CDM PROJECT OPPORTUNITIES IN SERBIA

SUMMARY TABLE

	PROJECT TITLE	REDUCTION [tCO_{2eq}/y]	PARTNERS	STATUS
	METHANE RECOVERY			
1	**AWMS METHANE RECOVERY PROJECT – "PIK – BECEJ"**	**21.000**	PIK – Becej	Project idea
2	**CDM PROJECT ACTIVITY IN BROWN COAL MINE "SOKO", SOKOBANJA, SERBIA**	**54.000**	RMU "Soko" Sokobanja	Project idea
	CARBON SEQUESTRATION			
3	**AFFORESTATION OF BARE SOILS IN CENTRAL SERBIA**	**6.500**	Public Company "Srbijasume"	Project Idea

Project title: Ref. No. 1	**AWMS METHANE RECOVERY PROJECT – "PIK – BECEJ"**
Project description:	The proposed project activity intends to improve current Animal Waste Management System (AWMS) established on the one of the oldest and biggest agricultural companies in the country "PIK – Becej". These changes encompass development of the existing open lagoon system for swine manure treatment into a recovery system. Recovered biogas prevailing with methane will be flared achieving GHG emission reduction through transformation of CH_4 into CO_2. The present manure management is traditional, based on flushing of the manure from the barns followed by two – lagoons wastewater treatment system. Wastewater flows into the primary lagoon where anaerobic digestion takes place while solid phase settles on the bottom. Biogas produced during digestion leads to the direct release of CH_4, N_2O and CO_2 into the atmosphere and is main reason for very unpleasant odour. Every 6 – 8 years primary lagoon is cleaned and removed sludge is used as fertilizer on the cropland. After first lagoon, digested wastewater overflows into the secondary lagoon where settles and stores until application to cropland. This project activity bundles farms belonging the same Working Unit "Pig Farming", located within the radius of up to 15 km: • The Organization Unit "Zalivno Polje" is located 6 km southwest of the Municipality Becej in the vicinity of industrial zone. This is commercial farm with annual production of 50.000 finishers. There are more than 30.000 animals constantly present at the farm of which the majority are market swine types, while population of breeding swine is about 2.350. As well, in the vicinity of the farm is vegetable processing factory „Flora" with production of about 20.000 t of waste during season April-October and cascade system for wastewater treatment. • The Organization Unit "Petefi" is located near river Cik in the vicinity of a village Backo Petrovo Selo. This is nucleus farm with production of 12.000 finishers. There are more than 8.500 animals constantly present on the farm of which breeding swine types are 755. • The Organization Unit "Breg" is located near road Becej – Backa Topola. This is also nucleus farm with production of 30.000 finishers. There are about 20.000 animals constantly present of the farm of which breeding swine types are 2.550. The project activity has foreseen two possible solutions for recovery system. First one is implementation of the simplest recovery system where primary lagoons will be covered with high density polyethylene material in order to collect biogas and avoid emission to the atmosphere. Then, collected biogas will be transported to enclosed flare for flaring in controlled conditions. In order to protect soil under lagoons watertight layers should be placed also. The second possible solution for project activity is implementation of an advanced recovery system using complete mix digesters. The wastewater will be flushed into tank where it will be mechanically mixed to ensure uniform digestion. As manure decomposes, biogas is generated, collected and finally combusted. To speed digestion, waste heat from the combustion of biogas will be used to heat digester. Digested waste water will be stored and used as a fertilizer on the croplands. Potential second project phase might include complete utilization of the biogas. It could be used as a fuel for cogeneration plant, replacing natural gas and electricity for barns heating and other processes in order to maintain intensive swine growth or it could be pumped into natural gas pipeline that exists on the farm in order to reduce usage of fossil fuel.

Applied methodology	AMS-III.D. – **"Methane recovery in animal manure management systems – Version 14"**
GHG offset	It is estimated that the project has capacity to reduced GHG emissions of more than **21.000 tCO_{2eq}/y**.
Sustainability	The following non-GHG related benefits have been identified: • Improvement of the soil quality protection; • Improvement of ground water protection; • Elimination of unpleasant odour in the vicinity of farms facilities; • Introducing of the advanced Animal Waste Management Systems in the county ;
Current status	Specific technical information have been collected through questionnaires and the local site owner agreed on the project implementation.
Estimated investment cost	Investment costs for implementation of simplest recovery system are more than 0,6 M€. For the decentralised advanced wastewater system investment costs are up to 6,8 M€ while costs of advanced centralised wastewater system are up to 4 M€.
Local partners	PIK – Becej

