# IEA DSM Task X – Performance Contracting

Country Report FRANCE

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# 1 EXECUTIVE SUMMARY

French energy policy has three major objectives: security of supply, environmental protection and low-cost energy in the interests of the national economy and of consumers, notably through its vast nuclear program. French energy policy is also based on a strong tradition of public service, a notion that used to integrate the principle of *spécialité*. This last principle has had a direct impact on the organisation of energy service supply in France for a long period of time. Now there is a closer definition of 'public services'. As soon as competition is introduced for a class of eligible customers, the principle of *"spécialité"* is no longer applied in that class, and energy services can be sold together with energy itself.

The term "Energy Service" appeared relatively recently in France, as a generic name to designate a fairly broad scope of activities in the energy sector. But, before this name was used, various services in the energy field had been offered for a long time by many companies, all more or less based on the concept of "Energy Performance Contract".

Six mechanisms of development are combined in the French history of energy services.

- Delegation of public utilities, beginning with water, and followed by district heating networks
- Operation contracts for public and semi-public buildings, public purchasing rules (coding)
- Operation contracts for private buildings namely Office buildings
- Contracts with profit-sharing, TPF, first French ESCOs
- Wider automation and new control systems for buildings, offices and industry
- Outsourcing with its two components: MS (maintenance in multi-services) and FM (lump sum purchase of various services).

Delegated management of public services partly explains the French model of ESCO. At a very early stage, it introduced the logic of breaking the link between the definition of the quality level of the public service and the definition of the means to provide it. It generated companies able to bear the financial risk of operations, a useful factor for the follow-up.

Operation contracts for public and semi-public buildings under public purchasing rules lead to a coding in items (P1/P2/P3/P4) divided for various reasons: to ensure the indexing of the prices, to apply the VAT at different rates, to distribute the elements of the invoice in accordance with the law, between owner and tenants or occupants, and to enter them in the public accounts. This coding and the demand of public accounting for fixed results for a fixed price largely determined the features of EPC in France. For all the P1 contracts presented, a clause of profit sharing can be included. This envisages the sharing of energy savings, or increases in consumption, compared to a previously defined basic consumption during one given whole year of heating. The advantage of these concepts of profit-sharing is that the occupants and the contracting parties are both interested in saving energy because they share the benefit. It should be noted that the market central commission in the register of the general technical specifications (Collection Marchés Publics n°2008) defines the formulas for profit-sharing. Profit-sharing involves all actors but, as opposed to a fixed price operation, increases the payback time for the operator and may prevent investment.

The first real attempt to formalise energy performance contracts, although these already existed implicitly in the various contracts, occurred in 1983 when, for the first time in Europe, a company (still existing and active nowadays) was set up for Third-party Financing (TPF).

The essential clause permitting TPF in the public markets is that of ”Control of energy savings with guarantee of result” (GR-ME): if the operator proposes actions reducing energy use, it can finance them on the future benefit. This ensures at the same time the best possible decision and the best possible realization.

The electricity industry has been aware for a long time of the potential economies and the control of the electrical energy that can be achieved by power electronics and programmable electronics. The aim is the optimisation of the production, transport, distribution and use of electrical energy at the boundaries of the processes in the building industry and infrastructure (sites).

Combined heat and power and renewables took off in France only when they were offered in the form of full energy services.

The current contracts of facility management are concentrated primarily in the tertiary sector. However, it is probable that deregulation of the electricity market will create a new market for service in France, while making it possible for new actors to offer advisory services concentrated on the supply of energy upstream of the meter.

Foreign ESCOs tend increasingly to consider that their role is not to finance the energy efficiency investments of their customers, but prefer a scheme where the customers are financed directly by banks or by third-party financing, and where the ESCO plays simply a role of technical engineering and provides a guarantee of results. This scheme hardly brings originality compared to what was always more or less done at the level of technical engineering, but it has obviously a great interest for small ESCOs, which are often under-capitalised structures and which in general do not have the means of borrowing significant amounts of money on the financial markets.

In addition, this scheme is likely to function well in countries having an established banking structure and having sufficient technical expertise to include and understand energy efficiency projects. It must be emphasised that the most original part of the French model consists of the combination of the financing and the guarantee, or even of the operator, the guarantee and the financier: so the ESCO takes the risks of financing the operation, and refunding is carried out only through effective savings, to which the financier can contribute.

# 2 INTRODUCTION, RATIONALE

The subject of EPC is important in France. On one hand, there are traditions of EPC, on the other hand they do not follow the US model and a variety of types has appeared. France decided on new objectives of energy efficiency that require a further increase of energy services. Ademe gathered a mirror group of French ESCO representatives and utilities to monitor IEA activity and to take advantage of this opportunity to define new visions. So the report was relatively lengthy in comparison with what a consultant separated from reality might have produced, but it's a real step forward for the EPC community in France.

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# 4 METHODOLOGY

Ademe gathered a mirror group of French ESCOs representatives and utilities (EDF, FG3E, GDF, GIMELEC, IGD, UCF). This group has been fully informed of the Annex works and contributed to the French papers. The group met six times (June 11 and October 8, 2001, January 16, June 19, October 1 and December 17, 2002) and contributed ideas and a number of legal documents. B. Jamet gathered and presented the French views at IEA meetings. ARMINES drafted all documents and analyses.


We want to thank them for their contributions:

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# 5 GENERAL ENERGY CONTEXT

## 5.1 Major objectives

France tries to achieve three major objectives in its energy policy: security of supply, environmental protection and low-cost energy for its economy and consumers, notably through its vast nuclear program. The French have been generally successful, in particular in ensuring a secure energy supply - a high priority for the country, which has only minor energy resources. For thirty years, French energy policy has been based on three main particular objectives:

*Energy independence since 1973*
In 1973, energy imports represented three-quarters of French consumption: 142.8 Mtoe including 126 Mtoe of oil. This great dependence on oil, the lack of national resources and the first oil crisis explained the strong voluntary reaction of authorities and politicians. We must add that this fear of energy dependency was more important among politicians in France than anywhere else, partly as a result of the French post-war willingness to develop a national leadership in every industrial field (weapons, iron & steel, cars, computers…) in order to guarantee national independence.

*The nuclear priority*
As a consequence, the French nuclear program was implemented fairly rapidly in the seventies as a response to the oil crisis. This high nuclear component of the French energy mix is surely one of the main French characteristics, which directly or indirectly influence all the national energy decisions.

*The traditional definition of public service principles*
French energy policy is also based on a strong tradition of public service, a notion that leads to tackling market failures as well as to pursuing social, regional and territorial objectives. This tradition remains largely embedded in the power system. For instance, concerning electricity, there are the principles of tariff equalization (uniform tariffs throughout the country for a given type of consumption), and the principle of *spécialité* (EDF is not authorized to manage activities which are not directly and naturally linked to its main fields). This last principle has, for a long time, had a direct impact on the organisation of energy service supply in France (see details in Appendix 2).

*The evolution of public service principles*
France is on the way towards instituting regulatory reform to comply with the EU directives on electricity and gas. Introducing competition while meeting public service concerns is a challenge for the French Government, for example, full geographical uniformity of tariffs – equalization as a public services obligation – creates market distortions by reducing niche markets for renewable energy.

At the same time, there is a closer definition of "public services". As soon as competition is introduced for a class of eligible customers, the principle of *"spécialité"* is no longer applied in that class. Since some DSM or RES actions are not profitable for the utility operator, they must now be funded from public benefit charges (FSPPE, FPE) and become more regulated and monitored. What remains is equity (*"égalité de* *traitement",* same demand, same price), cost/benefit balance (no large resource outside of the contracts, *"équilibre financier"),* geographical equalization of tariffs between consumers (through a special treatment of islands, e.g., limited to electricity), continuity of service (except *"force majeure"),* technical improvement of quality of service (*"mutabilité")* and a limited extent principle of *"spécialité"*.

## 5.2 Present debates on the national electricity system

Since 1946, when gas and power supplies were nationalised, the French electricity system has been based on the state-owned utility *Electricité de France*, which is a vertically integrated public service. It has been organized for five decades as a pure monopoly for transmission (over 63 kV) and importation / exportation, a quasi-monopoly for production (90 %) and distribution (95 %) [1]. As a consequence, this dominant position has permitted EDF to create a *de facto* 'monopoly of electrical expertise'.

As a response to the European Directive 96/92/CE on electricity in 1996, a new Law on Electricity has been lately but finally voted in February 2000 after a long debate. With the new Law on Electricity, the global situation will not change significantly, officially in order to prevent any rush to profitable industrial and urban areas and any desertion of rural areas. But some voices in Europe begin to criticize such an unbalanced development, EDF extending its distribution activities abroad while remaining protected in its home market.

*Generation*
France has opted for an authorization system for small units (below 20 MW). It is supplemented by a tendering procedure where national production capacities fail to meet the objectives of the multi-annual investment planning.

We can also note that the few French State-owned power producers others than EDF, but traditionally strongly linked to EDF, have been recently sold to other energy firms and then become small but concrete Trojan horses in the French power market: this is, for example, the case for SNET (it manages coal-burning plants) now controlled by the Spanish Endesa, and for CNR (Compagnie Générale du Rhône, which manages dams on the Rhône river) recently purchased by Suez-Lyonnaise.

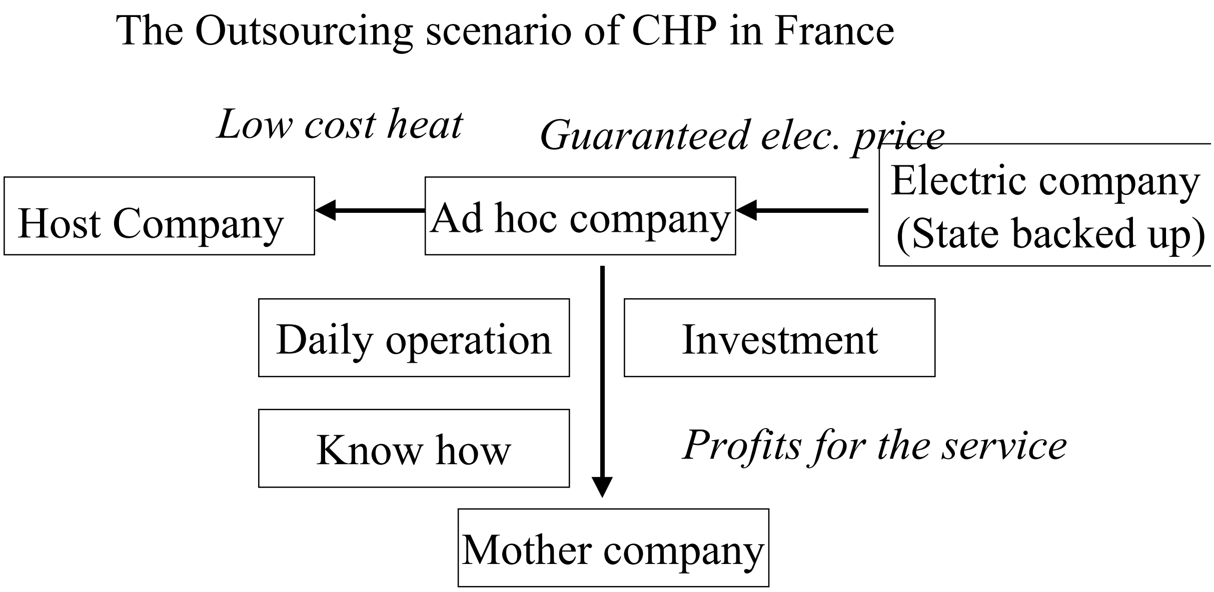
*CHP sold as a performance contract in France*
Although the market of CHP has increased very quickly in Europe, French particularities in terms of electricity production and administrative authorizations have slowed down the development of cogeneration by independent producers and by EDF. CHP units were authorized in only a very few cases. In 1994, only 570 CHP units (3,000 MW) were operated, mainly in industry, while the CHP potential was estimated between 5,000 and 10,000 MW by officials, and over 15,000 MW by equipment manufacturers. Once the barriers were taken away, the growth became exponential in France. The main line of expansion is outsourced cogeneration, where the HVAC

[1] With 98 GW installed, EDF represents 94% of the total capacity and 95 % of the electricity sales. There are 140 independent distributors representing between 5% and 10% out of the total consumption, mainly based in rural areas, but also in a few towns such as Belfort, Strasbourg and Grenoble.

operators provides a full service and guarantee a reduced price for heat to the host company, any other problem becoming its responsibility.

The case of cogeneration is now exemplary of EPC in France: 1) cogeneration is becoming the dominant 'Trojan horse' used by new independent producers for conquering some market shares in France; 2) its development imposes the development of a series of new services for sizing, financing, building and operating CHP units.

**Figure 1**




See Appendix 3 EPC in cogeneration.

*Transmission*
EDF retains it central role for transmission and managing the grid, but *via* an independent organism called GRTE (*Gestionnaire du Réseau de Transport de l'Electricité*). That assumes an effective unbundling and clarity to fix the price, and so, a high efficiency of the new Regulation Commission (CRE). The department in charge of the transmission management within EDF is supposed to be independent of the management of other EDF activities. The utility is obliged to transport electricity from an independent producer to its own customers, for a transmission fee fixed in advance and reflecting the real transmission cost.

*No change for distribution to non-eligible customers*
No changes are expected before 2007 for households. EDF is maintained as a quasi-monopoly (95%) for distribution in addition to some 200 small independent distributors in a few rural areas and towns such as Belfort, Grenoble, Metz, and Chartres.

*The particular development of electric space heating*
In the mid seventies, electric space heating was marketed as a 'cheap' response to the oil shock (and then, to the 'expensive' heating by liquid fuel). But the substantial capacity surplus of nuclear plants rapidly appeared, mainly because the nuclear program

planning has been based on very high demand scenarios which have never been realised because of a global slowing-down in the demand of electricity. Hence, this over-capacity obliged EDF to implement new strategies in order to develop sales. That is why, for instance, the electric space heating and electric water heaters became strategic priorities for the utility and are so widespread in France. Large power exports to other countries were the second main leg of the strategy adopted by EDF and supported by the State.

*Retail competition for eligible customers*
Article 19 of the Directive fixes minimum conditions for eligibility. French authorities have chosen these minimum conditions. In France, their implementation concerns 400 eligible industrial customers in the first step (> 40 GWh/yr), plus 400 in the second step (> 20 GWh), and then plus 1700 in 2003 (> 9 GWh) to achieve the market opening of 30 % imposed by the European Directive. At present, just a few industrial customers have changed their power suppliers.

*Present EDF's diversification and internationalization*
These changes are not free choices for EDF. The state-owned utility has strongly reacted. In 1999, EDF was allowed to increase its supplies only to eligible customers from strict energy supply to the supply of complete energy services, in order to be able to react strongly against competition from multi-services and multi-energies companies in the national market, even if this enlargement must respect some constraints.

As a consequence, EDF has also reorganized its structure, notably by regrouping all the service supplies from its subsidiaries into a new 'Pôle Services'. We see now an interesting case with the purchase of Clemessy and Dalkia (partly) by EDF, and their compulsory unbundling by a decree of the State. The French State authorities are acting quickly to avoid complications at European level. Even so, there is a risk of cross subsidization and use of proprietary information. The case started with the purchase of Clemessy in 1999 (4400 employees). Clemessy can no longer work for customers under 9 GWh (the eligibility threshold at the time of application, September 2001). This leads finally to the purchase of 30 % of the Dalkia service group (from Vivendi) in 2000 and to a complex financial structure where EDF owns only the international activities of the new Dalkia-Clemessy group and is apparently little involved in the domestic activity.

According to a recent Eurelectric survey (Chesshire et al., 2000), only France and Italy show such an anti-trust sensitivity on the integration of service companies in the captive segment. At the other end of the scale, Portugal for example seems to have had a long-lasting effort of diversification in many branches (engineering, laboratories, shares in the institution acting as energy agency, computer services, CHP, real estates), without anti trust concerns. EDF is facing a dilemma: how to prepare to face growing competition while at the same time respecting the principle of *spécialité*, particularly for future eligible customers (who are not yet eligible)? For this, EDF has multiplied the agreements with professional associations and has also been involved in the acquisition of engineering firms, leading to an intricate scheme of subsidiary companies.

The increases of international activities are also a priority for the State-owned power utility. It is very active worldwide since 1995 and successful in the bidding process abroad, notably in distribution. Presently, some voices appear throughout Europe against EDF strategy abroad, arguing that the French utility is very active in Europe while, at the same time, remaining largely protected in the French market.

*Some other events*
In addition to restructuring of the power and gas industries, several other important events in energy have also recently occurred: the double privatization (1996), and then the merger (2000), of Total-Fina and Elf, creating the fourth largest oil company worldwide; the partial withdrawal of Vivendi from energy activities; the partnerships between Vivendi and EDF for managing the large energy services company Dalkia, etc.; the leading role of Suez Lyonnaise abroad as a power and gas utility and in France as a service company; and the current restructuring of the French nuclear industry.

It is also important to mention a change in fuel distribution. Until now in France, petroleum companies also distributed their products. However, some of them now want to transfer this distribution activity to small firms and households: tougher energy competition between petroleum and gas, plus the sudden but rapid development of the '*grande distribution'* as powerful competitors for petroleum products, make this market less attractive for traditional oil companies. As a consequence, BP France announced in May 2001 its willingness to sell BP Fioul Services. We can also mention the case of RUBIS, a French independent firm for oil storage and LPG distribution, which has seen its activities growing significantly over the last years.

## 5.3 Present debates on the national gas system

Gaz de France dominates the French gas system, even if its monopoly situation is less secure than that of EDF for electricity. In fact, GDF has a strongly dominant position in the downstream gas industry, but it shares gas transmission management with Total Fina-Elf. The implementation of the European Directive on gas is under way, even if it targets only the minimal thresholds required by Brussels. But these changes may be stopped at the present time: the State wanted both to open the gas market and, at the same time, to privatize part of GDF in order to increase its financial ability to be present in the upstream gas supply and then to reinforce its ability to remain a dominant gas player in Europe. But in April 2001, this double industrial objective was questioned for social and political reasons. This move could be deferred to 2003 – notably after the national elections – it would be a negative situation for GDF's restructuring.

