Track One

Joint Implementation

Project Design Document

Project of TEFRA

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BIBLIOGRAPHIC REFERENCES

1) Acts of law

i) International

(1) Kyoto Protocol to the United Nations Framework Convention on Climate Change, adopted on 11 December 1997 and entered into force on 16 February 2005.

ii) European

(1) DIRECTIVE 2003/87/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC.

(2) DIRECTIVE 2004/101/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol's project mechanisms.

(3) DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subseqEUntly repealing Directives 2001/77/EC and 2003/30/EC.

(4) COMMISSION DECISION of 13 November 2006 on avoiding double counting of greenhouse gas emission reductions under the Community emissions trading scheme for project activities under the Kyoto Protocol pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

(5) COMMISSION DECISION of 18 July 2007 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council.

iii) National

(1) Environmental Law (act) of 27 April 2001 (Polish Journal of Laws no. 62 item 627).

(2) Act on the wastes of 27 April 2001 (Polish Journal of Laws 2007 no. 39, item 251 as amended)

(3) Act on the amendment of the act on the wastes and certain other acts of 19 December 2002 (Polish Journal of Laws 2003 no. 7, item 78).

(4) Act on the system of managing emissions of greenhouse gases and other substances of 17 July 2009 (Polish Journal of Laws no. 130, item 1070).

(5) Act on the greenhouse gas emission allowance trading scheme of 28 April 2011 (Polish Journal of Laws no. 122, item 695).

(6) Regulation of the Ministry of the Environment on the types of projects that may significantly affect the environment as a whole and its certain components of 26 July 2002 (Polish Journal of Law no. 122, item 1055).

(7) Regulation of the Ministry of the Environment on reference values for certain substances in the air (Polish Journal of Laws no. 16, item 87).

(8) Regulation of the Ministry of Environment on the types of projects which may be implemented as Joint Implementation projects in Poland of 26 August 2010 (Polish Journal of Laws no.167, item 1132).
(9) Regulation of the Ministry of Environment on the detailed scope of information contained in project documentation of 3 December 2010 (Polish Journal of Laws no.240, item 1608).

ABBREVIATIONS

Units of measurement:

CO_2	Carbon dioxide
km	Kilometer
m	Meter
t	Ton

Names:

EU ETS	European Union Emission Trading System
JISC	Joint Implementation Supervisory Committee
KOBiZE	National Centre for Emission Balancing and Management / Krajowy Ośrodek Bilansowania i Zarządzaniania Emisjami
NFOŚiGW	National Fund for Environmental Protection and Water Management / Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej
MŚ	Ministry of Environment / Ministerstwo Środowiska
EU	European Union
UNFCCC	United Nations Framework Convention on Climate Change
UPS	By-products of combustion / uboczne produkty spalania

Definitions:

AAU	Assigned Amount Units
AIE	Accredited Independent Entity
BAT	Best Available Technology
ERU	Emission Reduction Unit
GHG	Greenhouse Gases
JI	Joint Implementation
KPRU	National Allocation Plan for CO_2 / Krajowy Plan Rozdziału Uprawnień do emisji CO_2
PDD	Project Design Document

1. GENERAL AND TECHNICAL DESCRIPTON OF THE PROJECT

A. Location of the project – voivodeship, commune, city/town, address, property parcel number.

The project includes:
- 3 installations in different localisation, where production of hydraulic binder takes place or will take place. The installations are located in Greater Poland, Masovian and Łódź Vovoideships.
- Thermal-electric power stations and a power plant, which are the direct source of recovery of materials for the production of hydraulic blinders.
- A mobile Plant for the production of hydraulic blinders, which will operate in the place of use of them by the final customer.

Figure 1 Localization of the project

1. Installation for the production of road materials, located in Konin (precinct Pątnów) Kazimierska Street 45, 60-510 Konin, plot No. 89/43.

The project is implemented at the Pątnów plan site (Elektrownia Pątnów) in Konin on Kazimierska Street on a part of the plot no. 89/43, precinct Pątnów. Land area for the investment is 20m x 22m.

The direct surrounding of the analyzed investment's area is the industrial area of Pątnów I plant (Elektrownia Pątnów I). Surroundings of the investment area outside the plant area are:

- To the north – railway areas, Kazimierska Street, agricultural lands, buildings of Beniów city,
- To the east – Przemysłowa Street, buildings of Pątnów city,
- To the southeast–Gosławskie Lake, buildings of Gosławice city,
- To the south –Gosławskie Lake, buildings of Ludwikowo city,
- To the west – forest land.

Figure 2 Localization of the Konin installation

2. Installation for the production of geotechnical materials based on cement and black coal ash in Kawęczyn Heat Plant in Warsaw, Chełmżyńska Street 180, 04-464 Warsaw, plot no. 57.

The project is implemented in the Heat Plant Kawęczyn in Warsaw at ul. Chełmżyńskiej. Land area for investment in plot No. 57 is 5 119 square meters. The plot 34/12 is a slag and ash landfill Kawęczyn Heat Plant.

Kawętrzyn Heat Plant is located in district Rambertów in Warsaw, Chełmżyńska Street 180. It occupies land area of 65,06 ha. The Heat Plant surroundings are:

- To the north — industrial area and forest land of the Rembertowski Forest,
- To the east — forest land of the Rembertowski Forest,
- To the south — industrial area, where Youth Educational Centre No. 2, Strażacka Street is located,
- To the west —Chełmżyńska Street, further a Street with industrial and service facilities and scattered private housing.

The plant is located in an industrial team Kawęczyn which includes a range of establishments of various degrees of severity. Facilities located in this area: gas station, concrete factory, Mine Construction Company, Warehouses, transport bases, storage of coal, building materials factory, etc.

Housing in this area, especially on Chełmżyńska Street are mostly intended for disposal. These are mainly single-family bungalows and two multifamily buildings. The closest building to the plant is a one-story house (Chełmżyńska Street 174) and a little further- two-storey building (Chełmżyńska Street 168). On Strażacka Street Youth Educational Centre No. 2 along with the school is located. Heat Plant Kawęczyn was built as a thermal-electric power station and started in 1983. Since then it has been working as a heating plant.

Location of plots 57 and 34/12 has generally preferred urban conditions resulting from:

- existing transportation system on the Kawęczyn heat plant site and not generating any functional problems,
- main raw materials for the production of geotechnical materials based on waste are:
  - coal fly ash (code 100 102),
  - a mixture of fly ash and solid waste from the calcium-based flue gas desulphurisation (dry and semi-dry methods of desulphurization and fluidised bed combustion) (code 100 182),
  - sands from fluidised beds (code 100 124),
  - bottom ash, slag and boiler dust (excluding boiler dust mentioned in 100 104) (code 100 101)
  - mixture of ash and slag from the wet combustion waste disposal (code 100 180)
  - cement
  - lime
  - bentonite
  - dust and particles, excluding 101 312 and 101 313 (code 101 306)
  - solid wastes from gas treatment other than those mentioned in 101 312 (waste code 101 313)

Figure 3 Localization of the Warsaw installation

3. Production site manufacturing hydraulic binders based on combustion by-products, in Bogumil, Kleszczów, 97-406 Rogowiec, plot 158/8, 157/18, 157/15 and 156/5.

The planned project will be implemented in the Industrial Zone Bogumiłów, in Bogumiłów, plots no. 158 / 8, 157/18, 157/15 and 156/5, precinct Karolów, Kleszczów. Land area for the investment is 1.0221 ha. Plots, as provided under the Industrial Zone Bogumiłów, have in the past been agricultural cultivated. Currently this area is fallow, overgrown with trees (young birches) and grasses. the plots are completely undeveloped. Near the project site Bełchatów Plant is located.

Figure 4 Localization of the Bogumiłów installation

4. Direct recovery of ash from Żerań heat and power plant, Siekierki heat and power plant and Kozienice power plant.

Beyond the described locations, where plants for the production of binders are or will be, direct recovery of ash is performed from Żerań heat and power plant, Siekierki heat and power plant and Kozienice power plant. The project involves only the reception of ashes from professional power sector from the mentioned plants.
Żerań heat and power plant is localised on Modlińska 15 Street, 03-216 Warsaw. Siekierki heat and power plant is localised on Augustówka 1 Street, 02-981 Warsaw. Kozienice power plant is localised in Świerże Górne, 26-900 Kozienice.
No processes involving the production of binder are carried out in these locations, only reception of calcareous coal ashes generated in the plant.

5. Production of hydraulic binders in a mobile plant RAPIDMAX 400

Production of hydraulic binders also takes place in the mobile plant RAPIDMAX 400 for the production of hydraulic blinders, which operates in the place of use of them by the final customer.

Currently, it is planned to use the mobile plant 400 RAPIDMAX to produce binders for investments relating to the implementation of Lublin Ring Road - the road S17, sections 2 and 2a (Agreement No. 44/D/2D1S/2011 dated 12/13/2011). During the execution of works related to the operation - the construction of Ring Road - 400 RAPIDMAX mobile plant will be located on a parcel in the town Sieprawice, municipality Jastków (the area is not located in the road lane of S17, but is a part of construction sites of the General Contractor and is formally supervised by Construction Manager).

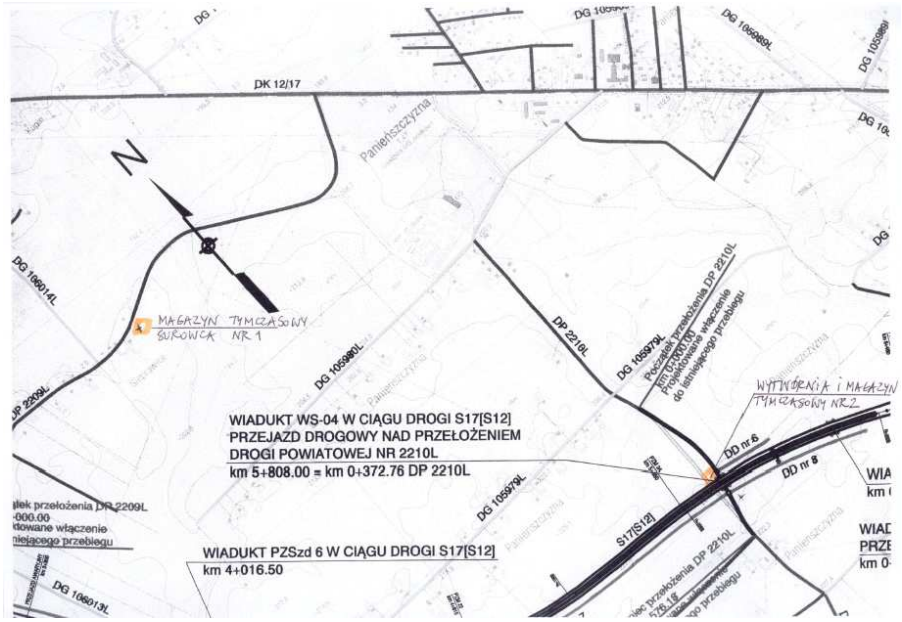

Figure 5 Localization of RAPIDMAX 400 mobile plant

B. Aim, type and realization period of the project

The aim of TEFRA project is the production of hydraulic binders, situated in the locations listed in point 1, section A of this document, used in road construction, geotechnical seals, and stabilization of hazardous waste.

The aim of the TEFRA project is production of alternative hydraulic binders, which can replace traditional materials based on cement and lime.

The production of cement and lime is associated with enormous CO_2 emissions. In the case of cement, depending on its type (CEM I - CEM V) it is less than 1 tonne of CO_2 per ton of produced cement and in the case of lime, slightly over 1 ton of CO_2 per tonne of lime. In order to reduce emissions it is reasonable to seek alternative binders, whose production does not generate such emissions.

Hydraulic binders produced in these factories are an alternative material in relation to the traditionally used binders - products based on cement and lime.

Production of binders in these installations is based on the use of calcareous fly ash from power plants, which are subjected to the processes of purification and enrichment, and are adapted to the requirements of standards. These processes do not result in the formation of CO_2 emissions. Thus, the increasing demand for the binders can be partially supplemented by alternative materials.

