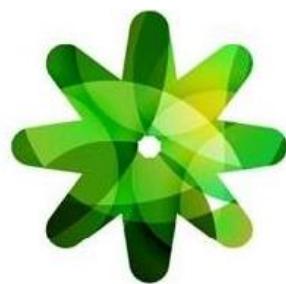


Renewable energy, opportunities for rural development in the province of Castellón

Results and experiences of the IN2RURAL project



Thursday, June 15, 2017
Llotja del Cà nem (Castellón)



IN2RURAL

Innovative Practices
in Renewable Energies
to improve rural
employability

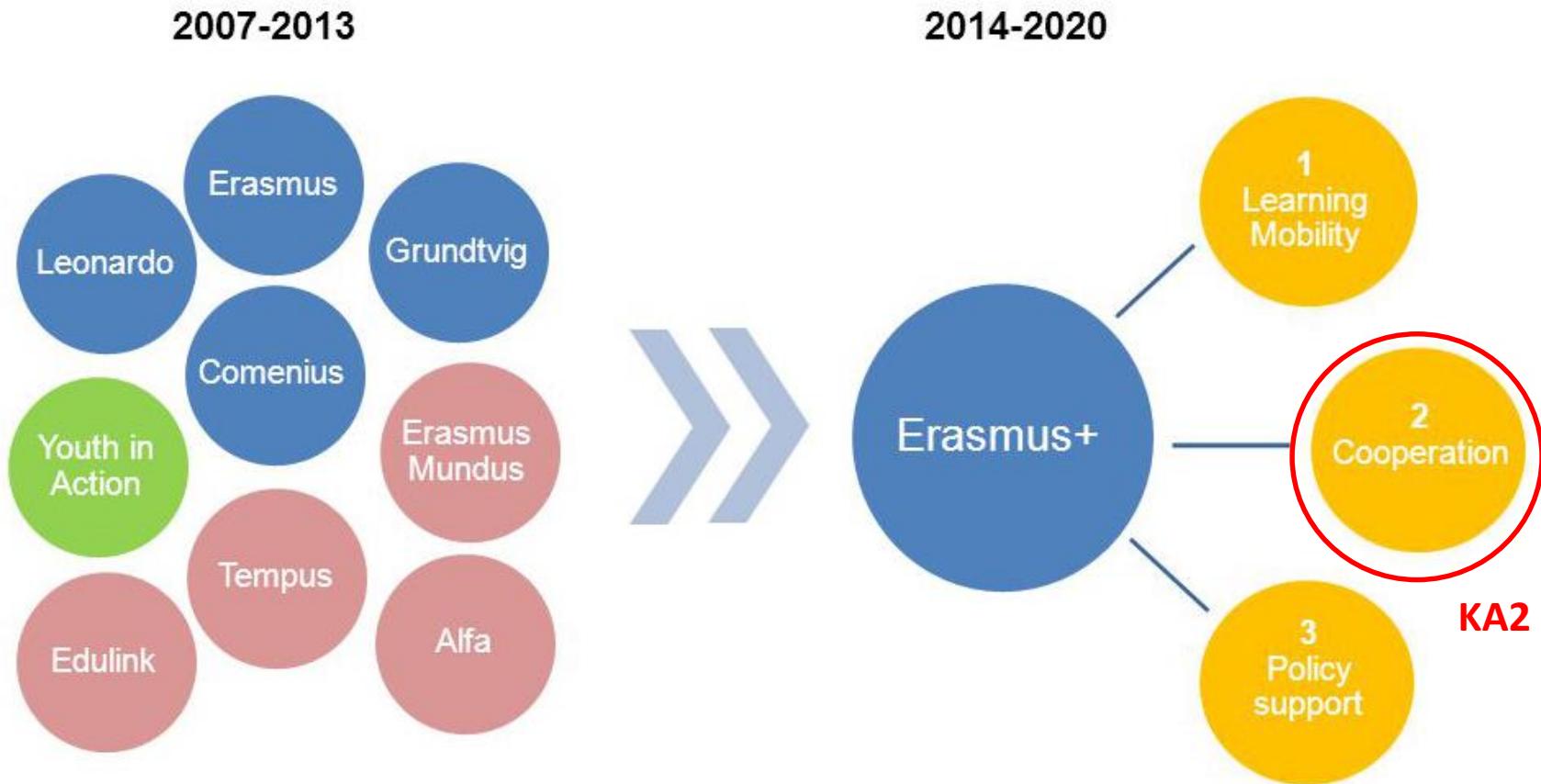
1. Erasmus + KA2 Introduction
2. IN2RURAL project

