



NEW JOBS IN THE FIELD OF RENEWABLE ENERGY AND RATIONAL USE OF ENERGY IN THE EUROPEAN UNION

- Examples in Germany, France, Greece and Italy -

Study carried out in the framework of the PREDAC project

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The Predac Project:



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1 THE WORK PACKAGE 2 OF THE PREDAC PROJECT

In the strong belief, that in a sustainable energy economy, the involvement of local protagonists is highly important for its future development, PREDAC – "Promotion of Renewable Energy and Development of Action on a Community Level" – gathers actions to promote energy efficiency and the use of renewable energy sources to a diverse public and to provide sector-employees with relevant information about new solutions and best European practice.

The work package two of the PREDAC project, which is entitled "Development of Emerging Employment" has the objective to promote new professions in the realm of energy management, to evaluate specific training needs in this field and to give an overview of training and study programmes in the field of renewable energy and energy efficiency in all of the European Union member states.

Within this working group, new and/or emerging professions or newly created business sectors in the renewable energy and energy savings sector have been identified in four countries. The study was completed by the general context of job creation in the countries of concern, as well as the host structures where the new profession can be employed. The present report contains the main results of this work.

Other outcomes of the PREDAC work package 2

- A European job bursary in the renewable energy and rational use of energy business is available under www.cler.org/predac/jobbursary.
- A data base of courses of study and training programmes in the field of renewable energy and rational use of energy is available on the PREDAC web site or can be ordered in a printed version at the CLER.

For more information about the PREDAC project visit the web site www.cler.org/predac or contact the CLER (contact person: Emmanuel Poussard, coordinator of the PREDAC project, phone +33 1 55 86 80 00 or mail predac@cler.org).

2 RENEWABLE ENERGY AND EMPLOYMENT IN THE EUROPEAN UNION

Renewable energy technologies are in general more labour intensive – for the same energy output – than conventional energy technologies. This is why the increasing deployment of renewable energy technologies in the European Union has the potential to offer industrial competitiveness and the development of a strong export industry, to enhance regional development and the creation of employment, especially in more remote areas. Agricultural regions in particular can benefit from stimulation of biomass industries to halt the decline in jobs, by encouraging a switch from traditional food crop production to non-food biomass production.

Many studies have been carried out to evaluate the economic and job-creating effect of an enhanced use of renewable energy sources. The EUFORES study, in particular, investigated the implications on employment on a European level, taking into account the employment losses from a subsequent decrease in the use of conventional energy sources and the economic impact of the levels of subsidy provided to renewable energy on the rest of the economy.

This study comes to the result that 900 000 new jobs can be created by 2020, as a result of a considerable increase in the energy production from renewable energy sources. 385 000 jobs are predicted to be created from provision of renewable energy and a further 515 000 jobs from biomass fuel production. The underlying assumption of renewable energy production is 1 066 TWh by 2020, which is an increase by a factor of about 2,4 in comparison to 1995, where the production has been 440 TWh.

Other findings of the EUFORES study were that the jobs displaced as a result of subsidies to support renewable energy deployment are significantly less than corresponding job gains elsewhere in the economy (both direct and indirect impacts). Job gains are greatest in the biomass field – both in the biomass energy industry and in fuel supply – however all technologies show long-term net job creation. All technologies generate a net increase in jobs during the construction phase and the most winning sectors of the economy are the agriculture and the industrial manufacturing sector. However, some renewable energy technologies entail net employment losses during the operational phase.

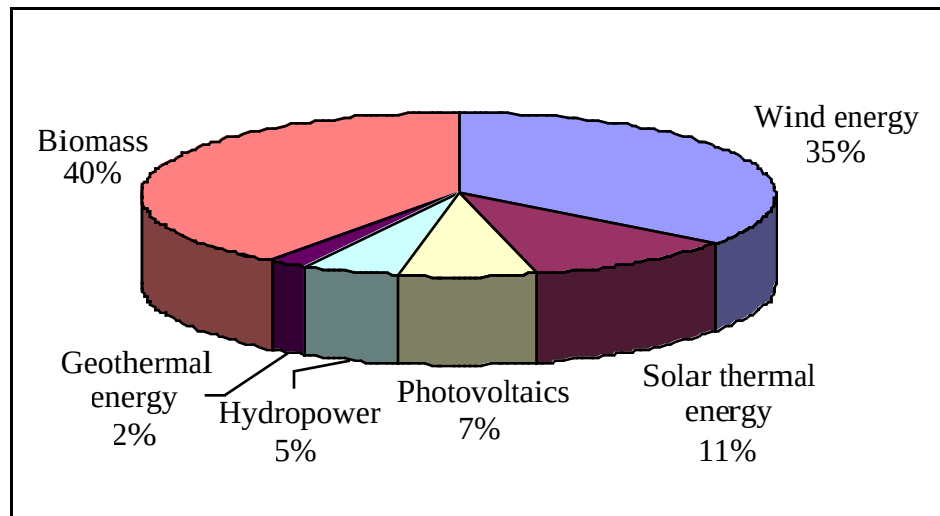
The employment creation occurs in all member states of the European Union. Germany, France and Italy have the greatest absolute employment increases while in Denmark, Greece and Austria the job gains are highest in proportion to their labour force.

In the following sections, the national contexts of four countries, as well as some newly created business sectors or professions in the energy management field in these countries will be described. The examined countries are Germany, France, Greece and Italy. The collected data comprise the national context, a total of 18 profession or business branch descriptions, the structures which host the new professions and some examples of new firms or host structures in the field of renewable energy or energy saving.

3 GERMANY

3.1 Employment in the Renewable Energy Sector in Germany

The Renewable Energy Act has caused an amazing boom in the renewable energy sector in Germany. The wind energy, biomass and photovoltaic branches have seen enormous growth rates and by now, the renewable energy sector has become a market which has a sales volume of approx. 8 billion euros per year and which has created about 130 000 jobs.



130 000 jobs in the field of renewable energy in Germany (2001); source: BMU, F. Staiss, Jahrbuch Erneuerbare Energien 2002

According to an estimation of the Federal Union for Renewable Energy (Bundesverband Erneuerbare Energien BEE), 300 000 persons might find employment in the renewable energy sector until the year 2010. If the renewable heat sector develops in the same way as has done the renewable electricity sector, this figure might even raise to 500 000 jobs in the renewable energy field. In this case, many new training and study programmes for future employees in this branch have to be created in order to meet the growing demand of the industry for renewable energy specialists. Especially engineers and technicians in the fields of mechanical engineering and electrotechnics have to be trained on solar, biomass and combustion technology and on process engineering.

Some of the new fields of business, which emerged with the enhanced use of renewable energy sources in Germany and the kind of jobs that can be found in these branches, are described in the following section.

3.2 Wind planning offices

3.2.1 Description

Wind park planning offices plan installations of single wind energy converters or whole wind parks with several wind turbines. The process goes from the research and acquisition of appropriate sites to the turn-key delivery of the finished wind parks. These offices often employ project engineers (electronics, electrotechnics, general engineers and others) who carry out the whole planning of the turbine or park. Other jobs in wind planning offices are in the financial field (acquisition of funds for the project finance) and in the legal advice business.

