

Document 1: Environmental report summary for 600 MW Unit 6 in Šoštanj Thermal Power Plant



ELEKTROINŠTITUT MILAN VIDMAR

*Inštitut za elektrogospodarstvo in elektroindustrijo
Ljubljana
Oddelek za okolje*

Paper No.: 1829 (Summary)

**ENVIRONMENTAL REPORT - SUMMARY
FOR 600 MW UNIT 6
IN ŠOŠTANJ THERMAL POWER PLANT**



Ljubljana, May 2007



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Ljubljana, May 2007

Director:

Prof. Dr. Maks BABUDER, BSc. El. Eng.

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FOR 600 MW UNIT 6
IN ŠOŠTANJ THERMAL POWER PLANT

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I. INTRODUCTORY

Construction of 600 MW Unit 6 at Šoštanj Thermal Power Plant is a project of national importance. Spatial planning of the construction area will be covered by the Local Detailed Plan on spatial planning of common interest for Unit 6 TEŠ with ancillary buildings (Preparatory program, Official Gazette of RS, No. 127/2006) and by the Local Detailed Plan on spatial planning of common interest for cooling tower and chimney stack for Unit 6 TEŠ (Preparatory program, Official Gazette of RS, No. 127/2006).

SCOPE AND SHORT JUSTIFICATION

The newly set up development policies and strategy plans for development of the Šoštanj TPP the new thermal power plant for production of electric energy is planned, namely the construction of Unit &6 of Špštanj TPP, with rated power of 600 MW, which will eventually replace the Units 1, 2 and 3 and partially also Unit 4, which will remain as cold reserve.

The lifetime of the oldest power generation Units 1, 2 and 3 are close to expiry. In spite of the fact that they had all been refurbished in order to extend their lifetime, they no longer can reach the criteria of up-to-date technologies which assure high efficiency and minimum environment pollution.

The Šoštanj TPP as large-scale energy production plant is bound to comply with the provisions of the IPPC directive on integrated pollution prevention and control (Council Directive 96/61 EU). Šoštanj TPP as major source of emission also has major obligation in fulfilling national requirements concerning reduced emission of sulphuric dioxide, sulphuric oxides and solid particles. By reducing the dust emission, the emission of heavy metals is also reduced. Šoštanj TPP has a special obligation within the framework of the requirements of Kyoto protocol, which cannot be complied with should the CO₂ emission from Šoštanj not be reduced. The development strategy of the Šoštanj TPP is taking into account all the environmental aspects related to the reduction of the environmental pollution.

Constructing the planned Unit 6 at Šoštanj TPP, with the power of 600 MW, which will replace the existing old Units and the out-dated technology is part of the strategy plan of the Šoštanj TPP oriented toward increasing of the electric energy production, in line with the Resolution on the National Energy Program (Official Gazette of RS, No. 57/2004) and in line with the Ordinance on the strategy of the Spatial Planning (Official Gazette of RS, No. 76/2004), which provides for further development of electric energy production on the area of present location. The selected technology for operation of the Unit 6 of the Šoštanj TPP is considered to be eligible BAT technology which is used in the process of coal firing as primary energy source in production of electric energy, and assures high efficiency and operation within the applicable regulations.

For the construction of the new thermal electric energy plant - Unit 6, Šoštanj TPP has the Licence for production of electric energy, No. 360-49/2005-8 dated 23.11.2005, and issued by the Ministry of the Economy. The Licence for production of electric energy defines technical requirements, important deadlines and conditions for constructing the Unit 6 of the Šoštanj TPP. Since during the preparation period for the project documents individual technical characteristics of the planned building for Unit 6 of the Šoštanj TPP had changed, the Ministry of the Economy has issued the Decree No. 360-49/2005-16 dated 21.5.2006 defining modifications of the technical conditions.

GUIDES FOR PREPARATION OF THE ENVIRONMENTAL REPORT

Environmental report for the detailed plan of the spatial arrangement for Unit 6 of the Šoštanj TPP with ancillary buildings shall be elaborated pursuant the following statutory provisions:

- Environmental protection Act (Official Gazette of RS, No. 41/04, 39/06),
- Spatial Planning Act (Official Gazette of RS, No. 110/02, 8/03, 58/03),
- Ordinance on type of spatial arrangements of national importance (Official Gazette of RS, No. 54/03, 68/05),
- Ordinance on environmental report and detailed procedure of comprehensive assessment of impact of plans execution on environment (Official Gazette of RS, No. 73/05).

