SEasonal PErformance factor and MONitoring for heat pump systems in the building sector
SEPEMO-Build

D5.2. European quality concepts for heat pumps
Version 2.1
Analyses on existing schemes in Europe for training and certification of heat pump installers.

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Date of delivery: 2011-09-15

Contract Number
IEE/08/776/SI2.529222

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1. Introduction

It is widely recognised that heat pump systems performances largely depend on the climate and quality of installation and not only on the product itself. However at the same time it is reported that heat pumps with a European Quality label can run at an SPF of 4, but also at an SPF of 2. This triggers a lot of criticism and mistrust, affecting the acceptance in the market considerably.

This not only be the case for heat pumps but also for other heating and cooling systems applied in domestic as well as commercial buildings, has brought the Commission under the RES-directive under AnnexIV to the requirement that biomass, heat pump, shallow geothermal and solar photovoltaic and solar thermal installers shall be certified by an accredited training programme or training provider.

SEPEMO is closely linked to RES directive, particularly annex VII B. It is mentioned there that “No later than 1 January 2013, the Commission shall establish guidelines on how Member States shall estimate the values of Q-usable and SPF for the different heat pump technologies and applications, taking into consideration differences in climatic conditions, especially very cold climates”.

For the RES Directive it is important to understand the real performance of heat pumps in different climate zones of Europe. To assure these standards for SPF, knowledge will be built up on field tests with concepts under WP2, WP3 and WP4. This field test is analysed in order to get the get in depth knowledge of the differences in performance in systems. The results will lead to guide lines for system quality and input for training programmes and this will give a basis for certification of system quality. Thus increasing the performance, economy in practical applications and therewith the general acceptance of heat pumps as a reliable energy system.

In the EU countries different quality concepts and certification procedures exist in the building and installation process, next to standards and installation guidelines. In order to get a good link to the development and implementation of the RES-directive existing certification schemes for heat pump installers in the participating countries under SEPEMO have been analysed. This Task 5.2 is running parallel to the QualiCert project (see Attachment 1). Some of the findings of QualiCert support the findings of the SEPEMO task. Important discussion is on topics such as: mandatory of voluntary, company or personal, methods for auditing and training courses. Certification for heat pumps put into a ‘one shop’ approach is more complex as for heat pumps other Directives have to been taken into account as well as legislative measures on local level for ground source systems.

At higher European level CA-RES is discussing the same topics in their WG2 and WG5 (See attachment 2). CA-RES is the obvious counter to present the findings and advice from the SEPEMO and QualiCert projects. As the CA-RES is organized as a structured dialogue (confidential) between national authorities responsible for the implementation the RES directive and are exchanging experiences and best practices in order to develop common approaches.

As well as presenting the findings of SEPEMO at the policy level the findings will also be used to update current certification procedures by updating the installation guide lines and training courses. For countries already working under EU-CERT this will go via the Education Committee of Eu-CERT, for other countries the ‘local/national’ installation guide lines will have to be updated.
2. European directive

In the RES-directive under Annex IV it is stated that a certified heat pump installer must have the skills required to install the relevant equipment and systems to meet the performance (SPF as under Annex VII) and reliability needs of the customer.

The certification or qualification process shall be transparent and clearly defined by the Member State or the administrative body they appoint. This clearly states that the responsibility for the certification process lies with the government, just as in the case of typical environmental legislation as with the F-gas regulation and/or the EPBD on HVAC.

Annex IV focuses on relatively small renewable energy installations typical for domestic buildings and small commercial buildings. Conventional technologies do not fall under directive.

As emphasis is laid in the RES-directive on the conditions for the training courses it seems to focus on a certification on personal basis. The training for installers shall include both theoretical and practical parts where at the end of the training, the installer must have the skills required to install the relevant equipment and systems to meet the performance and reliability needs of the customer, incorporate quality craftsmanship, and comply with all applicable codes and standards, including energy and ECO labelling. However certification of installer companies also fall under the RES-directive and it completely depends on the interpretation of the member states (see also the discussion under paragraph 6.

Notable for SEPEMO is the need to meet the performance and reliability needs of the customer. This means that a certificate is also a method to give a certain guarantee for performance, in the case of heat pump systems measured in SPF. Herewith the quality concept is directly translated into 'delivering according to the demands and needs of the customer’. Which is basically what quality is all about.

In general the theoretical part of the heat pump installer training should give an overview of the market situation for heat pumps. It should further cover geothermal resources and ground source temperatures of different regions, soil and rock identification for thermal conductivity, regulations on using geothermal resources, feasibility of using heat pumps in buildings and determining the most suitable heat pump system, and knowledge about their technical requirements, safety, air filtering, connection with the heat source and system layout.

The installer should demonstrate the following practical key competences:

- a basic understanding of the physical and operation principles of a heat pump, including characteristics of the heat pump circle: context between low temperatures of the heat sink, high temperatures of the heat source, and the efficiency of the system, determination of the coefficient of performance (COP) and seasonal performance factor (SPF);
- an understanding of the components and their function within a heat pump circle, including the compressor, expansion valve, evaporator, condenser, fixtures and fittings, lubricating oil, refrigerant, superheating and sub cooling and cooling possibilities with heat pumps; and
- the ability to choose and size the components in typical installation situations, including determining the typical values of the heat load of different buildings and for hot water production based on energy consumption, determining the capacity of the heat pump on the heat load for hot water production, on the storage mass of the building and on interruptible current supply; determine buffer tank component and its volume and integration of a second heating system.

On national level training courses are often based upon installation guidelines which have been developed on local experience. It can be imagined that these training courses do not include all these topics. Further it can be expected that within smaller installer companies the knowledge is
only available on heat pump technology itself and not on building technology and physics needed for the ability size an installation with a heat pump. The design of the system however according to the Directive is therefore a responsibility for the installer, which in practice in larger housing projects is not the case. Especially in larger domestic projects and commercial buildings these tasks being taken up by a consultant.

The certification schemes for heat pump installers shall take account that accredited training programmes should be offered only to installers with work experience, who have undergone, or are undergoing: training as a plumber or refrigeration engineer and have basic electrical and plumbing skills (cutting pipe, soldering pipe joints, gluing pipe joints, lagging, sealing fittings, testing for leaks and installation of heating or cooling systems) as a prerequisite.

The installer certification should be time restricted, so that a refresher seminar or event would be necessary for continued certification.

3. Other European projects

3.1 EU-CERT

In 2004 the SAVE project EU-CERT.HP was started by seven partners and associates from ten countries, aimed at initiating a European training and quality campaign for installers in the field of heat pump technology. It was supported by the European Commission within the Intelligent Energy Programme and was completed in December 2006.

The project focused on training, certification and dissemination.

- Training: Development of a common European training programme for heat pump installers. This included piloting the first training courses and examinations in all participating countries.