Project Summary
Results and experiences



Co-funded by the
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1. INTRODUCTION: Erasmus +



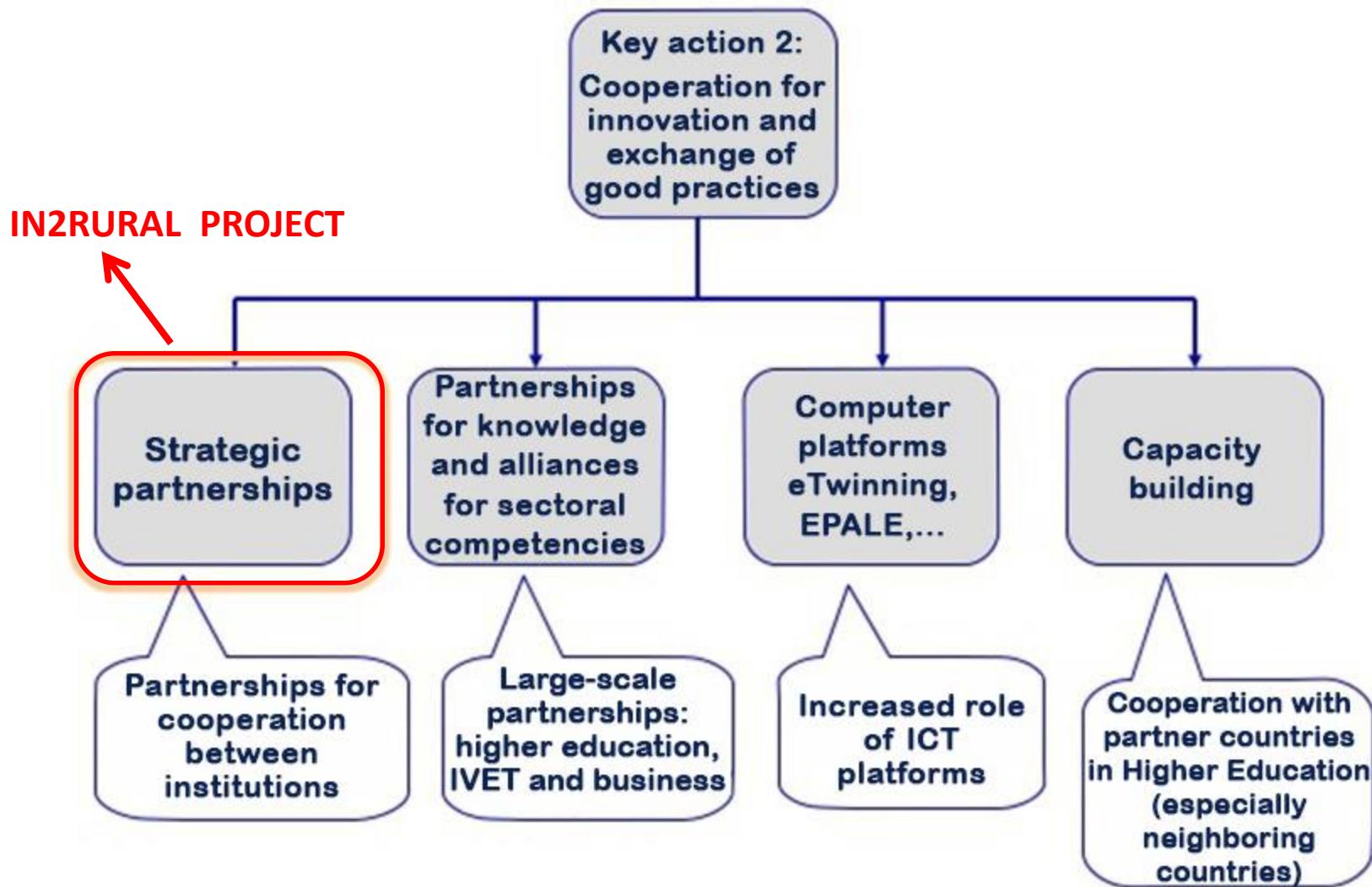
- European program of education, training, youth and sport 2014-2020
- Objective: to improve skills and employability and modernize education, training and youth work