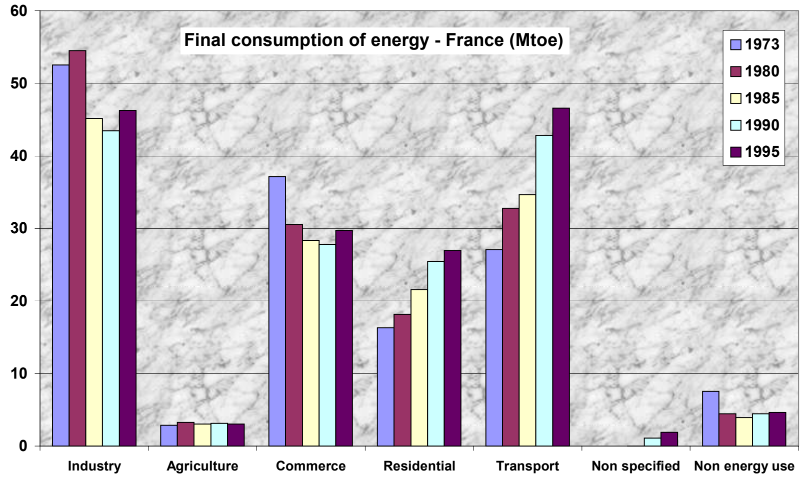
## 5.4 Implementation of the Kyoto targets in France

Meeting the Kyoto targets is also a challenge for France, since the share of nuclear energy in its power generation is expected to decline in the future – but over-capacity in the power sector will not disappear before 2015. Under the Kyoto Protocol, France is committed to stabilizing its greenhouse gas emissions at 1990 levels by 2008-2012. The Government has just published a National Programme to Combat Climate Change, which contains a package of measures for each sector. But one of its main proposals, the extension of carbon taxation on polluting activities (called TGAP) to energy products, has been strongly and publicly criticized by the Ministry of Economy early in May 2001.

## 5.5 Overview of French energy consumption

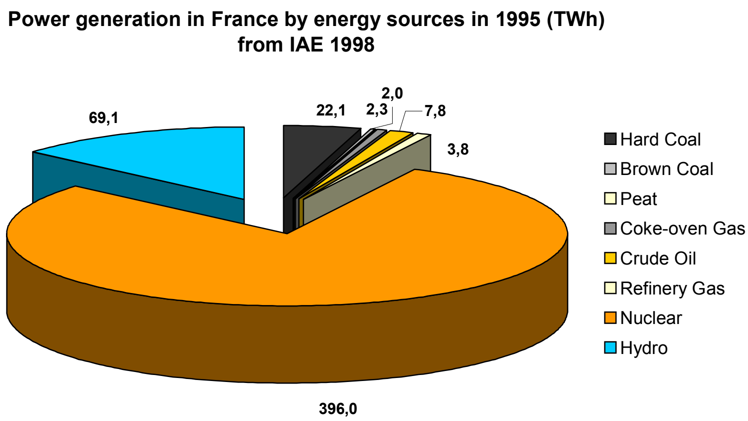
French final consumption has risen from 143 Mtoe in 1973 to 159 Mtoe in 1995. Although industries and tertiary sectors have succeeded in reducing their energy consumption by implementing operational energy efficiency programs, the residential sector (with growing purchasing power) and transport (a high level of activity and an increase in average driven distances) threaten the French ability to meet French objectives defined by Kyoto targets.

**Figure 2**




In France, the nuclear share is very high (around 75%), complemented by hydro power and a few oil- and coal-burning units. In the early 1980s, 45% of EDF's production was from nuclear power plants. This proportion has increased over the last few years, so that it is currently around 75%, with some peaks, such as in 1998 (82%). French nuclear power capacity is the second largest in the world after the United States.

**Figure 3**



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

## 6.1 Energy Efficiency Services

The terminology 'Energy Service' appeared relatively recently in France, as a generic name to designate a quite broad scope of activities in the energy sector. However, before this name was used, various services in the energy field had been already proposed for a long time by many companies, all more or less based on the concept of 'Energy Performance Contract'.

The mirror group drew up a list of the most frequent Energy Efficiency Services available in France:

1. Operation of a public building heating on a public market basis;
2. Operation of a district heating system conceded by a municipality;
3. Operation of combined heat and power generation according to buy-back tariff TAC (97XX);
4. Operation of buildings' heating with clause of profit-sharing;
5. Integration of tertiary multi-services or facility management
6. Industrial facilities management;
7. Operation of a geothermal production with pure sale of heat;
8. Installation and operation of solar collectors with guarantee of solar results (pure 'energy-service');
9. Operations of diagnosis by the fitters such as the 'Thousand boiler rooms' audit scheme;
10. Tariff optimisation of public utility by the historical operators;
11. Electric repair downstream of the meter;
12. Maintenance of decentralized electric generationquipment;
13. Operation of teleprocessing around the meter;
14. Decision-making aid on Ademe procedure.

The heart of EPC services is represented by services 1 to 6, although cases 6 to 14 provide complementary dimensions or precede developments. The French model is an EPC based on an operation procedure contract, which ensures its effectiveness.

HVAC operation, entrusted to firms specialized in this activity, is of French origin and was established shortly before the 2nd world war. A certain number of French companies tried 'to export' this particular approach of service abroad with its included EPC aspect. The paradox is that these companies have developed activities in other countries derived from their basic trade in France, but not from their inventive French EPC based initially on plant operation. However, recent successes in Italy, Spain and Belgium can contribute to the development of the 'operation-based' EPC.

The 'operation' activity in France is characterized by two significant criteria, which define the relations between the customer and the service company:

- The contracts define the results to be achieved;

- The contracting party operates diagnoses and carries out the improvements of which it guarantees the profitability;
- The contracts are drawn up for a duration of several years, although the current trend is towards a shortening of this duration.

In the majority of the countries of Europe and in the USA, the relationship between customers and companies is defined by:

- Contracts (or practices) based on specified methods;
- Few engagements of quality in the operation;
- Annual engagements that can be terminated at any time.

It follows that there is a multiplicity of contracts or 'relations' which can be established, for each component of an installation, between customer and supplier (supplier of refrigerating machines, supplier of cooling tower, supplier of control devices, etc.). It is in this context that the ESCOs are seen as revolutionary in countries that do not have the French model of a service company.

Six development mechanisms are combined in the French history of ESCOs. They are presented here as periods, but they coexisted.

- Delegation of public utility services, beginning with water, then district heating networks
- Operation contracts for public and semi-public buildings, public purchase rules (coding)
- Operation contracts for private buildings (tertiary, namely)
- Contracts with profit sharing, TPF, first French ESCOs
- Wider automation and new control systems for buildings, offices and industry
- Outsourcing with its two components: MS (maintenance in multi-services) and FM (lump price purchase of various services).

## 6.2 First period: Delegated Management of public services beginning with lighting, then gas and electricity distribution, then water, then district heating networks and finally waste treatment

We describe here only the three last items, whose success explains partly the French model of ESCO. Various legal forms exist: *Concession* (Concession Franchise), *Affermage* (Lease concession contract), *Gérance* (Fixed O & M), *Régie intéressée* (Direct Management by local authorities with incentive fee), etc. They introduced very early a logic of unbundling between the definition of the quality level of the public service and the definition of the means of providing it. They generated companies able to bear a financial risk of operations, a useful factor for the follow-up.

*Distribution of water*
The texts of regulation on water are very old. In the 19th century, water concessions were a source of income for the communes, confirmed by the Law of April 5, 1884 on the product of the water concessions. The communes very quickly delegated the distribution of water to private companies, together sometimes with waste water collection,

adduction and treatment, via the use of several schedules of conditions: the decree of July 6, 1907 fixes a standard schedule of conditions in addition. The construction and alteration work is of course at the expense of the company, but a subsidy is possible. For Paris and its suburbs, the treaty of July 1, 1860 entrusts to the General Water Company (CGE) the interested control of its waters.

*District heating*
The distribution of thermal energy to consumers is a specific local public utility. The Law of July 15, 1980 encourages its development in the name of energy saving. District heating companies belong to a trade association: the SNCU, National Trade union of District heating and Urban Air-conditioning.

Production of heat: communes can produce heat and electricity since the Law of August 2, 1949. Even when they do not produce, they have legal and possibly financial responsibilities concerning the installation, connection, exploitation, etc (decree of May 13, 1981).

Distribution of heat: in fact, the majority of the networks are the property of the communes. The circular n° 82-183 of November 23, 1983 is the model form of contract for the distribution of thermal energy. The service can be conceded, leased or be directly managed. There is also the circular of May 5, 1988, which makes it possible for communities to organise the relationship between users and the operator. It also proposes a model form of contract for subscription.

*Energy incineration of waste (Waste to Energy)*
Incineration of waste, which is very developed in France, was initially intended to provide district heating, but is increasingly used now for the production of electricity. The FGEEE brings together the National Trade union of the Treatment and Incineration of Urban and Comparable Waste, which is represented by the recycling, and incineration (for thermal energy and electric power production) Companies.

## 6.3 Second period: Operation contracts of public and semi-public buildings, public purchase rules (coding)

*Origin of coding*
The ‘contracts of operation’ of the heating installations are divided for various reasons: to ensure the indexing of prices, to apply VAT at different rates, to distribute the elements of the invoice in accordance with the law, between owner and tenants or occupants, and to enter them in the public accounts. As public accounts greatly dislike uncertainty, there is always pressure to use contracts specifying the required results (as compared to contracts specifying the required means, which are more random).

Thermal energy or fuel is the responsibility of the occupant, but it can be the subject of invoicing by the company of a P1 contract, which can take many forms. Typically, such a contract guarantees a temperature in the buildings instead of a purchase of fuels. The energy efficiency depends on the formulae of indexing of the Degree-Day.

Current services of operation are the responsibility of the occupant and are invoiced in accordance with Type P2 contracts. It is a service of advice and labour, with a commitment in respect of results, leading to technical assessments. The energy efficiency comes from the regular presence, analysis and maintenance.
A complete responsibility for maintenance, covering major repairs and the supply of materials, called total guarantee, can be subscribed by the owner and is invoiced in accordance with Type P3 contracts. The energy efficiency comes from the prompt replacement of malfunctioning materials.

The dialogue between the owner of building, his technical advisors and the specialized company, makes it possible to determine the best choice, adapted to each case.

Type P4 contracts, which cover all of the investments necessary, are prohibited by the public accounts. However, leasing and certain annuities (carry-forwards) (Rocard circular) are authorized. However, the essence of public financing for energy-saving equipment is the 'savings guarantee' clause, described below.

*Public purchasing and EPC*
The law fixed a framework for the duration of heating and air-conditioning contracts, while the Central Commission of the Markets defined the main types of operation of heating for the public markets (C.C.T.G., Collection of the General Technical specifications). The private markets were strongly influenced by this C.C.T.G.

If these standard contracts are appropriate for a first draft, they must be personalized according to the installation, in order to suit them to the specific requirements of the building. The adjustment can be defined in the C.C.T.P. (Collection of Particular Technical specifications).

The essential clause allowing the EPC in the public markets is the clause of 'Control of energy savings with guarantee of result' (GR-ME): if the in-place operator proposes actions to reduce energy use, it can finance them on the future benefit. This ensures the best possible decision and the best possible realization.

*Energy Performance Investment in Public Buildings repaid from the Savings (GR-ME)*
Public accounting has some rules which make Energy Performance Contracting difficult, in France, as in all countries: yearly expenditure, separation between investment expenditures and operational expenditures, etc. However, leasing with certain annuities (Rocard circular) is allowed. However, the essence of public financing for energy-saving equipment is the 'savings guarantee' clause described below. The differed payment clause is prohibited by the public procurement code ('Code des Marchés Publics') for authorities other than local authorities, because according to them it presents many disadvantages: an indirect debt of the local authority, which does not appear explicitly in its accounting, they are expensive for the community, opacity in market sharing between the three principal trading partners.

*The METP case (Public procurement of construction and operation with building companies)*
This historical example is representative of the difficulty of standardising the possibility of entrusting construction and operation of the public utility to the same company. The term of METP has been used for some new contract associating construction and operation of a public building. However, this formula was sometimes abused, allowing a delayed payment by the client for the operations of construction.It was found to decrease sometimes the advantages of competition for the purchaser in the following three ways:

- By reducing the number of the building companies suitable for the work;
- By excluding banks from the market for financing of the operation;
- By encouraging the lengthening of the market's duration

Moreover, the METP was found not in accordance with Article 2 of July 12th, 1985, relating to the public control of work which makes financing the exclusive responsibility of the building owner, and of which it cannot be relieved. Thus, for these various reasons, the law was deeply modified by the new Public Procurement Code (J.0. of 8th March 2001) applicable as from September 10th 2001, and the METP were removed.

## 6.4 Third period: Operation contracts for private buildings

Generally, there are more contracts of means and fewer contracts of results than in the public sector. This applies to various segments: heating, emergency generating set power units, etc.

*Contracts of 'means'*
Within the framework of a contract with obligation of means, the building owner entrusts the execution of specific tasks to a company.

In general, this type of contract defines only frequencies of visits and the nature of the services to be carried out, as well as labour and material means. It is somewhat old-fashioned due to the existence of the other types of contracts.

*Contracts of 'results'*
The contracts in respect of results impose a considerable responsibility on the company, which must successfully fulfil the mission, as defined by the contract. Their importance derives from the importance of the public markets.

Thus, the company gives its estimate on operational budgets, its guarantee of the quality of air conditioning and well-being in the buildings, of the maintenance of the materials, which are entrusted to them and compliance with the code of practice. It implements the means that it judges necessary, as needed to obtain the contracted result.

Whereas a contract of means can be of short duration, a contract of results can be only a long-duration contract. Indeed, the guarantee of the results implies a perfect knowledge of the installations but also, very often, significant investments in time for the knowledge, commissioning and adjustment of the installations.

A contract of results is incontestably the form, which it is advisable to give to a technical management contract when there are, by nature, expensive and complex heating air conditioning or cogeneration installations. Such contracts are defined by Acronyms in France, and called P1, P2, P3.

*Real guarantees come from aggregation of actors in the French practice*

The French insist on what is called a 'contract of results' instead of a 'contract of means'. By putting the responsibility of aggregating a number of functions on to one firm, they say the risk coverage is better, and this applies to both models that have been tried: the savings by the operators and the savings by a third party.

In the case of a project coming from the French HVAC operator, the company gives its estimate of operational budgets, its guarantee of the quality of air conditioning and heating in the buildings and of the maintenance of the materials. It implements the means that are regarded necessary, as needed to obtain the contracted result.

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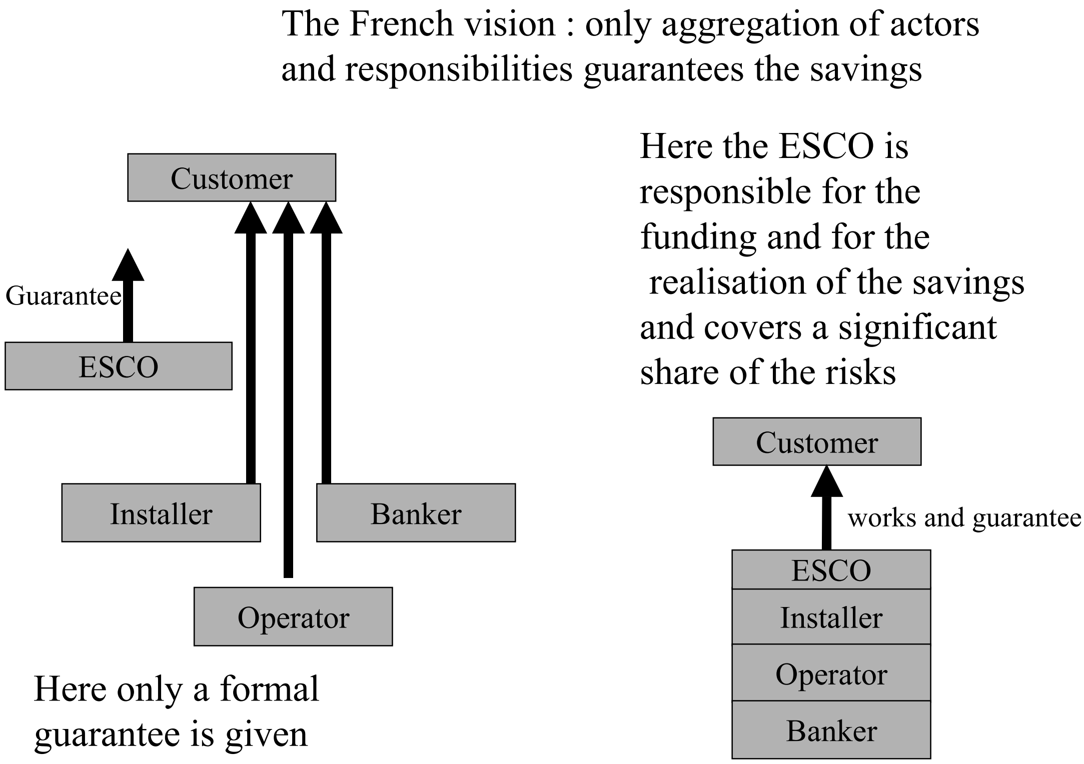
**Figure 4**




In the case of a third-party financing company, it provides the financing and carries out investments aiming at cutting running costs. It is reimbursed through the maximum savings ascertained from one year to the next, over a limited period of time. It therefore offers a threefold service:

- The financing,
- The technical realisation,
- A guarantee of results.

This guarantee of results is the most original feature of third-party financing, in the sense that investments are paid back only in proportion to the savings obtained. Whatever the performances of facilities and equipment installed, the guarantee of results ensures a net decrease of running costs for the customer. Should no savings be made, there would be no repayment; the customer thus benefits from the use of brand new equipment without having paid for it.

## 6.5 Fourth period: Contracts with profit sharing, TPF, first French ESCOs

The first real attempt to formalise energy performance contracts, although these already existed implicitly in the various contracts proposed by the ’exploitants de chauffage’ (as will be described later), occurred in 1983 when, for the first time in Europe, a company called ’SINERG’ (still existing and active nowadays) was set up, as a subsidiary of the French ’Caisse des Dépôts et Consignations’, to develop an approach known as ‘Third-Party Financing’.

The concept, inspired by a Canadian model developed by a company called ECONOLER in Quebec, subsidiary of Hydro Quebec, was exclusively aimed at the financing of energy-saving investments and investments aimed at replacing fossil fuels by renewable energy sources. The targeted clients were mostly energy consumers (the ’demand-side’), although energy producers (the ’supply side’) could also be taken into consideration in some cases.

The originality of the approach, compared to others and in particular to American ESCOs and to the French ’chauffagistes’, lay in that the ’Third-Party Financing’ concept was clearly orientated towards the financing of projects. This meant that SINERG was not necessarily proposing other services such as operation and maintenance and was not interested in selling just engineering services.