- Certification: Development of a European Certification Programme for heat pump installers and the pilot certification of installers from the participating countries. Eligibility for the certificate depends on passing the installer examination and demonstration of experience. The aim of the certificate is to identify competent specialists, who can design and install reliable, faultless and efficient heat pump systems and promote customer confidence.

- Dissemination: Promotion of the training and certification programme and EU-CERT trademark at a national and international level via the EHPA web site, national heat pump associations and training agencies. As a consequence awareness amongst government agencies, manufacturers, installers and customers has been raised, giving the programme and certificate increasing importance in the market place.

Following completion of the EU-CERT.HP project, management and development of the training and certification programme is being taken forward by the Education Committee of the EHPA. This committee is overseeing the quality of the training and certification process and provides new material for the training course as heat pump technology continues to develop.

Aim of the project

The project developed a common training framework and a certification scheme for heat pumps installers. The vision of the project is that the training and certification programme should be recognized all over Europe and presents a common standard for voluntary further education in the field of heat pumps technology in all participating countries. The certificate is delivered to the installer.
EUCERT training courses are implemented since 2006 in ten countries Austria, Czech Republic, France, Ireland, Italy, Slovenia, Sweden, UK, Germany, and Slovakia), while of these countries the Certification scheme is at least not valid in France, UK, Italy, Ireland. In the countries where the certification scheme is valid, each EU-CERT installer is registered on the reference list of certified installers.

**Quality scheme**

EHPA and members associations are managing the EU-CERT program which follows the ISO 17024 standard. The National Certification bodies in the different countries have been involved in the project.

The installer has to fulfil the following requirements to obtain the EU-CERT label:

- Proof of vocational training
- Proof of participation certificate confirming completion of the EU-CERT.HP training or of an equally valid training course.
- Certificate of successfully passed EU-CERT.HP final examination
- The employer of the applicant must be operating as an electrician, installer or HVAC engineer and be providing heat pump system planning and/or installation services. Alternatively, the applicant must be the owner of his/her own business in one of these sectors providing heat pump system planning and/or installation services.
- Proof of relevant professional experience.
- Completion of a certification contract between installer and the national certification body.

The persons within the certification body should be industry experts and have relevant experience in the field of Heat Pumps.

The quality scheme does not contain an audit component at the moment but this aspect is under consideration.

**Requirements for renewal**

Once delivered, the certification is valid for 3 years and may be renewed. The certified installer has to prove he/she has been active in the field. Additionally, the installer has to undergo a further training of half a day within the three-year period. A three-full-day training within 3 years is recommended. However, every 6 years, the installer will have to undergo a written and oral presentation.

Moreover, the certified installer is obliged to record any written complaints in respect of quality relating to the installations planned or installed by the certificate holder.

**Withdrawal of the Certificate**

The certificate will be withdrawn in the case of:

- Non-fulfilment of conditions for certification
- Announcement of false statement at application
- Certified person has been sentenced in court for environmental crimes
- Certified person has not fulfilled the economical obligations towards the certification board

**Requirements for training centres**

The EU-CERT training should be provided by a training institute accredited by EHPA. The training centres should have adequate laboratory equipment following technical specifications. Trainers should have sufficient experience in the related field and have attended a train-of-the trainer seminar. Also, they must not be involved in the certification process. In order to control the quality of training delivered, members of the EHPA education Committee visit the training centres infrequently.

The training standards were developed as part of the EU-CERT.HP project and are frequently updated by the EHPA education committee members.

The installer has to attend the EU-CERT training and pass a final examination. The training course is composed of 4 days of theory and one day of practical training.

### 3.2 QualiCert

QualiCert stands for “Common quality certification and accreditation for installers of small-scale renewable energy systems” and has main objective to develop and mutually recognize accreditation and certification schemes for installers of small-scale renewable energy installations. Within QualiCert, a manual of key success criteria for accreditation & certification systems has been developed and validated among key stakeholders. QualiCert is relying on an interdisciplinary multi-stakeholder approach involving builders and installers through their EU associations, existing training providers and accrediting bodies, the RES industry through its European associations, and a number of national energy agencies.

In a first step, QualiCert has collected information to assess certification schemes existing in the different EU Member States.

![Fig. 1: Existing accreditation and certification schemes in Europe](image)

The different stakeholders stress the importance of implementing a certification and accreditation scheme to improve the quality of RES installations. It is agreed that such a scheme enables to meet regulatory requirements and develop installation standards and best practices. It also increases confidence of the consumers and gives access to a network of qualified installers.
Important for the work under SEPEMO is to notice that under the QualiCert analyses it was found that:

- All countries under the SEPEMO-project have certification and training schemes for heat pump systems
- It is acknowledged that best practices and practical experience is needed to be able to develop and standardise training programmes
- The variety of training structures can cause confusion
- Auditing plays a crucial role in order to up keep the quality of certification schemes
- Some certifying bodies are ISO certified or have been accredited by the National Accreditation body others have been created by the stakeholders involved in the RES sector.
- Support from public authorities is considered as necessary for the implementation of a certification and accreditation process where the do not exist.

Some installers’ unions have expressed their disagreement with a mandatory certification which would oblige already active installers to go through an additional process to be able to continue performing their activities. On the other hand installer unions tend to ‘defend’ the weaker companies against administrative burdens and do have problems with ISO based certification schemes for these companies.

Concern is expressed as regards the costs and administrative burden of a certification and accreditation process. Renewable energy systems can become less competitive as conventional heating systems are not under the scheme.

In the recent workshops and meetings for QualiCert discussions focused on the interpretation of the RES-directive on topics as mandatory or voluntary, personal or company certificate and the problems with keeping training courses up to date with the latest developments in practical application of innovative technologies. In the discussion at the HLSG it was noticed that the relation with other European Directives were not optimal and that it can be questioned if the over regulation of heat pumps are adequately dealt with.

### 4. National Certification schemes

In order to get information on the various certification schemes for heat pump installers a questionnaire was sent out to the SEPEMO-participants (see Annex 2). This analysis gives an overview of Austria, France, Germany, Greece, Netherlands and Sweden. Although this is only covering 6 European countries it gives a good idea how certification schemes for heat pumps are built up and accepted in the various countries.

In general the procedure for certification runs as:

a) Signed request for certification  
b) Participation in the educational training for heat pump or the participation in an equivalent training  
c) Pass in the final exam (theoretical, practical, and verbal)  
d) Proof of relevant education or professional experience:  
   - skilled worker for gas and hot water  
   - refrigerant plant technician  
   - electrical installer or  
   - degree of a technically relevant university or polytechnic schools  
e) The employer of a certified installer must be
• a licensed enterprise of an electrical, a gas/hot water or a gas/hot water trading company which offers the planning and/or the installation of heat pump systems for customers
• and/or the installer himself is the owner of a licensed enterprise or an industries, who offers planning and/or the installation of heat pump systems

f) The following data of a reference plant need to be handed in to the certification body:
• filled out questionnaire for reference plants
• plant layout with representation of the heat source plant and the heat pump
• heating load calculation according to standards
• commissioning certificate

Basically this follows the main lines of EU-CERT.