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1. INTRODUCTION: Erasmus +

Key action 2. Cooperation for innovation



2. IN2RURAL: Project summary

“Innovative Practices in Renewable Energies to Improve Rural Employability”

- In the 2014 call, in Spain 124 projects were presented and 13 were awarded. IN2RURAL was the 4th highest rated
- Participate: **3 universities and 3 enterprises** from RREE of Spain, Romania and Hungary (coordinates UJI)
- Duration of the project: **3 years** (1/09/2014 – 30/08/2017)

<http://www.in2rural.ub.ro/>



GEOLIN



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2. IN2RURAL: Project summary

OBJECTIVES

- To promote the **training and employment of university students** in the field of renewable energies aimed at rural socio-economic development
- Applying training to the **development of initiatives** in this field
- **Dissemination** of good practices linking renewable energies and rural development



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2. IN2RURAL: Project summary

Some project results:

- Guide for training needs for rural development
- Online courses:
 - Technical English for renewable energies
 - Renewable energies for rural development
 - Search for employment and entrepreneurship in renewable energies for rural development
- Internships in Enterprise: case study development where the use of renewable energies for rural development is proposed (students tutored by University + company)
- Guide on renewable energies for small towns

Besides.....

- Dissemination activities open to the general public
- Active dissemination (press, video, web, facebook, youtube ...)
- Network of collaborators with different profiles in the project



El Mundo - Castellón al Día - 06/02/2015

La UJI promoverá
prácticas sobre
energías renovables

El proyecto tiene una duración de tres años e integra
a universidades y pymes de Rumanía y Hungría



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2. IN2RURAL: Project results

Study of training needs of renewable energies for rural development

- I. Introduction
- II. Metodology
- III. Castellón (Spain)
- IV. Bacau (Romania)
- V. Gyöngyös (Hungary)
- VI. Comparison of the 3 cases

Training needs in renewable energies for local development

Study of prospective and training needs of renewable energies market for local development

Coordinated by:
Leonor Hernández, Joan Raül Burriel, Zoltán Bujdosó and Liliana Topiceanu



IN2RURAL Co-funded by the Erasmus+ Programme of the European Union



Publisher 

<http://www.in2rural.ub.ro/index.php/proj-products>
<http://repositori.uji.es/xmlui/handle/10234/154485>

2. IN2RURAL: project results

Study of training needs of renewable energies for rural development: CASTELLÓN

PART 1. CONTEXT

- Definition of study territory
- Socioeconomic diagnosis

PART 2. RREE AND DEVELOPMENT

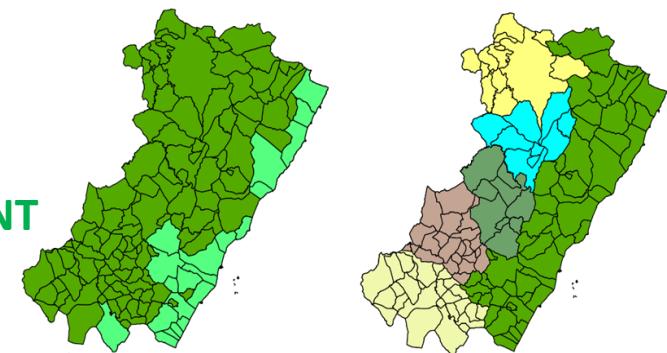
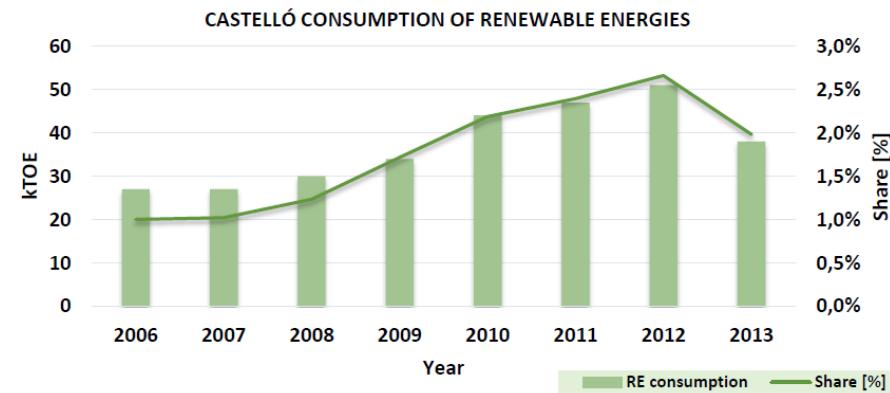
- Energy situation
- Development of RREE
- Employment and RREE
- Legislation RREE