However, the third-party financing model is based on the development of a service activity, which could be described in short as ’the selling of energy savings’. In other words, SINERG was neither a bank nor any other kind of financial institution (a leasing company, for instance) nor an insurance company, nor a provider of operation and maintenance services nor finally an equipment supplier. But, at the end of the day, it was able to assemble and to propose a package containing many of these individual elements.

The idea which led to the setting up of such a company came from the understanding that a number of energy consumers didn't realize the energy efficiency investments that they needed, even though these investments are cost-effective, because of their lack of knowledge regarding the technical means available to reduce their energy consumption, the perception of a high degree of risk or, at least, of uncertainty regarding the expected level of energy savings and, finally, the lack of available financing. This last point was regarded as particularly important because market studies had shown that even creditworthy energy consumers or organisations which would have been able to borrow money directly from banks were not inclined to do so, or to take loans to finance these kinds of investments, which were not considered as the highest level of priority.

Against this context, the third-party financing company provides the financing and carries out investments aiming at cutting running costs. It is reimbursed through the maximum savings ascertained from one year to the next, over a limited period of time. It therefore offers a threefold service:

- The financing;
- The technical realisation;
- A guarantee of results.

This guarantee of results is the most original feature of third-party financing, in the sense that investments are paid back only in proportion to the savings obtained. Whatever the performances of facilities and equipment installed, the guarantee of results ensures a net decrease of running costs for the customer. Should no savings be made, there would be no repayment; the customer thus benefits from the use of brand new equipment without having paid for it.

See Appendix 4 for a typical ESCO business model.

How does the third-party financing company work?

- Each project is submitted to bankers for examination of:
  - Generated cash-flow
  - Financial and economical situation of the customer.
- Each project is financed with a specific and adapted loan or financial engineering (leasing).
- As the bankers need guarantees, the ESCO must be credible in terms of:
  - Well known technical expertise (experienced staff)
  - Financial resources (sufficient level of equity, high ranked partners)
  - Risk management.

## 6.6 Fifth Period: greater automation and new control systems for buildings, offices and industry

The consequences of automation, first in qualitative and then in quantitative terms, are huge in terms of control of operation. The manufacturers of GIMELEC have thus defined three levels of interpenetrating between the conventional techniques and technologies and information technologies. The first level of intrusion of communication, which is called the level of the NTEC (New Technologies of Electrical engineering and Communication) allows, for example, the self-diagnosis of a circuit breaker, a transformer, a turbine, an engine etc.

The operation of this information at higher levels will allow more targeted management of the maintenance operations, will create savings in cost of intervention and will assist optimal use of the equipment.

The second level, which is called NTAC (New Technologies of Automation and Communication), consists of integrating information technologies in more complex systems of automation (power station or bulk station, complete train). The NTAC are the nerve centre of the control of a complex process. The contribution of information technologies partly determines the technical performance and the economic return of the investment.

The third level is called the NTIC (New Communication and Information Technologies). They find their application in the fields of remote maintenance, management of fluid networks (water, gas, electricity), regulation of road and railway traffic, electronic trade. NTIC are the interface tool between an industry and its customers. The electricity industry (GIMELEC) has long been aware of the potential economies and the control of electric energy through the Electronics of Power and Programmable Electronics:

- Optimisation of Industrial Processes, Industrial Applications of the Electronics of Power;
- Management of the Building Industry: Industry, Tertiary sector and Residential (collective);
- Electricity Distribution – HVAC – Lighting;
- Teleprocessing: - Group Boiler rooms – HLM – Infrastructures;
- Quality of Energy and Continuity of services;
- Power generating units;
- UPS.

### 6.7 Sixth Period: Facility management and new multi-services offerings

Facility management appeared in France at the end of the Sixties, with the signing in Paris of a first contract for the towers of 'La Defense' offering total service management. Thus, for ten years, the facility management offer has been developing in France mainly in the banking agencies and stores networks. The main principle of the multiple services offer or 'facility management' is to allow the real estate owner to entrust some of its responsibilities, other than those relating to its core activity, to a single service provider and to benefit from so doing. The contracts of facility management have a variable profile and there is no standard form of contract. Thus for services other than operation and maintenance of heating and air-conditioning equipment, there are neither standard clauses nor any parallels with contracts of operation. Facility Management is based on tailor-made contracts, negotiable individually. These can range from a minimum level of covering, for example, heating and air conditioning or high/low tension power supplies, up to a total service including the operation of all equipment, lighting and office automation, lifts and elevators, including staff management and human resources, global telephony and security, safety and cleaning services. Facility management contracts are tailored to customer requirements and are appropriately structured, thus offering a multitude of possible contracts. The advantages occur in better productivity of the company by reorientating the customer towards his core activity and in improved rendered services and working conditions. Facility management today in France consists of 25 companies which belong to the 'Trade Association of the Companies of Multiple Services Real estate and Facilities Management', managing an average area of 15 million square meters and a sales turnover from 1 to 1.2 Billion Francs in 2001.

# 7 LEGAL TRANSLATION, FOLLOW-UP, CERTIFICATION

### 7.1 Some typical clauses in French TPF contracts

The analysis shows that the French step is turned more towards open contractual approaches than standardized. Apart from the models prepared for concession or leasing contracts, a standard contract for energy services does not exist. Typology remains to be completed and is indeed the question raised by the international comparison considered, as well as the absence of agreement about terminology and translations. Even the simple fact of having a bilingual French/English nomenclature would be progress. However, it should be noted that, for its own needs, the French public sector has worked out standard conditions for its contracts of heating operation.

From this point of view, the model of contract of operation together with a clause of guarantee of energy savings developed by the profession at the request of the public purchasers could be essential for an international reference.

Dealing with EPC through TPF, the four main contractual aspects to be discussed are the following:

- Shared savings
- Contract of energy management
- ’First out’
- Guaranteed energy saving lease.

*Shared savings*

In a shared savings arrangement, the outside energy service company installs and finances energy efficiency improvements in return for a percentage share of the savings that result over the period of the contract.

Shared savings contacts are genuine performance contracts, in which the energy service company's revenue stems directly from the energy savings achieved by the improvements and services that it has recommended, financed, installed and maintained. Thus the building owner pays only for the energy savings that are achieved.

Typically, shared savings contracts are between 5-10 years in duration: with the split of savings being expressed as a pair of percentages that add up to 100, e.g. a ’70/30’ split is an arrangement under which the contractor receives 70% of the energy savings and the customer receives 30%. However, these figures quoted are purely illustrative - there is no ’typical’ split of the savings, since the distribution of savings is dependent on the value of the investment, the length of the contract, and the negotiations between the customer and the energy service company.

The split of the energy savings may be constant throughout the term of the contract, or, as commonly, it may vary. If the split varies, it is usually arranged so that a higher percentage of the savings is paid to the energy service company in the early years, with a shift to a higher percentage of the savings being retained by the building owner in later years. Normally the energy service company will retain ownership of any equipment it installs, with ownership passing to the building owner at the end of the contract at no charge.

Throughout the term of the contract, maintenance and servicing on the equipment installed is most commonly carried out by the energy service company, while maintaining certain agreed comfort, operating and performance standards. The energy service company may agree, however, that the equipment be maintained by the building personnel if they have sufficient expertise and follow agreed maintenance schedules and procedures. Again, there is no hard and fast rule – this is a matter for negotiation between the customer and the Energy Service Company.

Variations on the fixed term, fixed share of savings contract include a ceiling on energy prices, or even a ceiling and a floor. Without a ceiling on the energy prices, energy users may be paying windfall profits to the energy service company if there is a rapid escalation in energy costs. Some energy service companies may accept a cap or ceiling on payments, but in return may seek to have a floor energy price inserted into the contract which would give some protection to the energy service company in the event of a precipitous fall in energy prices.

It is also possible that a shared savings contract may have an element of guaranteed savings, such that a certain percentage of energy savings may be guaranteed, with the remainder of the savings shared between the two parties.

The principal advantages and disadvantages of a basic shared savings agreement are set out as follows:

*Advantages of Shared Savings*

- Finance is off balance sheet, since no capital bas been invested.
- All the risk that the investment will pay off as predicted is transferred to the energy service company.
- Since the return to the energy service company is wholly dependent on the level of energy savings achieved, the energy service company has a strong incentive to ensure that the improvements perform as predicted.
- Since the share of savings is calculated on a monthly basis, the energy user is constantly aware of the performance of the improvements.

*Disadvantages of Shared Savings*

- Fair payment to both parties depends on accurate calculation of the energy savings, and agreement on the 'baseline' consumption by reference to which savings are calculated. This could be a cause of dispute between the parties.
- Unless a guarantee is given, the energy user has no guarantee that any savings will be achieved.
- The total amount of the payments to the energy service company is not known in advance.

*First out*

This approach, which has been used extensively in Canada, involves the energy service company taking 100% of the energy savings until the capital cost and financing charges have been recovered and its profit has been realised. A maximum time limit for the contract is normally quoted, typically five years, but the exact length of the contract will depend on the level of energy savings achieved.

Thus the energy service company sets out in advance the project costs: cost of the engineering; the energy-saving investment; the expected financing charges and the profit it wishes to earn. As the contract progresses, the energy service company is paid

100% of the energy savings realised above the agreed baseline consumption, until the savings have repaid the project costs.

The energy service company normally owns the equipment, with ownership passing to the Customer on termination of the contract. If the equipment installed has not performed as predicted and has not repaid the project cost by the end of the maximum contract period, the loss is borne by the energy service company. However, as with shared savings, such an arrangement requires agreement upon the baseline consumption, and upon continuing accurate measurement of the savings above this baseline.

As with the other arrangements previously described, the energy service company operating 'first out' contracts is normally responsible for the maintenance of the equipment. Likewise, this could be modified so that maintenance responsibility remains in the hands of the energy user if the energy service company is satisfied that the personnel involved have sufficient expertise.

Because this approach involves the payment of all savings to the energy service company, it is perhaps more suited to energy users in the public sector, to whom investment in improvements to the fabric of a building might be seen as of greater importance than short-term energy savings.

This may be particularly true if public sector energy users face the problem of a declining budget to reflect any reductions in energy costs. For private sector building owners, however, and particularly for industrial energy users, the need for short term reductions in energy costs may be paramount.

*Advantages of 'First Out'*

- The energy user makes investment in energy-saving improvements without any up-front capital.
- Maximum contract term is somewhat shorter than other arrangements.
- The energy user is aware of project costs at the outset.
- Greater than expected savings reduce the contract length rather than provide windfall profits for the energy service company.

*Disadvantages of 'First Out'*

- No immediate reduction in energy costs.
- Payment of 100% of the savings to the energy service company leaves little incentive to the energy user to ensure that the savings are actually achieved.
- As with shared savings, the payment to the energy service company depends upon calculating the savings beyond fair and accurate baseline consumption.

*Contract of energy management*

Under a contract for energy management arrangement, the energy service company takes over responsibility for the energy bills and is reimbursed by the Customer at an agreed percentage of the previous energy costs. Thus, for example, the energy user will be given a guaranteed saving of 5%.

As with a shared savings arrangement, the contractor will carry out a detailed engineering audit of the facility and recommend certain improvements, which the contractor will procure, install, and usually maintain. Again, as with shared savings contracts, the energy service company will normally carry out the maintenance on any new equipment installed as part of the energy saving improvements, but this could be left in the hands of the existing on-site maintenance personnel, if the energy service company judges that they have sufficient expertise.

Contracts of this sort art typically of seven years duration, though this could be longer (rarely shorter) if a greater level of investment is required. The energy service company frequently has an element of shared savings built into the arrangement in order to provide an incentive to building owners to assist in achieving the maximum savings.

Thus the Customer is guaranteed a certain percentage reduction on the previous energy bills. All additional energy savings up to a certain figure belong to the energy service company, in order to repay the capital and maintenance costs and make a profit, but beyond the target figure, for example 30% savings, all incremental savings are shared, in proportions negotiated between the two parties. Commonly, the greater proportion will go to the energy user in order to give the maximum encouragement to the user.

Payment is normally made monthly, but is based on an annual sum divided into twelve equal payments. This figure is reconciled at the year-end, with any adjustments being made accordingly. The payment to the energy service company is indexed both to the fuel cost and to the occupancy/or production mix and levels, in order to neutralise the effect of increases and savings, which could have been made in any event.

*Advantages of Contract Energy Management*

- The customer knows the amount of payments in advance
- A fixed monthly fee with an annual reconciliation reduces the contract administration cost for both parties.
- Some energy savings guaranteed.
- Improvements are installed at no up-front cost to the Customer.

*Disadvantages of Contract Energy Management*

- Giving the energy service company responsibility for all fuel supplies may imply an unacceptable degree of control.

*Guaranteed energy saving lease*

In concept, a lease is very similar to conventional debt, in that the building owner typically makes fixed payments on a periodic basis for a specific time period. Several characteristics make leasing a superficially attractive financing option for energy efficiency improvements: leasing is a well-understood financial approach, which is not seen as novel or difficult to administer.

However, in order to qualify as a performance contracting arrangement, the lease must include a guarantee element linked to the value of the energy savings achieved.

Normally this guarantee takes the form of a guarantee that the level of savings will not be less than the lease payments, i.e. that the net cash flow will be positive.

Payments are fixed in advance with a reconciliation of the actual savings achieved after one or even two years. If the savings have been less than the lease payments, the lessee will refund the difference.

Such guarantees can be given with either operating or financing leases. An operating lease is usually short term, with lease payments not fully amortising the cost of the equipment, which means that the lessee does not become the owner of the equipment at the end of the term. An operating lease is in essence a rental agreement.

A financing lease, by contract, is equivalent in commercial terms to an instalment purchase. The rental payments fully amortise the cost of the equipment and the interest charges. At the end of the lease term, the lessee is entitled to continue hiring the equipment for a nominal sum.

Which type of lease is applicable will depend on the tax and cash situation of the energy user, financing as well as the tax treatment of leasing. In general, leasing is applicable only as a mechanism for equipment, but the equipment cost may not represent the majority of the project costs: the cost of the detailed engineering audit, installation, and maintenance may not be covered by a lease.

Further, the guarantee element of a guaranteed energy saving lease protects the energy user only from negative cash flow: There is no guarantee of actual energy savings, and little incentive to the contractor to ensure that the equipment performs to its maximum potential. Rather, the lessor is motivated only to ensure that the equipment performs adequately over a lengthy period. In this regard, guaranteed leases differ from the three previous performance-contracting arrangements as the 'performance' element of the contract is limited.

*Advantages of Guaranteed Saving Leases*

- Payments are fixed so total payments by the customer are known in advance (though the lease may well provide for the payment to be varied to reflect changes in taxation).
- The energy user for the equipment requires no up-front payment.
- Leasing is a familiar financing technique for most organisations.

*Disadvantages of Guaranteed Saving Leases*

- The lessor has no incentive to increase the energy savings beyond the guaranteed minimum.
- Leasing finance may cover only the equipment costs, not the substantial service costs of an energy-saving project.
- The tax and legal situations may vary over the term of the lease.

In order to carry out a successful contract, it is important that energy users realise that performance contracting is an involved process. The more time an energy user puts into defining their needs and establishing clear criteria for selecting an energy service company, the more advantageous it is likely to be for the energy user in the long run.

## 7.2 Some typical clauses in French operation contracts

The analysis shows that the French step is more turned towards open contractual approaches than towards standardized. Apart from the models prepared for concession or leasing contracts, a standard contract for energy services does not exist.

The French heating and air-conditioning market has developed itself by supplementing these mechanisms of engagement of means, which require great involvement of the building owners and occupants, by mechanisms based on the continuous presence of the contracting party which offers the services. The contracts previously described within the framework of the second and third mechanisms of historical development of the service offer are described here in the form of several sub-types of contracts. We display them again here in more detail while describing more precisely what can be their respective energy-saving contents. These contracts of heating service operation belong in fact to the category of contracts with obligation of result.

*The 'P2' type contract: Operating and standard maintenance of systems*

This involves the provision of advice and labour, which are at the base of all the Operation contracts. It considers the control and operation of the systems. This contract can lead in addition to the 'P1' type of contract, which involves the supply of energy, or to the 'P3' type of contract which provides important maintenance and replacement of equipment, therefore called 'total guaranty' ('guaranteed total').

P2 type contracts offer only a small direct potential in energy efficiency. They allow a correct operation of the installations in time and a constant adjustment of combustion efficiency and outputs. However, the contracting party is not concerned with the energy supply and is obliged to ensure only the correct operation of the equipment, which does not require precise measurement of the outputs for example. The obligation of maintenance, cleaning, balancing and control of the equipment is nevertheless a factor of better output of the installations and a guarantee of better energy efficiency. However, the contracting party wants to preserve his market, then offering a range of improvement proposals and measurements intended for the satisfaction of the customer and also proposing attached work, all of those being able to have energy efficiency contents and to contribute to 'continuous progress'. This contract is also called 'PF' contract (services and fixed price).

*The 'P1' type contract: Energy supply, without tacit profit-sharing*

The P1 contract builds on the 'P2' type contract. It corresponds generally to the highest expenditure of the contract, except for cases where there is an offer 'P2 multiple services' or facility management of great scope. P1 contracts might be based on inclu-sive cost or be proportional to the quantities of delivered heat or energy. It can also include increasing benefit in the event of decreasing energy consumption. Thus, in terms of energy effectiveness, the contents of such contracts depend on the details of the sub-contracts described below, and inherent to the supply of heat or energy.

*The 'MF' contracts (inclusive cost) and' MT' contracts (fixed price temperature)*

These are global price and inclusive cost contracts, independent of the climatic conditions for Type MF contracts and adjusted for the ambient temperature for Type MT contracts. The indoor temperature conditions and the duration of heating are specified. It is then in the interest of the contracting party to reduce the costs of primary energy necessary for the supply of the contracted interior temperatures. The occupants cannot moreover change these. However, there is no incentive for the building occupant or owner to make energy savings. These contracts are somewhat unclear, and it is conceivable that they will be spread with the energy deregulation. The remaining questions are: which are the limits to the purchase of energy by a third-party for resale as heat? (Or in the case of lighting?)

*The ''M' contract (heat metering)*

The cost of supply is in general proportional to the provided heat. The indoor temperature and the heating period and duration are fixed by the contract. The advantage in term of energy saving is thus twice, because the occupant may find it beneficial to reduce his heating requirements and the contracting party to increase his production efficiency in order to reduce the primary energy consumption.

*The 'CP' contract (fuel and services)*

The price fixed here corresponds to the quantity of fuel provided. Thus the occupant can accurately control the quantities of energy consumption. This contract thus encourages the occupant to reduce primary energy consumption. However, there is not much incentive for the contracting party to save energy.