As the certification scheme is based upon accredited training programmes and certification is given on personal basis emphasis is laid in the RES-directive on the conditions for the training courses. The basis for training for heat pump installers starts with the assumption that the trainee is already experienced or has the basic knowledge of installation technology. Especially the EU-CERT under the umbrella of the EHPA has put a firm basis under the quality of the training and certification process for heat pumps in Europe.

Installation guide lines as basis for the training are developed under the guidance of EU-CERT.HP. The Management and development of the training and certification system EU-CERT.HP is taken forward by the Education Committee of the European Heat Pump Association (EHPA). The Education Committee of the EHPA will be oversee the quality of the training and certification process and provide new material for the training course as heat pump technology continues to develop.

### 4.1 Austria

In Austria there is a certification system for installers of heat pumps, solar thermal and PV systems. This system is implemented by the AIT (Austrian Institute of Technology), a private non-profit organization. The certification scheme follows as under EU-CERT the ISO 17024.

The certificate is valid for 3 years. The certificate can then always be extended for three years, with the obligation to participate in an exercise program (one day per year). An additional condition for renewal is that we are to be active in the appropriate field.

The training can be followed by accredited training centres by the AIT. The content of the training and learning goals in consultation with relevant stakeholders and other players down. A working group of experts and trade associations concerned with updating the content.

The installations are subject to inspection by the AIT, on request in the course or after completion of complaints. These inspection fees apply.

To the certificate under the spotlight is a marketing campaign. We have made recognition of certified installers with stickers, logos and the like. There is a website where traceable certified installers.

The Austrian situation is, therefore, a voluntary, personal certificate. It is however beyond a simple recognition system, because there are audits carried out. In addition, the triennial update of interest.

### 4.2 France

The sub-Department Climate and air quality of MEEDDM (Ministry of ecology, energy, sustainable development and the sea) / DGEC (Directorate General for Energy and Climate) has subcontracted ADEME to work on the French NREAP.
Qualit’EnR is responsible for the qualification scheme for RES-installers:

- “QualiPV” for Solar pv,
- “Qualibois” for bio-mass
- “Qualisol” for Solar-thermal
- “QualiPac” since beginning of 2010 for heat pumps

Qualit’EnR is part of the NREAP, but will have to improve some points:

Qualit’EnR is a voluntary qualification but will need in future to become accredited by the French national accreditation body (called COFRAC).

- Qualit’EnR accepts, up to now, equivalent qualification like QualiBAT, QualiClimafroid and Qualalifelec to be a QualiPac installer. This tolerance should not accepted by DGEC.

Certification under QualiPac is voluntary and a scheme in which companies only gets certified.

An installer, as a company, that has no equivalent qualification, must send at least 1 employee to EU-CERT training and he has to pass successfully the exam (often, this is the boss for very small companies, which are, in France, the main HP installers in residential sector).

QualiPac is using a course based upon the EU-CERT training course, which is based on technical knowledge requirement, but some improvements have to be achieved, especially on independence of examination procedure, checking the level of trainer, and audit on training centres. But AFPAC had no means to achieve that. Now that QualiPac has been transferred to Qualit’EnR it is expected that some audit on training centres will be achieved in future.

Training standards are based upon specific installation guide lines. These guide lines are edited by Costic, AFPAC and EDF. AFPAC decides periodically (i.e. 5 to 6 years, depending on HP technical evolution) to update these installation guide-lines, either by a subcontract to Costic, either within an adequate internal working group. Trainings are executed in French language using the core-EUCERT manual extended by a national annex. In 2009, 120 courses were achieved by 11 training centres, with a total of 1046 participants were executed, 89% of all participants passed the final exam. For 2010, there should be a little bit less participants due to the transfer of QualiPAC from AFPAC to Qualit’EnR, the dramatic decrease of HP-market in France in 2010.

Since the beginning of 2010 certificates are centrally issued under Qualit’EnR and in procedure harmonized. Under the website www.qualit-enr.org the communication on the schemes is giving information on:

- qualified installers
- the latest developments
o the qualification procedures

Audits on quality are part of the procedure and are focusing on: design, practical installation and reporting. In the evaluation of the audits there are four levels of judging: Excellente=good; moyenne=average; insuffisante=insufficient and defaillante=bad). When judging ‘defaillante’ the installer is suspended. Action from the installer is required at the two levels above.

AFPAC achieved a standard document for audit installation 3 years ago, and independent on-site audits have been done last 2009 on around 600 HP installed by QualipAC installers. In 2008 the most frequent mistakes with installers were:

- initial thermal study is missing so fault HP capacity design could occur
- the separator between tap water and space heating was missing

Now that QualiPac has been transferred to Qualit’EnR it is expected that some audit on training centres will be achieved in future.

The heat pump certification scheme has a relation to BRGM/Qualiforage.

Qualiforage is a quality label for ground source installers set up by ADEME-BRGM-EDF and managed by BRGM, a public organism. It is a voluntary process and the installer signs a quality Charter and commits to comply with technical standards and good practices. The installer has to provide evidence of adequate equipment and administrative documents such as the decennial insurance.

4.3 Germany

The German Heat Pump Association “Bundesverband Wärmepumpe (BWP)” is the national coordination partner of EUCERT trainings in Germany. BWP in turn is cooperating with five training centers in Augsburg, Potsdam, Wiesenbusch (Gladbeck), Saffig and Karlsruhe. More training centers will be added in the future.

Trainings are executed in German language using the core-EUCERT manual extended by a national annex. In 2009 nine courses with a total of 87 participants were executed. 92% of all participants passed the final exam and thus qualified for certification. For 2010, 24 courses and approx. 200 participants are planned. The German heat pump association manages the certification system. All certified installers are documented online on a certified installers list ([http://www.waermepumpe.de/fachpartner/zertifizierte-partner/eu-zertifizierterwaermepumpeninstallateur.html](http://www.waermepumpe.de/fachpartner/zertifizierte-partner/eu-zertifizierterwaermepumpeninstallateur.html)).

Since 2000 a certification scheme on ground source installations is managed by DVGW (Deutsche Vereinigung des Gas- und Wasserfaches e. V.). It follows the ISO standards 17024 and 17011 (accredited certification body) and the certification is given to companies. It is a voluntary process but the national supervisory authority often requires a certification for the permission for drilling and installing a ground-source system. The certification is valid for 5 years. A surveillance audit is realized after 2.5 years. In order to renew the certification, a new audit is realized and installation references are required. DVGW does not provide training but checks if the requirements for training are fulfilled. Vocational education constitutes an apprenticeship including theoretical and practical training and the advanced training is mostly theoretical.

The Federal Institute for Vocational Education and Training, on behalf of the Federal Ministry of Economics and Technology develops directives and framework curricula for the professional...
education for trades and industry as well as for advanced training. Therefore, there is no certification and accreditation scheme in Germany.