The selected locations have good conditions for the project purposes.

They are in the immediate vicinity of the plant, which will allow for the purchase of electricity at competitive prices, and the only factor needed for the production of hydraulic binders will be electricity. what is more, the amount of electricity consumed during the manufacture process of the production of binders based on calcareous ash is much less than the amount of energy consumed in the processes of production of cement and lime. In addition, electricity is required for the production of certain types of hydraulic binders, in other cases there is only a collection of calcareous ashes from power plants, without applying any further technological processes - energy consumption in this case is zero. Therefore, the aggregated electricity consumption for the production of alternative binders is always lower than the electricity consumption during the production of traditional binders.

The location of the installation for the production of binders enables to use calcareous fly ash from nearby power plants.

The production of the binder began in May 2008, within a facility located in Konin - Kazimierska Street 45, 60-510 Konin.

In May 2009 the recovery of ashes from Żerań heat and power plant started.

In December 2009 the recovery of ashes from Siekierki heat and power plant started.

The manufacturing plant of binder was established in Warsaw - Chełmżyńska Street 180, 04-464 Warsaw.

In December 20011 the recovery of ashes from Kozienice power plant started.

In 2012 it is planned to start the installation for the production of binders in Bogumil, Kleszczów Commune, 97-406 Rogowiec.

In April 2012 it is planned to start a mobile plant RAPIDMAX 400 for the production of binders for investments relating to the implementation of Lublin Ring Road - the road S17, sections 2 and 2a.

C. Name and address of the developer and owner of the project

Implementer of the project:

- Name: Ekotech – Inżynieria Popiołów Spółka z o.o.
- Type of organization: Subject of the commercial law
- Address: Niedziałkowskiego Street 47A/4, 71-403 Szczecin
- National Official Register of Business Entities No.: 851-289-14-72
- Contact person: Tomasz Szczygielski
- Telephon/fax: +48 601 70 70 55
- E-mail: Tomasz@ekotech.pl
- Website: www.ekotech.pl

D. Project developer's and project owner's experience in projects realization, including projects that are being developed and not operating yet and description of authors and co-authors of technologies and solutions applied in the project

EKOTECH-IP was established in October 2004. It is based on human resources of her older and greater sister - EKOTECH company. The mission of this company is "to manage as many by-products resulting from human activities as posible, through the implementation of environmentally friendly solutions."

The main by-product, the company is handling with, are the ashes resulting from the combustion of coal in the power plant. Annually, the company is able to manage from 300 to 400 thousands of tons of waste. The major areas where these by-products of combustion (UPS) are used, include:

- reclamation and macrolevelling of degraded areas,
- construction of landfills,
- the production of binders for use in hydrotechnical and transport infrastructure engineering

Major projects carried out directly by Ekotech - Inżynieria Popiołów Sp. z o.o. that owns the project TEFRA:

1. Reclamation of the area by Mistrzowska Strees in Szczecin – 167.000 Mg,
2. Participation in the construction of landfill in ZEDO SA – 187.000 Mg,
3. Levelling of the area of Centrum Wodne LAGUNA in Gryfin – 20.000 Mg,
4. Reclamations of the areas in Skarbimierzyce – 200.000 Mg,
5. Macrolevelling of the area in Radziszów – 180.000 Mg,
6. Reclamation of the area in Kunów – 300.000 Mg,
7. Reclamation of the area in Szczecin - Nad Odrą Street – 350.000 Mg,
8. Participation in the construction of the bypass of Sochaczewo – 250.000 Mg,
9. Participation in the construction of the expressway S-3 – 25.000 Mg,
10. Participation in the construction of the highway A-1 – 50.000 Mg.

E. Project development phase – at the date of application

Necessary research determining the usefulness of fly ash from power plants, methods of collection and transport have been conducted. Technological processes treating ashes to the binder have been defined. Terms of cooperation with the power plants and installation locations have been agreed. Available technologies, machinery

manufacturers and equipment, the markets for road materials and producers of hazardous waste which should be subjected to stabilization - have been analysed.
At present, the project is in the operating phase.
The degree of progress of individual production units:

1. **Installation for the production of road materials, located in Konin (Pątnów precinct), Kazimierza Street 45, 60-510 Konin, part of plot No. 89/43**

The project, that is being a subject of the application for issuance of the Letter of Approval, was finished and at the date of application is under fully operation.

The table below shows the process of obtaining administrative decisions issued during the preparation and realization of investment.

Type of document	No.	Date of issuance
Environmental Impact Assessment	OŚ.7624-8/10	07.06.2010
Decision – construction permit	UA.7353-177/10	19.07.2010
Decision – recovery of waste	DSR.VI.7661-25/10	08.03.2011
Decision – recovery of waste	DSR.VI.7244.17.2011	21.11.2011

Table 1 List of administrative decisions for the Konin installation

2. **Installation for geotechnical materials based on cement and fly ash from coal combustion in Kawęczyn Heat Plant in Warsaw, Chełmżyńska Street 180, 04-464 Warsaw, plot No. 57**

The project, that is being a subject of the application for issuance of the Letter of Approval, was finished and at the date of application is under fully operation.

The table below shows the process of obtaining administrative decisions issued during the preparation and realization of investment.

Type of document	No.	Date of issuance
Decision – recovery of waste	PŚ.IV./BS/7660-55.6/08	28.07.2008
Operational permit	IIIOT/373/U/2009	14.09.2009
Desicion	UD-II-WOŚ-JNO-76611-3-7-09	18.09.2009
Decision – recovery of waste	PŚ.IV./BS/7660-65.9/08	29.09.2009
Decision – recovery of waste	OŚ-II-MRO/76615/26-3/09	01.12.2009
Decision – recovery of waste	PŚ.IV./BS/7670-81.5/08	16.12.2009
Decision – recovery of waste	PŚ.IV./BS/7670-11.2/10	24.02.2010

Table 2 List of administrative decisions for the Warsaw installation

3. Manufacturing plant of hydraulic binders based on combustion by-products, in Bogumiłów, Kleszczów Commune, 97-406 Rogowiec, plots 158/8, 157/18, 157/15 and 156/5.

The project is under preparation. Preliminary draft have been taken and the localization of the investment have been selected. the impact frame of investment on the environment have been taken and an appropriate environmental impact assessment have been obtained.

The next step will be performing a construction project, which will be submitted to the office to reach a decision on the construction permit. It is planned to obtain the decision and to execute all works within the 05.30.2012.

The table below shows the process of obtaining administrative decisions issued during the preparation and realization of investment.

Type of document	No.	Date of issuance
Environmental Impact Assessment	OŚG.6220.1.2012	21.02.2012

Table 3 List of administrative decisions for the Bogumiłów installation

4. Direct recovery of ash from Żerań heat and power plant, Siekierki heat and power plant and Kozienice power plant.

Necessary research determining the usefulness of fly ash from Żerań and Siekierki heat and power plants, methods of collection and transport have been conducted. Technological processes treating ashes to the binder have been defined. Terms of cooperation with the power plants have been agreed. Available technologies, machinery manufacturers and equipment, the markets for road materials and producers of hazardous waste which should be subjected to stabilization - have been analysed.

Żerań heat and power plant, Siekierki heat and power plant and Kozienice power plant - At present, the project is in the operating phase. The manufacturer conducts the Factory Production Control (Zakładowa Kontrola Produkcji), which has been certified by Centralny Ośrodek Badawczo-Rozwojowy Przemysłu Betonów „CEBET" (AC 008). The manufacturer maintains for the product Certificate of Factory Production Control (Certyfikat Zakładowej Kontroli Produkcji) no. 34/ZKP/09.

The table below shows the process of obtaining administrative decisions issued during the preparation and realization of investment.

Type of document	No.	Date of issuance
Decision – recovery of waste	80/09/PŚ.0	08.09.2009
Decision – recovery of waste	22/10/ PŚ.0	24.02.2010
Decision – recovery of waste	325/10/PŚ.0	13.10.2010

Table 4 List of administrative decisions for the direct recovery of ash

5. Production of hydraulic binders in a mobile plant RAPIDMAX 400

Production of hydraulic binders also takes place in the mobile plant RAPIDMAX 400 for the production of hydraulic blinders, which operates in the place of use of them by the final customer.

Currently, it is planned to use the mobile plant 400 RAPIDMAX to produce binders for investments relating to the implementation of Lublin Ring Road - the road S17, sections 2 and 2a (Agreement No. 44/D/2D1S/2011 dated 12/13/2011). During the execution of works related to the operation - the construction of Ring Road - 400 RAPIDMAX mobile plant will be located on a parcel in the town Sieprawice, municipality Jastków (the area is not located in the road lane of S17, but is a part of construction sites of the General Contractor and is formally supervised by Construction Manager).

F. Technical description of the project, including technology or solutions used in the project, indicating the innovation of technology, the best available techniques, the use results of research and development applied in the project

TEFRA project involves the sale and use of calcareous fly ash, or the production for sale and use of hydraulic binders based on calcareous fly ash produced in power plants Bełchatów, Pątnów, Kozienice, heat and power plants Żerań, Siekierki and heat plant Kawęczyn. Production and sales will be complementary to the cement and lime produced in the country. In this way, CO_2 emissions will be reduced.

The essence of the innovativeness of the project is the production, distribution and use of hydraulic binders based on calcareous classical and fluidal ash, produced in power plants Bełchatów, Pątnów, Żerań and heat plant Kawęczyn. The technological process consists of: fly ash separation into fractions enriched with other ingredients in the mixing process, and conditioning. As a result a material is created in accordance with the requirements for groups 13 282 and 14 000, to be used mainly in road construction but also for stabilization of hazardous waste, geotechnics, hydrotechnic constructions, sealing of landfills, etc.

Innovativeness means to identify problems or needs, and finding its solutions (patents, formulas, production lines, etc.) that meet the needs and expectations of stakeholders. In this case, innovativeness is a product. It involves the use of waste from power industry for the production of road and hydrotechnical engineering.

Implemented technology of geotechnical materials production with coal combustion by-products, gives rise to new types of materials that can replace the mixture based on the cement or lime, when all the technical requirements resulting from the relevant product standards and / or applications are met.

The classic material for the stabilization of the substrate on which the road embankment is built, consists in 100% of cement or lime. Per kilometer of constructed road it is needed from 280 to 4,000 tons (depending on the quality of the land on which the embankment is being built).

As part of the research and development service, performed by a certified testing laboratory, mixes have been designed, whose dominant components are ashes, while maintaining the properties specified in the standards. Number of conventional components (cement and lime) is limited only to a few percent.

The following types of hydraulic binders and technologies of their production are identified:

I. TEFRA 15x

The production process is carried out in the ash fiter plant from the boiler exhaust gas power plants. It consists of electrostatic precipitators, in which the flue gases are cleaned from fly ash resulting from coal combustion in power boilers, and reservoirs, in which the collected ash is collected. As a result, the material obtained (hydraulic binder - trade name TEFRA 15). Material obtained after recovery (TEFRA hydraulic binder 15), will meet the standard BS EN 14227-4, which according to building law means that the product will be approved for marketing.

II. TEFRA 25

The production process entails mixing a hydraulic binder TEFRA 15 with cement in the production plant, in appropriate proportions.

III. TEFRA STAB

TEFRA STAB, it is a road binder for drying and initial improvement of land for road embankments. The production process entails the direct reception of fly ash from power plants and their delivery to the final customer.

IV. TEFRA IN

The production process entails mixing the STAB TEFRA material with cement and bentonite in the production plant, in appropriate proportions.

V. BP mix

TEFRA BP, it is a concrete mix of ash and slag used as a layer of the embankment of stabilized aggregate. The production process entails mixing the by-products of coal combustion (UPS) - a classic fly ash with fluidized bed, ash, slag, cement, water and any improving additives. The classic and fluidal fly ashes are received from power plants and the ash-slag from the power plants' landfill.

Production facilities are located in small distances from the nearby power plants. Devices are installed in the halls with tanks for ashes and products.