*The 'P1 with tacit profit sharing' type of contract*

Profit sharing can be included in all the contracts presented previously (MF, MT, MC, CP, PF). The Type P1 contract envisages the sharing of energy savings, or excesses of consumption, in relation to a previously defined basic consumption during one given whole year of heating. This quantity is adjusted according to the period and the climate during the given heating season. Profit sharing cannot be applied for the first year of heating if the installation is new. The advantage of these concepts of profit sharing is that the occupants and the contracting parties both have an incentive to carry out energy saving because they share the benefit. It should be noted that the market central commission in the register of the general technical specifications (Collection Marchés Publics n°2008) defines the formulas of profit sharing. Profit sharing involves all actors but, as opposed to a fixed price operation, extends the payback time of the operator and may prevent investment.

*The 'P2 with profit sharing' type of contract*

Although 'P2' type of contracts are not an energy supply agreement, one can define a profit sharing in the energy saving in pure P2, which consists of contracting a continuous improvement of the operation service.

*The'P3: Major maintenance and equipment replacement' type of contract*

This type of contract covers major maintenance and possible renewal of the equipment. It is in general associated with the 'P1' and 'P2' types of contracts, but can in some cases be associated only with the 'P2' type of contract. In this type of contract, the building owner pays a contractual yearly bill, which depends on the age and conditions of the installations. On the other hand, the owner commits himself to replace whole or part of the failing materials throughout the contract. Even if it is transparent, this contract is seen by many of the public purchasers as a purchase with credit, which can not be appropriate.

In Type P2 and P3 contracts, the owner has the entire responsibility for the installations and can choose the replacement of equipment in order to reduce the costs of operations and maintenance. The contract stipulates that the contracting party has the obligation of renewing the equipment with identical installations of equivalent performance in term of efficiency. We can imagine that continuous technical progress and the possible profit-sharing on P1 or P2 on the energy cost reduction benefit or the desire for anticipating the risks of operation lead the contracting party to carry out faster and more economical replacements. Only the department of tax knows the real use of these funds, because it has to tax the benefit at the final period of engagements.

This type of contract - which however seems to correspond with the budgeting logic of the State – cannot on the other hand be carried out within the framework of the State market because it sets up procedures of prepayment prohibited within the framework of public markets. One can wonder whether the lifting or reconsideration of this ban might not permit energy saving on a larger scale in public buildings.

This type of contract thus presents significant energy efficiency content if it is contracted with a 'P1' type of contract with a profit-sharing clause or within the framework of a Type MF or MC contract. If the building owner and the contracting party jointly agree to replace the existing installations by installations of better efficiency of combustion, the difference in cost can be financed by the use of a Type 'P4' contract, which proposes a mode of particular financing in time.

## 7.3 Combined heat and power development as an energy service

Whereas, since the beginning of the Eighties, cogeneration knew a significant growth in the USA and in the majority of European countries, France remained until recently in a situation of weak development of this technique. In order to cure this deficit, the Authorities took, during these last years, a group of measures to ensure tax, technical and economical legal framework favourable to its development. This is part of the installation of a legislative framework for the encouragement of energy service offers in terms of combined production of electricity and steam. Thus a favourable tax device was set up, under the conditions of obtaining a minimum level of performance, guaranteeing over all the contracted period a total energy efficiency of 65% minimum, a global heat/power ratio of at least 50%, and the need for an efficient use of the produced heat. The principal points of this device are mentioned below:

- The exemption of the professional tax.

- The exemption of the TICGN (Inland Duty on Natural gas Consumption) and of the TIPP (Inland Duty on Petroleum Products) on the supplies of gases and heavy fuel intended to be used in these installations throughout a 5 years duration from the start-up.

- Permanent obligation of EDF to buy the electricity of the cogeneration installation.

All these measures taken by the Authorities, mainly considering the new electricity purchase contract of 1997, allowed the takeoff of this technology in our country in 1998. The installations of cogeneration units, which conformity was certified by the DRIRE (Regional Departments of Industry, Research and Environment) represented as of April 1999 the following capacities:

- 61 contracts of less than 1 MW, representing 53 MW.
- 216 contracts between 1 and 8 MW, representing 729 MW.
- 11 contracts of more than 8 MW, representing 157 MW attributed to heat network.
- 20 contracts of more than 8 MW, representing 606 MW for the industrial sector.

The cogeneration technologies installed in recent years or being planned at present have been in general engines functioning with natural gas for the small powers and of gas turbines beyond a few MW.

**Table 1**

| Years | Number of installations | Total Electric Capacity (MWe) |
|---|---|---|
| 1995 | 67 | 249 |
| 1996 | 94 | 330 |
| 1997 | 149 | 562 |
| 1998 | 638 | 4407 |
| TOTAL | 948 | 5323 |

Source: DRIRE 1999

For the first six-months period of 2001 only, 138 MWe of installed capacity were declared (31 installations), including 4 MWe in the tertiary sector (8 installations), 76 MWe in boiler rooms and heat networks (19 installations) and 57 MWe in industry. Today, following a one year and a half total gap concerning the future legislation relating to the purchase tariffs of the electricity produced by cogeneration, a probable development of 300 MWe per annum between now and 2010, in the categories of power lower than 12 MWe, (source ATEE, Club Cogénération (Technical Association of

Energy and Environment composed of Energy sectors and combined heat and power professionals).

### 7.4 Renewable energy services offers with Energy Performance Contracts

Although still little developed in France, the market for renewable The cost of supply is in general proportional to the provided heat. concentrated primarily on integrated production of thermal solar energy. However, since the 1980s, the use of low-enthalpy geothermal resources via heat pumps has been increasing considerably in the large tertiary sector, in industry and for district heating, and also recently in the residential sector.

*Guarantee of result associated with thermal solar energy*

Due to dissatisfaction with installations, sometimes too complex and badly designed without consideration of maintenance, or even with regular inspection of operation, various audits were held on collective solar installations at the end of the Eighties: A high failure rate appeared which could reach in certain areas 30 % of the installed equipment. Thus, the decision to set up a Guarantee of Solar Results (GRS) was implemented for the first time in 1988 in a hospital of the south of France. Since then, 150 installations are now functioning according to this principle in Europe and neighbouring countries. The Guarantee of Solar Results is a contract that translates the intention of the professionals, and is not limited to the supply of components. The manufacturers of solar collectors, the fitter and the contracting parties are chosen by the building owner, and are assisted by the engineering and design department or offices following the end of an invitation to tender. However, a new element is added with the usual criteria of judgement of the proposals: annual energy production of the projected solar installation. After acceptance, the engineering and design department assist the installation department, which is also involved in the previously laid down objectives. It is provided with a device of remote monitoring, which, month after month, computes solar energy production data. At the end of one year of operation, an energy balance is drawn up. If the energy produced by the solar system is equivalent to at least 90 % of the theoretical energy supply, measurements continue during four additional years. In the contrary case, the companies are faced with a double choice:

- To improve the installation to achieve the goals, at their own expense, *or*
- To compensate the building owner for the deficit of solar energy.

*Guarantee of result associated with biomass use*

*Guarantee of result associated with geothermal heat valorisation*

### 7.5 EPC proposed by the manufacturers and the electric and automation equipment suppliers

Today, vis-à-vis the recommendations of the European Union and the ADEME in France, GIMELEC (Grouping of the Electrical Engineering Industries) works to build joint positions with the manufacturers on:

- Reference applications
- Variable speed:  pumping, ventilation, HVAC
- UPS: Information technologies, Internet
- Digitalisation of the functions of control and supervision of Energy (Intelligent Instrumentation) and use of Web servers for Quality and the Control of Energy
- Automation and Command-control decentralised Production
- Public and private electrical supply networks

The aim is the optimisation of the Production, Transport, Distribution and use of electric energy at the boundaries of the processes in the Building industries and infrastructures (sites).

Key elements:

- Objectives; alliance of the different trades towards the services at every level; tax incentives policy, charters of ethics and a sales leaflet on the interest of the customers to have powerful systems (improvement of costs, of productivity, social harmony), policy of concrete partnerships on the basis of the markets and customers needs.

- Regulation systems play a particular role in the panorama of energy technologies. The S2TI (National Trade union of the Companies of Teleprocessing, 'Télé-transmission and Immotique') is exploiting part of this equipment.

## 7.6 EPC in Facility management

Today, it is possible to distinguish four categories of actors of facility management in France, which are differentiating themselves due to their original activities and their way to enter the market, i.e. diversifying gradually their offers starting from their initial respective knowledge:

- Contracting party of heating and air-conditioning services, which normally orientated their activity to maintenance of the technical equipment, and total services offers
- Cleaning services, which offer services of maintenance of the lighting equipment up to the services of safety and security
- Collective catering, which orientated itself to the services of total cleanliness
- A further category, which includes the messengers, companies of telephony, data-processing network management, safety and security, etc.

*Potential for induced energy saving*

A direct and indirect propensity for energy savings could arise from the observation of the contractual operation of the real facility management offer. If we do not consider here the offer of contract of operation maintenance, described later on, and that can be associated with profit-sharing, but only the offer of ancillary services such as lighting or office automation, several points are to be taken into account:

- The contracts of facility management are based on contractual costs. They are based on a precise inventory of fixtures and equipment of the contractual installations and refer to an obligation of result such as, for example, a level of illumination and of colours quality index for the contracts or sub-part of contract relating to lighting.

- Thus, the owner for the same rendered service may find it beneficial to reduce his costs and thus amongst other things to limit his consumption of energy and maintenance relating to this station. It is the same with equipment for office automation, for example, as much as the energy cost makes up a considerable proportion of the operation costs. We can then evaluate a direct potential for energy saving.

- Indirectly, we can observe a better organisation of the actions of maintenance or 'GMAO' (Management of Maintenance assisted by Computer-), a use of more efficient equipment in all the fields, permitted by the adequacy between the expressed needs and the technical and human resources used (specialisation of the personnel by 'trades') and a computerisation of technical management (GTC Centralised Technical management, GTB Technical Management of Building) allowing automation and self-checking of the equipment. In the same way, a better management or an external management makes it possible to avoid internal abuses of general materials consumption and to provide adequate and specialised solutions, amongst other technical things, for the given needs; the contracting parties can moreover implement a function of technical and economical research of the most competitive provisioning, adequate tariff options in the current and future context of deregulation (according to the electric type of offer available, The cost of supply is in general proportional to the provided heat. for example), and of the options for decentralised production of steam and electricity.

- However, we observe within the framework of facility management contracts a lack of responsibility on the parts of owners and occupants of the contracted installations and buildings. The fixed price contract does not encourage the occupants to behave in favour of energy saving, since their actions on energy consumption do not have any direct effect on their operation costs. Moreover, service providers cannot implement processes limiting the behavioural effects of the occupants and even improvement of the building structure, such as thermal insulation, which need heavy investments having to be subject either of long duration contracts or of participation by the owner in the investment expenses of such materials. The current tendency observed is, moreover, to realise primarily short-term contracts, which offer only little possibility of investment of energy-efficient equipment.

*Current State and development prospect*

The current contracts of facility management are concentrated primarily in the tertiary sector. The industrial sector still presents few contracts of facility management because the industrial processes likely to present a requirement in service are taking part of the core activity of the manufacturers. Thus the residential and industrial sectors can present, in addition to the tertiary sector alone, a significant potential of development of the facility management offer, such as the public sector which however from a legal point of view, does not offer today the possibility of contractual type with profit-sharing (except some prisons called 'Chalendon' after the man who allowed it in some specific public procurement).

However, it is probable that deregulation of the electricity market will create a new market for the offer of service in France, while making it possible for new actors to offer a service of advice focused on the supply of energy upstream of the meter. This offer of service thus can be considered in an integral energy service offer for the customer by creating a complete chain from gas to lighting (or primary energy up to useful energy) within the framework of decentralised production using, for example, gas cogeneration and better tariff option suggested to the eligible customer The cost of supply is in general proportional to the provided heat.

# 8 COMMON CLAUSES FOR REFERENCE IN FRANCE FOR TPF

## 8.1 Definitions for TPF

In the context of an EPC, certain words and phrases have a defined meaning: for example, baseline consumption means the energy consumption and costs for the past twelve months by reference to which any savings will be measured; for ease of reference the definitions are listed at the beginning of the contract, together with the location of each definition in the text.

## 8.2 Feasibility study for TPF

The preparation of a detailed energy audit, or 'feasibility study' is the first step the energy service company takes towards implementing an energy performance contract. The preliminary survey mentioned above gives the Supplier grounds for believing that energy savings are possible. The detailed audit, which is referred to in this clause, is the basis for the detailed proposals, the results of which are set out in Annex A.

In order to assist the Supplier to carry out the energy audit and to formulate detailed proposals, the Customer is required to provide certain information, including past energy records and standards of service; plans of the building; occupation and use of each part of the buildings; details of energy use; and current maintenance contracts. It is of the utmost importance that this information is accurate. A common mistake made by Customers is to over-estimate the level of service presently being enjoyed. For instance, a Customer may believe that rooms are being heated to 21°C, whereas they are only being heated to 17°C. If the Supplier were to act on this mistaken information it might well find that energy use went up rather than down. To protect the Supplier against this position, the Customer gives the Supplier a warranty (in Clause 16) that the information to be supplied by it will be accurate. If this turns out not to be the case, the Supplier will be entitled to recover damages for any loss it suffers. Such damage could include loss of profit.

The agreement stipulates that the Contractor will complete the detailed study within 90 days of being given the information by the Customer. This time limit has been specified in order to encourage a prompt response and thus progress by the Supplier. However, energy users should note that the time needed to produce the study is a direct function of the complexity of the building in question, the energy-using equipment and patterns of use. A study carried out on a building with a uniform level of occupancy and hours of use may require less than 90 days to complete. But to carry out a detailed energy survey on a large and complex industrial process could take substantially in excess of 90 days. Thus energy users and Suppliers should negotiate an appropriate time period for the detailed survey.

Both the cost and the form of the study are stipulated under Sub-clause (3). The form of the study is as set out in Annex A. While the cost of the study is given here as a set figure, energy users should note that this would not always be possible. In some cases, for example in the case of a large and complex multi-building site, the agreement may stipulate, rather than a set figure, a scale of fees, or a rate per hour with perhaps a maximum number of hours.

*Main issues in TPF*

The detailed survey should list:

1. The present standards of service - i.e. the present level of heating, cooling and level of lighting in the building, and

2. Whether the proposals the energy service company is making involve a change in any of these present levels of service. Building owners may be concerned that the energy service company may realise savings merely by reducing service levels e.g. reducing the heated temperature in the building.

3. It is therefore important that the energy service company sets out, from the outset, the present standards of service and any changes it proposes to make to the present standards.

4. From the energy service company's point of view, setting out the present standards of service can also be vital. Frequently, building owners may believe that the building is heated to a certain temperature, while the detailed survey reveals that temperatures are in fact lower. In order to avoid misunderstanding and potential conflict it is important that both parties are aware of the current standards of service before any modifications are made.

5. The study should give a broad specification of any equipment to be installed in order to achieve energy savings. The word 'broad' is used here, because while the Supplier can specify the nature of the equipment that it proposes to install, it may not be possible at this stage to specify the manufacturer or model number, since the Supplier may know several manufacturers of a certain piece of equipment, and wish to put the supply out to tender.

6. The study will specify the 'baseline consumption' which is the adjusted historical energy use. The baseline energy consumption is used to compare the current actual consumption throughout the term of the contract, with the historic levels of consumption, and thus arrive at a figure for energy savings.

The baseline consumption will normally be the historic consumption for the most recent 12-month period, or an average of consumption for the past 2/3 years if data is available. This historic consumption is adjusted to take account of a number of factors, including the number of heating days per month; occupancy level variations; operating schedule variations; and changes in the standards of service.

The effect of each of these variables upon the historic consumption is determined by a mathematical formula, which will be proposed by the energy service company. An alternative to a formula, which may be favoured by some energy service companies, is to perform a multiple regression analysis. A regression analysis is an engineering procedure, which uses a computer programme, which is specifically designed to find the best 'fit' between a number of different sets of data, and could be used to determine the baseline consumption for each type of fuel used in the building. However, in order to obtain meaningful results from a regression analysis, the data must be highly accurate. Frequently, some of the data needed may be incomplete or even unavailable.

While the sample method of calculating the baseline, quoted above, includes taking account of data on weather patterns (i.e. heating and cooling degree days) energy users should note that not all Suppliers take weather data into account. Some Suppliers believe that over the life of the agreement the weather will average out, making calculation of the baseline including weather data unnecessary.

Whether weather data need be included depends upon the variability of the weather during the base year and the preferences of the energy service company and the Customer.

The sample contract refers to heating degree-days and cooling degree-days. A heating degree day is found by taking a base temperature, usually 15.5°C. Temperatures are then taken hourly and the average number of degree days below the base is calculated for that day: this number is the degree day. For example, if the average number of degrees below base that day was 4, then a total of 4 degree days would have been accumulated. The object of using degree-days is to reduce the effect of variations in temperature upon energy costs, and so obtain a more accurate estimate of savings achieved by the energy service company. A cooling degree-day is used when a building needs to be cooled - in this case the base temperature is usually taken as 18°C.

*Energy savings calculation*

When the baseline consumption has been established, the energy audit should provide the method of calculating energy savings on a monthly basis. Energy users should carefully evaluate the proposed method, since the calculation of monthly energy savings dictates the size of the Supplier's fee.

This example which is discussed below assumes that the agreement covers energy consuming equipment which is, or can be, metered. If this is not the case, for example where the agreement covers a building that is part of a much larger site, and metering is available only to cover the entire site, then a formula for calculating consumption will be offered.

1. The 'Avoided Energy Cost' for each fuel type must first be calculated. The energy savings, in units of energy, are determined by simply subtracting the total amount of energy consumed during the month in question (derived from meter readings) from the corrected baseline consumption.

2. In order to calculate the monetary value of these savings, the next step is to calculate the current cost per unit of energy consumed, for each type of energy used, by dividing the total cost of the bill (in Francs) by the total number of units. For the purposes of this calculation, and in order to give the energy service company some protection from an unforeseen and sharp decline in energy prices, a minimum price is given for each fuel for the purpose of calculating the cost per unit of energy. If the price in one month is below the minimum price, then the minimum cost quoted here will apply.

   As a quid pro quo for this minimum energy price, or floor price, a maximum or ceiling energy price is also given. Such a maximum energy price protects the client from a rapid rise in prices, and avoids the payment of windfall profits to the energy service company if prices should increase considerably. Thus if the average current cost for any type of energy is above the price quoted as the maximum in any one month, then the maximum price will apply for the purpose of calculating the Supplier's fee.