The dual training system for installers implies that the vocational schools provide the theoretical part of the training and companies provide the practical training. In order for a craftsman to run its own business, advanced training resulting in a Master’s degree is necessary.

4.4 Greece

The Ministry of Environment, Energy and Climate Change” has contracted CRES to work on the Greek NREAP.

There is no official certification or accreditation scheme for RES installers in Greece. However, there are accreditation organisms such as the Hellenic Association of Accredited Certification and Inspection bodies (ESYD) which provide inspection and certification services for products and services for technical professions and the National Accreditation Centre for Continuing Vocational Training (EKEPIS) which provide accreditation to training centres.

A certification or qualification process for installers of ground source heat pumps is planned to be developed by CRES.

4.5 Netherlands

The Ministry of Economy, Agriculture and Innovation is responsible for the Dutch NREAP in which AgencyNL executes the working details of the Action Plan.

Much of what is needed under the RES directive is present in existing certification schemes in the Netherlands. From 2001 onwards under BRL6000 a certification scheme has been built up gradually for design, construction and management of technical installations for buildings. The installer can apply on a voluntary basis for a KOMO-Instal certificate and therewith distinguish from competitors. Certification for heat pump installers is part of the scheme.

For many small companies the procedure for this KOMO-Instal certification is rather costly, complex and thus not much in demand. Therefore the branch of installers UNETO-VNI has developed the Regulation for Acknowledgement of Heat Pump Installers.

Therewith noticeably two different schemes are in existence in which when updated the Regulation for Acknowledgement can fulfil the requirement of personal certification under the RES-directive.

4.5.1 BRL Certification scheme

The scheme under BRL 6000 is an umbrella for more technologies than heat pumps only. A certified installer has to comply with the general demands under BRL 6000-00 and can then chose from one of the sub sectors and activities.

The BRL certification process has much in common with the EU-CERT scheme and is a bit further in its development as it is in a large part already harmonized with other technologies as well as with the Dutch Building Codes.

BRL 6000 is accepted as National Guideline for Appraisal by the Building Commission on Harmonisation and acknowledged by the Ministry for Building and Environment for the Dutch Building Regulations. Although the certification is linked to the Dutch Building Regulation it is still a voluntary process. The BRL certification process is based upon the EN45011 product/process certification scheme and executed under the supervision of the Dutch Counsel for Accreditation (www.RvA.nl). The process for certification is therewith as much as possible in line with the ISO standard on quality assurance where the company applying for certification is itself responsible to
arrange its own internal quality systems. This has to be checked and approved by a certification body.

Companies (not persons) can then get a certification for project design, installing and/or management of installations in building projects. In relation to the European directive and SEPEMO the subcategory Energy Conversion is of interest

| BRL 6000-11 | Low temperature heat distribution |
| BRL 6000-12 | Individual heat pump storage water heaters |
| BRL 6000-13 | Individual domestic heat pumps |
| BRL 6000-18 | Collective domestic heat pump systems |

Installation guidelines by ISSO (www.isso.nl) are the backbone of these sub categories to describe the quality standards. For a request for a certificate the installer has to fulfil the following requirements:

- A choice of categories and activities has to be made dependent on the working area
- The company then checks if the operating procedures and routines are in line with the quality standards of the categories of the scheme and adjust the internal working processes if necessary to these standards. There are administrative requirements and competence requirements for the persons employed, the delivered work may be checked during the design, and installation and after completion.
- These working processes and routines are then described in the internal company specific Quality Handbook and the Handbook is then put into operation.
- An offer for certification is then asked for with an accredited certification body. The company then has to:
  - Provide legal documents about the company’s existence, legal and tax obligations, and insurances
  - Attestation of relevant experience in the related field: the installer should provide information of at least one operating quality system realized within 3 months before applying for the label.
  - Relevant training in the related area
  - Documentation about at least one installation reference for every certified field of activity
- The certification is the given after a survey by the certification body.
- A contract between the installation company and the certification body then confirms that the installer will be audited on its working processes and on projects in practical applications on yearly basis in the first two years and then every 48 months. Additional checks, suspension and withdrawal of the certificate can be a consequence of the audits.

The certification is valid for 3 years and costs 2 200 € each year.

The certification procedure is not based upon a special training course and is as a procedure in line with ISO quality procedures. However depending on the skills connected to the technical systems competence is general described by referring to final achievement levels of training schemes or particular schemes. Thus there are no accredited training centres in the certification scheme.
The auditing process is evaluated on yearly basis by the Council of Experts of KBI responsible for the BRL6000 certification scheme. This can result in an update of the certification scheme or advise to update exams or technical requirements and standards, like the ISSO publications.

KBI (www.kbi.nl) is facilitator of certification schemes accepted by the Dutch Accreditation Council (RvA). The Certification schemes are carried out by EN45011 accredited Certification Institutes and maintained under KOMO-Instal (www.komo.nl).

4.5.2 Acknowledgment procedures

Next to the BRL scheme the branch of UNETO-VNI has developed the Regulation for Acknowledgement of Heat Pump Installers. This type of regulation is more in line with the tradition of the branch to make distinction between installers and to reward companies with skilled and competent employees. This is typically what QualiCert calls a certification by the stakeholders involved in the installation branch and RES sector. As the heat pump installer feels and notices the consequences of bad performing installation directly in the media the development of certification procedures for heat pumps are well developed.

Regulation for Acknowledgement of Heat Pump Installers is co-ordinated by SEI (www.erkendinstallatiebedrijf.nl) and companies are taken up on a list (register of acknowledgement). Companies have to show that they dispose of skilled employees. Next to that the company has to have the equipment to be able to build installations at a competent level such as for heat pumps equipment to test on leakage and safety in line with the environmental legislation and building standards.

Companies can enlist with SEI if the can show competence in heat pump installations. This is then assessed by SEI on the basis of examination at training programmes.

A company that wants to be qualified for SEI acknowledgment has to have at least one competent full time employee in service that can show one relevant training certificate for heat pump installer. The training certificate for heat pump installers are described in the requirements by SEI and based upon the installation guide lines for heat pumps by ISSO.

4.5.3 Training

One of the most important parts of the certification procedures under AnnexIV of the RES-directive is the accredited training programme for which the minimum contents of the key competences of the installer are extensively described. Although only required for the installer acknowledgment procedures under SEI the training courses executed by Kenteq and OTIB and the CITO examination procedure are seen as a basis for personnel trained for companies going for the more official BRL-certificate. So the basics in both procedures are the same.

The training courses have been developed on the imitative of OTIB and ISSO by DWA, UNETO-VNI, Kenteq and the Dutch Heat Pump Association.
The basis for training for heat pump installers starts with the assumption that the trainee is already experienced or has the basic knowledge of installation technology. The course has six modules which are targeted at designers, project leaders and consultants in domestic and commercial buildings. As preliminary training to be accepted at the in depth training course basic training is given for mechanics and designer trainees.

