Sustainable Development

Sustainable Development

Policy and organization of nature and environmental protection function

The Croatian accession to EU on 1 July 2013 resulted in amendments and adoption of numerous new legal regulations from the environmental protection area harmonized with EU directives. Obligations and restrictions stemming from the legal framework represent a new challenge to HEP in meeting its obligation of securing customer supply.

HEP continuously monitors and analyzes the impact of its business processes on the environment. The most important indicators of such impacts are emissions of pollutants into the air and quantity of production waste. The company reports on all environmental components timely and objectively to relevant institutions, units of local self-government and the interested public. Employees working in nature and environmental protection department attend seminars and workshops to obtain information about duties and activities arising from environmental and nature protection legislation.

Technical support to these employees is provided by the Sustainable Development and Quality Improvement Department of HEP d.d. and members of HEP teams: the Team for Coordination and Standardization of Environmental Business Procedures, the Team for the Implementation of the Kyoto Protocol provisions and the Team for Obtaining the Integrated Environmental Requirements. The fundamental objective of the Team for Coordination and Standardization of Environmental Business Procedures is to analyse and evaluate environmental activities in HEP Group emphasizing planning, coordination, internal communication and proposals for improving environmental activities.

Harmonization with the EU legislation

OBTAINING ENVIRONMENTAL PERMITS

Environmental permits are a precondition for continuous operation of the existing and one of the pre-conditions for obtaining the usability permit for the reconstruction of the existing and the construction of new thermal power plants of nominal heat energy exceeding 50 MW. As the procedure for obtaining environmental permits formally commenced in 2007, the fundamental task entrusted to the Team in charge of obtaining environmental permits in the cooperation with authorized personnel of the Ministry for Environmental Protection and Nature was to develop requirements as well as technical and technological solutions and make plans and plants' harmonization programmes within set time periods viable in view of the plants' life span.

During 2013, the procedure for obtaining environmental permits for the existing thermal power plants, commenced pursuant to provisions of the Environmental Act (Official Gazette 110/07) and the Ordinance on the procedure for setting integrated environmental terms (Official Gazette 114/08) was continued. The new Environmental Act came into effect in the meantime (Official Gazette 80/13), which announced

the passage of the new Environmental Permit Ordinance (Official Gazette 8/14) aimed at harmonizing the Croatian legislature with provisions of the Directive on Industrial Emission 2010/75/EC. Pursuant to provisions of the above stated legal regulations regarding public disclosure in the process of environmental permit issuance, public consultations with regard to HEP Generation plants (TPP Rijeku, TPP Sisak, TE-TO Zagreb, KTE Jertovec and TE-TO Osijek) as well as the Osijek plant of HEP District Heating were held. First environmental permits in HEP Group were issued to the Osijek plant of HEP District Heating and TE-TO Osijek cogeneration plant in early 2014. Procedures regarding other plants are underway.

PREPARATION FOR GREENHOUSE GAS EMISSION TRADING

Croatia has become a part of the European Union Emission Trading Scheme at the beginning of the *third trading period* (from January 1, 2013 until December 31, 2020). Through its membership in the EU ETS, HEP has undertaken the obligation of buying greenhouse gas emissions on the market in the volume of verified CO2 emissions occurring as a consequence of electricity and a portion of heat energy generation, burning fossil fuels in thermal facilities of nominal thermal power exceeding 20 MW.
Purchased emission units must be submitted by traders onto Accounts of plant operators opened in the EU Greenhouse Gas Inventory – the Croatian part until 30 April each for the previous calendar year. The system of CO2 emissions trading in HEP Group was officially set up in 2012 pursuant to the Decision of the Management Board of HEP under which obligations, responsibilities and time-limits for meeting obligations of individual departments and companies within HEP's emission tradiong system are set. For the purpose of providing guidelines to HEP Trade, the company in charge of buying and selling emission units in HEP Group, the in-house commission was set up in March 2013, which proved to be a good cooperation model between departments and companies in terms of timely fulfilment of legal obligations and submission of emission units to the EU Greenhouse Gas Inventory.
As the emission prices are influenced by a number of factors (market supply and demand ratio, weather conditions, economy and politics), the PLEXOS market simulator was used in the project for projecting CO2 emission volumes as well as planning funds for emission purchase.

