

ENERGY TECHNOLOGIES FOR A SUSTAINABLE DEVELOPMENT



**CO-OPERATION BETWEEN AUSTRIA
AND CENTRAL AND EASTERN EUROPE**

Energy Partnerships are Partnerships for Success

Austria has been working on setting up co-operation in the field of energy policy with the countries of Central and Eastern Europe especially since 1989. Among the focal points of these efforts have been the use of renewable sources of energy on the one hand and increased energy efficiency on the other. Energy partnerships, which are co-ordinated by E.V.A., the Austrian Energy Agency, on behalf of the Ministry of Agriculture, Forestry, Environment and Water Management and the Ministry for Economic Affairs and Labour, are an important instrument in this context. Renewable energy sources and energy efficiency are also promoted by the European Union, which several of these countries will belong to within the next few years. The EU provides appropriate framework conditions by means of instruments such as the White Paper on Renewable Sources of Energy, the directive on promoting electricity production from renewable energy sources and the draft directive on energy efficiency in buildings as well as the draft directive on the promotion of cogeneration based on a useful heat demand in the internal energy market.

Many successful projects and further business contacts between Austrian technology and service providers and their partners in Central and Eastern European countries have developed in recent years. This booklet is intended to provide an overview of the wide range of projects and to encourage the dissemination of good practice so that new projects can build upon existing experience.

Europe's future energy supply will not only depend on the availability of technologies ensuring increasingly efficient energy use and the increasing use of renewable energy sources; it will also depend on how fast it will be possible to implement these technologies. The exchange of experience and appropriate know-how are of central importance here.



Wilhelm Molterer

A handwritten signature in blue ink, appearing to read 'W. Molterer'.

Federal Minister of Agriculture, Forestry, Environment and Water Management



Martin Bartenstein

A handwritten signature in blue ink, appearing to read 'Martin Bartenstein'.

Federal Minister for Economic Affairs and Labour

Energy Efficiency and Renewable Energy Sources as Answers to Global Challenges

This brochure presents examples of successful co-operation between Austrian providers of technology and services in the energy sector and partners in Central and Eastern European countries. The contributions were selected so as to show the widest possible range of technologies; all the projects presented have actually been realised.

This co-operation has two focal points: technologies for increased energy efficiency and technologies for the utilisation of renewable energy sources.

It is for a good reason that these topics are at the centre of Austria's Energy Partnership Programme with selected countries of Central and Eastern Europe: after all, Austria boasts a long tradition of using renewable sources of energy and of efficient energy use. The country covers about 70 % of its electricity requirement from hydropower, and about one quarter of its overall energy requirement is supplied by various renewable energy sources. Austria also enjoys excellent international standing in the field of developing energy-efficient technologies; for example, the country plays a leading role in the development of energy-efficient buildings. The so-called "passive" building method now makes it possible to erect buildings with an annual heat energy requirement of less than 15 kWh/m² at no significant additional cost.

The technologies presented in this brochure were in part developed under conditions of crisis. First of all, there were the two petroleum crises of 1973 and 1980, which abruptly made the world's oil-importing countries aware of their dependence on a resource which is in limited supply and only available in a few regions of the world. And it is not only oil which is in limited supply: the same is true of natural gas, coal and uranium.

An additional motivation for developing the technologies presented in this booklet was provided by the considerable volume of emissions and waste resulting from the use of fossil and nuclear energy sources. Initially, the focus of attention was on "classic" air pollutants such as hydrocarbons, sulphur dioxide or nitrogen oxides, which were associated with forest die-back and the poisoning of rivers. Later on, this focus shifted to carbon dioxide, which is responsible

for global climate change. Finally, there was the nuclear accident at Chernobyl in 1986, which further reinforced Austria's policy of promoting alternatives to nuclear energy.

On the other hand, the rise in crude oil prices resulting from the two petroleum crises unleashed considerable innovative potential.

Technologies for increased energy efficiency and for energy saving were developed and people became increasingly aware of the potential of renewable energy sources. In addition, the emission problems related to energy generation gave rise to the development of technologies reducing or altogether avoiding the production of pollutants.

So the crises of past decades can actually be said to have led the way towards a reorientation of the entire energy sector. In fact, the new technologies which were developed as a reaction to these crises are turning out to be far more crisis-resistant than the old ones.

Policy-makers are beginning to react to these changed conditions at the international level, too. For example, the Kyoto Protocol can be seen as a step towards a kind of global environmental and energy policy by way of reducing carbon dioxide emissions across national borders.

Furthermore, the very fact that the supply of fossil energy sources is limited – according to leading scientists, humanity will have used up about half the entire available petroleum reserves in the next few years – will soon draw increased attention to questions such as the regional distribution of resources and the security of energy supply.

It is clear that realistic reactions to these global problems will include increased energy efficiency, i.e. the most efficient possible utilisation of resources, on the one hand, and the increased use of renewable sources of energy on the other.

Naturally, this brochure can only present a fraction of the co-operation projects between Austrian providers of energy technology and services and their partners in Central and Eastern European countries. These projects should also be seen as regional, Central European contributions to meeting a global challenge, with many similar contributions still to follow.

Refurbishment and Uprating of the UNA-Kostela Hydro Power Plant in Bosnia and Herzegovina

Background

The UNA-KOSTELA hydropower plant was originally constructed between 1951 and 1954 with a total capacity of 6 MW and has been operating continuously for 46 years, including the war period from 1992 to 1995.

The plant, which had produced more than 1,500 GWh over the years, urgently needed refurbishment.

The plant is located 9 km down-stream of the city of Bihac on the river Una in

Bosnia and is owned and operated by the utility ELEKTROPRIVREDA BiH, Sarajevo.

After the end of the war, energy demand increased again. Therefore, and because of the growing need and the rising costs for maintenance and repair of the old equipment, it was decided to carry out a comprehensive refurbishment and uprating of the plant.

Project Description

Originally the plant was equipped with four 1.5 MW vertical Kaplan turbines, with a rated head of 12 m and a total discharge of 64 m³/s.

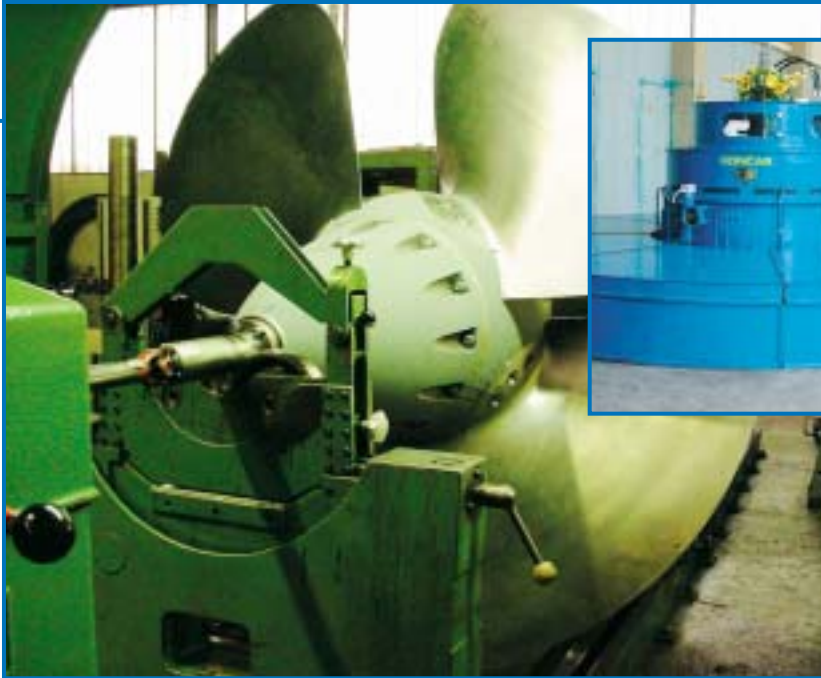
The target was to keep the rated head of 12 m but to increase the discharge from 64 m³/s to 88 m³/s, and thus to achieve a significantly higher output.

Furthermore, the work schedule had to be arranged in such a way that the plant could be in partial operation throughout the refurbishment process. The Project Implementation Unit of ELEKTROPRIVREDA BiH and the experts of ENERGOINVEST Sarajevo worked out a basic concept for the replacement of all the electromechanical equipment.

KÖSSLER Austria submitted the best offer for the new turbines and was commissioned with designing and manufacturing them, as well as with supervising their installation from 1999 onwards. An advanced hydraulic design was applied; the four new Kaplan turbines each have a 1,800 mm runner diameter and opera-

te at a speed of 300 rpm. The civil structure could be kept with only minor adaptations and the discharge could be increased, as required, from 64 m³/s to 88 m³/s, i.e. by 37 %. But on account of the modern design and much greater efficiency, the output was increased by 54 %, from 6,120 kW to 9,500 kW.

In addition, the Austrian company supplied new electronic-hydraulic governors for automatic, and even unmanned, operation of the turbines. The new turbines are equipped with self-lubricating bushings at the packing gland and so any further pollution of the river Una has been avoided. Furthermore, the turbine guide bearings consist of segments made of a special plastic material which is lubricated and cleaned with purified water from the river without causing any pollution. The new generators were supplied by a manufacturer from Zagreb, Croatia; the entire control system was adapted by a company from Ljubljana, Slovenia.



*Generators in
the power house*

*Kaplan turbine
before installation*

Non-technical Aspects

The project was completed within 24 months. During this period only one unit could be worked on at any given time, as the other three units always needed to be in operation.

Co-operation between the technicians

and engineers from Bosnia, Austria, Croatia and Slovenia was always excellent. Personal relationships and mutual cultural understanding have improved considerably as a result of working together successfully.

Financial Issues

70 % of the financing for this project was provided by the European Bank for Reconstruction and Development (EBRD), the remaining 30 % by the owner, ELEKTROPRIVREDA BiH.

Impact, Results

The need to rehabilitate the hydropower plant was never in question as it would otherwise have faced closure. This necessary investment has been made more worthwhile by the opportunity of significantly upgrading the plant's capacity at the same time.

Contacts

Kössler Ges.m.b.H.
J.P.Elektroprivreda BiH
European Bank for Reconstruction and Development
Energoinvest-Energoinzenjering

The Modernisation of the Solina Hydro Power Plant in Poland

Background

The utilisation of hydro-energetic potential for electricity production has a long tradition in the countries of Eastern Europe and the CIS. It is estimated that more than 50 % of the

existing facilities are past their intended lifetime.

Due to ageing and wear, production drops and complete outage of the unit or plant threatens any day.

