COGEN*challenge* - European Campaign for the Development and Documentation of 1000 Small-scale Cogeneration Projects in European Cities and Towns

Get your **cogeneration** project financed

A guidance document on cogeneration financing

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COGEN*challenge*

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Summary

Third Party Financing (TPF) is useful for any CHP project where energy technology know-how is needed, but not available to the customer or only at relatively great expense. Therefore, the user (from private or public sector) will involve an expert from outside, who provides the necessary knowledge, an Energy Service Company (ESCO) or third party company. The ESCO will manage a CHP facility and, at the same time, finance (and own) this installation. ESCOs can provide a complete range of services, from design, finance and installation to operation, maintenance and monitoring. Most importantly, the ESCO guarantees the user certain thermal and electrical outputs at agreed prices from the CHP-installation for the duration of the contract.

The contract negotiated between the ESCO and the client is the main issue and takes into account the particular circumstances and requirements of the site, e.g. the type of facility, the client's investment policy and the financial return required. Duration of a TPF (or contracting) project depends on these circumstances and is typically more than five years. Costs paid by the customer for the investment, the contract as well as the service and guarantees of the ESCO are included in the agreed price for power and heat from the CHP. Main advantages of TPF are:

- There is no initial requirement for capital: total costs are financed through a third party rather than the customer;
- The user has a contact person who has the required technical and financial know-how;
- The customer pays for ESCOs guaranteed services (depending on type of contract), e.g. the energy delivered.

There are organisations, such as facilitators through the COGEN Challenge project or energy agencies to help prospective customers with their decision. Moreover they are at hand at all stages to assist in the realisation of a TPF project.

What is an Energy Service

The EU Directive defines "Energy service company" (ESCO) as a company that delivers energy services, energy efficiency programmes and other energy efficiency measures in a user's facility, and accepts some degree of technical and sometimes financial risk in so doing. The payment for the services delivered is based (either completely or partly) on meeting quality performance standards and/or energy efficiency improvements. An Energy Service is an individual package consisting of installations, construction and services (designing, financing, operating) based on a contract between a customer and an ESCO.

Features

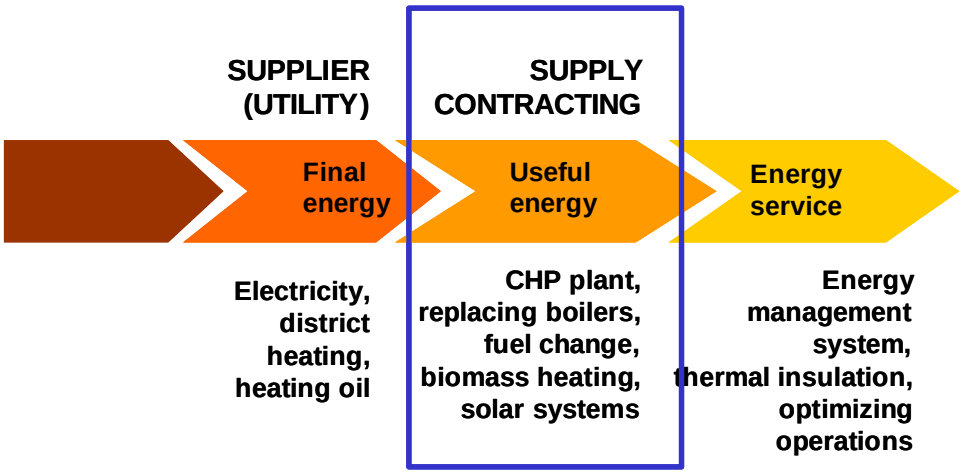
The package for each customer consists of several components:

- Warranties for function, performance, price;
- Outsourcing of technical and economical risks;
- Innovative solutions by the ESCO;
- „ One face to the customer“ through the ESCO;
- Individual package for each customer;
- Financial service.

However, there are two characteristic features, which are a mandatory part of a package. Firstly, the customer outsources the risk of the economic and technical performance of an installation. Secondly, the customer is guaranteed function and performance of the installation as well as level of costs (investment, running).

Energy service models

There are different models of energy services depending on the needs of the customer and the combination of energy and energy using technology and, in certain cases, the operations and maintenance necessary to deliver the service.



While Energy Performance Contracting aims to finance investments via the guaranteed cost savings achieved through improved energy efficiency (building insulation, heating system), supply contracting delivers useful energy (heat, electricity) at guaranteed prices.