G. Description of the method of achievement of the greenhouse gas emissions avoidance below a set baseline

As a result of this project hydraulic binders are manufactured for use in road construction, geotechnical seals and stabilization of hazardous waste.

The binders are manufactured by using fly ash from brown coal (calcareous) and mineral coal (classic and fluidal) with power plants, which are subjected to the processes of purification and enrichment and adapted to the requirements.

The traditional production of binders uses cement and lime, and the production of this raw materials causes the emission of huge amounts of carbon dioxide into the atmosphere. Changing technology of the production of binders, by replacing the commonly used raw materials - cement and lime- by alternative materials - calcareous fly

ash from power plants will contribute to reduction of CO_2emissions because the emission associated with the production of alternative materials, is zero.

Production of hydraulic binders based on fly calcareous ash produced by the energy industry is an innovative solution that allows you to limit the usage of cement and lime in the construction industry, whose production is associated with high CO_2 emissions. As a result of this project high-emission substrates, cement and lime, are replaced with alternative materials - ashes generated during power generation.

Emission from the production of the alternative binders does not exist, because it uses existing by-products, generated during the power plant operation, and the only factor needed for the production of hydraulic binders is electricity, consumption of which is also significantly lower than the consumption of electricity in the technological process of the production based on cement and lime. In addition, power consumption is not required in the production of each binder. Because of the conservatism and simplification of the methodology of calculation emissions from electricity production are not included neither for the production of binders based on cement and lime nor for calcareous fly ash-based binders.

Assuming that the production of hydraulic binders began in the second quarter of 2008, adopting production data regarding to manufactured hydraulic binders, in four and a half years from the start of the installation (by 2012) avoided emission will amount **567838,36 Mg** CO_2**.**

Assuming that the emission baseline is higher than the emissions from the project (that equal zero), the project has features of additionality and contributes to the reduction of anthropogenic GHG emissions below levels that would have occured in case the implementation of the project had been abandoned.

Detailed information and data reduction were included in the calculations, below, in the project documentation (pkt.4.).

H. Description of the project's impact on the environment

I. Impact on the environment - the installation's for the production of road materials in Konin on Kazimierska Street on a part of the plot no. 89/43, precinct Pątnów.

1. Noise emission.

The area has been classified as an industrial area for which no permissible noise levels shall be defined. The nearest areas requiring sound insulation are in a considerable distance from the areas of the investment. Implementation of the project is associated with a small change in the emission of noise and acoustic conditions in the areas located around the investment in question. Both in the implementation and the liquidation phase there is no excessive noise emission. The area designated for the implementation of the project does not require specialized operations that could negatively affect the noise climate around the project. Acoustic impact in the operation phase is determined using computer programs. The calculations take into account screening properties of the objects located in the area surrounding the investment. The calculations showed that the impact of the investment on the

areas that are to be protected from noise will be minor and will not constitute excessive noise emission. In addition, the calculations taking into account the functioning of the planned installation showed that the increase in equivalent noise level will be small. It was therefore concluded that in the operation phase of the installation activities will not endanger the environment and the acoustic environment quality standards will be met.

2. Emission of pollutants into the atmospheric air.

Technological emission from the use of the planned installation is related to the processes filling tanks (silos) and mixing of raw materials. Dust emissions will be performed in an organized manner. The movement of transport vehicles is assumed to be in the range of two vehicles per hour.

3. The emission of pollutants into the soil and groundwater.

Operation of an installation for the production of road materials does not cause the process wastewater or waste materials that could contaminate the soil or groundwater. The technology of mixing the ingredients to obtain road materials does not require the process water. Residual waste also do not arise.

Rainwater from hardened surfaces are discharged into stormwater drains of the Pątnów plant.

4. Water and sewage issues.

During the operation of the installation there is no demand for the process water. Sanitary sewage will be discharged into the sanitary sewer system of the plant. The employees will use social rooms of the plant. Rainwater from hardened surfaces are discharged into stormwater drains of the Pątnów plant

5. Waste.

Waste management in the operation phase of the project should be carried out in accordance with the law of waste from 27.04.2001 – Journal of Laws 2007, No. 39, item. 251, as amended., The Act of 27 July 2001 -the so-called introducing - Journal of Laws 2001, No. 100, item. 1085, the Act of 19 December 2002 amending the Act on waste and certain other acts (Journal of Laws 2003, No. 7, item. 78).

Law defines the principles of the management of waste, in particular the principle of waste prevention or minimization of the amount , disposal of waste from places of formation, as well as the use or disposal of waste in a manner that protects human life and health and the environment.

According to the classification in Polish regulations in force at the date of obtaining environmental permits the planned investment was classified as likely to have significant effects on the environment. This project requires the preparation of an environmental impact report.

The report on the impact of the proposed investment on the environment, prepared for the installation for the production of road materials, located in Konin Kazimierska Street 45, 60-510 Konin, part of plot No. 89/43, precinct Pątnów, did not take into the account the cumulative impacts of the proposed activity in relation to the emissions to air of substances from the plant for the production of road materials and pollutants from Pątnów plant's emitters.

Emissions from the two plants do not overlap each other. In addition, emissions from the plant for the production of road materials is a marginal part of the emissions from the power plant. Analysis of the submitted report with the calculations of spreading emitted substances in the air such as PM10, sulfur dioxide, nitrogen oxides, carbon monoxide, hydrocarbons, aromatic and aliphatic, showed that emissions from these sources do not exceed permitted levels of substances in the air and limits of the frequency of exceedance as defined in Regulation of the Minister of Environment of 26 January 2010 on reference values for certain substances in the air (Journal of Laws No. 16, item. 87).

As a result of the administrative proceedings following documents have been developed and the following administrative decisions have been issued:

1. Decision on environmental conditions of permission for execution of the project No. OŚ.7624-8/10, 07.06.2010 issued by the Mayor of the City of Konin
2. The decision on the construction permit No. UA.7353-177/10 from 07/19/2010.
3. Permit recovery waste No. DSR.VI.7661-25/10 from 08.03.2011 issued by the Marshal of the Wielkopolska voivodeship.
4. Permit recovery waste No. DSR.VI.7244.17.2011 from 21.11.2011 issued by the Marshal of the Wielkopolska voivodeship.

Permit for operation of the project – mobile plant located at Kazimierska 45 street, 60-510 Konin; lot no 89/43, Pątnów area – has been issued under the following conditions:

1. Providing an automatic system of ash mixer and feeding sleeve equipped with a filter system and dusty air intake fan, which ensures the content of dust in the air no more than 20 mg/Nm3.
2. Storage tanks for cement and hydraulic binders filled with a no greater performance than 60 m3 /h and equipped with pneumatic dust extraction system, which ensures the content of dust in the air not greater than 20 mg/Nm3.
3. Ensuring a proper management of waste in all phases of the project by minimizing their amount, selective storage in separate areas and the transfer to entities holding authorizations required by law for their recovery or disposal.

All of the above requirements are met by the investor of the project.

The area in which the plants for the production of adhesives were established is not under maintenance protection. No decision has been issued requiring the investor to provide archaeological supervision during excavations. This investment does not produce hazardous waste. There is no cross border impact on the environment.

II. The impact on the environment of the installation for production of geotechnical materials based on cement and fly ash from coal combustion in Kawęczyn Heat Plant in Warsaw, Chełmżyńska Street 180, 04-464 Warsaw, plot No. 57 .

1. Noise emission.

Noise emissions during the construction phase

Analyzed plant for the production of road materials is an mobile plant, has a simple modular construction , that allows easy movement of system components tractor and technical solutions for quick assembly and disassembly. Both - the assembly and disassembly will not make a significant noise level. The area intended for the implementation of the project is completely cured, lined with concrete slabs, and therefore there is no need to conduct the large-scale specialized earthmoving or construction.

Noise emissions during the operation phase

During the operational phase of the project, mixing mobile installation of bulk materials will be started, intended for use in the field. Installation is used for mixing of bulk materials such as cement, lime, fly ash, hydraulic binder, dynamic binder and fluid binder.

Analyzed mobile system is placed in an industrial area of the Thermal Power station and is surrounded by buildings and objects belonging to the plant, which forms acoustic screens for the noise from the area of installation. Therefore this location of the investment is beneficial from the point of view of environmental protection against noise. Another factor affecting the reduction of noise emissions to the environment of the project area is the distance from the nearest protected acoustically areas.

After making the necessary measurements and calculations, that the work system for the production of bulk materials, geotechnical and concrete in Kawęczyn Heat Plant in Warsaw, on plot No. 57, does not exceed the permissible sound level in a acoustically protected environment.

2. Emission of air pollutants.

Technological emission from the use of the planned installation is related to the tanks (silos)filling processes and mixing of raw materials. Dust emissions will take place in an organized manner. We also assume the movement of transport vehicles within two in an hour.

3. Emission of pollutants into the soil and groundwater.

There is no emission of pollutants into the soil and groundwater.

4. Waste.

Waste management in the operation of the project should be carried out in accordance with the Act on the wastes of 27 April 2001 (Polish Journal of Laws 2007 no. 39, item 251 as amended), Act of 27 July 2001 so. introducing – Polish Journal of Laws 2001 no. 100, item 1085 as amended, Act on the amendment of the act on the wastes and certain other acts of 19 December 2002 (Polish Journal of Laws 2003 no. 7, item 78).
Act lay down the waste management rules, in particular, the principle of waste prevention or minimization of the amount of waste, waste removal from the formation sites, and the use or disposal of waste in a manner that protects human life and health and the environment..

In the plant at the time of use are manufactured following categories of waste:

- Operational waste arising in the process of operating, maintenance (including construction and renovation of buildings) and in operation and maintenance of equipment,

- Waste related to the existence in the crew (including office and household waste), arising in connection with the work of support staff and the waste generated in the process of maintaining cleanliness and order.

As a result of the administrative proceedings following documents have been developed and issued the following administrative decisions:

1. Operation permit No IIIOT/373/U/2009 dated 14.09.2009r.
2. Waste recovery permit No PŚ.IV./BS/7660-55.6/08 dated 28.07.2008r.
3. Waste recovery permit No PŚ.IV./BS/7660-65.9/08 dated 29.09.2009r.
4. Waste recovery permit No OŚ-II-MRO/76615/26-3/09 dated 01.12.2009r.
5. Waste recovery permit No PŚ.IV./BS/7670-81.5/08 dated 16.12.2009r.
6. Waste recovery permit No PŚ.IV./BS/7670-11.2/10 dated 24.02.2010r.

The project has elements of protection against the harmful effects on the environment and its individual elements. Channeling of rainwater and the use of oil separators protect groundwater and soil contamination. Fully hermetic system prevents uncontrolled emissions. Emissions of substances is limited by the use of fabric filters.

The analysis shows that the proposed project will not have a negative impact on the environment in terms of:

- - Protection of air.
- - Noise hazards.
- - Issues water and wastewater.
- - Waste management.
- - Protection of the earth's surface, including soil and terrain.
- - Animal and plant world including Natura 2000 habitats.
- - Supply of underground water intakes.
- - Interference in the landscape.
- - Contamination and pollution of groundwater.
- - Conservation and protection of monuments of archaeological protection.

III. Influence of hydraulic binders manufacturing plant based on combustion by-products, in Bogumil, community Kleszczów, 97-406 Rogowiec, plot 158/8, 157/18, 157/15 and 156/5 on the environment.

1. Noise emission.

The area of investment has been classified as an industrial area, for which there are not permissible noise levels determined. Nearest areas requiring sound insulation, are at a considerable distance from land investment of this project. Implementation of the project is associated with a small change in the emission of noise and acoustic conditions in the areas located around the investments. Both in the implementation and liquidation phase there is no excessive noise. The area designated for the implementation of the project does not require specialized operations that could adversely affect the noise climate around the project. Acoustic impact in the operation phase is determined by using computer programs. The calculations take into account shielding properties of the objects located in the area surrounding the investment. The calculations showed that the impact of the investment on the protected areas from noise will be minor and will not constitute oversize noise. In addition, calculations performed showed that the increase in equivalent noise level which took into the functioning of the proposed system will be small. It was therefore concluded that in the operation phase of the installation activities will not endanger the environment and the acoustic environment quality standards will be received.

