

Standard Summary Project Fiche – IPA centralised programmes

Project number 17: Environmental Protection at the Electric Power of Serbia (EPS) company

1 BASIC INFORMATION

- 1.1 CRIS Number:** [2008/020-406](#)
- 1.2 Title:** **Environmental Protection at the Electric Power of Serbia (EPS) company**
- 1.3 ELARG statistical code:** 02.27
- 1.4 Location:** Republic of Serbia

Implementing arrangements:

- 1.5 Contracting Authority:** EC Delegation to the Republic of Serbia
- 1.6 Implementing Agency:** EC Delegation to the Republic of Serbia
- 1.7 Beneficiary** (including details of project manager):

The Project Manager will be Assistant Minister Predrag Sekeljic, Ministry of Mining and Energy.

Responsible for the management of the project: MIHAJLO GAVRIĆ – EPS, Manager of the Environmental Protection Sector, Electric Power Industry of Serbia – EPS.

A Steering Committee will be formed consisting of approximately 6 members. It will be chaired by the Project Manager and include representatives of the EC Delegation and other stakeholders such as the Ministry of Mining and Energy, the Ministry of Environment, Ministry of Forestry and Water Resources Management, Ministry of Finance etc.

Financing:

- 1.8 Overall cost:** **17,000,000 EUR**
- 1.9 EU contribution:** **11,000,000 EUR**
- 1.10 Final date for contracting:** 3 years after the signature of the Financing Agreement
- 1.11 Final date for execution of contracts:** 5 years after the signature of the Financing Agreement
- 1.12 Final date for disbursements:** 6 years after the signature of the Financing Agreement

2 OVERALL OBJECTIVE AND PROJECT PURPOSE

2.1 Overall Objective:

To contribute to environmental harmonisation and removal of serious health hazards.

2.2 Project purpose:

To fulfil Directive 2001/80/EC for large combustion plants by modernising specified Thermal Power Plants (TPPs), and EU Directive 96/59/EC by decontaminating facilities and replacing equipment using PBD – pyralene oils.

2.3 Link with AP/NPAA / EP/ SAA

AP and NPAA are not applicable

The Plan for Implementation of the European Partnership Priorities has listed detailed task with regards to the Environment and Energy sector – 7.3.2 - to begin implementation of the national environment strategy, 7.3.5 - to implement adopted legislation on industrial pollution, 7.3.12 – to continue to implement the national environment protection strategy, 7.5.1 implement the Commitments undertaken in the framework of the Energy Community Treaty.

Commission working document “Serbia 2007 Progress Report” as of 6.11.2007 (SEC(2007) 1435), regarding the Stabilisation and Association Agreement and the European Partnership priorities, where on page 34 stands “Limited progress has been made in implementing legislation on industrial pollution control and risk management. Work on plans to achieve compliance of existing installations with the legal requirements has been initiated, on pilot project basis”.

Under the European Partnership Serbia is committed to “establish an independent Energy Regulatory Agency and carry out environmental audits on energy plants and address worst polluters.”(p. 12). Under Article 111 (Environment) of the SAA, Serbia is obliged to halting further degradation and start improving the environmental situation with the aim of sustainable development. Stockholm Convention;

This project is strongly linked with the quoted documents, tasks and expectations.

The Energy Community Treaty signed multilaterally by the EU Commission and Balkan countries introduces the legal requirement for Serbia to implement the Acquis on the Environment. Annex II of the Treaty sets the deadline of 31 December 2017 for implementation of Directive 2001/80/EC (the ‘large power plant’ Directive), which is a relatively short period for such a major programme of works, and with such a high cost.

EU legal requirement (Directive 96/59/EC) requires the elimination of all PCB-filled devices by 2010/2015. This project will assure compliance within EPS by 2011.

Under the European Partnership Serbia is committed to “establish an independent Energy Regulatory Agency and carry out environmental audits on energy plants and address the worst polluters.” (p 12).

