

# Public Administration Training and Coaching on Renewable Energy Systems

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Guide on effective regulations to support  
the introduction of RE system in buildings

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**About this guide**

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## 1. Abstract

Significant energy consumption is concentrated in cities, municipalities and urban areas due to the daily activities that take place in them. Analyzing the energy systems in them, it is crucial to understand their complex structure, the great number of consumers and different types of energy sources. As an example, in 2008 and for the first time in history, half of the world's population lived in urban areas and it is estimated that this number will increase reaching 60% in 2030. Moreover, in 2030 urban energy consumption is estimated to reach 75% of the world's global consumption.

With the aim to reduce energy consumption and its environmental impacts, the European Commission developed the Europe 2020 Strategy, establishing targets for employment, innovation, social integration, energy and climate change. These are the objectives in the field of energy sustainability and climate change :

- greenhouse gas emissions 20% (or even 30%, if the conditions are right) lower than 1990
- 20% of energy from renewables
- 20% increase in energy efficiency

To achieve these goals, it is crucial to study the possibilities that local authorities have to improve their energy management. Local governments have an important role to play in the reduction of the environmental effects of climate change and one of the main measures that local authorities can adopt is the promotion of distributed generation systems using renewable energy sources. This model leads to a new system, in which a lot of energy generation systems are located near the consumers, minimizing losses in transport processes and thus improving energy management. Local authorities can promote and support the implementation of this system, and so contribute to improving environmental quality and guarantee its correct integration in the local architectural environment.

Thanks to the activities developed through PATRES, a number of local authorities in Spain, Italy, Austria, Romania, Czech Republic, and Croatia benefited from an integrated package including specialized training and dedicated professional assistance. These local authorities developed 27 Pilot Actions<sup>1</sup> leading to the devising of local regulations to promote renewable energies in buildings, the inclusion of renewable energies in green public procurement procedures and the promotion of the Covenant of Mayors.

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<sup>1</sup> 6 pilot action in Spain, 5 in Italy, 5 in Austria, 4 in Croatia, 4 in Romania and 3 in the Czech Republic

The most important results of the project were:

- **Involvement of 67 European local authorities and other public administration bodies.**
- **Development of 100-hour training courses addressed to municipal technical officers and heads of departments.**
- **Organization of 33 national and international visits to best practices.**
- **Implementation of 27 pilot actions in which new building regulations and/or annexes to building regulations setting requirements and parameters for energy and environmental issues, new Green Public Procurement protocols, and new Sustainable Energy Action Plans have been developed.**

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The aim of this guide is to show how it is possible to act through local administration to promote the integration of renewable energy systems in buildings and the benefits to adopt them in building construction requirements.

## 2. Introduction

### 2.1. Motivation and presentation of the PATRES project

PATRES (*Public Administration Training and coaching on Renewable Energy Systems*) is a 36-month-long European project (May 2010 - April 2013) funded through the Intelligent Energy - Europe Program. PATRES's goals included supporting local authorities, public utilities and social housing bodies in devising effective obligations and policies concerning minimum levels of energy from renewable energy sources (RES) in their building regulations and codes for new or refurbished buildings, in the public procurement for their facilities and social housing, in the development of their SEAPs. Acting on the building sector is crucial to reduce energy consumption and CO<sub>2</sub> emissions, since energy use in residential and commercial buildings is responsible for about 40% of EU's total final energy consumption and 36% of the EU's total CO<sub>2</sub> emissions. Local authorities have a crucial role to play in devising renewable energy and energy efficiency policies, since they are usually responsible for planning permissions, fiscal incentives and the proper application of zoning and building regulations.

PATRES involved 7 partners from 6 different countries with different expertise in renewable energy systems integrated in buildings, different sustainable energy approaches and local codes/regulations: Austria, Croatia, Czech Republic, Italy, Romania and Spain.<sup>2</sup>

All these partners were chosen according to their experience in energy saving, renewable energy systems in buildings, sustainable energy policies and in RES training or dissemination activities.

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<sup>2</sup> In the first phase of PATRES, Estonia was also taking part, but the partner involved in the activities (Tehnopol) later resolved to leave the project.

The consortium integrated also different kinds of expertise (universities, research centers, technology parks, research and environmental consultants and a public administration training center) and was composed by:

1. CONSORZIO PER L'AREA DI RICERCA SCIENTIFICA E TECNOLOGICA DI TRIESTE – Italy – (National Research Body) - Project Coordinator;
2. STENUM- Austria – (Environmental and Research consultancy);
3. UNIVERSITY OF RIJEKA – Croatia – (University);
4. ENVIROS -Czech Republic- (Energy and environmental consultancy);
5. FORSER –Italy –(Public administration training and consultancy center);
6. POLYTECHNIC UNIVERSITY OF BUCHAREST- Romania - (University);
7. CIRCE - Spain – (Centre of Research for Energy Resources and Consumption);

At the time of the submission of the project (2009) the countries involved in PATRES showed very different starting contexts as regards policies introducing minimum levels of energy from renewable sources in their building codes and regulations.

**Austria** was - and still is - a leading country in RES and energy efficiency in buildings because it has focused for decades on a permanent promotion of renewable energy sources, accompanied by an enhancement in the rational utilisation of energy.