Pursuant to the Decision No. 35409-316/2006-JL, issued on 22.11.2006 by the Ministry of the Environment and Spatial Planning, for elaboration of the local detailed plan for Unit 6 of the Šoštanj TPP with ancillary buildings, it shall be necessary to carry out the procedure of environmental impact assessments for all segments of the environments.

In the procedure of elaboration of the local detailed plan for cooling tower of Unit 6 of the Šoštanj TPP, the Ministry of the Environment and Spatial Planning has on 24.1.2007 issued the Ordinance No. 35409-315/2006-JL, stating, that there is no need to carry out the procedure of the comprehensive assessment of environmental impacts. Since these are the procedures which are classified as being characteristic as to the impact and location and possible effects, mainly due to the possible cumulative effects of other projects, the local detailed plan for the cooling tower and the chimney stack of the Unit 6 TEŠ it shall be reasonably considered in the procedure of comprehensive assessment of environmental impacts for the local detailed plan (LDP) for Unit 6.

ENVIRONMENTAL GOALS

The planned construction of the 600 MW Unit 6 of the Šoštanj TPP is elaborated in line with the various set up goals, which can be categorised as economical, technical and environmental goals.

After having carried out the recovery plan, which included the environmental recovery of all buildings in TEŠ, the situation on this area started improving. The older Units which were built already in 1956 (Units 1 and 2) and in 1960 (Unit 3) are decrepit and their lifetime is coming to an end. It is therefore of utmost importance to plan further development of electric energy production on this area. The main objectives of the planned construction of the new 600 MW Unit 6 at Šoštanj TPP are as follows:

- Keeping the location for performing the operation connected with energy production on the territory with arranged infrastructure and fulfilled conditions for development of this type of operation,
- Maintaining energy efficiency,
- Replacing the outdated technology with the new technology which assures high efficiency and environmental friendly operation,
- Increasing the production of electric energy with planned coal consumption,
- Reducing emission factor (CO₂/kWh),
- Complying with the requirements of the Kyoto protocol,
- Reducing the cost price of the electric energy in order to assure survival of future energy production facilities in the Šaleška dolina valley,
- Assuring smaller quantities of airborne pollutants, like SO₂, NO_x and dust, by choosing best available technology (BAT) for large-scale firing plants;
- Reaching statutory limit emissions or target values of air pollution with SO₂, NO_x and dust particles PM₁₀ in order to improve the quality of ambient air.
- Environmental objectives are closely connected with the environmental legislation and are stated for each segment of the environment.

CONTENTS OF THE ENVIRONMENTAL REPORT

Pursuant to the Decision No. 35409-316/2006-JL, issued by the Ministry for Environmental and Spatial Planning on 22.11.2006, for elaboration of the local detailed plan for Unit 6 of the Šoštanj TPP with ancillary buildings, it shall be necessary to carry out the procedure of comprehensive environmental impact assessments for all segments of the environments.

According to the Regulation on environmental report and detailed procedure of the comprehensive assessment of impacts of the implementations of plans to the environment, Official gazette of RS, No. 73/2005, in the present report all the impacts to all segments of the environmental components had been discussed within the framework of comprehensive assessment of impacts:

- Air protection,
- Soil protection,
- Waste generation and management,
- Surface water protection,
- Underground water protection,
- Noise protection,
- Protection against electromagnetic radiation,
- Protection of human health,
- Protection of animals,
- Protection of plants,
- Protected natural habitats and cultural heritage,
- Spatial characteristics, and
- Cultural heritage

Construction of Unit 6 of Šoštanj TPP will take place only on the territory occupied by industrial facility Šoštanj Thermal Power Plant. The planned Unit 6 of the Šoštanj TPP will be incorporated into the existing production facilities and the existing infrastructure will be used to the highest extent.

The related area which reaches to the boundary of the industry area of the Šoštanj TPP, and also the territory neighbouring the relevant area, there is no ecology distinctive registered zones, protected area, and also no buildings of natural heritage. The area considered in the detailed plan is located out of the direct or indirect impact to the natural heritage area, therefore, the Decision of the Ministry for Environmental and Spatial Planning No. 35409-316/2006-JL of 22.11.2006 takes into account the opinion of the Institute of the RS for Nature Conservation No. 1-III-385/3-0-06/LS of 17.11.2006, stating that the detailed plan for spatial arrangement for Unit 6 of Šoštanj TPP and the ancillary buildings there is no need to elaborate the acceptability assessment pursuant to the Nature Conservation Act ZON-UPB2 (Official Gazette of RS, No. 96/2004).