PART 3. ACTORS MAP OF RREE- CS

- Local government, business sector, associations
- Schools

PART 4. TRAINING, RREE AND RURAL DEVELOPMENT

- General classification of the training offer
- Available training sheets available



Non coastal municipalities with less than 5,000 inhabitants
Coastal municipalities or with more than 5,000 inhabitants

Els Ports region
Alt Maestral region
Alto Mijares region
Alcalatén region
Alto Palancia region

2. IN2RURAL: Project results

Online course 1: Technical English for RREE

Date:

- February 2016

Nº participants:

- 30 enrolled

Academic value:

- 0,5 ECTS

Course content (12 units)

- RREE and rural development
- Photovoltaic power
- Biomass
- Wind power



Open Educational Resources for online course of
Technical English for Renewable Energy



Co-funded by the
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UNIT 7 BIOMASS – Part 1

Read the definition of biomass. Check the meaning of 'organic matter' if necessary.

Biomass is any organic matter that is used as a source of energy. Organic matter comes from living organisms such as plants and animals, and contains organically produced carbon.



Open Educational Resources for online course of
Technical English for Renewable Energy



Read the text below.

Photovoltaic Cells: Converting Photons into Electrons

The solar cells that you see on calculators and satellites are also called photovoltaic (PV) cells, which as the name implies (photo meaning "light" and voltaic meaning "electricity"), convert sunlight directly into electricity. A module is a group of cells connected electrically and packaged into a frame (more commonly known as a solar panel), which can then be converted into larger solar arrays like the one operating at Nellis Air Force Base in Nevada.

<http://in2rural.karolyrobert.hu/?lang=en>

2. IN2RURAL: Project results

Online course 1: Technical English for RREE

Student support:

- Start here
- Forum
- Online tutorial sessions
- Glossary

Evaluation criteria:

- Tests
- Participation in forums

The image displays four screenshots of the IN2RURAL online course interface, illustrating the student support features mentioned in the slide.

- Screenshot 1: Course Home Page** (Top Left): Shows the main navigation menu with links to Home, My courses, Participants, Badges, Technical English for Renewable Energy, Renewable Energy and Rural Development, Photovoltaic energy, Biomass, Wind Energy, Questionnaire for students' assessment of In2rural, and My courses. It also shows sections for Technical English, Renewable Energy and Rural Development, and Photovoltaic Energy, each with a list of units.
- Screenshot 2: Forum Page** (Bottom Left): Shows a forum discussion thread titled "Which one would be better for the world: supplying all our energy from solar or wind power?". It includes posts from users like Irvin Segura Rodriguez and Alida Arends, and a response from Silvia Auseanu.
- Screenshot 3: Tutorial Session Page** (Top Right): Shows two video clips titled "In2Rural Technical English online tutorial #1" and "In2Rural Technical English online tutorial #2 NO EFFECT". Both clips feature a woman speaking in front of a whiteboard with technical terms written on it.
- Screenshot 4: Chat Page** (Bottom Right): Shows a chat session titled "Online tutorial sessions" from Thursday, 18 February 2016, 3:03 PM to Thursday, 18 February 2016, 3:27 PM. It lists messages from users like Szabolcs Rezeka, Silvia Auseanu, Diana Cristina Mindu, Alida Arends, and Aida, discussing the next module of the course.

2. IN2RURAL: Project results

Online course 2: RREE for rural development

Dates:

- From March to June 2016

Nº participants:

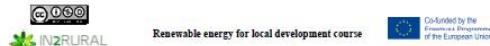
- 30 enrolled students

Academic value:

- 5,5 ECTS

Course content (4 units):

- RREE for local development
- Photovoltaic power
- Biomass
- Wind power



We call solar radiation a set of radiations coming from the sun, of which only 70% enters the atmosphere (sunlight). The rest is reflected back into space. Regarding the sunlight, this is absorbed by clouds, oceans and land surfaces. The remaining part can easily be converted into something useful and controllable (electricity or heat). Most of the spectrum of sunlight that reaches the Earth's surface is radiation in the ranges of visible light and infrared, with only a small part in the ultraviolet. Solar technologies are progressively adapted to work optimally at these frequencies.