2. Emission of air pollutants.

Technological emission from the use of planned installation is related to the filling process tanks (silos) and mixing of raw materials. Dust emission will take place in an organized manner. We also assume the movement of transport vehicles within two per hour.

3. Emission of pollutants into the soil and groundwater.

Operation of an installation for the production of road does not cause the production process or waste water that could contaminate the soil or groundwater. The technology used for mixing the ingredients does not require the use of technological water. Technological waste does not require as well.

Water runoff from paved surfaces are discharged into stormwater drains Pątnów..

4. Water and sewage issues.

During the operation of the installation there is no demand for the technological water. Sanitary sewage will be discharged into the sanitary sewage system power. Employees will use the power of social rooms. By the current state, water runoff from the paved surface area is discharged to the factory rainwater drains.

5. Waste.

Waste management in the operation of the project should be carried out in accordance with the Act on the wastes of 27 April 2001 (Polish Journal of Laws 2007 no. 39, item 251 as amended, Act of 27 July 2001 so. introducing – Polish Journal of Laws 2001 no. 100, item 1085 as amended, Act on the amendment of the act on the wastes and certain other acts of 19 December 2002 (Polish Journal of Laws 2003 no. 7, item 78).

The analysis shows that the proposed project will not have a negative impact on the environment in terms of:

- Protection of air.
- Noise hazards.
- Issues water and wastewater.
- Waste management.

- Protection of the earth's surface, including soil and terrain.
- Animal and plant world.
- Supply of underground water intakes.
- Contamination and pollution of groundwater.
- Conservation and protection of monuments of archaeological protection.

The investment production **plant based binders combustion by-products, in Bogumil, Kleszczów community, district Karolowa on plot 158/8, 157/18, 157/15 and 156/5**, according to the, Regulation of the Ministry of the Environment on the types of projects that may significantly affect the environment as a whole and its certain components of 26 July 2002 (Polish Journal of Law no. 122, item 1055), is not required to obtain an integrated permit.

Should only be:

- Notify the installation which does not need permit application for emission of gas and dust into the air,
- Obtain legal permission for the construction of water and water facilities and drainage of rainwater into the ground,
- Obtain the management of waste in the production and recycling of waste (waste deposit information and to obtain a permit for the recovery of waste).

These installations for the production of adhesives have been or will be made, and are or will be operated using the best technologies available on the market, which provides security and keep all the obligations and legal norms related to the operation of such facilities.

IV. The impact of recovery from the ashes of Żerań Power Plant, Power Plant Siekierki, and Power Plant Kozienice on the environment.

Recovery of ash is only loading ashes on the vans beeing produced in Żerań Power Plant, Power Plant Siekierki, and Power Plant Kozienice. In the above-mentioned sites are not carried out any additional processes, so there is no additional effect on the environment that are in the vicinity of the power plant, due to the described activity.

As a result of the administrative proceedings tere was developer Decision for the recovery of waste No. 80/09/PŚ.0 issued by the Marshal of the Mazowieckie voivodeship, Decision for the recovery of waste No. 22/10/PŚ.0 issued by the Marshal of the Mazowieckie voivodeship and Decision for the recovery of waste No. 325/10/PŚ.0 issued by the Marshal of the Mazowieckie voivodeship.

IV. The impact on the environment of mobile plant RAPIDMAX 400.

Analyzed plant for the production of Road materials is mobile, has a simple modular design that allows free movement of system components with the tractor and technical solutions for quick assembly and disassembly. Both - the assembly and disassembly will not be a significant noise level.

Analyzed mobile system will be located on the site will operate using hydraulic binders for the end-user. instalacja mobilna zostanie zlokalizowana i będzie funkcjonować na miejscu wykorzystania spoiw hydraulicznych przez

odbiorcę końcowego.
At present, it is planned to use mobile plant RAPIDMAX 400 to manufacture hydraulic binders for investments relating to the implementation of Lublin ring road - the road S17, sections 2 and 2a (No.44/D/2D1S/2011 Agreement dated 13.12.2011.). During the execution of works related to the operation - Lublin ring road construction, mobile plant RAPIDMAX 400 will be located in the back building of the General Contractor and will formally undergo Construction Manager.

During the production process of a hydraulic binders in a mobile label RAPIDMAX waste will not. Any non-compliant parts of the product will be stored on dedicated for the purpose temporary storage. After completing the task, if any, surplus materials and lots of non-compliant product will be exported by the Owner RAPIDMAX mobile plant and the land will be transferred to the Temporary Warehouse General Contractor in the state in which they are acquired for the use of the task.

I. Extent of the impact of the project on the environment for the avoidance of greenhouse gas emissions

At the moment, has been made assessment of the impact of the project on the environment (Installation for geotechnical materials based on cement and fly ash from coal combustion in Kawęczyn Heat Plant in Warsaw. Chełmżyńskiej 180, 04-464 Warsaw, plot No. 57), a report on the impact of environmental project (installation for the production of road, located in Konin Street. Kazimierska 45, 60-510 Konin, Fri. plot No. 89/43, district Pątnów) and information card project (Are of mixing loose materials on the basis of cement and other additions resulting from the combustion of coal in Bogumil, community Kleszczów, 97-406 Rogowiec, plot 158/8, 157/18, 157/15 and 156/5.)

Based od prepared documentaion on the environmental impact, the project has been approved by the environmental authorities.

There was no need to assess the environmental impact and the procedure for transboundary environmental impact (Installation for the production of road, located in Konin Street. Kazimierska 45, 60-510 Konin, Fri. Plot No. 89/43, district Pątnów).

It was necessary to assess the impact of projects on the environment (Installation for geotechnical materials based on cement and fly ash from coal combustion in Kawęczyn Heat Plant in Warsaw. Chełmżyńskiej 180, 04-464 Warsaw, plot No. 57)

During these procedures, all legally required public consultation was carried out and the interested parties have an opportunity to express their views. There have been no complaints or opinions.

Project boundary is defined by the area covering discussed in this project plants for the production of hydraulic binders, area of Power station and thermal power station, which is the recovery of ash to produce hydraulic binders and locations, where produced hydraulic binders will be used, and will cover area of whole Poland.

J. Name of the entity developing the project documentation.

Carbon Engineering sp. z o. o.
28/12 Szlak Str.
31-153 Kraków

Tel. +48 609 100 623
office: +48 12 376 82 43
fax: +48 12 378 93 23

www.projektydlaklimatu.pl

KRS (National Court Registry Number): 0000351847
NIP (Tax Identifiaction Number): 676 241 61 56
REGON (Statistic ID Number): 12118233

K. Calculation of the planned costs and revenue related to the project.

ITEM	AMOUNT (PLN)
Revenues from sales	231.257.527
Cost of production of binders	185.223.861
Cost of binders license	40.316.235
Finance expenses	330.000
Expenditure on investment	7.547.100
Earnings without ERU	231.257.527
Costs without ERU	233.417.196
Flows	-2.159.670
Revenues wth ERU	242.705.404
Costs with ERU	233.417.196

Flows	9.288.208

2. DESCRIPTION OF THE PROJECT FUNDING SOURCES

A. Method of the project's financing

The project was financed on the basis of investor's own funds and with funds from the bank credits and loans from private banks.

The next section is a summary of the investment costs for each plant for the production of hydraulic binders.

B. Project's financing sources

1. Installation for the production of road, located in Konin (precinct Pątnów) Street. Kazimierz 45, 60-510 Konin, Fri. plot No. 89/43

The installation was built by Ekotech, in 2010-2011..

In 2010, expenditures amounted to PLN 776,000.
In 2011, issued 650,000 PLN.
That makes the total amount of 1,426,000 PLN.

Funding was downpayment and bank loans in the amount of 1,174,000 PLN. In 2011, repaid loans in the amount of PLN 1,000,000, thanks to the activities of current and received a grant in the amount of PLN 792,000. During the implementation of environmental investment decision and a building permit is reached.

2. Installation for geotechnical materials based on cement and fly ash from coal combustion in Kawęczyn Heat Plant in Warsaw. Chełmżyńskiej 180, 04-464 Warsaw; plot No. 57

In 2008 was purchased mobile installation RAPIDMAX 400 by the Ekotech-center,.
The purchase cost was U.S. $ 850,000, which, given the exchange rate of the period gives an amount of 2,125,000 PLN. Installation was purchased from its own resources.
In 2011 it was sold to Ekotech - Engineering Ashes.
The remaining amount to be paid in 2011 and 2012, amounted to PLN 395,000.
These amounts have been included in the capital expenditure Ekotech - Engineering Ashes.

In 2011, was built Engineering Ashes New Installation by Ekotech.
The amount of the investment was PLN 600,000.
The total investment was financed by equity contributions.
This year it is planned to install the EC sieved Kawęczyn (where it is now) into CHP Zeran. Currently lasts the administrative procedures related to environmental decision. Then you will need a building permit.

3. Production plant based binders combustion by-products, in Bogumil, community Kleszczów, 97-406 Rogowiec, plot 158/8, 157/18, 157/15 and 156/5.

The project is initiated by Ekotech - Engineering Ashes. Work is currently under design. Investments made operat impact on the environment and the application for the environmental decision. It is planned to be done in the years 2012 and 2013.
The first stage, in the amount of about PLN 1.5 million, will enable production to start around June. The applicant applied for a grant in the amount of PLN 924,000.
The second stage will involve the improvement of the production process, which will result in cost reduction exercise thereof, and the range of products will be increased.
Estimated cost is approximately 1,500,000 PLN, the Applicant applies for a grant in the amount of PLN 924,000.

3. DESCRIPTION OF THE PROJECT'S BASELINE, THE DESIGN AND THE METHOD FOR ITS DETERMINING

A. Method of baseline determination, icluding the methodology applied in the project, with a justification

Baseline scenario

Baseline scenario method was chosen in such a way as to present the best scenario would occur in the case where the project would have existed. **Baseline scenario is that the hydraulic binders would otherwise be produced by traditional methods, which are based on the use of cement and lime, and would be used in road construction. Produkcja spoiw hydraulicznych w Polsce jest oparta na wykorzystaniu tradycyjnych surowców w postaci cementu i wapna.**

Project scenario

Project scenario TEFRA involves the construction of labels, which will produce hydraulic binders, to use in road construction, geotechnical seals and stabilization of hazardous waste. These materials are manufactured to replace traditional binder, produced on the basis of cement and lime.

The methodology used in this project to determine the reduction of CO_2 emissions involves using high-calcium ash produced in the power industry. Described method of production of hydraulic binders is an innovative solution successfully introduced to the market. This operation allows to reduce the use of cement and lime in construction, because production of them is associated with high emissions of CO_2. Emitting substrates - cement and lime - as a result of this project, are replaced with alternative materials - ashes which are generated during generating energy.

This action will contribute to a significant reduction in CO_2 emissions from the project because it is zero – high-calcium ashes are a byproduct of power plant operation, so there is no need for their preparation for the project, as opposed to the cement and lime, where the production is intentional and results in CO_2 emissions atmosphere.

In a situation where the project is implemented, the demand for cement will decrease, and hence, the production of this material will be reduced, and this in turn will help to avoid CO_2 emission.

Calculations of reduction emission will be based on the total amount of CO_2 emissions avoided through this project. Baseline emissions implies a higher rate than the scenario of the project, for which it is zero. That's why emission from whole project is zero.

Calculations were based on the following indicators:

WS cement replacement rate

To calculate the amount of cement which would be produced in the situation where the project would not be realized, adopted indicator of the amount of cement [Mg] per 1 [Mg] used instead of the cement product produced from the high- calcium ash.
WS cement replacement ratio is a dimensionless value. Data on the rate of replacement of cement are given for different types of adhesives and their use by the manufacturer. These data were determined on the basis of the relevant calculations in accordance with the intended use of particular types of adhesives.