Under Article 111 (Environment) of the SAA, Serbia is obliged to halt further degradation and start improving the environmental situation with the aim of sustainable development. ...Cooperation could also centre on the development of strategies to significantly reduce local, regional and trans-boundary air and water pollution, to establish a system for efficient, clean, sustainable and renewable production and consumption of energy. (p59)

2.4 Link with MIPD

Energy: Compliance support to meet the needs of the Regional Energy Treaty, relevant Community Directives and regional market obligations; compliance of legislation with the acquis. (p. 23)

Environment: Support to the approximation and implementation of Environmental legislation and related strategies p. 22)

The benefit from this project will be the implementation of the EU Directives 2001/80/EC for large combustion plants and 96/59/EC for pyralene oils.

2.5 Link with National Development Plan (where applicable) n/a

2.6 Link with national / sectoral plans

The project is in accordance with all of the following strategic documents:

- Sustainable Development Strategy of the Republic of Serbia
- The Programme of Energy Development Strategy Implementation of the Republic of Serbia by 2015 for the period from 2007 and 2012
- Waste Management Strategy (the whole document)
- National Environmental Programme of the Republic of Serbia (NEAP RS)

- The Framework Plan of the Electric Power Industry of Serbia for the Reduction of Harmful Substances Emission from EPS TPPs considered within the Study: 'Emission Control from Coal-Fired TPPs of Electric Power Industry of Serbia', was financed by European Agency for Reconstruction during 2003. The Plan was developed in cooperation with EPS, Ministry of Mining and Energy and Ministry of the Protection of Natural Resources and Environmental Protection of the Republic of Serbia.
- The Pre-feasibility Study for Emission Control for Coal-Fired Power Plants, financed for EAR during 2003 by RWE Innogy, established the priority facilities for harmful substance emission alignment from EPS TPPs.
- The new Serbian Environmental Protection Law anticipates continuous control of air emission of harmful substances for all TPPs.
- Sustainable development and environmental management measures were planned for the next ten years for the Republic of Serbia within the National Environmental Program of the Republic of Serbia (NEAP RS – Draft) adopted in accordance with the Environmental Protection Law (Official Gazette RS № 135/04).
- EPS Development Plan and EPS Mid-Term Development Plan define the need to reduce dust emission from existing thermal power plants and eliminate PCB oils.

The proposed project is in the field of waste management and air quality protection, one of the first priorities which is one part of the restructuring of environmental protection in EPS, and represents some 70% of the problem of environmental protection in the Republic of Serbia.

3 DESCRIPTION OF PROJECT

3.1 Background and justification:

During the last decade of the twentieth century, Serbia had many problems such as social-economic setbacks, isolation and a difficult inheritance which resulted in Serbia neglecting environmental issues. As the country emerges from this period, fresh attention is being given to the environment so that technical and energy-related development assumes a cleaner nature than hitherto. Electric Power Industry of Serbia (EPS) with its activities - starting from natural resources, coal and hydro potential to generation, transmission and distribution of electricity - has a great impact on the natural state of environment. Thermal power facilities are without a doubt the biggest polluters of air, compared to other plants and facilities within EPS. In accordance with the Serbian policy of association and harmonisation with the EU and its standards, the Electric Power Industry of Serbia decided to give first priority to respecting EU environmental standards.

Flue gasses from TPPs - Part of IPA funding (EU contribution)

During the construction of existing TPPs, there were no legal regulations concerning emission limits at the republic level, so no measures were taken to reduce sulphur and nitrogen oxide emission into the atmosphere. Measures taken to reduce dust emission do not meet current emission requirements and limits, both of domestic and EU regulations. Emission alignment of these facilities with the requirements of EU regulations is required in the forthcoming period.

Measuring equipment for continuous emission measurement was not installed on thermal power plants - concentration level of dust and gases (SO₂, NO_x, CO, CO₂) in flue gases. Emission control is carried out once a year by the authorised institution.

Equipment for dust treatment of flue gases - electrostatic precipitators (ESP) was installed in Nikola Tesla B Thermal Power Plant as an air protection measure when it was constructed in 1984-1985. Electrostatic precipitators of this unit have an ash handling design value of 98% and a design value of dust concentration in flue gases after electrostatic precipitator of 951 mg/m³, meaning that even if they operated within their design values they would not meet current legal regulations for dust concentration reduction in the atmosphere, i.e. the prescribed emission limit value. Flue gases of this unit are emitted into the atmosphere over

a stack with the height $H=280$ m, therefore the operating state of the electrostatic precipitator has a direct impact on air pollution of the immediate environment.

