IEA DSM Task X – Performance Contracting

Country Report, Italy

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1 EXECUTIVE SUMMARY

Renewed interest is growing in Italy on development and operation of Energy Service Companies (ESCO), owing to both economic and governmental policy reasons (e.g. electricity market opening, new decrees on mandatory energy efficiency actions). Consequently, the relevant contractual concerns, such as Performance Contracting, are drawing the attention of national experts: the need for deepening knowledge in this field motivates the participation of Italy to the present IEA DSM Task X.

This report surveys the national evidence and feelings (state-of-the-art, expectations) about ESCOs, with particular attention to the contractual items. In particular:

- The Italian context of the electricity industry and market, in the light of unbundling, liberalisation and privatisation processes, is first considered,

- This is followed by a review of expectations and requirements on ESCOs and of their actual operation conditions (size, organisation, type of services, markets, forecast evolutions) in the national scenario,

- Main issues on Performance Contracting (financing, contractual, measurement and verification, guarantees) are then considered,

- Barriers to ESCO operation are pointed out and targeted government policies are described,

- Finally, available case studies are presented and conclusions on lessons learned are summed up.

2 INTRODUCTION

In the context of the actions carried out to implement the Kyoto protocol, particular attention is being devoted by national authorities to programmes relevant to:

- improvement of thermal generation efficiency,
- decrease of consumption in industry, service production and residential sectors.

In fact, these two items are expected to reduce CO_2 emissions in Italy by about 45 % by the 2012 deadline. In particular, very recent decrees were issued on mandatory energy efficiency actions, aimed at decreasing consumption of primary energy by the electricity and gas sectors. These actions, which earn the performers a number of energy efficiency certificates (TEE), are addressed to the distribution companies, who may outsource them to Energy Service Companies (ESCO) in TEE trading.

In addition to that, public authorities are taking a growing and direct interest in ESCOs, as suitable agents of outsourced actions aimed at compliance with standards, requalification and power upgrading in public buildings (hospitals, schools, offices, etc).

Finally (and from a more general viewpoint), liberalisation of the electricity market is bringing about renewed interest of electric utilities towards business-orientated DSM actions involving ESCOs.

In this context, ESCOs are going to focus great attention at national level, as suitable partners in implementing advantageously energy efficient actions, while speeding up innovation and shortening the gap between research and application. Moreover, according to a present general feeling, ESCOs are bound to play a more and more important role in the trade scenario, in the direction of a balanced and straightforward development of an open electricity market.

The limited presence of ESCOs in Italy, and a not so deep experience in TPF (Third Party Financing), the elective financial mechanism adopted by ESCOs in their operation – brought about the need to gain knowledge and working tools to be made available at a national level. In October 2000, the International Energy Agency (IEA) Demand-Side Management Program established a Task on Performance Contracting. The Task is aimed at increasing international awareness of the ESCO industry, with special reference to contracts involving performance criteria and TPF.

Italy decided to attend this Task to share its limited but existing experience in this field with that of other countries with similar or fully developed electricity markets. CESI has been involved in this Task, as the Italian subject in charge at present with the system research concern; that is, research activities, as the present one, devoted to the whole national electric system. More in detail, Italy is now engaged in producing a country report, the present one, which highlights:

- national electricity context,
- activity of existing ESCOs,
- the main legal and contract issues,
- possible case studies.

An international workshop is planned for November 2001, to discuss the country reports of the participating countries. On the basis of the achieved conclusions, each participating country will develop in 2002 the individual implementation plans for increasing the national viability of performance contracting.

3 ADMINISTRATIVE INFORMATION

3.1 Organisation responsible for the report in Italy: CESI

3.1.1 General

CESI is a private company belonging to the Enel Group (the major Italian electrical utility). The Group was established in 1956 and operates in over 35 countries in the world, with more than 40 years of growth in the market.

Since the beginning, CESI has been a market leader in testing, certification of electromechanical equipment and electrical power system studies. The company offered the services of its widely esteemed technicians to electrical utilities, electromechanical and electronic manufacturers and large-scale users of electric power.

Since *January 1st 2000* CESI has enlarged its field of activity. In the frame of the liberalisation of the Italian electrical system and the consequent reorganisation inside Enel Group, CESI has acquired from Enel its R&D activities (in generation, transmission, distribution, final use of energy, environment and renewable energy fields).

The merger between these two well-known organisations, CESI and Enel Research, has produced a company of about 1000 people covering *all the sectors in the electrical energy field as global power consultants, contract research organisation and provider of services and special equipment for the electrical industry***.**

The competence, know-how, knowledge and references acquired by CESI include also the strong tradition of CISE, a company (incorporated in Enel Research in 1998) which operated for more than 50 years in the generation, environment, and materials.

The shareholders of the 'new' CESI well represent the various components of the electric sector: *electrical utilities* (Enel Group, Edison, Sondel, AEM of Milan and Turin), *the Italian independent system operator* (GRTN), *leading European electromechanical groups* (ABB, Alstom, Pirelli, Schneider, Ansaldo, Siemens etc), and industrial users.

3.1.2 The services

The services offered are as follows:

- Power production services
- Transmission and distribution services.
- Environment services
- Industrial plant services
- Testing services
- Component services
- Project services
- Certification services
- Training services.
- Renewable energy services

3.1.3 The market

The services offered are aimed at:

- Electrical utilities (production, transmission and distribution)
- Independent system operators (ISO)
- Regulation authorities
- Electromechanical and electronic manufacturers
- Industrial users
- Public administrations
- International financial institutions.

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4 METHODOLOGY

4.1 Method for country report setting up

The country report describes the results of a series of actions, such as:

- surveys
- interviews
- reviews

which were addressed to:

- Governmental Agencies (MICA - the Ministry for Industry, Trade and Handicraft , ENEA - the National Agency for Energy and Environment)
- suppliers of energy services (the present or potential ESCO)
- end users of the energy services (typically, ASL - local health boards)
- support, assistance and consulting agencies (such as ICIE).

4.2 National parties involved in the study

Some parties were involved in a direct way, since they brought their share of contribution on the basis of their experience gained in the past. At present they are the following:

ICIE - Private centre for research and services in the building industry, with emphasis on energy and environment problems. ICIE, together with Piemonte Region, Finpiemonte (a financing company), AEM Torino (a municipal electric utility), Credito Italiano (a bank institute) and the three non-Italian ESCOs IDAE (Spain), ECOTEC (GB) and Cora-Sea (Germany), is working on initiatives devoted to promoting and adopting Third Part Financing (TPF) in Italy, such as:

- establishing a scheme of Special Specification for heat and electric power supply through TPF to industrial, civil and hospital users;

- direct assistance to Omegna Local Health Board in issuing a particular Specification;

Moreover, ICIE formed an expert group capable of giving assistance in the implementation of energy conservation programmes.

FIRE - Federazione Italiana per l'uso Razionale dell'Energia (Italian Federation for Rational use of Energy), is a non-profit organisation established in 1988. Its founder members are ENEA – Italian Agency for New technologies, Energy and the Environment, and other outstanding organisations active in the field of RUE. In 2000, FIRE had about 400 members. Energy managers operating in the private and public sectors may join the Federation either directly or through the organisations to which they belong. Energy managers are required by law (10/91) in Italy to be appointed to large energy consumers. There are at present about 2500 such energy managers. The primary objective of the Federation is to promote the rational use of energy, mainly through the provision of operational, technical and scientific support to Energy Managers. FIRE aims at:

- promoting and activating an 'energy culture' through the dissemination of information, knowledge and best practices of rational energy use among operators and the general public;

- carrying out studies, research, surveys and analyses to identify needs and cost-effective options for energy efficiency improvement;

- encouraging initiatives and disseminating best available energy technologies;

- contributing to the identification of new techniques for energy saving;

- stimulating international collaboration involving foreign associations operating in the energy and environment sector.

Since 1992, there has been an Implementing Agreement with the Ministry of Industry and Trade which has transferred the Ministry's own support activities for implementation of Article 19 of Act 10/1991 relating to the Energy Managers to FIRE. FIRE has established a network with over 2000 Energy Managers nominated in Italy; the network operates through direct contact, information dissemination events, a magazine and web site.

To promote the professional growth and the role of the Energy Manager, FIRE utilises the capabilities of its technical and managerial staff in addition to resources made available by its members. These capabilities cover all the sectors (technical, scientific, design, management, institutional and administrative) involved in operation and completion of the proposed project.

The network of Energy Managers may be activated for collecting various operative experiences for specific problems and for selecting experts at various levels who can contribute to the project.
For further details, see the website: http://www.fire-italia.it.

Other parties were involved in an indirect way, since they made available the results of their experience. At present, they are the following:

ENEA - Italian Agency for New technologies, Energy and the Environment. ENEA is the public agency working in the fields of research and innovation for sustainable development, with the aims of promoting the goals of development, competitiveness and employment together with environmental protection. ENEA also acts as an agency for public administrations through advanced services in the field of energy, environment and technological innovation. ENEA works closely with FIRE in the field of ESCO and Third Part Financing, making available human resources for this purpose.
For further details, see the website: http://www.enea.it/

Piemonte Region - The Piemonte Region assumed a really strategic role in the Third Part Financing frame: in fact, in their capacity as an institutional party, they acknowledged TPF as a valid energy policy instrument to implement National policies to stimulate energy saving (Act 10/91) and European Directives (Dir. 93/67) evidencing TPF as a suitable tool to support energy improvements in public administrations' structures. The Piemonte Region assumed that the lack of a contract model represented the true barrier to the spread of TPF in Italy. Consequently, they processed and tried out successfully a model of Contract Specification devoted to Local Health Boards (see ref. 9); in addition, they have recently defined a contract model devoted to Public Administrations for procurements in the sector of public lighting (see ref. 10).