The typical rates of replacement of cement or lime combustion by-products / by-products produced from the combustion products were estimated based on the equivalence of technical products. The product made with by-products of combustion, showing a comparable performance specifications at a standardized product made with cement or lime (these performance tests are confirmed as reported), provides an objective basis for estimating the degree to which the cement or lime can be replaced by an appropriate side-product of combustion. In each case cited is a normative reference document.

Since this estimate is not a direct - not the result of intentional ago dedicated research - is always taken into account here headroom uncertainty associated with the methodology of calculation of indirect.

Emission rate of carbon dioxide for the production of cement [CO_2 Mg / Mg].

To determine the baseline benchmark we use carbon dioxide for the production of cement clinker given by the Cement Manufacturers' Association, bringing together business executives the cement, lime and companies working with them, and, as legal persons, companies and lime cement industry.

Benchmark is the basis for determining the baseline, and then calculate the reduced emissions resulting from the implementation of this project.

B. Source data used to calculate the baseline

To calculate the baseline, the following data:

In the area of road currently the primary reference document for use of fly ash for soil stabilization chemical and aggregates for the construction of road, is the standard BS EN 14227-3: 2007.

In order to calculate the baseline and calculate the indicators used to replace the following methodology:

1. Indication of the reference document for the traditional solution, together with identifying typical and most likely quantity of cement / lime, which would be used to achieve this part of the road construction, which analyzed the most commonly used alternative products.
2. The demonstration of the amount of product alternative which usually need to use to achieve equivalent, comparable technical parameters of the road construction, based on laboratory tests, such as done for the FPC.
3. From a comparison of these two values to calculate the indicator 'gross' and zoom out of any residual cement content in the product alternative (TEFRA 25, UTEX-CEN BP).

Alternative binders to cement also begin to be used on a significant scale in the field of geotechnical injection. This area is technologically much less standardized than the roads, so there is no such specific reference documents that exist in the road. Hence the need for a different methodology for determining the rate of substitution. (TEFRA IN)

Using the above methodology established:

1.	Replacement of cement binder TEFRA 25 on soil stabilization	1 TEFRA 25 : 0,6 cem	In the stabilization of soil cement dose administered by the PN-S-96 012 is 4-10% of the strength in the range of 1.5-2.5 MPa in the approval study adhesive 25 applied dose TEFRA 7% average yield strength of 1.9 MPa ground; data seem to indicate a substitution of 1:1, but taking into account the uncertainty resulting from the smaller number of available studies, compared with cement, it is proposed to adopt a reduced rate	Norm PN-S-96012. Research for technical approval made by Barg Laboratory in 2010

JUSTIFICATION

Polish standard PN-S-96012 Motor roads. Substructure and improved substrate with cement stabilized soil - in Section 2.2 mix cement and dirt. 2.2.1 Content Cement - given that:

"The content of the cement must be taken in the range from 4% to 10% (m/ m), calculated on the weight of dry soil, depending on soil type and particle size, make and type of cement used layers and categories of traffic." Next standard specifies that for the upper layer of the substrate is required for an improved compression strength after 28 days in the range of 1.5 to 2.5 MPa.

This application is functional area TEFRA 25 in road construction dominates, and adapted it for further analysis. During the study as the basis for technical approval for the bond TEFRA 25, made in 2010 at the Laboratory Barg, improved soil strength was obtained in the range of 1,6-2,4 MPa, 7% binder dosage. Similar results were obtained in studies on the use of pre-trial sections of the binder in concrete road projects in 2010-2011.

Fixed dosing TEFRA bond 25 is the exact arithmetic mean of the range defined by the above cited standard, a range of results is also very strength coincides with the range required by the standard. This would entitle to postulate a direct equivalence binder for cement in the application of the dominant consideration. You could even show that the TEFRA bond 25 is used primarily in cohesive soils, where the dosage of cement is necessarily closer to the top of the standard range. However, taking into account the uncertainty arising from the disproportionately greater number of studies of soil stabilized with cement stabilized soil than bond TEFRA 25, eventually adopted a more conservative rate of 1 TEFRA 25 = 0.7 cem. After deducting the average cement content in the binder TEFRA 25 to 10% by weight of the binder, the final effective replacement rate shall be rounded off at 1 TEFRA 25 = 0.6 cem, or otherwise 1 cem = 1.67 TEFRA 25th.

2.	Replacing lime with the binder TEFRA 15 with cohesive soil stabilization	1 TEFRA 15 : 0,6 lime	The function of the dose of lime soil stabilization suggested by PN-S-96011 is 3-7%, TEFRA 15 is used at a dose of 5-10%, taking into account the uncertainty resulting from the smaller number of available studies, compared with lime, it is proposed to adopt a rate reduced	Norm PN-S-96011 The research activity of the hydraulic binder ISCMOIB 2009

JUSTIFICATION

The most direct comparison of the effectiveness of binders such as lime TEFRA 15 of the standard notation found in the road - PN-S-06103: 1997 Road car ash concrete foundation - where the point 3.2.8.4 Determining the optimal active content of fly ash from coal or lime or cement , provides that:

"For the preparation of test compound of interest takes the content of 5% (m/m) to 12% (m/m) active fly ash from coal or from about 4% (m/m) to 6% (m/m) of lime or between 6% (m/m) to 8% (m/m) of cement, and the final amount is determined based on the results of the compressive strength of the samples. "

which results in the replacement rate in the range of 0.8 to 0.5, or an average of 0.65.

Polish norm PN-S-96011 Motor roads. Soil stabilization with lime for the road - in 2.2 Mixtures 2.2.1 Determining the composition of the mixture - states that: "The composition of the mixture depends mainly on the type of soil and lime and its destination. Dosed quantity of lime and water should always be fixed in relation to the laboratory by weight of dry soil. Indicative addition of lime to the soil, depending on the destination compound is:

- The upper layer of the substrate improved - from 3% to 7%. This application is functional area TEFRA 15 in road construction dominates, and adapted it for analysis.

Practical experience with the application of binder TEFRA 15 on a very large number of road projects in 2009-2011 showed that the most commonly used binder was 50% higher than the amount of calcium that would be used to achieve equivalent performance and improved soil contained in the range of 5% to 10%, which indicates the average rate of 0.67.

However, taking into account the uncertainty arising from the indirect nature of the data used in the analysis, the more conservative replacement rate at 1 TEFRA 15 = 0.6 wap, wap or otherwise 1 = 1.67 TEFRA 15th.

3	Replacing the lime with binder TEFRA STAB in improving soil	0,5 lime: 1 TEFRA STAB	The function of the dose of lime to improve soil suggested by PN-S-96011 is 2-4%; TEFRA STAB is used at a dose of 4-8% field tests confirm this effect	Norm PN-S-96011 Own analysis

JUSTIFICATION

Polish PN-S-96011 Motor roads. Soil stabilization with lime for the road

- In Section 2.2 Mixtures 2.2.1 Determining the composition of the mixture - states that:

"The composition of the mixture depends mainly on the type of soil and lime and its destination. Dosed quantity of lime and water should always be fixed in relation to the laboratory by weight of dry soil. Indicative addition of lime to the soil, depending on the destination compound is:

- The initial improvement of land for further stabilization or for incorporation the embankment less than 1.0 m (lower layer improved substrate) - from 2% to 4%. The standard does not specify such a layer for improved soil required compressive strength after 28 days.

It is this functional area TEFRA STAB use in road construction dominates, and adopted it as the basis for further analysis.

Practical experience with the application of binder to TEFRA STAB land improvements of excessive humidity in 2009-2011 allowed the determination of the level of binder in the range of dosage of 4-8%, the degree of excessive humidity is in the range 2% to 11% above the optimum moisture content. The resulting effect of drying and purification in the ground for the further stabilization justify replacing one adopted TEFRA rate STAB = 0.5, wap, wap or otherwise 1 = 2 TEFRA STAB.

4	Replacement of cement in the mix of road foundation UTEX-CEN BP	1 UTEX-CEN BP : 0,45 cem	Cement content in such substructures take around 6-8%, the content in the finished cement mixture CEN UTEX-BP of 3-4% can be ascertained that the ash used in the concrete mix as a function of the binder is able to replace the amount of 0.45 cement	PN-S-96012 Current research performed by the Laboratory of Control 2010, 2011

JUSTIFICATION

Polish PN-S-96011 Motor roads. Soil stabilization with lime for the road

- In Section 2.2 Mixtures 2.2.1 Determining the composition of the mixture - states that:

"The content of the cement must be taken in the range from 4% to 10% (m/m), calculated on the weight of dry soil, depending on soil type and particle size, make and type of cement used layers and categories of traffic." Next standard specifies that for auxiliary foundation is required compressive strength after 28 days in the range of from 2.5 to 5 MPa.

Above given cement content is also further narrows the range of 6-8% by point 3.2.8.4 Determining the optimal active fly ash content of lignite or lime or cement PN-S-06103: 1997 Road car ash concrete foundation.

This functional area TEFRA BP dominates in road building, and accepted it as a basis for further analysis.

Current research TEFRA blend BP Control performed by the laboratory under supervision in 2010-2011 show that the above-specified parameters are obtained at 3-4% of the cement content in the mixture. These studies are consistent with the initial recipe research, made by the Laboratory BARG.

Taking into account the content of the mixture UTEX-CEN BP silicate fly ash, bed ash and slag, which allow to reduce by half the content of the cement in relation to the cement-stabilized soil, one can adopt the conservative substitution ratio 1-CEN UTEX BP = 0.5 CEM cem or otherwise 1 = 2 UTEX-CEN BP. After deducting the average cement content in UTEX-CEN BP at 5% by weight of the mixture, the effective replacement rate is rounded at 1 UTEX-CEN BP = 0.45 cem, or otherwise 1 cem = 2.22 UTEX-CEN BP.

5	Replacing cement with injecting grout TEFRA IN JET	1 TEFRA IN JET : 0,7 cem:*	In the grout formulations for jet grouting technology developed and tested by the Warsaw University of Technology, binders containing more than 60% of the ash bed receive no worse performance than the reference mortar with the cement as a binder	PN-EN 12716:202 Execution of special geotechnical works jet injection. Research grout fluidized bed of ashes, PW, 2010, 2011.

* The ex determined value post for each application according to the rationale and procedure for monitoring

JUSTIFICATION

Standard BS EN 12716: 2002 Execution of special geotechnical works - jet injection, in Section 6.4. state that:

"The cement slurries weight ratio of water / cement ratio should be in the range of 0.5 to 1.5", which means that depending on the particular strength requirements, the type of soil and other technological factors, according to standard cement content of water in the slurry 1000l injecting should be between 650-2000kg.

Warsaw University of Technology conducted a number of laboratory studies demonstrating the use of fluidized bed ash possibility of replacing a significant part of cement slurries for injection jet. In 2011, performed at the Warsaw University of Technology recipe research towards the development of alternative injection mixture for one of the contractors involved in the construction of the second metro line in Warsaw (Job No. 501H/1110/6493). The initial recipe contained 357.8 kg cement grout 1000l and in the formulation of alternative content has been reduced to the level of 140.6 kg cement grout 1000l 281.2 kg by using ash bed. This gives the rate of replacement of cement 0.77, as a result, even higher than those served in their studies among others Kledyński, Rafalski, Falaciński, Strulak and Żarkowska.

Available studies allow postulating a relatively high rate, replacing one TEFRA IN JET = 0.7 cem, or otherwise 1 cem = 1.4 TEFRA JET IN, knowing that in each case, taking into account the dependence multiparameter appropriate technology injection soil improvement, individual calculation will need to be obtained for the effective replacement of individual projects, where the output is compared to a traditional recipe based on cement and used an alternative formulation involving fluidized bed fly ash and / or conventional. Past experience indicates that higher rates will not be performed.

- Emissivity indicator of carbon dioxide for the production of cement clinker, EC [CO_2 Mg / Mg].

Emissivity indicator provides a basis for determining the baseline, and then calculation of the reduced emission resulting from the implementation of this project..

