creating a secure investment environment catalysing an initial round of investment and thereby allowing the technology to progress along its learning curve. Hence, support schemes should be temporary and can be phased out as this technology reaches full competitiveness in a (then) complete and open internal market where a level playing field is fully established.

Today, however, market conditions in the EU heat sector prevent RES H&C from fully competing with conventional technologies developed historically under protected, monopolistic market structures where costs reduction and risks were borne by consumers rather than by plant suppliers and operators. The internal market is still far from being perfect and transparent. Firstly, in many countries electricity and gas prices are regulated, thus they do not reflect the full costs of the heat generation. Secondly, there is lack of market transparen-

cy, including lack of information provision to customers and taxpayers and a clear billing.

Support measures for RES H&C technologies are therefore needed to favour the progress towards costcompetitiveness of a key source in the future European energy mix and to compensate for current marketfailures.

## Differenciated approach in line with maturity and special characteristics

On of the main findings of the IEE project "RESH Policy" is that "[e]ffective policy must consider many factors, addressing multiple barriers and requiring different instruments to be applied simultaneously whilst avoiding overspending" (Connor P. et al, 2013: p. 14). Therefore "[t]here is a need to be able to identify and satisfy the particular support needs of disparate technologies (ibidem) varying in terms of size, applications, as well as market and technology maturity. In other words, each policy measure should address a specific market failure/barrier and aim to achieve a predetermined result. This should always be considered by policymakers when designing support schemes, including for RHC technologies. The portfolio of policy measures should be designed to ensure the efficiency of the support, which implies to have a coordination of the policy measures and a consistency between them.

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