Energy Service Companies chosen from a list of selected companies (see sect. 13.2).

This network of contacts has allowed a fair exchange of information for a year, but it is still unofficial and quite far from a formal national reference group. Nevertheless, CESI is moving towards such a goal: a more official presence of representatives of ESCOs and of the other parties (public administrations, energy managers) would increase the impact and the value of this national group.

5 GENERAL ENERGY CONTEXT

5.1 Legal framework

Until 1987, Italian energy policy seemed to be little inclined to look to the example and experience of other countries, and produced a somewhat centralised, rigid and constrained energy policy, largely prepared with the involvement of energy agencies dependent on the Government. Today, the picture is completely different. On the one hand, there is the international influence in the form of the objectives set by the European Union; on the other, the process of decentralisation in Italy has led to the participation of regional and local governments in energy policy. The conviction is growing that energy, as a strategic factor for the economic and social development of the country, requires recourse to market dynamics and free initiative, superseding the older concept of the need to regulate the topic exclusively through a command and control regulatory system.

The National Conference on Energy and Environment held in Rome in November 1998 signalled the start of a new way of making energy policy, based on concertation, decentralisation, use of market mechanisms and integration with territory management policy. That Conference was not a point of arrival, but rather a starting point. It was the opportunity to lay the foundations for a different way of proceeding in energy matters in future years. To some extent it marked the abandonment of a system of imposition in favour of a policy based on the market and concerted decisions based on voluntary pacts and agreements.

It is in this context that the Pact on Energy and the Environment was signed by representatives of government institutions, of economic and social forces and of environmental and consumer organisations, confirming the new mode of selection and implementation of the country's principal energy/environment objectives. That Pact, combined with other instruments of negotiated planning, constitutes both corollary and instrument of a policy of concertation, which by its very nature, prevents disputes arising between the various parties involved, and thus limits the costs of environmental conflict. In a context in which the principles of globalisation of markets and economies is becoming established, the European Union is developing a single market for electricity and gas, and environmental aspects are increasingly important, the Government indicated additional priorities in the energy field in the concluding document of the 1998 National Conference on Energy and Environment, in addition to the signing of the Pact on Energy and Environment:

- Reorganisation of the electrical industry (known as the Bersani Decree)
- Resolution on the Kyoto protocol (CIPE Deliberation)
- Introduction of the carbon tax
- Implementation of the Bassanini Law (relevant to procedures to streamline public administrative activity and decision and control processes).

These proposals are in line with the following basic policy directions adopted by the Government in energy matters, with a view to increasing Italy's role in the European context.

- Greater recourse to the market
- Participative approach
- Sustainable development
- Decentralisation
- Simplification of regulations and administrative procedures
- Emphasis on consumer/citizen behaviour
- Better north-south balance
- Emphasis on action in local areas
- Internationalisation of enterprises.

Starting from the consideration that spontaneous evolution of the system could neither lead to improved security of supply nor to compliance with international obligations in the environmental field, in the cited document the Government outlined a programme of actions which addressed the following aspects, in harmony with the scenarios for evolution and the basic choices made:

- Security of supply, to be achieved through market regulation instruments that, in the medium term, ensure 40 % of the gross internal market will be met by national resources (fossil and renewable), and fuels obtainable from a wide variety of sources. This will allow the concept of 'petroleum reserves' to be replaced by that of 'hydrocarbon reserves' including oil, gas and LPG.

- Natural gas market to be created through complete implementation of legislative decree 164/2000 in the context of completion of liberalisation of energy markets.

- Emphasis on more efficient energy use by consumers in view of its beneficial effects on security of supply, on the environment and on employment, as well as the opportunity it provides for modernisation of production equipment to make Italian industry more competitive in international markets through high efficiency production with low environmental impact.

- Doubling of the share of renewable energy sources by the year 2010, as a target to be reached in constant dialogue with the regions.

- Quality of supply of energy services as a factor of significant importance both for its effects on the competitiveness of the production sectors and for the economic development of the country, and for the protection of end-users/consumers following liberalisation of the electricity and gas sectors.

- Economy of energy services. Liberalisation of energy markets is seen as a necessary precondition for development: economic, social, civil and employment. On this aspect, it is the intention of the Government to favour horizontal expansion of enterprises and integrated management of the various services, and to introduce a

new concept of economy that incorporates external costs and benefits – as external factors – in the price of supplies.

- Environmental compatibility, seen as an opportunity for development rather than as a constraint, must be pursued in the first place through the rules of the market and compliance with the IPCC Directive EC/96/61, where it provides for use of the best available technologies in industrial processes and modernisation or closure of the most obsolete and polluting electrical generation plant. In this field, and taking account of its commitment to reduction of CO_2 emissions, the Government approach is to undertake initiatives such as the Clean Development Mechanism and Joint Implementation through co-operation with developing countries.

- Handling of the closure of nuclear reactors, with an answer to be given jointly with the regions to the problem of treatment and storage of radioactive waste and establishment of a medium-term programme for decommissioning of nuclear plant.

- Research on energy and environment, with, on the one hand, promotion and support for major medium/long-term national, European and world research projects, for example on global climate change, renewable energy and thermonuclear fusion; on the other hand, technological innovation taking account of the country's problems of competitiveness.

There thus emerges a clear intention on the part of the Government for dialogue and mutual evaluation in implementation of the ambitious programme described above, in the first place with the regions, giving them a planning role which, in the past, was too often neglected in favour of assignment of merely operational tasks. In the context of this new approach in national energy policy consequent upon liberalisation of the energy markets, space and possibilities of development have appeared for a strategy of support to investments based on use of project financing instruments. Among these is what is known as the *TPF option*, under which an *energy service company* undertakes to provide a comprehensive service of diagnosis, finance, installation, operation and maintenance of technical plant.

5.2 The Italian electricity system: present structure

5.2.1 Production

The following data are available for electric energy production for 1999 (see ref. 2 and 3):

National electricity balance (GWh):

	1997	1998	1999
Gross production	*251 462*	*259 786*	*265 692*
• Hydroelectric	46 552	47 365	51 636
• Conventional thermal	200 881	207 970	209 268
• Geothermal	3 905	4 214	4 403
• Wind and solar PV	124	237	385
Auxiliary services	*12 174*	*12 843*	*13 018*
Net domestic production	*239 288*	*246 943*	*252 674*
Import	*39 827*	*41 633*	*42 539*
Export	*-995*	*-901*	*-529*
Pumped storage stations	*-6 728*	*-8 358*	*-8 884*
Electricity request to the grid	*271 392*	*279 317*	*285 800*
Grid losses	*17 718*	*18 508*	*18 400*
Final consumption	*253 674*	*260 809*	*267 400*

PRODUCER	**%**
Enel	61
Others: - Municipal companies (about 165) - Private companies (about 80) - Independent producers (about 430) - Cogeneration producers (about 430)	25
Import	14

It must be pointed out that, from 2003 on, no operator will be allowed to produce or import, either directly or indirectly, more that 50 % of the total electric energy produced in or imported to the national market. Moreover, Enel is required to transfer not less than 15,000 MW of its production capacity to other generation companies, which will decrease down to 40 %; this is forecast by the end of 2002, with a chance of respite not higher than one year.

5.2.2 Transmission and dispatching

Transmission and dispatching activities remain reserved to the State and will be granted by way of concession to GRTN SpA as the National Transmission Grid Operator. At present, GRTN is not the owner of the grid assets, but will provide operation, maintenance and development of the network to ensure efficient operation on the national system. The grid is now owned by the Enel Group through the company Enel Terna; Enel Terna is to be merged with GRTN in the next future.

The Authority will set rules and directives for electricity and gas management to guarantee the access of any operator in a non-discriminatory way.

5.2.3 Distribution

Distribution and market with non-eligible clients, performed at present by Enel (94%) and municipal companies (6%), are based on 30 year's grant regime. Grants are issued by the Ministry of Industry and Trade. The following table shows the distribution of final use of electricity (GWh):

	1997	**1998**	**1999**
Agriculture	4 354	4 487	4 615
Industry	133 916	137 700	139 815
Service production (tertiary)	56 919	59 347	62 300
Residential	58 485	59 275	60 670
Total	**253 674**	**260 809**	**267 400**

5.3 Market evolution

5.3.1 Present market (1999)

The present electricity market (1999) is characterised by the below figures (see ref. 2):

	%
Enel	70.8
Cogeneration producers	24.0
Local companies	4.0
Others	1.2

The regulatory framework for the electricity market is defined by Legislative Decree 79/99 (the *Decreto Bersani*). The main points of the decree are summarised below.