IMPACTS EVALUATION

METHODOLOGY FOR ASSESSMENT AND EVALUATION OF THE PLAN IMPACTS

The impacts had been assessed in compliance with the defined criteria, resulting from the methodology for assessment and evaluation. Pursuant to the Regulation on Environmental report and detailed procedure of comprehensive assessment of impacts of the implementation of plans to the environment (Official gazette of RS No. 73/05), the Environmental Report shall define direct, remote, cumulative, synergy, short-term, middle-term, long-term, permanent and temporary impacts.

For the elements of the environment we have defined respective indicators for monitoring the anticipated impacts to the environment. The indicators are based mainly upon existing data bases.

Regulation on Environmental report and detailed procedure of comprehensive assessment of impacts of the implementation of plans to the environment the above stated impacts are defined as:

- **Direct impact:** is assessed, when the plan will cause activities affecting the environment which is on the plan area have direct impact to the state of the environment indicators. Assessed area of direct impact is determined upon field experiences, detailed data on implemented activity affecting the environment and other actual circumstances
- **Remote impact:** is assessed, when the plan will cause activities affecting the environment which are not direct result of the plan implementation, but rather take place not in the vicinity of the original impact or as are consequence of other complicated actions, like activity affecting the environment, which changes the water level and thus resulting in changed state of the environmental status of nearby wetland.
- **Cumulative impact:** is assessed, when the plan will cause activities affecting the environment which have minor impact to the selected indicators, but together with the existing activities affecting the environment or activities planned and made according to other plans, do have great impact to the selected indicators, or, in case more impacts that are not substantial for the environment but belonging to the same activity affecting the environment or more activities of the same plan have a cumulative impact, the effect of which are substantial to the selected indicators.
- **Synergy impact:** is assessed, when the plan will cause activities affecting the environment which are overall greater than the sum of individual impacts. The synergy impact is assessed especially in cases, when the amount of impacts to the habitats, natural resources or settled area is close to the compensating capacity of these impacts.
- **Short-term impact:** is an impact which stops having impact on the selected indicators of the state of the environment within last five (5) years from the beginning of impact.
- **Middle-term impact:** is an impact which stops having impact on the selected environment indicators of the in a time period from five (5) and ten (10) years from the beginning of impact.
- **Long-term impact:** is an impact which does not stop having impact on the selected indicators of the state within ten (10) years from the beginning of impact.
- **Permanent impact:** is an impact with permanent consequences.
- **Temporary impact:** is an impact with temporary consequences.

Document relevant for preparation of the assessment of the impact of the plan implementation, was the methodology which is described in the Ordinance on environmental report and detailed procedure for comprehensive assessment of impacts of the plans implementation to the environment.

For each individual segment relevant indicators for monitoring the planned impacts had been developed. The assessment of the impacts of planned implementation of the plan – construction of Unit 6 TEŠ – to realization of the environmental objectives is determined in classes defined in the following table.

Table 1: Scale of impacts of implementation of the plan to environmental objectives

Impact class	Definition of the impact class
A	No impact or positive impact possible
B	Minor impact
C	Minor impact under certain conditions (provided mitigations measures had been carried out)
D	Substantial impact
E	Destructive impact
X	Impact cannot be assessed

If sub-assessment and assessment for any result of the plan implementation is classified in class A, B or C, the impact of the plan implementation to realization of goals of the comprehensive assessment are not important. If sub-assessment and assessment for any result of the plan implementation is classified in class D or E, the impact of the plan implementation to realization of goals of the comprehensive assessment is important and harmful.

II. DESCRIPTION OF THE PLAN AND ACTIVITY AFFECTING THE ENVIRONMENT

DESCRIPTION OF THE PLANNED DETAILED PLAN AREA

DATA ON TOTAL TERRITORY COVERED BY THE DETAILED PLAN AREA

The area of the planned detailed plan area cover the territory inside the existing industry zone of TEŠ (detailed plan area Unit 6 TEŠ) and territory inside the existing industry zone of TEŠ and along its outer margin (Detailed plan area for tower and chimney stack 6 TEŠ).