3. In order to arrive at the 'Avoided Energy Cost' for a particular fuel, the number of units saved (calculation A) is multiplied by the cost per unit of energy (calculated in B).

A detailed engineering energy audit of a building is a time-consuming and thus costly procedure. If the study shows that, in the opinion of the Supplier, no material energy savings can be made, or at least there is insufficient energy-saving potential to make a performance contract economic, then the cost of the study, which is specified here, will be shared between the Customer and the Supplier.

It should be noted that some energy service companies would not make any charge for the feasibility study, whatever, the outcome, if the walk-through survey had indicated that savings would almost certainly be available. In this case the contract would be signed only after the detailed energy audit had been carried out and proposals produced by the energy service company.

In the more likely event that sufficient savings have been identified, the contract calls upon the Customer to decide within 30 days of receiving the study whether or not to proceed with the agreement, and thus to adopt the study. If the Customer decides not to go ahead, it must pay the Supplier the cost of the study, within 14 days of having made its decision, with the study then becoming the property of the Customer, and the agreement coming to an end. However, if the Customer decides to adopt the study, then the Supplier meets the cost of producing the study. If the Customer takes no decision, within the required 30 days, it is assumed that the decision is negative, and the agreement is at an end. While energy users may at first sight regard this as a somewhat onerous provision, it is in reality an important safeguard for the energy service company, and one without which an energy service company would be very unlikely to enter into an agreement. The cost of the detailed energy survey is typically in the region of FFr 100,000, and potentially considerably more. In order to 'insure' this cost, the energy service company requires this provision in the contract.

When the Customer decides to proceed with the agreement by adopting the study, the two parties normally negotiate upon the details of the energy-saving improvements, with the proposals being modified in the light of these discussions.

Energy users should be aware that the proposals that the energy service company makes are likely to require negotiation in order to achieve a mutually satisfactory project - while possible, it is unlikely that the initial proposal of the energy service company will be acceptable in detail to the energy user. The energy user may well require technical assistance at this stage.

Again in order to encourage prompt progress in the process, the contract stipulates that if the two parties cannot agree upon modified proposals within 30 days (or longer if agreed) then the contract will be automatically terminated and the Customer obliged to pay the cost of the study to the energy service company.

Where the two parties are agreed upon modifications to the initial proposals, these final proposals are then signed by both parties and become part of the contract. The final proposals, which have been agreed and signed, refer to the contract. They bind both the Customer and the Supplier.

### 8.3 Installation of equipment by TPF

Normally, the proposals require new equipment to be installed in the Building as part of the energy-saving services. The agreement puts a number of obligations upon the energy service company regarding this installation. The energy service company is required to install the equipment in accordance with the proposals, and to the timetable set out in the proposals, at its own expense. This installation of equipment at the Supplier's expense is the hub of the performance contract. A specific time limit is not given in the sample contract, since the time allowed for implementation will obviously vary considerably depending upon the complexity of the project and whether installation is to be completed in phases or not. However, the proposals should cover this point, and energy users are advised to check that the timetable proposed is reasonable for the Supplier without involving undue delay.

A second obligation of the energy service company is to carry out the installation in a good and workmanlike manner, without causing damage to the building or unnecessary disruption. This requirement is a protection for the energy user.

Thirdly, the energy service company should guarantee the equipment installed for one year from the 'commencement date', fit for the purpose for which it is installed.

In order to check that the equipment has been properly installed, a trial period of 14 days is proposed, when the Customer can test the equipment at its own expense. If the Customer has not notified the Supplier that the equipment is defective during the 14 days, then this is treated as acceptance of the equipment by the Customer. If, however, the energy service company is notified by the Customer that the equipment is defective, then the Supplier is required to rectify the defect, and the trial period will be repeated.

In order to protect the Customer from a never-ending succession of 14-day trial periods, this sub-clause sets a three-month time limit on such trials. If equipment is still not working properly three months after it has been installed, then the Customer can bring the agreement to an end by giving the Supplier immediate notice. If the agreement is terminated in this way, then the Supplier must remove the equipment installed as soon as reasonably practicable and at its own expense. The Supplier must also restore the building and the process to its previous condition.

The energy savings are calculated from the date on which the Customer is regarded as having accepted the equipment. For the purposes of calculating energy savings, this date is called the ’commencement date’.

In order to ensure that the maximum energy savings are achieved, an objective in the interests of both parties, the energy service company should be allowed, with the client's consent, to alter, add to, remove or replace equipment. Shared energy-saving agreements are typically from five to ten years' duration, and in this time the technology available to the energy service company may alter considerably. It may also be the case that one piece of equipment installed performs disappointingly, and thus the energy service company needs the freedom to make these changes as circumstances dictate.

The contract may state that the Supplier will remain the owner of the equipment it installs. A number of points need to be borne in mind in this context:

The owner of the equipment will be responsible for any damage it causes to third parties, and will thus need to consider taking out insurance.

The law relating to real estate and land in France can have unexpected consequences. If a piece of equipment is attached to real estate or land (as a fixture), then the ownership of it may pass automatically from the previous owner of the equipment to the owner of the land. Several tests are applied to decide whether a piece of equipment becomes part of real estate or of the land on which it is built: for example; the degree of annexation to the land; the degree of indispensability of the fixture to the real estate or land to which it is attached. As an example, a boiler installed in a building might not become part of the building, but the central heating radiators fed by it, provided that they have become part of the building and indispensable to its functioning, almost certainly would.

The sub-clause is drafted to remind people of this problem, and says that the owner of the building should agree to vary what would otherwise be the position.

The availability of allowances for tax (based on depreciation) needs to be considered. The general rule is that capital expenditure can be set only against capital gains for tax purposes. In some cases, capital expenditure can be set against income. At present, a certain percentage of the remaining cost can be written off against income in the year of expenditure, and subsequent years during the term of amortisation of the related equipment (usually five years from the date of expenditure). As to the applicable percentage of amortisation, energy-saving equipment benefits from a decreasing rate amortisation system.

This system provides for a coefficient that varies following the available term of amortisation (minimum 2 and maximum 3). To qualify for this allowance, the expenditure must 'belong' to the person who incurs the capital expenditure. It will be apparent that equipment which becomes part of the land ceases to belong to the person who installed it. However, under French law, equipment such as energy-saving equipment is assimilated, for tax purposes, to a 'Fixed Business Installation' which belongs to the installer, who is taxed on the income resulting from there.

The tax position regarding capital allowances is complicated and advice should be taken in connection with each contract.

## 8.4 Maintenance and TPF

The energy service company has an obvious interest in the maintenance and servicing of the installation, since the return to the energy service company depends upon the continued operation of any equipment installed. In order to ensure themselves that this maintenance is being carried out to the required specification and frequency, most energy service companies wish to carry out the maintenance on the installed equipment themselves, normally at the expense of the energy service company. In some cases, the provision of maintenance services by the Supplier will extend to the existing energy-consuming equipment, since the operation of, for example, a boiler plant obviously affects the level of energy savings achieved. Different energy service companies will have different proposals on this point, and the exact nature of the maintenance services proposed will vary depending on the circumstances of both Customer and Supplier. The model contract provides for the service and maintenance of the installation.

If the energy service company is taking responsibility only for the maintenance of the new equipment, then the maintenance of other parts of the installation remain the Customer's responsibility. However, in such an event, the proposals normally stipulate the frequency and nature of the Customer's maintenance obligations for that part of the installation.

A point that energy users should note is that not all energy service companies require that they carry out maintenance on even their own equipment. If the energy service company judges that the Customer's in-house maintenance staffs have sufficient expertise, then the maintenance may rest with the Customer subject to certain mutually agreed procedures and schedules.

In order to protect the investment of the energy service company, the Customer cannot enter into, or renew, an existing maintenance contract for any part of the installation without the written consent of the Supplier, whose consent cannot be unreasonably withheld.

The Customer is required to notify the energy service company within 24 hours if the equipment breaks down or if the energy supply is interrupted. This protects the energy service company from loss of earnings through prolonged non-operation of the energy-saving equipment. If the Customer does not notify the energy service company within 24 hours, and the breakdown causes damage to the building, then the Customer is responsible for any loss or damage arising.

The contract provides further protection to the energy service company's investment, which is physically located on the Customers premises. The Customer is required not only to keep the building in a good state of repair, but further, is specifically prevented from removing or replacing any of the installation.

In order to allow the energy service company to carry out its contractual obligations, the Supplier and its sub-contractors have the right to reasonable access to the building.

### 8.5 Insurance and TPF

The insurance provisions of the contract are contingent upon the ownership of the equipment, set out in Clause 4(4). In the model contract, since the energy service company is the owner of the equipment, it is required to insure the equipment to its replacement value.

If the ownership of the equipment is passed straight to the Customer from the outset, then the insurance liability for the equipment tests with the Customer.

If the installation is damaged, but repairable, then the energy service company is required to use the insurance proceeds and to make up any shortfall. If the equipment is irreparably damaged, then the contract is terminated with the Supplier retaining the insurance proceeds. The Supplier should also consider insuring against loss of profits in these circumstances.

## 8.6 Payment within TPF

It is necessary to describe the procedure whereby the energy service company is paid for its services. It is envisaged that the Customer will pay the energy service company a monthly fee based upon the percentage share of the energy savings achieved, to which the Supplier is entitled under the agreement.

Normally the energy service company carries out the calculation of the energy savings and the monthly fee. In order to allow the energy service company to perform this calculation, the Contract requires the Customer to send promptly to the Supplier all fuel bills paid during the previous month. Thus the Customer remains responsible for paying the fuel bills.

Each month, the energy service company calculates the fee and sends an invoice accordingly to the Customer, together with a demonstration of how the fee has been calculated. The Customer is obliged to pay the Supplier's invoice, once received, typically within fourteen days.

The payment schedule, which is the percentage split of the savings, is set out in the proposals. Commonly, the agreement gives a higher percentage share of the savings to the energy service company in the early years of the contract, switching to a smaller share in later years. Other contracts, however, may have a constant percentage split of the savings throughout the term.

If the Customer disagrees with an invoice, it must notify the energy service company within 7 days, otherwise it will be deemed to have accepted the invoice. If an invoice is in dispute, the Supplier and the Customer should in the first instance see if they can reach agreement on the correct amount. If, within 28 days, they cannot reach agreement, then either side can refer the invoice in question to an expert.

If an invoice is in dispute, and has been referred to an expert, in order to provide the energy service company with a continuing income, the contract requires the Customer to pay on account either the amount of the last undisputed invoice or, if no invoice has previously been paid, an agreed percentage of the cost of installation. When the correct fee has been resolved, then adjustments will be made to the fees paid on account as necessary, carrying interest.

## 8.7 Late payment in TPF

In order to protect both parties from late payment, the contract requires the third party to pay interest at a set annual percentage rate on any money from when it is due until it is paid. Any agreed percentage rate may be provided for within the limit of the 'taux de l'usure', which is a ceiling rate fixed on a bi-annual basis pursuant to a law dated December 28, 1966. This is not intended to be a penalty, but simply to reflect the fact that one party has had the use of money which should have been paid to the other.

## 8.8 Change in assumptions in a TPF

It is recognised that, throughout the term of the agreement, changes are likely to occur which will affect the baseline consumption – the hours of operation, pattern of occupancy, or even the purpose of a building could all change. Any changes that affect the assumptions upon which the original baseline consumption was based will need to be reflected in the baseline, so that the energy savings calculation will continue to be both accurate and fair. Some of these assumptions may relate to the building itself, such as its size, hours of occupancy, and so on, while others may be financial in origin. It may, for instance, be assumed that the Supplier is entitled to receive a first-year capital allowance in respect of the equipment installed by it, so reducing the post-tax cost of the equipment and the corresponding return which the Supplier seeks. If this is not the case, so that - perhaps through a change in the law - a capital allowance is not given to the Supplier, the Supplier may wish to be compensated accordingly.

Thus the sample contract requires the Customer to notify the Supplier immediately when any change takes place, so that the baseline consumption can be amended. If the two parties cannot agree upon the new baseline, the matter is referred to an expert, while the Customer continues to pay the Supplier the previous fee.

## 8.9 Force majeure

If either the Customer or the Supplier is unable to fulfil its obligations because of circumstances beyond its control, such as fire, labour disputes etc, then the obligations of both parties are suspended until these circumstances end, for a maximum of 60 days. If, after 60 days, the two parties are still unable to fulfil their obligations, then either may terminate the contract.

## 8.10 Termination

*Contract End*

The agreement between the energy service company and the Customer will be for a number of years, the exact length depending, among other things, on the size of the initial investment; the amount of energy savings generated; and the split of savings between the two parties. Contracts are normally of 5-10 years' duration, with 7 years being a typical figure.

At the end of the contract term, the ownership of the equipment installed is passed from the Supplier to the Customer, without charge.

*Early Termination*

If either party, (a) fails to pay a sum of more than FFr 10,000 within 14 days of its being due, or alternatively consistently fails to pay sums less than FFr 10,000 or... (b) fails to carry out its obligations, and the failure cannot be remedied or is not remedied in a reasonable time, then the other side may terminate the contract. In either case, the Customer is obligated to buy the equipment, at a price which is discussed below.

*Purchase Option*

It has been recognised that building owners or occupiers are unlikely to be willing to enter into a long-term contract without a purchase option. However, from the point of view of the energy service company, it will be more desirable if the contract is seen through to its end. Thus, balancing these conflicting interests, a clause may allow the Customer to purchase the equipment after two years, by giving six months notice.

*Consequence of termination*

When the contract comes to an end at the agreed end date, the ownership of the equipment passes directly from the Supplier to the Customer, at no charge to the Customer. The equipment, which is now owned by the Customer, is therefore the Customer's risk.

Where the Customer ends the agreement, then the Customer must buy the equipment. There are a number of ways in which the purchase price could be calculated. One method would be for the Customer to pay the original cost of the equipment, less that proportion of it already recovered through fees paid, plus interest on that figure since the contract started. Another method – used in the model contract – is to put the Supplier in the position it would have been in if the contract had continued for its full period. The formula for calculating the price, which the Customer pays to the Supplier, is set out as follows:

The original capital cost of the equipment (including labour and installation costs) is added to the cost of producing the feasibility study. This total capital cost of the project is referred to as the calculation cost.

Assuming that the calculation cost is written off in equal annual instalments over the life of the agreement, subtract the proportion of the capital costs that have already been paid - i.e. the payments made from the commencement date of the contract to the date of the purchase.

The remaining portion of the capital costs or calculation cost - i.e. that part to be paid from the purchase date up to the end date specified in the agreement, is the future cost which is the basis for the purchase price.

These ’future costs’ – that part of the ’calculation cost’ not yet paid, are discounted from the end date to the date of purchase at an annual rate of interest to be agreed by the two parties.

To this figure arrived at in (c) above, the Supplier will add any costs which it will incur through early termination of the contract; for example penalties for repaying finance early. Through this method a total purchase price is calculated, that the Customer must pay to the Supplier. When this agreed sum has been paid, the ownership and the risk for the equipment are the Customer's.

# 9 QUALITY CERTIFICATION AND EPC ASPECT OF OPERATION CONTRACTS

## 9.1 Quality certification

One approach of quality certification, known as 'Valiance', has been applied over about the last year, with the development of a charter of minimal standards to be applied to companies adherent to FG3E (a significant part of the ESCO business) and likely to be controlled by a professional committee.

It makes it possible for the companies which subscribed to the SNEC to propose contracts of operation with high levels of engagement of results and implementation of seven specific engagements, specified below, and The cost of supply is in general proportional to the provided heat. These contracts must then include:

- Undertaking of the whole of the installation, with a specified result, by the contracting party.
- Supply and energy management by the operating company.
- A group of specific clauses concerning the management of the contracted property and with agreement with the customer.

The contracts thus drawn up between the owner and the contracting party will have to include the seven following undertakings:

1. The identification of services recognised as key elements by the customer,
2. A guarantee of some result for a total fixed price,
3. The extent of the work and the supply of evidence,
4. Implementation of a steady programme of progress and improvement,
5. A duty of information, communication and transparency of the results,
6. The guarantee of results and of good state of inheritance at the end of the contract,
7. The engagement on The cost of supply is in general proportional to the provided heat.

This type of contract is towards an open and contradictory approach between the owner and the customer, and apart from the standard minimal obligatory clauses previously exposed, does not go in the way of standardisation of the service offer.

## 9.2 Legal bases for improved operation

The law of 29th October, 1974, provides that any heating or air-conditioning contracts are renegotiated if works of improvement generate energy savings of 10% or more. For the same consumption, if further energy or energy recovery are required, the same measurement may apply (law of 15th July, 1980). It is therefore compulsory to mention a reference consumption and energy in a contract of operation. Public procurement requires more, but these provisions can apply to private contracts and represent a kind of extension of the same idea:

Generally, French law supports a long duration of the relation of service concerning energy matter (3-year contracts for the supply of electricity, contracts of operation of the public buildings going up to 16 years, etc.)

### 9.3 Granted guarantees and international comparison

American ESCOs tend more and more to consider that their role is not to finance the energy efficiency investments of their customers, but prefer a scheme where the customers are financed directly by banks or by third party financing agencies, and where the ESCO plays simply a role of technical engineering and provides a guarantee of results. This scheme hardly brings originality compared to what was always more or less done at the level of technical engineering, but it has obviously a great interest for small ESCOs, which are often under-capitalised structures and which in general do not have the means of borrowing significant amounts of money on the financial markets.

In addition, this scheme is likely to function well in countries having an established banking structure and having sufficient technical expertise to include and understand energy efficiency projects. But these conditions are far from applying everywhere, and obviously, whether in the countries in transition, or in the developing countries, or even in certain European Union countries. It is moreover advisable to keep in mind that the most original part of the model known as ‘third-party financing’ consists of the bringing together of financing and the guarantee: the fact that the ESCO ensures at its risks the financing of the operation is in itself a strong guarantee for the customer if the contract clearly indicates that refunding is carried out only through effective savings.

In this case, if the results in terms of savings in energy consumption are not as large as expected, the consequences for the customer are very limited, since it does not have to support the financial burden of an investment which has proved to be useless. In any other case, application of the guarantee necessary to the installation of an honest and valid contract supposes that clear and credible commitments are undertaken. This does not pose major problems with groups having a certain financial standing (however, a guarantee is often compared to an audit with financial commitments to be taken into account in the structure of assessment), but it is less obvious for small companies such as those mentioned above, which can easily suspect that the famous guarantee suggested is actually fictitious. There are examples in the United States of ESCOs which were bankrupted when they were called upon to honour an unwisely given guarantee.