The realisation of a CHP plant is therefore related to supply contracting.

Supply contracting - scope of services

There is a wide range of services from the ESCO, such as:

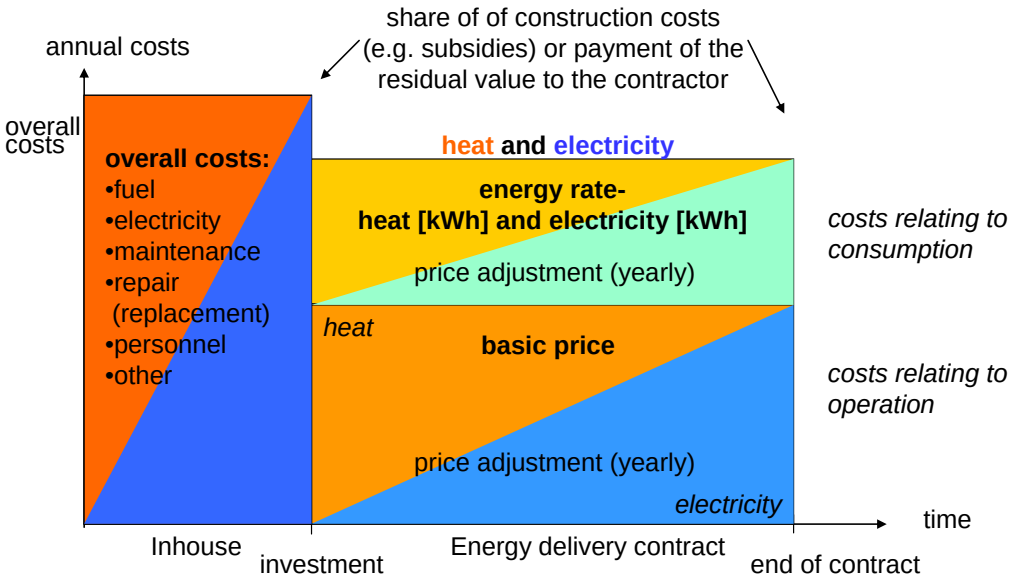
- The ESCO designs, constructs, operates and finances the CHP plant (incorporating legal requirements, subsidies, negotiations with utilities);

- The ESCO is responsible for purchasing of fuels (such as natural gas);
- The ESCO guarantees the function and performance of CHP (power, heat, operating hours);
- The ESCO takes care of the repair and maintenance of the CHP installation over the contract period (included in guaranteed price);
- The ESCO delivers useful energy (heat, electricity) at guaranteed prices (all inclusive).

Instead of choosing, coordinating and paying for different companies to realise his CHP, the customer buys electricity and heat, efficiently produced by CHP. His payments are only related to actual metered consumption.

Supply contracting- business model

An external ESCO carries out design, building and financing of the CHP plant as well as operation and maintenance. It takes over the technical and economical performance risks. The investment can be self-financed (in some cases with a subsidy), or using debt financing or third party financing. The ESCO is responsible for buying fuel and maintenance.



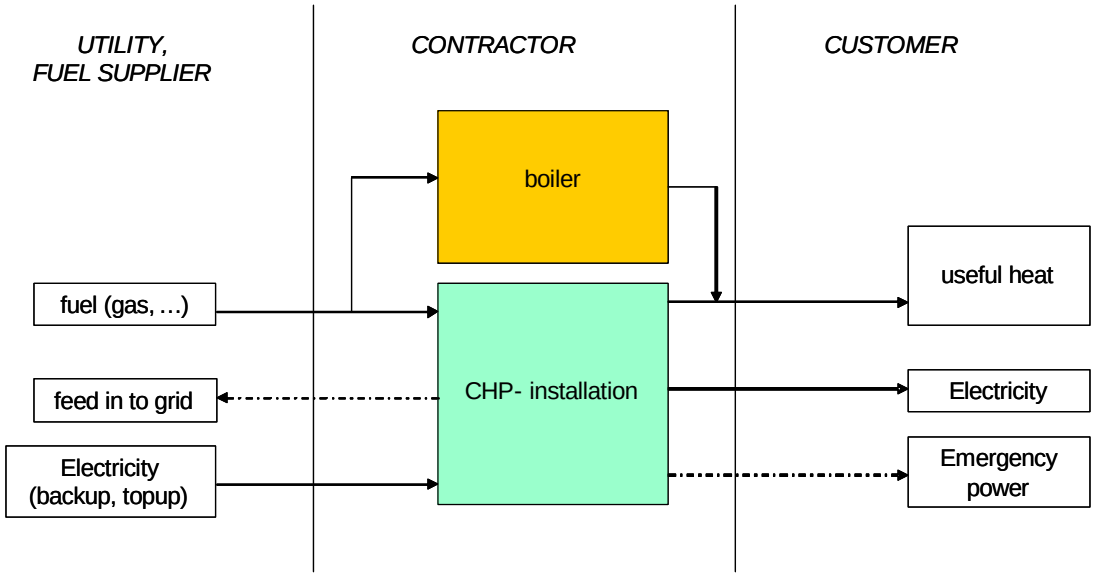
The costs of services are included in the guaranteed prices for heat and electricity. Costs are divided into:

- Costs relating to consumption: these are energy rates for heat and electricity (kWh), usually with an annual price adjustment based on an individual index for fuel and electricity; and
- Costs relating to operation: these include costs for repair and maintenance, construction, technical and economical risk costs and investment.

Performance limits

In most cases a CHP plant will be integrated into existing installations (boiler, electrical equipment). Since the ESCO guarantees the performance, the definitions of service limits when running a CHP plant are of major importance.

The ESCO is responsible for buying fuel and electricity (backup, top up). In order to run the CHP plant, it does the necessary repairs and maintenance. Since heat production is closely linked to the CHP, running of the boiler will be included, but not necessarily its repair and maintenance. The same holds true for electrical and grid connection and fuel supply (e.g. gas pipe) as well as the general heating and electrical system.



Benefits for the client

Realising a CHP project with the help of an ESCO has many advantages over an in-house solution:

- There are no or little initial investment costs through third-party financing;
- The customer can shift technical and economical risks to the ESCO;
- There are guaranteed energy prices, which can be based on energy market indices;
- The function and performance of the installation is guaranteed;
- Energy efficiency of the whole installation, including boiler and tap water, where appropriate, is improved;
- The client can find and order an ESCO through a cost-benefit-analysis, who optimizes and plans the complete project and offers the best technical solution;
- The customer can focus on his core business;
- There is one contact person (from the ESCO) for all issues;

The customer can make use of the ESCOs experience in terms of design, building, running and maintaining the CHP plant. While improving on energy efficiency, he does not need to bother about the performance of the often little known technology. This results in a win-win situation for all parties involved and the environmental benefits as well.

Comparison with an in-house solution

The typical customer's question in making the decision for a CHP installation is related to the choice between in-house implementation or contracting an ESCO.

The customer does not need to have funds or the burden of credit lines for other core business activities when investing in a CHP plant. A conventional bank loan may not be available to the customer, whereas an ESCO would be willing to provide third party pre-financing.

The following table gives an overview.

decision/ success criteria	Inhouse	Energy service
investment costs	100%	0-100%
economic and technical risks	Owner	Contractor
facility with optimal function and performance	only at high own commitment	in interest of contractor
performance warranties	No	Yes
guaranteed operation	only warranty period	over total contract period
cost limit	No	Yes
long-term contractual obligation	No	Yes
project coordination	building owner+ engineer	Consultant+ Contractor
service package	No	Yes
overall costs	higher	lower

Decision criteria checklist

If you want to know if you should go for contracting or alternatively an in-house solution, the following checklist will help you.

Contracting ⇔ *Inhouse-implementation*

1. **Technical**
   existing know-how (design, operation): *low* ⇔ high

2. **Economical**
   efficiency of
   operation and maintenance: *high* ⇔ low
   risk of achieving
   the expected results: *low* ⇔ high

3. **Organizational**
   one face to the customer ⇔ qualified own personnel

4. **Financial**
   no funds available for CHP-investment ⇔ CHP fits to investment scheme

5. **Legal**
   longterm contractual
   obligation is acceptable: *yes* ⇔ no

If your answers are generally in the red section, you should opt for contracting the CHP plant to an ESCO, otherwise you could also consider doing it yourself.

Barriers and the solution

The usual situation with customers is the need for power and heat on one hand and inefficient existing installations on the other. In many cases, the solution is a CHP plant. However, there are barriers which hold customers back.