Project Description

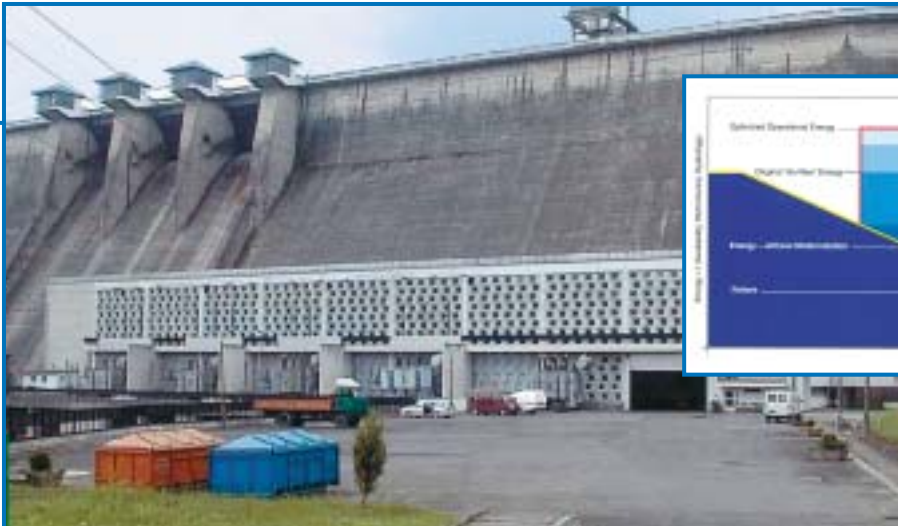
By means of thorough inspection of the two turbine-generator units, backed by the unique Voith Siemens Hydro computational assessment tools and by fluid dynamics analysis (CFD analysis), the optimisation potential, outage time and pertinent costs were identified, thus giving the customer a clear idea of the benefits of rehabilitation prior to concluding the contract.

In terms of execution, the most crucial engineering challenge was the optimisation of the two vertical shaft Francis turbines of 48 MW limited output each, originally supplied by others in 1967. A completely new runner, fitting into the existing wheel case, has been developed. Whereas usually some 15 to 30 % performance increase will be achieved, the Solina HEPP turbines, with unchanged rated speed but discharge increased from 127 to 139 m³/s, have been upgraded to 73 MW, as contractually guaranteed. This huge increase in performance of more than 50 % and the

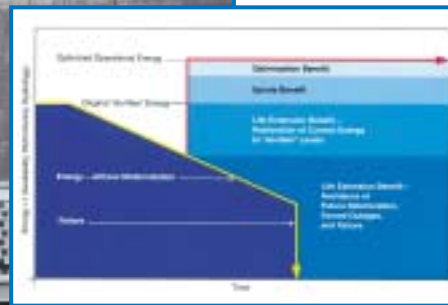
simultaneous elimination of vibration problems in the partial load range was contingent upon precise realignment of the turbine guide bearing and the installation of a stabilising air system. The Gdansk-based Turbo Institute has established that the extent of vibration-free operation actually exceeds the contractually guaranteed range.

In addition, the generators have been upgraded, the turbine control system has been changed to digital technology, the pressurised air-oil supply system has been adapted, a thrust-bearing lifting device has been installed, and the excitation equipment has been replaced by static one.

Stringent time management allowed the completion of refurbishment a solid two weeks ahead of the contractual schedule, even though cracks in the turbine shaft discovered after the dismantling of the second machine required a new 20-ton shaft to be supplied in record time.



Solina hydro power station: outside view



In-time rehabilitation can drastically increase a plant's profitability and, moreover, extends its lifetime.

Non-technical Aspects

The future belongs to hydropower. It conserves our fossil fuel reserves, is abundant, self-renewing supply, is non-polluting and produces no waste streams. Hydropower is not only environmentally friendly but also cost-effective.

Hydropower plants also play an important role in water resource planning, in preventing flooding, making rivers navigable, solving irrigation problems and creating recreation areas.

Impact, Results

Without any environmental impact, the power plant's non-polluting energy production has been substantially increased, its operational range has been widened and its lifetime has been extended by at least a further 30 years. Voith Siemens Hydro has gained another satisfied client. Consequently, the Solina HEPP rehabilitation project has been a full success for everyone involved, as Elektrownie Szczytowo-Pompage

S.A.'s general manager confirmed in a congratulatory letter.

Once the two further, smaller, reversible machines have been upgraded, an estimated total annual energy increase of 93 GWh (i.e. from 137 to 230 GWh), including peak energy supply, will be achieved. After the completion of the project, Solina HEPP will be the largest and most modern hydro power plant in Poland.

Contacts

VOITH SIEMENS Hydro Power Generation GmbH & Co KG
Elektrownie Szczytowo-Pompage S.A.

Modernising Iron Gates I Hydro Power Plant in Romania and Serbia

Background

The hydro power plant Iron Gates I on the river Danube was commissioned between 1970 and 1972 with six 178 MW Kaplan turbines each on the Romanian and Serbian sides. With these 12 units of 9.5 m runner diameter, it is the largest river power station in Europe. After intensive operation for more than 25 years, ageing has led to increased maintenance costs and operational

risks. Site investigations showed that complete refurbishment of the turbine and generator would be necessary for safety reasons. Cracks on important turbine parts were increasing operational risks. A turnkey contract was therefore awarded by Hidroelectrica SA (formerly RENEL) as client to VA TECH Hydro as contractor, to carry out improvements.

Project Description

VA TECH Hydro has been working on this project since 1993, the preliminary studies began in 1995. Many side investigations were held, and preliminary model tests were carried out at VA TECH Hydro's laboratory, acceptance tests were done on the same model. The diagnostic phase was completed in October 1998.

The project covers the modernisation and upgrading of the units from 178 MW to 200 MW. The scope of work includes the dismantling, refurbishment, modernisation and re-assembly of the electro-mechanical equipment, erection supervision and all testing and commissioning. For the main turbine components, VA TECH Hydro carried out strength calculations using the finite element method, thus determining the design and manufacturing solutions to ensure an appropriately long new operating life for the turbine unit. To shorten the refurbishment

time of the project, the first unit was supplied with a complete new runner. Then the old runner hub and blade mechanism were refurbished and used for the second unit, and so on for subsequent units.

The refurbishment project will span a period of 90 months (7.5 years) from the contract award date (October 1997). The sequence of the main work carried out covers the following activities: model tests, manufacturing of new parts, complete dismantling of the units and auxiliary systems, inspection and testing of all main turbine and generator components, final decision-making with regard to the volume of supply and necessary work, site and workshop refurbishment, application of corrosion protection, re-assembly of the turbine, generator and auxiliary systems, commissioning and acceptance tests, and training of operation and maintenance personnel.



Technical improvement of out-of-date plants may improve the operating efficiency remarkably.

Non-technical Aspects

The Danube is part of the Rhine-Main-Danube Waterway that links the North Sea with the Black Sea. The Iron Gates

Scheme has made the Danube easily navigable since the 1970ies.

Impact, Results

A number of important targets will be achieved. Equipment reliability and plant availability will be improved, the output will be increased by about 12 per cent. This is achieved by improving turbine efficiency and increasing the discharge. Even more important is the quality of the energy (more daytime/peak energy), resulting in very attractive investment coefficients (benefit/cost ratio and updated unit costs). Day-to-day plant operation has been optimised

by installing a new redundant automation and control system, a redundant diagnostic and monitoring system and a redundant protection system.

The first refurbished unit was handed over to the client on September 8, 2000, the second one on August 14, 2001, the third one on June 28, 2002. Commercial operation of the refurbished units has achieved all the guaranteed parameters.

Contacts

VA TECH Power & Water GmbH
VA TECH HYDRO SA

BOOT Natural Gas Cogeneration System in Slovenia

Background

Energetika Ravne d.o.o., a subsidiary of the state-owned Slovenian Steel Works in Ravne, is responsible for supplying energy to several other companies belonging to the Slovenian Steel Works. The services provided include electrical power, hot water, technical gases and compressed air. In addition, the company supplies heat for the local district heating system of the community of Ravne. Since 1995, Energetika Ravne has

extensively analysed a variety of possibilities of upgrading the existing energy system and ensuring long-term efficiency, as well as environmentally sound energy solutions. In 1998, Energetika Ravne decided in favour of a world-class 8.2 MWe cogeneration facility manufactured by Jenbacher AG, and of an innovative BOOT (build-own-operate-transfer) financing scheme offered by ETA Energieservice GmbH.

Project Description

The plant consists of 3 JMS 620 NLC natural gas cogeneration modules. The gas engines are Jenbacher 4-stroke, turbo-charged, 20 cylinder series 6 spark-ignition engines with a shaft output of 2,723 kW each, according to ISO 3046 standards. The generators are rotary current synchronous medium voltage generators, 50 Hz, cos-phi (power factor control) adjustable between 0.8 and 1.0. Control of each module is effected by the control system built into the module control cabinet; these LEANOX controllers ensure compliance with the strictest emission limits. Operational and fault messages are registered and evaluated by the programmable controllers and transferred by modem for continuous in-house monitoring. Due to the minimal space available, the plant has been installed in a 3-level set-up within the existing boiler house.

Modules	3 x JMS 620GS NLC
Output el. total	8,169 kW
Output th. total	7,761 kW (8,298 kW)
Efficiency el.	42.0 %
Efficiency th.	39.9 %
Total efficiency	81.9 %
Hot water system	80/100 °C (or 70/90 °C)
Electric power generation min.	30 mill.kWh/year
Emissions	TA air
Fuel	natural gas
Voltage	5 kV
Start-up	October 1999



Natural gas cogeneration modules



Steam boilers in Ravne, Slovenia

Financial Issues

The realisation of the Energetika Ravne d.o.o. cogeneration project by ETA Energieservice GmbH clearly proves the importance of custom-tailored, off-balance sheet financing and BOOT models in boosting the utilisation of this highly efficient and environmentally sound technology, specifically for projects located in CEE pre-accession countries. The combination of private venture capital, in-depth involvement of the refinancing bank, the best available

technology and, last but not least, a strong drive for innovation by the customer, is essential in securing the success of such a project. The financing structure of the project avoids 100 % of the technical risk for Energetika Ravne as 100 % of the turn-key investment has been made by ETA Energieservice GmbH. The BOOT contract between Energetika Ravne and ETA Energieservice GmbH provides for a term of 10 years.

Impact, Results

With this highly efficient cogeneration plant it has been possible to set a leading example of environmentally friendly energy production in accordance with the demands of the customer. The amount of CO₂ emissions avoided

by this plant in comparison to conventional energy production is about 30,000 t per year, which is a considerable contribution to the necessary reduction in greenhouse gases.

Contacts

ETA Energieservice GMBH
Jenbacher AG Energetika Ravne d.o.o.

CHP Information Centre Bratislava within the Framework of the Slovak-Austrian Energy Partnership

Background

It is a well-known fact that different forms of combined heat and power schemes (CHP) have considerable technical potential in Slovakia (as in practically all countries of Central and Eastern Europe). This is due both to the long tradition of centralised heat supply in Slovakia and to the structure of the country's industry.

In a feasibility study conducted in 1996 as part of the preparations for

the CHP Information Centre project, E.V.A. estimated Slovakia's CHP potential at approximately 3,000 GWh_{el} (about 600 MW_{el}) in the district-heating sector and at least the same value in the industrial sector.

Considering this great (market) potential, it was surprising that only a few projects had entered into the concrete planning stage or had been implemented by that time.

Project Description

In 1997, E.V.A. and Kommunalkredit prepared the Terms of Reference for Austrian consultants, in order to assist in establishing a CHP Information Centre at the Slovak Energy Agency in Bratislava. The winner of the tender was a consortium formed by the Austrian consultancy firms Agiplan and Verbundplan.

Between 1997 and 2000, the CHP Centre project was implemented. The Centre's main tasks during that period were project identification and development on the one hand and institution building on the other.

Project development covers all steps from identifying promising sites for new

CHP projects, evaluating economic feasibility, conducting pre-feasibility-studies and identifying suitable project partners and contractors, to carrying out information activities for investors and suppliers, securing suitable framework conditions and evaluating the projects one year after their start.

In order to facilitate institution building, three consultants were trained by developing projects together with Austrian experts and by attending training courses in Austria. Furthermore, a CHP database and standard feasibility studies were developed, along with a project handbook, electronic tools and standard contracts.