WATER FRAMEWORK DIRECTIVE – BASIS FOR INTEGRAL WATER MANAGEMENT

The foundation for integral water management in EU was set by the Water Framework Directive (2006/60/EC), which provisions were transposed by the Republic of Croatia into its Water Act and its stemming secondary legislation. Integral water management includes water protection and evaluation of ecosystem services, sustainable water usage, eutrophication and water pollution reduction as well as flood and ice risk assessment and management. The Water Area Management Plan stemming from the Water Act remains in force until 2015. The list of candidates with individual water body status was made as its part to be confirmed through the Water Bodies Management Plan for the period 2016-2021. As the announcement of the water body status and the determined water level is a prerequisite for setting objectives which need to be developed by implementing measures i.e. it affects the operation of the existing and the construction of future generation facilities, HEP as an interested party need to be included in the Plan development.

EUROPEAN ECOLOGICAL NETWORK NATURA 2000

Areas of the National Ecological Network in Croatia encompass internationally important bird habitats as well as areas important for other wild species and biotypes pursuant to the Bird Protection Directive (Council Directive 79/409/EEC; 2009/147/EC) and the Directive on the conservation of natural habitats and of wild flora and fauna (Council Directive 92/43/EEC). In light of its particular geographical position, Croatia has numerous biological variety of species and biotypes thus making the size of its territory in the National Ecological Network and the NATURA 2000 proposal one of the largest in Europe.
In the period between 2009 until today, HEP has repeatedly, in a written and oral communication with state bodies competent for the preservation of biological diversity, indicated possible real obtacles and limitations in the operation of the existing and the construction of planned electric facilities, to which the company has not received a satisfactory reply. Since 2007, the year of establishing the National Ecological Network, HEP has not constructed a single more significant investment project on the area of the ecological network. Therefore, real limitations regarding the execution i.e. increased project

costs will be seen and quantified only after some of these projects have gone through the process of environmental impact assessment

KEEPING UP WITH LEGAL REQUIREMENTS

To educate and inform the employees about obligations resulting from legal environmental regulations in a timely manner, HEP Group has been systematically following and monitoring, in the form of monthly reports and annul printed bulletins, as well as preparing overviews of legal requirements in environmental and nature protection of importance for operations and business of all HEP Group companies since 2000. During 2013, improvements were continued and further expansion of the implemented electronic data bases were planned (Registry of Waste Generation and Process; Registry of Chemicals Consumption; RETZOK – Accounting Monitoring of Costs and Investments in Environmental Protection; Emission Verification – monitoring air-borne pollutant emissions and verification of greenhouse gas emissions), a part of HEP's IT Environmental Protection System which is currently being developed.

Basic indicators

During 2013, HEP continued to monitor pollutant emissions into the air – sulfur dioxide (SO_2), nitrogen oxides (NO_x), carbon dioxide (CO_2) and particulates as required by the air quality legislation, as well as the quantities of hazardous and non-hazardous waste generated within HEP and concentration of hazardous substances in waste water.

AIR EMISSIONS

Pollutant emissions into the air come predominantly from HEP's large combustion plants – thermal power plants Plomin 1, Plomin 2, TE-TO Zagreb, EL-TO Zagreb, TE-TO Osijek, Sisak, Jertovec and Rijeka while the remaining part of the pollutant emissions result from heating boiler rooms of HEP District Heating d.o.o. Compared to 2012, the year 2013 witnessed a decrease of all air emissions from thermal facilities as a result of increased, environmentally friendlier, share of natural gas compared to fuel oil. As of January 1, 2012 HEP has been procuring only a low-sulphur fuel oil which has resulted in additional decrease of air pollutants.