The electrostatic precipitators were designed with a number of sections per precipitator (2 sections, while the new ones have 16 sections), hence section outages have a more significant impact on the reduction of ash handling level and increase of dust emission from the stack. After about 23 years of operation, the present ESP separation rate is well below design values. The large scale emissions from the thermal power plant due to the lack of effective ESPs leads in particular to significant deposits of heavy particles in the surrounding areas which experience a high incidence of respiratory illnesses, particularly among children. This pollution also causes damage to crops and agricultural produce. Power station plumes can travel considerable distances with little dilution. The power plants included in this project are relatively close to fairly large population concentrations - the municipality of Obrenovac in which the power plants are situated, has a population of about 30,000.

From 2000, EPS has taken a series of actions aimed improving the operation of thermal units, as well as increasing the availability and reliability of units in operation. By 2004, within the capital overhaul and regular overhauls, special attention was paid to the ESP, with the purpose of bringing the existing ESP after ten-year operation to the maximum reliability level within the existing technologies. From 2004, alignment of EPS operation with legal regulations was started. Other projects were also launched related to environmental improvement around the TPP and on a broader level. Performed ESP reconstructions at EPS TPPs in the period between 2004 and 2006 include:

- Replacement of existing ESPs with new ones: ESP reconstruction of Unit A1, A2 and A5 at TPP Nikola Tesla A, Units A2 and A4 TPP Nikola Tesla A, and TPP Kostolac A 2004-2007
- Two further ash handling systems, at TPPs Kostolac A and Kostolac B, are being financed by KfW and EBRD amounting to about €40 million in total based on the EAR's Feasibility Study of 2003.
- An ash handling system reconstruction at TPP Nikola Tesla A amounting to about €35 million is being planned.

By aligning electrostatic precipitator operation with requirements of EU regulations for dust emission reduction, the total dust emission from TPP Nikola Tesla A and TPP Nikola Tesla B, after performed ESP reconstruction on TPP Nikola Tesla A - Units 1, A2, A3, A4 and A5, was reduced by 80%; while the total dust emission at TPP Kostolac A and TPP Kostolac B was reduced after ESP reconstruction on Units A1 and A2 by 54%.

Pursuant to the Law on Integrated Pollution Prevention and Control, TPP Nikola Tesla (TPP Nikola Tesla A, TPP Nikola Tesla B, TPP Kolubara (Unit A5) and TPP Morava) should by 2015 obtain an operation permit, while one of the conditions for obtaining of this permit is alignment of their operation with the requirements of legal regulations, related to continuous emission measurements.

Between 2003 – 2007 during the ESP reconstruction, equipment for continuous air emission measurement of harmful and hazardous substances was installed at a number of TPPs, but some remain uncontrolled. This project is designed to address this lack.

PCB – Pyralene oils-Not part of IPA funding (EU contribution)

PCB oils are well-known as one of the most toxic substances in common use in the electrical power industry. Until recently they have been used in transformers of all kinds, from major sub-stations to small local transformers. Especially the latter are almost impossible to protect adequately from the dangers of damage, and leaked PCBs constitute a serious health hazard for many citizens, often the most disadvantaged sectors of society.

Previous experience in the settlement of this issue is reflected through implementation of studies, programmes and plans implemented so far. Such projects include:

- Settlement of issues concerning areas contaminated with PCB oils created by NATO bombing of substation BOR 3 at Bor. The issue was settled through a Norwegian

donation for terrain development – decontamination of the area and operational restoration of the completely destroyed substation.

- Elimination of the great number of condensers filled with PCB oils – pyralene oils at CE *Elektrodistribucija Beograd* and CE *Elektrodistribucija Kraljevo*.
- Implementation of the Study bearing the same name as this project *Settlement of Issues related to PCB (Pyralene Oils) Filled Devices at PE EPS*, aimed at the registration of all PCB devices at PE EPS (PCB transformers: total: 2 units/100kVA, 1 unit /250kVA, 14 units /400kVA, 9 units /630kVA, 16 units /1000kVA, 4 units /1250kVA - in total 46 containing a mass of 33,217kg of PCB out of a total mass 126,759kg including PCB-filled transformers (contaminated PCB transformers: 26 units/132- 360 kVA).
- Elimination plan of PCB devices and their substitution by 2010.