**Spain** was a best practice in Europe. The country promoted from 2007<sup>3</sup> a great development of renewable energy introducing a stable legal framework based on feed-in tariffs with premium price recognizing the environmental benefits. At that time, despite the fact that Spain was the first European country to enforce the obligatory implementation of solar thermal energy in new and refurbished buildings<sup>4</sup>, there were still some social and market barriers that restrained the further development of renewable energy systems for the heating and cooling markets. However, when compared to the situation found at the beginning of PATRES, the current Spanish energy system has changed dramatically, due to the economic and financial crisis and to the huge Spanish public debt. Spain has since stopped governmental incentives for feed-in tariff systems in January 2012<sup>5</sup>, thus paralyzing the renewable energy sector completely. Currently the interest in this field is focused on auto-consumption of energy, following a law passed in November 2011, allowing to connect low power installations (less than 100 kW) to the electricity grid by means of the internal

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<sup>3</sup> Royal Decree 661/2007 about the regulation of the electric energy production in special regimen. Available in: <http://www.boe.es/boe/dias/2007/05/26/pdfs/A22846-22886.pdf>

<sup>4</sup> Building Technical Code, published on 2006 by the Royal Decree 314/2006. Available in: <http://www.boe.es/boe/dias/2006/03/28/pdfs/A11816-11831.pdf>

<sup>5</sup> Royal Decree – Law 1/2012. Available in: <http://www.boe.es/boe/dias/2012/01/28/pdfs/BOE-A-2012-1310.pdf>

electrical grid of an owner. This new legislation opened the possibility to develop renewable energy systems and produce electricity in buildings and SMEs promoting distributed generation<sup>6</sup>.

**Italy:** The Italian 2008 Budget Law introduced the obligation for new buildings to have a renewable energy system for producing hot water. Nevertheless, this was designed as a rule to be implemented in the local municipalities building regulations, and it has not yet been adopted throughout most of the country. So there are important differences between regions, for example the region Trentino Alto Adige is considered a best practice for its great job promoting renewable energy systems, and there are other areas where regulations are still poor (mostly in southern Italy, but with some excellent exceptions). The new Decree 28/2011 transposed Directive 31/2010 and established obligations starting in 2012 for new buildings and buildings undergoing “major renewal” to cover their energy consumption (both for heating and electricity) resorting to increasing rates of RES: 20% (from 2012 to 2013), 35% (from 2014 to 2016) and 50% after 2017.

**Romania:** The 2010/31 Directive was partially transposed into the national legislation by adopting OUG no. 69/2010, which provides subsidies for the acquisition of heating stations as well as for the renovation of residential buildings with subsidized interest for 5-year loans. Later, in 2011, two national laws were adopted which provide tax incentives for the renovation of buildings’ envelopes with regard to architectural aspects: Law 153, which applies to all buildings for thermal and electrical efficiency improvement, and Law 158, applying to blocks of flats. Starting on January 1<sup>st</sup>, 2019 (for all new public buildings) and December 31<sup>st</sup>, 2020 (for all new buildings, regardless of their destination), the percentage of primary energy locally generated using renewable energy sources must be greater than the building’s primary energy consumption obtained using fossil energy sources (fossil fuels, electricity, district heating, and so on).

**Czech Republic and Croatia:** have been committed to introduce renewable energy systems and spread energy efficiency in buildings both to fulfill the European Directives and in the belief that this could be a big opportunity for the economic development of local communities.

The Czech Republic introduced a Renewable Energy Law<sup>7</sup> in 2005 with stable feed-in tariffs for electricity produced through renewable energy sources. From 2008, this led to an enormous increase in renewable electricity installed capacity, especially of photovoltaic systems. Due to the increased costs, the feed-in tariffs were drastically reduced at the beginning of 2011. The increased costs of RES electricity for consumers have partly turned public opinion against RES systems. Nevertheless, options still remain in the field of building integrated RES, such as solar (thermal)

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<sup>6</sup> Royal Decree 1699/2011. Available in: <http://www.boe.es/boe/dias/2011/12/08/pdfs/BOE-A-2011-19242.pdf>

<sup>7</sup> Act no. 180/2005 Coll. on the support of electricity produced from renewable energy sources.

systems and biomass boilers. The favorite options are those that combine renewable energy systems with energy efficiency.

Both Romanian and Czech municipalities are not the main authority in charge for renewable energy systems introduction in building regulations. Currently this role is played by the Ministries of Environment, Energy Regulatory Authorities or Regional authorities. Moreover, in many of these countries licensing is an awkward issue (e.g. in Romania and Croatia a high number of permits are required and numerous administrative bodies must be contacted even for a rooftop solar installation's procedure). As a consequence, in all these countries there was a concrete need for technical training and support for managers and technical officers working for local authorities (from municipalities to regions according to the legislative framework of each country involved in the project), public utilities and social housing bodies in the following activities:

- technical and economic assessment of the suitability of specific renewable energy systems in buildings;
- implementing effective obligations and policies for minimum levels of energy from RE sources in building regulations and codes;
- implementing effective policies for minimum levels of energy from RE sources in public procurement (Green Public Procurement – GPP) for their facilities or social housing;
- fostering the signing of the Covenant of Mayors by local authorities.

In the Czech Republic, the new Energy Performance of Buildings Directive was included in the new Law on Energy Management (318/2012 Coll.), replacing the former Law 406/2000 Coll. The new Law came into force on 1<sup>st</sup> January 2013 and includes all provisions from the new Directive, including, energy performance certificates, inspection of boilers and air-conditioning systems and the requirement for 'nearly zero-energy buildings' by 2021.

Directive 2010/31/EU was transposed into Croatian legislation with many supporting energy by-laws, from the obligatory energy efficiency classes decree of new buildings to the decree for the establishment of a feed-in tariff system that has worked rather well, with no major technical or legislative barriers, apart from the complicated procedure for obtaining the feed-in tariff itself. First legislation called for about 70 different documents to be produced, but a recast has cut this down to 30 documents.

The target group chosen for PATRES is managers and technical officers working for local authorities rather than local political authorities, because they are in charge for transforming policies in real regulations, standards, rules and procedures and because politicians change due to elections but staff do not.

## 2.2. What are the ways to promote renewable energy in municipalities?

Local governments play an important role in encouraging the use of renewable energies in buildings. The main ways are:

- Develop local regulations that promote the installation of RES systems in buildings.

Example: To develop a local council regulation that establishes a higher solar thermal contribution to hot water demand, than the requirements set by national legislation.