## 10 OTHER GOVERNMENT POLICIES

It is difficult to identify in French measures for directly influencing the supply of energy services, apart from the State's own building stock. A series of measures have been defined for a long time by the State for encouraging firms to implement energy efficiency programs: they include financial (leasing or ‘crédit-bails’ like SOFERGIES) and concern the financing of energy conservation; while others are fiscal and propose a complete or partial tax exemption on benefits, or a reduction of the ‘taxe professionnelle’ by 50%. Most State actions are usually more concerned with the promotion of efficient investments than with the imposition of regulation.

We have already mentioned the case of tax exemption on gas and petroleum for encouraging the development of CHP units in France in 1997 and 1998. This tax exemption, plus the new requirement for EDF to sign contracts for purchasing the first 12 years' production of electricity generated by each new CHP unit, has made it easier to assess the competitiveness of each CHP project. These measures were supposed to be maintained until 2005. But this advantage has been rapidly cancelled in response to the unexpected success of the program. In fact, new conditions for CHP were so attractive that the objectives fixed for the first five years (i.e. 2000 MW of new CHP units) have been realized during the first year, *via* an aggressive policy of equipment suppliers such as Vivendi and Suez-Lyonnaise. These temporary conditions were finally suspended in December 1998, and just a few of them were implemented again in mid-March 1999. Whatever the reason, we can wonder if such a stop-and-go policy is favourable to any smooth industrial development.

We can also list some sophisticated accounting mechanisms:

- When the customer is a public entity, the depreciation is in favour of the ESCO.
- When the customer is a private firm, the depreciation is in his favour. But in some cases, for internal accounting reasons, the customer can transfer the pay-off to the ESCO.

*SOFERGIES*

The firms called SOFERGIEs specialise in the financing of investments generating energy conservation or protecting environment such as projects for managing wastes [2]. They propose financial mechanisms based on leasing (*crédit-bails*). What are their advantages?

- They can finance up to 100% of the total investments, including pre-studies of feasibility and installation sites, which creates considerable flexibility for the cash budget.
- During the period of the investment use, the frequency of interest payment can be monthly, quarterly or half-yearly. Interest may also be linear or in order to suit the profile of receipts, or digressive. It can be fixed or variable.
- Interest charges for leasing are not integrated into the budget of investments, but into the operating budget (*budget de fonctionnement*) for the public entities, and as contingent liabilities (*engagement hors bilan*) for private firms. The main consequence is that the ability of the firm to borrow is not affected.
- The period of financing can vary from three to twenty years, depending on the type of project.
- Financial depreciation can be accelerated, so that it is faster than the format defined by classical accounting rules.
- In some cases, such financial interest charges (*location financière*) can be eligible for some fiscal advantages.

[2] Eligible energy conserving projects: urban heating network, CHP units, boilers, self generation of power, renewables, cooling systems, etc. Projects for environment : waste management, water treatment, etc.

*FIDEME*

In December 2000, the Minister of Environment, Dominique Voynet, announced a new national program for energy conservation (€ 230 million or FRF 1500 million). One of its features concerns the creation of a fund for environment and energy conservation (FIDEME) targeting small and medium firms (PME). This fund is intended to assist a large range of energy conservation and environmental protection projects: new processes for recycling waste; renewable energy etc. This part of the fund, which is worth € 46 million (FRF 300 million) is designed as a mutual fund with the risks (*fonds commun de placements à risques*) shared between the French Agency ADEME (1/3), the Caisse des Dépôts et Consignations (1/3) and the Dutch bank ABN-AMRO (1/3). The public entity ADEME will support the risks in case of project failures. The presence of ABN-AMRO is justified by its significant updated expertise in terms of engineering and management of environment-friendly projects. French banks will be authorized to participate in the fund via a bidding system.

# 11 CASE STUDIES

## IMPORTANT NOTE : MOST COMPANIES APPEARING IN THE CASE STUDIES CAN MAKE A LARGE RANGE OF OFFERS. THEY ARE NOT AT ALL LIMITED TO THE CASE STUDIES THAT THEY HAVE ACCEPTED TO REPORT HERE.

### CASE STUDY 1 Electrical load Management in industry

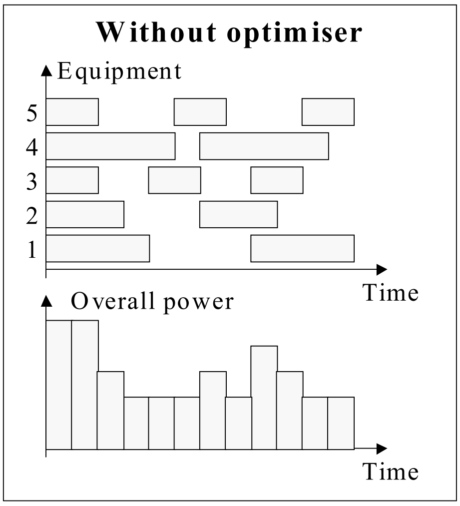
Galva Plus is specialized in the hot galvanization of steel parts (barriers...). The main equipment that needs electricity is an induction furnace used to maintain the Zinc in fusion (450°C). The latter is operating 24h/24h and is on/off controlled: when the temperature of the Zinc bath passes below the set point, the furnace is commanded to heat with full power independently of the difference to this reference value. This kind of control thus does not allow to manage the amplitude of the power demand and can generate important peaks. On the other hand, when the furnace is off, the power demand of the site is low. In the framework of an approach initiated by EDF, LM Control intervenes on site in order to optimize power calls.

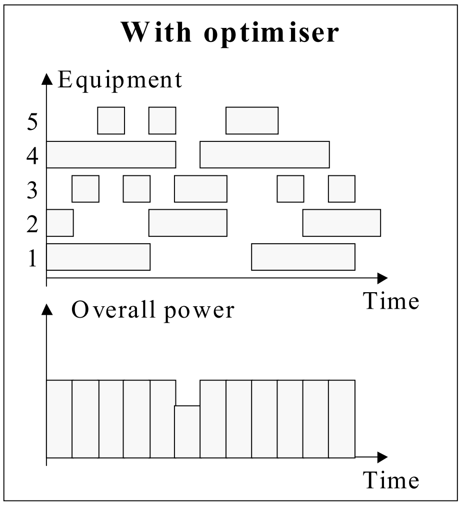
**The invoicing of Electricity in France :**

The invoicing of EDF is based on two criteria: on the one hand a subscribed power and on the other hand a price per kWh consumed. The knowledge of consumption of the site allows to optimize tariffs by balancing the subscribed power and the possible overstepping. The subscribed power is then slightly lower than the total power of the site. In spite of this tariff optimization, EDF is conscious that it is possible to more decrease the subscribed power and then to reduce the invoice of electricity. Indeed, EDF invoices its customers compared to their load diagram which is established by averaging the power called over 10 minutes. By reducing the amplitude of power calls, it is possible to reduce the subscribed power and thus the invoice.

**The energy management device:**

Before the energy management device is set up, every equipment of the site can call power at the same time which leads to important peaks on the load diagram. The client is then obliged to subscribe a power equal to the amplitude of these peaks.



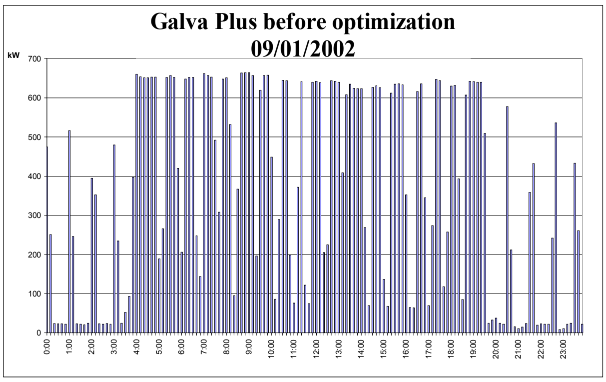



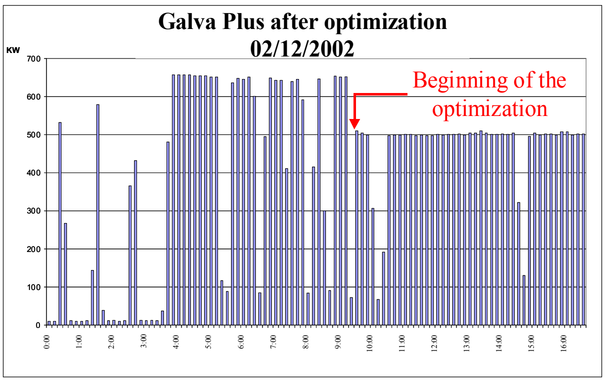

This device allows to manage power calls. Indeed, when the power called passes over the set point, the device switch the supply of certain equipments off. Also, when the power called passes below the set point, the device switch the supply of certain equipments on. The on/off priority depends on the process and the customer choices. Finally, load management with this device is possible only for equipments with inertia and is then favorable for thermal uses (furnace, cold group, …).

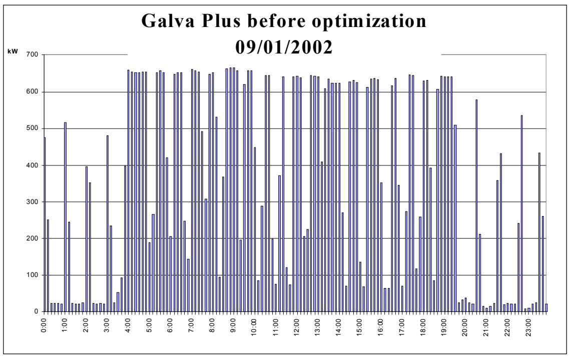
The specificity of the Galva Plus optimizer is that it manages only the furnace. LM Control implements a power set point into the optimizer and synchronizes its clock with the EDF network. In a 10 minutes interval, the optimizer calculates in real time the average power and avoids exceeding the power set point by ordering the stop of the heat sequence even if the Zinc bath did not reach the reference temperature. At the beginning of the next 10 minutes interval, the optimizer restores the signal to the furnace and proceeds in the same way until the reference temperature is reached.

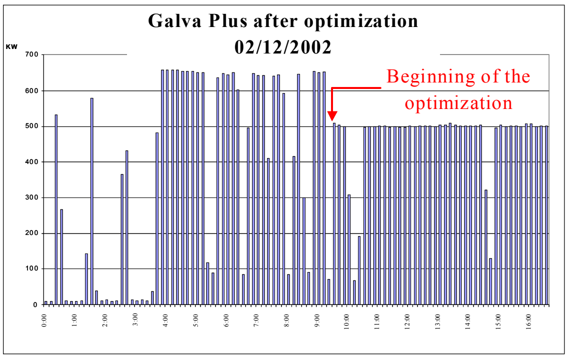
The rise in temperature of the regulation is slower but on the other hand, this device avoids the power call peaks. During the audit, LM Control must take into account production parameters (average parts flow to galvanize) because if this flow is too high, the furnace will not have the capacity to maintain the temperature of the bath because heat periods will regularly be cut by the optimizer. The temperature will thus decrease gradually and the zinc will solidify.

The set up of this energy management device allows to reduce peak amplitude from 650 kW to 510 kW as showed on the following diagrams. The subscribed power can now be reduced in order to decrease the electricity bill.






**The Fidelio approach:**

In the optics of the opening of the markets of energy, EDF initiated a policy called FIDELIO for customer loyalty building. EDF selected two ESCos (LM Control and Energie System) specialized in energy management. This approach includes 4 separated phases in order not to invoice all the service if the project is not feasible (phase 1 report) or if the customer decides not to apply the recommended solutions (phase 2 report):

- Feasibility study (1000€): EDF determines the equipments that are the principal cause of power calls and makes a report favorable or not to the prolongation of the approach.
- Thorough audit (3500€): The ESCo measures the consumption of considered equipments during the 10 days period which is as representative of the real consumption of the site as possible. The ESCo also takes into account the will of the customer (investment, mark of the device, return on investment...) as well as production parameters. A report including a technical solution (type of optimizer) with engagement of results on the generated savings is finally proposed.
- Works management (3000€): The installation can be supervised either by the customer or by the ESCo. The device and its installation (25000€) are not included in the price.
- Follow-up (1 year, price to be negotiated with the ESCo): The ESCo intervenes in order to adjust the optimizer. Indeed, the measurement campaign is not completely representative, it is sometimes necessary to intervene.

By this approach, EDF wants to decrease of a minimum of 10% the bill of its customers with a return on investment lower than 2 years.

**Utility of such an approach :**

The main use of this optimizer is to reduce the electricity invoice by smoothing the load diagram. However, in the French current context of low electricity price, this process represents an important behavioral change because it leads to define a maximum parts flow to galvanize and thus limits power calls.

The interest for EDF is double: The management of the electricity production is easier when the overall load diagram is flat. However, due to the opening of energy markets, the comparison of supplier tenders became possible and thus could not be in favor of

EDF without optimization. This process is thus a way to develop the loyalty of the customer by proposing solutions to reduce the electricity bill without any supplier switching.

| LM Control | Galva Plus S.A. |
|---|---|
| 39, rue des frères Lumière | ZI route de Tours |
| BP 22 | 36500 Buzançais |
| 69682 Chassieu | France |
| France | |
| Phone : +33 (0)4 72 47 74 00 | Phone : +33 (0)2 54 84 14 14 |
| Fax : +33 (0)4 72 47 74 11 | Fax : +33 (0)2 54 84 02 02 |
| Web : www.lmcontrol.com | Web : www.galva-plus.com |

**CASE STUDY 2 Guaranteed Solar Results in a hotel**

**The use of solar energy in the hotel sector was initially developed in the very sunny places like the Balearic Islands. Hotel managers realized that the customers were very sensitive to the environmental protection and thus the installation of a solar system was an asset for the image of the hotel. This argument is all the more valid for tourists who leave the pollution of the cities in order to seek a better framework.**

The daily (domestic) hot water consumption of hotels is estimated between 100 litres and 160 litres per room, according to their categories. In addition, kitchen hot water needs are evaluated between 8 litres and 15 litres by meal.

Fully aware of the importance of the ecological concept for the industry of tourism, the Accor group initiated, since 1993, a thought on the implementation of a coherent environmental policy. “Formule 1” hotels are the reference of very economic hotels (350 hotels in 10 countries). Perpignan Formule 1 hotel has a capacity of 97 rooms with a variable occupancy

## INFORMATION

**Facility size:**
97 bedrooms

**Technical Pool**
Consultant: Tecsol, Perpignan
Installer: Euroclimat, perpignan
Maintenance: Euroclimat, perpignan
Manufacturer: Giordano, Aubagne

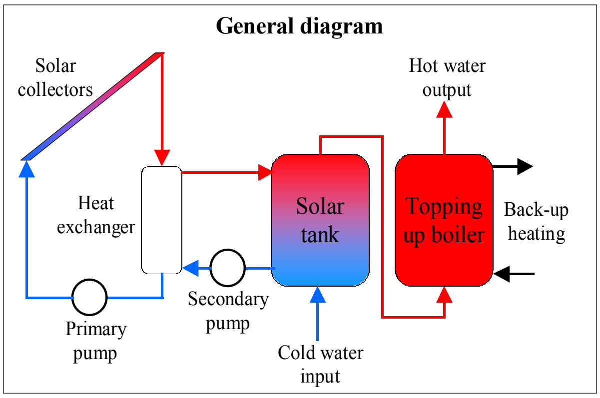
**Technical Data:**
Giordano C8/8S – 75,8 $m^2$
Solar storage : 4000L
Main energy : electricity

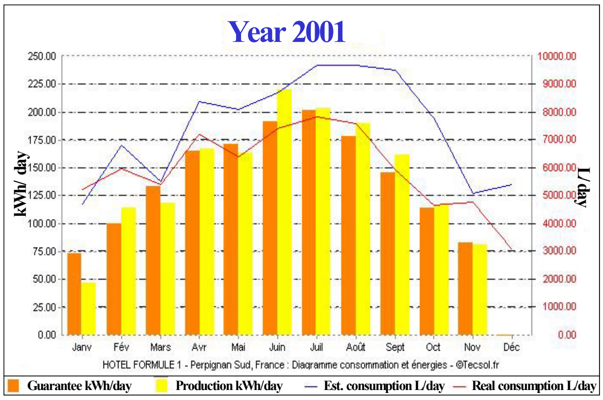
**Funding:**
Accor Group
Cost: 50305 € → 664 €/$m^2$
Financing: 75% ADEME / AME

**Annual Savings:**
51072 kWh - 2200 € - 6 ton $CO_2$

rate (from 50% to 100%). It is one of the first Accor hotels to be equipped of solar collectors on its roof. Within the framework of a Guaranteed Solar Results contract, the solar water heater was put into service in April 2000.

Beyond its ecological aspect (use of renewable energy), the solar installation is perfectly adapted to seasonal variations and optimizes as well as possible the investment carried out. Indeed, daily consumption of domestic hot water is more important in summer when the sun is higher. The solar installation ensures the pre-heating of domestic water before the electric production. The electric boiler is thus fed by solar hot water instead of cold water.




Thanks to the system of remote supervision, it is possible to follow the daily evolution of the solar production. Each month, Tecsol forwards to its customer a report specifying the objectives as well as the real production. One month is taken into account in the guarantee only if the consumption of domestic hot water is higher than 50% of the estimate carried out during the studies. For example, as showed it the following table, for the year 2001, the 12 months of contract were taken into account in the guarantee.