3.2.2 The fields of business

- Research and acquisition of appropriate sites for wind energy exploitation
- Negotiation and contracts with the involved groups
- Research of investors and shareholders
- Planning of the wind parks (technical and legal planning)
- Surveillance of the wind-park construction
- Exploitation or selling of the finished parks
- Acquisition of foreign sites

3.2.3 Kinds of jobs offered

- Project developers: Engineers or others
- Lawyers or legal assistants
- Financial experts
- General staff (administration, accounting, management, public relations and others)

3.2.4 Some firms

ABO Wind AG	www.ABO-Wind.de
aerodyn Energiesysteme GmbH	www.aerodyn.de
AG.L.N. Dr. Ulrich Tränkle	www.agln.de
Aufwind Schmack GmbH Neue Energien	www.aufwind.com
BBB Umwelttechnik GmbH	www.bbb-umwelt.de
BOREAS Energie GmbH	www.boreas.de
eab technology group	www.eab-group.de
EBV Management Holding AG	www.ebv.ag
Energiegesellschaft NordOst mbH	www.eno-wind.de
Energiekontor AG	www.energiekontor.de
Energiequelle GmbH	energiequelle-gmbh.de
Energy-Consult Projektgesellschaft mbH	www.energy-consult.net
EnerSys Gesellschaft für regenerative Energien mbH	www.enersys.nevag.de
ENERTRAG AG	www.ENERTRAG.de
e.n.o – wind Energiegesellschaft NordOst	www.eno-wind.de
ENOVA Energiesysteme GmbH & Co. KG	www.enova.de
eternegy GmbH (MVV Energie AG)	www.eternegy.de
G.A.S. Energietechnologie GmbH	www.g-a-s-energy.com
Garrad Hassan and Partners Ltd.	www.garradhassan.com
Gesellschaft für Handel u. Finanz mbH	www.ghf.de

Harpen AG	www.harpen.de
Ingenieurbüro Holger Walter	www.ihw-online.de
juwi GmbH	www.juwi.de
Marsh GmbH	www.marsh.de
Ostwind Gruppe	www.ostwind.de
NET GmbH neueenergietechnik	www.ib-net.net
NORDEX Planungs- und Vertriebsgesellschaft mbH	www.nordex.de
Plambeck Neue Energien AG	www.plambeck.de
Planungsbüro Georg Mikschl	www.mikschl.de
PROKON Unternehmensgruppe	www.prokon-energiesysteme.de
P&T Technology AG	www.pt-technology.de
RWE Solutions AG	www.energie-aus-wind.de
SAG Montagegesellschaft mbH	www.tessag.com
SeeBA Energiesysteme GmbH	www.seeba-online.de
target GmbH	www.targetgmbh.de
Tricon Thiel & Rudde Ingenieur Consult	www.Tricon-GbR.de
Umweltkontor Renewable Energy AG	www.umweltkontor.com
VBW Vermessungsbüro Weigt	www.vermessung-weigt.de
Volkswind GmbH	www.volkswind.de
voltwerk AG	www.voltwerk.de
WEAG Future Energies AG	www.weag-ag.de
WES IBS GmbH Wind Engineering Services	www.wes-ibs.de
WindSolar AG	www.windsolar.com
Windwärts Energie GmbH	www.windwaerts.de
wind 7 Aktiengesellschaft	www.wind7.de
WKN Windkraft Nord AG	www.wkn-ag.de
WPD AG	www.wpd.de

3.3 Weather Survey and Environmental Impact Survey Offices

3.3.1 Description

When planning a renewable energy project, it is necessary to evaluate the energy source before deciding which site to choose. With the stronger use of renewable energy sources in Germany, various small and medium companies, which offer measurements and weather data have been created, especially in the wind energy field. They take measurements of wind velocity, air density, solar irradiation or other relevant data and thus help to optimize installation siting and operation optimization.

Another branch which is important in the renewable energy sector is environmental impact surveys. Renewable energy installations should be constructed on sites, where the environmental damage is least. So, for every request of construction permissions, an environmental impact survey has to be established. Additionally, for every installation realized in Germany, compensation for the actual environmental damage is compulsory. Therefore, the damage caused by the renewable energy installation has to be evaluated. Impact on the fauna and the flora is measured and compensation measures are proposed. This is especially important for wind turbine installations, even more with the start of several off-shore projects.

3.3.2 *The fields of business*

- Measurements of weather data on site
- Data preparation
- Spatial planning expertise
- Environmental impact calculation
- Measurements of sound emissions

3.3.3 *Kinds of jobs offered*

- Spatial planners
- Scientific advisors (meteorologists, geologists, biologists, statisticians and others)
- Surveyors, experts
- General staff (administration, accounting, management, public relations and others)

3.3.4 *Some firms*

ABO Wind AG	www.abo-wind.de
AL-PRO	www.al-pro.de
anemos-jacob Büro für Windanalyse	www.anemos-jacob.de
Aufwind Schmack Neue Energien GmbH	www.aufwind.com
BBB Umwelttechnik GmbH	www.bbb-umwelt.de
Büro Bülow	www.buero.buelow.de
döpel Landschaftsplanung	www.doepel-landscape.com
Dipl.-Ing. Andreas Morgenroth Büro für Landschafts- und Freiraumplanung	www.morgenroth-gruen.de
Deutscher Wetterdienst (DWD)	www.dwd.de
Dr. Schulz & Partner GmbH	www.drschulz.com
eab technology group	www.eab-group.de
Garrad Hassan and Partners Ltd.	www.garradhassan.com
GEO-NET Umweltplanung und GIS-Consulting GbR	www.geo-net.de
Germanischer Lloyd WindEnergie GmbH	www.gl-wind.org
Ingenieurbüro für Energietechnik und Lärmschutz	www.iel-michalk.de
Ingenieurbüro Jörg Kuntzsch	www.windgutachten.de
Jadewind	www.jadewind.de
Planungsbüro Dr. Weise	www.pltweise.de
Planungsbüro GFN	www.windenergie.gfnmbh.de
Planungsgruppe Grün, Köhler-Storz & Partner	www.pgg.de
Planungsbüro SOLvent	www.solvent.de
TERRAGraphica GmbH	www.terragraphica.de
UMP Institut für Umweltmessung und Planung	
Wind Solutions	www.wind-solutions.de
Wilmers Meßtechnik	http://wilmers.com
WINDTEST Grevenbroich GmbH	www.windtest-nrw.de
WINDTEST Kaiser-Wilhelm-Koog GmbH	www.windtest.de Renewable

3.4 Energy Finance Service Providers and Bond Brokers

3.4.1 Description

Renewable energy finance becomes more and more complex as the sums to be invested rise with the increase of the installation sizes, due to considerable technological advance. Large wind parks demand high investment amounts and appropriate finance measures have to be found for each type of renewable energy installation.

In many fields of renewable energy, especially in the wind energy branch, local small investors (citizens) contribute to the finance of the installations.