For the calculation the benchmark for carbon dioxide production of cement clinker given given by the Cement Manufacturers Association, gathering industry executives enterprises cement, lime and companies working with them, and, as legal persons, companies and lime cement industry.
According to published by the Cement Association in 2010 to develop, Mon.:
"Cement Industry - characteristics and impact on the environment", the rate of emission of carbon dioxide for the production of cement clinker is EC = 0.823 [CO_2 Mg / Mg].
This document is available on the website of the Association of Cement Producers at:
http://www.polskicement.pl/index.php?s=3/3/0&baza=pokaz&nid=15

C. Determination of the applied baseline with justification

Baseline

Baseline BE [Mg CO_2] has been appointed as the product of:

- the amount of cement that would have been used to produce hydraulic binders in a situation where there were not used hydraulic binders based on fly ash in power plant high-lime, B [Mg],
- benchmark carbon dioxide for the production of cement clinker, EC = 0.823 [Mg CO_2/Mg];

BE = B [Mg] x WE [Mg CO_2/Mg];

To determine the amount of cement that would be used to produce hydraulic binders in a situation in which there were not applied hydraulic binders based on high-lime ash in a power indicator is used to **replace rate WS** hydraulic binder. This ratio is a dimensionless value represents the amount of cement and [Mg] per 1 [Mg] used instead of the cement product produced from the high-lime ash.

Amount of cement B [Mg] was determined as the product of:

- the quantity of a hydraulic binder based on fly high-lime ash, Sx [Mg]
- replacement ratio of cement, WSX, as specified by the manufacturer for each type of binder

$B = \sum (S_x\ [Mg] \times WS_x)$

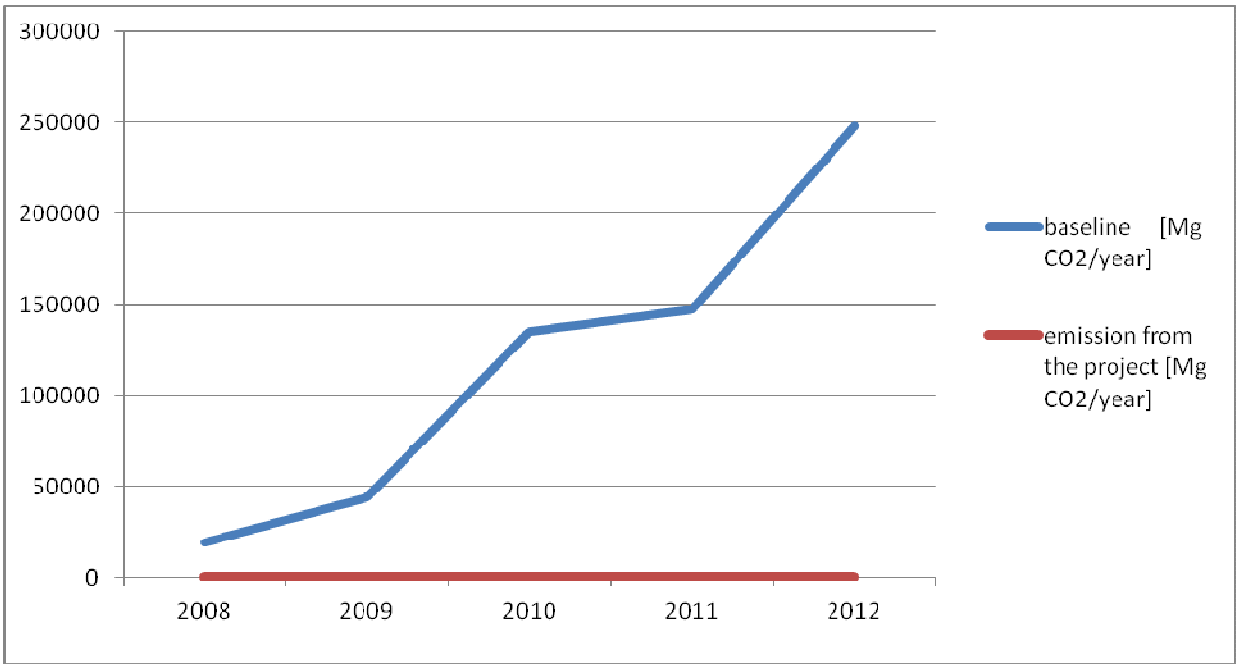

Figure 6 Baseline and project emission

D. Date of designation baseline

The date of the designation of the baseline shall be: 15.05.2012r.

E. Name of entity designating the baseline

Carbon Engineering sp. z o. o.
ul. Szlak 28 lok. 12
31-153 Kraków

NIP: 676-241-61-56
REGON: 121182332
www.projektydlaklimatu.pl

kom.: +48 795 320 900
biuro: +48 12 376 82 43
fax: +48 12 378 93 23

KRS: 0000351847

4. ASSESSMENT OF AVOIDING THE GREENHOUSE GAS EMISSION AND DESCRIPTION OF ESTIMATING THE USED METHODOLOGY

A. Considering the annual value

Avoided annual value of GHG emission was calculated as the difference between baseline emissions and emissions in a situation where the project is implemented.

According to the methodology, the determination of the baseline at point. 3C, the emissions from the baseline was determined using the following formulas:

$$BE = B\ [Mg] \times WE\ [Mg\ CO_2/Mg];$$

$$B = \sum (S_x\ [Mg] \times WS_x)$$

Emission from the project is zero.

The reduction in CO_2 emission achieved through this project was calculated as the difference between baseline and project emission, which is equal to zero, so that the reduction is equal to the baseline emission:

$$ER = BE$$

Amount of replaced cement in subsequent years by various types of hydraulic binders:

year	Type of hydraulic binder	Amount of prodeuced hydraulic binder, S [Mg]	Replacement rate, WS [-]	Amount of cement replaced by material tefra, B [Mg]
2008	TEFRA 25		0,6	
	TEFRA 15	24963	0,6	14977,80
	TEFRA STAB	2792,52	0,5	1396,26
	TEFRA IN		0,7	
	MIESZANKI BP	13426	0,45	6041,7
SUM:		**41181,52**	**SUM:**	**22415,76**
2009	TEFRA 25		0,6	
	TEFRA 15	35404,50	0,6	21242,70
	TEFRA STAB	40747	0,5	20373,5
	TEFRA IN		0,7	
	MIESZANKI BP	15941	0,45	7173,45
SUM:		**92092,5**	**SUM:**	**48789,65**

2010	TEFRA 25		0,6	
	TEFRA 15	159205,78	0,6	95523,47
	TEFRA STAB	43864	0,5	21932
	TEFRA IN		0,7	
	MIESZANKI BP	36514	0,45	16431,3
	SUM:	**239583,78**	**SUM:**	**133886,77**
2011	TEFRA 25	14856	0,6	8913,6
	TEFRA 15	221374,24	0,6	132824,54
	TEFRA STAB	45135	0,5	22567,5
	TEFRA IN	3343	0,7	2340,1
	MIESZANKI BP	10497	0,45	4723,65
	SUM:	**295205,24**	**SUM:**	**171369,39**
2012	TEFRA 25	50000	0,6	30000
	TEFRA 15	220000	0,6	132000
	TEFRA STAB		0,5	
	TEFRA IN	120000	0,7	84000
	MIESZANKI BP	150000	0,45	67500
	SUM:	**540000**	**SUM:**	**313500**

Table 5 Amount of cement replaced in subsequent years various by types of hydraulic binders

Emission from baseline:

year	Amount of cement replaced by material tefra, B [Mg]	Cement benchmark, WE [Mg CO_2/Mg]	Emission from the baseline, BE [Mg CO_2]
2008	**22415,76**	0,823	18448,17
2009	**48789,65**	0,823	40153,88
2010	**133886,77**	0,823	110188,81
2011	**171369,39**	0,823	141037
2012	**313500**	0,823	258010,5

Table 6 Emission from baseline

Emission avoided through this project:

year	The annual volume of avoided emission, ER [Mg CO_2]
2008	18448,17
2009	40153,88
2010	110188,81
2011	141037
2012	258010,5
SUM:	**567838,36**

Table 7 Emission avoided through this project

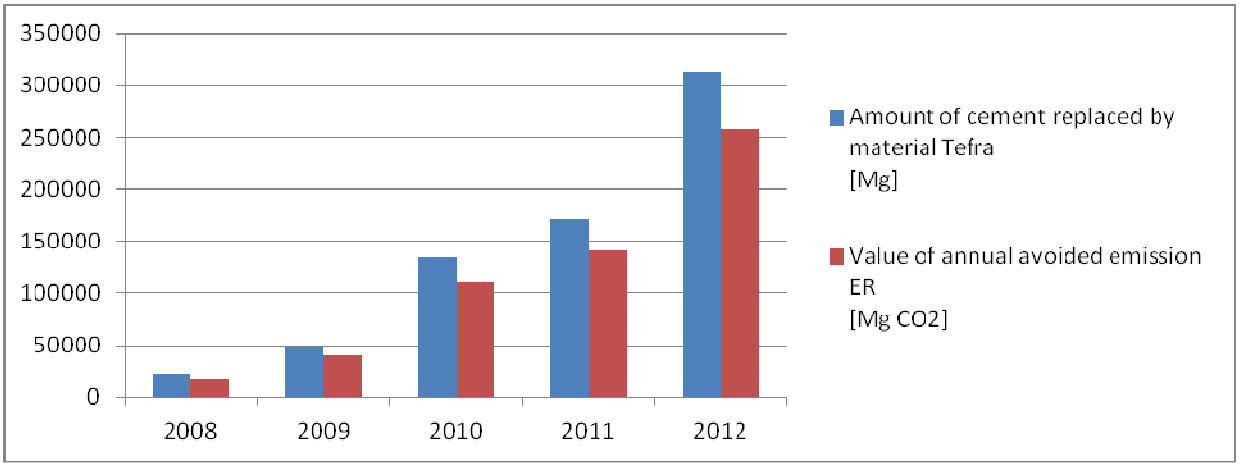

Table 8 Amount of cement replaced in each year by TEFRA material and the size of the annual emissions avoided

B. Considering the size of the total for the period 2008-2012

The total production volume of hydraulic binders based on alternative substrates is estimated at: 1208063.04 [Mg].

The size of avoided emission for period 2008-2012 will amount to 567838 Mg CO_2 equivalent 567838 emission reduction units (ERUs).

C. Considering the size of the total during the project

In order to determine the size of the total emissions avoided during the project, adopted a forecast of production of individual binders for each year of the period 2013-2020 on the basis of forecasts Investor.

Estimated production of various types of hydraulic binders in 2013-2020 will therefore be:

$$S_{x\ 2013\text{-}2020} = \sum S_{xi}$$

Where S_{xi} is forecast of production in given year.