Around the planet, the solar resource is not constant but it is concentrated in the so-called "Sunbelts" (latitudes situated in between the tropics). Figure 4, which is where the solar rays reach more perpendicular to the surface throughout the year. In this sense, one can highlight areas such as California, Atacama, and North Africa.

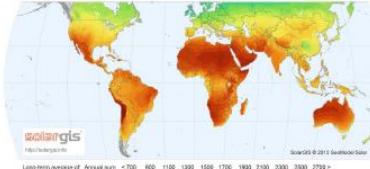


Figure 4. Irradiation World map by SolarGIS © 2013 GeoModel Solar. Licensed under CC BY-SA 3.0 via Commons - <https://goo.gl/dsdyNv>

The global solar radiation incident on any type of inclination surface consists of three different components: direct, diffuse and reflected components (Figure 5). These can be described as:

- Direct:** known as beam or direct normal irradiance, it is the solar radiation experienced at a given location on Earth by any surface perpendicular to the Sun's rays. It is equal to the Solar Constant (1366.1 W/m^2) minus the atmospheric losses due to absorption and scattering. These losses depend on the time of day (length of light's path through the atmosphere), the angle of the solar elevation (azimuth), the cloud cover, the moisture content, and others such as aerosols, ozone, mixed gases.
- Diffuse:** is the solar irradiance which is scattered or reflected by atmospheric components in the sky, reaching measurement surfaces with multiple angles.
- Reflected component:** it is mainly exclusively considered for inclined surfaces since it is basically a ground reflected component, hence very influenced by the albedo parameter. Albedo is synonymous for reflectance and denotes the reflection coefficient of the surface. In the case of solar energy, the reflected component may be quite important in northern European latitudes where Sun elevation is low for a

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Figure 5. Different types of biomass, by MarcusKaufmann CC-BY-SA 3.0, via Flickr.

In the second sense, biomass also means plants or animal matter that can be converted into biofuels (ethanol, biodiesel, and biogas). Numerous types of plants can be grown for biomass production, including grasses, cereals, willows, trees, sugarcane, bamboo, and a variety of tree species, ranging from eucalyptus to oil palm. There are also crops that are specifically grown for use as fuel that offer high biomass output per hectare with low input energy. Some examples of these plants are: willow, which typically yields 10–15 t dry matter per hectare; switchgrass, which typically yields 3–5 t dry matter per hectare in the UK. The grain can be used for liquid transportation fuel, while the straw can be burned to produce heat or electricity. Other crops such as corn and sugarcane can be fermented to produce the transportation fuel, ethanol. On the contrary, biodiesel, another transportation fuel, can be produced from non-edible food products like vegetable oils and animal fats. Soils in the region can have high organic matter, animal manure and human waste. All of these release methane gas (also called landfill gas or biogas) by fermentation. Finally, it is to note that there is a great deal of research involving algal fuel or algae-derived biomass due to the fact that it's a non-food resource (one of the main handicaps of the use of crop-based biomass amount of nourishment for humans and animals) and can be produced at rates 5 to 10 times those of other types of land-based agriculture, such as corn.

The biomass is a secondary and renewable source by region as well as the potential availability of biomass for energy. To some extent, the forest is a forest by-products such as wood residues are common in the USA. Agricultural waste is common in Mauritius (sugarcane residue) and Southeast Asia (rice husks). Bioethanol is very common in Brazil (sugarcane production). Animal husbandry residues, such as poultry litter, are common in the United Kingdom and The Netherlands.

For any specific project to be developed in a rural environmental, promoters and engineers will have to analyze the biomass supply possibilities available in the region.

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2. IN2RURAL: Resultados del proyecto

Online course 2: RREE for rural development

UNIT 1: RREE INTRODUCTION + RURAL DEVELOPMENT

Chapter 1: First steps into renewable energies

Chapter 2: The renewable energies panorama

Chapter 3: The renewable energies technology

Chapter 4: Development in rural areas

Chapter 5: How initiatives can promote social sustainability of rural areas

UNITS 2, 3 y 4: PHOTOVOLTAIC POWER / BIOMASS / WIND POWER

CHAPTER 1: TECHNICAL ASPECTS

CHAPTER 2: ECONOMICAL ASPECTS

CHAPTER 3: SOCIAL AND ENVIRONMENTAL ASPECTS FOR RURAL DEVELOPMENT

CHAPTER 4: FULLY DEVELOPED CASE STUDY OF EERR APPLICATION to RURAL DEVELOPMENT

CHAPTER 5: PROPOSED CASE STUDIES (to be developed by students)