3.4.2 The fields of business

- Fund raising
- Contract negotiation
- Project acquisition
- Market surveys
- Organization of local investment bonds (administration and service for the share holders)
- Financial and economical consulting
- Communication of new bonds

3.4.3 Kinds of jobs offered

- Bankers
- Consultants
- Lawyers or legal assistants
- Renewable energy market specialists
- Public relation specialist
- Shareholder relation manager
- General staff (administration, accounting, management and others)

3.4.4 Some firms

Aufwind Schmack GmbH Neue Energien	www.aufwind.com
Das Grüne Emissionshaus GmbH	www.das-gruene-emissionshaus.de
DEE Deutsche Erneuerbare Energien GmbH	www.dee-gmbh.de
Deutsche Structured Finance GmbH (DSF)	www.DSF-FRA.de
dr-wyputta.de Windenergiebeteiligung	www.dr-wyputta.de
EBV Management Holding AG	www.ebv.ag
Emissionshaus König & Cie. GmbH & Co. KG	www.emissionshaus.com
Energiegesellschaft NordOst mbH	www.eno-wind.de
Enertrag AG	www.enertrag.de
european natural power ag	www.enp-ag.com
juwi GmbH	www.juwi.de
Kraftwärmeanlagen GmbH (KWA)	www.kwa-gmbh.de
GHF Gesellschaft für Handel und Finanz mbH	www.ghf.de
motus UmweltKommunikation	www.motus.de
NEVAG neue energie verbund AG	www.nevag.de
Nordex AG	www.nordex.de

Plambeck Neue Energien AG	www.plambeck.de
PricewaterhouseCoopers	www.pwc.de
Projekt Ökovekt GmbH	www.planungsgemeinschaft.de
reconcept GmbH	www.reconcept.de
Saxovent GbR	www.saxovent.de
SoLaR Betriebs- & Beteiligungsges. für Solaranlagen	www.solar-gmbh.de
Umweltkontor® Renewable Energy Aktiengesellschaft	www.umweltkontor.com
Volkswind GmbHInternet	www.volkswind.de
WEAG Future Energies AG	www.weag-ag.de
Windwärts Energie GmbH	www.windwaerts.de

3.5 Photovoltaic and Solar Thermal Installation Manufacturers

3.5.1 Description

Germany has by far the largest solar thermal and photovoltaic park in Europe. There are many programmes supporting the direct use of solar energy. Under these favourable conditions, many companies have been created which produce and sell solar equipment.

3.5.2 The fields of business

- Production and marketing of solar thermal and photovoltaic equipment

3.5.3 Kinds of jobs offered

- Researchers and developers (engineers, scientists)
- Sales managers
- Production managers
- Technicians
- Financial and legal experts
- Administration and management employees

3.5.4 Some firms

AET GmbH	www.aet.de
Alfasolar Vertriebsgesellschaft mbH	www.alfasolar.de
BlueSun Systems AG	www.bluesunsystems.com
Deutsche BP Aktiengesellschaft	www.bpdeutschland.de
Energiebau solarstromsysteme gmbh	www.energiebau.de
ErSol Solar Energy Aktiengesellschaft	www.ersol.de
IBC Solar AG	www.ibt-solar.de
Kappei Solar Future Technik	www.sft.de
Kyocera Fineceramics GmbH	www.kyocerasolar.de
Phönix SonnenStrom AG	www.SonnenStromAG.de
PV Silicon AG	www.pvsilicon.com
Q-Cells	www.q-cells.com
RWE Solar GmbH	www.ase-international.com
SES 21 AG	www.ses-21.com
Sharp Electronics (Europe) GmbH	www.sharp-eu.com

Shell Solar Deutschland	www.shell.de
Solara AG	www.solara.de
Solar-Fabrik AG	www.solarfabrik.de
Solarion GmbH	www.solarion-gmbh.de
SOLARWATT	www.solarwatt.de
SolarWerk GmbH	www.solarwerk.de
SolarWorld AG	www.solarworld.de
Solon AG	www.solonag.com
Solvis Energiesysteme GmbH & Co KG	www.solvis.de
sunways AG	www.sunways.de
Total Energie Deutschland GmbH	www.total-energie.de
Wagner & Co Solartechnik GmbH	www.wagner-solartechnik.de
Würth Solar GmbH & Co. KG	www.wuerth-elektronik.de

3.6 Renewable Energy Producers and Suppliers

3.6.1 Description

Green electricity

After the liberalization of the electricity market in Germany, several green electricity suppliers have been created which sell electricity, partly or fully produced from renewable energy sources, to households and firms. Usually, the price for this electricity is slightly higher than the conventional electricity price. The suppliers engage themselves to spend a part of their benefits for the construction of new renewable energy or combined heat and power installations.

Renewable fuels

With the use of renewable combustion technologies (solid biomass, bio-gas, bio-diesel and others) comes the need to ensure the fuel supply. Several companies are specialized in the renewable fuel production and supply.

3.6.2 The fields of business

- Purchase and sale of green electricity and renewable fuels
- Calculate the clients' electricity consumption and match demand with offer
- Renewable energy installation exploitation

- Fuel processing
- Fuel logistics
- Fuel storage

- Advertising
- Client service

3.6.3 Kinds of jobs offered

- Sales(women)
- (Electrical) engineers
- Chemists, biologists
- General staff (administration, accounting, public relation and others)

3.6.4 Some firms

Green electricity

Elektrizitätswerke Schönau

Energreen

Greenpeace energy e.G.

Grüner Strom AG

LichtBlick GmbH

Märkischer EnergiePark

Naturstrom AG

NordStrom GmbH

Ökostrom-Handels AG

Solar World AG

unit energy stromvertrieb

www.watt-ihr-spart.de

www.energgreen.de

www.greenpeace-energy.de

www.gruener-strom.de

www.lichtblick.de

www.mep-hagen.de

www.naturstrom.de

www.nordstrom.de

www.oekostrom-handels-ag.de

www.wechselstrom.net

www.unit-energy.com

Wood pellet producers

Ante-Holz GmbH

Allspan Spanverarbeitung GmbH

Börde Biomasse GmbH

Deutschmann Biobrennstoff GmbH i.G.

Drechserei Spiegelhauer OHG

Haas Fertigbau

J. Rettenmaier & Söhne GmbH & Co

Kaisermühle Gänheim

Landwirtschaftl. Trocknungsgenossenschaft Neuhoof/Zenn

Schellinger+Co Mühlenwerke

Trocknungsgenossenschaft Weißenburg

WEAG & Mohr GmbH & Co. KG

Westerwälder Holzpellets GmbH

Bio-diesel: Producers

Biodiesel Schwarzheide GmbH

BIO-Diesel Wittenberge GmbH

Campa® Biodiesel

Hallertauer Hopfenveredelungsgesellschaft mbH

Landwirtschaftliche Produktverarbeitungs GmbH

Mitteldeutsche Umesterungswerke GmbH & Co. KG

NEW Natural Energie West GmbH

Oelmühle Leer Connemann GmbH & Co.

Ölmühle Hamburg c/o Connemann GmbH & Co.