Amount of cement replaced in subsequent years by various types of hydraulic binders:

year	Type of hydraulic binder	Amount of produced hydraulic binder, S [Mg]	Replacement rate, WS [-]	Amount of cement replaced by material tefra, B [Mg]
2008	TEFRA 25		0,6	
	TEFRA 15	24963	0,6	14977,80
	TEFRA STAB	2792,52	0,5	1396,26
	TEFRA IN		0,7	
	MIESZANKI BP	13426	0,45	6041,7
	SUM:	**41181,52**	**SUM:**	**22415,76**
2009	TEFRA 25		0,6	
	TEFRA 15	35404,50	0,6	21242,70
	TEFRA STAB	40747	0,5	20373,5
	TEFRA IN		0,7	
	MIESZANKI BP	15941	0,45	7173,45
	SUM:	**92092,5**	**SUM:**	**48789,65**
2010	TEFRA 25		0,6	
	TEFRA 15	159205,78	0,6	95523,47
	TEFRA STAB	43864	0,5	21932
	TEFRA IN		0,7	
	MIESZANKI BP	36514	0,45	16431,3
	SUM:	**239583,78**	**SUM:**	**133886,77**
2011	TEFRA 25	14856	0,6	8913,6
	TEFRA 15	221374,24	0,6	132824,54
	TEFRA STAB	45135	0,5	22567,5
	TEFRA IN	3343	0,7	2340,1
	MIESZANKI BP	10497	0,45	4723,65
	SUM:	**295205,24**	**SUM:**	**171369,39**
2012	TEFRA 25	50000	0,6	30000
	TEFRA 15	220000	0,6	132000
	TEFRA STAB		0,5	
	TEFRA IN	120000	0,7	84000
	MIESZANKI BP	150000	0,45	67500
	SUM:	**540000**	**SUM:**	**313500**
2013-2020	TEFRA 25	400000	0,6	240000
	TEFRA 15	1200000	0,6	720000
	TEFRA STAB		0,5	
	TEFRA IN	800000	0,7	560000
	MIESZANKI BP	800000	0,45	360000
	SUM:	**3200000**	**SUM:**	**1880000**

Table 9 Amount of cement replaced in subsequent years by various types of hydraulic binders

Emission from baseline:

year	Amount of cement replaced by material tefra, B [Mg]	Cement benchmark, WE [Mg CO_2/Mg]	Volume of annual emission from the baseline, BE [Mg CO_2]
2008	**22415,76**	0,823	18448,17
2009	**48789,65**	0,823	40153,88
2010	**133886,77**	0,823	110188,81
2011	**171369,39**	0,823	141037
2012	**313500**	0,823	258010,5
2013-2020	**1880000**	0,823	1547240

Table 10 Emission from baseline during the realization of project

Avoided emission through this project:

year	Annual volume of avoided emission, ER [Mg CO_2]
2008	18448,17
2009	40153,88
2010	110188,81
2011	141037
2012	258010,5
2013-2020	1547240
SUM:	**2115078,36**

Tabela 11 Avoided through this Project emission during it's realization

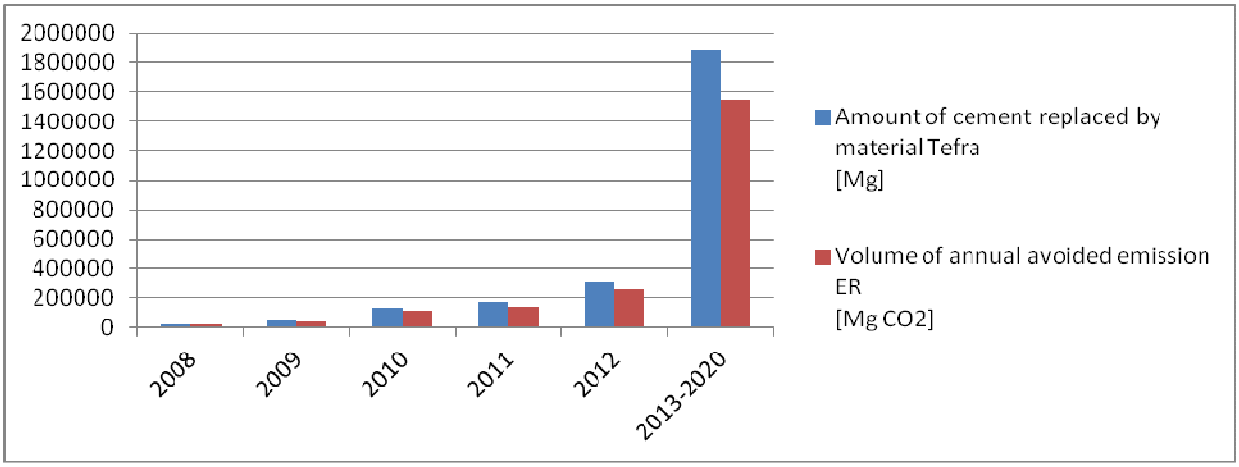

Figure 7 Amount of cement replaced in each year by TEFRA material and the size of the annual emission avoided during the project

D. Start date of avoiding greenhouse gas emissions

The start date od avoiding GHG emission was **01.05.2008.**

E. Period of generating emission reduction units

It is assumed that the generation of ERUs from project covers the period from 01.05.2008r. to 31.12.2012., which is in line with international and national legislation governing principle of reducing JI projects, which used a flexible mechanism for meeting the objectives of the Kyoto Protocol.

F. Determination of the greenhouse gas emissions generated by the project

The project does not result in GHG emissions and doesn't make a risk of additional emissions.

5. ASSESSMENT OF THE ADDITIONALITY CONNECTED WITH THE REALIZATION OF AN EMISSION AVOIDANCE PROJECT

A. National and sectoral policies

None of the formal national policies (eg energy policy, environmental policy, climate policy) is not supported directly and had not yet created effective mechanisms to support economic use of coal combustion by-products in the energy sector. The increase in storage costs, stricter requirements for landfills, are not sufficient to run a massive, technologically advanced use of ashes. The proposed project may be an incentive to launch such a system process. Promotional and educational experience, including carried out by Ekotech (in particular, already 19 international conference on "Ashes of Energy", a number of specialized technical seminars and publications of the ashes, out of national activity, such as ash EuroCoalAsh European conference, organized alternately with the U.S. Conference of World of Coal Ash, a global network of organizations WWCCPN ash) indicate that a breakthrough is still missing a comprehensive solution that would not only encourage energy companies but also entities in the area of technical support and market power to address this issue. The situation on the European and international market is not much better than in Poland, and in many respects, is actually of Polish entities can be considered as leading. The proposed project would therefore be the impetus for the qualitative development of this branch of business in Europe. Given that Poland has not yet implemented the Waste Framework Directive requirements (novella Recovery Act project is still working), and practical implementation of REACH faces high barriers (lack of a clear mandate for the results obtained under the REACH environmental regulations is still optional NIH hygiene certificate is more important than the mandatory data sheet or information sheet made of a substance based on the REACH registration dossier), the project should be considered vital for the implementation of the practical application of the requirements of these regulations. The proposed new operation in Europe (Roadmap 2050, energy efficiency, efficient management of raw materials) is another strategic areas that could use the mechanism of this project as an example of the practical effects of obtaining synergies and reduction. This project would also take a balanced, coordinated and effective effort to overcome the barriers of perception-ash as useless at best questionable - waste, as well as other barriers identified earlier.

B. The estimated internal rate of return

Introduction

Application of Joint Implementation of the project, in addition to overt benefits resulting from waste disposal and use them for the production of alternative binders, which can replace the traditional materials used so far produced on the basis of cement and calcium also causes other economic benefit for investors. In order to determine the appropriate classification of the impact of the project and to give individuals testifying to reduce CO_2 emissions, the analysis was carried out under the internal rate of return on investment in the project.

Calculations:

Year	Revenues without ERU [zł]	Revenues with ERU [zł]	Total cost [zł]	Cash flow without taking into account ERU [zł]	Cash flow taking into account ERU [zł]
2008	0	0	2 536 819	-2 536 819	-2 536 819
2009	0	0	920 935	-920 935	-920 935
2010	1 343 264	1 343 264	6 011 763	-4 668 499	-4 668 499
2011	7 386 382	7 386 382	8 071 327	-684 944	-684 944
2012	25 100 000	26 577 519	24 219 700	880 300	2 357 819
2013	19 300 000	20 882 193	21 110 000	-1 810 000	-227 807
2014	19 300 000	20 986 868	19 500 000	-200 000	1 486 868
2015	24 050 000	25 849 594	22 250 000	1 800 000	3 599 594
2016	24 050 000	25 901 931	22 250 000	1 800 000	3 651 931
2017	24 050 000	24 050 000	22 250 000	1 800 000	1 800 000
2018	24 050 000	24 050 000	22 250 000	1 800 000	1 800 000
2019	24 050 000	24 050 000	22 250 000	1 800 000	1 800 000
2020	24 050 000	24 050 000	22 250 000	1 800 000	1 800 000

Table 12 Statement of income and investment costs

Year	Price of permission ERU (13.02.2012) €
2012	3,67
2013	3,93
2014	4,19
2015	4,47
2016	4,60

Table 13 Commodity futures contracts with settlement in December of the year (2012-02-13)

Year	Revenue from the sale of forward contracts (04.02.2012)€	Revenue from the sale of allowances in forward contracts (04.02.2012) zł
2012	344410	1 477 519
2013	368810	1 582 193
2014	393209	1 686 868
2015	419486	1 799 594
2016	431686	1 851 931

Table 14 Revenue from the sale of ERUs in forward contracts in different years

The period of the project	2008-2020
Period of genertaing ERUs	2008-2012
Total revenue from ERU sales [PLN]	8398104
Exchange rate EUR / PLN (2012-02-21)	4,29

Table 15 Additional data

IRR without ERU	1,10%
IRR with ERU	11,68%

Table 16 Calculated rate of IRR

Summary

Purification and enrichment processes developed during the project ashes high-lime do not emit carbon dioxide into the atmosphere. The use of the resulting materials instead of the traditional use, products based on cement and calcium allowed within five years to avoid the issue in the amount exceeding 567 thousand. t (eq) of carbon dioxide. In the analysis of the IRR were taken into account all of the company (total costs and revenues of all companies). In the first two years of the project, the target beneficiary only granted to individuals bear the costs associated with the development of the ashes. The use of currently available futures prices received permission allows for the calculation of future income resulting from the sale of units received in the years 2012-2016. In each year, the revenue will amount to 1 477 519, 1 582 193, 1 686 868, 1 799 594, 1 851 931 zł. An additional source of income in the total amount of 8 398 104 zł, allows to achieve a greater percentage of 10.58 points internal rate of return on investment. Please note that the IRR = 11.68% taking into account the proceeds from the sale of allowances ERU has been calculated at an exceptionally low price of allowances, taking into account historical data from the entire period. It is also important opportunity to generate additional revenue (with an increase in allowance prices) in the coming years, which will contribute significantly to increase the internal rate of return.

C. Description of the difficulties that may occur during the implementation of the project and an indication of the way they are removed

List of formal, legal, economic, technical and social barriers identified by the investor during the preparation and implementation of investment

Barriers and obstacles can be summarized in terms of:

Legal barrier:

a. Not implemeted to polish law Waste Directive, makes that UPS often ambiguous (and differently in different areas) are classified by the administration– as waste or recycled products, resulting in the need for justification and obtain waste permts
b. Extending the investment process procedure for obtaining permits and approvals for the use of UPSs, often rejected due to poor knowledge of the complex and ambiguous investors interpreted the requirements of the competent local administrations
c. National legislation concerning tenders not using virtually environmental conditions (in terms of the overall impact of the projects on the environment)
d. Real lack of enforcement priority for secondary raw materials from natural investment projects

e. Absence from decisions regarding project requirements regarding the carbon footprint, energy efficiency and others. (eg specified in EU law)

f. No obligation to analyze the emissivity of the proposed engineering solutions at the stage of preparation of the Environmental Impact Assessment.

g. Allowing the development plans and the initial conditions of investment (and then building permits) the use of natural resources, without requiring analysis of the possibility of using recycled materials

h. Direct applicability of REACH requires the registration of UPSs as substance. The registration process has not been formally closed. It required the establishment and maintenance (to ensure that the next steps) consortium providing a common registration at EU level and to provide information to ECHA. It should be noted that the separate products had been recorded: UPS classic coal, fluidized bed boiler UPS, ash desulfurization methods. As part of the consortium's members had to finance a set of physico-chemical, ecotoxicity and others. admissibility of evidence, and prepare a dossier filings with the cards and card product exposure. Product registration cannot be directly used UPS because of concerns the administration and design of the point a.

i. Production of certain types of binders is associated with the provision of factory quality control and compliance with building standards. Due to the novelty of the project, they are not widely known and used. Often, independent external monitoring is therefore monopolized and expensive.

j. Plant construction adhesives requiring cumbersome and lengthy administrative procedures related to obtaining a decision on the environmental conditions of the project, a decision on the recovery of waste, a decision on the building permit.

