Ali Sayigh *Editor*

Renewable Energy in the Service of Mankind Vol II

Selected Topics from the World Renewable Energy Congress WREC 2014

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Selected Topics from the World Renewable Energy Congress WREC 2014

- Editors
- (view affiliations)

- Ali Sayigh

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About this book

Introduction

· Details the research advances being made in pivotal renewable energy technologies from waste-to-energy and offshore wind, to energy forecasting and bio-hydrogen

· Includes case studies and detailed examples to demonstrate how leading-edge research is applied in practice

· Covers economic and policy issues from regional perspectives around the globe

This book provides insights on a broad spectrum of renewable and sustainable energy technologies from the world's leading experts. It highlights the latest achievements in policy, research and applications, keeping readers up-to-date on progress in this rapidly advancing field. Detailed studies of technological breakthroughs and optimizations are contextualized with in-depth examinations of experimental and industrial installations, connecting lab innovations to success in the field. The volume contains selected papers presented at technical and plenary sessions at the World Renewable Energy Congress, the world's premier conference on renewable energy and sustainable development. Held every two years, the Congress provides an international forum that attracts hundreds of delegates from more than 60 countries.

Keywords

Biomass and Biofuels Energy Meteorology Geothermal Power Green Energy Hydrogen Fuel Cells Marine Energy Renewable Energy Renewable Energy Policy Waste-to-energy Wind Energy

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50—Energy Efficiency in Retrofitting a European Project for Training on Renewable Energy Solutions (REE_TROFIT)

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Chapter
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Abstract

REE_TROFIT (www.reetrofit.eu) project (founded by the EU Commission in the Intelligent Energy Europe (IEE) program) aims to contribute to solve the shortage of local qualified and accredited retrofitting experts, as foreseen in the Energy Performance of Buildings Directive (EPBD) and its recast—and as indicated by various European countries in an assessment by the European Commission (EC)—for increasing the energy performance of the existing building stock. REE_TROFIT will use the in-house know-how and experiences of participants in carrying out vocational courses on innovative eco-building technologies. REE_TROFIT project defines best practices for institutionalization and implementation of vocational courses on renewable energy (RE) solutions and energy efficiency (EE) in retrofitting, setting up, and implementing a large-scale educational scheme and by fostering exchange of knowledge and best practices among stakeholders.

One of the major milestones of REE_TROFIT project is to raise awareness in the regional, national, and European policy-makers for the full implementation of the EPBD and its recasts. Additionally, during its lifespan, it intends to define an exploitation strategy for assuring the sustainability of training beyond the project duration and increases the local retrofitting markets.

The REE_TROFIT (newsletters: http://www.reetrofit.eu/content.php?p=nlt) training scheme is founded on an innovative educational model specifically targeted for the building professionals; the adopting REE_TROFIT training model offers the following attractive features:

Flexibility: is applicable in contexts with different regulatory frameworks: climate,

landscape restrictions, qualification levels of learners, etc.

Transferability: is capable of responding to local training needs through methodologies and tools transferable at European level.

Innovation: is accessible, affordable, and capable of overcoming the problems encountered during the previous training program experimented in the partnering countries.

Modularity: offers different training programs which are composed of independent, closed, domain-specific modules that may be activated according to the different training needs.

Brevity: offers training courses with a short duration, which are decomposed in shorter training tracks in order to ease the attendance of the targeted professionals.

Plurality: different training methods, tools, and media might be used in the training process in order to consider the needs of the trainees and to guarantee effectiveness.