EMISSION OF AIR POLLUTANT SUBSTANCES IN 2013 BY HEP GROUP SOURCES

Year	NOx	SO_2	solids (PM10)	CO_2
	t/year	t/year	t/year	t/year
2012	5,156	8,055	179	3,726,274
2013	5,286	6,025	93	3,490,584
2013/2012%	**3**	**-25**	**-48**	**-6**

WASTE

During 2013, the Sustainable Waste Management Act came into effect (Official Gazette 94/13) and announced the passage of numerous new secondary regulations which need to be embedded into the existing waste management system in HEP. The years-long trend of improving waste management system continued in 2013 by investing in existing and new temporary waste storages and in employee education. All HEP Group companies and plants continued to build and equip temporary storages for waste and secondary raw materials and furnish them with tanks for separate waste collection. Electronic management of waste data using the application "Waste Management" continued in all plants.
In 2013, a total of 1,565 tons of hazardous waste and 101,705 tons of non-hazardous waste was produced within HEP Group. Reduced quantities of generated hazardous and non-hazardous waste are the result of continuous improvement of the waste management system in HEP i.e. waste separation at the location of its emergence, waste storage development, increasing record-keeping quality of generated waste volumes and HEP employees education. All generated waste was handed over to authorized collectors, exporters or processors for further processing and final disposal.

TOTAL QUANTITY OF HAZARDOUS AND NON-HAZARDOUS WASTE GENERATED IN 2012 AND 2013

Year	Hazardous waste (t)	Non-hazardous waste (t)
2012	2,259	103,519
2013	1,565	101,705
2013/2012 %	**-31**	**-2**

EXPENSES FOR ENVIRONMENTAL AND NATURE PROTECTION

In 2013, total expenses for nature and environmental protection incurred by HEP Group companies amounted to HRK 101.08 mn and remained at the 2012 levels. The most significant investments in 2013 were the projects of improving the waste management system in HEP's plants as well as nature and the environment protection projects.

EXPENSES FOR ENVIRONMENTAL AND NATURE PROTECTION IN HEP GROUP ACCORDING TO RETZOK REPORTS

Environmental protection	**Cost of regular operations** (in HRK 000)	**Investments** (in HRK 000)
Air and Climate	5,360	130
Waste Waters	1,507	66
Waste	7,924	3,643
Soil and Underground Water Protection	557	51
Noise and Vibrations	18	0
Nature and Landscape Protection	6,845	4,118
Radiation Protection	45	0
Research and Development	117	518
Others (mostly fees in regular operations)	61,807	8,378
TOTAL 2013	**84,180**	**16,904**
TOTAL 2012	**84,796**	**16,396**
2013/2012 (%)	**-1**	**3**

Major achievements in 2013

AIR QUALITY PROTECTION

- The system of adaptive electrofilter regulators for reducing flue ash concentrations at air discharge from TPP Plomin 1 was upgraded.
- TPP Sisak conducted control measurings of the system for continuous measuring of air pollution emissions from Unit A boilers and intermittent air pollution emissions from Unit B boilers as well as auxiliary boiler room.
- KTE Jertovec conducted intermittent measurings of air pollution emissions from gas turbines.
- TE-TO Zagreb carried out the replacement of all 8 combined gas/fuel oil and 8 ignition burners, 8 sets of safety and regulation gas, fuel oil, blowing/dispersing steam and combustion air reinforcements, replacement of bay measuring equipment, installation of new burner management and monitoring system and its connection to the Unit C operating system. Measuring air pollution emissions in natural gas- and fuel oil-fired operations resulted in figures in compliance with permitted borderline emission values valid until 1 January 2018 i.e. until the expiry of the transition period for harmonizing with the provisions of the Industrial Emissions Directive. The reconstruction of VK 5 and VK6 hotwater boilers was also carried out resulting in a more efficient combustion thus reducing the air polluting emission volume.