### 4.5.4 Mandatory certification schemes for heat pumps

**a. Ground sources**

The design and implementation of energy storage in combination with heat pumps is much in demand and currently guidelines are being developed as well as a mandatory certification scheme under the Ministry of Infrastructure and Environment. The certification scheme is for companies and consist of two elements:

- The company works in accordance with the requirements of internal quality and performance. This is demonstrated with a certificate issued by a certification body.

- The design of energy storage systems has the necessary skills, as evidenced by successful completion of the CITO test.

If both conditions are met, the company recognized by the public authority in charge of the certification scheme. This approach creates a level playing field for the market and hence a better assurance of quality of energy storage. The approach closely follows the EU Directive "Energy renewable sources ", in which accreditation and certification are required for sustainable energy.

**b. F-Gas regulation**

**c. EPBD – regulation**

### 4.6 Sweden

Article 14, paragraphs §14.3 and §14.4 of the RES-directive\(^1\) is treated in the Swedish Proposition 2009/10:128. Generally, there is no national or regional legislation concerning certification or equivalent qualification schemes for installers of small plants based on renewable energy but several sectors have introduced, or are about to introduce, a system for certification or equivalent qualification system. These systems may, where appropriate, take into account existing systems and structures and are based on the criteria listed in Annex IV.

The Swedish Energy Agency\(^2\) should be tasked together with the Swedish National Board of Housing, Building and Planning\(^3\) and SWEDAC\(^4\) to develop proposals for nationally coordinated system of certification or equivalent qualification system in accordance with Article 14.3. The assignment should also include developing proposals on how information, regarding certification or equivalent qualification system in accordance to article 14.4 is provided to the public, where it is not already available.

There are currently three different certification schemes for heat pump installers in Sweden. Two of them focus on installation quality and are based on the same education curricula and training, the EUCERT and SVEP-certification. Certification according to these schemes is voluntary. To acquire the certificate, the installer must prove competence in the designing and installation of heat pump systems. The third one is certification in order to fulfill the requirement of the EU directive 303/2008 which is required whenever the installer will make any intervention at the refrigerant circuit. The three certification schemes are described below.

### 4.6.1 EUCERT and SVEP-certification (voluntary)

The EUCERT and SVEP certification are both based on the same training and education. The certification scheme EUCERT is developed and kept up to date by the European Heat Pump Association (EHPA). The main difference between the two schemes is that the SVEP certification is not controlled by a third party according to ISO 17024. The certification is issued in cooperation between SVEP\(^5\) and Incert\(^6\). Incert is the Swedish National Certification body for the EUCERT and is accredited by SWEDAC. SVEP certificates are issued by SVEP.

SVEP-certification requires that a person in a supervising position at a company has passed the EUCERT examination test. When this is accomplished, the company can be SVEP-certified. Otherwise, SVEP-certification is on an individual basis. A holder of a EUCERT- certificate fulfills the requirements of being a SVEP-certified installer.

The certification schemes include a competence test for the installation and designing of heat pump systems. At least two years of experience of planning or installations of heat pumps, alternatively, technical documentation from one reference building where the applicant has been responsible for the whole installation process from tender to an installed and delivered system, is required to get the certificate.

The applicant of the certificate must be employed or be the owner of a company where he is working with planning or installations of heat pumps.

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\(^2\) www.energimyndigheten.se/en

\(^3\) www.boverket.se

\(^4\) www.swedac.se/en

\(^5\) SVEP, Svenska värmepumföreningen, ([www.svepinfo.se](http://www.svepinfo.se)). The Swedish heat pump association is an independent professional body and the official information channel for heat pumps to the public, government agencies, organizations and decision influencers in Sweden.

\(^6\) Incert, Installations Certifiering i Stockholm AB, ([www.incert.se](http://www.incert.se)) is a company, accredited by Swedac, that is managing the certification process of persons and companies.
The certificate requires mandatory training which includes a two days course (one (1) day theoretical, one (1) day practical) followed by one (1) month of self-studies by a computer self-study course. The training course is based upon installation guidelines according to EUCERT and includes the following topics:

- Calculation of the house energy and heating capacity needs
- Different heat distribution systems
- The domestic hot water system
- Control of the heat pump
- Back up and supplementary heating
- Condensing (fixed and floating)
- Refrigerants and refrigerant cycles
- Dimensioning of collector
- Contracts and complains
- Insurance package

The heat pump education and examination is performed at the Mid Sweden University in Härnösand and for the SVEP- certification also by a number of manufacturers. The list of educational partners is published on the SVEP website.

The installation guidelines are managed and developed by the Education Committee of the EHPA. The Swedish partner in this project is the Mid Sweden University. The Education Committee of the EHPA will oversee the quality of the training and certification process and provide new material for the training course as the heat pump technology continues to develop.

A final examination is made online with 60 multiple choice questions. A personal certification is valid for six years; an audit is performed after 3 years. There are around 23 certificates issued according to the EUCERT in Sweden today (May 2010) and around 150 certificates issued according to the SVEP-certification (December 2010).

4.6.2 EU directive 303/2008 (mandatory)

The EU regulation 303/2008 (COMMISSION REGULATION (EC) No 303/2008)\(^7\) includes regulations for works with fluorinated greenhouse gases. Certifications according to this regulation are divided into personal certificates and company certificates. A company or person that lacks a certificate and still works with refrigerants is practically working illegally. The rules for the regulation are common for EU and include also other systems than heat pump systems. Incert is currently the only certificate provider that is allowed to issue certificates according to EU directive 303/2008. Incert is accredited by Swedac\(^8\).

a. Personal certificates

According the EU directive 303/2008, all persons working with certain fluorinated greenhouse gases must be certified for the works under the new certification categories I, II, III or IV. In Sweden, there are requirements for mandatory personal certification of Category I, II, III and IV, and certification of the company of Category I and II in accordance with the refrigerant regulation and EU Regulation 303/2008 in order to make operations in the refrigerant circuit if it contains f-gas.

The categories are:


\(^8\) Swedac is a government agency that is dedicated to be an accrediting body according to for example ISO/IEC 17024 - General requirements for bodies operating certification of persons.
o Category I: Installation, maintenance & service, treatment (Drain) of the refrigerant, and leak check regardless amount of refrigerant.

o Category II: Installation, maintenance & service, treatment (emptying) refrigerant for refrigerant amounts less than 3 kg (6 kg if it is a hermetically sealed systems), and leakage control regardless amount of refrigerant (if no interference is made at the refrigerant system).

o Category III: Disposal (emptying) of the refrigerant filling for amounts less than 3 kg (6 kg if it is a hermetically sealed system).

o Category IV: Leakage Control whatever the filling amount.

In order to perform work that is regulated by the refrigerant regulation two options is provided:

1. The installer can have a “sharp” personal certification. A sharp certification requires passed written and practical test.

2. It is permissible for staff that is new to the profession to work under the supervision of a certified person for up to two years. This option requires no intervention by authorities or by certification companies, but can be organized within their respective companies.