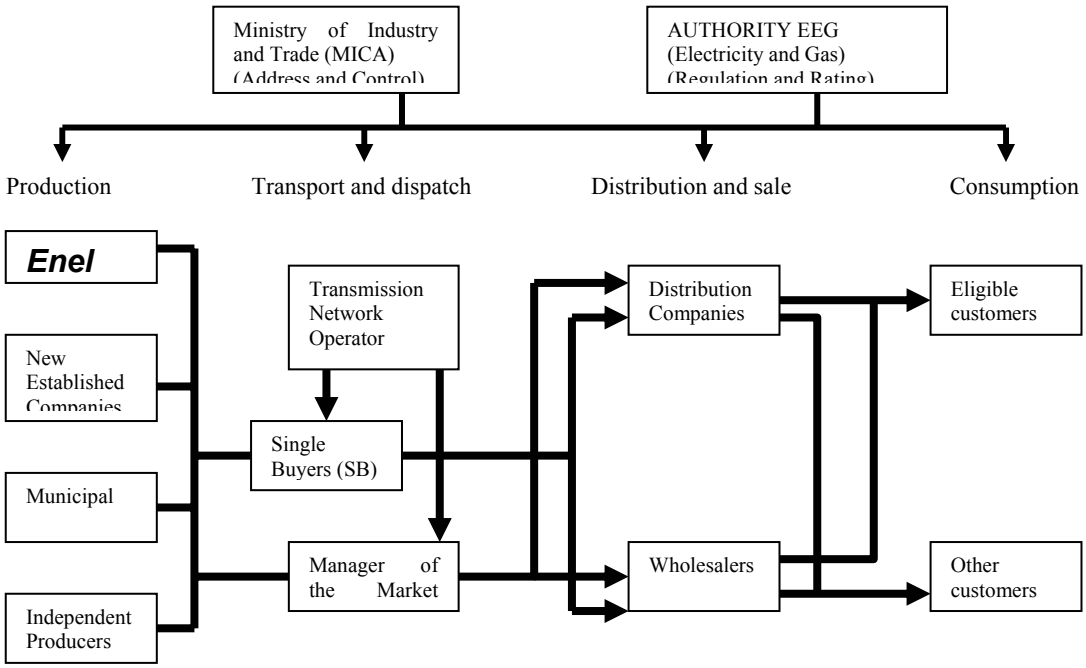
Two parallel markets will coexist within the national electric system.

A *restricted market*, consisting of all the residential clients and the other users whose consumptions are below fixed thresholds (non-eligible clients); these clients are not allowed to stipulate supply contracts directly with national or foreign producers. GRTN will establish a stock company, the 'Single Buyer', with the main task of guaranteeing availability of energy for non-eligible customers. The Single Buyer will buy energy from producers under non-discriminatory conditions and must provide yearly forecasts of electricity demand for the following three-year period.

A *free market*, where the eligible clients operate. These clients, having a consumption exceeding fixed thresholds, are allowed to stipulate supply contracts, unbound by tariff, directly with producers, distributors or wholesalers. GRTN will establish a stock company, the 'Manager of the Market', with the task of looking after the competitive

electricity market, which will act as a trading exchange authority with the role of ensuring a real-time balance of electricity demand and supply.

The new configuration of the national electricity market, once the transition process is completed, is outlined below (see ref. 3):



Full implementation of a liberalised market will require further regulatory actions by the Ministry of Industry and by the Authority.

5.3.2 Liberalisation

Liberalisation is in progress in the Italian electricity market. The minimum opening of the market foreseen is outlined in the below table (see ref. 3).

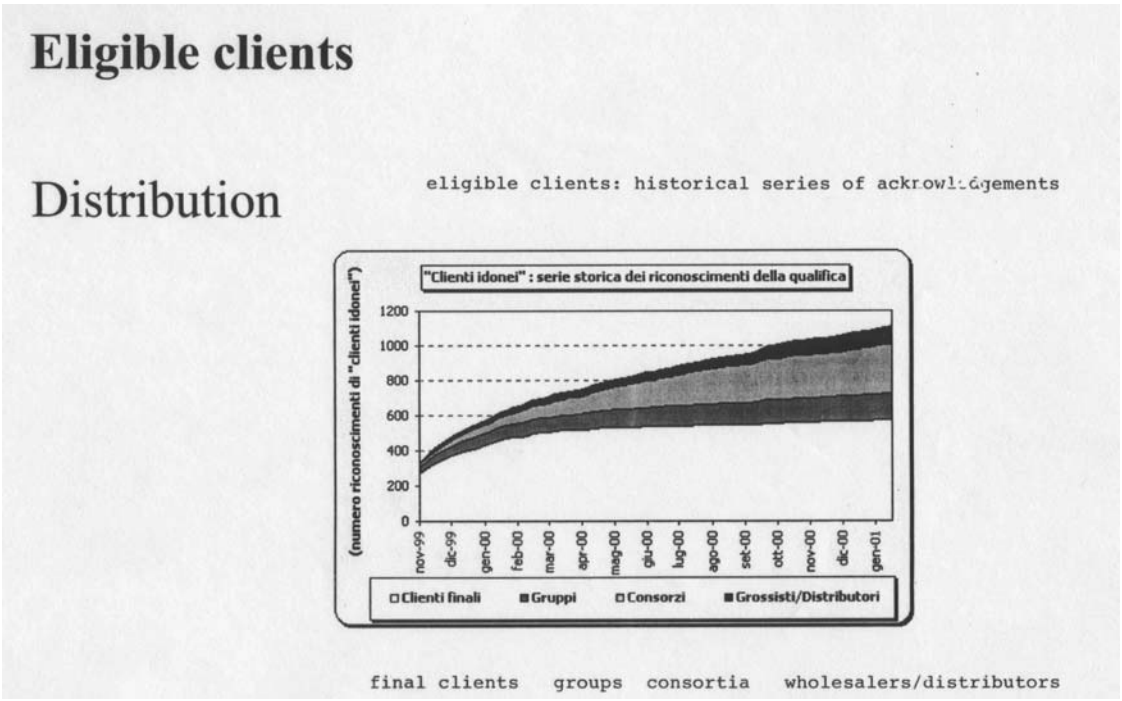
Year	% of market opening
1999	30
2000	35
2002	40

A competitive market relies on eligible clients, who are allowed to enter into bilateral contracts with national or non-national producers or wholesalers and to use the national transmission grid, paying a transport tariff to the transmission network operator. Eligible clients will deal with bidding mechanisms in 2001-2002, managed by the Electric Market Manager; the bidding price will reconcile supply and demand on an hourly basis and subject to physical grid constraints.

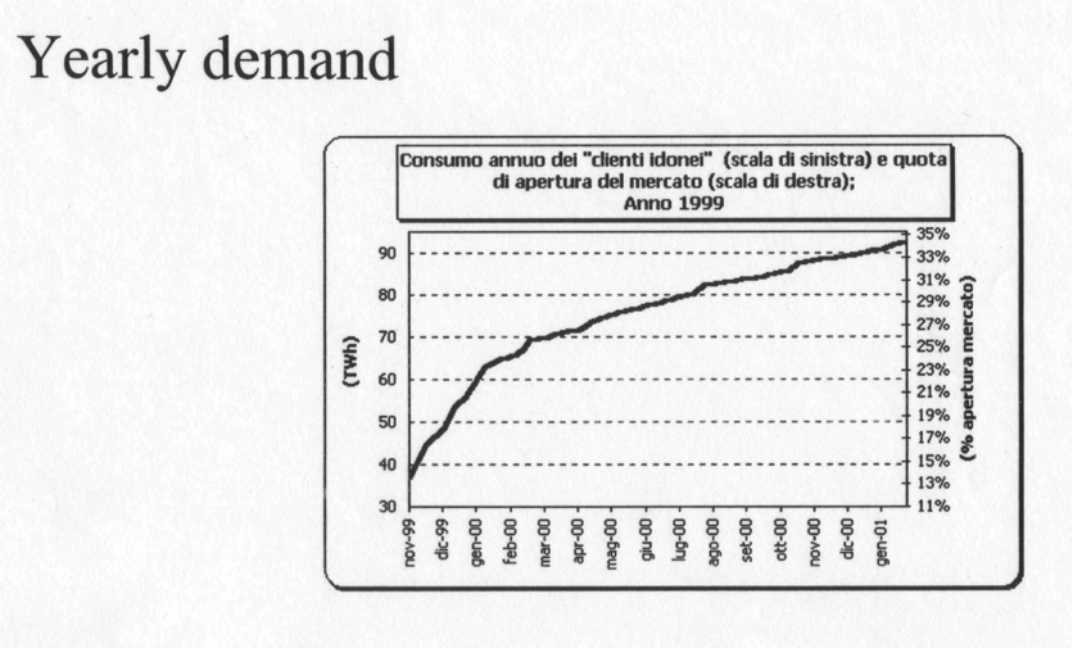
The eligibility criteria are based on minimum threshold for annual consumption, as shown below:

	From 19-2-1999	From 1-1-2000	From 1-1-2002
Global consumption threshold (for companies, groups of companies and consortia)	30 GWh	20 GWh	9 GWh
Single point threshold	2 GWh	1 GWh	1 GWh

Some information about the trend of the acknowledgement as eligible client and their distribution is shown in the below figure (see ref. 2):



Forecasts of total annual consumption of eligible clients (left axis) and about the amount of market opening (right axis) are also reported.



At present (1999), only 20% of eligible clients stipulated free contracts (mainly, with producers in other countries).

5.3.3 Privatisation

In November 1999, about 32 % of Enel's share capital was placed on the market and purchased by about 3.83 million private and institutional investors. From this, since Enel is in charge of about 71 % of the country's production, we can state that at present at least *20 %* of the national electric market is managed by private parties. Some unit of percent may be added to this figure if one takes into account the private presence in the shareholding of other Italian electric utilities (such as Aem Milano, Edison, Sondel).

6 DEFINITION OF ESCO/PERFORMANCE CONTRACTING, INCLUDING THIRD PARTY FINANCING

6.1 Definition

An ESCO is a company that has the capacity and knowledge to make investments, take risks and implement energy saving actions, recovering and obtaining a return on its investment through the savings achieved as a result of its action. To conduct its activeties, the ESCO must:

- have the technical capacity to design the project and implement the actions involved

- have the economic and financial capacity to:
- promote and/or undertake investments
- assume risks
- handle wide-ranging projects
- be solvent

- be versatile

- be able to respond to continuing technological development with
- new products
- a high degree of diversification.