Combined heat and power plants – the scope of the CHP information centre in Bratislava

Financial Issues

The Austrian Federal Chancellery financed 75 % of the project costs in the first year, 50 % in the second year and 25 % in the third year. The Slovak partners agreed to cover the rest of the costs and to continue running the Centre after the end of the funding period.

The decisive factor for the feasibility of

CHP projects has definitely proven to be a high rate of capacity utilisation. This is an argument in favour of CHP projects supplying industrial process heat, for which there is a steady demand. With an operating time of 7,000 to 8,000 full-load hours per year, pay-off periods of 3 to 5 years can be achieved.

Impact, Results

Between 1999 and 2001, about 27 projects with a capacity of about 260 MWel and an investment of about € 185 mill. were completed. This is equivalent to more than 30 % of the market potential, assessed by E.V.A. at about 600 MWel in 1996. This was not only an important contribution to increasing energy effi-

ciency in Slovakia but also an example of successful co-operation with Austrian suppliers and financial institutions.

Many of the Cogeneration Centre projects were supported by Kommunalkredit (up to 15 % of the costs), in addition to PHARE funds.

Contacts

CHP-Centre Bratislava

Agiplan Planungsgesellschaft Ges.m.b.H.

Verbundplan GmbH

Energieverwertungsgesellschaft – the Austrian Energy Agency (E.V.A.)

Kommunalkredit Austria

The Banja Rusanda Project in Serbia – A Success for Energy Saving and the Environment

Background

Associated gas often comes up along with raw oil when the latter is pumped up. As this gas consists of several components, making it unfit for the primary energy market, it has been treated like waste gas in the past. Some of these components cause plugging of burner nozzles during firing in domestic and industrial installations. The idea of mixing this gas with the clean natural gas coming from the large fields in Siberia is not viable, either, as a decrease in quality would never be accepted. For many years NIS NaftaGas has been sear-

ching for a way of using this waste gas with a relatively high heating value of 24 - 26 MJ/Nm³ (LHV). Two Austrian companies, OMV Cogeneration and JENBACHER AG, which used to have the same problem with associated gas, have found a way of using it. Now the Yugoslavian subsidiary of OMV Cogeneration (OMV Cogeneration d.o.o.) and the local gas utility NIS NaftaGas have agreed to install a CHP plant at the Banja Rusanda Rehabilitation Centre located in the Yugoslav Banat, north of Belgrade.

Project Description

The existing boilers at Banja Rusanda (one of which even dates back to the year 1911 and is still in operation) will partly be integrated into the new plant and partly be eliminated. Two gas motors of the type Jenbacher JMS 212 GS-N.LC (2 x 539 kWel; 2 x 720 kWth) with a total efficiency of more than 85 % will be installed. These motors will provide electricity and heat for the rehabilitation centre. Excess electricity is to be fed into the grid of EPS (Electric Industry of Serbia).

This CHP plant (planned, built, owned and operated by OMV Cogeneration d.o.o.) will utilise associated gas, which has mostly been burned off up to now.

On the one hand, associated gas will be used for heat production. This means that in addition to the project's advantages from the energy point of view, special emphasis will also be placed on the issue of CO₂.

On the other hand, associated gas will be used to generate electricity. This additional amount of associated gas to be used at Banja Rusanda will have a "double" effect on CO₂ emission levels, saving emissions, e.g., from a coal-fired power plant and saving the emissions which would otherwise be caused by burning off this amount of associated gas.



The NIS Refinery



The CHP plant will use associated gas and provide electricity and heat for a rehabilitation centre.

Financial Issues

The CHP plant is financed under a 7-year project financing plan organised by OMV Cogeneration, who also takes 15 %

equity in the project. The total investment of the project amounts to € 1.5 mill.

Impact, Results

The project, which is currently being implemented, will foster the economic development of the Banja Rusanda Rehabilitation Centre. It will also make a significant contribution to achieving the goals of the Kyoto conference through a "double" effect of CO₂ reduction through efficient use of CHP on the one hand and by eliminating the burning-off of associated gas on the other hand.

After this first successful co-operation project, OMV Cogeneration d.o.o. is planning further projects with a similar set-up along the pipelines and oil production facilities of NIS in order to replicate good practice. This example shows how easily CO₂ emissions can be reduced and how easily CHP technology can be implemented in an economical way.

Contacts

OMV Cogeneration GmbH
NIS-Naftagas

Biomass District Heating for Trhové Sviny, Czech Republic

Background

Trhové Sviny is a town situated some 20 km from České Budějovice in the Czech Republic. As many other towns in the Czech Republic and in other countries of Central and Eastern Europe, Trhové Sviny is supplied by a district heating grid. Before the project, district heat was supplied by two old-fashioned coal boi-

lers, which had to be put out of service due to their high emissions.

In 1998, "Tepelné Hospodářství Města Trhové Sviny District Heating limited s.r.o" (Central Heating Co.), which is 100 % owned by the town of Trhové Sviny, was founded.

Project Description

While looking for alternatives to energy supply by coal, city officials visited some well-working, biomass-fuelled district heating plants, situated mainly in Austria. After some two years of discussion and consideration, pre-feasibility studies and economic assessment, it appeared to be the most favourable solution to install a biomass-based district heating plant. Following a competitive bidding process, the company SFC Umwelttechnik GmbH (SFCU) from Salzburg, Austria, was commissioned as a general contractor for the biomass boiler; i.e. all work related to the assessment of optimal boiler power, electronic equipment, installation and co-ordination was carried out by SFCU.

In view of the planned full-load time and of fuel availability, the best solution was found to be a 2.5 MW boiler which can be fired with wood waste, sawdust,

woodchips and bark. The biomass plant was to be operated almost all year round. Plenty of fuel wood is available within an area of 20 km around the plant, and contracts with suppliers were accordingly concluded.

There were only five months between the signing of the contracts and the first operation of the plant. The biomass boiler mainly supplies the heat which is needed all year round, while peak demand is covered by three gas boilers, which also provide reserve capacity. This combination of biomass and fossil fuels has been shown to be favourable in many cases.

The boiler was supplied by Kohlbach Co. of Austria, whereas all other components could be purchased from local Czech companies.



District heating based on biomass makes Trhové Sviny less dependent on fossil fuels.

Non-technical Aspects

Co-operation between partners from two countries – in this case from Austria and the Czech Republic – functioned very well. However, as there had been little experience with biomass district heating in the Czech Republic before this project, the local population had to be comprehensively informed of the advantages of the project. In the beginning, for example, there were doubts that there was sufficient biomass available in the vicinity of the plant. But the inhabitants were involved as partners in the project from the beginning, and their initial doubts could be allayed.

Financial Issues

The investment for the biomass boiler amounted to 20 million Czech crowns (approximately € 670,000), which was too much to be covered by Trhové Sviny District Heating alone. A low-interest loan provided under the PHARE programme and a loan from the Czech Energy Agency CEA, amounting to 3 million Czech crowns (approximately € 100,000), made the investment possible. The financing of the project was also made possible by the fact that biomass is much cheaper than coal and gas, which were previously used as fuels. The payback period is 8 years. Furthermore, the project was supported by an Austrian grant amounting to approximately € 85,000.

Impacts, Results

The installation of the biomass boiler has made Trhové Sviny a little less dependent on fossil fuels. The project, however, was only the first step; further steps are planned: the installation of a

gas engine, the connection of new customers to the grid, and the adaptation and repair of the grid, which is to be buried below surface.

Contacts

Kohlbach Heizkessel- & Industrieanlagenbau
SFC Umwelttechnik GmbH
CEA, Prague (CZ)
Kommunalkredit Austria

Biomass Project in Bystřice nad Pernštejnem, Czech Republic

Background

The town of Bystřice nad Pernštejnem has some nine thousand inhabitants and is supplied with district heat. Before the start of the project, energy for district heating was provided by two boilers:

- a natural gas boiler with 5 MW installed capacity and a yearly production of 35,000 GJ, and
- a brown-coal boiler with 14.4 MW installed capacity and a yearly production of 47,000 GJ

These two boilers supplied their heat via

two separate grids, which were owned by different bodies. While the town held a 20 % share in the gas boiler and in the corresponding grid, it owned the brown-coal boiler and its grid completely. The emissions of the brown-coal boiler were tremendous: for example, 1,900 tons of dust and 174 tons of SO₂ per year.

In 1999, the local authority decided to replace the brown-coal boiler by a modern boiler. After some months of discussion, it was decided to adapt the heating centre of the brown-coal boiler for the use of biomass.

Project Description

The project at Bystřice nad Pernštejnem consists of the following parts:

- The complete replacement of heating technology, exchanging brown-coal boilers for biomass boilers. Two boilers of 4.5 MW each, built by Urbas, were installed. These boilers can be fired with both wood and straw.
- The construction of a heat storage tank with a capacity of 350 m³, which will make it possible to cover peaks in heat demand.
- The construction of a biomass storage facility equipped with an automatic crane. The plant can be fuelled from the storage facility for one month of full load.
- The adaptation of the heating grid and the connection of new customers to the grid. About 60 % of the town's inha-

bitants are supplied with heat at a peak load of 9 MW. The grid itself has a length of only 3.5 km, which allows very economical operation. Relatively small grids, as compared to the connected load, are frequent in Central and Eastern European countries. They usually supply large housing blocks or industrial customers.

- The previously separate district heating grids were joined, creating a unified grid for the whole city.

- All heat exchangers at customers' sites were replaced.

The project was started in October 2000. Most of the construction work was carried out in 2001, some final work was done in 2002. The plant started operating in November 2001.



The biomass-boiler in Bystřice nad Pernštejnem, Czech Republic



Outside view of the project at Bystřice nad Pernštejnem

Non-technical Aspects

During the first months of operation, biomass fuel has mainly been supplied by saw mills. In the long term, however, it is planned to make the plant independent from this market. A biomass cultivation programme has been launched for this purpose. As there is rather little experience with biomass cultivation in

the climatic conditions of the Czech Republic, a number of tests over several years are planned to determine the species best suited for cultivation as energy crops.

Five people are employed by the district heating plant.

Financial Issues

The total investment amounted to about 140 mill. Czech crowns (or € 4.78 mill.). The project was supported by the Czech State Environmental Fund by a

grant and an interest-free loan. The non-material costs were partly financed by Kommunalkredit Austria.

Impact, Results

After the first season of operation, a measurement of emissions was carried out. Dust emissions, for example, have been reduced from 1,900 tons to 4.5

tons per year, SO₂ emissions from 174 tons to 2.3 tons per year. This reduction in hazardous emissions has markedly improved the air quality in the town.

Contacts

Urbas Maschinenfabrik GmbH.
Kommunalkredit Austria

Biodiesel from Rape Seed Oil in Olomouc, Czech Republic

Background

Oil plants, waste cooking oils and animal fats: every country has inexhaustible energy reserves in its backyards and they grow and re-grow year after year.

BioDiesel is a proven, environmentally friendly substitute for mineral oil diesel, produced from vegetable or animal oils and fats. It can be used directly in any common diesel engine without the need for prior engine adaptation. The main environmental advantages of BioDiesel compared to mineral oil diesel are:

- reduction in exhaust gas emission during the combustion process (e.g. - 50 % soot)

- fully biodegradable diesel fuel substitute
- non-toxic biofuel

The economic efficiency of the BioDiesel production process to a large extent depends on whether cost-effective raw materials can be used and on the amount of feedstock needed to produce one litre of BioDiesel. It is in this respect that the technology of BDI Anlagenbau GmbH differs from those of its competitors.