The certificate is not linked to a guarantee scheme or any special assurances, but each category level guarantees a certain level of experience. To get a certificate the installer must do an exam which is divided into two parts; one written and one practical part. There is no mandatory training to get the certificate, but the examination centers normally also supplies different courses on commercial basis. A web based course has been recently launched by one of the examination centers. Before the examination it is possible to do a diagnostic test that is available in three parts online. This is a way for the installer to calibrate his knowledge so that it becomes visible what theoretical parts he should study more before the final exam. A cost of 500 SEK is charged for each part of the diagnostic test. Courses and examination are strictly separated by regulations and legal agreements.

The certificates are usually issued for a period, for example, for five years. Thereafter, some form of recertification is required. Each year within the five year period the installer has to confirm that he is active within his profession.

Today there are 8744 issued personal certificates (May 2010). Within one year this number is expected to reach 10-12 000. Transition rules occur until July 3rd, 2011.

b. Company certificates

Companies that perform the services of Category I and II it is necessary that both the company has a company certificate and that all persons performing procedures have personal certificates in the right category. The rules apply since 2010-01-01. A company certificate ensures that the company has procedures and equipment required under the terms of reference for the implementation of works in each category, and that the company has employees who have the right category on their personal certificate.

The company must apply for their certificate. The application must include at least:

- A list of equipment (ID), and routines for maintenance of equipment
- Routines for managing refrigerants
- List of certified installers
- A proof of registration

A company certificate is issued for five years and costs 5000 SEK (~EUR 500). After five years the company must re-apply. Incert is currently the only company that is allowed to issue company certificates. Until 3rd of July 2011, companies that were accredited by Swedac before the 4th of July 2009 has a temporary certificate. An updated list of companies that are certified according to EU
regulation 303/2008 (by Incert) is available at their web page. From 4th of July 2011, all companies
must be accredited by Incert.

4.6.2 Svensk kylnorm

In addition to the certification schemes there is a handbook, called "Svensk Kylnorm", provided by
Kyl och Värmepumpföretagen\(^9\). Svensk Kylnorm is a guide for refrigeration and heat pump
companies in order to help them to live up to legislation and requirements from the authorities.
The kylnorm gives an overview of the various directives and regulations involving security,
construction, installation, operation and maintenance of refrigeration and heat pumps and systems.
It also gives examples of what is considered good practice in the industry. Svensk Kylnorm is
gradually adapted to the common European CEN standard. Svensk kylnorm consists of four basic
parts:

- **General Part**: A norm for stationary refrigeration & heat pumps, refrigeration and transport
  refrigeration in ships.
- **Climate Comfort**: A norm for climate comfort in motor vehicles, trains and machinery
- **Ammonia**: A norm for facilities with ammonia
- **Flammable refrigerants**: A norm for units with flammable refrigerants (Interim Edition)

These basic elements are not comprehensive, but have to be complemented with fact sheets.

The kylnorm thus have no legal status itself, but serves as a compilation of legal requirements, and
good practice.

4.6.3 Certification of ground sources

There are both local and national recommendations for the design and placement of boreholes.
Municipalities recommend their residents to hire well trained drillers that are members of Geotec\(^10\),
Avanti\(^11\) or certified by SITAC\(^12\). A certified well driller has an environmental- and liability
insurance. The municipalities can require building permits for locations where for example water
assets is low or where there is a risk of salt water entrainment. Permits are required within water
protection areas and in some protection areas drilling can be forbidden. SGU has developed the
standard "normbrunn-07"\(^13\) which is a set of guidelines for well drilling.

These recommendations for placement of boreholes includes for example:

- A least distance to a neighboring borehole should be at least 20 m.
- A least distance to municipal sewer should be at least 4 m
- The distance to a neighbor’s property boundary should be least 10 m, else an approval note
  from the neighbor is necessary.
- The distance to a building should be at least 4 m to avoid damage of the building ground.
- The borehole should have a safe distance to water wells (30-50 m) and be located lower in the
ground

5. Relation to other European directives

There are various certification requirements for installers of renewable energy systems already
existing and ‘under construction’. This is especially a problem for installers of heat pumps. From
\[9\] www.kvforetagen.se
\[11\] Avanti Svenska Försäljnings AB
\[12\] SITAC is appointed to spokesman body within EOTA - European organization for technical
approvals
\[13\] http://www.sgu.se/dokument/service_sgu_publ/normbrunn-07.pdf - att borra brunn för
energi och vatten.
various environmental legislation and safety regulations (pressure vessels, F-gases, ground sources) to the requirements on maintenance for Air Conditioning under the EPBD are developed certifications and/or qualifications independent from each other.

There is a strong need for these various certificates to develop into one full heat pump certificate. The implementation of the Renewable Energy Directive can possibly serve as a catalyst.

Furthermore based on the ECO-design Directive there are energy requirements under development for a number of product groups. Sustainable energy is in the product groups on 'heating, cooling and air conditioning, ventilation'.

**Ground sources.**

In various countries special legislation is being developed or in place for drilling of ground sources. This type of quality assurance is often mandatory as part of environmental legislation to protect ground water aquifers. These being the source for drinking water or for the use in industrial processes. As installer companies for heat pumps are more than often not the same companies doing the drilling these ...

**F-Gases**

Companies in the sector of refrigeration since 1st January 2010 have to do with the new statutory obligation under the European-style F-Gases decision. For companies active in the field of installation and/or maintenance of refrigeration equipment (installation, repair, periodic maintenance, commissioning, preventive monitoring and decommissioning) with F-gases or controlled (ozone depleting) substances (e.g. CFCs, HCFCs and HFCs) be released is company certification according to the F-gases act required. There are 2 levels of certification: first one for personal (with examination of know-how), second one for the company (with proof of certified personal and necessary tools).

**Air conditioning**

Air-Conditioning falls under the RES-Directive. So the implementation of Article 9 of the EPBD (Energy Performance Building Directive) is of importance for the certification of heat pumping technologies and seems of importance to monitor the effects of Article 9.

Article 9 of the EPBD is named “inspection of air-conditioning systems”. It stipulates that “with regard to reducing energy consumption and limiting carbon dioxide emissions, Member States shall lay down the necessary measures to establish a regular inspection of air-conditioning systems of an effective rated output of more than 12 kilowatts”. Moreover, “this inspection shall include an assessment of the air-conditioning efficiency and the sizing compared to the cooling requirements of the building”. Finally, “appropriate advice shall be provided to the users on possible improvement or replacement of the air conditioning system and on alternative solutions”.