6.2 Offered services

An ESCO is expected to supply its end users with the following possible services:

- Energy audits and technical-economical analysis

- Design and implementation

- Financing

- Supply:
  Fuel and/or heat and/or electricity
  Lighting
  Services in the electric field:
  - Power factor regulation in final use
  - Efficiency improvement of electric motors

- Operation and maintenance

- Guarantee of results

6.3 Target markets

Possible market segments where ESCOs are supposed to gain a wide coverage and to operate profitably should be characterised by:

- meaningful size, at either global energy requirement or single-user level[1],

- remarkable margins for improvement of efficiency and saving.

[1] End-user where an ESCO can target profitably his services should be characterised by an annual economic engagement for electric power greater than a lower threshold, e.g. 100,000 Euro.

For this purpose, a very synthetic review of the national energy requirements is presented below. The study is aimed at getting elements in order to point out the most significant energy sectors where ESCOs can operate with less risk and more profitably.

Data from 1998 relevant to residential and service-production sectors were obtained from ENEA, the Italian Agency for Energy and Environment (see ref. 1). Enel provided data from 1996 relevant to the industrial sector (see ref. 4).

National energy balance 1998	
non-electric source	108 Mtoe/year
electric source	260.809 TWh_e/year

Civil and service-production sector: energy requirements

Sector	**End use**	**Fossil (**Mtoe/year)	**Electricity** (TWh_e/year)
Residential	Heating	18.758	N.A.
	Domestic hot water	2.437	11.3
Service-production	Climate control + domestic hot water	6.169	55.9

Industry: energy requirements

Segment	**Fossil (**Mtoe/year)	**Electricity** (TWh_e/year)
Wood + rubber + plastic	1.34	11.81
Food	1.99	9.93
Paper/print	1.75	8.72
Textile/leather	1.45	10.60
Building	6.01	11.83
Chemical	5.07	17.88
Mechanical	2.38	20.86
Metallurgical	5.75	23.49
TOTAL	*25.74*	*115.12*

As for *lighting*, specific data are available (1998):

Sector	**End use**	**Requirements (TWh_e/year)**
Residential		7.5
Service-production	Public lighting	5.0
	Other	13.0
Industry		4.5
TOTAL		*30.0*

The results of this review lead to the following remarks.

Energy requirements in the *residential sector* represent a considerable amount of the national balance, through both the fossil source (for heating purposes) and the electric source (for domestic hot water production). A market in this sector might be in principle still be very promising. Nevertheless, this would entail a service towards a very fragmented, hardly approachable class of end users, whose needs often are very differentiated and unlikely to be reconciled without effort, which has deterred, and is bound to continue to deter, future ESCOs actions in the sector.

As for *service-production sector***,** very remarkable electricity requirements exist to supply climatisation and domestic hot water. The more homogeneous and approachable kind of user makes this sector very attractive for ESCO operation. As a matter of fact, the few existing examples of national ESCO activities are mainly relevant to cogeneration installations at local health boards, and there seems to be considerable scope for future interventions in the private field:

large distribution 'food' and 'non-food',

banks and insurance companies,

as well as in the public administrations:

- schools,
- universities,
- offices,
- water mains,
- gas networks.

As for *industry*, mainly SMI is bound to be targeted, even if room exists also for large industry. The most energy-intensive sectors turn out to be building, chemical, metallurgical and mechanical, for both fuel and electricity requirements. It should be pointed out that high values of electricity demand may be reasonably assumed as indicative of a cogeneration need (and related possible ESCO interventions). On the other hand, high fuel consumption is not in principle meaningful likewise, since it is difficult to distinguish the amount of energy used for heating (the most preferred field for ESCO operation) from that used for the specific industrial process. However, it is worth considering that the amount of energy spent in the industry for ancillary systems (as heating and dhw) is estimated as amounting to about 10% of the total; moreover, in several cases also production of energy for the industrial process (e.g. for steam generation) may take advantage of possible ESCO energy services based on the installation of cogeneration plants. Another very promising industry end-use where remarkable energy saving can be obtained by efficiency improvement is that of electric motors. In this context, a very recent national decree (see sect. 10.2) on the improvement of energy efficiency of final use encourages DSM activities in this sector.

Considering specific end-uses, the *lighting sector* is characterised by considerable electricity requirements. It looks to become an interesting market segment for many Italian companies available to operate through TPF mechanisms. This is also due to the still existing margins for energy and cost savings by either efficiency improvement or a

more rational exploitation of the lighting systems (theoretically, savings up to 70 % might be achieved, see ref. 6).

6.4 Size of ESCOs

The national ESCO market is still at a very early stage; information is consequently very sparse. However, some quantitative indications about ESCO operations were collected and below reported:

- about 15 Italian companies declare to operate or to be available to operate as ESCO (see chpt. 13.2), adopting TPF mechanisms; average dimensions and economic capacities are not so meaningful, since data are dispersed over a very wide range,

- according to information from the cogeneration sector:

- 1-3 interventions per year are performed;

- the relevant investments range from 0.1 to 1.5 million EUR, with total installed power of 0.5-2 MW (even more for industrial end-users).

6.5 Type of ESCOs

The first distinction to be made is between a private sector and a public sector ESCO. The former makes energy saving a means of obtaining profits through the sale of services. The latter (a Government agency) pursues the same objective but with a view to promoting capital expenditure of public utility or obtaining results of public utility.

Another classification, based of the activity field, is the following:

- 'Ad hoc' independent company
- Machinery supplier (electrical equipment, cogeneration, etc)
- Fuel and/or electricity supplier
- Public energy agency
- Public/private joint venture

7 HOW ESCOS OPERATE

7.1 Type of services provided

According to the performed survey, actual activity of ESCOs is relevant to the fields below described.

7.1.1 Cogeneration in the local health board sector

A remarkable demand of restructuring and refurbishment of heat plants has been growing in Italy for about ten years in the local health board (ASL) sector. The hospital facilities of an ASL are characterised by:

- medium to large size,
- high energy costs,
- winter and summer conditioning (heating, cooling, domestic hot water)
- technological services (sterilisation, laundries, kitchens)
- medical services (electro-diagnostic, electro-medical devices).

With high energy consumption and low efficiency of plants, ASL tend more and more frequently to entrust industry with the services of management, operation and maintenance; a mix of interventions of energy saving is then pursued, aimed at reducing the historic costs/consumptions without additional investments and with the guarantee of the expected energy outcomes and of the saving forecast on the energy expense.

Cogeneration interventions are commonly performed in the hospital sector. According to information obtained by SIRAM (see ref. 5), a very active ESCO in this context, it results in:

Produced electric power:	200 - 1000 kW
Thermal power (hot water):	200 - 700 kW
Thermal power (steam):	0 - 500 kW
Investments:	0.15 - 1.25 million EURO
Expected payback period:	4.5 - 5.5 years

7.1.2 Cogeneration and heat generation in the industrial sector

As for energy services supplied in the industrial sector, much less details are available so far owing to obvious confidentiality, typical of private branches. As a matter of fact, two main reasons drive the reluctance of ESCOs to disclose information relevant to contract setting up and managing:

- each agreement is closely tailored to the needs and expectations of the individual client, and for this reason is also highly dependant on the physical characteristics of the structures to which the energy service will be supplied (e.g. insulation, design details), as well as on the characteristics of existing devices; in the majority of the cases, the client requires a non-disclosure agreement on these items, also for reasons of industrial secrecy,

- the presence of contractual conditions tailored to the particular conditions (e.g. those for a fair managing of risks connected to excessive deviations of climatic conditions from the reference ones used to quantify the service offer); they are often the fruit of very long and accurate technical/legal negotiations previously performed by

groups of multi-skilled specialists, and for this reason, they constitute one of the most valuable aspects of the contractual matter, not to be diffused towards possible competitors.

The obtained information can summarised along the following lines:

- the main service offer is relevant to the cogeneration sector, orientated to supplying industrial steam and electric power for process uses,

- some more details were given by DALKIA: they have been operative in Italy for one year, working on about 90 TPF offers; targeting industry, at present in the sectors of food, chemistry and paper, ranges on power demand higher than 2 MW;

- the operating companies almost invariably are structured as multinational groups of economic soundness; the management of financial risks connected to TPF operations relies on the experience of the financial companies of the group and on the ability to set up business plans as a suitable mix of self-financed (with delayed benefits) activities and short-term profitable services.

7.1.3 Lighting

An arising interest is growing in the lighting sector for many Italian companies available to operate through TPF mechanisms. This is due to several reasons. First of all, the fact that the lighting of large service production and industrial buildings is a sector that still shows considerable margins for energy and cost savings by either the improvement or a more rational use of the lighting systems.

As far as we know at present, few companies have definite experiences as ESCO in the lighting sector. For example, MERLONI operates by supplying public and private structures by suitable controller of light flux on their expenses; they base their profits on the relevant savings. Their operations seem to be quite solid in this field. Nevertheless, many other companies gave their availability to gain expertise and to operate as ESCO, as is shown in 13.2.

7.2 Short-term forecast evolutions

A promising chance of evolution of the energy services in Italy seems to rely on the growing demand for more efficient heating and air conditioning in service production and office sectors. In fact, very often insufficient insulation of the buildings towards the environment and obsolescence of thermal/cooling plant allow for remarkable improvement of efficiency (and profitable interventions for ESCOs). Moreover, climatisation in service production and office environments matches the basic requirements of suitability for ESCO interventions highlighted in Section 6, which on the other hand are hardly verified in residential environments.