A patented process allows not only the use of fresh vegetable oils but, at the same time, the use of 100 % spent cooking oils and of animal fats with a high content in free fatty acids.

Project Description

In 1994 the BioDiesel production plant in Olomouc, Czech Republic – planned and constructed by BDI Anlagenbau GmbH – went into operation. With a production capacity of 30,000 tons of BioDiesel per year this plant was at that time one of the largest BioDiesel production facilities in the world, and still is one of the largest in Eastern Europe.

The feedstock for this BioDiesel production facility is rape seed oil (water-deg-

ummed), which is produced in the neighbouring oil mill. The rape seed is grown in the regions nearby.

In addition to the main product – high-quality BioDiesel, fulfilling the strictest BioDiesel quality standard world-wide (DIN 51606), some saleable side products are also produced in Olomouc. The crude glycerine and the free fatty acid phase are of such high quality that they can be sold to the chemical industry.



The production of biodiesel from rape seed oil has a positive impact on the economic situation of Olomouc.

Non-technical Aspects

The production of BioDiesel from rape seed has a considerable impact on the economic situation of this region of the Czech Republic. New jobs have been created, existing ones – especially within the farming community – have been secured. An additional source of income for farmers has been created.

Based on the experience gathered in connection with the BioDiesel produc-

tion in Olomouc and on the successful, problem-free use of its BioDiesel, the government of the Czech Republic soon started to support the nationwide use of this environmentally friendly biofuel. By granting a tax advantage on a fuel blend called BIONAFTA (30 % BioDiesel, 70 % mineral oil diesel), the Czech government has boosted the use of BioDiesel in the country.

Financial Issues

From the macro-economic point of view, the production of BioDiesel from renewable resources helps to decrease the country's dependency on petroleum imports by increasing its capacity for self-sufficient supply.

International studies (e.g. Ifo Munich) prove that the production of BioDiesel from rape seed oil secures and creates many jobs in agriculture, as well as in the processing of raw materials and in the marketing of BioDiesel.

Impact, Results

By successfully establishing the BioDiesel production facility in Olomouc, many positive impacts have been created for the Czech Republic, for instance environmental protection by using renewable resources for the creation of an environmentally friendly product, or positive microeconomic impacts on the region by creating jobs and local value-added products.

Contacts

BDI Anlagenbau GmbH
Milo Olomouce a.s.

Demonstration of Small-scale Biomass Boilers for Residential Use in Hungary and Slovenia

Background

With its forests covering 56 % of the national territory – much more than in the surrounding countries – Slovenia is comparable with Scandinavian countries in terms of its ample supply of biomass resources.

The situation in Hungary is characteri-

sed by a rather small wooded area, covering only 19 % of the national territory. Although firewood is still used in the country and residues from the wood-working industry are used in industrial boilers, modern biomass technology is still largely missing from the national market.

Project Description

The main goal of this project is to install three different types of biomass demonstration unit showing typical EU standards, for example firewood gasification boilers, woodchip boilers or pellet boilers, in both Hungary and Slovenia. The transfer of biomass know-how from EU to CEE countries by means of lectures,

planning workshops, practical installation and specially adapted information materials for dissemination in Eastern countries is the second objective of the project. The project is accompanied by a measurement programme on emission factors under practical conditions.

Non-technical Aspects

Slovenia, with its rich biomass resources, is in a much better position to realise a biomass dissemination programme than other CEE countries. However, the utilisation of biomass in CEE pre-acces-

sion countries is generally restricted to places where cheap industrial waste-wood from the biomass-processing industry is available, and to private forest ownership.



Small-scale biomass boilers for residential use

Financial Issues

In Slovenia the preconditions for a biomass dissemination programme exist, the use of biomass as a national renewable resource is politically accepted, different biomass projects have been realised under the Phare and INTERREG programmes, and subsidies for biomass district-heating and for small-scale biomass boilers are provided by the Slovenian government.

The situation in Hungary is still characterised by very low costs for natural gas, which reduces the chances of broad dissemination of renewables in the heating market.

The INCO-COPERNICUS programme, which financed this project, focuses on specific research, technological development and demonstration in the field of technological co-operation with third countries of Central and Eastern Europe (CEE) and the Newly Independent States (NIS).

Impact, Results

Three different types of biomass demonstration units have been set up at six sites in the two countries; they are open to individual visitors, groups, schools and decision-makers in order to make the relevant information accessible to potential users. A measurement programme analysing the emissions of biomass boilers accompanies the project. Finally, the practical utilisation of biomass in producing thermal energy for households is demonstrated in practice, and information on the importance of biomass as a renewable, indigenous source of energy is provided.

The members of the consortium carrying out the project come from Austria, Germany, Hungary and Slovenia.

Contacts

OEAR Regionalberatung GesmbH
Landtechnik Weihenstephan
St. Istvan University Gödöllő
ApE, Energy Restructuring Agency

Installation and Demonstration of EU Solar Technology for Hot Water Production in Bulgaria and in the Ukraine

Background

The meteorological preconditions for the use of solar energy in both Bulgaria and the Ukraine are much better than in Austria. The southern oblasts (districts) of the Ukraine, as well as the Crimea,

receive 1,450 kWh/m²/a, which is about the same as the amount of irradiation received by the whole Black Sea region. Maximum irradiation in the south-east of Bulgaria is 1,600 to 1,650 kWh/m²/a.

European Aspects

The main aim of the INCO-COPERNICUS Programme of the Fourth Framework Programme is to enable the Central and Eastern European Countries and the Newly Independent States (CEE/NIS) – whose levels of development differ widely – to be associated with the generation of knowledge and innovative

technologies needed to solve their specific problems and to achieve sustainable economic development.

The members of the consortium carrying out the present project come from the Austria, Bulgaria, Greece and the Ukraine.

Project Description

The main objectives of this solar demo project are to demonstrate the western technical state of the art in the use of thermal solar technology by installing three solar demonstration units both in Bulgaria and in the Ukraine to demonstrate typical EU standards, and to transfer solar know-how from the EU to CEE/NIS countries by way of lectures,

planning workshops and practical application.

Furthermore, a measurement programme was carried out in Bulgaria and in the Ukraine; the results were compared with measurements gained in the participating EU countries.



Thermal solar collectors for hot water preparation on the roof of a house



There is a high potential for large scale solar installations in Bulgaria and in the Ukraine.

Non-technical Aspects

The situation in CEE countries is characterised by:

- an unclear situation regarding building permits, as well as other bureaucratic barriers;
- the lack of government support for solar technology, regarding research and technological development, as well as investments;
- the fact that most solar components are not available nationally but have to be imported from the West.

Furthermore, in Bulgaria it is still forbidden to use polypropylene glycol as anti-freeze in solar installations.

Financial Issues

The framework conditions in CEE/NIS countries are generally dominated by three economic facts:

- comparably low prices for competing energy sources (e.g. electricity: 3.5 ct/kWh);
- price regulation (government subsidies for private households);
- a low level of income, i.e. limited potential for investment.

Based on these facts, the calculated payback-time for the costs of Western European solar installations would be at least 35 years; the actual payback time under the present project ranges from 8 to 12 years, depending on local conditions.

Impact, Results

In addition to the actual installation of three SOLAR demonstration units in each of the two countries, a permanent

measurement programme will lead to the production and publication of specific information materials.

Contacts

OEAR Regionalberatung GesmbH
 NIMH - National Institute of Meteorology & Hydrology
 BTU - Bioresource Technology Unit, TU Athens
 FUTURE AGE ENERGY Info & Publishing Centre
 Institute for Energy Saving and Energy Management

Solar Plant for Domestic Hot Water Preparation in Bulgaria

Background

Delta is a Bulgarian tourism company with hotels on the Black Sea coast. In one of its hotels in Burgas the gas boiler had to be repaired in April 2001. The owner decided to install a solar plant for the preparation of domestic hot water. The motivations for this investment were lower operating costs on the one hand, and the possibility of covering energy peaks and avoiding bottlenecks

in domestic hot water preparation by means of a large hot water storage tank on the other. The solar plant contributes to a higher level of convenience as the organisational effort of purchasing propane-butane gas bottles is minimised. Six weeks after the customer inquiry the solar plant was installed and ready for operation.

Project Description

The hotel has 600 beds. Prior to the installation of the solar plant, domestic hot water preparation was carried out by a 250 kW gas boiler (propane-butane gas); seven 2,000 litre tanks were used for hot water storage. In the course of the renovations a solar collector area of

100.8 m² was installed on the flat roof of the hotel, and the old installation was repaired.

According to the manager, 40 % of the hotel's fuel consumption were saved in the first year of operation.

Non-technical Aspects

In the year of 2000 OVEKA 92, an engineering company in Sofia got informed of the highly developed solar market in Austria and started to promote this technology in Bulgaria. This was actually a follow up of the project introducing consumption-based billing in district heating in Sofia, technically realised by OVEKA 92. The Austrian collector producer Ökotech was identified by a tender and immediately offered it's support through a training course for the staff of OVEKA in installing, operating and

maintaining a large-scale solar heating plant.

In 2002 a pilot project was developed by OVEKA and Techem to demonstrate economical benefits of solar energy in comparison with electricity in the housing sector. This 120m² installation was the first commercial installation in Bulgaria supplying an apartment building (with 78 flats) with hot water and realised through a third party financing concept.



*Hotel Delta in Burgas, Bulgaria,
with solar collectors mounted on the roof*



*100.8 m² solar collector area
on the flat roof of the hotel*

Financial Issues

As there were no state subsidies for investment in renewable energy technologies available, the plant was financed by the company's own resources. The total cost of the plant, including the modernisation of the existing boilers, amounted to € 29,000. OVEKA in installing, operating and maintaining a large-scale solar heating plant.

In 2002 a pilot project was developed by OVEKA and Techem to demonstrate economical benefits of solar energy in comparison with electricity in the housing sector. This 120m² installation was the first commercial installation in Bulgaria supplying an apartment building (with 78 flats) with hot water and realised through a third party financing concept.

Impact, Results

Households in Bulgaria are not supplied with natural gas, as is the case in most other European countries. Besides district heating electricity is the major source for domestic hot water preparation and space heating. This leads to overloads of the electricity grids, mainly in winter months.

Solar energy is economically competi-

ve with electricity. There is a high potential for large-scale solar installations for water and space heating in hotels, hospitals, residential and office blocks, district heating grids, etc. The increased use of solar energy instead of electric heating would reduce the considerable high variation of loads between summer and winter.

Contacts

OVEKA 92 ood

Rainer Bahn Müller

S.O.L.I.D Gesellschaft für Solarinstallation & Design mbH

Ökotech Produktionsgesellschaft für Umwelttechnik mbH

Renewable Energy Networking Project Austria – Czech Republic – Hungary

Background

With about 21 m² of yearly installed solar collectors per 1,000 habitants, Austria is one of the leading countries in Europe in terms of using solar thermal energy. 1.2 % of the total energy demand for hot water preparation and space heating is already being provided by solar thermal collectors. More than 3,000 people are employed in this field.

The good relations between Austria, the Czech Republic and Hungary provide the basis for joint incentive programmes to promote the use of solar energy for low temperature applications in these countries. Meteorological conditions in the Czech Republic and in Hungary are at least as good as in Austria. Energy prices, which are currently relatively low in these two countries, are beginning to rise.