CHAPTER 6: EXTRA MATERIAL



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<http://in2rural.karolyrobert.hu/?lang=en>

2. IN2RURAL: Resultados del proyecto

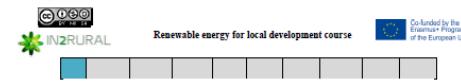
Online course 2: RREE for rural development

Case studies

- A case study of RREE applied to RRDD to be developed in English by the student tutored by 3 specialists (enterprise/ university):
 - Technical
 - Rural development
 - English
- They include:
 - Previous good practices
 - Technical Alternatives
 - Calculations and design
 - Economic aspects
 - Impact on rural development (environmental, social and economic)



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Based on our results, we observe that the VAN calculated for a period of 20 years gives to us <0, therefore the investment stops being profitable in the 13th year.

4. Environmental, social and rural impact of the case study development

4.1. Environmental impact

First of all, since we are installing a renewable energy source for the water extraction it is necessary to emphasize that it will not be expressed CO₂ to the ambience, once be installed. Since we aware that in the production process, transport and installation if that is expressed.

On the other hand, we must speak about the visual and acoustic impact that supposes the turbine. The visual impact is not very big, because it is a question of a wind turbine of small size (3.2m of diameter and 12m of height). The Enair 30 is characterized for being one of the most silent, therefore the acoustic impact will not exist, unless gets damaged.

4.2. Social and rural impact

In the Món de Negres are aware of how important it is to treat well its environment. That's why if we enter its web (www.mondonegros.com) we can find different information. The installation of renewable energies a focus supposes more attention to the its personnel will show them and will tell the children, and to no children, its benefits that it implies: both at level of the farmhouse and to environmental is



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Figure 2: Wind map East Spain, (<http://atlasmeteorico.idae.es/meteosim/>)

In the table 1 we can see the wind speeds in a year.

2.3. Wind turbine selected

We know that a normal house consumes about 4000 kWh/year, while a large consumer can reach around 1000 or 2000 kWh/year. Based on our consumption, we know that it is a question of a normal house; therefore we have a required potency of between 3kW and 7,2kW.

For this project, the wind turbine selected is an Enair 30 of Enair Energy S.L. (enair.es)

The characteristics of this Enair 30 wind turbine are the following:

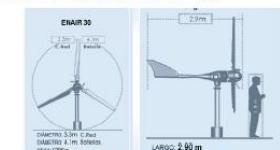


Figure 3: dimensions of Enair 30

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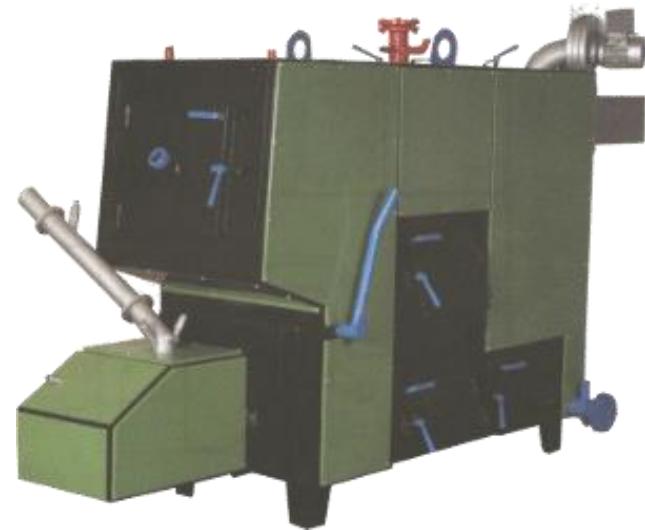
2. IN2RURAL: Resultados del proyecto

Online course 2: RREE for rural development

CASE STUDIES EXAMPLES:

A water purification company requires the installation of a sewage plant in Benafigos (Spain). The installation is far from the conventional electricity grid and therefore the client decides to study the possibility of installing an isolated photovoltaic system to supply the power required by the installation.

The heating system of a municipal building in Tiszaföldvár (Hungary) wants to switch from diesel to pellets. The building is 1970 and without modern insulation. The city is in the middle of a region with agricultural and forestry activity.