CHP is a complex technology. When it comes to layout, design, choice of products and running an installation, professional know-how is needed. An ESCO is a specialised company which has all the necessary skills to implement a CHP project. There are many different crafts coming together (planner, electrician, plumber, builder). An ESCO combines all necessary steps; there is only one person to talk to for the customer.

When it comes to running a CHP plant without professional help, there is a certain risk concerning total cost, trouble free operation or the energy costs. With an ESCO, the customer is guaranteed an energy price and can calculate costs right from the start. The guaranteed energy prices can contractually be based on energy market indices and can therefore increase only in line with the market.

In many cases, there is no or little investment capital available for measures outside the customer's core business. With the help of an ESCO, financing can be provided and can be included in the agreed energy price, if desired.

All customers have particular needs. An ESCO can arrange a tailor-made service package individually for each customer.

Good practice examples

In the meantime, there are quite a lot of good practice examples of CHP projects all over Europe. Go to www.cogen-challenge.org and see the list of showcases of successful cogeneration projects.

Austria

Austria and Graz Energy Agency have already experience with contracting and TPF models. Followed by some more installations in the meantime, a special TPF-project with two small scale cogeneration units was realised in 2004.

The leisure centre in Graz-Andritz (owned by the municipality of Graz) consists of an outdoor swimming pool (surface of 1,850 m²) and an indoor sauna area operating all year round. The two existing boilers were about to be replaced.

The company of " E-Werk-Gösting" as contractor decided to deliver power and heat and install only one new boiler complemented by two gas-driven " Solo 161" Sterling engines with 18 kWel. A part of the investment costs (mainly the new boiler, plumbing, etc) were paid directly by the municipality, while the costs for the CHP plants are paid for by improving on overall energy efficiency over the contract period of 15 years. Operation of the whole installation is still done by staff of the leisure centre. Maintenance of the CHP plants is done by the contractor. The main advantages for the municipality are the environmental benefits, the guaranteed costs and the individual service package from one competent partner.

France

The Bains Clinic (day hospital) in Grenoble have entrusted Gaz Electricité de Grenoble (GEG), the local electricity and gas supplier, with the modernisation of its facilities (heating plant built in 1964, three 17-year-old boilers, hot water production reaching the end of its service life (with risk of bacteriological pollution) and the use of a fuel oil driven electricity peak load unit).

A beginning was made with a complete renovation of the heating plant and of the regulation, which led to the first result of a drop of 10% in the energy consumption. In parallel, the fuel oil unit was shut down and two of the boilers were renovated. A natural gas cogeneration module (Waukesha natural gas engine, 300 kWel) was installed, the first one in France of this size.

GEG financed the operation, its installation and its management. The running and maintenance of the facility were entrusted to Dalkia Company. The Bains Clinic therefore possesses a turnkey contract and a single interlocutor for its heat, hot water and electricity needs.

The reasons to choose cogeneration were the following:

- Energy efficiency: 20 to 30% savings in primary energy;
- Reduction of pollution: due to the use of natural gas, the NOx discharges have been reduced by 30% by eliminating the fuel oil unit;

- Cost control: the clinic today has consistent energy invoices with considerable savings over the cost of the original facility. Furthermore, it pays no investment charges and is freed from any maintenance expenses.

This example of a turnkey service tender and a “ win-win” logic could be introduced in the Rhône-Alpes region for the private sector.

Slovenia

Slovenia is in the developing period of the introduction of TPF schemes. Recently a project was carried out in the boiler house of Zrece, owned by Unior company, which supplies hot water for the tourist resort “ Terme Zrece” and Zrece district heating network.

The TPF project with a 500 kWel gas engine installation was successfully concluded in autumn 2005 by company Unior (owner and client) and ESCO Petrol as a contactor. Each contractual partner contributed half of the 417,000 € investment funds. Petrol is responsible for the energy part and for reaching the contractual technical and economical parameters of the project. Both partners have guaranteed return on the invested funds from the accomplished savings and incomes from cogeneration operation whereas Unior as a client is eligible for the remaining savings of the project. The contractual period is linked to the contractual return on investment of the contractor (without explicit duration period). After the conclusion of contractual relation, the CHP unit will become the complete property of Unior.

The project success is based on an excellent partnership of the parties involved and on a professional contract.

Standard project flow

The following gives an overview of the steps involved for a having a successful CHP project with an ESCO.