- Promote Green Public Procurement, by means of technical requirements that establish that RES systems have to be implemented in new buildings or in the renovation of public buildings

Example: In the renovation of a public building, making the replacement of an old oil boiler with a new one using biomass mandatory.

- Develop Sustainable Energy Action Plans (SEAP). RES integration in private and public buildings can be established as a priority in a local energy strategy. This point is very important, since the lack of an integrated and systematic policy framework of reference does not foster adequate investment levels in the most important areas.

Example: Develop a SEAP that establishes that by 2015 50% of public buildings should have photovoltaic systems and by 2020 10% of all buildings through a local regulation that promotes it.

- Join European initiatives like the Covenant of Mayors, where signatories agree to reduce their local CO<sub>2</sub> emissions by more than the established 20% target.

Example:- To sign the Covenant of Majors and agree to reduce CO<sub>2</sub> emissions by 2020 by 24% when compared to the 2008 values. Among the measures to achieve this goal, the suggestion is to publish a local regulation that promotes solar thermal systems in buildings and to renovate public lighting, replacing the existing one with one using photovoltaic energy.



Regardless of the chosen ways to promote renewable energies in municipalities, it is crucial to develop a strategy that indicates the measures to be implemented by the municipality in the coming years. This strategy has to be realistic and it is necessary for it to be supported by all local stakeholders. The strategy has to show all the adopted measures, investments required and available financial tools. The following table is an example:

Year	Measure	Cost	Financial way
2014	Substitution of the boiler installed in the public school, with a new one that uses biomass.	65.000 €	Energy Service Company with a 10-year contract.
2015	Install new street lighting in the industrial area that uses solar photovoltaic modules.	54.000 €	Regional subsidies that finance 30% of investments.
2016	Install solar flat plate collectors in the renovation of the city hall buildings.	24.000 €	National subsidies plans and local finance.
2017	Foster the installation of photovoltaic systems for auto-consumption of energy (in the net metering modality) in new buildings, adopting a new local regulation that makes it mandatory.	0 €	Own resources.
2018	Install a heat pump that uses geothermal energy for heating the swimming pool of the new sports center.	Not evaluated	Priority to an ESCO contract.

Table 1: Energy Plan example.

An action plan that will be successfully implemented in the municipality should have the following characteristics:

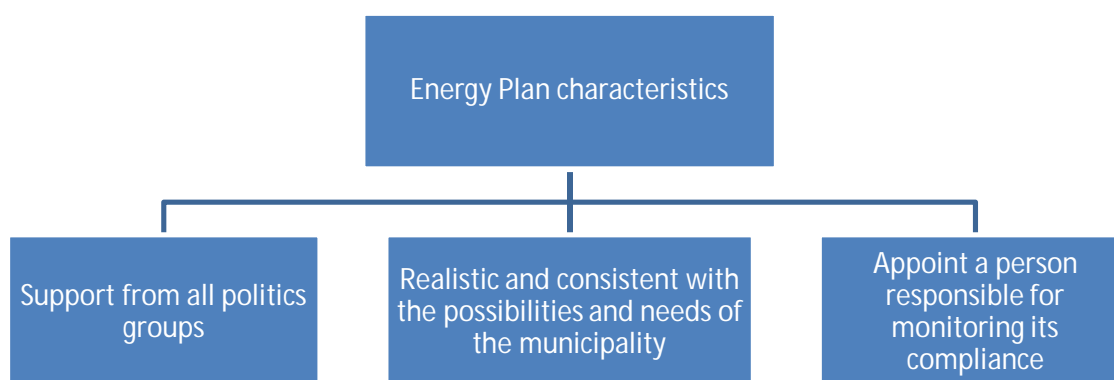


Figure 1: Energy Plan characteristics.

## 2.3. Benefits for local authorities

Municipalities and other local authorities, public utilities and social housing bodies involved in the project will benefit from:

- **Removal of “non-technical barriers”:** One of the main barriers is presently the lack of expertise and skills for drawing effective regulations affecting the use of renewable energy sources, especially in new EU Member States, in small local authorities or in disadvantaged areas. In this field PATRES showed a strong commitment to support countries that have recently joined the European Union and to candidate countries where the introduction of renewable energy systems is still limited and energy efficiency on average is poor, whereas there is high potential for new buildings and renovation of old ones. In some cases the local level building regulations still does not pay adequate attention to renewable energy systems or hinder the introduction of RE systems in buildings because of contradictory, muddled and complicated procedures.

- **Increased public officers’ competences and expertise:** Throughout the project, officers and managers have acquired high-level expertise in drawing effective regulations that foresees clear procedures for the implementation of renewable energy systems, provides the proper mix of mandatory requirements and incentives to achieve the widest diffusion of RE systems, to manage renewable energy systems and related technologies (with their potential and limits), to implement new EU Directives related to energy and identify technologies that are most suited for the peculiarities of their territory.

- **Improvement of public procedures related to RES for their facilities** that might lead to considerable energy savings and to the introduction of renewable energy systems in buildings. It is worth highlighting in this respect that local authorities often manage a large number of buildings. In addition to this, PATRES persuaded municipalities to join the Covenant of Mayors and to develop SEAPs (Sustainable Energy Actions Plans) to reach important CO<sub>2</sub> reduction targets by 2020.

In addition to the above, implementing a SEAP means that a municipality decides to act well beyond the building and the public procurement sectors and to achieve significant energy consumption and CO<sub>2</sub> reduction also in the transport sector, urban and land use planning, renewable energy sources (RES) use, distributed energy generation and ICT sectors.

