EMCC
European Monitoring Centre on Change

Bulgaria: Sofiyska Voda

22 January 2013 | Observatory: EMCC

About

Case study name:
The greening of industries in the EU

Country:
Bulgaria

Organisation Size:
500+

Sofiyska Voda is part of the Veolia Water Group and is the largest water utility company in Bulgaria, providing water supply and sewage services to the capital, Sofia. In 2009, Sofiyska Voda introduced combined heat and power technology for energy production from the bio-gas produced at the sludge digestion facility at its Kubratovo waste-water treatment plant. The case study illustrates how this new green technology contributes to reducing carbon emissions and the operational costs of the company, and its impact on employment and skills development. While not creating new jobs, the new technology has helped eliminate or transform some environmentally inefficient jobs through providing additional training.

Introduction

The water supply and sewage sector is essential for the economy and for environmental protection. The sector employs about 17,000 workers in Bulgaria (0.8% of total employment). Its contribution to the Gross Value Added is 0.9%.

Sofiyska Voda AD (Sofia Water) operates the water supply and waste-water services of the Municipality of Sofia. The company was established in October 2000 by a 25-year concession agreement with UK United Utilities. Since 2010, the French multinational company Veolia Water has been the majority shareholder. In 2010, the company had **1,189** employees.

Combined heat and power (CHP) co-generation technology used in Sofiyska Voda allows energy to be produced from bio-gas at higher efficiency and therefore at a lower price and with less pollution compared to the conventional methods used in other waste-water treatment plants. The co-generation installation transforms about 82% of the power contents of the fuels to useful energy, which is about twice that of conventional plants. The Sofiyska Voda green practice was selected as it contributes to the mitigation of climate change, particularly the reduction of hazardous emissions, it involves energy production from a renewable local source, and it can be transferred to other waste-water treatment plants.

Drivers and motivations

Sofiyska Voda's activities are closely related to environmental protection and the effective use of natural resources, and the company attaches high importance to mitigating climate change. The new green technology is important in three areas: green energy production from renewable energy sources, greenhouse gas emissions reduction, and sustainable waste management.

The first main driver that triggered the green change activities in Sofiyska Voda was the availability and economic feasibility of new technology. Energy production from bio-gas through co-generation is a new technology that is used in many other countries.

The second main driver was the availability of finance provided in the 2009–2013 business investment plan of the company for the modernisation of the Kubratovo waste-water treatment plant, part of which is the implementation of the co-generation technology.

There are also economic motivations. The continuously increasing prices of fuel and electricity are making the energy potential of bio-gas as a local independent source even more promising for reducing company expenditure.

Another driver is to create a positive image of the company among the local community and society through providing high-quality, sustainable and environmentally friendly waste-water services as part of Sofiyska Voda's corporate social responsibility policy. In 2009 the company's green practice was acknowledged by the business community, and Sofiyska Voda won the Bulgarian Business Leaders' Forum Annual Responsible Business Award 'Investor in Environment'.

Green business practices

The co-generation project started in 2008. It was the second stage of a project to modernise the sludge and gas line in Kubratovo waste-water treatment plant, co-funded by the European Commission's Instrument for Structural Policies for Pre-Accession (ISPA), the national budget and the European Investment Bank. In 2009, Sofiyska Voda commissioned three combined heat and power units for the generation of heat and electric power from bio-gas. Sofiyska Voda's investment amounts to BGN 5 million (€2.55 million) and includes the design, purchase, delivery and installation of the co-generators.

Description of the new technology

CHP is a technology for combined production of heat and electrical energy as an independent source. It uses bio-gas obtained in the sludge-treatment process. Kubratovo waste-water treatment plant treats, on average, 400,000 m^3 of waste water per day, a by-product of which is sewage sludge. Up to now, the bio-gas produced in the process of sewage digestion has been burnt without being utilised. The quantity of bio-gas produced by the plant is 20,000–25,000 m^3 per day, which is enough to ensure the operation of the co-generator units.

Contribution to production of energy from renewable resources

Kubratovo waste-water treatment plant uses the most energy of any Sofiyska Voda site. The implementation of the project makes it possible for the company to use sustainable green energy and reduce the electricity dependency on the grid. The co-generation transforms about 82% of the energy content of the fuels into useful energy, which is about twice the level at conventional plants. This means higher efficiency at a lower price and less pollution. CHP technology also reduces the operational costs for electricity and heating (€0.65 million saved on electricity costs).

The energy generated from each engine equals 1,063 KW/h power energy and 1,088 KW/h heat energy. Thus, the total power of the three co-generators is sufficient to meet the full needs of the plant.

The hazardous emissions in the atmosphere are also reduced under the company commitments to the Kyoto Protocol. The total carbon reduction for the period 2008–2011 was 510,200 tonnes. The 2012 reduction is expected to be 139,200 tonnes.

The reduced carbon emissions contribute to the targets in the Sofiyska Voda Emission Reduction Purchase Agreement between Sofiyska Voda, European Bank for Reconstruction and Development (EBRD) and the Dutch government. In 2009, based on the monitoring reports required in the agreement, an income amounting to BGN 2.3 million was recognised as revenue, as a result of the carbon emissions sold.