Project Description

In neighbourly co-operation, a network of energy experts from the three neighbouring countries was established: SOLAR-NET, the main goal of which is to support a speedy changeover to renewable energy supply. Information, training, best practice examples and exchange of know-how will form the basis for initiatives to implement new sustainable energy technologies.

The Sluneční Sít project is located in the border region between Lower Austria and the Czech Republic. Under the project, information activities will target different groups of actors that have proved to be important based on Austrian experience: schools, scientific institutions, business, funding institutions, as

well as the population at large. Besides, deployment activities will be launched which will lead to the construction of solar thermal equipment.

The SOLAR-NET II project is based in Vienna, in the Austrian Province of Burgenland and in Western Hungary. A wide range of outputs will be produced within the framework of this project : a quality label for medium- and large-scale solar facilities, workshops, marketing activities, an engineering handbook for large-scale solar facilities, information and awareness raising, vocational training for planners, architects and other occupational groups, as well as an interregional centre for renewable energy sources in Hungary.

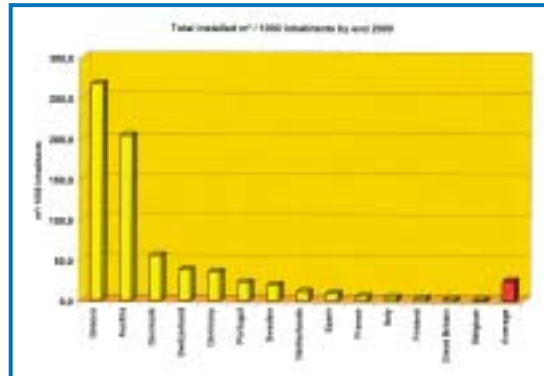
Financial Issues

50 % of the two Interreg III A projects was financed by the EU. The remaining 50 % were paid by the City of Vienna, the Austrian Ministry of Agriculture,

Forestry, Environment and Water Management, the Government of Lower Austria and by Arsenal Research.



Demonstration plant in Břeclav



Total installed solar collector area per 1,000 inhabitants for selected European countries (end of 2000). Austria, together with Greece, is leading the group. Not surprisingly, there is a growing industry and considerable know-how concerning solar technologies in Austria.

Non-technical Aspects

Once these projects have been finalised, their success will depend, in the first place, on the number of people who can be convinced that renewable sources of energy, especially solar thermal applications, are valid alternatives to conventional energy sources, both in economic

and in environmental terms. Therefore it is necessary to reach opinion leaders and politicians, as well as architects and craftspeople. Our job is to convince them by means of best practice examples or thorough training.

Impact, Results

Based on interregional scientific co-operation, these projects will have a substantial impact on education and training systems. Furthermore, the creation of new employment opportunities in an

expanding sector, as well as the development of new professions (solar fitter, solar architect, etc) are essential aspects of these projects.

Contacts

Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.
 CALLA
 VERONICA
 Széchenyi István University

District Heating Project in Banská Bystrica, Slovakia

Background

Steirische Fernwärme Ltd., a subsidiary of Energie Steiermark Holding, was founded in 1995 as one of the successors to STEWEAG, the former regional utility. Today Steirische Fernwärme, together with its subsidiaries and interests, provides energy services ensuring reliable heat supply to 25 towns, cities and regions in Austria, Slovakia, the Czech Republic, Slovenia and Hungary.

Steirische Fernwärme carried out an ecologically exemplary project in the

84,000-inhabitant town of Banská Bystrica from 1995 to 2002. The project involved completely renovating Radvan, the town's largest, but outdated, district heating plant with a 7 km network of pipes. Requiring a total investment of around € 10 million, Radvan was the most comprehensive municipal energy project which Slovakia had ever seen. Today Steirische Fernwärme supplies reliable, eco-friendly heat to over 23,000 households and companies in Banská Bystrica.

Project Description

The aim of the ambitious project was to streamline the obsolete plant and to save primary energy, thus achieving drastic reductions in emissions and stabilising district heating tariffs for the customers. Not only did the project succeed in meeting these goals, but it also cut heating costs for consumers thanks to the overall savings achieved, even though energy costs have generally risen in Slovakia since 1995 due to an average inflation rate of 25 per cent.

As advanced control systems and meters have been installed, customers now also benefit from fair billing for the first time; bills are no longer based on the size of their flats but on actual power consumption. Furthermore, Steirische Fernwärme guarantees its Slovak customers a previously inconcei-

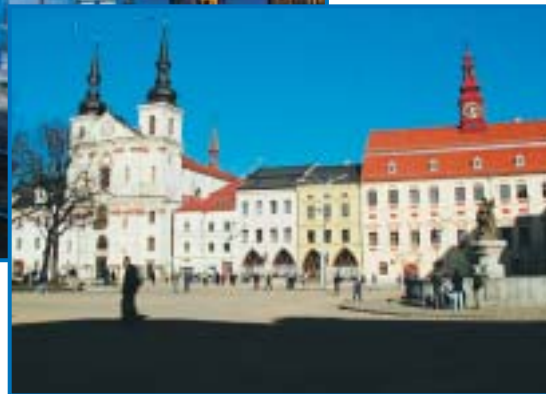
vable, 100 per cent fail-safe supply.

Savings finance investment for the future:

Steirische Fernwärme's main services in this project included providing expertise, technology, capital and strategic project controlling. In concrete terms, the company was responsible for the modernisation of the generation plant and substations, the hydraulic control of the central heating systems, district heating supply according to actual heat requirements, and the installation of state-of-the-art meters. Since it was primarily the local construction industry and various service companies that carried out the work, the project created jobs and therefore had a beneficial economic effect on the region as a whole.



Night view of the district heating plant Radvan, Slovak Republic



The town of Banská Bystrica, Slovak Republic

Financial Issues

This energy performance contracting project primarily finances itself from the day-to-day savings. The level of savings was agreed in the contracts and lies at

25 to 30 per cent. The Slovak Energy Agency confirms that all the other conditions stipulated in the contracts have been met as well.

Impact, Results

With this project, Steirische Fernwärme has completed the largest municipal power project ever to be carried out in Slovakia. As a result, Steirische Fernwärme has gained an excellent reputation as a reliable heating provider.

As far as Steirische Fernwärme is concer-

ned, close co-operation with the local authority was of prime importance in this project in order to provide environment-friendly, cost-effective and safe heating for the population. Following the example set in Banská Bystrica, a dozen other projects have since been initiated in Slovakia.

Contacts

Steirische Fernwärme GmbH

Sofia District Heating

Background

About half a million Bulgarian households are supplied with district heat, making Bulgaria one of the biggest European markets in this sector. As in other Central and Eastern European Countries, heating bills in Bulgaria were independent of actual consumption until the nineties.

The average household's annual costs for space and water heating amount to just under one-third of its annual income.

It was against this background that the Austrian Federal Chancellery, which was then in charge of the "Ostzusammenarbeit" initiative, commissioned the consortium iC Consulente – Techem together with its Bulgarian partners, to carry out all necessary technical and organisational measures for the introduction of consumption-based billing in a district of Sofia.

Project Description

Between October 1998 and the end of 1999, the basis for transparent billing was created by equipping 1,340 flats with thermo-valves and heating cost distributors and by adjusting the installations in the buildings to operate efficiently and economically.

In the course of the pilot project, the necessary equipment could be installed in 95 % of the specified flats in the district. The required investment was financed by the Austrian Ministry for

Foreign Affairs (the relevant fund was originally managed by the Federal Chancellery).

Among the key factors for the success of the project were the adjustment of billing systems and the elaboration of a concrete legal framework. The experience gained in the project, as well as Techem's experience in heat billing in many European countries, was integrated into the relevant legislation.

Non-technical Aspects

The greatest difficulty turned out to be the large number of households which had to be approached individually. Unlike in many other European countries, most buildings in Bulgaria are not centrally owned or managed; almost all

flats in the country are individually owned. The Sofia District Heating Company therefore has to manage approximately 350,000 separate supply contracts with individual households.



Equipping flats with thermo-valves and heating cost distributors results in remarkable savings of the heating costs.

Financial Issues

The conversion costs per flat amounted to approximately one monthly salary. This investment paid off within less than 18 months by way of energy savings.

In addition to providing support in introducing consumption-based billing, this pilot project has demonstrated how substantial savings and major investments can be initiated at very low cost (the overall project costs amounted to approximately € 440,000). The new technical conditions and the introduction of consumption-based billing have resulted in savings of 30 % of the original heating costs, which is considerable by European standards.

Impact, Results

Even before the end of the project, Techem set up a registered office in Sofia.

Together with its partners, Techem has meanwhile equipped about 100,000 flats with thermo-valves and heating cost distributors. This has resulted in energy savings of about 30 % on average, or a total of 370,000 MWh annually, which is equivalent to the heat requirement of another 30,000 flats.

The average annual costs for district heat and hot water per household have thus been reduced from € 350 to € 250, saving each family almost a whole monthly salary in energy costs.

Contacts

Rainer Bahnmüller
iC Consulenter
Techem
Techem Bulgaria
Toplofikacia Sofia

Up to 30 % Energy Saved by Thermostatic Valves in Komárno, Slovakia

Background

In the mid-nineties a housing co-operative in the southern Slovakian town of Komárno launched a comprehensive refurbishment scheme for its prefabricated housing blocks – a type of building that spread throughout Eastern Europe in the time between 1965 and 1975. The objective was to improve the unsatisfactory room temperature at the lowest possible cost.

Before awarding the contract, the co-operative examined different options, such as additional inside and outside

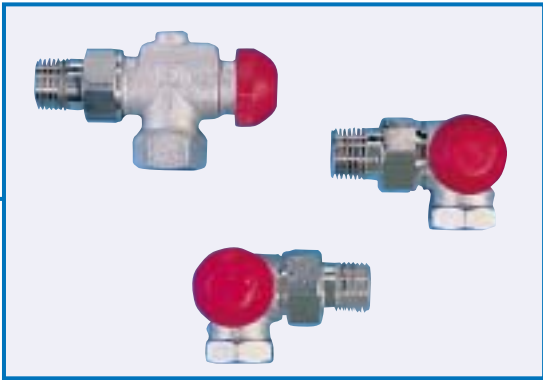
insulation, replacing windows and doors, and refitting the heating system. Having calculated the costs and benefits of each option, the co-operative decided to equip the existing sectional steel radiators and panels with thermostatic valves and thermostats. In addition, each radiator was to be fitted with a vaporiser-heat counter. The pipes of the two-pipe system were to be left in place, too, but the heating circuits were to be equipped with automatic balancing valves and metering stations for hydraulic adjustment.

Project Description

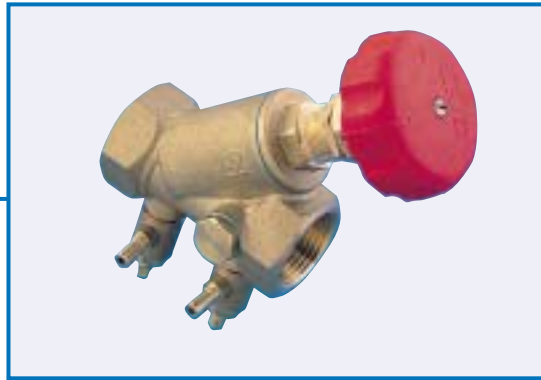
In spring 1995 Herz's Slovakian subsidiary, Herz Bratislava s.r.o, was commissioned to re-equip the heating systems in 92 housing blocks comprising a total of almost 4,000 flats. Heat loss calculation and balancing set up was calculated by the balancing software of HERZ s.r.o. All of these flats were fitted with Herz thermostatic valves from the TS-90-V series and with Herz 7260 thermostat heads. In order to ensure precise water distribution, Herz STRÖMAX M balancing valves were also installed in each building. Fitting started in July 1995 and was car-

ried out in three stages.