The main benefits are the following:

1. **Improve the municipality image:** this provides a differentiation when compared to others.
2. **Improve quality of life:** due to the CO<sub>2</sub> emissions reduction in the urban area.
3. **Obtain new financial solutions:** the participation in European initiatives like the Covenant of Mayors allows to obtain new funding and tools addressed to municipalities that work to improve the environment in their areas.
4. **Establish alliances:** to take part in this kind of initiatives and programs is an opportunity to meet other local government representatives that are working in energy-related programs, thus fostering knowledge exchange and highlighting potential for cooperation.
5. **Develop sustainable trade lines in the municipality:** fostering the creation of SMEs dedicated to install or maintain renewable energy installations.
6. **Offer better publicly owned installations to society:** this activity is very useful because it is an example of best practices for all the citizens.
7. **Reduce energy costs:** despite the fact that an initial investment is needed, to use renewable sources like biomass or solar photovoltaic energy usually proves to be more sustainable than resorting to conventional systems.

### 3. Methodology

#### 3.1. Flow diagram

The methodology develop for the PATRES project is shown in the following diagram:

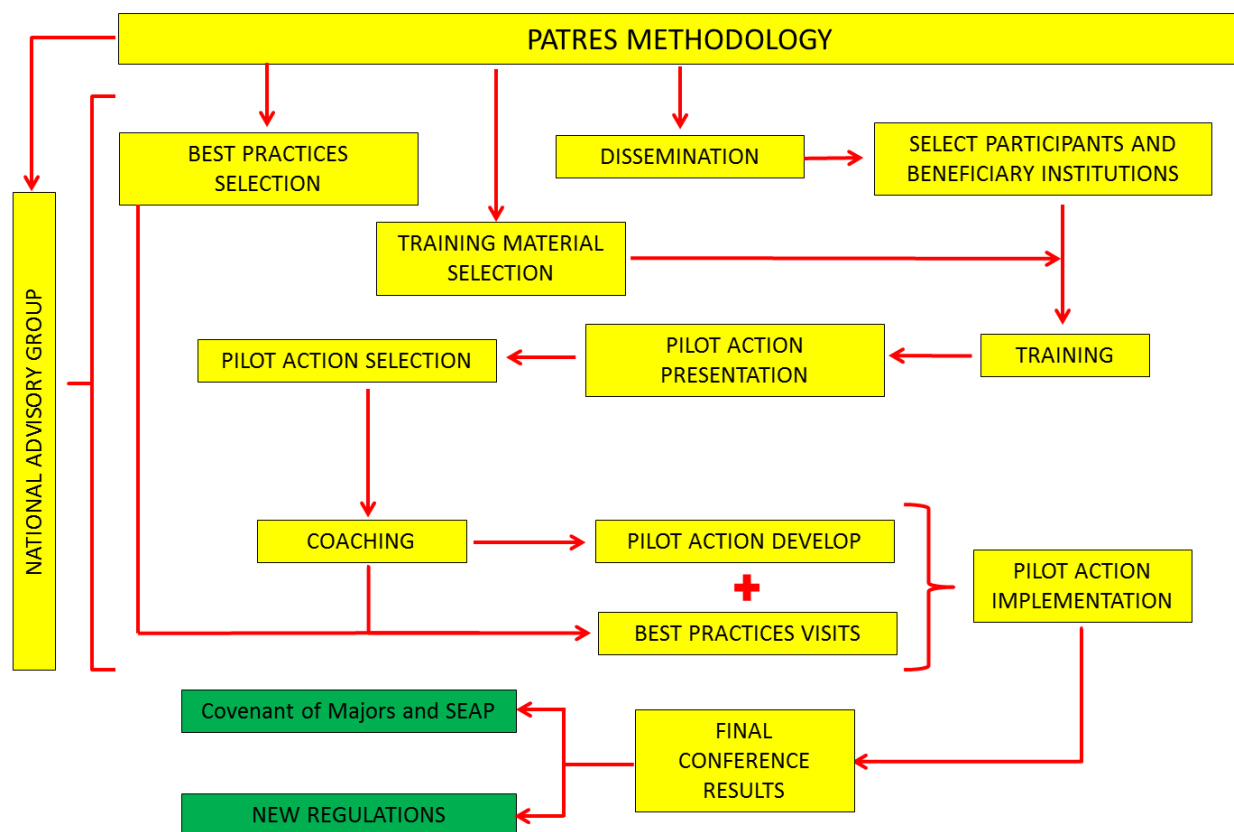


Figure 2: PATRES Methodology. Source: PATRES Consortium.

In the first project phase, dissemination activities were carried out to obtain the highest possible number of participants from relevant institutions and organizations. At the same time, a National Advisory Group was appointed in each country. The National Advisory Group included representatives from authorities and stakeholders whose experience could support and guide the management of project activities in the best possible way.

After that, a training course addressed to public administration technical officers and heads of departments was organized. The 100-hour course was intended to transfer technical, financial and legislative knowledge to handle the wide-ranging issues related to renewable energies. Moreover, the different subsidy programs available at a national and European level were studied. After the training, a significant number of the participating institutions and organizations were involved in the development of pilot actions. A decision was made in the development of the training course to be held in each partner’s country to merge a top-down with a bottom-up approach.

According to the project objectives, the training course had to have the same general structure, for all partners. Once the general framework was designed and agreed by all the partners, the “common training course program” was personalized to suit each partner’s context.

The partner in charge for the design of the training (CIRCE) developed a first framework for the course, starting with an analysis of existing European experiences on RES issues, helped by the other partners who shared with CIRCE experiences found in their own national (and other countries’) contexts.

A search for high quality documentation was done, which was used later also as “didactical materials” during the training courses. Everything was made available on the project website and was subdivided into different topics, training modules and participant levels<sup>8</sup>.

The training course framework was organized in modules, focusing on 5 main topics: **RES technologies, RES legislation, development of rules for residential buildings promoting the use of RES, implementation of the rules, design of the pilot actions.**

The training course framework was then modified by each partner in order to make it suitable for each specific context and the target groups each partner chose. The adaptation was made according to the different needs identified by each partner at a local level, involving National Advisory Groups, experts on the different topics and representatives of municipalities.