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<http://in2rural.karolyrobert.hu/?lang=en>

2. IN2RURAL: Project results

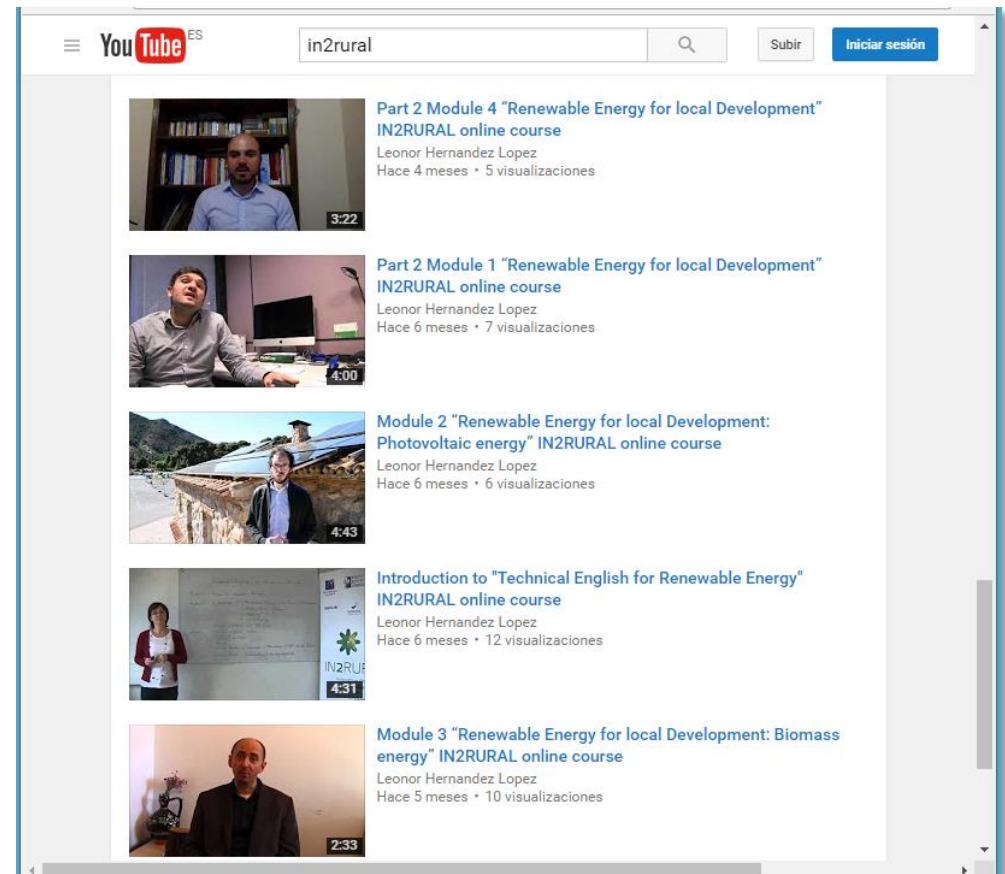
Online course 2: RREE for rural development

Student support

- Video presentation
- Forum
- Online Tutoring Sessions
- Tutoring by mail / Skype / face-to-face
- Glossary

Evaluation criteria:

- Tests
- Participation in forums
- Case study



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<http://in2rural.karolyrobert.hu/?lang=en>

2. IN2RURAL: Project results

Online course 3: RREE Employment and entrepreneurship for rural development

Dates:

- Juny 2017

Nº participants:

- 30 enrolled students

Academic value:

- 1 ECTS

Course content (2 units):

- Active job search
- Entrepreneurship



Module 2: Active Job Searching

- Chapter 1: Job-seeking and placements abroad
- Chapter 2: Europass CV and cover letter
- Chapter 3: Personalized coaching in occupational skills

Module 2: Entrepreneurship

- Chapter 1: Entrepreneurship competences
- Chapter 2: The initial steps to create a business plan
- Chapter 3: Resources for entrepreneurs

2. IN2RURAL: Project results

Internships (2 months + Final Degree Project)

Development of case studies where the use of RREE for rural development is proposed (students tutored by University + enterprise)

Dates:

- November 2016 to May 2017

Nº participants:

- 12 students (4 students from each country, 50% national enterprises, 50% International enterprises)