In a first step, the radiator flow pipes were fitted with presetable thermostatic valves and thermostat heads for hydraulic adjustment. In a second step, Herz 4002 automatic differential-pressure controllers were installed in the rising pipes. Finally, balancing valves and metering stations were installed in each building in order to ensure precise water distribution.



Herz products such as TS-90 thermostatic valves helped to achieve energy savings of up to 30 % in the Komárno project



Hydraulic adjustment by means of Herz STRÖMAX M section control valves ensures balanced energy distribution in the refitted housing blocks

Non-technical Aspects

The recorded figures have led to energy savings of up to 30 % annually. The residents' investment, which they financed out of their own pockets, paid off after only two years.

Furthermore, balanced energy distribution to all flats has been ensured by means of hydraulic adjustment. Before the refitting project, there were considerable fluctuations and many flats were either oversupplied or under-supplied, depending on their location within the block.

Financial Issues (average values)

- 43 flats per block
- 63 m² per flat
- € 95 investment per flat (one-off)
- 2,049 kWh annual energy savings per flat
- € 59 annual reduction in heating costs per flat, which is about one third of annual heating costs

Impact, Results

Following the example of Komárno, 70,000 more flats have been refitted in Slovakia over the last few years. This corresponds to € 4.12 million in energy savings per year. Another 25,000 flats can now be heated with the 157 million kWh saved annually.

Herz is currently planning similar projects in other Eastern European countries and in some CIS countries. Given

the comparable prefab building techniques and the common heating system, similar refitting projects are feasible and would make sense in the Ukraine, in Russia and in many other countries. Considerable benefits can thus be achieved at low cost: energy savings (and thus, financial savings), enhanced quality of living and environmental protection.

Contacts

HERZ Armaturen Ges.m.b.H.
HERZ Bratislava s.r.o.

Modernisation of the Lozovo District Heating Plant near Burgas, Bulgaria

Background

Boiler plants in CEEC are often older than 20 years and maintenance work has mostly been restricted to large units such as boilers. The use of measuring technology has usually been limited to the absolute minimum and only the

most basic control systems for automation have been employed, and almost exclusively in large power plants. This has resulted in low quality of service and low efficiency on the one hand and high emission levels on the other.

Project Description

The Lozovo district heating plant operates four boilers. In order to keep project costs as low as possible, the investment was limited to the necessary actuators and to measuring and automation technology. As both the boilers and the burners were fairly new they could be used without adaptation thanks to special adjustment and control methods.

A separate automation system was installed for each boiler. Each of these systems independently controls and adjusts all functions of the respective boiler, such as combustion chamber pressure and air-fuel ratio.

Another system optimally distributes the current total heat requirement, which is calculated by means of statistical process control, to the boilers in operation. An additional control system is employed for additional installations, such as a de-aerator and a water treatment plant. Among other things, this system ensures a constant water quality and records and replaces any water loss.

Furthermore, all of these control systems are connected to three computers. Two of these serve as control stations for the entire plant (including starting the boilers), and one is used to process the data for statistical process control.

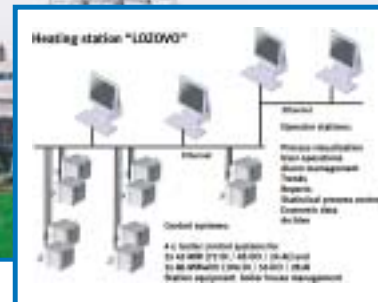
Non-technical Aspects

In addition to using up-to-date hardware, it was essential to develop methods and algorithms tailored to the specific requirements of such boiler plants. While the existing standard solutions were technically adequate, they failed to take the economic aspect into account.

In co-operation with Sofia Technical University, algorithms have therefore been developed which also evaluate the individual operating points of a boiler from an economic point of view.



The heating plant Burgas



Structure of the control system

Financial Issues

The total investment amounted to approximately € 140,000 and was raised entirely by the district heating plant. However, as the project was carried out in several steps over a period of three years and as about € 50,000 was saved in fuel costs in the first year alone, the actual capital requirement was only about € 73,000 over a period of 2.5 years.

Impact, Results

Due to sustainable fuel savings of approximately 10 %, the investment paid for itself after just over one year. Boiler efficiency could be increased by about 2 %. The resulting increase in return now makes it possible to operate the district heating plant without major government subsidies even though end user prices continue to be fixed by the state.

Finally, this plant has provided a model for many similar projects in Bulgaria.

Contacts

Festo Ges.m.b.H.
Toplofikazia Burgas EAD

The World Bank Group – KYJOV (CZ): CO₂ Mitigation Project

Background

In 1998 a combined-cycle heat and power plant (CHP) was constructed on the site of the glass bottle manufacturer Vetropack Moravian Glass (VMG). The CHP utilises waste heat from two gas turbines and from the glass furnaces of the factory for heat and power production.

The project was supported by the Global

Environment Facility (GEF) and financed by the World Bank. For this reason an Environmental Impact Assessment (EIA) was necessary in order to get the project approved. As the Czech EIA did not suffice for project assessment, the World Bank ordered KWI to carry out an EIA according to Category A rules (full EIA).

Project Development Objectives (non-technical aspects)

The core component of the project is the construction of a new CHP plant. This is a combined heat and power plant using combined-cycle technology with a nominal output of 23 MW electricity and 18.5 MW heat, including excess process heat drawn from VMG.

The plant is equipped with two gas turbines with a nominal output of 16 MW of electricity; an exhaust gas boiler; a condensing bleeder turbine with a nominal output of 10 MW of electricity; a 22 kV transformer station; a water treatment plant; heat exchangers and

pumps; and a hot water pipeline connection. The CHP uses waste heat and natural gas as primary fuel input.

In addition, the operating company, Teplárna Kyjov, a.s., supplies the district heating network of the city of Kyjov with heat. For this purpose, existing local area district heating networks have been interconnected, modernised and expanded and the old boilers have been replaced by heat exchanger stations which are now supplied with heat from the CHP.



Inside view: One of the two gas turbines with a nominal output of 16 MWe



The glass bottle manufacturer Vetropack Moravian Glass, CZ

Financial Issues

The whole project amounts to about 24.9 million US\$, including the costs for personnel training and project supervision.

Contacts

KWI Management Consultants & Auditors GmbH

Holistic Building Technology for Pharmaceutical Pioneer in Croatia

Background

PLIVA d.d. is a highly successful pharmaceutical company with its headquarters in Zagreb. The company produces pharmaceutical products for human and veterinary use, foodstuffs, pesticides, cosmetics and hygiene products. It has received a number of awards for exceptional performance in the past. This success is highlighted by PLIVA d.d.'s plans

to expand to ex-Yugoslavia, Europe and the United States. With the completion of the new production facilities for solid oral forms in Zagreb, Pliva d.d. has broken new ground. For the first time in the history of the company, a significant large-scale investment was made with a general contractor: VA Tech Elin EBG.

Project Description

The most modern pharmaceutical production facility in Europe was completed on the basis of the Elveco-Lhoest technology and of a design by a Croatian company.

During the construction of this facility, VA Tech Elin EBG was commissioned with a variety of tasks requiring special know-how on technical building equip-

ment, media supply and the entire interior construction of the pharmaceutical solid oral forms production facility. At the same time, parts of an existing building were renovated in accordance with the norms of "Good Manufacturing Practice" (GMP), new systems were integrated into existing networks and high energy efficiency could be reached.

Non-technical Aspects

The peculiarities of each individual project always pose special challenges for the project team. As Pliva d.d. has also been successful in developing new solid substances, this project was a challenge for everyone involved with respect to material selection, qualitative design of the clean rooms, and production logistics. Another difficulty consisted in the

fact that some of the assembly work had to be completed in production areas under clean-room conditions during the operation of the plant. Based on the success of this large-scale project, activities in the Croatian market will be continued in future by a newly founded VA Tech Elin EBG branch office in Zagreb.



Part of the heating and cooling station



Night view of PLIVA d.d. pharmaceutical company

Financial Issues

The whole project amounted to € 26.6 mill.

Impact, Results

Based on the basic design, detail engineering was completed by VA Tech Elin EBG and by Croatian designers. Croatian subcontractors under Austrian supervision were responsible for the assembly and start-up of the facility. Materials were delivered by companies from throughout Europe.

VA Tech Elin EBG was responsible for the engineering, delivery, assembly and start-up of the following systems:

- heating, air-conditioning, ventilation, sanitary installations
- compressed air, sprinkling system, sewer
- pure water and pure steam
- solvents
- cooling water and steam systems
- process control systems for building equipment and media supply
- interior construction – partially with clean-room technology
- elevator systems
- heavy-current engineering
- power factor correction system
- main lines and cabling
- light and electrical outlet installations
- diesel emergency power generator
- uninterrupted power supply system
- communications engineering (fire alarm system, safety and telecommunications system, access control system)

Contacts

VA Tech Elin EBG GmbH

Energy Efficiency Measures in the Hungarian Furniture Industry

Background

sattler energie consulting has been providing energy consultancy services for Austria's largest manufacturer of beds and furniture for several years. After completion of energy optimisation measures at its Austrian plants, this company's internal "Factor 4" energy efficiency programme was to be extended to its plant in Hungary.

As there were also plans for the further expansion of this plant, the aim was to provide the additional capacity required for the new installations by way of efficiency measures, according to the slogan "Nega-watts, not megawatts".

Non-technical Aspects

In Hungary the power component is a significant cost factor in electricity bills. In 2001 the difference between the power requirement notified in advance to the provider and the amount of power actually required still gave rise to significant additional costs.

An analysis of the relevant data showed that the plant's power requirement largely follows a seasonal cosine curve, combined with a certain linear increase corresponding to the growth in production.

Significant additional savings could be achieved by notifying optimal power values for each month, calculated on the basis of a simulated annual load curve.

Project Description

By means of the multi-channel load distribution analysis developed by *sattler energie consulting*, the individual consumers within the plant and their energy requirements over time were charted, showing how much energy was needed, and when and where it was needed, consumed or even wasted. On this basis, the following measures were developed:

- By optimising the drying ovens, about 40 % energy was saved as compared to the former, unregulated drying process.
- In the field of compressed air, network pressure was reduced from 8.5 bar to 7

bar without interfering with production.

- During the afternoon and night shifts, when only parts of the plant are in operation, lighting, ventilation and extraction are now only provided in those areas while the rest of the plant is shut down.
- By means of load control measures the overall capacity level could be maintained or even reduced despite the considerable expansion of the plant.



Actual and simulated load curves show that the plant's power requirement largely follows a seasonal cosine curve, combined with a certain linear increase.

By means of the multi-channel load distribution analysis, the individual consumers within the plant and their energy requirements over time can be charted.

Financial Issues

Due to organisational measures such as regular leakage checks, pressure reduction and simulated annual load curves, and to the savings achieved as a result of not having to increase capacity, funds for energy-saving investments have become available.