Most Member States opted since 2005 for a voluntary instrument for plant optimization. However with the EPBD-recast discussion was held to develop into a mandatory instrument in line with the F-Gas regulation.
6. Discussion

In the discussion held at several meetings in QualiCert, CA-RES and local certification development meeting for NREAP, questions were raised about the European directive which are major policy choices when deciding on the direction of the Action Plan for certification at European level:

- **Voluntary or mandatory.** The Manual under 3.2.1. states that it is advisable to link certification to the building codes. Even if this may be politically more complicated, experience has shown that strictly voluntary schemes take much longer to gain market acceptance than schemes coupled to a subsidy scheme or building code. In the Netherlands the Certification under the BRL-system is harmonized with the procedures under the Dutch building code. This makes it easier to develop towards a mandatory arrangement. However as this is not the case in most of the other participating countries and certainly not for EU-CERT. The opinion is that ‘for the time being’ the scheme harmonized at European level must be voluntary but should prepare in becoming mandatory.

- **Company or personal certification.** The Directive states that the installer should be certified, which in the end can mean a company or a person. In Europe a mix of company and personal certification could be possible. In the end however the installer company is responsible for the ‘product’ they sell, which should be installed by qualified persons working for the company.

- **Size of small scale renewable.** It is the opinion that the certification scheme is for domestic housing. However there is a grey area in size towards commercial buildings ranging from groups of terraced houses, towards flat and old pensioners living blocks and small office buildings. The SEPEMO-project is also looking into larger apartment blocks but not into the systems for office buildings.

- **Auditing and renewing the certification.** In order to minimize the administrative burdens the renewal of certification should be as simple as possible but as often as possible to update installers’ competences regularly about the latest technology developments. Auditing focuses on the proof of knowledge, skill and competence in practical applications. There are concerns about the costs for extra auditing. Therefore audit standards for different technological applications need to be clearly communicated to the installers to allow for self-auditing, possibly based upon the self-auditing tool developed by Qualit’EnR.

- **Training.** A Concern is that most training programmes are not often updated as renewable energy technologies evolve quickly. Concern which is possibly taken away when manufacturers are directly involved giving specific and certified training courses. Under the Directive this is possible. In a harmonized procedure for certification on heat pumps, like EU-CERT but also in the local certification schemes this should be inserted. As training is based upon installation experience in practice and the installation guide lines these should be looked into and update where needed. At European level for EU-CERT it seems a simple step forward to develop these updated guidelines with the experience from SEPEMO

- **Relation to other European directives.** In other European Directives, like the EPBD, especially heat pumps are under specific regulation or certification procedures. EU-CERT and local certification schemes must specifically for heat pumps look into the possibilities of a ‘one shop’ certification system where the other schemes must be taken into the procedures.

- **Role of government and stake holders.** As the certification or qualification process shall clearly defined by the Member State or the administrative body they appoint, the public sector plays an important role. Especially in the process beginnings it the public sector, e.g. a national energy agency, brings the necessary impartiality, political weight and authority in the process. In line with QualiCert it is recommendation to go into a public/private partnership for the start-up phase of the scheme as well as for the first years of operation.
Relation to conventional fossil technologies. The relation with competitive fossil technologies is of importance as through the Directive more regulation and costly certification is asked for which increases the already competitive disadvantage over fossil technologies. It should be looked into how to get these on the same train.

7. Conclusions

As, except for Greece and Netherlands, most countries are participating in the EU-CERT program the approach towards training courses is largely harmonized already. This is not yet valid for certification schemes under EU-CERT. In general however the EU-CERT approach can be taken as an example for the QualiCert project.

Any certification/accreditation or equivalent qualification system requires training and in many countries training schemes are already in place. When developing a certification/accreditation scheme in line with the RES-directive, it is of utmost importance to take into account the already existing training structures/schemes in order to avoid losing existing knowledge.

Training according to the RES-directive can be provided by both public and private training centres but also by manufacturers and federations/branche organisations, as long as these training programmes get accredited. It is noted that in order to get this accreditation the training courses in general must be updated in line with the requirements of the RES-directive.

With a fast developing technology like heat pumps it is of importance that these training programs are up to date with the latest development. This is not always guaranteed by the time it takes to include the market and operating experience into official training courses and handbooks with installation guidelines.

An important aspect is the voluntary basis of all certification schemes whereas QualiCert mentions that experience has shown that strictly voluntary schemes take much longer to gain market acceptance than schemes coupled to a subsidy scheme or building code. This raises the question for the market acceptance how to link a certification scheme to national building codes or a subsidy scheme and thus to come to a less voluntary basis.

Because certification of installers is on a voluntary basis and there is a lack of demand from the consumer, the interest with installers is relatively small to get certified. The certification procedure, especially as under the BRL scheme, is a rather complex and costly effort and in the competitive environment less attractive for the installer, although it has been shown that by a good quality assurance of the process cost reduction can be notable due to the reduction of failures.

In order to meet the requirements under the RES-directive the certification procedures need to be harmonized and renewed on a national level. This has to be implemented as much as possible built upon existing structures.
Attachment 1 - QualiCert findings

Certification or equivalent qualification of a company or a person?

The argument brought forward in favour of granting certification to a company is that the company is liable for the quality of the installation. Furthermore this approach reduces the danger that employees having gained the relevant qualification will be headhunted by the competitor. The argument in favour of certifying a person is that the installation should be carried out by the actual person having gained the required qualification, which is not guaranteed if certification/qualification is granted to a company.

Experience shows that both options can work well; the choice very much depends on the common practise of a country.

Public / private partnership

Public/private partnership is highly recommended for the start-up phase of the scheme as well as for the first years of operation. Public financial support may especially be needed at the beginning of the scheme, when few companies are certified.

One centrally managed scheme for all RES technologies

A centrally managed system reduces cost and the basic management structure can support the whole range of technologies. Furthermore, it is also easier for the consumer to find their way to qualified professionals. The existence of some certification/accreditation schemes in a country for individual technologies can make the creation of a centrally managed scheme difficult or impossible.

Linking the scheme to a subsidy scheme or building code

For the market acceptance of a certification scheme, the linking of such a scheme to a subsidy scheme or building codes is advisable. Even if this may be politically more complicated!

Institutional aspects

Both the public sector and the industry should collaborate in setting up and managing a scheme. Training institutes should be involved since the beginning.

Financial aspects

The installer needs to bear the cost for obtaining the certification. But the quality scheme should be supported by public funds and the renewable energy and building sector industry.

Communication aspects

In order to ensure a quick market-uptake, it should be promoted towards installers and consumers with a well-targeted marketing campaign including for example short advertising films, newsletters, documentation about the scheme etc. Furthermore: a list of certified/accredited/qualified installers publicly available on a website of the quality scheme. This allows consumers to easily identify qualified installers, and constitutes a good incentive for installers to join the scheme.

Renewing certification

The duration of validity of the obtained accreditation/certification or equivalent qualification is an important element. A renewal interval of 2 years seems to be advisable. Some schemes practice shorter or longer intervals, e.g. 1 year for Qualit’EnR (France), 3 years for AIT (Austria). Renewal can granted after additional training and exams.
Training

Training programmes as well as training providers are approved by an authoritative body or that they have received formal recognition of a Member State. The training can be provided by both public and private training centres.