Growth is also forecast in the lighting sector, owing to the above mentioned margins for energy and cost savings still existing. Furthermore, in this context, the European Commission launched a programme for the adoption of the best technologies and ways of management; this programme, named Greenlight, relies on successful similar experiences of EPA in US (see the relevant website). This programme highly encourages the ESCOs' operativeness and is aimed at acting as a catalyst in this sense; a remarkable activity is performed in Italy in this context by FIRE, which is in charge of the implementation of the programme as Italian Agent.

8 MAIN ISSUES IN PERFORMANCE CONTRACTING

8.1 Financing

For what concerns the Third Party Financing scheme, the main envisaged contract typologies are:

- *shared saving*: this is the most used form of TPF which foresees that, on the basis of the results of the feasibility study, the parties agree on the amount of savings to be shared (80 % to the third party and 20 % to the end user). This form allows the supplier to repay its own service and the end user to benefit from part of the economic saving, while waiting to become the owner of the plant and consequently benefit 100 % of the savings pursued. The share percentage is agreed by the parties on the basis of several factors, such as the length of the contract, expected pay-back, capital invested, risk undertaken;

- *first out*: this is the form with which the final user recognises to the third party the total amount of the saving realised in a limited predefined period of time. In this case the third party runs the risk of being committed to transfer to the end-user the whole savings at the end of the period agreed, apart from the expected re-imbursement/repayment.

The Performance Contracting is assumed as a contract form through which the third party, not concerned with the financial aspects, assures to the final user, for the duration of the contract, a yearly economic benefit which allows the final user to face the debt service up to the paying off of the loan and to keep for himself a share of the savings achieved.

8.2 Contractual/legal matters

8.2.1 Agreement with the customer's management

The agreement with the customer's management is fundamental to the success of a TPF action, in which it is essential to avoid:

- internal resistance to organisational change
- difficulties in human resources management
- unwillingness to see a supplier as a partner
- difficulties due to the complexity of contract negotiations and selection of a partner.

8.2.2 Preparation of the contract

The following points represent the fundamental requisites in the preparation of a contract for a successful application of Third Party Financing:

- energy diagnosis and feasibility studies that realistically evaluate the savings obtainable through the action proposed
- technologies that adapt to the customer's current needs
- high return on the investment and a short pay-back period
- availability of financing at highly competitive rates
- customer's management truly interested in reducing the energy cost of output
- agreement with an energy services company of proven solidity and experience
- contracts that show clearly the division between customer and supplier of risks and benefits associated with a Third Party Financing operation

8.3 Standard/Model contracts - structure of typical contract

SECTION A: General rules
1. Object
2. TPF scheme
3. Interventions and services to be supplied by ESCO contractor
4. Amount of the contract
5. Duration of the contract
6. ESCO contractor obligations and responsibilities
7. Contract awarding criteria
8. Governing laws

SECTION B: Works
1. Project of the intervention works
2. Authorisation for the execution of the works
3. Handover of the works, start and completion date
4. Penalties
5. Variations
6. Works direction

7. Force Majeure
8. Technical documentation
9. Acceptance test of works, performance test
10. Warranty of the plant constructed

SECTION C: Management
1. Handover of the plants for operations
2. Maintenance
3. Client's access to the plants
4. Modifications to the plants
5. Handover of the plants and final testing

SECTION D: Payments
1. Payments for the works
2. Plan for sharing of savings
3. Composition of the periodic fee
4. Unit charges for the settlement of the fee for energy service, to be used in formulating the economic bid
5. Determination of payments for maintenance
6. Methods of payment
7. Guarantee deposit
8. Third party liability insurance
9. Performance bond
10. Price adjustment
11. Assignment of credits
12. Expenses dependent on the contract and on its execution.

The concepts describing the above mentioned articles are here below listed.

SECTION A: GENERAL RULES

1. *Object*
   The object of the contract is the supply of goods and services in the frame of heat generation, aimed at achieving better comfort and economic and energy savings in respect of a given situation.

2. *TPF scheme*
   The understanding of the contract is the use of the TPF procedure, i.e. design, supply of goods and execution of the works to be financed by ESCO Contractor that will be repaid by the savings obtained and guaranteed by the Contractor.

3. *Intervention and services to be supplied by ESCO Contractor*
   These include mainly design, supply of materials, execution of the works, supply of fuel, management of heat and electric generation (in case of a CHP plant) and maintenance of the equipment.

4. *Amount of the Contract*
   It is obtained by the 'historical costs' multiplied by the years of operation

5. *Duration of the Contract*
   It covers the time for the execution of the new works as well as for the management and operation of the plant.

6. *ESCO Contractor's obligations and responsibilities*
   It is related both to the direct costs (such as legal, design, permits, setting out, labour, insurance) and to costs responsibilities of the main activities (such as construction, surveillance, organisation and technical assistance) undertaken by the ESCO Contractor.

7. *Contract awarding criteria*
   It refers to a final score based on the percentage weights of technical and economical aspects of the potential ESCO Contractor's offer.

8. *Governing laws*
   It lists the national laws and decrees and national and local specific regulations to comply with in the contract.

SECTION B: WORKS

1. *Project of the intervention works*
   It is included in the Contractor's bid and it consists of the final design proposed, covering all technical as well as economic and planning aspects.

2. *Authorisation for the execution of the works*
   It covers all acts necessary to obtain permits and authorisation required by current laws.

3. *Handover of the works, start and completion date*
   It covers the time planning for the execution of the works.

4. *Penalties*
   It covers the penalty for the delay in the execution of the works (the penalty for a lower production if any, of heat and/or electric power, being paid by the Contractor by a lower return on the investments, as provided for TPF scheme.

5. *Variations*
   This paragraph covers the possibility of variations required by the Client, in case he considers these necessary and advantageous.

6. *Works direction*
   This covers the regulations of the assignment of the Direction of the works.

7. *Force Majeure*
   It mentions the regulations concerning the Force Majeure events.

8. *Technical documentation*
   It covers the list of all the technical documents to be delivered by the Contractor on completion of the works.

9. *Acceptance test of works, performance test*
   This covers the methods of the final test of acceptance of the works and of the performance test of the plant.

10. *Warranty of the plant constructed*
    It covers the ESCO Contractor's obligations for the whole duration of the contract.

SECTION C: MANAGEMENT

1. *Handover of the plants for operation*
   It covers the assignment of a technical contact person, the preparation of a handover report with the list of documents to be attached.

2. *Maintenance*
   This concerns the description of all actions of planned, ordinary and extraordinary maintenance of the structures and plants.

3. *Client's access to the plant*
   It concerns the full accessibility to the plant by the Client personnel.

4. *Modification to the plant*
   This covers the possible modifications to the plant handed over made by the Contractor within the limit of one sixth/fifth of the amount of investment, at Service forbidden.

5. *Handover of the plant and final testing*
   It covers the method of handing over the plant to the Client after the final acceptance testing.

SECTION D: PAYMENTS

1. *Payment for the works*
   It covers the description of the mechanism of the recovery of the investment amounts made by ESCO Contractor through the total of savings obtainable, as the sum of the electric energy and natural gas not purchased and the reduction of fuel consumption, as a result of optimisation.

2. *Plan for the sharing of the savings*
   It deals with the method of sharing the forecast savings between the Client and the ESCO Contractor, freely proposed by the ESCO Contractor, the economic and financial report attached to the bid.

3. *Composition of the periodic fee*
   It lists all the items that are part of the fee, such as ordinary maintenance, production of heat and electric power and amortisation of new plants.

4. *Unit charges for the settlement of the fee for the energy service, to be used in formulating the economic bid*

   This refers to the unit charges, main object of the bid that, multiplied by the actual consumption, contribute to the determination of the above said periodic fee; the energy measurement shall be read on suitable heat and electric watt-hour meters.

5. *Determination of payments for maintenance*
   It deals with the description of the extent of each type of maintenance operation covered by the fee.

6. *Method of payment*
   It deals with the description of the method of ESCO Contractor's invoicing the Technical Office and payment from the Client.

7. *Guarantee deposit*
   It covers the amount and the validity duration of the guarantee, according to the law.

8. *Third party liability insurance*
   It concerns the necessity for Contractor to take out an insurance policy for third party liability covering all damage as required by law.

9. *Performance bond*
   It deals with the issue of a Performance Bond, at the same date of the above mentioned insurance, covering the ESCO Contractor's obligations towards the client.

10. *Price adjustment*
    It mentions possible indexing criteria of the contract costs (essentially fuel and labour costs).

11. *Assignment of credits*
    It refers to the assignment of credit permitted only for what concerns the execution of the contract.

12. *Expenses dependent on the contract and on its execution*
    It deals with the expenses to be borne by the ESCO Contractor.

No standard model is in use at present at national level, though a large effort has been performed successfully in this sense in the hospital sector, at least at a regional level (see afterwards in chpt. 12). The Piemonte Region, in cooperation with ICIE, Fin-piemonte SpA, AEM-Torino, Credito Italiano (I), IDAE (E), ECOTEC (UK) and SEA (D), in the frame of EC THERMIE projects, set up a draft Special Specifications for a typical client (Local Health Board or Hospital) for adjudication of a contract for Third

Party Financing, with the purpose of supplying energy, inclusive of actions of technological improvement of plant aimed at energy saving. The text of such a contract is reported in: http://www.icie.it/icie/energia/energia.htm

Furthermore, they have recently defined a contract model devoted to Public Administrations for procurements in the sector of public lighting. Further details can be found in chpt. 12.