Figure 1: Area of the planned Detailed plan area for Unit 6 TEŠ. (Source: ZUM Maribor)

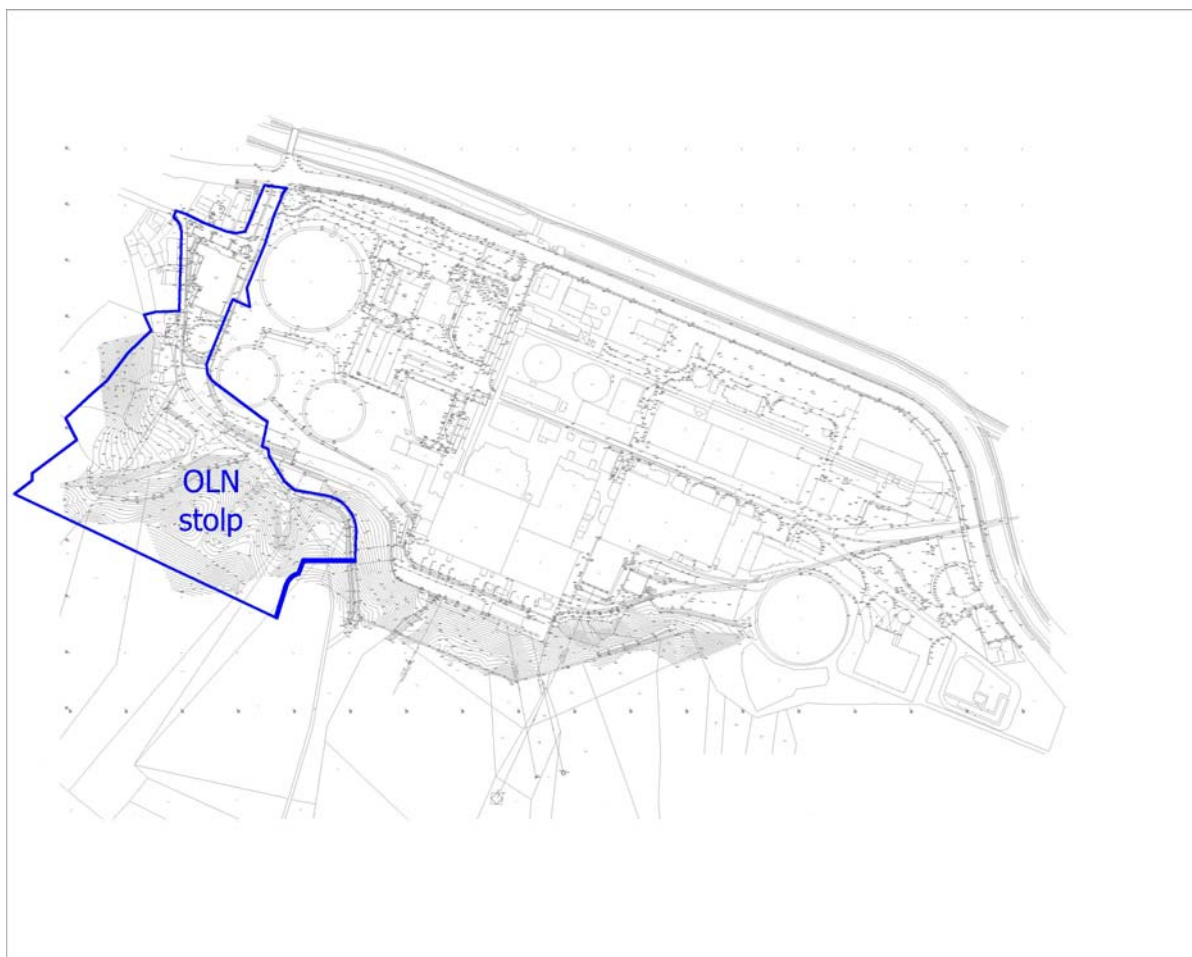


Figure 2: Area of the planned Local detailed plan Tower and Chimney Stack 6 TEŠ. (Source: ZUM Maribor)

JUSTIFICATION OF THE TECHNOLOGICAL OPTION

In the pre-investment study made for Unit , various technologies had been presented for production of electric energy by coal firing, that can be used in the new Unit. Basically, they are divided as follows:

- PCC – pulverised coal combustion
- FBC – fluidised bed combustion – atmospheric and pressurised
- IGCC – integrated gasification combined cycle.

Pulverised coal combustion is most common technology in existing thermal power plants and also, this technology is applied also in newly constructed thermal power plants. In order to achieve high efficiency rate, the live steam parameters shall be »raised«, and this is possible by using supercritical parameters, where there are certain limitations because of the material used and because of the higher temperatures and pressures of the processing medium. Thermal power plants built lately and using coal firing, have efficiency rate as high as 43% and. 45%.

The studies so far had shown, that best available technology is pulverised coal combustion with supercritical parameters of steam. This technology for Unit 6 Šoštanj TPP is most suitable BAT technology, which is used in coal firing as primary energy source for production of electric energy and allows high efficiency rate and operation within statutory provisions.