- In the Sisak Plant of HEP District Heating d.o.o., the return condensate system from all heating stations in TPP Sisak was put into operation. The use of the condensate energy will reduce the fuel volume for energy production resulting in reduced air pollution emissions.
- In the Osijek Plant of HEP District Heating d.o.o., the automatics was replaced on the 35 MW hot water boiler resulting in the reduction of air pollution emissions. The replacement of 3,400 m of hot water network by preinsulated pipes as well as the replacement of the 1,200 m of steam network will result in reduced heat losses, consumed water volumes and air pollution emissions.
- The R12, R22 or R502 active substances were replaced in all air-conditioners and heat cranes of Elektroprimorje Rijeka (HEP DSO) by R134, R407 or R404 substances which are more acceptable in terms of ozon layer preservation.

WATER PROTECTION

- HEP Generation launched the project of supplying, installing and commissioning the environmental measuring equipment, which is a precondition for increasing energy efficiency, better utilization of raw materials and aux substances and reduced environmental impact. Under the project, water flow monitoring was ensured for seven metering points at the Plomin site, four water supply connecting points, one fresh water source and two sea water discharges from TPP Plomin 1 and 2. TPP Sisak also commenced the installation of waste water flow measuring devices as well as devices for measuring the flow of caught water and discharged cooling water from the plant.
- TPP Sisak conducted cleaning of the waste water processing device and the drainage system: sanitary sewer and sewage disposal tank, waste water measuring hole and prepump station, deep concrete tank in the waste water processing plant and the waste water oily separator. The internal discharge system was upgraded for achieving water impermeability. As part of the HEP District Heating steam network revitalization, the project of collecting steam heat condensate from main heating stations was conducted. The condensate is returned to TPP Sisak and used for feeding steam boilers with a permanent monitoring of condensate quality (use of heat condensate, reduced supply water volume for auxiliary boilers).
- Individual portions of the sewage system in KTE Jertovec were rehabilitated and tested.
- New chemical water prepration (KPV 3) was built and commissioned in TE-TO Zagreb. This is a fully automated cutting edge plant with the microprocessor management of 240 t/h capacity (2x 120 t/h) of operational demi water and 120 t/h in regeneration or preparation. As part of this project, the plant for processing clean condensate and its return into the demineralized water system for boiler supply was built. This resulted in a significant reduction of raw water extraction from TE-TO Zagreb wells as well as waste water discharge into the public sewage system. During 2013, fuel oil tank farm was revitalized in TE-TO Zagreb as part of the comprehensive reconstruction of the fuel oil economy. The oily waste water separator will be completed during 2014. New devices for measuring the volume of pumped water were installed as well as meters monitoring the emergence of the oily layer in the hole in front of the waste water prepump station, meter monitoring of the emergence of oily waste waters and waste water pH values in the last internal hole before the connection into the main discharge collector, the Sava cooling water meter, the Sava water temperature meter in front of the water intake pumps as well as the colling water temeperature meter prior to its return into the Sava i.e. the Savica lake.
- Floor heater in the old fuel oil tank SG1 was revitalized in EL-TO Zagreb. The project of reducing waste and cooling waters on gas turbines was conducted and works on redirecting waste waters to one exit hole (1-east) launched as well as the installation of the flow meter (replacement of old unreliable meters).
- The construction of the facility intended for protecting water supply from pollution at the discharge canal of HPP Dubrava started in the hydro generation area North. The fundamental intention of this facility is to protect water flows downstream from HPP Dubrava engine room from contamination caused by upstream pollution (regardless of plant's operating mode) or by hydropower plant's operation.

- Oil sumps of HPP Peruća and HPP Orlovac were cleaned and tested for water impermeability. The device for determining oil in the system and drainage well of HPP Zakučac was installed as well as oil separators.
- The reconstruction of the sewage system leading from the restaurant was completed in Elektroslavonija Osijek (HEP DSO). The oil separator was also installed.