Keywords

Retrofitting buildings Training Courses Renewable energy

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50 - Energy Efficiency in retrofitting an European project for Training on Renewable Energy solutions (REE_TROFIT)

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Topics:
3. Sustainable & Low Energy Architecture

Abstract:

REE_TROFIT project (founded by EU Commission in the IEE programme) aims to contribute to solve the shortage of local qualified and accredited retrofitting experts, as foreseen in the EPBD and its recast - and as indicated by various European countries in an assessment by the EC - for increasing the energy performance of the existing building stock. REE_TROFIT will use in-house, the know-how and experiences of participants in carrying out vocational courses on innovative eco-building technologies. REE_TROFIT project define best practices for institutionalization and implementation of vocational courses on renewable energy solutions and energy efficiency in retrofitting, set up and implement a large-scale educational scheme and by fostering exchange of knowledge and best practices among stakeholders.
One of the major milestones of REE_TROFIT project is to raise awareness in the regional, national and European policy makers for the full implementation of the EPBD and its recasts. Additionally, during its lifespan, it intends to define an exploitation strategy for assuring the sustainability of training beyond the project duration and increase the local retrofitting markets.
The REE_TROFIT training scheme is founded on an innovative educational model specifically targeted for the building professionals; the adopting REE_TROFIT training model offers the following attractive features:
Flexibility: is applicable in contexts with different regulatory frameworks, climate, landscape restrictions, qualification levels of learners, etc.
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Brevity: offers training courses with a short duration, which are decomposed in shorter training tracks in order to ease the attendance of the targeted professionals
Plurality: different training methods, tools and media might be used in the training process in order to take in regard the trainees needs and to guarantee effectiveness

Keywords:
Retrofitting buildings, training, courses, renewable energy.

1. REE_TROFIT Project objectives

REE_TROFIT aims to contribute to solve the shortage of local qualified and accredited retrofitting experts, as foreseen in the EPBD and its recast - and as indicated by various European countries in an assessment by the EC - for increasing the energy performance of the existing building stock. REE_TROFIT will use in-house know-how and experiences of participants in carrying out vocational courses on innovative eco-building technologies to define best practices for institutionalization and implementation of vocational courses on renewable energy solutions and energy efficiency in retrofitting , set up and implement a large-scale educational scheme in 6 MS for training more than 450 building professionals and by fostering exchange of knowledge and best practices among stakeholders, provide suggestion to regional, national and

European policy makers on how to incentivize, de-bottleneck the local retrofitting markets for full implementation of the EPBD and define an exploitation strategy for assuring the sustainability of training

2. The features of high-quality assessment processes

The REE_TROFIT project developed and tested a quality assurance mechanism that best guarantees on site energy and carbon reductions during the energy saving renovation process. This was only possible through a strong collaboration with stakeholders and policy makers.

The activities foreseen by WP6 of the REETROFIT project aimed to improve knowledge and skills of the buildings workforce and the guide materials developed has proved valuable input for the EU BUILD UP Skills initiative.

Furthermore, REE_TROFIT vocational courses, delivered in each of the 6 partner countries, tested and improved the theoretical frameworks developed. On the whole, courses have reached over 470 supply side actors (primarily building operators) and energy advisors. Furthermore REETROFIT partners have promoted cooperation with over 20 federations and governmental bodies involved in the energy and building sector in own EU partner countries.

A feedback loop between four main activities was established and maintained for the duration of the REE_TROFIT project:

1. Identification of existing and innovative best practices to encourage the uptake of energy retrofitting approaches and to improve the quality of on-site energy saving renovation activities, analysis and development of an extensive database kept up to date during the lifetime of the project.
2. An Efficiency Assistant was developed, translating the best practice tools and identified techniques in each of the 6 EU partner countries context for best driving the uptake recommendations into a practical guide. The guide supports policy makers and practitioners aiming to establish and/or to improve programmes stimulating recommendations and encouraging action on energy efficiency in retrofitting.
3. Quality assurance tools for housing energy saving renovations were developed, constantly updated and improved on the basis of success factors from existing best practice and according to market actors and eventually tested within real renovation projects.
4. Many pilot projects were designed, delivered and evaluated. With such projects different aspects of the theoretical frameworks developed within the REE_TROFIT training were tested and improved, tailoring them to the specific policy context and market conditions in each country.