JUSTIFICATION OF THE LAY-OUT OPTION

The studies so far had discussed various possibilities for allocating the buildings required for the new Unit on the available territory. The only possible location for the new Unit is on the place of the existing cooling towers of the Units 1 and 3, which life span is about to expire and is planned to shutdown. Possible geographical location vary only in different lay-out of the buildings and are described further in this paper, where options are marked according to the orientation of the main axis of the building:

- **North - south:**
The machine room is located along the hillside on the south side of the Power Plant, the boiler room and the flue gas treatment building are located further to the northern direction toward the Paka river,
- **East-west:**
The machine room is located on the plateau west from Unit 1, the boiler room and the flue gases treatment building are located in the west direction toward Šoštanj,
- **East-north:**
The machine room is located on the plateau west from Unit 1 (same as in option East-West), the boiler room and the flue gases treatment building are located in the north west direction toward the Paka river.

When selecting optimum allocation, the following criteria had been taken into account:

- Environmental requirements and limits,
- Technological conditions required for proper and efficient operation of the new Unit as well as of the existing Units that will remain in operation.
- Technical requirements for constructing the new buildings.
- Access to the buildings, for maintenance purpose and for simple operating, and
- Incorporation into the existing territory with little or no interferences.

As best possible option, the East-West lay-out had been selected, where the machine room is located on the plateau west from Unit 1, the boiler room and the flue gases treatment building are located in the west direction toward Šoštanj, the cooling tower is located further into the hillside.

One of the advantages of such lay-out is allocation of the buildings onto the plane zone, save for the cooling tower, which will be located further to the hillside on the plateau, raised by some 5 m. This will add some extra costs to the budget, but the space will be more rationally used. Another advantage of this lay-out option is also the standard arrangement of the buildings and of the technological equipment. This means that it is verified, controlled, optimised and therefore assures lower price. Also, it is offered by a vast number of suppliers.