Actual costs have primarily arisen from

additional energy-saving investments (e.g. frequency converters and residual-moisture-based control of drying ovens) and for other control measures such as interconnected control units for compressors, load control for capacity optimisation, etc.

Impact, Results

Capacity was already at 790 kW in January 2001; however, the maximum in December 2001 was only 814 kW, despite an additional installed capacity of 150 kW (simultaneous capacity: approximately $150 \times 0.4 = 60$ kW), showing that savings of 36 % can actually be achieved by restricting the use of the wood chipper and by using it at off-peak times. Another 44 kW was saved by means of

load management. Increased efficiency of production is more difficult to prove as both seasonal fluctuation and production volume play a central role here. On the basis of calculations, savings of 10 to 15 % can be assumed; as these measures have only just been implemented, no reliable figures are as yet available.

Contacts

sattler energie consulting

Austria's Financial Support of Environmental Projects Abroad

Instruments and Approaches

As in previous years, environmental projects in Slovakia, Hungary, Slovenia and the Czech Republic were supported under the Austrian Support Scheme for Environmental Projects Abroad in 2001. This programme, which Kommunalkredit Austria AG manages on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water Management, has provided a framework for supporting environmental projects outside Austria since 1993. A total of 199 projects (including 13 in 2001), representing a subsidy volume of € 38.8 mill. and environmentally relevant investments worth € 231.1 mill., were approved between 1993 and 2001. These projects, which are exclusively located in four of Austria's neighbouring countries, the Czech Republic, Slovakia, Hungary and Slovenia, are subsidised at a rate of 10 to 15 % of the investment costs.

Whereas in the initial phase, support was chiefly granted for studies and conceptual work, the focus has been on concrete implementing measures in the areas of waste water, air pollution avoidance (e.g. installing flue gas purification systems in existing power plants) and energy production in recent years. In the latter area, measures such as the expansion of district heating networks, biomass-fuelled generating facilities, and CHP plants have increasingly been funded.

One example is the replacement of the existing, brown-coal-fired boiler of the district heating plant at Bystřice, Czech Republic, by a biomass-fired one. The changeover to biomass has led to a considerable reduction in CO₂ emissions and has also contributed to reducing SO₂, CO, dust and NO_x emissions. The project is also going to be prepared as a Joint Implementation Pilot Project in order to gather experience in this new field; the necessary preparation work is being carried out in co-operation with the project's planner.

Applications for funding under the Support Scheme for Environmental Projects Abroad can be submitted by local or regional government authorities or companies in one of the four countries mentioned above. The applicant must operate a plant which has negative environmental effects on Austria. Furthermore, the measure to be supported must have a positive impact on the environmental situation in Austria. As a result of this requirement, only projects in the vicinity of the Austrian border can be supported under the programme. As another essential requirement, funding applications must be received by Kommunalkredit before the start of the project in question.

In accordance with the amending law for the Environmental Support, which came into effect in April 2002, the Support Scheme for Environmental Projects Abroad is now also used to support Austria's climate strategy. In future, funding for relevant measures to be implemented within the framework of the Flexible Instruments of "Joint Implementation" or "Clean Development Mechanism" provided by the Kyoto Protocol will be possible under the Support Scheme, in addition to a separate Federal JI/CDM programme which is currently being set up. The group of countries eligible to benefit from the Austrian Support Scheme for Environmental Projects Abroad has been extended for the purposes of such projects. The funding regulations are currently being adapted accordingly.

Together with the planned Austrian JI/CDM programme, the Austrian Support Scheme for Environmental Projects Abroad will thus continue to be an interesting instrument for the promotion of environmental protection outside Austria.

For further information on the Support Scheme for Environmental Projects Abroad, please contact:

Alexandra Amerstorfer
Kommunalkredit Austria AG

Contact Addresses for Projects Described in this Brochure

(in alphabetical order)

Agiplan Planungsgesellschaft Ges.m.b.H.

Schwarzenbergplatz 7
A-1030 Wien
Phone: +43 1 / 98166 23
Fax: +43 1 / 98166 30
E-mail: agiplan@agiplan.co.at
Internet: www.agiplan.co.at

ApE, Energy Restructuring Agency

Lojze Subic
Litijška cesta 45
SI-1000 Ljubljana
Phone: +386 1 / 586 38 72
Fax: +386 1 / 586 38 79
E-mail: lojze.subic@ape.si
Internet: www.ape.si

BDI Anlagenbau GmbH

Wilhelm Hammer
Eduard-Ast-Straße 1
A-8073 Feldkirchen / Graz
Phone: +43 316 / 240 23 79
Fax: +43 316 / 240 23 75
E-mail: bdi@biodiesel-intl.com
Internet: www.biodiesel-intl.com

BTU - Bioresource Technology Unit National Technical University of Athens Department of Chemical Engineering

Prof. Emmanuel Koukios
Zografou Campus
GR-15700 Athens
Phone: +30 1 / 772 31 91
Fax: +30 1 / 772 31 63
E-mail: koukios@chemeng.ntua.gr
Internet: www.chemeng.ntua.gr

Bundesanstalt für Landtechnik

Manfred Wörgetter
Rottenhauserstraße 1
A-3250 Wieselburg
Phone: +43 7416 / 521 75 30
Fax: +43 7416 / 521 75 45
E-mail: manfred.woergetter@blt.bmlfuw.gv.at
Internet: www.blt.bmlf.gv.at

CALLA

Sdružení pro Záchranu Prostředí
Edvard Sequens, Dalibor Straský
Fráni Srámka 35
CZ-37004 České Budějovice
Phone: +420 38 / 73 10 166
Fax: +420 38 / 73 10 166
E-mail: calla@ecn.cz

CEA-Czech Energy Agency

Irena Plocková
Vinohradská 8
CZ-12000 Praha 2
Phone: +420 2 / 242 177 14
Fax: +420 2 / 242 177 01
E-mail: cea@ceacr.cz
Internet: www.ceacr.cz

CHP-Centre Bratislava Slovak Energy Agency

Martin Bella
Bajkalská 27
SK-827 99 Bratislava
Phone: +421 2 / 582 48 203
Fax: +421 2 / 534 21 019
E-mail: martin.bella@sea.gov.sk
Internet: www.sea.gov.sk

Elektrownie Szczytowo-Pompowe S.A.

Ryszard Krasicki
ul. Panska 73
PL-00 834 Warszawa
Phone: +48 22 / 620 11 81
Fax: +48 22 / 624 25 55
E-mail: esp@ikp.atm.com.pl
Internet: http://www.elsp.com.pl

Energetika Ravne d.o.o.

Mojca Kert Kos
Koroška cesta 14
SI-2390 Ravne na Koroškem
Phone: +386 2 / 870 61 00
Fax: +386 2 / 870 61 06
E-mail: mojca.kos@siol.net
Internet: www2.siol.net/ext/energetika/index1.htm

E.V.A. - the Austrian Energy Agency

Alois Geisslhofer
Otto-Baueß-Gasse 6
A-1060 Wien
Phone: +43 1 / 586 15 24 33
Fax: +43 1 / 586 15 24 40
E-mail: geisslhofer@eva.ac.at
Internet: www.eva.ac.at

Energoinvest-Energoinzenjering

M. Pasic
H. emerli a 2
BiH-71000 Sarajevo
Phone: +387 71 / 618 174
E-mail: ening@bih.net.ba
Internet: www.internet.ba/comet_energo-invest

European Bank for Reconstruction and Development

Felice Maffei
Obala Kulina Bana 4
BiH-71000 Sarajevo
Phone: +387 71 / 667 945
E-mail: projectenquiries@ebrd.com
Internet: www.ebrd.com

ETA Energieservice GMBH

Harald Himmler
Eduard Bodem Gasse 6
A-6020 Innsbruck
Phone: +43 512 / 346 644
Fax: +43 512 / 346 645
E-mail: eta.energie@tirol.netwing.at
Internet: www.maximpowercorp.com

Federal Ministry of Agriculture, Forestry, Environment and Water Management

Stubenbastei 5
A-1010 Wien
Phone: +43 1 / 51522 0
Internet: www.lebensministerium.at

Festo Ges.m.b.H.

Friedrich Mikuska
Lützowgasse 14
A-1140 Wien
Phone: +43 1 / 910 75 168
Fax: +43 1 / 910 75 250
E-mail: mikuska@festo.at
Internet: www.festo.at

FUTURE AGE ENERGY Info & Publishing Centre

Andrey Konechenkov
P.O. Box 56
UA-253192 Kiev

Phone: +380 44 / 274 30 17
Fax: +380 44 / 241 70 38
E-mail: fae@fae.kiev.ua

HERZ Armaturen Ges.m.b.H.

Gerhard Glinzerer
Richard-Strauss-Straße 22
A-1230 Wien
Phone: +43 1 / 616 26 31 0
Fax: +43 1 / 616 26 31 27
E-mail: office@herz-armaturen.com
Internet: www.herz-armaturen.com

HERZ Bratislava s.r.o.

Vendelin Hozzank
Rezedova 1
SK-820 07 Bratislava 27
Phone: +421 2 / 43 42 19 74
Fax: +421 2 / 43 41 30 74
E-mail: herz@tecton.sk

Institute for Energy Saving and Energy Management

National Technical University Kiev
Prof. Arthur Prakhovnik
Borshchagovskaya 115
UA-252056 Kiev
Phone: +380 44 / 241 70 37
Fax: +380 44 / 241 70 38
E-mail: avp@tcem.ntu-kpi.kiev.ua

Jenbacher AG

Teki Suajibi
Achenseestraße 1-3
A-6200 Jenbach
Phone: +43 52 / 44 600-26 24
Fax: +43 52 / 44 600-26 24
E-mail: t.suajibi@jenbacher.com
Internet: www.jenbacher.com

J.P.Elektroprivreda BiH

Emir Avdi
Vilsonovo Setaliste 0
BiH-71000 Sarajevo
Phone: +387 33 / 610 394
E-mail: hidro@ep.org.ba
Internet: www.elektroprivreda.ba

Kohlbach Heizkessel- & Industrieanlagenbau

Walter Kohlbach
Grazer Straße 26-28
A-9400 Wolfsberg
Phone: +43 52 / 21 57 0
Fax: +43 52 / 21 57 11
E-mail: office@kohlbach.at
Internet: www.kohlbach.at

Kommunalkredit Austria

Alexandra Amerstorfer
Türkenstraße 9
A-1092 Wien
Phone: +43 1 / 31 631 240
Fax: +43 1 / 31 631 104
E-mail: a.amerstorfer@kommunalkredit.at
Internet: www.kommunalkredit.at

Kössler Ges.m.b.H.

Werner Panhauser
Hauptstraße 122
A-3151 St. Pölten – St. Georgen
Phone: +43 2742 / 885 272
Fax: +43 2742 / 884 626
E-mail: office@koessler.com
Internet: www.koessler.com

KWI Management Consultants & Auditors

Manfred Stockmayer
Burggasse 116
A-1070 Wien
Phone: +43 1 / 52 520 200
Fax: +43 1 / 52 520 266
E-mail: ms@kwi.at
Internet: www.kwi.at

Landtechnik Weihenstephan

Technical University Munich
Prof. Arno Strehler
Phone: +49 8161 / 71-35 27
Fax: +49 8161 / 71-35 27
E-mail: strsek@tec.agrar.tu-muenchen.de
Internet:
www.tec.agrar.tu-muenchen.de/landtech/

Milo Olomouc a.s.