Rheinische Bioester GmbH

Thüringer Methylesterwerke GmbH & Co. KG

Novaol Austria

Bio-diesel: Wholesalers

BayWa AG

Beckmann Mineralölhandel GmbH

Carl Büttner Mineralöl-GmbH

Diermeier GmbH & Cie. Mineralöl KG

DS-Mineralöl GmbH

Handelsvertretung Roselinde Splinter
 H. Jürgen Kiefer GmbH
 Lange Mineralöl GmbH
 Raiffeisen Hauptgenossenschaft Nord AG
 Raiffeisen Zentralgenossenschaft eG Karlsruhe
 Raiffeisen Central-Genossenschaft Nordwest eG
 Raiffeisen-Warenzentrale Rhein-Main eG
 Saarberg Bio-Energie Handelsgesellschaft mbH
 TESSOL GmbH
 Wetterauer Agrar Service GmbH
 Wirtz Brennstoffe Handels- und Transportgesellschaft mbH

Bio-diesel: Retailers

There are more than 1500 bio-diesel filling stations all over Germany.

3.7 Technical Surveys Offices and Operation and Maintenance Service Providers

3.7.1 Description

Most wind park operators prefer to subcontract the operation and maintenance to a specialized company. This work is often done by the turbine manufacturers under a special contract or it is assigned to an independent firm. Another technical field of business is the certification of wind energy converters. They are tested in order to make sure that they correspond to the official safety standards. These tests are done by independent technical offices who are licensed to issue surveys and certificates. As in the other business branches, the wind turbine sector is predominant here. This is why there are many offices, which are specialized in the testing or operation and maintenance of wind turbines.

3.7.2 The fields of business

- Technical maintenance
- Repair of broken components
- General inspection of renewable energy installations
- Emergency service
- Remote monitoring of the installation performance

3.7.3 Kinds of jobs offered

- Technicians (electronics, electrotechnics, thermal energy technology)
- General staff (administration, accounting, management, public relations and others)

3.7.4 Some firms

DEWI Deutsches Windenergie-Institut GmbH	www.dewi.de
Dipl.-Ing. Martin Veltrup-Neil	www.veltrup-neil.de
Ing.-Büro WIND-CHECK	www.wind-check.de
Jadewind Ing. Büro Martin	www.jadewind.de
KÖTTER Consulting Engineers	www.koetter-consulting.com
Rotorworks Andre Dochow	www.rotorworks.de

TÜV NORD GRUPPE	www.tuev-nord.de
TÜV Süddeutschland Bau und Betrieb GmbH	www.tuev-sued.de
Windrad Engineering GmbH	www.windrad-engineering.de

... and many wind turbine, solar installation or component manufacturers.

3.8 Wind turbine manufacturers

3.8.1 Description

A big part of the jobs created by the use of renewable energy sources is located in the turbine-manufacturing business.

3.8.2 The fields of business

- Production and marketing of wind energy converters

3.8.3 Kinds of jobs offered

- Developers (engineers, scientists)
- Sales managers
- Production managers
- Technicians
- Financial and legal experts
- Administration and management employees

3.8.4 Some firms

AN Windenergie GmbH	www.anwind.de
DeWind AG	www.dewind.de
ENERCON GmbH	www.enercon.de
Fuhrländer AG	www.fuhrlander.de
GE Wind Energy GmbH	www.gewindenergy.com
NEG Micon Deutschland GmbH	www.neg-micon.de
Nordex AG	www.nordex.de
REpower Systems AG	www.repower.de
Vestas Deutschland GmbH	www.vestas.de

There is also a large number of manufacturers of small wind energy converters (< 10 kW).

3.9 Renewable Energy Project Management and Project Auditing Firms

3.9.1 Description

Renewable energy projects demand special expertise and knowledge of project management and the special characteristics of renewable energy projects as well as of renewable energy markets. If project are realized in a foreign country, knowledge of the local markets, laws and other details are also necessary. Renewable energy project management firms offer this expertise

either to wind park planning offices or to private and public investors and banks who want to invest in renewable energy projects. Project auditing firms follow the renewable energy projects during their realization and provide consultancy throughout the whole process.

3.9.2 *The fields of business*

- Renewable energy consulting
- Market surveys
- Project structuring, project management consulting
- Project monitoring
- Financial Modeling and project finance consulting
- Renewable energy risk management
- Due Diligence
- Model Audit

3.9.3 *Kinds of jobs offered*

- Consultants
- Renewable energy market specialists
- Project managers
- Economical and financial experts
- General staff (administration, accounting, management, public relation and others)

3.9.4 *Some firms*

EBV Management Holding AG	www.ebv.ag
eternegy GmbH	www.eternegy.de
INERCON GmbH	www.inercon.com
Garrad Hassan and Partners Ltd.	www.garradhassan.com
PricewaterhouseCoopers	www.pwc.de
Rödl & Partner GbR	www.roedl.de

3.10 **Energy Inspector**

3.10.1 *Context*

Many cities in Germany are taking steps to check their energy consumption in order to find out their reduction potential. These measures are linked with the actions taken in the framework of the commitment to fulfill the reduction objectives fixed in the Kyoto protocol. The energy saving potential is vast, but has to be detected and evaluated and the necessary investments have to be calculated on the basis of standard capital investment budgeting methods.

3.10.2 *Missions*

- Evaluate the energy performance of buildings
 - o Quality of the thermal insulation of the walls, the windows, the roof, the floor and the cellar
 - o Heating installations
- Find out the important energy losses of a building

- Suggest measures to be taken in order to save energy

3.10.3 Required aptitudes

- Engineering education
- Good knowledge of thermodynamics and heating installations
- Basic knowledge of capital investment budgeting
- Capacity of discussing problems and convincing people

3.10.4 Host structures

- Municipalities
- Small or medium enterprises
- Local energy agencies

3.10.5 Example

City of Frankfurt am Main

The Frankfurt municipality offers an energy inspection service to the owners of buildings. Energy inspectors ("Energie-Checker") evaluate the energy performance of their buildings, detect energy losses and suggest measures that help to reduce the energy consumption. The average decrease of the heating expense achieved by these measures is one third. This service costs only 25 € for the building owner, the remaining 50 € are paid by the municipality within their incentive programme.

Contact

Stadt Frankfurt am Main – Energiereferat 79A

Dr. Werner Neumann

Galvanistr. 28

D-60486 Frankfurt am Main

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4 FRANCE

4.1 General context

To identify the host structures and the new jobs, we have to know the contexts enclosed to renewable energy and energy control.

4.1.1 Environmental context

10 % of greenhouse gas emissions are a direct result of communal building energy consumption¹. However, the general public is increasingly aware of environmental problems (climate change, pollution...). A survey performed by the BVA² polling institute reveals that 61 % of people consulted believe that amongst the different energy sources available, renewable energies (wind, geothermal...) should be developed as a priority.

4.1.2 Economic context

Studies have proved :

Community energy expenditures represent close to 30 € per inhabitant per year. The energy budget reduction potential is of the order of 10 % (that is, for a commune of 20 000 inhabitants, a potential saving of 60 000 € per year)³. Household energy expenses represent on average one month of income in household budgets. A recent study assesses the private party electricity saving potential at 137 €/year⁴.