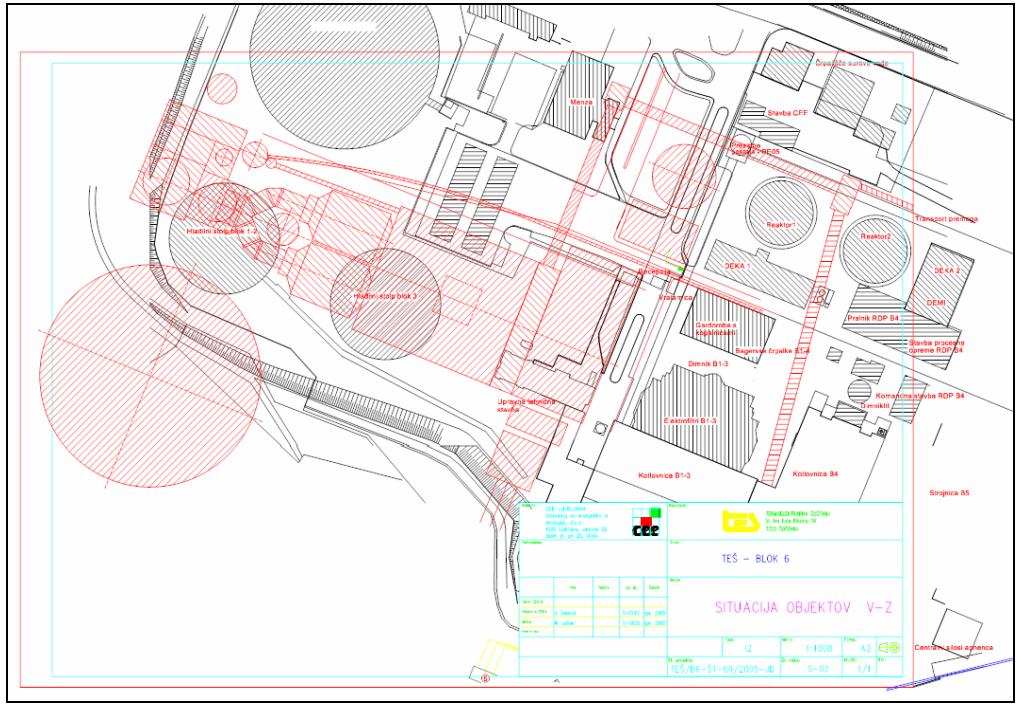


Figure 3: Position of buildings - East-West

III. SEGMENTS OF THE ENVIRONMENT – DESCRIPTION AND ESTIMATION OF THE EXPECTED EFFECTS OF THE PLAN

Air protection

The environmental goals regarding emission of the pollutants demand the achievement of the limit emission concentrations and reduction of the emission of sulphur dioxide, nitric oxide, dust and other pollutants, according to Regulation about limits of the emission of the pollutants in the air from big heating facilities (Official gazette RS, No. 73/2005). This can be achieved by choosing the best available technology (BAT) for big heating facilities. The environmental goals regarding the ambient air pollution are the reduction of the ambient air pollution and the achievement of the prescriptive limit and goal value of the ambient air pollution with sulphur dioxide, nitric oxide, ozone and parts according to Regulation about sulphur dioxide, nitric oxide, parts and lead in the ambient air (Official gazette RS No. 52/2002, 121/2006) and Regulation on ozone in the ambient air (Official gazette RS No. 8/2003).

The chosen coal powder technology and cleaning of the flue gases represent the appropriate BAT technology for applying coal in big heating facilities and the emission of the pollutants from TEŠ will be reduced, when the unit 6 is finished. The unit 2 will replace the old units 1, 2, 3 with the BAT technology with higher efficiency, which corresponds to modern goals of the energy strategy.

We estimate, that apart of the *direct influence*, defined with the evaluation range, there is also the *long distance influence* due to the long distance transport of flue gases. The expected concentrations of sulphur dioxide in the ambient air are shown in sample calculation and in data of immission concentrations on the Austrian side of the border. All data show that in the actual condition the concentrations don't exceed the immission limits. At the expected height of the chimney (230m) of the new unit 6 TEŠ the immission concentrations will nowhere exceed the values regulated by law.

The power plants are the source of emission of nitric oxide that are one of the forerunners at ground ozone developing, yet they represent the minor part in accordance to traffic, which is the main source of NOx in Slovenia. In the new unit 6 there will be an appliance for the selective catalytic reduction of NOx, which means the reduction of emission and immission concentrations of NOx, and this will cause the *synergy influences* on formation of the ground ozone as well. Due to the reduced emission of pollutants in the air the *long-term influences* will be reduced as well.

Due to the appropriate conditions of the flue gases emission the quality of the ambient air will be higher as well. According to this we assume that the expected construction of unit 6 TEŠ doesn't represent a main influence on the environment when the extenuating measures are taking into account. These measures are represented by the electrostatic precipitator system for extracting the dust parts, eliminating the nitric oxide by catalytic reduction by using ammonia, and filter plant for desulphurization for flue gases by using the technology of wet scrubbing of flue gases in the basis of CaCO₃.

ESTIMATION OF EFFECTS		
Ambient air quality	During construction	During operation
	B	C

Soil protection

The environmental goals regarding soil protection are the reduction of intrusion of different pollutants in the ground, especially those from the polluted air masses.

In the region of the site TEŠ the ground is used for rural and industrial purposes mostly, in the southern part of the power plant there is also a forest. By dumping by-products (slag, thick ash, electrostatic filter ash and plaster), the coal-mine subsidence areas between Družmirje and Velenje lake are rehabilitated and this could take place during operation of TEŠ 6 as well. We don't expect any negative effects on the ground when constructing the unit. The influences during operation of TEŠ 6 will depend on emissions caused by TEŠ. There are *long distance influences* during operation due to dumping the pollutants on the ground surface as wet deposition (rainfall) and dry deposition (dust sediment). As the emission of pollutants in the air will be lower after finished construction in comparison with the present condition, we estimate that the influences of dumping the pollutants on the ground will be reduced, but they will be permanent. The expected emission of will SO₂ and NO_x will be lower after the beginning of operation of unit 6 than the present emission. We estimate therefore the influence of operation of TEŠ 6 will have no essential influence on the soil quality.

ESTIMATION OF EFFECTS		
Soil quality	During construction	During operation
	B	A

Development and manipulation with the wastes

The environmental goals regarding manipulating the wastes are the reduction of the quantity of the solid waste products (ash, slag and plaster), that are the result of the electric power production and they are dumped on legal dumping locations, and the increase of the material use of the mentioned wastes that effects the quality of the waste products, mostly the contents the unburnt organic materials in slag.

With the new unit TEŠ 6 we don't expect essential changes in manipulating wastes as the result of the electric power production and being used at filling (reconstruction) the sinkings of the coal-mine Premogovnik Velenje. The reduced quantity of waste water at the site of the sinkings due to cancelling the hydraulic transport of the ash has a positive effect on the environment. We estimate that the influence of the planed construction will have no essential influence on manipulating the wastes, as well during the construction as during the operation of the unit 6 TEŠ.