8.4 Ownership of installed equipment

On the basis of the collected information, the present experience evidenced that:

- the cogeneration plants already installed or which will be installed in the future by ESCO at local health boards using TPF will become property of the end user himself after the expiry of the contract; a redemption may be required by the ESCO

- as for lighting sector, the ownership of the installed equipment is transferred to the client.

8.5 Guarantees and enforcement

Some risks are associated with a Third Party Financing operation, e.g.:
- insolvency of the customer
- poor performance of the plant
- economic risks (energy prices)
- financial risks (interest rates)

The generally respected principles are the following:

- the third party financing formula does not present any particular risk to the customer, who does not start making payments unless a saving is achieved,

- all these types of risk must be dealt with in the contract between the parties,

- risks that cannot be shared must be covered by insurance policies (paid for by the ESCO).

A more detailed analysis of the risks and their cover is shown in the table below:

STAGES	POSSIBLE RISKS	CONSEQUENCES	COVERED BY
Feasibility study	Errors in the study	Abandonment of the project	Having technical ability. Extended study. Cost met by ESCO
Engineering – design	Errors in the project/design	Malfunctioning of the plant Entity of the error	Insurance policy Experienced technical staff
	Interruption of the project - engineering design - customer decision	Cost according to how far the project has advanced	Cover against suppliers. Customer guarantee
Risks from events occurring during construction	Delays in mounting Non compliance of the supplies	Penalties and loss of profit	Insurance policies Existence of margins Cover of suppliers
Risks from events occurring during start-up	Worse yields Normal conditions not achieved	Loss of benefit Loss of saving	Setting of margins Contracts with suppliers Existence of guarantees Extreme conditions and terms set by the Contract
	Failure to obtain permits/ Authorisations		Inclusion of companies with negotiating ability Timing margins Control elements Use of project financing
Risks from events occurring during operation and maintenance	Operation below rated levels - Reduced availability - Greater fuel consumption - Operation below rated levels - Changes to regulations - Changes in energy prices	Reduced cash flow	- Execution of supply guarantees - Existence of margins - Modification of investment conditions - Modification of plant - Loss of profit insurance policy - Diversified portfolio
	Operating costs - From breakdowns - From major maintenance - From early obsolescence		- Strict contracts - Insurance against breakdowns - Conservative maintenance and repair policy
	Clients and suppliers - Reduced output - Lock-out		- Modifications to the contract (extension) - Third party guarantees - Project financing

8.6 Measurement and verification

The criteria to be adopted to assess the energy savings originated by an energy efficiency action cover a very wide range, and represent one of the most critical items in Performance Contracting. In fact, according to the present general opinion, such an assessment is a joint result of assumptions/evaluations and measurements: very often the former aspect overrides the latter. Nevertheless, this assessment is of vital import-

ance for an ESCO while setting up its contractual offer, since mismatching between forecast and effective savings may lead to remarkable losses of profit. This is why standards of measurement and ex-post verification were set up in US and in EC (see ref. 7 and 8); though they are affected by large margins for discretion, yet they represent the most rational and internationally acknowledged evaluation base available.

8.7 First year and following years, simplified benchmarking

The known experience is relevant to the Contract Specifications for the local health boards of Omegna and Caserta (see chpt. 12). More in particular:

***Omegna*:** The local health board grants ESCO a lump sum of 90 % of the historical cost for the first contract year. This will acknowledge the first year's energy services on the existing plants entrusted to ESCO for management. During this period, ESCO will implement all the interventions forecast in its offer. At the end of this period, the annual rate forecast in the offer will apply. As for the following years, the value of the annual rate and of the historical reference parameter will be indexed yearly; the indexes of the variation of fuel and labour costs, and possibly also tax exemption on fuels, will drive this updating process.

***Caserta*:** A trial and a check on the correct plant working will be performed two months before the beginning of the contract. No lump sum is forecast for the management of energy service of existing plants. Similarly to Omegna contract, the value of the annual rate and of the historical reference parameter will be indexed yearly; the indexes of the variation of fuel and labour costs, as well as possible tax exemption on fuels, will drive this updating process.

8.8 Different types of services included today and in the future

With regard to the above mentioned contracts, they generally include other services beyond those connected to high efficiency actions specifically performed by the ESCO. These services are, for example:

- management of existing thermal plants,
- ordinary and extraordinary[2] maintenance of new and existing plants,
- design, financing, realisation and management of interventions for technological upgrading and normative modifications of existing plants,
- design, financing, realisation and management of additional intervention for the technical/operational optimisation, also by means of automated supervision and control systems, devoted to favour energy and cost savings; the ESCO is generally widely free in defining the details of this item;

[2] Within pre-fixed economic limits.

- further energy audits on the thermal plants of the user, in case of further need of energy saving and/or in case of remarkable increase of energy needs.

9 OBSTACLES AND OPPORTUNITIES

Obstacles for addressing to ESCOs interventions often exist as a consequence of end user's management difficulties, such as:

- impossibility of having an independent expenditure budget
- difficulty of finding and organising data on energy consumption and expenditure
- limited time available to the organisation’s energy manager, who has often been given that role as an addition to his main function
- the problem of roles overlapping between the energy manager and any other outside energy operators
- lack of motivation, at the root of which there is a scarce interest in the topic of efficient use of energy resources combined with the uncertainty of budget cover for energy costs, independently of their entity.

From the ESCO's viewpoint, some barriers which discourage ESCO operation follow from:

- insufficient knowledge of the specific problem and of suitable contractual procedures,
- too low expected profits compared with the envisaged risks,
- legal barriers connected with *bureaucratic difficulties* in coping with public Administrations' tenders.

On the other hand, advantages of TPF can be envisaged for both the end-user:

- more rapid implementation
- transfer of management responsibility to ESCO
- better quality and reliability of the received service
- saving
- improvement of indoor conditions

- outsourcing of non core-business activities: e.g. this allows a public administration to give lower priority to accessory or ancillary activities with respect to the main one(s), with the advantage of guaranteed service supply and related savings;

- adequation of plants to standard

and the ESCO:

- profit
- growth and diversification
- synergy with other own activities (apart from possible conflicts of interest)
- legal incentives (see 10.2).

10 GOVERNMENT POLICIES

The legislative scenario relevant to special policies adopted by Government to encourage a rational and efficient use of electric power (or to deter from undesired or unforeseen use of it) is outlined below.

10.1 Guidelines

A new Italian energy policy has emerged since 1998, which differs from the previous one to a large extent. The new policy was discussed at the Italian National Energy Conference of November 1998, which was convened by the Government and organised by ENEA. The basic elements emerged at the conclusion were the following (see ref. 3).

- To enhance the role of the competitive market, to increase efficiency and reduce costs, to encourage new initiatives and increase employment.

- To promote sustainable development

- To simplify legislation and procedures, leaving as much space as possible for voluntary norms.

- To rely on the behaviour of the citizens to achieve the objectives of energy efficiency, quality and environmental protection.

- To support the internationalisation of energy companies and extend financial markets, in order to improve the quality of the enterprises.

10.2 Adopted measures

The introduction of this new energy policy brought about some important decisions taken by the Government:

- Implementation of EU Directive 96/92/CE on the internal electricity market (Decreto Bersani), discussed earlier in sect. 5.3.1. This should be considered as the starting point for a complete change of this sector, including a renewable energy portfolio.

- Issuing of Law 448/98 introducing the carbon tax (as part of the Financial Law 1999). The fiscal burden on energy is determined in relation to the CO_2 emissions and energy content of fuel. Tax yield will be 4500 million EURO per year by 2005. Reduction of other taxes, in particular on manpower costs, will be considered in order to keep the overall fiscal burden constant. Rules were also issued for use of part of the carbon tax income (about 150 million EURO/year) to reduce emissions: financing of energy saving programmes in industry and public/private housing,
  - promotion of renewables,
  - researches and information on climate change,
  - international cooperation for clean technologies transfer to developing countries

- Setting of objectives in terms of reduction of greenhouse gas emissions for each energy sector in accordance with commitments made by signing the Kyoto Protocol: CIPE deliberation 137 19/11/98. Total expected greenhouse gas reductions are shown for the pointed out years as equivalent Mt of CO_2):

Energy sector	**2002**	**2006**	**2008-2012**	**Impact**
Improvement of thermal generation efficiency	*4/5*	*10/12*	*20/23*	*20%*
Transport sector	4/6	9/11	18/21	19%
Renewables	*4/5*	*7/9*	*18/20*	*19%*
Decrease of consumption in industry /service-production/residential	6/7	12/14	24/29	25%
Non-energy sector emissions	2	7/19	15/19	16%
Absorption by forests			0.7	1%
Total	**20/25**	**45/55**	**95/112**	

xx = Reduction obtained by actions on supply of electric energy (39% of the objective)
yy = Reduction obtained by actions on demand of electric energy (25% of the objective)

- Decree on energy savings and renewable sources in the Italian electricity distribution sector.

A Decree has recently been issued jointly by the Minister of Industry and the Minister of Environment. It foresees compulsory measures to reduce the primary energy consumptions for production of electric energy. These measures:

- address distribution companies proportionally to their distribution business,

- will be paid back by an amount on the distribution price, according to criteria defined by the Authority for electricity and gas,

- will be performed under the Authority's control, along the following lines:

  - the distribution company performs energy saving projects by specifying guidelines, costs and expected benefits;
  - the Authority approves the projects and subjects them to yearly verification, supported by CESI, ENEA, Universities or other competent Agencies;
  - the projects can be carried on either directly by the distribution companies or indirectly (through controlled companies *or ESCOs*);
  - non-compliance with the objectives entails fines greater than the value of the investments necessary for compliance.