- Study and design of renewable energy facilities in the Mas Torre Martínez
- Comparative study between the use of urban heating and individual heating systems, based on biomass, in a rural municipality in the interior of the province of Castellón
- Photovoltaic-wind energy hybrid system for the supply of energy to an isolated consumer
- The role of biomass in the GAIA ecovillage and its use in the establishment of new eco-houses

2. IN2RURAL: Project results

Guide on renewable energies for small towns

2. IN2RURAL: Project results: DIFFUSION

Flyer

SOBRE EL PROYECTO

IN2RURAL es un proyecto europeo aprobado en el marco del Programa Erasmus+. Se desarrollará desde el 1 de septiembre de 2014 hasta el 31 de agosto de 2017 y tiene como origen el Programa Intensivo Erasmus "IT Forest. Formación innovadora sobre biomasa forestal para el desarrollo rural sostenible" <http://itforest.uji.es>

OBJETIVO

El objetivo general de **IN2RURAL** es promover prácticas innovadoras en el sector de las energías renovables para mejorar la empleabilidad del estudiantado universitario en zonas rurales de Bacau (Rumanía), Castellón (España) y Gyöngyös (Hungria).

PARTICIPANTES

El consorcio de **IN2RURAL** integra universidades públicas y PYMES: Universitat Jaume I y Heliotec (España), Universitatea Vasile Alecsandri de Bacău y General Electric (Rumanía), Karoly Robert Foiskola y Geolin (Hungría).

El colectivo que se beneficiará directamente del proyecto es el estudiantado universitario de titulaciones relacionadas con las energías renovables y el desarrollo rural.

Las actividades que se llevarán a cabo son formación especializada, investigación aplicada, y sensibilización y divulgación pública.

RESULTADOS E IMPACTO

El estudiantado aumentará sus competencias técnicas, mejorando su empleabilidad a través de una relación más cercana con el mundo del trabajo en un contexto internacional. Las universidades, empresas y colaboradores locales fortalecerán sus competencias para trabajar a escala europea, mejorará su visibilidad e impulsarán el trabajo en red.



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Newsletters

2. IN2RURAL: Project results: DIFFUSION

Youtube channel: IN2RURAL

https://www.youtube.com/playlist?list=PLg4VBgL4sO8_XhDDm1ogsqfDNwqwZMnrk

The screenshot shows the YouTube channel page for 'in2rural'. The main video player on the left is displaying a video titled 'IN2RURAL project presentation (Erasmus+ programme)' by Leonor Hernandez Lopez, which has 37 views and was published on March 14, 2016. Below the video player is the video's thumbnail and metadata. To the right is a sidebar listing four other videos from the channel:

- 1. IN2RURAL project presentation (Erasmus+ programme) - Leonor Hernandez Lopez
- 2. I Renewable Energy Fair Atzeneta Maestrat (IN2RURAL project) - Leonor Hernandez Lopez
- 3. Cooperativa de Viver (oil cooperative) Multiplier Event Segorbe (Spain) IN2RURAL - Leonor Hernandez Lopez
- 4. Som Energia (energy consumption cooperative) Multiplier Event Atzeneta (Spain) IN2RURAL - Leonor Hernandez Lopez

At the bottom of the sidebar, there is a link to 'Mapa de Negocios (example of Renewable Energy)'.



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2. IN2RURAL: Project results: DIFFUSION

Diffusion seminars

theran.campusobert@uji.es [www.campusobert.uji.es](#)', 'IN2RURAL', and a program section detailing speakers like Lorena Benítez, Isabel Giménez, and Héctor Beltrán San Segundo."/>

WEB/FACEBOOK/YOUTUBE

<http://repositori.uji.es> >> IN2RURAL

www.in2rural.ub.ro

www.facebook.com/in2rural

www.youtube.com >> IN2RURAL



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2. IN2RURAL: Network of collaborators

- Network of collaborating entities:

- City councils and public administration



Ajuntament
de Benlloch



Todolella



Ayuntamiento de Segorbe



Ajuntament
d'Atzeneta del Maestrat



Ajuntament
De Serra



- SMEs in the renewable energy sector



forestal del maestrazgo



- Cooperatives and associations related to RREE



Tecnología para el Desarrollo Local

- educational centres



- Other entities (users and / or promoters of RREE)



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Gracias por vuestra atención



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<http://www.in2rural.ub.ro/>



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