Audits

The discussion about audits is very tricky. The results of the survey indicate a clear preference to on-site audits of installations in operation. All stakeholders agree that audits are a valid means to give evidence of the quality achieved, and to get a real feed-back of on-site mistakes to give tracks of improvement by pointing out these mistakes in training course; on the other hand, audits are quite expensive and time-consuming and therefore need to be limited to a random selection of installations.

Audits on quality are part of the standard ISO-procedures and are focusing on: design, practical installation and reporting. Like in the French case the evaluation of the audits has four levels of judging: good; average; insufficient and bad. When judging ‘bad’ the installer is suspended. Action from the installer is required at the two levels above. (please cancel this sentence that is not true as far as on-site audit are concerned – see my comment on p 12; moreover: the role of AFPAC, as HP association, is to set and launch quality system on HP, and not to manage them continuously; once this quality system has been tested 1 or 2 year, other body must take over and this is what has been done between AFPAC and QualitENR)

The clear objective of a certification scheme is to increase the number of highly-qualified market players. In this respect, the function of audits in this context is to improve the quality of installations; therefore they should be used as a positive incentive for correcting mistakes and improving quality. In case that audits reveal poor quality of an installation, these results should be discussed with the installer in order to guide them towards improving performance. Only in case of serious misconduct or repeated unsatisfactory installations audit results may lead to suspension of the certification/accreditation or equivalent qualification of an installer.
Attachment 2 – CA-RES


The CA-RES is organized as a structured and strictly confidential dialogue between national authorities responsible for the implementation of the Directive 2009/28/EC or their nominated representatives. In the CA-RES, Member States exchange experiences and best practices and develop common approaches.

The Austrian Energy Agency (AEA) coordinates the Concerted Action CA-RES. Partners and participants are nominated organisations from all 27 EU Member States plus Norway and Croatia.

WG 2: Calculation Methodology

Working Group Joint Leaders:
Mr. Wolfgang Bittermann (National Statistical Office of Austria)
Ms. Mojca Suvorov (National Statistical Office of Slovenia).

Discussion topic and questions asked on the implementation of heat pumps:

- Do you have a sufficient database in your country to apply the proposed methodology or is there a need for additional surveys?
- Do you have national estimations for the “seasonal performance factor” (SPF) and the amount of useful heat produced from the heat pumps (Qusable) factor values?
- Should heat pumps used for water heating only be taken into account, too?
- What average durability should be assumed for heat pumps?

These questions were used together with the document Accounting for renewable energy from heat pumps: A framework proposal written by Mr. Nikolaos Roubanis (Eurostat) and Mr. Øyvind Vessia (DG ENER) as a basis for the discussion in WG 2.

WG 5: Information and Training + Guarantees of Origin

Working Group Leader: Mr. Antonio Joyce (National Laboratory for Energy and Geology, LNEG, Portugal),

Discussion on:

- Are there difficulties implementing the criteria laid down in Annex IV of the RES Directive 2009/28/EC?
- Are there certification schemes already in place? Are they being planned or currently being set up?
- Which are the responsible body/(ies) for setting up and authorising certification/qualification schemes by 2012 for installers?
- How are (will be) the different stakeholders involved in the development of the certification schemes?
- Are the certification schemes voluntary or mandatory?
- What type of Indicators can be used for the implementation of Article 14.
Attachment 3 - Questionnaire

Name of organisation/company filling out the questionnaire:
Name of contact person:
Email address:
Telephone:

<table>
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<tr>
<th>Questionnaire about existing schemes for training and certification of heat pump installers</th>
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The aim of this questionnaire is to collect information about the existing scheme for certification and/or accreditation of heat pump installers in your country and to get information about the basis of certification and training schemes in order to find ways to implement the guidelines for heat pump installations developed under SEPEMO.

The questionnaire is just a guide line for questions to be asked to be able to make a country report and to find ways to effectively implement the findings of SEPEMO.

QUESTIONNAIRE

In order to analyse and give an overview of heat pump certification schemes in Europe questions per participating country under SEPEMO should be answered on:

Policy on certification
1. Which ministry, agency and/or persons are responsible for National Renewable Energy Action Plan (NREAP) and especially AnnexIV?

2. Is a policy being developed by the government to implement AnnexIV of the RES directive and does this make use of existing structures and procedures.

3. Is there existing national and/or regional legislation concerning certification or equivalent qualification schemes for installers according to Article 14(3) of the Directive.

General information on certification schemes
4. Which certification schemes are existing on heat pumps for domestic and commercial buildings and which are the responsible body/(ies) for setting up and authorising these certification/qualification schemes.
   
   a. Are these certification schemes/qualifications in line with the requirements under the RES-directive?
   
   b. Is information on these schemes publicly available?
   
   c. Are lists of certified or qualified installers published?
   
   d. Are other schemes accepted as equivalent?
   
   e. Are the certification schemes built upon training and examination?
   
   f. Is the certification delivered to a physical person or to a company?
   
   g. Is the certification process a voluntary or mandatory process?
   
   h. Is the certification linked to a guarantee scheme, a special insurance, an incentive scheme for consumers...?
   
   i. Could you please provide figures about the number of certifications delivered?
   
   j. Since when is the certification scheme being implemented?
   
   k. Is information on the certified installers available online (if so, please indicate)
**Training and process of certification**

5. What are the legal requirements for obtaining certification?

6. What are the technical skills required?

7. Training centre: In case the training is provided by a training centre, what are the requirements to become an accredited training centre:

8. Training for installers (persons): please provide details about the training standards for installers:
   a. What is the target group?
   b. What is the duration of the training?
   c. Does the installer need to provide evidence of prerequisites in the related area?
   d. If yes, please indicate what the prerequisites are (in terms of education, experience...):

**Training standards in relation to installation guide lines**

e. Could you please provide a brief description of the training standards for installers (theoretical and/or practical exercises, duration of practical exercises...):

f. Are training standards based upon specified installation guide lines?

g. If yes, which installation guide lines?

h. Which organisation is responsible for developing installation guide lines?

i. Which procedure is used to develop these installation guide lines?

j. Are installation guide lines regularly updated as a consequence of technical development or as a feed-back on practical field experiences?

**Examination**

k. Does the installer have to pass a final examination?

l. Please indicate which type of examination (exam, MCQ, discussion with jury...) :

m. What are the minimum passing scores required for the final examination?

n. EXAM leading to a declaration of the professional level

o. Could an installer take part in the final examination without having attended the training course?

9. How is the training material made available (hard copy, electronic versions...)?

10. Is the training material available to the public?

11. If not, is it possible to buy it?

12. How have been elaborated the training standards for installers (e.g. through a national initiative, a European project, working group of experts...) and how are they updated?

13. Is the training mandatory or voluntary for obtaining the certification?

**Auditing the process**

14. Does your certification process contain an audit component? If yes, what is the focus of the audit?

15. How are the audits realized?