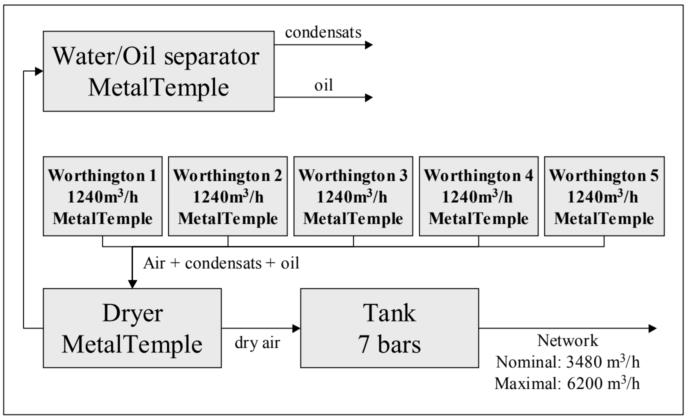
| 2001 | Estimated/Real consumption (Litres/day) | Guaranteed/Real production (kWh/day) | Total production (kWh) | Annual productivity (kWh/m$^2$) |
|---|---|---|---|---|
| Measured values (12 months) | 7450/6170 | 136/140 | 51072 | 676 |

The contract extends until the end of the year 2003. The objectives of the Guaranteed Solar Results contract were reached and even exceeded by 3% in 2001. By considering the average price of the electricity of 4,3c€ per kilowatt-hour in France, the annual economy realised is approximately 2200€ which implies a return on investment of 5 years. Finally, the average $CO_2$ emission of a electrical boiler is estimated at 0,12 kilogram $CO_2$ per kilowatt-hour. The solar installation thus avoids to emit 6 tons of $CO_2$ annually.

| | |
|---|---|
| TECSOL<br>105, avenue Alfred Kastler<br>B.P. 434<br>66004 Perpignan cedex<br>France<br>Phone : +33 (0)4 68 68 16 40<br>Fax : +33 (0)4 68 68 16 41<br>Web : www.tecsol.fr | Hotel Formule 1 Perpignan Sud<br>Route de Thuir<br>Espace Sainte Anne<br>66000 Perpignan<br>France<br>Phone : +33 (0)8 91 70 53 54<br>Fax : +33 (0)4 68 54 91 06<br>Web : www.hotelformule1.com |

## CASE STUDY 3 Compressed-air Outsourcing in industry

MetalTemple is a precision foundry specialized in the production of small mechanical elements. The site had one compressed air station in order to cover the needs of the process. All the equipments of the installation were operated and maintained by MetalTemple and the manufacturer for bigger works.




**Initially** – The compressed air station is composed of five Worthington compressors, one separator, one dryer and one tank.

"Elyo Centre Est Méditerranée" had previously won the MetalTemple steam production in 1999. As a MultiEnergy Service Company, Elyo audited the compressed air installation in order to define several technical solutions. Whatever the technical solution, Elyo proposed MetalTemple to externalize the compressed air production using the new equipment during a 10 year contract. This kind of contract includes:

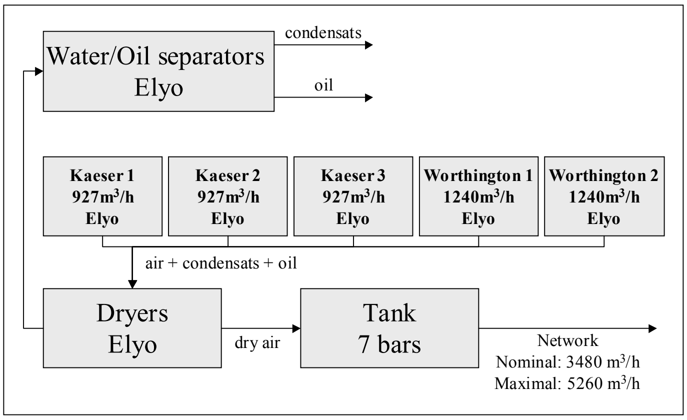
- A P1 contract (Metering Market type) which consists in supplying the customer with primary energy (electricity) and which is sold to a certain price per cubic meter of compressed air.
- A P2 contract which consists of the operation and the small maintenance of the installation.
- A P3 contract which is a full coverage of renewal needs on the installation during the life cycle.
- A P4 contract which constitutes a financing plan of the new installation at the beginning.

**Outsourcing of the compressed air production**

Elyo is responsible for the implementation of the new compressed air station which includes now :

- New equipments : three Kaeser compressors, one dryer, two separators, one controller device, two energy (electricity and compressed air) meters and the hot air exhaust pipes.
- Existing equipments : two Worthington compressors (3 existing were removed) and one dryer.

All these equipments, even the existing one are taken into account by the P3 guarantee.




**After** – Outsourcing of the compressed air production as soon as the renewal of the station.

Once works were carried out, Elyo began the operation and the maintenance of the new compressed air station. The contract defines the objectives of Elyo in terms of performances:

- To ensure the compressed air supply continuity at the following characteristics: P = 7 bars ± 0,5 bars and a nominal flow of 3480 $m^3$/hr.
- To operate the installation by seeking constantly the best performance (technical and financial). Within the framework of the P3 full coverage, Elyo will thus inform MetalTemple of the technological innovations and will be able to propose solutions.
- To ensure the safety of the goods and the people and to manage waste generated by such an installation.

The contract also fixes guarantees in case of non-respect of these objectives. Indeed, Elyo must compensate MetalTemple in terms of operational losses to the tariff of 150000€/day. This kind of contract allows MetalTemple to transfer to Elyo the risks (technical and financial) of a faulty operation of the compressed air station.

The two parts can require the anticipated cancellation of the contract in the event of insufficiency compared to commitments. MetalTemple will have in that case replace Elyo for the remaining financing of works 30 days after the notification of the cancellation and Elyo will have to return the installation in normal state of operation and maintenance.

The amount of the contract is composed of two parts: an annual fixed part (non adjustable) (P2+P3+P4) and variable part (P1) depending on the compressed air production (€ per cubic meter air). The latter is however revisable each year according to electricity, labour and service prices.

| | **P1** Primary Eg (€/m$^3$ air) | **P1** cost (€/yr) | **P2** Operation (€/yr) | **P3** Maintenance (€/yr) | **P4** Financing (€/yr) | Investment needed (€) |
|---|---|---|---|---|---|---|
| Initially | 0,505 | 90900 | >46707 | | 0 | 188502 |
| Phase 3 | 0,553 | 99540 | 43394 | 13377 | 26838 | 0 |

Before the contract, operation and maintenance tasks only take into account the cost of components and labour. P2 and P3 costs in the contract are higher than that because of the full coverage guarantee which allows to face all troubles on the installation. The annual bill is thus 183330€ for a consumption of 18 million cubic meters of air.

By decreasing the available maximal air flow, Elyo provides a new installation which better suits to MetalTemple needs. Moreover, improvements in efficiency allow to choose new compressors which have 27% less install capacity. As a result, the specific consumption of electricity to produce compressed air drops by about 10%.

| | Old compressors 2001 | *New compressors* 2002 estimation |
|---|---|---|
| Specific consumption (Wh/m$^3$) | 129,5 | 116,7 |

Considering an average annual consumption of 18 million cubic meters of air, the use of this new compressed air station allows to save 230400 kilowatt-hours which represent 27 tons of $CO_2$.

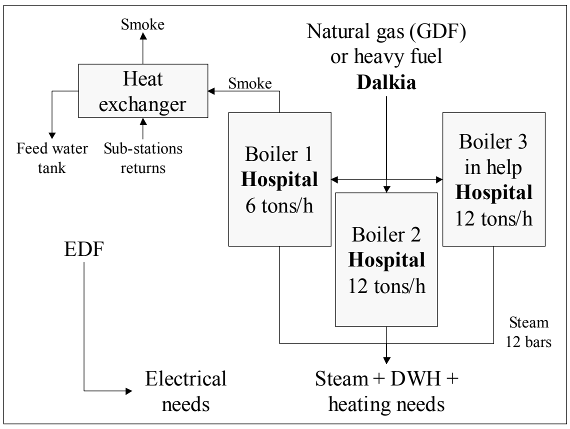
Inspections are far less frequent because the installation is remotely checked from the Chambéry Elyo agency. Elyo intervenes in the hour which follows the notification of a disfunctioning on the installation by the remote monitoring system or by a call from MetalTemple.

The lifespan improvement due to the Elyo operation is difficult to evaluate. However, MetalTemple got the knowledge of experienced professionals in the field of energy which is an undeniable advantage for the lifetime of the installation.


| | |
|---|---|
| **ELYO Centre Est Méditerranée**<br>**264, rue Garibaldi**<br>**69488 Lyon cedex 03**<br>**France**<br>**Phone : +33 (0)4 72 60 64 00**<br>**Fax : +33 (0)4 72 61 84 48**<br>**Web : www.elyo.com** | **MetalTemple**<br>**16, rue du Temple**<br>**BP 44**<br>**73140 Saint Michel de Maurienne**<br>**France**<br>**Phone : +33 (0)4 79 20 29 01**<br>**Fax : +33 (0)4 72 59 20 04**<br>**Web : www.metaltemple.fr** |

## CASE STUDY 4 Improvement of a hospital heating installation by a CHP unit

The Metz-Thionville Regional Hospital had three steam boilers for its needs of steam (laundry, kitchen and sterilization), Domestic Hot Water and heating. These boilers used mainly natural gas but could use heavy fuel in case of a problem on the gas network.




**Initially** – Three boilers worked for the heating of buildings, the production of DHW and its own needs of steam. The hospital purchased the totality of its electricity from Electricité De France.

Long before the retrofit, the Metz-Thionville Regional Hospital had signed with Dalkia a contract of operation and maintenance of its boilers for a 10 year duration which included:

- A P1 contract (Fixed Cost Market type) which consists in supplying the customer with primary energy (natural gas and heavy fuel) and providing all needs at a fixed price per year independently of weather conditions.
- A P2 contract which consists in the operation and the small maintenance of the installation.
- A P3 contract which is a full coverage of maintenance needs on the installation during the contractual period.
- A P4 contract which constitutes a financing plan of the new installation at the beginning.

In 1994, Dalkia and its client decided by mutual agreement to break the current contract in order to launch a new call for tenders. The main objectives of this procedure was to install on the site a cogeneration unit and to change the type of the P1 contract from a Fixed Cost Market type to a Metering Market type. For this new call for tender, Dalkia had some advantages (the current concessionary perfectly knew the installation) compared to its competitors. After competition, Dalkia got the market on June 1, 1994.

## Installation of a CHP unit

Dalkia is responsible for the implementation of the works. The customer chose to install a gas engine developing a 942kWe electric power and a 1285kWc thermal power. This new equipment replaced the first old steam boiler. The heat generated is used to preheat completely the returns of the first sub-station and partially those of the second sub-station before the feed water tank. Moreover, in order to reduce the electricity bill, Dalkia proposed to the hospital to use the existing diesel fuel power generating unit during the highest tariff section of EDF. Of course, for safety reasons, a new power generating unit is installed on the site. Finally, Dalkia installed several energy meters (gas, steam, heat) in order to allow the P1 Metering Market type contract.

The tariff of the new energy supply contract (P1) is detailed in the following table:

| | | Price |
|---|---|---|
| Steam production (€/ton) | Natural gas (P1SG) | 11,14 |
| | Heavy fuel (P1SF) | 13,04 |
| Thermal energy in sub-station (€/MWh) | Natural gas (P1G) | 16,36 |
| | Heavy fuel (P1F) | 19,15 |
| Cogeneration (€/MWh) | Natural gas (P1CG) | 32,45 |
| | Heavy fuel (P1CF) | 93,89 |

The contracts of operation and maintenance (P2) and full coverage guarantee (P3) take into account the following equipments:

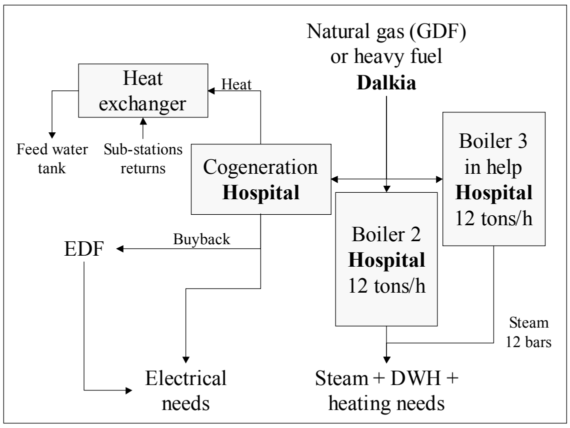
- Production and distribution of steam
- Exchange, distribution, emission of the heat and the DHW

- Production of cold water and air-conditioning
- Water treatment
- Cogeneration

The amounts of these new contracts of operation and maintenance (P2) and full coverage guarantee (P3) are presented in the following table:

| | P2 (k€/yr) | P3 (k€/yr) |
|---|---|---|
| Production and distribution of steam | 254,1 | 47,4 |
| Exchange and distribution of the heat and the DHW | 128,3 | 50,6 |
| Production of cold water and air-conditioning | 130,6 | 51 |
| Water treatment | 35,1 | 7,1 |
| Cogeneration | 93 | 9,2 |
| Overall | 641,1 | 165,3 |

Dalkia financed the new cogeneration unit and other works and invoiced monthly to the hospital thanks to the P4 contract until the end of the contract.




**After work** – Two steam boilers worked for the heating of the buildings, the production of DHW and its own needs of steam. Moreover, one cogeneration unit and a diesel fuel power generating unit are used for the production of electricity.

The work on the installation ended on December 31, 1994. As soon as January 1, 1995, Dalkia started operation and maintenance tasks on the installation. The performance contract signed between Dalkia and its client defines the objectives of the concessionary. Its main responsibilities are:

- To ensure the continuity of the steam supply (P = 12 bars, T = 190°C, maximum flow 16t/h, tolerance 5%), of the heating (temperatures between 16°C and 26°C depending on the building, tolerance ±1,5°C) and of the DHW supply (temperatures of 45, 50 or 60°C for the medical uses, of 65°C for the kitchen and 80°C for dishwashers in the kitchen, tolerance ±5°C).
- To ensure the annual quantities of thermal energy produced by the boilers (guaranteed outputs) and recovered by the cogeneration unit (guaranteed quantity) as well as the production of electricity (guaranteed productions of the cogeneration unit and the power generating unit).
- To ensure the heavy fuel supply in case of a problem on the gas network (stocks for 6 days of full power operation).
- To operate the installation by seeking constantly the best performances (technical and financial). Within the framework of the P3 full coverage, Dalkia

will thus inform the hospital direction of technological innovations and will be able to propose solutions.

Strong financial penalties guarantee a good operation of the installation. This kind of contract allows the hospital to transfer to Dalkia the risks (technical and financial) of a faulty operation on the installation. In case of a delay or a break in the production (heating, DHW, steam or cold water), the daily penalty is the multiplication of the annual average daily supply (35MWh, 7MWh, 15 tons and 12MWh) by the price of primary energy (P1G, P1G, P1SG and EDF). Moreover, in the event of a delay or a break of the supply to a sub-station (heating, DHW, steam and cold water), the daily penalty is the same as previously balanced by the ratio of the nominal of the sub-station considered and the nominal point of the site (8000kW, 67m3, 2t/h and 2100kW). Finally, in case of an insufficiency of supply, the daily penalty is all or a percentage of the preceding one in relation with the difference with the guarantee.

The amount of the contract is composed of two parts: an annual fixed part (P4) which is non revisable and a variable part (P1+P2+P3) depending on the production (€ per ton of steam or per megawatt-hour of heat). The latter is however revisable each year according to the price primary energies, the evolution of wages and services costs (P1+P2+P3).

| | **Before** | **After** |
|---|---|---|
| **P1 NG + HF (k€/yr)** | 399 | 428 |
| Purchase to EDF (k€/yr) | 496 | 123 |
| Repurchase to EDF (k€/yr) | 0 | -38 |
| **Overall EDF (k€/yr)** | 496 | 85 |
| **P2 (k€/yr)** | 548 | 641 |
| **P3 (k€/yr)** | 164 | 165 |
| **P4 (k€/yr)** | 0 | 97 |
| **Service overall cost (k€/yr)** | **1607** | **1416** |

The investment carried out by Dalkia for the installation of the cogeneration unit is 965,6 k€. The annual economy of the service (without financing) is of 288 k€. The return on investment is consequently 3,4 years.

The lifespan improvement due to the Dalkia operation is difficult to evaluate. However, the hospital benefits from the know-how of experienced professionals (refrigeration technicians, electrical and mechanical specialists) in the field of energy which is an undeniable advantage for the lifetime of the installation. An effective human presence will be constantly guaranteed. Moreover, Dalkia can send reinforcement in the hour which follows the notification of a dysfunction on the installation.

The heat produced by the cogeneration unit allows to preheat part of returns of sub-stations. To make an environmental balance, one can assume that the combustion of natural gas produces 0,225 kilograms of $CO_2$ per kilowatt-hour of natural gas and that a present combined cycle power plant (60% output) produces 0,35 kilograms of $CO_2$ per electric kilowatt-hour. Finally, the output of the power generating unit is evaluated at

25% and the combustion of the diesel fuel produces 0,31 kilograms of $CO_2$ per kilowatt-hour of diesel fuel. So the balance is the following:

| | | *Befor e* | **After** |
|---|---|---|---|
| CHP unit | Gas consumption (MWh) | 0 | 13040 |
| | Elect. generated (MWh) | 0 | 4628 |
| | Heat production (MWh) | 0 | 5804 |
| | $CO_2$ (ton) | 0 | 2934 |
| **Power generating unit** | Fuel consumption (MWh) | 0 | 1512 |
| | Elect. generated (MWh) | 0 | 378 |
| | $CO_2$ (ton) | 0 | 469 |
| Boilers | Chaleur (MWh) | 18266 | 12462 |
| | $CO_2$ (ton) | 5138 | 3505 |
| **EDF** | Purchase (MWh) | 8478 | 4424 |
| | Buy back (MWh) | 0 | 408 |
| | CHP auxiliaries (MWh) | 0 | 166 |
| | $CO_2$ (ton) | 2967 | 1549 |
| **$CO_2$ without the power generating unit (ton)** | | **8105** | **7988** |
| **Overall $CO_2$ (ton)** | | **8105** | **8457** |

This table shows that the modernization of the boiler room allows to avoid the annual emission of 117 tons $CO_2$ which is a reduction of 1,4%. However, these performances are skewed because of the $CO_2$ emissions due to the lowness of the power generating unit output.



| | |
|---|---|
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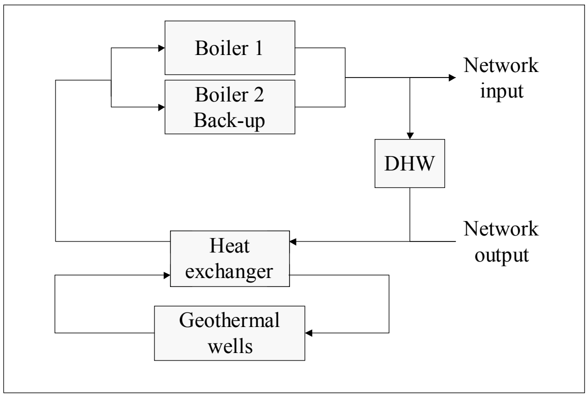
**CASE STUDY 5 Management of a district heating network and increase of geothermal contribution**

The district heating network of the Ritouret area in Blagnac had been set up in October 1976. Since the beginning, the city of Blagnac made important investments for its thermal installation. Its main characteristics are :

- 34 sub-stations which cover 1900 equivalent housings (flats and communal buildings).
- 5 kilometers long.

The main heat source is the geothermal one. To assist this renewable source, central boilers with a total capacity of 15 MW have been installed. These boilers operate with natural gas but in case of a problem on the gas network, the installation can also operate with heavy fuel which is stored in large tanks.