Project development phase

During the initial contact, the facilitator gets an overview of the customer's needs and the situation and collects data required for a pre-check. Then a first assessment is being made whether the installation of a cogeneration unit is an economic option for the customer. Size and profitability will be roughly assessed.

After that, a pre-check will be carried out. It is usually a technical, economical, organisational, financial and legal survey and evaluation of the project. If required, a detailed analysis can be done. This gives accurate values for a certain installation including prices. At the end of the development phase, the customer has the necessary information to realise a CHP installation.

Project realisation

When realising a project the specification of services (design, building, maintenance, etc.) is required. Depending of the size of the project and the customer, there will be a functional tendering. For that reason, measures and framework conditions are to be described. This information is already available when a detailed analysis during the development phase was carried out.

An essential part of bidding documents is the model contract. The experts, such as facilitators or energy agencies, have the necessary know-how. During the bidding process the comparison and assessment of biddings (cost-benefit-analysis), negotiation and contract conclusion have to be done. This, again, should be done in cooperation with the experts. The last phase is the realisation itself. It consists of detailed planning, monitoring of progress and quality assurance.

Conclusions and recommendations

- Contracting through ESCOs is a well proven instrument to successfully implement CHP projects.
- The European Union supports the energy service approach, e.g. Directives on Energy end-use efficiency and Energy Services.
- One can shift the economic and technical risk from an in-house solution to the ESCO by means of performance (operating hours), operation (maintenance) and price warranties (life cycle costs).
- Check out the good practice examples of CHP contracting and third party financing.
- Contracting needs a certain size of the CHP facility to cover costs of the ESCO. A feasibility study for your decision should be done first.
- Call for tenders and compare offers to "in-house" solutions.
- Look out for a professional model contract that takes into account all relevant matters.
- Monitor the project's progress and assure quality through implementation.

A contracting project requires a lot of experience (assessment, analysis, functional tendering, awarding of contract, model contracts, etc) and professional help. Therefore it is advisable to cooperate with an experienced consultant. In six European cities a " facilitator" for small-scale cogeneration can assist interested parties with their knowledge and experience in this technology. In Graz (Austria), Namur (Belgium), Frankfurt am Main (Germany), Lyon (France), Ljubljana (Slovenia) and Oviedo (Spain) the facilitators can be contacted directly as experts for their regions and countries. In most other European countries there is a national cogeneration association that is able to assist you. Contact COGEN Europe if you need national information.

Sources

On www.cogen-challenge.org you will find additional information on small-scale cogeneration, including:

- addresses of suppliers of cogeneration units and of project;
- developers close to your home;
- fact sheets describing the legal and economic framework in your country;
- calculation tools that help you to carry out pre-checks;
- a list of showcases of successful small-scale cogeneration projects;
- a calendar showing information and training events on small-scale cogeneration.

More information on contracting and TPF can be found on:

- www.grazer-ea.at Grazer Energieagentur, Graz Energy Agency
- www.raee.org Rhônalpénergie-Environnement; regional environment and energy agency
- www.ijs.si Institute Jozef Stefan, Energy Efficiency Centre
- www.energie-cites.org Energie-Cités, association of European local authorities
- www.eva.ac.at Österreichische Energieagentur, Austrian Energy Agency

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Who we are

COGEN Europe
The European Trade Association for the promotion of cogeneration

Fundación Asturiana de la Energía (FAEN)
The new Regional Energy Agency of the Principado de Asturias in Spain

Jozef Stefan Institute
The main Slovenian technological institute, complementing the role of the universities and bridging the gap between science and applications

Climate Alliance
An association of European cities and municipalities with the objective of preserving the global climate

Institut de Conseil et d'Etudes en Développement Durable asbl (ICEDD)
A Belgian independent research and consultancy company with extensive expertise in cogeneration

Rhônalpénergie-Environnement (RAEE)
The regional energy and environment agency of the Rhône- Alpes region in France

Energie-Cités
An association of European local authorities for promotion of local sustainable energy policies

Stadt Frankfurt am Main - Dezernat Bildung, Umwelt und Frauen - Energiereferat (The local municipal energy agency of the City of Frankfurt, Germany)

Grazer Energieagentur Ges.m.b.H (GEA)
A limited company which promotes energy efficiency and renewable energies in the City of Graz and the Region of Styria, Austria.