In the Czech Republic, the Ministry of the Environment was also involved, while in Romania some agencies for energy and the environment. In Croatia some mayors and heads of urban planning departments took part in the analysis of the training course program. Italy organized some focus group sessions, involving ANCI, the Italian Association of Municipalities, and representatives of social housing bodies. The results of this “customization” were 7 training courses with the same modules but emphasizing the 5 topics in a different ways in the involved countries.

Here follows a brief analysis of the training courses which can be used for its improvement in the case of future replication.

Strength	Weakness	Suggestions
Exchange experiences and knowledge among participants belonging to different Public Administration bodies	Need to have political support for a more effective implementation Bottom-up approach unfamiliar	Add distance learning to the face to face lessons Obtain the European LA certification for RES experts

<sup>8</sup> The sources for this information were mainly other relevant projects, both national and European. Thanks to this database, PATRES participants had materials available for consultation in renewable energies, covering, for instance, both technical and socio-economic aspects.

<p>Inclusion of all the topics related to RES</p> <p>Good mix between lessons and discussions</p> <p>Visits to best practices and in particular to different countries</p> <p>The organization of the training process.</p>	<p>to some participants</p> <p>Duration (10 days too much)</p> <p>Insufficient funds for implementing pilot actions</p>	<p>Combine topics of renewable energy and energy efficiency</p> <p>Reduce lessons (theory) for more good practice examples.</p>
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The training courses ended with the design of pilot actions by participants. Pilot actions aimed to let the participants experience what they learned during the previous phases of the training by developing a project to be implemented in their own municipality. 5 pilot actions were selected in Austria and Italy, 6 in Spain, 4 in Croatia and Romania and 3 in the Czech Republic. In this phase, each of the pilot actions had 60 hours of technical assistance provided by PATRES experts. To support this, visits to best practices were organized both at a national and European level. The visits were useful for participants, because they were examples of how to implement local initiatives. After the coaching phase, all the results were presented in a final conference organized in Bucharest on 14<sup>th</sup> March 2013.

**Pilot Action Development.**

The development of pilot actions is the way for the participants from public administration to achieve the objectives established at the beginning of the project. A pilot action is the development of an idea that participants began to build upon during the training phase. The presented pilot actions had the following main characteristics:

- Feasibility: they had to be within the competences of the proposing organisation.
- Coherence: not conflicting with existing legislations framework (on urban planning, energy, building codes, etc.) .
- Sustainability: effort and expertise within the institution will continue the work after the completion of the project.
- Flexibility: in adapting promptly to legislation and market changes.
- Relevance: for the achievement of the PATRES objectives and with a potential to be transferred in other regions.
- Cooperation with other participants.

Pilot actions are useful for Public Administration because they allow participants to learn during the implementing phase through different channels:

- Coaching that participants receive.
- By means of learning-by-doing during the implementation of them.
- Through the exchange of knowledge generated with the rest of participants in the project.
- With the transfer of knowledge during the visits to best practices.

Ultimately, the most significant result of pilot actions is that different public administration bodies lead improvements in their territories through their own staff.

To follow a complete list of the pilot actions developed by PATRES participants:

SPAIN		ITALY	
TITLE	INSTITUTIONS	TITLE	INSTITUTIONS
Local regulations to improve and promote renewable energy systems and energy efficiency in Andorra.	Municipality of Andorra.	Model building regulations for energy and environmental sustainability and to foster the introduction of RES in building	Ares FVG – Regional Agency for Sustainable Building. Municipalities of: Arzignano, Eraclea, Marcon, San Daniele del Friuli, Padua and Trieste. Federation of Municipalities of Camposampierese.
Energy at homes, renewable energies and energy efficiency in the municipalities of Huelva.	Provincial Deputation of Huelva, Municipalities of Cortegana, Bollullos del Condado, Trigueros, Almonte, Villamanrique.	Drafting of a model annex to building regulations for energy and environmental sustainability of urban planning and building construction measures with a focus upon the introduction of RES systems.	Municipalities of: Ravenna, Forli, Novate Milanese and Geovest srl.
Improvement of energy management in the municipalities of Huesca through the use of RES systems and the energy efficiency equipment.	Provincial Deputation of Huesca, Municipalities of Tardienta, Benabarre, San Esteban de Litera and Alquezar.	20 20 20: model energy and environmental annex to building regulations to foster energy efficiency and the introduction of RES.	Molise Region, Province of Foggia, Municipalities of Bari and Calvello, SEL Societa Energetica Lucana.
Local regulations to promote RES installations through the net metering system in municipalities.	Provincial Deputation of Zaragoza	San Daniele Zero+: towards an energy-self-sufficient municipality through efficient buildings and grids and low-impact plants and systems.	Municipality of San Daniele
Public procurement to improve energy management in public buildings.	Municipal Society Zaragoza Buildings.		
Improvement of energy management in the city of Soria through the promotion of new local legislation on RES and energy efficiency in lighting.	Municipality of Soria.	PAES of the municipality of Trieste	Municipality of Trieste
CROATIA		ROMANIA	
TITLE	INSTITUTIONS	TITLE	INSTITUTIONS
SEAPs	Municipalities of Krk and Kastav	Green Public Procurement Guide	Baia Mare City Hall and Energy Management Agency Maramures.
RES subsidies	Primorsko-goranska county, municipalities Krk, Kastav and Crikvenica,	Setting up of Zlatna SEAP	ALEA and Municipality of Zlatna.
RES spatial planning regulation	Primorsko-goranska county	Covenant of Mayors – New Romanian signatories.	Energy Agency Brasov, Environment Protection Agency Deva and Deva city Hall.