The elimination of this highly toxic material from the industrial process in JP EPS, in accordance with the requirements of the WHO, UN POPs convention (Stockholm) and the EU directive 96/59/EC is a high priority.

3.2 Assessment of project impact, catalytic effect, sustainability and cross border impact (where applicable)

Impact

After the reconstruction of the electrostatic precipitator of Unit B2 TPP Nikola Tesla B, dust emission into the atmosphere from flue gases will be reduced by 90% to the level of 30 mg/m³, which will have an impact on air quality improvement around the TPP, reduction of soil contamination and reduction of the number of people suffering from respiratory illnesses in this area. The number of sections will be increased within the planned reconstruction, with the achievement of higher reliability of operation of these electrostatic precipitators. In addition to this, analysers for continuous dust emission measurement in flue gases after the ESP will be installed, enabling constant control of ESP operation.

This project will also enable continuous monitoring of emission of harmful substances from flue gases of the power plants of EPS, TPP Nikola Tesla A and B, situated nearby the town of Obrenovac (about 30 000 inhabitants), and 40 km away from Belgrade, TPP Kolubara A, situated nearby the town of Lazarevac (about 30 000 inhabitants) and TPP Morava, situated nearby the town of Svilajnac.

Quality emission monitoring would enable improvement of air quality around the TPPs. The number of people suffering from respiratory illnesses, now increasing in this area, would be reduced,. Harmful impact on soil would also be reduced around the facilities through constant control of operational efficiency of installed electrostatic precipitators.

Eliminating all PBC oils in EPS and cleaning up after contamination of the surroundings will remove serious health hazards from the environment. The impact is expected to be shown in a long-term reduction in the instance of associated health problems such as cancer.

Catalytic effects

The health of the working and the youngest population will be improved, with all direct and indirect effects: reduction of health costs, both curative and preventive for all levels and age groups of population; increased efficiency of the working part of population; reduced pollution of agricultural surfaces; improved economy of the affected areas.

The PCB work in EPS will set a standard to be emulated by others. It is difficult to enforce environmental legislation in the private sector when the bulk of pollution is the responsibility of such a large public organisation as EPS. When EPS has cleaned up its operations, general enforcement will be easier to implement and better justified.

Sustainability

The Government Memorandum on budget for 2008 with projections for 2009 and 2010 shows that the Government commits itself to undertake gradual annual tariff adjustments in order to reach cost-recovering tariffs for electricity in compliance with European levels, thus

allowing EPS to raise finance for investment in environment projects. The current round of investment through donor financing should therefore represent a one-off improvement to bring the Serbian power generating capacity to a point where sustainable further development is possible without subsidy or further donor intervention.

In eliminating PCBs, Serbia will be bringing itself into line with international standards. Through adoption and approximation of Serbian legislation to EU standards, far greater attention will in future be given to potentially hazardous substances, and avoiding a repeat of the present situation will become a mainstream task of energy producers and environmental agencies alike.

3.3 Results and measurable indicators

The components 1 and 2 are financed through IPA funding, whereas the 3. component – (PCB project) is 100% financed by EPS as national public contribution.

Component 1:

A new ESP procured and installed at TPP Nikola Tesla B Unit B1.

Measurable indicators will be the degree of compliance with a procurement and installation schedule to be developed with the tender documentation.

Component 2:

Equipment for continuous air emission measurement of harmful and hazardous substances Procured and installed at TPP Nikola Tesla A and B, TPP Kolubara A and TPP Morava.

Measurable indicators will be the degree of compliance with a procurement and installation schedule to be developed with the tender documentation.

Component 3:

This project will be contracted, financed, managed and implemented by EPS.

All EPS contamination sources (facilities and devices filled or contaminated with PCB oils) eliminated and replaced with corresponding facilities and devices that satisfy EU standards.