We estimate that the unit 6 will have a *permanent positive effect* on dumping the by products of combustion in coal-mine caves and for filling the subsidence areas.

ESTIMATION OF EFFECTS		
Developing and manipulating the wastes	During construction	During operation
	B	B

Surface water protection

The environmental goals regarding surface water protection are mostly preserving the quality or improving the condition of all surface waters.

The effect on waters during construction will not be essential, when all necessary measures will be respected. There will be some effects due to greater usage of rough water and greater quantity of waste technologic waters, i.e. outlet in the water flow. With the appropriate expected cleaning of waste waters on CČN and with reaching specific MDK values and with assuring the Qesp of the river Paka and of the lake level the influences on the water flow and lakes will not be essential when the extenuated measures will be respected.

We estimate that at the closed circuit of the technological waters and at the appropriate cleaning of waste waters there will be *direct effects* on water only due to the expected emission into water, which will be in accordance with the applicable legal regulations.

ESTIMATION OF EFFECTS		
Surface waters	During construction	During operation
	B	B

Underground water protection

The environmental goals regarding underground water protection are how to prevent worse quality and how to take care for better condition of all underground waters.

There is no direct effect on underground waters, except in the case of accidental spilling of different fuels, lubricants or ammonia.

ESTIMATION OF EFFECTS		
Underground waters	During construction	During operation
	B	A

Noise protection

The environmental goals regarding noise protection in natural and living space are the reduction of noise emission on the source of the noise and the reduction of noise spread – this will ensure a healthy living space during construction and during operation of the unit 6.

There will be a clearly noticeable noise exposure in front of the exposed residential buildings when working with heavy construction machines. The additional measurements of noise protection measures will be needed, as prescribed. By applying these measures we would be able to achieve the noise levels at construction works as prescribed by law. Therefore the effect of the construction will not be essential under condition that the extenuating measures will be respected. The nearest residential buildings will not be exposed to the excessive noise when the new unit 6 will be built and when it will operate – under condition that all necessary noise protection measures will be respected. The emission noise level will not exceed 45 dBA in front of the nearest residential buildings in the III stage of noise protection and which are about 200m away from the planed unit.

The long distance influence of the noise takes place outside the industrial zone TEŠ, that could have a permanent influence on the environment as well. As the expected limits of the noise outside the industrial zone will not be exceeded, we estimate that there will be no mentioned effects due to construction and operation of the unit 6 TEŠ, under condition that the extenuating and protective measures will be respected. The effect will be negligible, when the extenuating measures are respected.

ESTIMATION OF EFFECTS		
Noise protection	During construction	During operation
	C	C

Protection from electromagnetic radiation

The environmental goals regarding protection from electromagnetic radiation (EMR) in natural and living space are how to achieve the environmental pollution by EMR as little as possible.

The only sources of electric field strength, which can be registered, are the connections of high power transformers. At all connections the value of the electric field strength at the allowed distance for a man, is lower than the effective limit for the I. region.

We think that the 400 and 110 connections that are according to technical level important for discussion will be short and that they will go directly into 400 or 110 kV cable, which means that they will not effect the environment by electric fields.

We estimate that *direct* and *long distance effects* due to the construction and operation of unit 6 TEŠ are negligible.

ESTIMATION OF EFFECTS		
Electromagnetic radiation	During construction	During operation
	A	A

Protection of human health

The environmental goals regarding protection of human health are how to ensure or improve a healthy living space during construction and during operation of the unit 6.

During operation of the unit 6 there are different negative effects on human health. The two main causers of these negative effects are polluted air and noise.

Polluted air can cause *long distance effects* due to the transport of the pollutants through the air in long distances, due to the *short exposure* to high concentrations of pollutants in the ambient air, *cumulative* and *synergy* effect due to different pollutants and permanent exposure to low concentrations. The unit 6 will not cause the exceeding the limits of the immission concentration in the air. As the limits of the immission concentrations the ones that have no negative effect on human health, we estimate that the effects on human health will be negligible. As the emissions from TEŠ will be lower after the unit 6 TEŠ is built, the conditions in the environment will improve compared to the present conditions.

In the discussed example the noise could have a negative effect on human health as well – as a *long distance* and *permanent* effect. As the noise limits outside the industrial zone TEŠ will not be exceeded, we estimate that the effects on human health will be negligible.