Model procedure for obtaining RES producer status	Municipality of Krk	PLEEn 2020 Local Plan for Energy Efficiency in District 3 Bucharest.	District 3 Bucharest City Council.
<b>AUSTRIA</b>		<b>CZECH REPUBLIC</b>	
<b>TITLE</b>	<b>INSTITUTIONS</b>	<b>TITLE</b>	<b>INSTITUTIONS</b>
Strategic energy action plan	Communities of Eisenkappel, Lieboch and Grambach	Renewable energy vision for the city of Koprivnice	City of Koprivnice
Guideline for contracting	Community in Baden, Villach and Lieboch.	Solar heating and cooling on administrative buildings owned by the Moravian-Silesian regional authorities.	Moravian-Silesian Region
Standards for public building renovations.	Cities if Villach and Gratz and Communities of Siebersdorf and Baden.	Assistance in developing a SEAP for the city of Ostrava	City of Ostrava
Renewable energy vision (General guideline by the community)	Villach and Eisenkappel		
Energy plan Graz 2015	City of Graz		

**Table 2: PATRES Pilot Action. Source: PATRES Consortium.**

In the implementation phase of pilot actions the following items were identified as key points, that are very important in the promotion of renewable systems in buildings :

- **Political support:** In public administration it is crucial to have the politic support of mayors, deputies or councilors, because the motivation and support to implement the pilot actions needs to be from the entire local authority so the necessary resources and effort are made available.
- **Coordination:** Very often local authorities do not have an energy manager and functions are entrusted to separate sectors, such as: environment, urban planning or industrial development. So it is important to appoint an energy manager that leads all the activities in the field of energy in municipalities and has a global vision of all priority activities, coordinating the different areas or departments involved.
- **To have a person permanently in charge of the projects:** The restructuring of too many areas in public administration causes rotation in jobs whose functions are environment or energy-related activities. This implies that often there are not enough people implementing the necessary activities in these fields.
- **Encourage municipalities to adopt best practices:** for municipalities to be involved in this kind of activities, it is necessary that they see the benefits and the opportunities that this kind of measures have. To participate in European projects and obtain funding are two of them.
- **Strategies to spur small municipalities to join forces:** There are many small municipalities in several European regions: grouping some of these together to obtain synergies and a more powerful contractual force is a major opportunity for the involved territories. The role of provinces/counties as entities that foster the grouping of smaller local authorities and look for the benefits for them is very important.
- **Integration with existing programs:** There are previous programs that dal with environmental issues - like Agenda 21, for instance - so new programs like the Covenant of Mayors has to be integrated with existing activities.



- **Develop standards:** In the creation of technical specifications for green public procurement, it is very useful for municipalities to be able to count upon previous documents developed in other administrations and whose results have been satisfactory.

By means of the questionnaires that participants completed after the coaching phase, the following points were identified as the strongest in pilot actions' development:

- It allows putting in common activities with other administrations.
- It allows cooperation and exchange of knowledge with other public entities.
- It allows updating knowledge and promoting best practices that society can use.

### 3.2. Previous Best Practices

The best practices described below are previous exemplary projects realized by other European public administration bodies in which the integration of renewable energy systems in buildings has been promoted by means of green public procurement or local regulations. The 33 Best Practices visits allowed exchanging experiences with other institutions, for instance on how to finance projects or how to involve stakeholders. The organization of visits is very useful because they show how similar projects are developed in other regions, by means of this channel the local authority's technical officer gets to know the technological progress in renewable energy systems installed in buildings and what the real results are, which allows to gain from this knowledge for later implementations. Some examples of Best Practices are the following:


<b>Title:</b> Eco City Valdespartera – Zaragoza (Spain)	
<b>Description:</b> The development of the project in the Valdespartera area, located on the outskirts of the city of Zaragoza, provides 9.687 buildings, 97% of them being social housing. Valdespartera incorporates a set of innovations that make the project an example of environmental and social sustainability. The project also establishes the requirements that homes should have with respect to low power consumption and use of both passive and active solar energy, the latter through thermal solar collectors on the roofs of buildings.	

Table 3: Spanish Best Practice

More information about this best practice at:

<http://www.valdespartera.es/>

<http://www.patres.net/esp/best-practices.aspx>

**Title:** Building Regulations of the Municipality of Bolzano (in the legislative framework of the Autonomous Province of Bolzano and of the Casa Clima - KlimaHaus certification system).

**Description:**

The Council of the Autonomous Province of Bolzano has recently adopted Decree n. 939 of 25/6/2012 on the energy performance of buildings, based on the provisions of EU Directive 2010/31/EU.

Accordingly, all municipal new buildings of Bolzano will probably soon have to meet the following additional requirements:

- a) buildings' energy performance will have to meet at least the parameters envisaged by CasaClima Class A, as from 1st January 2015;
- b) CO<sub>2</sub> emissions in buildings other than residential ones must not exceed the limit value set at 100 kg CO<sub>2</sub>/m<sup>2</sup>a;
- c) CO<sub>2</sub> emissions in residential buildings must not exceed the limit values in kg CO<sub>2</sub>/m<sup>2</sup>a, as per degree days for the specific location in question;
- d) the overall primary energy demand must be covered for at least 40% resorting to RES and from January 1, 2017 this percentage shall be 50%;
- e) a new incentive was introduced to foster a significant introduction of RES in new buildings and to allow owners to go beyond restrictions normally imposed by the building regulations in case specific sustainability parameters are met.



Table 4: Italian Best Practice

More information about this best practice at:

[http://www.comune.bolzano.it/index\\_it.html](http://www.comune.bolzano.it/index_it.html)

<http://www.patres.net/esp/best-practices.aspx>


<b>Title:</b> Avrig SEAP	
<b>Description:</b> The Avrig SEAP, approved on 29 June 2010, stands out for the special focus on the development of RES systems on public buildings as well as the development of local RES technologies production. Activities comprised within the SEAP have been carried out successfully, the municipality representing a good example for small municipalities in Romania. Several photovoltaic systems have been implemented on public buildings and others are being developed.	