4.1.3 Social context

Thanks to renewable energy and energy control development, some proximity public service jobs are created directly in organizations, and through their actions they in turn generate indirect jobs in the local economic fabric. Renewable energy is more labour intensive than conventional energy technologies in delivering the same amount of energy⁵. In terms of social equity, these actions allow the reduction of outstanding energy payments (unpaid bills) estimated on a national level to represent between 69 and 106 million euros per year.

4.2 Identification of the new jobs and the host structures in France

Face to these contexts, we have identified in France four new jobs that we try to develop in host structure (find enclosed the templates concerning new jobs):

¹ - “*Mémento des décideurs...*” prepared by the *Mission Interministérielle de l’effet de serre* (MIES or Inter-Ministerial Greenhouse Effect Taskforce), June 1999 (see bibliography)

² - Survey performed by BVA in December 1998 (commissioned by CEA, COGEMA, EDF and FRAMATOME)

³ - “*Energie et patrimoine communal*”, study prepared by the *Agence de l’environnement et de la maîtrise de l’énergie* (ADEME or Environment and Energy Conservation Agency), 1995

⁴ - Study performed by the *Montreuil Vincennes Energie* local agency and the ENERTECH consultancy firm in October 2000

⁵ Study performed by Eufores untitled « the impact of renewables on employment and economic growth », 1998

- Energy saver
- Household environment adviser
- Trainer in the field of energy
- Renewable energy and energy control project developer and manager

The host structure likely to create new jobs are these which can inform citizen and municipalities about their energy consumption, they are in France:

- Municipalities
- Inter-community structures
- Social welfare housing lessors
- Energy agencies
- Non profit organizations

There are some new jobs adapted to these structures' needs and nature, for example:

Municipalities: energy savors, household environment advisors, energy animators, renewable energy and energy control project developers and managers.

Social welfare housing: renewable energy and energy control project developers and managers, household environment advisors.

4.3 Energy ambassador

4.3.1 Context

Recoveries of outstanding energy and water payments are increasing constantly in France, and represent over 90 million euros per year or an average of over 15 euros per French citizen.

4.3.2 Missions

The household environment advisor or energy ambassador's mission is to help consumers in general - and persons with financial difficulties in particular - to achieve energy savings. In some cases, this person accompanies the implementation of an outstanding payment assistance mechanism. Relational skills are as important as technical skills.

The energy ambassador's mission covers two fields of competence:

Social / relational

- Meet tenant families in outstanding energy payment situations at the request of the social services.
- Mediate between families in outstanding payment situations and service providers.
- Help to find solutions in dispute cases.
- Help to put together outstanding payment assistance request files.
- Inform and increase awareness of tenants on water and energy control: public sessions are organized in the individual housing groups in order to increase the number of participants at the time of the household environment advisor's intervention.
- Creation of a telephone answering service and help desk.

Technical

- Analyze outstanding payment files transmitted by social workers.
- Detect incorrect equipment use.

4.3.3 Required aptitudes

- Technical (energetic and thermal) knowledge
- Communication, mediation and teaching ability

4.3.4 Basic training

Social and Family Economics Advisor diploma; Technical Energy Training (Thermal engineering *DUT (Diplôme universitaire technique* or Vocational Training Certificate) or *BTS (Brevet technicien supérieur)* or University Technical Diploma).

4.3.5 Example

ADIL 26 (Agence Départementale d'Information sur le Logement 26) or Drôme Department Agency for Information on Housing):

With the help of the Rhône-Alpes Region, the Drôme Regional Council, the *Caisse d'Allocations Familiales* (Family Allowance Fund) and the FTUEE (Fonds pour Travaux d'Urgence d'Economies d'Energie or Fund for Emergency Energy Conservation Work), ADIL 26 has set up an energy conservation work assistance project for households in financial difficulty. The « Energy Control Social Agent » accompanies the installation of the FTUEE.

4.4 Energy and Water Saver*4.4.1 Context*International context

Compliance with Kyoto commitments and European Renewable Energy Directive

National context

The National Energy Efficiency Improvement has defined some actions to develop energy efficiency and renewable energies (e.g. feed-in tariff for wind energy). According to ADEME⁶'s study, the municipal energy bill represents 30 €/resident/year (in Rhône-Alpes the municipal energy and water bill represents 36 €/resident/year) and the possibilities to reduce the energy budget are about 10%. It seems impossible to effectively reduce the energy consumption without an energy specialist: an energy and water saver.

In term of job creation, there is a programme called « Nouveaux services, Emplois jeunes » which gives 15 000 €/year during five years to host structure (municipality, non profit organization and others) to employ young people.

⁶ Agence de l'environnement et de la maîtrise de l'énergie (ADEME) is the French Agency for Environment and Energy management under control of the Industrial and Environment ministry.

4.4.2 Missions

The energy saver's mission covers three fields of competence: Technology, management and education.

Technology

- To be involved in carrying out water and energy audits
- To detect incorrect use of equipment
- To propose actions to reduce energy and water consumption while improving the users' comfort

Management

- To record and to monitor water and energy consumption
- To manage contracts
- To propose contract modifications
- To evaluate social, economic and environmental impacts of actions carried out by energy savers

Education

- To inform, to sensitize citizens, users, schools, people's representatives about energy and water savings and renewable energy sources
- To propose entertainment about water and energy savings
- To produce some documents about these topics

4.4.3 Required aptitudes

- Technical (energetic and thermal) knowledge and about energy and water
- Engineering or technician education
- Knowledge about the according regulation aspects
- Communication, mediation and teaching ability
- Basic knowledge of investment calculation

4.4.4 Host structures

- Municipalities
- Intercommunity structures
- Social welfare housing organizations
- Energy agencies
- Non profit organizations
- Energy and water companies
- Big energy consumers (hospitals, large buildings, ...)

4.4.5 Examples

Municipality: Lorient (61 844 inhabitants)

The town of Lorient has created four energy saver positions: In 1999, their actions resulted in a global energy saving of over 274 400 € compared to 1996. They financed their job thanks to the energy and water savings that they achieved.

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Social welfare housing organizations OPAC 38

OPAC's actions in favour of energy savings answers to social housing organizations' concerns: **to control the pair « rent + charges ».**

For example :

- The optimization of electricity subscription rates resulted in an annual saving of over 150 000 € without any investment.
- The production of photovoltaic energy using 100 m2 of solar panels for community lighting and controlled mechanical ventilation engines in a 122 apartment building block.

Intercommunity structure: Communauté d'agglomération du Pays Rochefortais (17 towns which represent 52 000 habitants).

4.5 Energy Animator

4.5.1 Context

In order to answer the population's questions concerning energy control and savings, a local community or an association can set up awareness-raising activities to address these issues.

4.5.2 Missions

- Perform actions directed at the general public in favour of rational energy management.
- Raise awareness and educate children on rational energy use.
- Develop an animation and information program addressing rational energy use and renewable energy for the general public and academic world (students and teachers).
- Guide schools into becoming models of environmental management and respect.
- Prepare information leaflets on these themes.