Indicators:

- Number of devices containing PCB destroyed and substituted
- Number of devices containing PCB decontaminated and placed back into service
- Number of decontaminations of contaminated surrounding facilities
- Number of decontaminations of soil and water resources.

3.4 Activities:

Activities related to component 1

1. Launching of the service contract for Technical Specifications for components 1 and 2 (technical assistance of the independent consultant for the drafting of technical specifications of equipment);
2. Launching of the service contract for the Supervising Engineer (components 1 and 2), also for the TA in the evaluation of the works contract
3. Launching of the international works tender and collection of tenders
4. Selection of contractor and contract conclusion
5. Manufacture and transport of equipment
6. Dismantling of old equipment
7. Installation of equipment
8. Commissioning with all accompanying tests
9. Continuous operation of the facility and analysis of operation results.

Activities related to component 2

1. Launching of the service contract for Technical Specifications for components 1 and 2 (technical assistance of the independent consultant for the drafting of technical specifications of equipment);
2. Launching of the service contract for the Supervising Engineer (components 1 and 2), also for the TA in the evaluation of the works contract
3. Launching of the international works tender and collection of tenders
4. Selection of the contractor and contract conclusion
5. Supply of measuring equipment for measurement and data processing (hardware and software)
6. Preparation of measuring points
7. Installation and calibration of the measuring equipment
8. Commissioning of the measuring equipment
9. Training of operational staff for supervision and maintenance of the measuring equipment

Activities related to component 3 (fully handled and financed by EPS)

Development and implementation of an action plan including the following:

1. Development of tender documents
2. Dismantling of existing transformers and other devices
3. Decontamination of contaminated transformers and other devices where possible
4. Transport and destruction of existing transformers and other devices
5. Supply and erection of new transformers and other devices
6. Commissioning of new transformers and other devices
7. Decontamination of surrounding installations
8. Decontamination of soil and water resources
9. Monitoring of project implementation
10. Acceptance and commissioning of facilities by operating divisions of EPS.

All activities should be carried out in accordance with the latest domestic and EU legislation.

Contracting Arrangement:

Components 1 and 2

There will be two service contracts (1.1 preparation and 1.2 works supervision) and the two works contracts (for 1.3 precipitators and 1.4 monitoring system), with EPS as employer and the EC delegation as financing authority.

Component 3

There will be one supply & works contract 1.5 to replace contaminated equipment that cannot be rationally decontaminated. Financing will be by EPS, supervision and testing will be carried out by the staff of EPS.

3.5 Conditionality and sequencing:

It will be a condition that the technical specifications should be prepared by the beneficiary. Implementation of the works must be overseen by a qualified supervising engineer. For operational reasons (the need to operate the power plants during the peak winter period) works to replace the ESPs must be undertaken during the planned plant shutdown periods.

Concerning PCB oils, supplies should be timed for delivery when the first installations are removed for destruction and surrounding facilities decontaminated.

3.6 Linked activities

From 2000, EPS has taken a series of actions aimed at the improvement of operation of thermal units, as well as availability and reliability increase of units in operation.

By 2004, within the capital overhaul and regular overhauls, special attention was paid to the ESP, with the purpose to bring the existing ESP after ten-year operation to the maximum reliability level within the existing technologies. From 2004, alignment of EPS operation with legal regulations was started.

Other projects were also launched related to environment improvement around the TPP and on a broader level:

- Capital overhauls of units A3 TPP Nikola Tesla A, reconstruction of ESP (€64.5 m CARDS 2002), financed by EAR.
- Study of pollution from thermal power stations in Serbia and on pollution mitigation measures and their costs (€0.75 m CARDS 2003), financed by EAR.
- Development of an Environmental System for EPS in accordance with ISO standards (Phase one in CARDS 2003 €0.3M and Phase II in CARDS 2004 €0.175M), financed by EAR.
- Reconstruction of Unit A1, A2, A4 and A5 ESPs, TPP Nikola Tesla A between 2004-2007 (€58 m).
- Reconstruction of Unit A2, Electrostatic precipitators at TPP Kostolac A, CARDS 2004, €5M, financed by EAR (based on the study undertaken under the 2003 programme).
- Ash handling system reconstruction with the thick slurry system at TPP Nikola Tesla B (€28M), through which reduction of ash dispersion from the ash pit will be achieved. Project implementation started in 2007, financed by EAR.
- Emissions Reductions from Nikola Tesla thermal power plant (unit A6 at the Nikola Tesla A and Unit B2 at the Nikola Tesla B) was granted €12 m from IPA 2007 budget and the project is expected to start in 2009.