Petr Seifert
Hammerska 50
CZ-783 71 Olomouc
Phone: +420 68 / 512 7113
Fax: +420 68 / 512 7187
E-mail: vavrova@lukana.cz

**NIMH - National Institute for Meteorology
& Hydrology
Bulgarian Academy of Sciences**

Peter IVANOV
Tsarigradsko Chaussee 66
BG-1784 Sofia
Phone: +359 2 / 975 39 86
Fax: +359 2 / 988 44 94
E-mail: peter.ivanov@meteo.bg
Internet: www.meteo.bg

NIS-Naftagas

Narodnog Fronta 12
YU-21000 Novi Sad
Phone: +381 21 / 481 - 1111
Fax: +381 21 / 481 - 4345
E-mail: naftagas@EUNet.yu
Internet: www.nis-naftagas.co.yu

ÖAR Regionalberatung GesmbH

Günther Schwärzler
Weiglsgasse 19/26
A-1150 Wien
Phone: +43 1 / 893 55 77
Fax: +43 1 / 893 55 77
E-mail: schwaerzler@oear.co.at
Internet: www.oear.at

OMV Cogeneration GmbH

Andreas Glatzer
Gerasdorfer Straße 151
A-1210 Wien
Phone: +43 1 / 404 40 - 22 128
Fax: +43 1 / 404 40 - 23 098
E-mail: andreas.glatzer@omv.com
Internet: www.omv.co.at

OVEKA 92 ood

Petar Angelov
bul. W. Lewski 122
BG-1000 Sofia
Phone/fax: +359 2 / 467 471
E-mail: oveka92@abv.bg
Internet: www.oveka92.com

Representation in Austria

Rainer Bahnmüller
Ortnergasse 3/7
A-3400 Klosterneuburg
Phone/fax: +43 2243 / 22 814
E-mail: rainban@web.de

Ökotech Produktionsgesellschaft für

Umwelttechnik GmbH
Asperngasse 16
A-8020 Graz
Phone: +43 316 / 576 077
Fax: +43 316 / 576 077 28
E-mail: oekotech@aon.at

**Österreichisches Forschungs- und
Prüfzentrum Arsenal Ges.m.b.H.**

Brigitte Bach
Faradaygasse 3
A-1030 Wien
Phone: +43 / 50 550 6497
Fax: +43 / 50 550 6390
E-mail: brigitte.bach@arsenal.ac.at
Internet: www.arsenal.ac.at/erneuerbare

sattler energie consulting

Mario Schwab, Peter Sattler
Marktplatz 4
A-4810 Gmunden
Phone: +43 7612 / 73 799
Fax: +43 7612 / 73 799 - 50
E-mail: office@energie-consulting.at
Internet: www.energie-consulting.at

SFC Umwelttechnik GmbH

Konrad Wutscher
Julius Welsler Straße 15
A-5020 Salzburg
Phone: +43 662 / 434901
Fax: +43 662 / 434901 8
E-mail: office@sfcu.at
Internet: www.sfcu.at

S.O.L.I.D. Gesellschaft für Solarinstallation

Hergottwiesgasse 188
A-8055 Graz
Phone: +43 316 / 292 840
Fax: +43 316 / 292 840 - 28
E-mail: office@solid.at
Internet: www.solid.at

**St. Istvan University Gödöllő
Institute of Sanitary and Heating
Technology**

Prof. Istvan Barotfi
Páter Károly út 1
H-2101 Gödöllő
Phone: +36 28 / 415384
Fax: +36 28 / 415384
E-mail: barotfi.kott@mgk.gau.hu
Internet: www.mgk.gau.hu

Steirische Fernwärme GmbH

Peter Trummer
Neuholdaugasse 56
A-8010 Graz
Phone: +43 316 / 3603 - 51010
Fax: +43 316 / 3603 - 21009
E-mail: peter.trummer@fernwaerme.com
Internet: www.fernwaerme.com

Széchenyi István University

Péter Tóth
Hédervári u. 3
H-9007 Győr
Phone: +36 96 / 503 400-3232
Fax: +36 96 / 503 469

Techem GmbH

Florian Angerer
Ortnergasse 3/7
A-3400 Klosterneuburg
Phone: 0650 / 7000214
E-mail: florian.angerer@techem.at
Internet: www.techem.at

Techem Bulgaria

Juliot Curie 20
BG-1113 Sofia
Phone/fax: +359 2 / 963 215 047
E-mail: techem@techem.net

Toplofikacia Burgas

Valjio Dutschev
P.O.B. 642
BG-8000 Burgas
Phone: +359 56 / 871 111
Fax: +359 56 / 871 101
E-mail: office@dhc-bs.com
Internet: www.dhc-bs.com

Toplofikacia Sofia

ul. Jastrebetz 23
BG-1680 Sofia
Phone: +359 2 / 598 135
Fax: +359 2 / 597140
Internet: www.toplo.bg

Urbas Maschinenfabrik GmbH.

Josef Urbas
Billrothstraße 7
A-9100 Völkermarkt
Phone: +43 4232 / 25 21 17
Fax: +43 4232 / 25 21 55
E-mail: Urbas@urbas.at
Internet: www.urbas.at

Slovenská energetická agentúra

Dr. Kvetoslava Soltésová
Rudlovska 53
SK-974 28 Banská Bystrica
Phone: +421 48 / 414 26 56
Fax: +421 48 / 414 23 51

Verbundplan GmbH

Parkring 12
A-1010 Wien
Phone: +43 1 / 536 05 - 54860
Fax: +43 1 / 536 05 - 54748
E-mail: vpl@verbundplan.at
Internet: www.verbundplan.at

VERONICA - Ekologický institut

Yvonna Gailly
Panská 9
CZ-601 91 Brno
Phone: +420 5 / 422 18 351
Fax: +420 5 / 422 10 561
E-mail: yvonna.gailly@ecn.cz

VA Tech Elin EBG GmbH

Hermann Kosiba
Salzburger Straße 287
A-4030 Linz
Phone: +43 732 / 3737-2191
E-mail: hermann.kosiba@elinebg.at
Internet: www.vatechelinebg.at

VA TECH ELIN EBG GmbH

Werner Schoißengeier
Jablanska 56
HR-10000 Zagreb
Phone: +385 1 / 38 62-574
Fax: +385 1 / 38 64-017
E-mail: werner.s@vatech.hr
Internet: www.vatechelinebg.at

VA TECH HYDRO SA

Jean-Pierre Kaufmann
Rue des Deux Gares 6
CH-1800 Vevey
Phone: +41 21 / 925 77 10
Fax: +41 21 / 925 77 03
E-mail: JP.Kaufmann@vatech-hydro.ch
Internet: www.vatech-hydro.com

VA TECH Power & Water GmbH

Anton Rappelsberger
Penzinger Straße 76
A-1141 Wien
Phone: +43 1 / 891 00 - 2668
Fax: +43 1 / 891 00 - 3757
E-mail:
Anton.Rappelsberger@vatech-pw.com
Internet: www.vatech-hydro.com

VOITH SIEMENS Hydro Power Generation

Ernst Bruckner
Linzer Straße 55
A-3100 St. Pölten
Phone: +43 2742 / 806 2638
Fax: +43 2742 / 78646
E-mail: ernst.bruckner@vs-hydro.com
Internet:
www.more-powerful-solutions.com

Contents

<u>Energy Partnerships are Partnerships for Success</u>	<u>2</u>	<u>Installation and Demonstration of EU Solar Technology for Hot Water Production in Bulgaria and in the Ukraine</u>	<u>24</u>
<u>Energy Efficiency and Renewable Energy Sources as Answers to Global Challenges</u>	<u>3</u>	<u>Solar Plant for Domestic Hot Water Preparation in Bulgaria</u>	<u>26</u>
<u>Refurbishment and Uprating of the UNA-Kostela Hydro Power Plant in Bosnia and Herzegovina</u>	<u>4</u>	<u>Renewable Energy Networking Project Austria – Czech Republic – Hungary</u>	<u>28</u>
<u>The Modernisation of the Solina Hydro Power Plant in Poland</u>	<u>6</u>	<u>District Heating Project in Banská Bystrica, Slovakia</u>	<u>30</u>
<u>Modernising Iron Gates I Hydro Power Plant in Romania and Serbia</u>	<u>8</u>	<u>Sofia District Heating</u>	<u>32</u>
<u>BOOT Natural Gas Cogeneration System in Slovenia</u>	<u>10</u>	<u>Up to 30 % Energy Saved by Thermostatic Valves in Komárno, Slovakia</u>	<u>34</u>
<u>CHP Information Centre Bratislava within the Framework of the Slovak-Austrian Energy Partnership</u>	<u>12</u>	<u>Modernisation of the Lozovo District Heating Plant near Burgas, Bulgaria</u>	<u>36</u>
<u>The Banja Rusanda Project in Serbia – A Success for Energy Saving and the Environment</u>	<u>14</u>	<u>The World Bank Group – KYJOV (CZ): CO₂ Mitigation Project</u>	<u>38</u>
<u>Biomass District Heating for Trhové Sviny, Czech Republic</u>	<u>16</u>	<u>Holistic Building Technology for Pharmaceutical Pioneer in Croatia</u>	<u>40</u>
<u>Biomass Project in Bystřice nad Pernštejnem, Czech Republic</u>	<u>18</u>	<u>Energy Efficiency Measures in the Hungarian Furniture Industry</u>	<u>42</u>
<u>Biodiesel from Rape Seed Oil in Olomouc, Czech Republic</u>	<u>20</u>	<u>Austria’s Financial Support of Environmental Projects Abroad</u>	<u>44</u>
<u>Demonstration of Small-scale Biomass Boilers for Residential Use in Hungary and Slovenia</u>	<u>22</u>	<u>Contacts</u>	<u>45</u>

Published by:

Federal Ministry of Agriculture, Forestry, Environment and Water Management
Department for Environmental Economics and Energy Policy
Stubenbastei 5, A-1010 Vienna, Austria
Internet: <http://www.bmu.gv.at>

Federal Ministry for Economic Affairs and Labour
Department of Energy and Mining
Schwarzenbergplatz 1, A-1015 Vienna, Austria
Internet: <http://www.bmwa.gv.at>

Edited by:

Energieverwertungsagentur – the Austrian Energy Agency (E.V.A.)
Otto-Bauer-Gasse 6, A-1060 Vienna, Austria
Phone: +43 1 / 586 15 24, Fax: +43 1 / 586 15 24-40
E-mail: sedmidubsky@eva.ac.at
Internet: <http://www.eva.ac.at>

With contributions from:

Margarete Dal-Bianco, BMWA
Alois Geisslhofer, E.V.A.
Johannes Schmidl, E.V.A.
Alice Sedmidubsky, E.V.A.
Helmut Söllinger, BMLFUW

Translation by:

Andrea Steiner
Hörnesgasse 15, A-1030 Vienna, Austria
E-mail: andrea_steiner@aon.at

Produced by:

Lithoscan
Linzer Straße 224, A-1140 Vienna, Austria
E-mail: lithoscan@magnet.at

Notice to the reader:

The information contained in this document is based on project descriptions provided by several sources. Neither the publishers nor E.V.A. shall assume any warranty or legal liability for the accuracy, completeness, or usefulness of any information given in this brochure.
It is envisaged, that this brochure will be available on the homepages of E.V.A. and the above mentioned ministries.

Vienna, September 2002