Anticipation and management of the impact of green change on quantity and quality of jobs

Despite the economic crisis, Sofiyska Voda managed to introduce the CHP technology, as the investment has been ensured and the process very well planned. Collaboration with the company supplier, the municipal government and the training organisation also contributed to the success of the project. However, some difficulties needed to be overcome, and this resulted in bureaucratic and time-consuming administrative procedures.

Impact on quantity of jobs

Kubratovo waste-water treatment plant employs 126 workers and specialists, of which 12 workers and specialists are directly involved in the co-generation. The co-generation team comprises five stokers–operators, five shift supervisors, one supervisor for bio-gas usage and utilisation, and one chief of the technology department. No new jobs have been created. Due to the implementation of the new technology, the company decreased the number of employees working in environmentally inefficient jobs. As a result, four stoker jobs have been eliminated due to the shift from fossil fuel to bio-gas, five stoker jobs have been transformed into stoker–operator jobs, and one supervisor job has been transformed into supervisor responsible for the bio-gas utilisation. These jobs have been transformed by the provision of additional and specific training. As the technology requires an increased role for technical supervision of adherence to the technology requirements, the shift supervisors and the chief of the technology department were entrusted with new duties.

The company expects to expand employment, as it plans to increase the energy production from bio-gas by installing one additional co-generator unit in cooperation with the Sofia municipality.

Impact on quality of jobs

Green skills

According to the company management, most of the skills required for the transition to the new green practice introduced in the company are not new, but some of the jobs – for example those of stokers–operators and supervisors – require a different blend of competencies (in new renewable energy technology) and additional training to broaden their pre-existing skills. This is true both for generic and technical skills.

The implementation of the new CHP technology requires specialised skills related to understanding the essence of the new technology and the operation and maintenance of co-generators. The organisation of training for green jobs is part of the Training Policy Programme of the company, according to which an annual plan is adopted each year by the management and the trade unions.

Training was provided to everyone employed in the co-generation processes. It was conducted by an external training organisation, Expert Laboratory for Control and Assessment – ELCO Ltd, and by specialists from the company. The appointment of the training organisation was made under the regulation of the Public Procurement Act. The training related to maintenance of the co-generation installation is provided by the company Ecoenergy Technology, which is responsible for maintenance and repair of the co-generators.

The main training modules included: environmentally friendly policies, CHP technology; working with co-generation installations; regulations concerning gas usage; steam and heating boilers; and electrical engineering – a third-level degree, which according to internal company rules requires theoretical knowledge and practical skills in electrical engineering, electrical equipment, and health and safety rules. For obtaining this degree there are also requirements for length of service depending on educational level.

The co-generation technology introduced in the Kubratovo plant is part of the company's commitment to anticipate and manage green change in line with the requirements of the ISO 14001: 2005 standard and to provide the necessary environmental training both to the staff working at green workplaces and other employees. A special procedure entitled 'Human resource management: Environment training and sharing information/communications' was elaborated under the environment management system. It requires the company to engage in constant assessment of needs and opportunities of the skills related to green practices. This training is part of the generic skills development providing for better understanding of the need for environmentally friendly policies, energy efficiency, use of renewable resources, and enabling the employees to operate in more environmentally friendly ways.

Other working conditions

All employees working in the co-generation project enjoy career and employment security under the human resource management policy provisions. All are employed on a permanent, full-time labour contract. Career advancement is also provided under clear rules and is related to individual performance and qualification levels.

Every two years, the employer and the two company trade union organisations affiliated to the Confederation of Independent Trade Unions in Bulgaria (CITUB) and the Confederation of Labour 'Podkrepa' (Podkrepa CL) negotiate a company collective agreement providing for better working conditions, increased wages, social benefits, work–life balance, improvement of skills level and career prospects. The collective agreement includes the employees in the co-generation.

More than 80% of the employees in the co-generation installation (10 people) work 12-hour shifts compared to 36% of the whole Kubratovo plant staff, due to the continuous technological process. From the beginning of 2009, as with all company employees, they received two additional days' paid leave as agreed under the collective agreement.

Working conditions in the co-generation facility improved after the implementation of the CHP technology, as better automation and control over the processes were introduced. This has a positive impact on decreasing work-related injuries. In the co-generation area there are no injuries, while the injury rate for Sofiyska Voda is at 1.17.

However, some specific risks exist, namely risk of gas outflow in the premises and also outside the building, risk of fire, and risk of explosion. In view of this, the health and safety measures in the CHP facility were tightened under the company system for the management of health and safety at the workplace, based on the OHSAS 18001 standard.

The management of Sofiyska Voda and the Kubratovo plant introduced measures to motivate workers and to increase their work satisfaction. Regular meetings between the co-generation team and the management are held at which the employees can raise their concerns related to work organisation and working conditions; they are also informed about any planned changes. The employees in the co-generation installation are engaged in the improvement of the new green technology. The innovative proposal of one of the team members for the 'creation of a cooling system of key places of the co-generation installation' was awarded with the prize for Employee of the Month under the Sofiyska Voda scheme for rewarding the individual and team achievements.