3.7 Lessons learned

Experience on reconstruction executed so far has shown that equipment delivery period from abroad was prolonged, having an impact on the completion of the planned reconstruction implemented during overhauls, whose beginning and duration period is limited during the year. This is the reason why the tenders for equipment procurement and delivery necessary for the reconstruction should be planned earlier, since equipment comes from abroad.

When working with PCB oils, previous experience and international norms show that exceptional measures of personal protection need to be strictly implemented during the execution of these activities

4. INDICATIVE BUDGET (AMOUNTS IN €)

			SOURCES OF FUNDING									
			TOTAL EXP.RE	IPA COMMUNITY CONTRIBUTION		NATIONAL CONTRIBUTION					PRIVATE CONTRIBUTION	
ACTIVITIES	IB (1)	INV (1)	EUR (a)=(b)+(c)+(d)	EUR (b)	%(2)	Total EUR (c)=(x)+(y)+(z)	% (2)	Central EUR (x)	Regional/ Local EUR (y)	IFIs EUR (z)	EUR (d)	% (2)
Activity 1												
Contract 1.1		X	200,000	200,000	100							-
Contract 1.2		X	1,000,000	1,000,000	100							
Contract 1.3		X	6,500,000	6,500,000	100							
Contract 1.4		X	3,300,000	3,300,000	100							
Contract 1.5		X	6,000,000			6,000,000	100	6,000,000				
TOTAL IB												
TOTAL INV			17,000,000	11,000,000	64.7	6,000,000	35.3	6,000,000				
TOTAL PROJECT			17,000,000	11,000,000	64.7	6,000,000	35.3	6,000,000				

NOTE: DO NOT MIX IB AND INV IN THE SAME ACTIVITY ROW. USE SEPARATE ROW

Amounts net of VAT

(1) In the Activity row use "X" to identify whether IB or INV

(2) Expressed in % of the **Total** Expenditure (column (a))

4 INDICATIVE IMPLEMENTATION SCHEDULE

Contracts	Start of Tendering	Signature of contract	Project Completion
Contract 1.1	T + 2Q	T + 3Q	T + 5Q
Contract 1.2	T + 3Q	T + 5Q	T + 12Q
Contract 1.3	T + 4Q	T + 6Q	T + 12Q
Contract 1.4	T + 4Q	T + 6Q	T + 12Q
Contract 1.5	T + 1Q	T + 4Q	T + 12Q

5 CROSS CUTTING ISSUES

5.1 Equal Opportunity

The beneficiary will make sure its objectives, policies and interventions have a positive impact on and are in line with the main principles of gender equality. It will ensure equal opportunities clauses in all tendering material for procurement of equipment.

5.2 Environment

The objective of this project is to help Serbia to achieve compliance with the Environmental Acquis, as required by the Energy Community Treaty. This project will thus directly involve mainstreaming of environmental issues.

5.3 Minorities

As minorities and other vulnerable groups are usually the first to suffer from environmental degradation, and have the least chance of protecting themselves (e.g. by choosing residences in non-polluted areas), this project will improve their conditions in terms of reduced health hazards.