**Initially** – Geothermal is associated with two natural gas boilers (heavy fuel as back-up). The installation generates the heat needed for the district heating and for the production of Domestic Hot Water.

In order to anticipate an extension of the network and new connections, Blagnac launches a consultation in 2001 in order to delegate and optimize the management of its service of heat distribution and to reduce the costs. This franchise is in accordance with the main strategic trends of the city which priority is the respect of the environment.

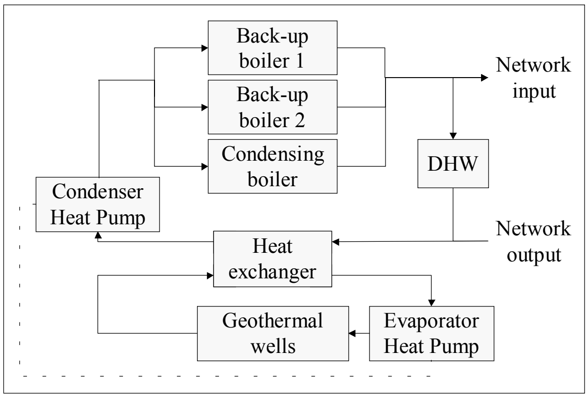
For the renewal of the franchise, Dalkia, the current operator, carried out an audit of the thermal installation of Blagnac in order to propose various technical solutions. Dalkia then presented several proposals with their respective advantages:

| **Solution** | **Technical characteristics** | **Added value** |
|---|---|---|
| **Base** | Installation of a condensing gas boiler with or without keeping the geothermal energy | Increase available power + decrease costs increasing operation efficiency |
| **Offer 1** | Base + installation of a heat pump as a back-up to the geothermal energy | Assistance to the geothermal source + interesting tariff |
| **Offer 2** | Base + cogeneration with or without keeping geothermal | Decrease energy and environmental bills |
| **Offer 3** | Base + wood boiler with or without keeping geothermal | Renewable energy + employment of two persons |

By studying the feasibility of a wood boiler, Dalkia took into account the objectives of the city in terms of environment. In order to assist its customer and to facilitate the choice of the best offer, Dalkia computed the overall cost of the services and thus the price of the megawatt-hour:

| | **Scenario 1 Keeping the geothermal** | **Scenario 2 Abandoning the geothermal** |
|---|---|---|
| **Condensing boiler** | Capacity : 4 MW<br>Cost : 34,45 €/MWh | Capacity : 6 MW<br>Cost : 38,57 €/MWh |
| **Condensing boiler + Heat pump** | Evaporator : 411 kW<br>Condenser : 528 kW<br>Cost : 33,23 €/MWh | |
| **Condensing boiler + CHP** | Capacity : 2 MW<br>Cost : 29,88 €/MWh after electricity buyback | Capacity : 2 or 2x1,5 MW<br>Cost : 33,08 €/MWh after electricity buyback |
| **Condensing boiler + Wood boiler** | Capacity : 2 MW<br>Cost : 34,91 €/MWh | Capacity : 4 MW<br>Cost : 38,42 €/MWh |

In first, Blagnac eliminated the scenario of abandoning the geothermal source as well as the installation of a wood boiler for obvious financial reasons. Moreover, the cogeneration scenario was really profitable because of the advantageous conditions of buyback by EDF of the electricity produced. However, Blagnac decided not to start such a process. The city finally decided to install only a new condensing boiler and a heat pump to support the geothermal equipments.




**After work** – geothermal is associated to a gas condensing boiler (heavy fuel as back-up) and the two old back-up boilers. A heat pump has also been installed to assist the geothermal energy. The installation produces the heat needed for the district heating and for the production of Domestic Hot Water.

Old boilers are kept in case of an extension of the network. However, as showed in the following table, the two boilers only intervene to back-up the new condensing boiler which is much more efficient.

| | Before | After |
|---|---|---|
| Boiler 1 consumption (MWh/yr) | 10103 | 133 |
| Boiler 2 consumption (MWh/yr) | 3368 | 133 |
| Condensing boiler consumption (MWh/yr) | 0 | 8592 |

Indeed, the new boiler recovers part of the heat contained in the smoke (which is normally evacuated in chimney) resulting from the gas combustion in order to transfer it to the district heating circuit.

The heat pump allows to optimize geothermal recovery while extracting the remaining heat on the primary circuit after the heat exchanger (and before injection) to transfer it to the secondary (district heating) circuit. This heat pump requests an additional electricity consumption but improves the overall output of the installation.

| | Before | After |
|---|---|---|
| Gas (MWh/yr) | 13470 | 8858 |
| $CO_2$ boilers (ton/yr) | 3031 | 1993 |
| Electricity heat pump (MWh/yr) | 0 | 629 |
| $CO_2$ electricity (ton/yr) | 0 | 76 |
| Primary energy (MWh/yr) | 13470 | 9487 |
| $CO_2$ overall (ton/yr) | 3031 | 2069 |
| $SO_2$ (ton/yr) | 0,019 | 0,012 |
| NOx (ton/yr) | 2,026 | 1,160 |

The retrofit of the installation and the increase of the geothermal contribution allowed to reduce the yearly consumption in primary energy by 3983 megawatt-hours (29%) and the annual $CO_2$ emission by 962 tons (31%). The emissions of other pollutants were also reduced.

In addition of energy metering, Dalkia is committed to follow the pollution generated by the boilers as well as the quality of reinjected geothermal water. In order to reach the objectives, Dalkia sets up bio-indicators (vegetation) and carries out monthly pollution assessments.

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|---|---|

# APPENDICES

## Appendix 1: List of French ESCOs belonging to FG3E

AXIMA(RINEAUS.A.)
BEAUFILS Alain
CEPRIM
CGST-SAVE
CHARVET
CIEC
COFATHEC Services
Compagnie de Chauffage
CRAM
DALKIA
DELOSTAL & THIBAULT
E2S
ELYO Ile de France
ELYO Centre-est Méditerranée
ELYO Centre-ouest
ELYO Midi Océan
ELYO Nord-est
ENERCHAUF
H.SAINTPAUL
HERVE Thermique
IDEX
IDEXENERGIE ALPES
IDEXENERGIE EST
IDEXENERGIE SERVICES
LAGRANGE
LANSARD Energie S.A.
LAURENT BOUILLET
Entreprise
Les Combustibles de Normandie
Maintenance Technique De Bâtiments
Maintenance Technique Méridionale
Méridionale des Combustibles
MIEGE Exploitation Chauffage
M.T.M
OPTIMEGE
PERIN Frères
PROCHALOR
SCBC
SEC (Société d'Exploitation de Chauffage)
SECCS.A
SECMA
SEDEP
SEDICO

SEMCRA
SFFE
SICE
SIME
SOCCRAM
SOGI
SOLOREC
SOMESYS
SONEX
SOPAREC
SORADEC
SPDC
SRECAB
STIHLE Frères S.A.
TECNI
THERMESYS
THERMICAL

## Appendix 2: Principle of ”spécialité”

The principle of “*spécialité”*: a historical review of the structure of energy service supply in France

The impact of the principle of “*spécialité”* has been important for structuring the supply of energy services in France. Article n° 46 of the Nationalization Law adopted on April 8, 1946 established Electricité *de France* and then defined its missions and limitations, notably those linked to the principle of *spécialité*, and then the activities *beyond the meter*: EDF is not allowed to intervene beyond the meter. As a result, for small customers, the French ESI consists essentially of two elements: on one side, EDF as the (quasi-)monopoly power company; on the other side, 35,000 small companies for installing and repairing electrical equipment. At the end of the 1980s, EDF attempted to enlarge its activities and to capture non-traditional markets by using its knowledge and abilities in related fields such as engineering, HVAC engineering and other energy services. But this attempt at diversification raised the new question of sustainable competition, and then the question of the survival for the individual craftsmen present in some of these markets: the principle of *spécialité* was directly concerned by this debate.

Finally in 1995, the National Council of Competition and the National State Council both refused to allow EDF to develop these requested activities for small customers, with the argument that so large a company could develop unfair competition in these markets against smaller private companies and craftsmen. For larger customers, EDF’s diversification was thus authorized in 1995 but under strict limitations: 1) its derived activities were limited to public lighting (*via* CITELUM), water distribution and urban waste management (*via* TIRU), and some engineering (*via* Cogétherm, Séchaud & Metz with strict limitations which lead finally to the sale of the company. Clemessy passed on to Dalkia for the same anti-trust reasons, Charth…); 2) EDF was obliged to create subsidiaries to pursue such enlarged activities in order to avoid any internal cross-subsidies. Officially, this authorized diversification concerned services that improved the EDF power services. But they also coincided with markets where powerful competitors such as Vivendi and Suez-Lyonnaise are present. But this situation was just an intermediate stage.

But the changes authorized in 1995 were just an intermediate step. In 1999, the new French conditions have pushed the State to permit EDF to widen its diversification again by developing a more complete range of energy services to eligible customers.

## Appendix 3: EPC in cogeneration

The case of cogeneration is an example of a change in the French energy system: 1) cogeneration is becoming the dominant '*Trojan horse'* used by new independent producers for conquering some market shares in France; 2) its development necessitates the development of a series of new services for sizing, financing, building and operating CHP units.

For a long time, while the market for CHP has increased very rapidly in Europe, French conditions in terms of electricity production and administrative authorizations have slowed down development of cogeneration by independent producers and by EDF. CHP units were authorized in only a very few cases. In 1994, only 570 CHP units (3000 MW) were operated, mainly in industry, while the CHP potential was estimated between 5 000 and 10 000 MW by officials, and over 15 000 MW by equipment suppliers.

Indeed, the energy landscape is dominated by the major operator (EDF) and by an electricity production system based on nuclear energy. Nowadays, particularly because of the new competition for production authorized by the new Law on Electricity, important interests and stakes linked to the development of cogeneration have led France to implement a specific policy favouring the development of this technology.

Despite a strict definition of cogeneration, the legislative conditions have allowed the development of CHP. Today, 5 % of electricity is produced with this technology. In 1997, a national policy for developing cogeneration was launched. Its goal was to install 2 000 MW in five years: the objective has been reached in one year. This incredible increase of CHP units is due to the interesting conditions implemented by the French State, notably the obligation imposed on EDF to purchase excess electricity generated by CHP units at attractive terms. Today's main objective is to ensure its viability.

In fact, in order to encourage independent producers and to limit risks of penalty, different measures have been defined:

- Lengthening of cogeneration contract duration to 12 years and a clearer definition of network connecting conditions than before.
- Tax exemption for gas and petroleum products (T.I.C.G.N. on gas and T.I.P.P. on petroleum) used by CHP plants installed before the end of 2005.
- Reduction of penalties in case of failure by CHP units.
- Definition of a clear method of calculating the purchase tariffs by EDF without taking into account the present electricity tariff.

This last point is perhaps the most effective one: the permanent obligation for EDF to buy electricity from cogeneration producers. According to the regulation this last point concerning electricity from independent producers and contained in the Nationalization Law of 1946, and a decree in 1955, EDF must establish a purchase contract for the energy produced by:

- Any plants supplied with recovered energy or household waste energy.

- Any plants supplying public district heating networks.
- Any cogeneration installation below 12 MW.

A new decree in December 1994 has cancelled the 1955 one, in order to oblige EDF to buy electricity produced by cogeneration plants and installations using renewable energies. Some constraining conditions have been implemented for limiting technical CHP failure: for instance, since the 23rd January 1995, each CHP producer must fulfil specific requirements to obtain a '*certificate of conformity*', which entitles him to a cogeneration contract. The two main criteria guarantee the implementation of efficient CHP units: 1) the global efficiency (produced energy over consumed primary energy) of the CHP installation has to be over 65%; 2) the ratio 'heat/electricity' has to reach a minimum of 50 %.

In order to limit the disturbances due to the connection of cogeneration installations on the grid, different arrangements have been defined. These specific rules have to guarantee the compatibility of the CHP development and 1) the national energy planning and 2) the global French energy efficiency objectives.

Different programs exist to promote the development of cogeneration. At the European level, the Joule-Thermie and Save II programs encourage the use of cogeneration by financing the technological development of cogeneration and by spreading information about the different possible ways to finance CHP projects.

On the French side, ADEME, the French Agency for Energy Efficiency and Environment Defence, has implemented a system based on individual, technical and financial assistance for companies or local authorities wanting to invest in cogeneration. This assistance helps to determine the fuel requirement according to the steam needs, the size of the installation and an estimate of the investment.

## Appendix 4: Typical EPC business model from French experience (SINERG)

### Interest of EPC for the customer

It is threefold:

- Financial: The customer undertakes its energy investments without financing them. The repayment is made on the basis of shared savings. The customer is therefore always ensured a net gain, and the financing is off-balance sheet which in many cases is the most interesting and important feature of the transaction.

- Technical: The third-party financing company handles the whole process and is responsible for the works which are to be carried out. The guarantee given obliges the company to supply efficient facilities.

- Economical: Because of this particular way of repayment, the customer is insured against any technical problems or changes of energy prices. This process is a real guarantee of the return period.

### Different types of contracts developed by Sinerg

There are two categories of third-party financing contracts:

*Contracts with public authorities*

The third-party financing company finances investments, which have a 6-year return period.

The repayment is made by annual instalments, which amount, for 85% of the savings, over an average duration of 12 years.

The third-party financing company never becomes the owner of the facilities installed. These facilities are therefore listed in the intangible (financial) fixed assets part of the third-party financing company's accounts.

*Contracts with Industry*

The third-party financing company finances investments, which have 3.5 year return period.

The repayments are made by annual instalments of between 85 % and 100 % of savings, over an average duration of 6.5 years.

The third-party financing company becomes the owner of the equipment installed, which therefore is listed in the tangible fixed assets of its accounts.

The consequence of these two contracts on the accounts is obviously different. In the second type, whenever it is authorised for energy equipment, using the declining balance method of depreciation will allow the customer to bring profits forward and manage cautiously its risks.

**Risks management**

Third-party financing contracts imply a repayment of the outlay in proportion to the savings realised over a limited period of time. This means that, theoretically, the amount of savings might not be sufficient enough to cover the repayment. Hence there is a risk of loss for the third-party financing company. Obviously, the most important point for the third-party financing company is to minimise its risks, especially because of the guarantees it grants.

*Mastering the risk of technical performance depends on the following components:*

- Limitation of the guarantee through the contract: all contracts set up minimum for the calculation of annual instalments.
- Strict diagnosis and careful forecasting of energy savings before undertaking the works.
- Involvement of subcontractors in the guarantees given: contract with research consultants of subcontractors usually include a payment in proportion to the results obtained over a one year period.
- Involvement of heating contractors: in many cases, the third-party financing company negotiates, on behalf of its customers, contracts on a set or proportional basis with heating companies that guarantee energy savings.
- Technical measures to limit the risk: as often as possible, the third-party financing company decides upon dual energy systems. And within the same contract, a diversification of techniques used and energy sources (according to the site) is specified, so that one risk can be offset by another.
- Search for multi-contracts: a standard contract agreed upon for several dozen of sites will dramatically reduce the technical and price risks (for n sites → average unit risk is divided by n).

*Two methods are used to master the risk of price changes:*

- Diversification of risks (one particular risk being offset by another): in the contract, the third-party financing company undertakes several works on which any variation of energy prices has different consequences. For example, a contract specifies:
  - A substitution process from coal to gas
  - A savings programme on gas consumption.
- Obviously, with a rise in the price of gas, the substitution process will appear less attractive. On the other hand, the savings programme on gas consumption will become very interesting.

- Counter-guarantee from energy distributing companies: some of the important substitution processes will not be suitable for the system previously described. The third-party financing company therefore tries to obtain a commitment on prices from energy distributing companies.

Before offering its services, the third-party financing company must make sure it is able to master the two types of risks. Only then can it limit any variation of forecasted energy savings in relation to actual savings.

Furthermore, the duration of contracts is always longer (2 to 4 years) than the normal period of repayments. Thus, the only consequence of a variation of 10% to 15% in savings is a longer period of repayment, without any loss in capital and interests.

**Example for a programme of works for energy savings**

| | |
|---|---|
| Global cost (excluding grants) | FRF 1 000 (VAT incl.) |
| Time of return (investment/savings – VAT incl.) | 5 years |

The third-party financing company writes a contract for duration of a maximum of 12 years, during which the repayment cannot exceed 85% of the savings realised.

| Year | Energy savings (VAT incl.) | REPAYMENT (VAT incl.) | | | Net gain |
|---|---|---|---|---|---|
| | | Capital | Interest | Total | |
| 1 | 200 | 75 | 95 | 170 | 30 |
| 2 | 200 | 82 | 88 | 170 | 30 |
| 3 | 200 | 90 | 80 | 170 | 30 |
| 4 | 200 | 99 | 71 | 170 | 30 |
| 5 | 200 | 108 | 62 | 170 | 30 |
| 6 | 200 | 119 | 51 | 170 | 30 |
| 7 | 200 | 130 | 40 | 170 | 30 |
| 8 | 200 | 142 | 28 | 170 | 30 |
| 9 | 200 | 155 | 15 | 170 | 30 |
| thereafter | 200 | 0 | 0 | 0 | 200 |

Rate of interest taken for the above example: 9.50 %

Should no energy savings be realised, the guarantee comes into action.

Let us assume that due to poor technical performances or to a variation in the price of energy, savings amount to FRF 150 instead of the FRF 200 initially forecast. The schedule of repayments becomes as follows:

| Year | Energy savings (VAT incl.) | REPAYMENT (VAT incl.) | | | Net gain |
|---|---|---|---|---|---|
| | | Capital | Interest | Total | |
| 1 | 150 | 33 | 95 | 128 | 22 |
| 2 | 150 | 36 | 92 | 128 | 22 |
| 3 | 150 | 39 | 89 | 128 | 22 |
| 4 | 150 | 43 | 85 | 128 | 22 |
| 5 | 150 | 47 | 81 | 128 | 22 |
| 6 | 150 | 51 | 77 | 128 | 22 |
| 7 | 150 | 56 | 72 | 128 | 22 |
| 8 | 150 | 62 | 66 | 128 | 22 |
| 9 | 150 | 68 | 60 | 128 | 22 |
| 10 | 150 | 74 | 54 | 128 | 22 |
| 11 | 150 | 81 | 47 | 128 | 22 |
| 12 | 150 | 89 | 39 | 128 | 22 |
| thereafter | 150 | 0<br>(Total 679) | 0 | 0 | 0 |

The remaining capital to be paid (1 000 – 679) will be borne by the third-party financing company.