2.1. Main actions of REE_TROFIT Consortium for the quality assessment

An overview of the 6 pilot training courses that have been running from 2010 to 2013 in the REE_TROFIT partner's countries is reported, focusing on increasing quality of on-site renovation activities:

Denmark – Evaluation of the impact of the activities of the Danish Knowledge Centre for Energy Savings in Buildings on the uptake of energy efficient renovation, and detailed analysis of the ProjectZero initiative for the municipalities.

The Aarhus School of Engineering (IHA), REE_TROFIT partner, is cooperating with Energitjenesten, the independent Utility Energy Service in Denmark for the training activities using the "The Handcraft Companies Energy Forum" as a platform, and with the Architect School of Aarhus (DK) for offering courses to building professionals on energy efficient building. The course includes passive house design, natural and mechanical ventilation and heat recovery. IHA, with the support of these training partners and the Danish Federation of Small and Medium Sized Enterprises, will bring experience and know-how on advanced building techniques for retrofitting.

Greece – Energy saving renovation of large scale apartment buildings in Crete.

Technological Educational Institute of Crete (TEIC) is also involved in the following activities:

- RES School: a 2 week long educational and training programme on small scale renewable energy sources and energy saving.
- EPEAEK: developing a distance learning course on “Renewable Energy Sources and Environmental Management”.
- Research study for the Chamber of Engineers, Western Crete Branch, on the definition of the best practices and procedures for the energy audit and the role of Professional

Italy – Establishment of a national stakeholder consultation forum with the Chamber of Commerce of Lucca to create consensus and hasten implementation of legislation in Italy, and at the practical level, to improve the energy saving renovation process of a social housing company, and renovation for school buildings and other public building in Lucca. In particular, LUCENSE was able to be proactive in the promotion of the institutionalization of REE_TROFIT as training model among the Italian Chamber network to ensure the highest and broader level of institutionalization, contacting the Italian Union of Chamber of Commerce. “Unionfiliere” is the Italian Association of Chamber of Commerce aiming to develop and improve “Made in Italy” industry. The activities of LUCENSE and the Chamber of Commerce of Lucca (CCIL) were aimed to establish a permanent committee for sustainable building in the context of Unionfiliere. LUCENSE attended to the first meetings, on behalf of the CCIL, promoting the REE_TROFIT model as reference for building professionals training on the theme of sustainable building and retrofitting.

Hungary - Setting up collaborative initiatives to engage tenants and property owners in energy saving retrofit of multi dwelling residential buildings and public ownership with the Chamber of Commerce of Kecskemet

Bulgaria - Improvement of REE_TROFIT recommendations and energy saving renovation practice with a focus on residential buildings from the '70s and '80s in the Sofia area.

The European Labour Institute (ELI) together with The Bulgarian Chamber of Commerce and Industry (BCCI) established a National Center for Vocational Training (NCVT) for training professionals in various sectors. The NCVT shows in the membership over 52000 companies and 28 regional Chambers of Commerce and Industry and 67 sector organizations.

Several dissemination channels will be used in Bulgaria toward the huge pool of professionals and organisations of NCVT for attracting participants to the training courses.

France – Development and testing of energy efficiency guidance and training material for residential energy saving refurbishment approach in collaboration with the Chamber of Commerce of Drome.

The Chamber of Commerce of the Drome (CCID) incorporates a training organization called Neopolis, dedicated to Eco-construction. An important mission of CCID-Neopolis is to fulfil the training needs of professionals for nurturing a competitive market. Neopolis is the only vocational training institution in France providing training sessions on Eco-construction.