ANNEX 1: LOGICAL FRAMEWORK MATRIX

LOGFRAME PLANNING MATRIX FOR Project Fiche		Environmental Protection at the Electric Power of Serbia (EPS) company	
		Contracting period expires 3 years after the signature of the Financing Agreement	Disbursement period expires 6 years after the signature of the Financing Agreement
		Total budget : 17,000,000 Euro	IPA budget: 11,000,000 Euro
OVERALL OBJECTIVE	Objectively verifiable indicators	Sources of Verification	
To contribute to environmental harmonisation and removal of serious health hazards	<ul style="list-style-type: none"> ▪ Serbian practice in line with EU norms. ▪ Reduction of the level of suspended particles in ambient air in the region surrounding the TPP ▪ Reduction of soil contamination ▪ Reduction of incidence of diseases associated with environmental contaminants 	<ul style="list-style-type: none"> ▪ EPS reports ▪ Annual report of Environmental Protection Agency on air quality within the impact zone ▪ Annual statistics report of the Ministry of Health on the number of people suffering from respiratory illnesses and diseases associated with PCBs 	
SPECIFIC PROJECT PURPOSE	Objectively verifiable indicators	Sources of Verification	Assumptions
To fulfil Directive 2001/80/EC for large combustion plants by modernising specified Thermal Power Plants (TPPs), and EU Directive 96/59/EC by decontaminating facilities and replacing equipment using PCB – pyralene oils.	<ul style="list-style-type: none"> ▪ Level of emission parameters (SO₂, NO_x (reduced to NO₂), CO, CO₂, dust) and operation parameters (temperature, oxygen) of TPPS ▪ Consistency of emissions control at TPPs over a longer period ▪ State of EPS installations and surrounding environment in comparison with EU norms. 	<ul style="list-style-type: none"> ▪ EPS / TPP technical reports 	<ul style="list-style-type: none"> ▪ EU standards do not change while the project is being implemented.
RESULTS	Objectively verifiable indicators	Sources of Verification	Assumptions
Component 1: A new ESP procured and installed at TPP Nikola Tesla B, Block B1	<ul style="list-style-type: none"> ▪ degree of compliance with a procurement and installation schedule to be developed with the tender documentation. 	<ul style="list-style-type: none"> ▪ Project reports 	<ul style="list-style-type: none"> ▪ Continued support by top management of EPS for issues of environmental

<p>Component 2:</p> <p>Equipment for continuous air emission measurement of harmful and hazardous substances procured and installed at TPP Nikola Tesla A AND B, TPP Kolubara A and TPP Morava.</p>	<ul style="list-style-type: none"> ▪ degree of compliance with a procurement and installation schedule to be developed with the tender documentation. 	<ul style="list-style-type: none"> ▪ Project reports 	<p>protection.</p>
<p>Component 3:</p> <p>All EPS contamination sources (facilities and devices filled or contaminated with PCB oils) eliminated and replaced with corresponding facilities and devices that satisfy EU standards.</p>	<ul style="list-style-type: none"> ▪ Number of devices containing PCB destroyed and substituted ▪ Number of devices containing PCB decontaminated and placed back into service ▪ Number of decontaminations of contaminated surrounding facilities ▪ Number of decontaminations of soil and water resources. 	<ul style="list-style-type: none"> ▪ Project reports 	
<p>ACTIVITIES</p>	<p>Means</p>	<p>Costs</p>	<p>Assumptions</p>
<p>Component 1:</p> <ol style="list-style-type: none"> 1. Launching of the service contract for Technical Specifications (components 1 and 2) 2. Launching of the service contract for the Supervising Engineer (components 1 and 2) 3. Development of tender documents; 4. Launching of the international works tender and collection of tenders 5. Selection of contractor and contract conclusion 6. Manufacture and transport of equipment 7. Dismantling of old equipment 8. Installation of new equipment 9. Commissioning with all accompanying tests 	<p>One service contract for Technical Specifications (for both components), one service contract for Supervising Engineer (for both components), two works contracts (one component each) .</p>	<p>Two service and two works contracts:11 mil euro</p>	

<p>10. Continuous operation of the facility and analysis of operation results.</p>			
<p>Component 2:</p> <ol style="list-style-type: none"> 1. Launching of the service contract for Technical Specifications (components 1 and 2) 2. Launching of the service contract for the Supervising Engineer (components 1 and 2) 3. Development of tender documents (technical specification) 4. Launching of the international works tender and collection of tenders 5. Selection of the contractor and contract conclusion 6. Supply of measuring equipment for measurement and data processing (hardware and software) 7. Preparation of measuring points 8. Installation and calibration of the measuring equipment 9. Commissioning of the measuring equipment 10. Training of operational staff for supervision and maintenance of the measuring equipment 			
<p>Component 3:</p> <ol style="list-style-type: none"> 1. Development of tender documents 2. Dismantling of existing transformers and other devices 3. Decontamination of contaminated transformers and other devices where possible 	<p>One procurement contract for equipment,</p>		