4.5.3 Required aptitudes

Know-how

Manual skills

Way of being

Feeling for human contact and creativity, educational aptitudes.

4.5.4 Basic training

BEATEP (*Brevet d'Etat d'Animateur Technicien d'Education Populaire* –People's education technical animator State Vocational Training Certificate) obtained in particular at the ASSEM school.

Baccalaureat+4 (technical and scientific masters degree).

4.5.5 Host structures

- Local communities
- Inter-communal structures
- Non-profit organizations

4.5.6 Examples

ADIL 26 or Drôme Department Agency for Information on Housing

Rational energy use interventions in particular at the Valence Institut Universitaire de Formation des Maîtres (teacher training institute).

L'ASDER

Education and increase of childrens' awareness of rational energy use and waste problems in the Savoie department.

4.6 Renewable energy and energy control project developer and manager

4.6.1 Context

International context

The European Renewable Energy Directive⁷'s objective for the contribution of renewable energy sources in electricity production by the year 2010 is 22,1% (in 1997, this objective was 13,9 %).

National context

The growth rate defined by the Directive for France is 15 to 21 % by 2010. This represents 13 or 14 000 MW of wind energy installed between now and 2010. As far as solar thermal energy is concerned, the *Plan soleil* (Sun Programme) plans the installation of 60 000 m² in France by 2006 (that is 15 000 solar water heaters a year).

4.6.2 Missions

- Provide potential contracting authorities - individuals or local communities - with knowledge of existing technologies and arguments to assist decision-making
- Identify and quantify the renewable energy potential of specific regions
- Program and supervise renewable energy works

4.6.3 Required aptitudes

Technical (energetic and thermal) knowledge and knowledge of energy and water regulations.
Communication, mediation and teaching ability

4.6.4 Host structures

- Local communities
- Inter-communal structures
- Social welfare housing organizations
- Energy agencies
- Non-profit organizations

⁷ Parliament and Council Directive relating to the promotion of electricity produced from renewable energy sources on the internal market, year 2000

4.6.5 *Examples*

Montmelian

The agent's mission is to develop the use of renewable energy sources within the territory of the community.

ASDER

The ASDER association has created a "Renewable Energy Technical Advisor" position. This advisor develops, investigates and diffuses solar thermal technologies. The advisor provides the potential contracting authorities - individuals or local communities - with knowledge of the existing technologies and arguments to assist decision-making.

5 GREECE

5.1.1 *General context*

To identify the host structures and the new jobs, we have to know the contexts enclosed to renewable energy and energy control.

5.1.2 *Environmental context*

About 40% of the total population in Greece live in the metropolitan area of Athens, which is surrounded in the three sides by mountains. The problem of air pollution and gas emissions has been sensed intensely since the decade of 80's, resulting to the sensitization of people regarding environmental issues on one hand and a series of measures on the other. This history creates a favourable background for the use of renewable sources of energy, which nevertheless is more adequate for a lesser scale of production

Another interesting point is geography. Greece, having an important number of inhabited islands (more than 300) that is more or less isolated from the big energy producing installations, favours small renewable energy plants, able to cover local needs and compatible with tourist activities.

5.1.3 *Economic context*

Even if technically is feasible, economically it is very expensive to transfer energy or even non-renewable fuels in isolated areas and islands.

There are tax incentives for households to use solar energy to heat water. Taking into account that in Greece most days of the year are sunny and that this measure stands now for more than 20 years there is already a tradition for this kind of energy consumption.

Although there is an important volcanic activity in Greece, geothermal energy production, where used, has not proved to be economically cost-effective in the long term.

Energy consumption may be reduced by up to 30%, if some measures of passive energy saving are taken while houses and/or offices are being built

Renewable energy may be produced by factories as by-product or by-procedure of their main activities. In this case a thorough analysis and the subsequent business plan may be drawn beforehand.

5.1.4 *Legal context*

Laws concerning energy production and energy consumption have been modernised during the last years. In this way, we are moving from a state monopoly to an open energy market, where private companies and local communities may undertake diverse initiatives.

The "Capodistria Law" for local authorities, voted four years ago, has joined small villages to bigger local units, which have more resources (human, economic etc.) and are in a position to play a more active role in local development.

5.1.5 *Social context*

Issues like renewable energy, ecology, sustainable development are getting all the more appealing to young people to work with. Professions related to these issues have a high social image.

Apart from new professions clearly having to do with renewable energy, a great number of already existing professions (e.g. all professions contributing to the building of a house) have to be retrained and new curricula, concerning the way they have to work in order to achieve passive energy saving and reduction of gas emission, have to be inserted in their training.

On the other hand, there is a lack of scientific and technical personnel knowing how to study, plan, calculate and operate renewable energy production plants and being able to inform and consult those who are interested in applying those technologies and measures.

5.2 **Identification of the new jobs and the host structures in Greece**

Taking into consideration the above-described contexts, we think that except of the urgent need for redesigning the curricula for many already existing professions e.g. plumbers, isolation materials technicians, architects etc. We think there is room for at least four new jobs (find enclosed the templates concerning new jobs):

- Renewable energy production mechanic
- Renewable energy consultant
- Renewable energy researcher
- Technician for Design and Installation of Solar Thermal Collectors

Host structures may be energy producing companies of the public or the private sector. They may as well be municipalities, local development agencies and inter-community structures. Finally, some persons could fill out these new jobs being self-employed.

5.3 Renewable Energy Consultant

5.3.1 Context

Increase of sensitization of the population about environment along with selection of the option for soft development generate the need for new initiatives concerning energy production and persons that can handle those subjects.

5.3.2 Missions

- To inform local authorities about ways of producing electricity by using renewable energy sources and present the advantages of such an option for sustainable local development
- To work with companies of both the private and the public sector of the economy in order to calculate and set up such plants
- To calculate the mix of energy sources that could provide the optimum solution for each case when the consumption needs change
- To advise industries if it is economically viable to produce energy as a by- product of their activities
- To speak to large audiences about energy saving and environmental management

5.3.3 Required aptitudes

- Good technical and technological knowledge as far as environment, renewable energy, industry and civil consumption are concerned
- Sufficient knowledge about economic parameters involved in energy production and consumption
- Good human relations, communication and presentation skills

5.3.4 Host structures

- Energy producing companies and plants
- Municipalities
- Intercommunity structures
- Local development agencies

5.3.5 Basic training

Engineers (electric engineers, chemical engineers, mechanical engineers, production engineers, civil engineers) or environmental scientists. Lyceum plus five years of studies is a prerequisite. Master in generation and management of energy is also required.

5.3.6 Example

Big department store in Athens

A very big department store in Athens hired an energy consultant as an external cooperator. His mission was to perform a research about the present situation of energy consumption and according to this, to point out the critical points. As a result, he was asked to suggest solutions for reducing the energy consumption. He was to develop a business plan for all the investments that have to be done, allocating the optimization of the electricity use and with knowledge of the

existing technologies to find solutions for energy generation from renewable sources for example the production of photovoltaic energy.