2.2 Suggestions for policy makers

In order to sustain and incentivize local markets for qualified/certified professionals in building sector, suggestions for policy makers were addressed with the following activities:

1. Establishing a **clear vision and goals** that all stakeholders could understand, buy into and implement working together. Different pilot projects have shown the power of collaborative partnerships in driving change in the presence of a shared vision and efforts (e.g. for the Danish Project Zero: zero carbon by 2029).
2. ***Valuing guidelines*** and ensuring that the provided guidance is tailored, specific and accurate.
3. Acknowledging the key role of ***information and communications activities*** of the Chambers of Commerce in driving action on energy retrofitting in order to ensure that builders, electricians and installer could understand where and how they can seek support about certificate recommendations.
4. Ensuring ***access to finance***, with local, Regional and National contributions, low interest loans or other means that can significantly increase the uptake of energy saving measures. Secondly, the financing support should ideally be coupled to energy efficiency targets to be achieved.
5. ***Training and support for supply chain actors*** is therefore essential for ensuring homeowners to have access to skilled trades people able to deliver quality renovation works.
6. Helping builders to develop and maintain ***homeowners' trust*** is one of the most important links of the chain. Important factors for achieving this objective are the provision of impartial information/advice and the guarantee of quality throughout the supply chain in a way that renovations actually deliver foreseen results.
7. A further key aspect is ***process and project management support,*** for the homeowner, builder and installer and/or the whole supply chain. This aspect is crucial for ensuring maintenance of the supply chain with all actors involved working together to deliver a successful low energy renovation intervention.

Clearly, the suggestion to policy makers is not a simple "cut and paste" exercise of the REE_TROFIT model to different countries across Europe (and to the EPBD), rather all the elements need to be tailored and adapted to local context. In the below, we zoom in on some of the overarching and common outcomes of the REE_TROFIT courses in different countries. In fact, in order to address the key elements listed above, insight into specific parts of the whole process could thus be provided in order to create a fully functioning energy saving renovation market.

3. Methodology - Strengthening the role and impact of REE_TROFIT trainees

Improving skills and knowledge of technicians and professionals who attended REE_TROFIT courses includes detailed recommendations for cost-optimal energy saving, financial analysis (i.e. payback times) and technical specifications. All these point resulted to be crucial for strengthening the value of the vocational course.

The training of energy experts and building professionals having specific competences allowed to link to the EPBD methodology, and to address grant or financial support schemes (Regional and National, for instance Integration of renewable energies) by imposing minimum levels for the overall energy performance of both public or residential buildings after renovations. This methodology thus resulted to be important to firmly embed REE_TROFIT installer and builder in the start-up phase of any energy saving retrofit activity.

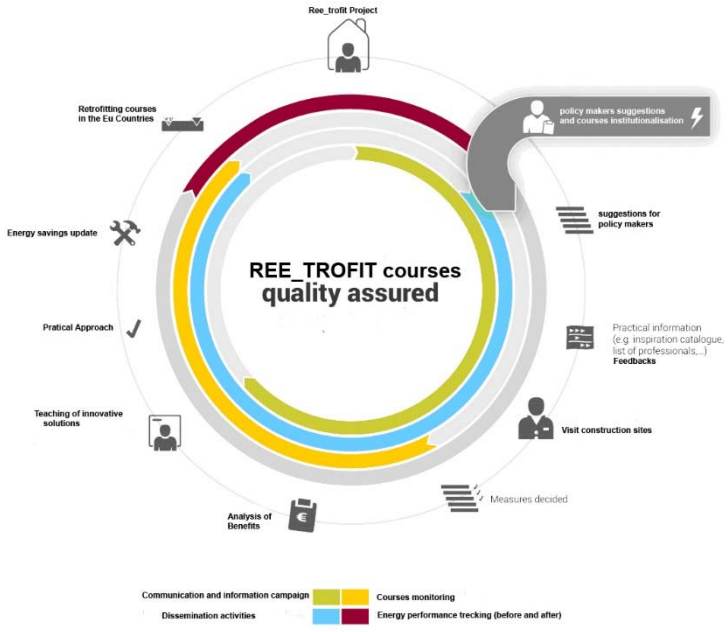

Figure 1: Fully functioning energy saving renovation REE_TROFIT training courses

On the other hand, the existing cost differences between energy efficient and "standard" refurbishments resulted to have a great influence on decision making process of the property owners. Public institutions and policy makers have thus a crucial role in encouraging investment in ambitious energy saving retrofit interventions: policy makers'