Project title: Ref. No. 2	**CDM PROJECT ACTIVITY IN BROWN COAL MINE "SOKO", SOKOBANJA**
Project description:	Brown Coal Mine "Soko" (hereinafter: RMU "Soko") is located in south Serbia, in the east part of Sokobanja valley in the area of village Citluk. RMU "Soko" operate, together with 8 more coalmines, under the Public Utility for Underground Coal Exploitation "Resavica", founded by Government of Republic of Serbia at 23rd of May 2005. First coal exploitation in the mine started 100 years ago, at 1908, but till 1946 the production was aimed only on satisfying the needs of the local population. The first organized underground exploitation of coal started at 1948 with the production from 40.000 – 60.000 t/y. The brown coal reserves of the RMU "Soko", according to the investigation done in the period from 1988 to 1992, are 69,7 Mt (million tons) from which 23,4 Mt are A+B category. The thickness of coal stratum varies from 20-30m and the heating value of "Soko" brown coal is around 17,8 MJ/kg. The annual production of coal varies through time, from 40-60.000 t/y in 1948 to 225.000 t/y during '80s. The current production is from 100-150.000 t/y. The objective of the project is improvement of coal mine methane (CMM) management system in the RMU "Soko" in order to establish a friendly environmental solution and reduction of methane release into the atmosphere. The project would be composed of CMM capture and utilization through electricity production, thus converting methane emission into CO2 and simultaneously reducing its GHG effect. The method of CMM capturing is still to be determined after more detailed investigation of the mine. Without the expectation of the project being register as a CDM project the proposed project would faced serious investment and technological barriers which operator of the mine Public Utility for Underground Coal Exploitation "Resavica" could not overcome. Under the current regulations in Serbia, highly explosive CH4 must be drained from underground gassy mines to permit safe working of the coal production. However, no low or regulation exists to enforce the methane utilization and/or destruction by flaring.
Applied methodology	ACM0008 – **"Consolidated baseline methodology for coal bed methane, coal mine methane and ventilation air methane capture and use for power (electrical or motive) and heat and/or destruction by flaring or catalytic oxidation"**
GHG offset	It is estimated that the project has the capability to annual GHG emission reduce through utilization of the CMM of approximately 54.000 t CO_2 eq or around 40.000 t CO_{2eq} only with methane combustion.
Sustainability	The sustainability aspects of the project activity lead to the following general conclusions: • Implementation of the project will enable more sustainable development of the mine through environmental protection point of view and reduction of GHG emission into the atmosphere, • The project activity will reduce the electricity consumed for power generation from the power grid and thereby eliminate its associated CO_2, SO_x and NO_x emissions,

Current status	Specific technical information has been collected through questionnaires and site visits and the coal mine owner agree on the project implementation.
Estimated investment cost	Data are not available
Local partners	RMU “Soko” Sokobanja, managed by Public Utility for Underground Coal Exploitation “Resavica”, Serbia

Project title: Ref. No. 3	**AFFORESTATION OF BARE SOILS IN CENTRAL SERBIA**
Project description:	The total project area of 1.300 ha encompasses 700 ha of bare soils of state-owned land, managed by the public company "Srbijasume" and 600 ha of bare soils of privately owned land. Sites foreseen for afforestation are defined and described in the forest management plans. However, lack of funds prevents realization of these forest management plans. Present natural vegetation cover is herbaceous with sporadic appearance of shrubs i.e. the natural vegetation cover falls below the threshold used in the forest land category and is not expected to exceed this threshold without human intervention. At the locations with higher slope gradient, a threat of soil erosion exists and there is also a risk of fire. Proposed project activity is afforestation of bare soils with autochthon coniferous and broadleaves species including spruce, white/black pine, beech, oak, black locust, etc. Depending on tree species, first cutting activities would take place after 20 years, as an important element of plantations tending while the main cuttings would take place 80 - 120 years after establishment of plantations. Afforestation would include site preparation, planting of seedlings and weed control. Average annual above-ground biomass increment has been estimated at 5-6 m^3/ha. Taking into account that state owned land with bare soil spreads over 80.000 ha and that afforestation rate of this land in forestry plans has been set at 800 ha/year but only if additional funds would be available, the Programme of Activities which would include afforestation of additional 800 ha per year for the two following years could be evaluated and taken into consideration.
Applied methodology	AR-AMS0001 – ***Simplified baseline and monitoring methodologies for small-scale afforestation and reforestation project activities under the clean development mechanism implemented on grasslands or croplands.***
GHG offset	It has been estimated that the project has capacity to sequester, at least, **6.500 tCO_2/year**.
Sustainability	• Appropriate selection of native species would contribute to biodiversity conservation, i.e. it would lead to increase in species diversity, while mosaic habitat formation would enhance habitat diversity; • The project would support sustainable development of rural communities by generating employment opportunities in rural communities with rather high rate of unemployment and by establishing necessary environment for of various forest products; • Result of forest cover and root development would be also reduction of soil degradation, improvements in soil stabilization and soil fertility and enhancement of the water retention capacity of the land.
Current status	Project idea
Estimated investment cost	Cost of afforestation of state-owned land with bare soil, managed by public company "Srbijasume", is around 1.200 €/ha while afforestation of privately owned land with bare soil, through providing seedlings to the site-owners, costs around 600 €/ha. Therefore, total investment cost of the project has been estimated at 1.200.000 €.
Local partners	Public Company "Srbijasume".