ESTIMATION OF EFFECTS		
Human health	During construction	During operation
		B

Protection of animals

The environmental goals regarding protection of animals are how to achieve and maintain satisfactory living conditions and how to prevent the decreasing of biotic diversity of ecosystems.

Most of construction works will take place inside the industrial zone TEŠ. We don't expect any negative effects on animals during construction of the unit 6. Regarding effects of TEŠ 6 on the environmental the most important are the immission concentrations of pollutants in the vicinity of TEŠ and the way of waste dump. The expected emission of SO₂, NO_x, dust and heavy metals will be lower compared to the present situation, therefore the living conditions for animals will get better.

The effects that may emerge are defined as *long distance* and *permanent* due to the immission concentrations of the air as the result of the emission of the pollutants from TEŠ in the air. As the immission concentrations will not exceed the limits, we estimate that the expected effects during operation of the unit 6 are negligible.

ESTIMATION OF EFFECTS		
Protection of animals	During construction	During operation
		A

Protection of plants

The environmental goals regarding protection of plants are how to maintain satisfactory living conditions and how to prevent the decreasing of biotic diversity of ecosystems

Most of construction works will take place inside the industrial zone TEŠ. We don't expect any negative effects on plants during construction of the unit 6. Regarding effects of TEŠ 6 on the environmental the most important are the immission concentrations of pollutants in the vicinity of TEŠ and the way of waste dump. The expected emission of SO₂, NO_x, dust and heavy metals will be lower compared to the present situation, therefore the living conditions for plants will get better.

The effects that may emerge, are defined as *long distance* and *permanent* due to the immission concentrations of the air as the result of the emission of the pollutants from TEŠ in the air. As the immission concentrations will not exceed the limits, we estimate that the expected effects during operation of the unit 6 are negligible.

ESTIMATION OF EFFECTS		
Protection of plants	During construction	During operation
	A	B

Protection of nature and natural heritage

The environmental goals regarding sanctuaries and natural heritage are how to preserve the characteristics, which give them the status of sanctuaries and natural heritage.

Most of the construction works will take place inside of the TEŠ, where there is no sanctuaries and regions of NATURA 2000, and we don't expect any negative effects on nature. In the vicinity of TEŠ there could be negative effects mostly due to emissions in the environment and dumping of wastes of the burning process. The expected emission of SO₂, NO_x and dust will be lower compared to the present situation, the effects of the operation of the unit 6 will be negligible.

As there are no buildings of natural heritage and no sanctuaries registered on the site of the unit 6, only *long distance* and *permanent* effects as the result of emissions from TEŠ could be expected. As the expected immission concentrations will not exceed the limits, their effects will be negligible.

ESTIMATION OF EFFECTS		
Sanctuaries and natural heritage	During construction	During operation
	A	B

Protection of characteristics of the region

The environmental goals regarding characteristics of the region are how to preserve the characteristics that give the region the status of the »region characteristics«.

The version east – west, where the cooling tower is situated to the south in the hill, will increase the effects on regional characteristics during the construction. The site will be exposed more and there will be greater actions in relief structure of the region needed.

During operation of the unit 6 placed in east-west direction the unit is placed more in south slope. Due to this location the unit is less dominant in the space. At good composition proportion and relation to the existing buildings in the space this version can be treated as the appropriate version of the unit 6.

ESTIMATION OF EFFECTS		
Regional characteristics	During construction	During operation
	C	C

Cultural heritage

The environmental goals regarding cultural heritage are how to preserve permanently those values that have been acknowledged as cultural heritage.

In the location of TEŠ there are no units of cultural heritage, yet they are in the vicinity: in towns Šoštanj and Velenje and in the nearby villages. We don't expect any effects on cultural heritage during construction. Nevertheless the conditions and the opinion of the Institution for protection of cultural heritage of Slovenia – local authority Celje have to be obtained. The effects during operation of TEŠ 6 will depend on immissions caused by TEŠ. The expected emission of SO₂ and NO_x and dust after starting of the unit 6 will be lower than the existing ones, so, we estimate the effects on cultural heritage due to operation of the unit TEŠ 6 as negligible.

ESTIMATION OF EFFECTS		
Cultural heritage	During construction	During operation
	A	B

Conclusion

According to the estimation of the effects on the environment the conclusion regarding constructing of the unit 6 TEŠ, 600 MW, with ancillary buildings, which is the item of the Community Detail Plan, with the applicable and environment-friendly BAT technology with the expected treatment plants and with a strict respecting of the proposed measures for reducing negative impacts on the environment, during construction as well as during operation, as an acceptable action in the environment.