recommendations should be accurate, based on robust data and analysis and the communication to target audience should be effective. Furthermore, National or Regional regulation issuing body should directly interact with the supply chain, helping to create new networks and supporting the selection of services of certified experts, such as those trained by REE_TROFIT vocational courses and/or by other vocational courses aimed to train professionals in low energy retrofitting. However, any successful programme driving the uptake of energy efficient methodologies and sustainable refurbishments is highly dependent on the quality of consultancy. This need for quality consultancy goes beyond the building owners. The process management aims to ensure an integrated supply chain and a seamless customer journey, but, although it is believed to be necessary to maximise the energy efficiency potential of retrofitted buildings, this approach is not yet formalised in most of the countries. However, a number of different higher professionals (site managers, assessors, project managers) could be able to address this point.

Will follows an analysis of the principal impact strategies follows by the partners countries for the planning, organisation and institution of the vocational Retrofit courses:

The REE_TROFIT training model aims to contribute to improve the cultural level and the skills of building professionals (construction SMEs, electrical installers, thermo-hydraulic installers) in the field of energy efficiency (EE) and renewable energy (RE) in building retrofitting, which is an area where major potential exists to reduce energy consumption and improve sustainability in buildings, with economic and environmental win-wins.

The main 10 features of REE_TROFIT model are the following:

- **flexible**: applicable in contexts with different regulatory frameworks, climate, landscape restrictions, qualification levels of learners, etc.
- **transferable**: capable of responding to local training needs through methodologies and tools transferable at European level
- **innovative**: accessible, affordable and capable of overcoming the problems encountered by previous training program experimented in the partnering countries.
- **modular**: the different training programs are composed of independent, closed, domain-specific modules that may be activated according to the different training needs
- **short**: short duration of the training courses, which are decomposed in shorter training tracks in order to ease the attendance of the targeted professionals, capable of breaking down barriers such as lack of time, reluctance to invest in training, poor habit to listen, etc.
- **plural**: different training methods, tools and media might be used in the training process in order to take in regard the trainees needs and to guarantee effectiveness
- **interactive**: in order to ensure the active involvmente of trainees
- **open**: possible different training environment also supported or codesigned with the market leading companies
- **pragmatic**: committed to providing high quality and accessible training opportunities to each trainees and effective skills and competence readily applicable in their workplace
- **effective**: allowing professional to grow in their jobs and improve their performance

The impact on VET is producing an innovative and sufficient model for training courses of professionals in the retrofitting sectors with concrete *Platforms* for training of 3 types of professionals able to test it trough one pilot and 2 further batches of trainings;

- it is going to be proposed a new holistic approach to training in order to prepare professionals for integrated solutions;
- use of an advanced methodologies in vocational training courses – a balance between class and pragmatic activities, usage of mock-ups and practical works, site-visits followed by class analyses, interactive workshops, role-playing, integral solutions' fashioning etc;
- to crystallize "best practices" for vocational training courses ;
- to work out assisting tools for the expansion of the vocational training courses in the partner countries
- guidelines, assessment tools, questionnaires etc. each point could be developed more in details and the chapter
- to finish with concrete qualitative and quantitative results and conclusions of the level of the achieved results by country and all together.

4. Results - Impact on the energy actors at the retrofitting market / involvement of new actors in the professional vocational training processes

Italy
Competent energy and financial analysis is necessary to achieve the widespread adoption of whole systems retrofits.
While the industry has grown rapidly in the past five years, we have been hampered by a number of issues that make it challenging to provide cost effective and high quality analysis.