Anticipating and managing green change

Collaborative approaches

The introduction of the CHP technology as a new green practice of Sofiyska Voda was widely discussed with many stakeholders, including the State Energy and Water Regulatory Commission (SEWRC), relevant ministries, local government, training institutions and with the supplier of the JENBACHER co-generators.

Sofiyska Voda manages the implementation of co-generation, the related skills development and other working and financial conditions related to green business practice in collaboration with trade unions through social dialogue and information and consultation procedures.

The unions were informed about the issues related to risk assessment and health and safety improvements related to the CHP technology. The Working Conditions Committee, comprising representatives of employer and employees on parity basis, was also informed about the company plans and the impact of the new technology on working conditions.

The collaboration with the local government of the Municipality of Sofia is successful, as the introduction of the co-generation in Kubratovo plant is part of the municipality's integrated water project.

Sofiyska Voda is the first public–private partnership in the water supply and sewage sector. The experience of Sofiyska Voda shows the benefits of public–private partnership for the sector through increased investment and introduction of new technologies. In their collaboration, the municipality and the private partner share the risks as well as the responsibility for strategic decisions. The technological knowledge, expertise and best green practices of Veolia Water will contribute to Sofia's green future and to the preservation of natural resources.

Sofiyska Voda is one of the first employers to conclude a partnership agreement with the universities. The company has maintained a long-standing partnership with the University of Architecture, Civil Engineering and Geodesy, the University of Chemical Technology and Metallurgy, and the Technical University. For most of their practical courses, these universities use the company sites, including the co-generation facility. Sofiyska Voda also organises internships under the name Challenge the Future in the co-generation facility and other green workplaces in the Kubratovo plant. It allows students and young specialists to gain practical experience in green jobs and awareness about co-generation and other green practices.

Conclusions and recommendations

The case study suggests a number of conclusions and recommendations.

The main drivers of the introduction of the new green technology relate to the availability and feasibility of the new CHP technology and its economic, social and environment effect.

The technology used in Kubratovo is essential to support the transition to a more resource-efficient and sustainable economy. It can be transferred to other waste water treatment plants (there are more than 50 in the country) and also to other sectors.

It is anticipated that the introduction of the CHP technology will expand, and this will require a qualified workforce, able to operate new

facilities. The case study shows that the current skills level of the local utilities is insufficient. It is therefore essential to collaborate with training providers and to conduct training programmes that cover the scope of technical and operational knowledge needed for green jobs in the water sector.

Collaboration with universities and offering student internships on green jobs is very important as they provide opportunities for better green skills needs assessment, integration of green skills into the university curriculum and better preparation of the future labour force.

Sofiyska Voda's experience shows that public–private partnerships present numerous advantages to municipalities in terms of introducing green practices, especially the provision of investment and experience by the private partner, due to the limited availability of funds for the water sector.

Bibliography

Sofiyska Voda AD (2003), *Safety, well-being and risk management: Our commitment, our principles*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/SV%20-%20HS%20Commitment%20-%20ENG%20-%2003.pdf.

Sofiyska Voda AD (2008), *Annual report & accounts 2008: Stability*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/Annual%20Report%202008eng.pdf.

Sofiyska Voda AD (2009), *Annual report and financial statements, 2009: Continuing progress*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/Annual%20report%202009.pdf.

Sofiyska Voda AD (2009), *Caring for the environment*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/Caring%20For%20The%20Environment.pdf.

Sofiyska Voda AD (2010), *Environmental protection annual report 2009*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/SV%20-EnvReport%20-%20ENG%20-%20WEB.pdf.

Sofiyska Voda AD (2010), *Installation for combined production of heat and electrical energy*, available online at http://www.sofiyskavoda.bg/SVDocuments%20English/Installation.pdf

Veolia Water (2011), *Health and safety policy*.

Other sources

Sofiyska Voda AD website, http://www.sofiyskavoda.bg/en/default.aspx.

News about the company activities, http://www.sofiyskavoda.bg/en/presscenter.aspx.

Branch collective agreement in the water supply and sewage sector, 2010–2012 (in Bulgarian).

Collective agreement of Sofyiska Voda (in Bulgarian).

Corporate social responsibility profile.

Quick links

- Legal information
- Data protection
- Environmental policy
- Cookies
- Subscriptions
- Multilingualism
- Templates for Eurofound reports
- Eurofound style guide
- Management Board extranet
- Map - how to get to Eurofound
- FAQ
- Sitemap

Contact us

Eurofound, Wyattville Road, Loughlinstown, Co. Dublin, D18 KP65, Ireland

Phone: (00) 353 1 2043100

E-Mail: information@eurofound.europa.eu

Press: media@eurofound.europa.eu

MEMBER OF THE NETWORK OF EU AGENCIES

EUROFOUND ACHIEVES EMAS REGISTRATION

EUROFOUND IS AN AGENCY OF THE EUROPEAN UNION

Eurofound