- are associated with energy saving certifications: every project is coupled with energy saving titles for an amount proportional to the obtained reduction of consumes. These bonuses are granted to the company that performed the measure (distribution company or ESCO). Bonuses are freely tradable and can be handed over to a distribution company by an ESCO, which can find incentives and co-financing through these law mechanisms.

The targets, in terms of annual reduction of primary energy consumption, are shown below:

Year	**Reduction (Mtoe/year)**
2002	0.1
2003	0.5
2004	0.9
2005	1.2
2006	1.6

The possible actions suggested by the Decree are the following:

Reduction of electricity consumption, e.g. through:

- substitution of electricity with non-electric energy where convenient
- containment of electricity loss (optimisation of stand-by consumption)
- decreasing the demand for electric energy for air conditioning (e.g. by better insulation or suitable window glasses)
- increasing efficiency of lighting systems

- power factor regulation in final uses
- use of high-efficiency electric devices/motors
- educational campaigns.

Direct reduction of primary energy consumption, e.g. through:

- use of renewable energy
- substitution of non-electrical energy with electrical energy where more efficient
- improving combustion efficiency
- building insulation
- promotion of electric and gas vehicles.

11 LESSONS LEARNED

The survey activity on ESCO state-of-the-art in Italy, whose results are contained in this country report, led to some remarks about aspects to be pointed out.

1. Interventions of ESCO in Italy adopting contractual formulas of Performance Contracting and Third Part Financing are performed in cogeneration and lighting sectors; nevertheless, this kind of operation is still far from widespread.

2. The demand of PC services in the public sector looks at the moment very promising; Stability at the time of public administration structures and of their energy needs may be considered proper elements to encourage ESCOs in taking business risks.

3. The efforts of Piemonte region to achieve a standard contract specification for PC bids turned out into a definition of fair contractual relations between ESCO and client, at least within the public sector.

4. Issuing decrees on primary energy saving, relevant to mandatory EE actions and involving trading of energy saving certifications, features as a mechanism to promote ESCO and TPF.

12 CASE STUDIES

12.1 Generalities

As it was pointed out in sect. 7.1.2, details about the content of contracts are generally considered confidential, in particular in the industrial sector. Nevertheless, efforts were made by local governments, Piemonte region in particular, to produce a model form of specifications for thermal plant refurbishing in the local health board sector (see sect.8.3), and a model form for public sector procurements in the sector of public lighting. It is worthwhile emphasising that the characteristics of TPF seem to fit very

well with the requirements of the public administration, in general contributing to removal of the traditional difficulties that obstruct investment in the rational use of energy. The key concepts of the contract relevant to thermal plants are listed (and discussed where necessary) below.

Historical costs

The annual energy cost incurred by the local health board in the year immediately preceding those of the start of the contract: the sum of the costs for fuel and electric power of the hospital where it is intended to install cogeneration, personnel and maintenance.

This last must assure the contracting local health board an immediate contractually guaranteed saving (the value of the total saving envisaged, decreased by the amortisation), as compared with the aforesaid historic cost, for the duration of the contract, as set out in summary in the bid document. The historical costs also represent the upper limit for the bids and will be time-discounted according to the variation of the prices of fuels, electric power and personnel.

Historical consumption

Detail of heat and electricity consumption (Nm^3 of natural gas and kWh_e monthly and annual total) of the hospital for the last year of reference, with an estimate of the number of days of heating, of the total volumes heated, of the number of air changes, of the number of patients and of the degree-days.

Energy requirements

Specification of the service required by the hospital expressed in terms of requirement for quantities to be supplied (monthly quantity in kWh_{th}, kWh_e, litres of superheated water and domestic hot water and kg of steam) for the last year of reference. This specification constitutes an indicative mean obtained conventionally from the hospital's fuel consumption and the mean efficiency of the plants. It will be checked and if necessary replaced in its role as indicator of the hospital's mean requirements by the measurements made by the Contractor through installation of appropriate heat and watt-hour meters in the course of the first year from handover of the works.

Obtainable saving

The total of the saving obtainable following bringing into use of the new plant, including the cogeneration plant, will be made up as follows:

1. A first component of the saving will derive from non-purchase of electric power by the local health board, which will continue to have the contract with ENEL.

2. A second component will derive from the non-purchase of natural gas by the Contractor for use in existing thermal plants (with aims of integration and reserve with respect to cogeneration), due to the simultaneous production of heat by the co-

generator.

3. A third component will derive from reduced fuel consumption as a result of actions for optimisation of the plant, networks and methods of operation freely proposed by the Contractor.

The saving of which in point 1 will be shown by totalling electricity consumption at the end of each year of the contract. The savings of which in points 2 and 3 from the total of the fuel bills (natural gas and gas oil) at the end of each year of the contract, paid by the Contractor, which will take over the contracts for gas and gas-oil purchase.

Plan for sharing of the savings

The Contractor, in the economic and financial report attached to the bid, describing the costs and benefits deriving from the set of actions for plant and operation optimisation, including cogeneration, proposed, shall prepare an analysis justifying its savings forecast in relation to the amount of the investments to be made. This report, in addition to the amount of the investment for all the actions proposed, shall show:

a. The annual total of cogenerated kWh_e guaranteed to the local health board, and corresponding avoided costs at the electric power tariffs applicable at the date of the bid.

b. The annual total of cogenerated kWh_{th} guaranteed to the local health board, and corresponding avoided costs for the natural gas traditionally used in the boiler room at the natural gas tariffs applicable at the date of the bid.

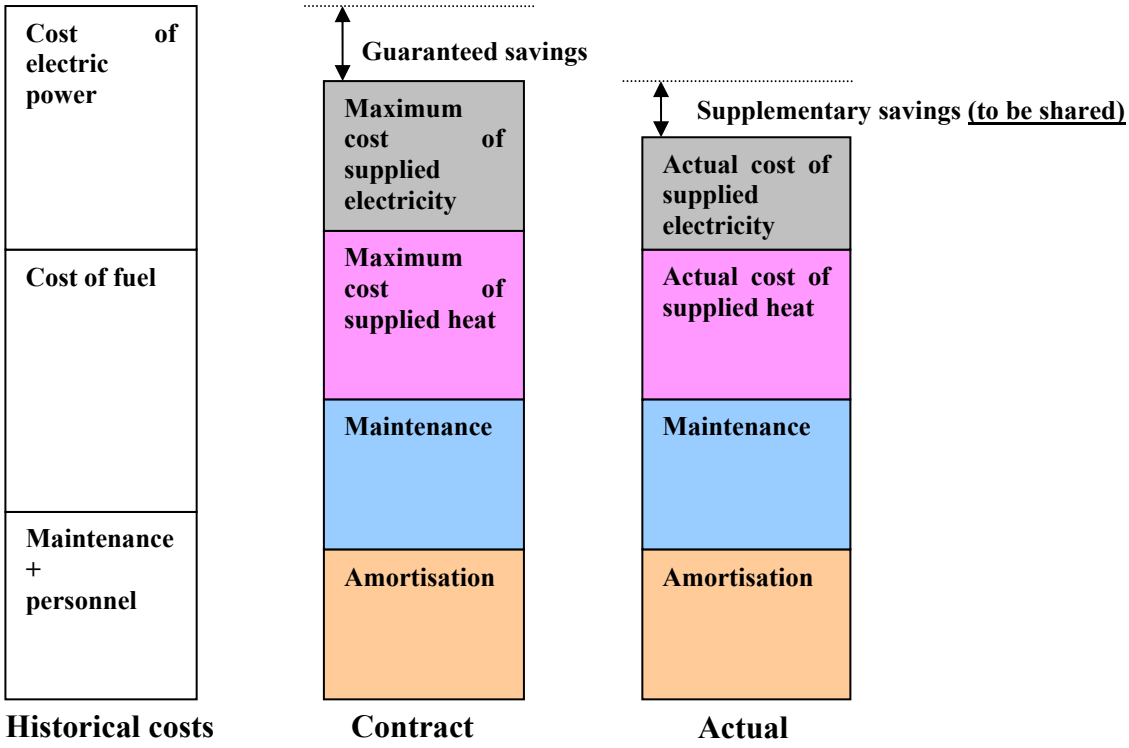
c. Annual total of Nm^3 of natural gas and litres of gas oil that the Contractor expects to save, in terms of reduced consumption, following implementation of the additional optimisation actions (other than cogeneration) proposed, and consequent avoided costs for the natural gas and gas oil traditionally used in the boiler rooms at the tariffs applicable at the date of the bid.

d. Cost given by the constant amortisation instalment (including financing costs) for the whole duration of the contract to recover the investment proposed for cogeneration which the local health board will meet by using part of the economic saving deriving from cogeneration of energy.

e. Cost given by the constant amortisation instalment (including financing costs) for the whole duration of the contract to recover the investment offered for all the additional actions proposed, which the local health board will meet by ceding to the Contractor (which will retain it) a part of the saving, in terms of reduced consumption, stated in making the offer.

f. Value of the economic saving resulting from comparison of the data indicated above [(a+b+c) - (d+e)] partially available to the local health board according to the share-out plan proposed by the Contractor, in which is indicated the amount (net economic

benefit) to the local health board that the Contractor undertakes to guarantee. This shared saving scheme is outlined in the below figure.