<ol style="list-style-type: none"> 4. Transport and destruction of existing transformers and other devices 5. Supply and erection of new transformers and other devices 6. Commissioning of new transformers and other devices 7. Decontamination of surrounding installations 8. Decontamination of soil and water resources 9. Monitoring of project implementation 10. Acceptance and commissioning of facilities by operating divisions of EPS. 	<p style="text-align: center;">materials and works.</p> <p style="text-align: center;">Appropriate monitoring personnel supplied by EPS.</p>	<p style="text-align: center;">Supply and works contract: 6 mil euro (financed by EPS)</p>	
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ANNEX 2: AMOUNTS (IN €) CONTRACTED AND DISBURSED BY QUARTER FOR THE PROJECT

(IPA contribution only)

Contracted	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Total
Contract 1.1			200.000										200.000
Contract 1.2					1.000.000								1.000.000
Contract 1.3						6.500.000							6.500.000
Contract 1.4						3.300.000							3.300.000
Cumulated			200.000		1.200.000	11.000.000							11.000.000
Disbursed													
Contract 1.1			120.000		80.000								200.000
Contract 1.2					300.000		200.000		200.000		200.000	100.000	1.000.000
Contract 1.3						1.950.000		1.950.000		1.950.000		650.000	6.500.000
Contract 1.4						1.000.000		1.000.000		1.000.000		300.000	3.300.000
Cumulated			120.000		500.000	3.450.000	3.650.000	6.600.000	6.800.000	9.750.000	9.950.000	11.000.000	11.000.000

ANNEX 3: INSTITUTIONAL FRAMEWORK – LEGAL RESPONSIBILITIES AND STATUTES

Close cooperation of PE EPS and the following institutions is necessary:

- Ministry of Mining and Energy;
- Ministry of Finance;
- Ministry of Environmental Protection – Environmental Protection Directorate;
- Ministry of Forestry and Water Resources Management;
- Municipalities and local communities on whose territory TPP is located.

ANNEX 4: REFERENCE TO LAWS, REGULATIONS AND STRATEGIC DOCUMENTS:

Reference list of relevant laws and regulations:

- Directive 2001/80/EC defining harmful substances emission limit values from large combustion plants;
- Directive 96/62/EC - framework, related to the quality of ambient air;
- Convention on Long-Distance Cross-Border Air Pollution;
- Contract on the Founding of SE Europe Energy Community, which came into force in July 2006, within which implementation of Directive 2001/80/EC is planned;
- Law on Environment Protection - Official Gazette RS № 135/04;
- Law on Integrated Pollution Prevention and Control - Official Gazette RS № 135/04;
- Stockholm Convention;
- Directive 96/59/EC;
- Draft Law on Waste Management;
- Draft Law on Air Protection;
- Energy Development Strategy by 2015 (Republic of Serbia);
- The Programme of Energy Development Strategy Implementation of the Republic of Serbia by 2015 for the period from 2007 and 2012;
- EPS Development Plan and EPS Mid-Term Development Plan define the need to reduce dust emission from existing thermal power plants and eliminate PCB oils.

ANNEX 5: DETAILS PER EU-FUNDED CONTRACT (*) WHERE APPLICABLE:

Component 1:

A new electrostatic precipitators installed at TPP Nikola Tesla B, Unit B1, with output dust concentration of 30 mg/m³.

Component 2:

Measuring equipment for continuous emission measurement of harmful and hazardous substance on thermal power plants to measure:

emission parameters: SO₂, NO_x (reduced to NO₂), CO, CO₂, dust,

operation parameters: temperature, oxygen.

Component 3:

All EPS contamination sources (facilities and devices filled or contaminated with PCB oils) eliminated and replaced with corresponding facilities and devices that satisfy EU standards.

100 kVA - 2

250 kVA - 2

400 kVA -14

630 kVA - 9

1000 kVA -16

1250 kVA - 4

Σ - 47

Total mass of PCB - 35 343 kg

Total mass of devices filled with PCB oils - 114 466 kg