WASTE MANAGEMENT AND SOIL PROTECTION

- Temporary waste storage was upgraded at the Plomin TPPs site. The storage is covered, fenced, lit, under video surveillance. Its access is forbidden to unauthorized personnel, and waste tanks duly marked.
- All generation plants of HEP Generation continued upgrading their waste management systems by procuring appropriate tanks, developing temporary waste disposal sites and staff education.
- All water flows housing HEP hydropower plants continued with cleaning debris, its sorting and appropriate processing and disposal.
- HPP Jaruga (located within Krka National Park) is run by environmentally friendly oils and grease. Transformers bearing 5.1 tonnes of oil were replaced by the new ones with 2.8 tonnes of oil i.e oil switches were replaced by the non-oily ones.
- During the process of introducing the environmental management system in line with ISO 14001 in distribution areas of HEP DSO, the waste management system was upgraded by procuring a disposal tank for hazardous and non-hazardous waste and developing the existing temporary waste disposal sites.

ENVIRONMENTAL PROTECTION

- In HEP Generation's hydrogeneration area North, fish spawning sites within the HPP system are made by regulating water levels during the spawning period considering the hydrology on the upstream part of the Drava river i.e. its flow from Slovenia. Subsidizing fish stocking (in line with the fish stocking plan of sport fishing clubs) and cooperation with the County Association was continued. Monitoring of the ichthyologic accumulation water condition is conducted including drainage canals and the part of the old flow of the river Drava. Furthermore, for the purpose of protecting the relic species, Myricaria Germanica plant, its habitation identification re-started along embankments of HPP Dubrava. Invasive species (egeria densa and zebra mussel) continued to be removed for the purpose of protecting equipment as well as preserving biological diversity of the Drava river.
- Hydrogeneration area South continued subsidizing fish ranching in the cooperation with local sport and fishing clubs.
- Under the Agreement on cooperation in conducting protection measures of the protected white stork (Ciconia Ciconia), concluded between the Ministry of Culture and HEP, HEP DSO constantly conducts measures for white stork protection. During 2013, all stork nests on electric power network pillars were recorded, the condition of the stork nest frame monitored, installed, replaced, repaired or removed, as needed, by placing a new pillar or a frame. In 2013, activities relating to bird protection against the electric shock on MV lines were conducted, especially in areas of increased risk.

OTHER

- Focusing on adapting TPP Plomin to best available technology until 2018 pursuant to measures set by the Environmental Permit Requirements, the acustic model of the existing condition on site was made (TPP Plomin 1 and 2 and coal transport). Conflict and strategic noise maps were also made in line with the said measures aimed at lowering noise at plant's borders. Other measures will be conducted in 2014 in line with the requirements deadlines.
- In the hydrogeneration area North, the removal of accumulated deposits from the accumulation lake of HPP Varaždin continued for maintaining safety and reaching initial accumulation levels.
- HEP District Heating continued the project of revitalization, planning and expansion of the Central Heating System (CHS) of the city of Zagreb resulting in reduced heat losses and increased reli-

ability of heat energy supply on the entire territory of Zagreb. Apart from the rehabilitation of the CHS heat water network, the heating station equipment was also modernized. Furthermore, the construction of the hot water and steam lines continued for the Zagreb suburb of Dubrava during 2013, which will serve as the basis for connecting boiler rooms into the CHS thus increasing energy efficiency as well as reducing air polluting emissions.

CERTIFICATION

- During 2013, TPP Rijeka, TE-TO Osijek and TPP Plomin introduced integrated environment management systems according to ISO 14001 as well as the quality management according to ISO 9001. ISO certified quality and environment management systems are the result of the long-lasting responsible and process-oriented operations in all HEP thermal and hydropower plants in generation areas North and West. The introduction of the quality and environment management systems in HEP Generation will be completed in 2014 with the introduction of the said systems into hydrogeneration area South and HPP Dubrovnik.
- In 2013, all 21 distribution areas of HEP DSO confirmed their environment management systems according to ISO 14001, which were introduced and certified in 2012.