Table 5: Romanian Best Practice

More information about this best practice at:

<http://www.patres.net/esp/best-practices.aspx>

<http://primaria-avrig.ro/>


<b>Title:</b> Ivancic grad low energy lot "Poljana"	
<b>Description:</b> The idea for starting the project came when a delegation from Ivancic Grad participated in the annual assembly of Energy Cities in the Irish city of Cork in 2008. There they studied their project on how to build low-energy houses for social needs. Considering that Ivancic Grad owns a construction lot for which the urban plan provides for a residential zone (plotted in the 80s), the City Council decided to encourage the construction of low energy and passive houses. The investor receives free electrical and water infrastructure alongside a finished plan for their new low-energy home.	

Table 6: Croatian Best Practice

More information about this best practice at:

<http://www.patres.net/esp/best-practices.aspx>

[www.ivanic-grad.hr](http://www.ivanic-grad.hr)



<p><b>Title:</b> District of Murau</p> <p><b>Description:</b></p> <p>The district of Murau combines 35 communities on an area of 1.384 km<sup>2</sup>. There are 32.000 people living in this district. The region is rich in renewable energy sources like sun, biomass, water and wind, but there is a low economic performance and a high migration rate. That is why the region needs to be strengthened and answers to the problems have to be found.</p> <p>Due to the large offer of wood, water power and sunlight (the sunniest district in Styria), the energy topic offers a big potential for the future of the region.</p> <p>Energy vision (Project “Energievision”)</p> <p>A first major phase of the project took place in 2002 and 2003, when key agents were interviewed and two “energy summits” were held; these ultimately led to a formal agreement on an “Energy Vision for Murau” with five overriding aims and corresponding measures.</p> <p>May 2004 saw the start of a second major phase, the process of implementation. The discussion concentrated on measures connected with selected key issues; these were elaborated on study groups.</p> <p><b>Aims:</b></p> <ul style="list-style-type: none"> <li>• Developing new sources of income to strengthen the regional economy</li> <li>• Ensuring and developing new jobs</li> <li>• Independence of unforeseeable foreign energy suppliers</li> <li>• Making an active contribution towards climate protection</li> <li>• Grant energy security and autonomy</li> </ul> <p>The overall aim is to be energy self-sufficient in 2015.</p>	 
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Table 7: Austrian Best Practice

More information about this best practice at:

<http://www.patres.net/esp/best-practices.aspx>

<http://energievision.at/>

**Title:** Kněžice biogas power plant

**Description:**

A biogas power plant has been constructed in the village of Kněžice (approx. 500 inhabitants), located in the Central Bohemian region, 70 km east of Prague. The plant uses biodegradable waste, such as manure, sewage, straw, woodchips and food waste, from local farms and households to produce biogas. The biogas produced provides the town with a renewable alternative for space-heating and electricity generation (instead of using gas or coal), and has solved the municipal problems of waste and sewage management. By installing this biogas plant, the municipality avoided the traditional solutions of constructing a sewage treatment plant and connecting the town to the national gas network. Connecting small villages to the national gas network is expensive and would increase the dependency on imported energy sources.



Table 8: Czech Republic Best Practice

More information about this best practice at:

<http://www.patres.net/esp/best-practices.aspx>

<http://www.res-league.eu/>

## 4. Lessons learnt

According to the feedback collected from PATRES participants, the following factors have been considered as crucial for the successful implementation of pilot projects:

- It is necessary to have human resources available to promote all the energy measures, since this kind of projects need a long time to see complete results.
- Political support is a key factor, but this support has to come from all political parties, since notwithstanding who is running the municipality, the energy plan will have to continue being implemented.
- The lack of programs directed at small municipalities causes that they are not very proactive, so it is very important that upper-level authorities (e.g. provinces or counties) can adopt a role to spur small municipalities to join forces and produce a wider-ranging energy plan.
- In some countries, like Italy and Spain, the best regulation form to support RES introduction in building regulations is writing an **energy annex** to the existing "standard" building codes: in this way, the adoption of this document can be faster because it has to be approved only by the city cabinet and not by the town council.
- The local energy building regulations should have a flexible structure in order to ease the updating to the ever-changing laws in the energy field and should contain only the municipal rules that differ from the regional/national/European framework, having a technical energy annex comply with this suggestion.
- A glossary and a check list are useful tools that help avoid misunderstanding between local authorities' technical officers (in charge of authorizing building constructions and, in some cases, apply sanctions if the construction is not compliant with the submitted plans) and designers (that aim to present correct and complete projects).
- A feasible way to promote RES introduction in buildings without any artistic or historical relevance is promoting demolition instead of significant renovations: a demolition and reconstruction process can guarantee higher energy performance when compared to those gained by a radical, but expensive renovation and also ease the introduction of RES systems that can be integrated in the new building design.
- A good quality 'Energy and environmental annex to building regulations' should also limit the spread of buildings with a bad introduction of RES that damage the landscapes from an aesthetic point of view and should also suggest better ways for their introduction.

During the implementation of pilot actions, the following characteristics have been identified with an external and an internal analysis .

This can be useful to understand what the current situation in any municipality is.

**INTERNAL ANALYSIS:**

**STRENGTHS**

It is possible in some countries like Italy or Spain to develop local regulations.

Society is becoming more aware of pollution and related health problems.

There is a great number of public buildings that can be used to install RES systems.

RES and energy efficiency technologies are well-established and no longer at an experimental stage, thus ready to be used without any further test.

Synergies have to be identified and communicated.

Networking tools to cooperate and learn from other municipalities are available.

Broad coverage in the training approach.

Availability of European funding (Structural and Cohesion Funds) for RES projects in the current (2007-2013) and next programming period (2014-2020).

**WEAKNESSES**

It is not possible to develop local regulations in all countries.

The restructuring of areas in public administrations leads sometimes to a lack of personnel specifically dedicated to energy issues.

For the large number of existing small municipalities it is more difficult to implement improvement measures.

Technical officers with the necessary skills to manage energy programs are not always available in municipalities.