ANNEXES TO THE SPECIFICATIONS

Annex A — Records describing the present state of fact of the existing boiler rooms and distribution networks, as delivered to the Contractor.

Annex B — Technical and economic feasibility study for the new cogeneration plant.

Annexes C — (Mandatory)

C1 — Detail of heat and electricity consumption (Nm^3 of natural gas and kWh_e monthly and annual total) of the hospital for the last year of reference (historical consumption), with an estimate of the number of days of heating, of the total volumes heated, of the number of air changes, of the number of patients and of the degree-days.

C2 — Detail of heat and electricity consumption (Nm^3 of natural gas, litres of gas oil and kWh_e annual totals) of the health care facilities of local health board. With an indication of the number of hours/day and of the number of days of heating, combined with an indication expressed in ITL/m^3,day for the volume heated.

C3 Specification of the service required by the hospital, expressed in terms of requirement for quantities to be supplied (monthly quantity in kWh_{th}, kWh_e, litres of superheated water and domestic hot water and kg of steam) for the last year of reference.
This specification constitutes an indicative mean obtained conventionally from the hospital's fuel consumption and the mean efficiency of the plants. It will be checked and if necessary replaced in its role as indicator of the hospital's mean requirements by the measurements made by the Contractor through installation of appropriate heat and watt-hour meters in the course of the first year from handover of the works.

C4 Composition and amount of historical expenditure

Annex D Plan of the boiler rooms and facilities of the local health board.

Annex E Specifications relating to ordinary, planned and extraordinary maintenance of the cogeneration plant and ordinary maintenance alone of the boiler rooms and fluid distribution network for the entire plant stock of the local health board …. (to complete with the addition of the maintenance rules proposed by the Contractor in submitting the project/bid).

Annex F Technical specifications for operation of the plants.

Annex G Standard document for presentation of the plan for amortisation and savings share-out in relation to the investment in cogeneration. (Mandatory)

Annex H Standard document for presentation of the plan for amortisation and savings share-out in relation to the investment in additional actions (mandatory).

Annex I Emission limits for cogeneration plant and heat generators.

N.B. For further clarification of what has been said above under Annex B, the description of the cogeneration plant in the hypothesis of the feasibility study referred to should be considered indicative and not exhaustive, and the Contractor is therefore required to supplement and/or modify the content of the annex with a description of every other apparatus and/or technological installation that may be considered necessary to deliver the finished work in accordance with good practice, functional and functioning, as part of a definitive project to be presented with the bid.

Remarks about compliance with public procurement laws.

According to national regulations, the herein applicable procedures are those relevant to public procurement for the supply of services. Two kinds of laws are applicable in Italy, according to whether the bid base is lower or greater than the EC threshold of

EUR 200 000. The considered case studies belong to the latter class, where the 157/95 decree (implementing the CEE 92/50 directive on public procurement of services) must be considered. The regulation governs procurement of services and procurement of related works in quite a different way. In particular, the former case (more suitable in principle to the present contract) foresees much more straightforward tender formalities and procedures, as well as less severe requirements of the candidates. However, the atypical nature of the contract (a mixed one: service + work procurement) introduces difficulties on how to interpret and to apply the law. Such inconveniences were overcome by identifying the prevailing nature of the contract: in other words, by ascertaining whether the supply of services predominates with respect to the associated works (design, construction, operation, maintenance). The adopted evaluation criteria are the following:

- Economic criteria, based on quantitative assessment of the service/work cost ratio. This evaluation can hardly be attained '*a priori*', i.e. during the launch phase of the tender, though it can be reasonably estimated on the base of the above historical costs;

- Relevancy criterion, based on a more subjective evaluation on whether and how the works are ancillary against the service supply and finalised to this objective.

Some contract specifications issued by local health boards were made available in the recent past (see ref. 5). The essential features of two contract specifications for energy services issued by local health boards are reported below.

12.2 Omegna local health board

12.2.1 Characteristics of the case

Supplied services:

- ordinary and extraordinary maintenance of the existing thermal and conditioning plants

- design, financing and operation of a cogeneration plant (this item is considered optional)

- technological requalification, optimisation, integration of plants and adaptation to standards of existing plants

Duration: 1 transition year + 8 operation years

Bid base: 2,310,578 EURO/year (The bid base, once the amortisations are deducted and guaranteed savings are taken into account, is also the upper acceptable limit for the yearly rate paid to ESCO)

Annual fee agreed: 2,104,050 EURO.

Particular items: Saving surplus with respect to the contractual one is shared between ESCO and ASL:

- first tranche of 7500 EURO: 100 % to ESCO
- further tranche of 7500 EURO: 75 % to ESCO and 25 % to ASL
- further savings beyond 15000 EURO: 60 % to ESCO and 40 % to ASL

Outcome of the tender: Dalkia won the bid.

Adjudication criteria:
The project/bids presented by the competing enterprises shall be subjected to examination by the Committee, which shall examine them on the basis of the elements indicated below and shall construct a ranking, assigning each of the said elements a score within the maximum limits here indicated.

A) 35 percentage points for the economic part

B) 65 percentage points for the technical part

in turn subdivided as follows:

A) Score to assign to the economic bid (fixed charge) from Contractor X 35 points
According to the following system of calculation.
Y = 35 PM/PX
Where Y is the percentage score to assign to the bid from X
PM is the amount of the lowest bid
PX is the amount of the bid from X

B) Maximum score to assign to the technical part 65 points
according to the following subdivision.

a) Quality of the operating project (method of provision of the service, computerised support to maintenance, operating model proposed understood as methodology of planning of maintenance, application of control check list) 20 points

Technical project 45 points
according to the following subdivision:

a) Technical quality of the project of technological requalification and adaptation to standards of existing plants 10 points
b) Technical quality of the cogeneration project 10 points
b) Quality in terms of efficacy and complementarity from the technological point of view of the various actions aimed at saving 10 points
c) Total energy saving from all the actions proposed expressed in toe/year (for conversion values, see Ministry of Industry Circular N° 219/F of 2.3.92) 10 points
d) Organisation of the accident prevention and safety system and improvement of air emissions 5 points

Reference: ASL n. 14.
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Fax +39.0323.643020

12.2.2 Energy efficiency investments

The contract involves energy efficiency investments, performed by the ESCO to attain the requested improvement on the energy performances. Such investments are relevant to plants and devices installed by ESCO and involve no supplementary costs for the ASL, since they are included in the annual fee. Ownership will be transferred to ASL after the contract expiration.

The total investment amount is 1,890,000 EURO:

- 970,000 EURO in CHP at Verbania and Domodossola hospitals (2 natural gas 505 kW engines intended to supply 75 % of electricity needs)

- 920,000 EURO in other than CHP intervention, devoted to generation, distribution and regulation sectors; the relevant expected decrease of fuel consumption is of about 325 tep/year

12.2.3 Advantages for ASL

From an administrative viewpoint:

- A single procurement procedure was performed against a number of different bid services (design, installation, fuel supply, management, maintenance, etc.)

- Resources for an investment plan for energy efficiency were derived from the budget voices relevant to ordinary expenses (whose availability is generally beyond dispute).

- Administrative simplifications were attained through outsourcing of energy services and devolution of relevant responsibility to ESCO.

From a technical viewpoint:

- Any technical/management shortcomings of ASL in the energy field were overcome.

- The technical risks relevant to interventions and management of the energy services were transferred from ASL to ESCO.

- A warranty on the service quality was obtained, connected with the efficiency conditions which ESCO is bound to assure in its service, against economic penalty.

From an economic and financial viewpoint the TPF procedure:

- overcame the problem of the chronic lack of budget for project financing, typical of public administrations

- allowed ASL to route financial resources (already available on capital account) towards other kind of investments, more relevant to their corporate calling

- allowed ASL to implement at a lower cost their plan of interventions, owing to the stronger bargaining power of ESCOs in the market of energy technologies and products

- allowed ASL to gain immediate economic savings with respect to the historical costs, against no direct investment

- allows ASL to take over the energy efficient devices and plants included in the ESCO supply service, upon expiration of the contract

12.3 Caserta Civil Hospital

Supplied services:

- ordinary and extraordinary maintenance of the existing thermal plant

- design, financing and operation of a cogeneration plant (this item is not considered optional)

- technological requalification, optimisation, integration of plants and adaptation to standards of existing plants

- implementation of an automatic supervision and control system to improve the already obtained optimisation level

Duration:15 operation years after testing
Cost of works: 3,000,000 EURO (bid base not available)

Particular items: saving surplus with respect to the contractual one is shared between ESCO and ASL:

- first tranche of 7500 EURO: 100 % to ESCO
- further tranche of 7500 EURO: 85 % to ESCO and 15 % to ASL
- further savings beyond 15000 EURO: 75 % to ESCO and 25 % to ASL

Outcome of the tender: offers are still being evaluated

Reference: Doct. Claudio Furcolo (General Director)
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13 ADDITIONAL REFERENCES

13.1 Bibliography

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13.2 List of ESCOs

A list of Italian companies willing to act as ESCO with TPF mechanisms is given below, obtained from the website of FIRE. It should be pointed out that there are different degrees of expertise in this specific matter. In fact, on one side some companies can claim a solid competence gained through several years of practice in the field of cogeneration or lighting: on the other side, other companies are in the very beginning stage and their presence in the list means little more than a declaration of intents. Some of these companies also act as 'endorsers' of the Greenlight programme that is, they sustain the programme with definite actions by which they bind themselves with EC.

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DALMINE ENERGIE
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HONEYWELL SpA
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