5.4 Renewable Energy Production Mechanic

5.4.1 Context

Following the liberalization of the energy market and the strengthening of communal resources in Greece, many local authorities mainly in islands but also of the mainland are interested in acquiring energy producing plants.

5.4.2 Missions

- To know how renewable energy production plants work,
- To supervise their operation,
- To be able to be in charge of their maintenance.

5.4.3 Required aptitudes

Good knowledge of technologies

- Electric engines and generators connections with distribution network
- Applied electronics
- Automation and measurement technology
- Wind energy technology
- Photovoltaic technology
- Solar thermal systems
- Biomass and biofuels

Good feeling and knowledge of

- Environment protection and preservation management
- Environment protection technologies
- Environment protection measurements
- Energy saving etc.

5.4.4 Host structures

- Municipalities
- Intercommunity structures
- Local development agencies
- Energy producing companies and plants

5.4.5 Basic training

Technical energy training (Technological Educational Institute- TEI, lyceum plus 4 years)

5.4.6 Example

Many islands, e.g. Syros in Cyclades have wind parks with a set of wind generators in order to produce energy to cover their needs.

Renewable energy production mechanics are in charge of their operation and their maintenance. In Syros, there is also a desalination plant, providing the island with potable water after processing sea water, by using energy produced by the wind park.

5.5 Renewable Energy Researcher

5.5.1 Context

Research on the energy design and policy for the renewable energy resources and energy conservation. Development of applied research for new energy technologies.

5.5.2 Missions

- To consult local and national authorities in national policy, strategy and planning affairs, concerning renewable energy resources.
- To execute applied research and develop new technologies which are technically and economically sustainable and environmental friendly.
- To organize, supervise and implement projects that aim to the promotion of the above-mentioned new technologies.
- To develop the required substructure, for the support and implementation of investing programs.
- To provide technical services and consultancy in the form of specific know how and information.
- To organize and participate in technical and scientific seminars, educational programs etc.

5.5.3 Required aptitudes

- Proven good technical and technological knowledge as far as environment, renewable energy and industry are concerned
- Managing and organizational skills
- Sufficient knowledge of economic parameters involved in energy production and consumption
- Good human relations, communication and presentation skills
- Proven experience in developing and implementing energy related and environmental projects.

5.5.4 Host structures

- Energy producing companies and plants
- National or private research center
- Universities or technological educational institutes
- Consulting companies

5.5.5 Basic training

University degree in engineering (electric engineers, chemical engineers, mechanical engineers, production engineers).

Master or PhD in energy generation and management is also required.

Any further economical studies will be appreciated.

5.5.6 *Example*

A research center dealing with renewable energy resources.

Such a center consists of laboratories that are dealing with alternative sources of energy, such as wind, solar and geothermal energy as well as biomass, hydrogen and photovoltaic technology. These laboratories are mainly self-conserved, based on incomes that arise from research programs that are submitted, implemented and completed by the laboratories themselves. These programs are founded mainly by the European Commission, and include big industries and local authorities as partners, which will be the end users of the research results.

5.6 Technician for Design and Installation of Solar Thermal Collectors

5.6.1 *Context*

There are many areas in Greece, where the sunlight is remarkable. The solar radiation is considerable for production of heating energy, with main uses in heating water (either in low temperature for domestic use or in very high temperature for production of electric energy) or houses.

Technicians are needed who know how to study, design, development, installation, control and support of systems that use solar radiation to produce heating energy for domestic or industrial use.

5.6.2 *Missions*

- To design solar collectors according to the specific conditions of the area where they are going to be used and their specific application
- To install and set them in operation
- To be able to check and control their operation
- To provide technical support, during their operation

5.6.3 *Required aptitudes*

- Good knowledge of technologies of solar thermal systems
- Good technical and technological knowledge on environment, renewable energy and industry
- Good knowledge of applied electronics
- Experience in automation and measurement technology
- Good feeling of
 - o Environment protection and preservation management
 - o Energy saving

5.6.4 *Host structures*

- Consulting and construction companies
- Energy producing companies and plants
- Industries that use high amounts of electric energy

5.6.5 *Basic training*

Technical energy training (Technological Educational Institute- TEI, lyceum plus 4 years)
Technical degree in engineering (electric or mechanical engineers).

5.6.6 *Example*

In many islands, big hotels use solar thermal collectors to cover their high needs especially in the summer.

6 ITALY

6.1 Boiler Inspectors

6.1.1 Context

International context

Compliance with Kyoto commitments and Energy Efficiency Directives.

The Directive Proposal of EU Parliament on energy efficiency in building sector (2001/C 213 E/15 COM (2001) 226 def. – 2001/0098 (COD) Art. 1 e) proposes the introduction of compulsory inspection of boilers.

National context

According to Law 10/91 art. 31 Italian municipalities with more than 40,000 inhabitants in their territory and province administrations in the remaining national territory have to accomplish the inspection of all the boilers at least once every two years. The assessed number of boilers to be inspected is 11 million: 9.5 million boilers with a capacity smaller than <35 kW and 1.5 million boilers with capacity >35 kW. It is estimated that the number of plants effectively inspected in 2001 has reached a fraction of 10% of the total. This low value is due to numerous difficulties and economic obstacles faced by public administrations for the accomplishment of the new inspection task.

6.1.2 Missions

- Verify the state of maintenance of all installed boilers and guarantee for an energy efficiency exceeding a minimum value each boiler.
- Verify the presence of automatic temperature regulation and safety equipment.
- Control the conformity to law of the heating plant.
- Raise awareness and inform the final users about energy conservation, energy savings, safety rules and the achievement of a good comfort level.

Boiler inspectors should be seen in the same light and role as “fire-men” by the users.

6.1.3 Required aptitudes

Education and know-how

Technical knowledge on thermal processes and plants, in-deep knowledge of laws and standards as well as manual skills in verification procedures.

Way of being

- Awareness of risk and respect for norms and technical procedure
- Feeling for human contact and creativity

6.1.4 Basic training

Attestation for verification of boilers and thermal plants.
Baccalaureat+4 (technical and scientific Master degree).

6.1.5 *Host structures*

- Municipal and Provincial Administrations
- Inter-communal structures
- Municipal service companies
- Non-profit organizations

6.1.6 *Example*

Etruria Servizi

Municipal service company of the town of Civitavecchia (Roma).

Within this public company the “Ufficio Verifiche Impianti Termici” is charged of the task of inspection of all the boilers installed within the territory of the town. The office acts through five inspectors selected within a specific ENEA national project. The LPU (Lavoratori di Pubblica Utilità: public utility workers) project “Verifiche degli Impianti Termici”- Italy 1998-2001.

6.2 **Energy Contract Broker**

6.2.1 *Context*

International context

The European directives 96/92/CE and 98/30/CE introduce the liberalization of the gas and power markets in the European Union. Among a complex of different effects these directives introduce the plurality of Private Power and Gas suppliers in most of the EU member countries.