There are often municipalities that do not have an energy manager.

Energy related issues are often managed by different local authorities (at municipal, provincial, regional levels) and this limits the impact of municipal regulations.

The PATRES course dealt with a wide range of topics for one course: activities ranged from how to increase the number of district heating connections in an existing district heating grid to crowd-financing for photovoltaic plants.

Need to find a balance between general information about potential solutions and in-depth advice for experts with very specific ideas in the same class.

Wide range of personal motivation (from leading experts to people not motivated at all, but delegated by their mayors).

Selection of visits for best practice excursions – bigger network needed and more upfront knowledge on what really happened in the best practice cases.

Investment in RES usually only takes place when there are grants available.

Already very high level of building codes (thermal standards, even demanding the use of solar heating for specific buildings).



**Table 9: Internal analysis of the renewable energy sector in buildings in Europe. Source: PATRES Consortium.**

**EXTERNAL ANALYSIS:**

THREATS
<p>The inadequate installation of RES or the incorrect maintenance causes that sometimes society is unable to see the advantages of the systems.</p> <p>The lack of financial programs directed to implement measures.</p> <p>The lack of final checks in the building sites done by municipal technical officers can make even the best energy regulations useless: there is a need of mandatory checks in building sites made by the Icola authority.</p> <p>Communities in Austria at present have different priorities (financial problems).</p> <p>Fragmentation of communities in Austria: many communities try to do their own thing (and sometimes reinvent the wheel).</p> <p>Many regional district heating systems using wood chips which were built in the past are not economical and are now struggling</p> <p>Notion that the community has already a very high level regarding the application of renewable resources.</p> <p>Increasing costs of feed-in tariffs support in the Czech Republic have caused that RES is generally considered as an expensive option.</p> <p>Preference for energy efficiency measures that save money instead of RES systems.</p> <p>Projects of ESCOs in municipalities prefer energy efficiency measures only.</p>
OPPORTUNITIES
<p>The increase in the energy prize leads to implement efficient energy and renewable energy measures.</p> <p>Getting small municipalities to join forces and exchange experience and resources.</p> <p>European Policies are addressed to increase the contribution of RES in buildings.</p> <p>There is a great number of previous best practices that can be adopted.</p> <p>The prize of technologies is decreasing and so each day installing RES systems becomes more feasible.</p> <p>The possibility to implement measures through ESCOs has made it more easy for the municipality to do an investment.</p> <p>Adopting a local regulation that promotes the installation of RES in buildings positively affects the municipality's image.</p> <p>Municipalities adopting a local regulation that promotes the installation of RES in buildings becomes sometimes a tourist destination (i.e. Solarcity in Linz and Bolzano in Italy have organized energy-related guided tours).</p> <p>Adopting a local regulation that promotes the installation of RES in buildings enables also public authorities to cut energy bills also for the public buildings.</p> <p>Networking.</p> <p>People in Austria would like to see more use of renewable sources in their communities and expect a higher involvement of politicians in this field.</p> <p>Insecurity generated by new emerging energy policy.</p>

**Table 10: External analysis of the renewable energy sector in building in Europe. Source: PATRES Consortium.**

## 5. Conclusions and Discussion

By using renewable energy systems in public and private buildings it is possible to improve the energy management in municipalities and urban areas. To develop a SEAP is very interesting due to the possibility to monitor the evolution and the impact of the adopted measures.

Currently all local authorities are very interested in solving economic problems related to energy consumption. European programs like the Covenant of Mayors are very interesting for municipalities due to their impulse for all the energy improvements. For municipalities, and especially for small ones, it is often not clear which economic benefits signing the Covenant will bring, and for this reason occasionally some municipalities do not support it. This is the reason why supporting structures can spur the signing Covenant of Mayors in this kind of municipalities.

The integration of renewable energy systems in buildings has a great technological potential, due to mature technology both in thermal generation using solar technology or biomass and in the electric generation. However, the lack of significant support from some governments leads to slow growth in this market. An example is the net-metering legislation: this kind of regulation has been adopted by some European countries, like Germany, Belgium or Italy, with successful results, but other countries are waiting to adopt the legislation, and not for technical reasons related to the feasibility of the technology or its costs for the countries, as it was in the initial steps with the feed-in tariff systems.

In the thermal field, biomass for thermal applications is very suitable in public buildings changing old boilers with new ones that use biomass, and this activity is being mainly carried out through energy services companies, due to the lack of budget availability in local authorities.

The efficient use of energy is currently becoming more interesting for municipalities, and especially for small ones, as the rate of investment in these measures is lower than in the case of renewable energy investment. This is the reason why activities typically implemented by Energy Services Companies, like installing biomass boilers instead of others that use diesel or natural gas, or improving public lighting using new efficient lamps are being the most important measures municipalities are adopting.

To adopt local legislations is possible in some European countries, leading to increased implementation of sustainable requirements in the field of solar thermal technologies. However very often legislation does not establish that it is also necessary to take into account operation and maintenance activities, due to the lack of information about the real contributions of some installation (mainly solar thermal for low temperature). This fact makes society feel that some RES

technologies are not as good as they should be, since the real contribution and function of them is not clear, and so municipalities do not direct more efforts in developing local legislation in this field.

The state of the art in most renewable energy technologies is competitive enough to install renewable energy systems instead of traditional ones. However, it is necessary that all countries develop first national legislation that reflects the real state of technology, sets requirements for installations and mechanisms to monitor and show real production.

PATRES is an example of how it is possible for the public administration to promote renewable energies , and the results of the pilot actions show it is possible for local authorities to promote renewable systems. To do it successfully, however, it is necessary for the size of the municipality to be adequate, whereas in small municipalities that do not have sufficient technical support it is better to promote it by means of regional government or energy agencies.

*Public Administration Training and coaching on Renewable Energy Systems  
Guide on effective regulations to support the introduction of RE system in buildings*

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