Ree_trofit 's Building Energy Solutions approach in the institutionalisation of VET courses:

Tools and Resources	Developed a set of tools and templates that will save time and increase the quality of Teaching in energy savings in buildings
Training and Education	Developed training and education materials that are the basis of the principal arguments involved in the VET .
Building Energy Innovation	Direct involvement of industrial and municipal stakeholders involved in renovation of buildings

Impact on energy retrofitting for the VET

Cost-Effective Energy Efficiency as a High-Priority Resource
Process in place, such as a city and/or regional collaborative, to pursue energy efficiency as a high-priority resource.
Policy established to recognize energy efficiency as high-priority resource.
Potential identified for cost-effective, achievable energy efficiency over the long term.
Energy efficiency savings goals or expected energy savings targets established consistent with cost-effective potential.
Energy efficiency savings goals and targets integrated into a regional energy resource plan.
Developing Processes to Align Utility and Other Program Administrator Incentives
Utility and other program administrator incentives for energy efficiency savings reviewed and established as necessary.
Establishing Evaluation, Measurement, and Verification Mechanisms
Robust, transparent procedures established. Strong public education programs on energy efficiency in place.
Developing Region Policies and incentives to Ensure Robust Energy Efficiency Practices
National policies require routine review and updating of building codes.
Building codes effectively enforced.
National and local government lead-by example programs in place.

Impact on teaching methods

Another approach of teaching will give by Lucense and Abita to provide a new platform to diffuse e-learning methods of teaching, using modern technology, e-learning system to offer a great potential to bring learning to the beneficiary, to their own organizations and communities.

VET in the partners countries - SMEs – the number of the trainees foreseen to be trained was sometimes doubled or tripled, their feedback showed complete satisfaction and need for continued further trainings;
-involvement of public authorities and energy agencies;
-involvement in the training process, interest in further projects and training activities;
-Chambers of Commerce actively involved in the trainings, spreading information and training tools among their members;
-Training institutions, secondary schools, higher technical institutes-provoked for integrating new disciplines in their curricula and offered Platforms and advanced model for their integration;

- great interest for the new products and innovation in retrofitting.

Impact on the MS VET activities

The impacts produces by the VET product-model are;
- good results on test of the model and continuous improvement for the institutionalisation of the courses;
- experienced a new training approach also with the use of technological supports and e-learning methods – an holistic approach;
-worked out Guidelines, Plans and other tools for easing the VET process in the MS and the further implementation of the REE_TROFIT model.
-Gaps in the VETs trainings identified and "Recommendations" for successful carrying out proposed.

Suggestions to policy makers

-create incentives and stimulate for broader, continuing training of professionals in this very important field;
-provide funding or attractive financial models for training of the SMEs in the retrofitting sector;
-create mechanisms for certifying short-term dynamic training courses at national level and registration of the trained professionals;
-assure funding for training of public officers;
-include disciplines corresponding to the needs of the retrofitting market in the compulsory educational programs in the secondary and higher schools; -stimulate the creation of new professions /green collars/ and jobs.
-assure affordable funds and models for retrofitting of buildings;
-stimulate national SMEs in producing and implementing new advanced products and technologies necessary for the EE renovation of buildings;
-improve legislation, fashion policies for easing the implementation of RES;
-produce levers for the intensive EE renovation of the building stock and massive application of RES.

5. Conclusions

The REE_TROFIT project is supporting the idea that a tight connection between the supply chain and the demand for sustainable refurbishment focusing on energy saving could successfully drive interventions towards low energy buildings particularly by promoting vocational courses in order to improve competences of building professional. However public institutions and policy makers have a crucial role in encouraging and promoting energy saving retrofit interventions.

Currently, levels of general retrofitting activity are poorly monitored across Europe and there is virtually no monitoring of retrofit activity undertaken in response to energy savings measures. There is, in other words, a huge potential for much better tracking and analysis to identify the remaining potential for action on energy efficiency and CO_2 emissions reduction in European buildings. However, the most recent EU directives strongly support and promote energy performance of buildings. This is yet another important element that could support policy makers, market actors, local authorities, and householders themselves in planning low carbon improvement strategies.

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newsletters: http://www.reetrofit.eu/content.php?p=nlt