National context

A number of decrees both of the Italian Government and of the Ministry of Productive Activities and Directives of the Italian Power and Gas Authority introduce for the first time the plurality of supply offer, contracts and prices: Decree Leg. 79/99, Decree Mica 9/5/01, Del AEEG 288/01, 317/01 for power, 237/00, 120/01 and 26/02, regarding the new rules and norms for power and gas transport, measurement and the establishment of tariffs. The end-consumer faces a variety of possibilities never seen before. The range of possibilities is foreseen to be so wide that a market is opened for new professionals, well knowing contracts, prices and opportunities and able to act as a consultant for medium size consumers: a broker able to suggest which distributing company and which contract to chose, how to do demand side energy management, when to change to another company or whether own production might be advantageous or not.

6.2.2 *Missions*

- Advise energy final users and assist in energy supply contracting.
- Raise awareness and inform the end-users about energy conservation, energy saving opportunities and own power production.

6.2.3 *Required aptitudes*

Education and know-how

Basic knowledge of economics and technical knowledge of power and gas markets.

Way of being

Feeling for human contact and aptitude in advising.

6.2.4 Basic training

Basic knowledge of economics.

Baccalaureat+4 (technical and scientific Masters degree).

6.2.5 Host structures

- Municipal administrations and inter-community structures
- Energy service companies (municipal and private)

6.2.6 Example

This professional profile is present with the personnel of ESCos and Energy Distributing Companies.

6.3 Thermal Plant Design Inspector

6.3.1 Context

International context

Compliance with Kyoto commitments and Energy Efficiency Directives. The Directive Proposal of the EU Parliament on energy efficiency in the building sector (2001/C 213 E/15 COM (2001) 226 def. – 2001/0098 (COD)) refers to the need of energy efficiency objectives in buildings and therefore also at the level of thermal plant design.

National context

Italian municipalities have the institutional task to control new buildings' design and to verify conformity to regulation of all parts, both envelope and thermal plant. According to Law 10/91 art. 28, the building owners must present a specific report regarding compliance of building design with prescription of art. 25 and art. 26, which engage him to allow controls of energy saving and efficiency of the building and its energy installations. This prescription entails the need of a big effort to control thermal plant design, which might overtax municipal technical offices. Only a few large towns can afford the cost of the work if a professional engineer is employed for the task. ENEA has set up the specialized software *RECAL 10*, which can be the starting point for the promotion of a new professional profile in a growing market with numerous new buildings under construction.

6.3.2 Missions

- Verify the design of new thermal plants in buildings
- Verify the compliance of the thermal plants with the energy efficiency standards
- Control the conformity of the heating plant to the corresponding law
- Raise awareness inside the local administrations about energy efficiency technology and energy saving tools and related technical solutions including renewable energy sources
- Act as consultants on new energy technology and systems in the residential sector for local authorities

6.3.3 *Required aptitudes*

Education and know-how

- Technical knowledge on thermal processes and plant design (university level)
- In-deep knowledge of laws, norms, regulations and authoritative procedures

Way of being

Aptitude to consultancy and advising

6.3.4 *Basic training*

- Attestation of training to use of RECAL 10 for thermal plants design verification
- Baccalaureat+4 (technical and scientific Masters degree).

6.3.5 *Host structures*

- Municipal administrations
- Inter-communal structures
- Municipal service companies

6.3.6 *Examples*

The Town of Bari, Capital of the Region of Puglie, manages energy by means of an Energy Office perfectly equipped with professionals able to verify global efficiency of building including thermal design computation and hypothesis verification, according to the Law 10/91 art. 28/33.

6.4 Gas fired Plant Safety Inspector

6.4.1 *Premise*

This type of new profession has to be recorded as a new profession of the energy sector at least in Italy due to the great geographic diffusion of natural gas as a fuel for space heating and combined heat and power (and cold) energy generation.

6.4.2 *Context*

International context

The oil crisis has demonstrated that security of fuel supply only can be assured by differentiating energy sources and by replacing fossil fuels with renewable energy sources. The most important measure undertaken by the Italian government in the seventies and eighties was to conclude contracts and take part in the construction of two important natural gas pipelines: one coming from Siberia and Russia, and the second bringing the Algerian gas to Europe, via Tunisia and Italy. The Italian natural gas share is now 30%, reducing the oil share to 40% from the former 80%.

National context

By this operation, the Italian energy system gained in security (with a relative sacrifice due to the slow down of renewable penetration caused by commercial aggressiveness of the Gas National Company & Board), but its safety problems grew. Natural gas is now available in most Italian

regions, even in small mountainous towns. The law n° 46/90, art. 14 obliges municipal administrations and public sanitary units to verify the compliance of gas transport and gas fired equipment with the safety norms and regulations. This prescription entails the need of a big effort to assure the verification function, which might overtax municipal technical offices because of a lack of appropriate and because of the high cost of commissioning external professionals. This problem may be solved training young engineers and may be the starting point for the promotion of a new professional profile within a wide market.

6.4.3 Missions

- Verify the safety of natural gas installations
- Control the conformity to law of the gas equipments and pipelines
- Raise awareness among the local administrations and the general public about safety problems, accident prevention and good maintenance behaviour
- Act as consultants on technical norms and regulations regarding safety and accident prevention behaviours for local authorities

6.4.4 Required aptitudes

Education and know-how

- Technical knowledge of mechanical engineering and design of plants with moving fluids (university level)
- In-deep knowledge of laws, norms, regulations and authoritative procedures

Way of being

Aptitude to control activity including censorial aspect

6.4.5 Basic training

- Attestation for verification of plant safety
- Baccalaureat+4 (technical and scientific Masters degree).

6.4.6 Host structures

- Municipal Administrations
- Inter-communal structures
- Municipal service companies and gas distributor companies

6.4.7 Example

Italgas, Gasenergia, Tamoil and SNAM as all important Gas Distributing companies have this professional profile among their employees.

6.5 Energy Saving Measures Developer

6.5.1 Context

International context

- Compliance with the Kyoto commitments and the European Renewable Energy / Energy Efficiency Directives.

- Liberalization process of power and gas market.

National context

On April 24th, 2001 the Ministry of Productive Activities (former Ministry of Industry) enacted two twin decrees: one for gas and the second for power distribution (non-generation), where the Italian national objectives for energy conservation and renewable energy sources development to are specified. Gas and electricity distributors will have to help final users to adopt appropriate measures to reach those objectives. The Authority for Electricity and Gas controls the measures and emits an *Energy Efficiency Share*, proving the contribution to the annual objectives. These shares will be tradable on a special energy efficiency share market. The power distribution companies will recover the cost of the measures on the energy tariff, so the saving of “virtuosi” is paid by all consumers. The creation of the new energy efficiency share market opens a new professional profile: the Renewable Energy and Energy Conservation measures Developer.

6.5.2 Missions

Identification, design, planning and accomplishment of energy efficiency measures and projects, including renewable sources integration; to be realized in cooperation with the clients of the gas or power distributing company

6.5.3 Required aptitudes

Electric and mechanical engineers, technical knowledge of thermal processes and installations, in-deep knowledge of laws and normative and procedures

6.5.4 Basic training

- Design practical training experience
- Baccalaureat+4 (technical and scientific Masters degree)

6.5.5 Host structures

- Energy Distributing Companies
- Municipal service companies
- Professional Engineering Companies