<u>Design and engineering:</u>

a. Uncritical specifying lime and cement as the primary solution, not requiring the developers' effort, "and additional work

b. Out of designers who know the market, new technologies and binders

c. Failure by the investors environmental requirements announced in tenders (no environmental criteria in tender evaluation)

d. Investor resistance against the use of new, unfamiliar solutions, resulting in increased risk of investment failure

   - Issues of time - extending the formal procedures

   - Quality issues - the use of new products by designers and untrained executive team

e. Istotne Important to facilitate the use of natural resources, unencumbered administrative procedures and used "habitually" by designers as safe technology, usually not requiring remediation degraded pits

f. The need for using larger amounts of material (using adhesives UPS) in comparison with the cement and lime

g. Legitimate concerns of investors against public opinion denying the use of the "waste" that could occur in delay in the approval documentation

h. Longer investment process (design) due to the need for further review, consultation and environmental permits (for UPS binders)

i. Some dependence on the seasonal production of adhesives, contrary to the seasonality of investment (especially roads)

j. Powerful lobbying groups of producers cement and lime

Executive (investment):

a. Poor knowledge of implementing technology in the application of adhesives for construction companies
b. Additional requirements related to the implementation of the practice of building technologies using binder with UPSs

Cost effective:

a. High cost associated with the registration of REACH (Research, registrations)
b. Additional costs associated with administrative permissions (the costs of research, expertise, quality testing) for the generation of binders
c. Additional costs in the manufacture of quality monitoring in power plants and in the applicant's
d. Lower cost of raw materials design virtually unencumbered issues such as restoration of degraded the land and gravel pits
e. Additional costs of building installations producing binders, procedures and administrative permits for their run
f. Lower cost of cement and lime products as the standard
g. Higher costs associated with the investment regulations such as having more need of binders
h. Higher designing costs associated with additional expertise and arrangements for the use of adhesives and extended UPS investment process, associated with the planned and use of them

Justification of additionality of the Project

In the course of project implementation TEFRA, the Investor was forced to overcome these barriers and difficulties that were to him as the financial burden, as well as organizational and time. Documentary evidence of the existence of these barriers are available in the office Ekotech - Ashes Engineering Sp. Z.o.o.

Thanks to the experience of those involved in the preparation of the project and the determination of project owners (specialized in projects related to the production of hydraulic binders), and so long for additional support for investment in the form of ERUs, it was possible to overcome private and sector barriers and to ensure successful implementation of the the project. These conclusions drawn from the history of the investment and encountered in connection with the difficulties indicate the condition of additionality of the project, within the meaning of Article 6.1 (b) of the Kyoto Protocol.

6. MONITORING PLAN

A. Identification of the data and information that should be collected to monitor the project and the method of data collection, analysis and storage

In order to monitor the project it is necessary to systematically and accurately collect data on the **volume of sales of different types of hydraulic binders delivered to the end user,** as a result of the installations for the production of hydraulic binders.

Sales data that will form the basis for the development of the monitoring reports are sourced from commercial invoices.

Invoices are issued to the end user by distribution companies:

- Ekotech-Centrum Sp. z o.o. located at Chełmżyńskia St. 180, 04-464 Warsaw.

- Ekotech – Inżynieria Popiołów Sp. z o.o. located at Niedziałkowskiego 47A/4 St., 71-403 Szczecin

- Ekotech Sp. z o.olocated at Niedziałkowskiego St. 47A/4, 71-403 Szczecin

Amount billed and sold to the end user of adhesives is determined on the basis of direct mass measurements using hydraulic binders available in different weights or using power balances included in an installation for the production of hydraulic binders. Data on sold weight binders under which sales invoices are issued, are documented in the form of receipts confirmed by the recipient weight.

All scales used to determine the mass of hydraulic binders sold to the end user have valid certificate verification.

For each type of hydraulic binder was determined replacement cement ratio, calculated in accordance with the applicable methodology, the use of appropriate standards for individual measures, which are used for hydraulic binders. Replacement rate is the basis for the calculation of emission reductions.

Obtained data in the form of sales invoices from the period of the last 10 years are stored in the premises of the companies that sell cement to the end user. Distribution companies are::

- Ekotech-Centrum Sp. z o.o. located at Chełmżyńskia St. 180, 04-464 Warsaw.

- Ekotech – Inżynieria Popiołów Sp. z o.o. located at Niedziałkowskiego 47A/4 St., 71-403 Szczecin

- Ekotech Sp. z o.olocated at Niedziałkowskiego St. 47A/4, 71-403 Szczecin

Ekotech-Center Sp. Z o.o. on the basis of invoices issued by it from the sale to the end user binders prepare an annual statement of the amount and type of bond sold to the end user and provide the above. statement to the

seat Ekotech - Inżynieria Popiołów Sp. z o.o. **Ekotech – Inżynieria Popiołów Sp. z o.o. prepares a summary of sales data based on their own sales invoices,** sales invoices Ekotech Sp. Z o.o. and a statement obtained from Ekotech-Center Sp. z o.o.

Data on the rates of cement and replace its calculation methodology and a summary of sales data are stored in the company's headquarters Ekotech – Inżynieria Popiołów Sp. z o. o. **Calculations and internal reports for the number of ERUs generated by the project activities are stored in paper and electronic form - CD (original and backup) for 10 years from the end of the reference period in the seat** Ekotech – Inżynieria Popiołów Spółka z o. o.

Monitoring reports for the previous year will be sent to the national competent authorities no later than March 1 of the calendar year of the request for issuance of ERUs for the production of energy in a given period, subject to monitoring.

B. Description of formulas used to calculate the emissions generated by the project, along with their description

The project contributes to the reduction of carbon dioxide emissions by replacing traditionally used in the production of products of hydraulic binder - cement and lime - alternative materials - generated during electricity generation ashes.

Emission reduction ERy by the Project during the year y is the difference between baseline emission (BEy), emission from the project (Ey) and emissions due to leakage (Ly):

$$ERy = BEy - Ey - Ly$$

Baseline emission equals BEy:

$$BE_y = B_y \text{ [Mg]} \times WE \text{ [Mg } CO_2\text{/Mg]};$$

where:
- By - amount of cement which would be used for the production of hydraulic binders in the given year, in a situation in which there is not applied hydraulic binder based on fly ash from power plants high-lime [Mg]
- WE – benchmark of cement production
  WE = 0,823 [Mg CO_2/Mg]

Quantity of cement By was determined according to the following relationship:

$$By = \sum (S_{xy} \text{ [Mg]} \times WS_x)$$

where:
- S_{xy} - the quantity of hydraulic binder type, produced in a given year based on the high-lime ashes [Mg]
- replacement ratio of cement, WSx, specified by the manufacturer for each type of adhesives. While for non-TEFRA binders , indicators WS_x were calculated once and are used throughout the duration of the project (ex ante). For the binder TEFRA IN indicator WS_x is calculated for each specific application (ex post) based on the following methodology:

WSx indicator for TEFRA IN, will be determined in each case obtained by calculating an effective replacement for individual projects, where the output is compared to a traditional recipe based on cement (kg of cement/1000l grout) and use an alternative formula involving fluidized bed fly ash and / or conventional.

Project does not cause GHG emission, also it doesn't create a risk of leakage due to the additional emission, and therefore:

Ey = 0
Ly = 0

Accordingly, the reduction of emission in the project is as follows::

$$ERy = BEy = (\sum (S_x \times WS_x)) \times WE$$

C. Determination of procedure for monitoring the reliability of data and information gathered in order to monitor the project

MONITORING PLAN
The procedure for reviewing the accuracy of data and information collected to monitor the project TEFRA for the purpose of granting of the emission reduction units (ERUs)

	Name and surname	Position	Date	Signature
Developed by:				
Accepted by:				

A . Duration of the monitoring and the methodology applied:

1. The aim of this paper is to present procedures for obtaining and recording the data needed to verify the number of annual emission reduction units (ERUs) generated by the factory binders Ekotech - IP in the period from 2008 to 2012.
2. The monitoring plan will be used for verification of emission reduction units generated as a result of the

creation and operation of hydraulic binders Ekotech Factory - IP.

3. Monitoring methodology has been developed for the need of this project.

4. Verifying the number of achieved emission reduction units will take place every year in the period 2008-2012. Monitored variable is the amount sold by the Applicant in the adhesives during the period 2008-2012.

B. The allocation of responsibilities, rules for obtaining data, running the calculations and internal control::

1. The following parameters will be monitored and their size:
- Number of different types of adhesives, **sold to end-users, in a consolidated statement of sales data, prepared on the basis of sales invoices, issued by distribution companies** – Ekotech Centrum Sp. z o.o., Ekotech – Inżynieria Popiołów Sp. z o.o. i Ekotech Sp. z o.o. and documentation in the form of weight tickets, confirmed by the recipient, based on the sales invoices,
- Cement replacement ratio hydraulic binder - the value adopted for the calculation of the replacement rate is chosen in a proper manner and in accordance with the methodology of determining indicators presented by the Applicant,
- Number of emission reduction units in a calendar year.

2. Measuring the amount of bond sold to the end user will be determined on the basis of customer sales invoices issued. Sales Invoices will be issued on the basis of weight tickets confirmed by the recipient. Receipts weight is a document stating the actual weight of hydraulic binders and are issued after each weighing binders delivered to the recipient. Weighing is done using weights included in the individual installations for the production of hydraulic binders Investor or using the weights belonging to the plant, which will directly receive the ashes, do not require additional processing.
All scales have a current certificate validation.
Confirmed by the recipient weight tickets will be delivered to the Company's Distribution- Ekotech Centrum Sp. z o.o. lub Ekotech – Inżynieria Popiołów Sp. z o.o. On the basis of receipts issued by the weight distribution of invoices for end users (1 per week).

3. Replacement of cement binder ratios were determined based on the appropriate measurement and calculation methodologies. Calculation methodology was developed by the Applicant in accordance with applicable industry standards, for individual activities, which are used for hydraulic binders.
A particular type of bond sale will involve the use of a specific ratio of replacement of cement binder to further reduce CO_2 emissions calculations.
Relevant information will be on the sales invoice, which will be delivered to a specific type of adhesive to the end user, which is a clear indicator of a suitable replacement for further calculations.
If Tephra IN, calculations are made for each specific project (application) based on the comparison output and alternative formulations developed for the project.
Calculations performed person designated by the applicant (as in p7)

4. Receipts and invoices sales weight should be kept at the premises of the distribution companies:: Ekotech Centrum Sp. z o. o., Ekotech – Inżynieria Popiołów Sp. z o.o. and Ekotech Sp. z o.o. in separate rooms in separate binders for each year, arranged chronologically and sold by a hydraulic binder. The person responsible for keeping records of receipts and invoices, sales weight is the sales manager for logistics, Danuta Orzechowska (Ekotech Center Sp.) And sales logistics manager Edyta Kryszkiewicz (Ekotech – Inżynieria Popiołów Sp. z o.o. and Ekotech Sp. z o.o.)

5. CD and paper files in the form of:
- **compile aggregate sales amount** of hydraulic binders delivered to the end user based on an overview of sales data Ekotech Centrum Sp. z o. o. and sales invoices issued by Ekotech – Inżynieria Popiołów Sp. z o. o. and Ekotech Sp. z o. o.,

- methodology for the calculation of replacement indicators,
- evidence for the development of baseline and alternative formulations for use TEFRA IN in individual projects and the calculation of replacement indicator.
- calculations and internal reports identifying the number of ERUs generated by the project should be kept in a separate room, where are the other fundamental, key documents Ekotech – Inżynieria Popiołów Spółka z o. o. on paper, in binders described for each year (in the case of calculations and reports determining the number of units of domestic emission reductions achieved by the project 2 copies - the original and a copy) and electronic format CD (for all documents 2 copies - the original and a copy), in a specially prepared spreadsheet eight-character password protected. Access to these records should be restricted to designate - Slawomir Juszczyk, the person replacing - Edyta Kryszkiewicz and Wojciecha Ratowskiego.

6. Calculations and internal reports on the numbers of ERUs generated by the project should be kept for 10 years after the end of the reporting period.
The person designated by the applicant to manage the project will be responsible for obtaining the source data for the calculation of baseline emissions and, consequently, the number of units ultimately reduce emissions and proper storage.
Person designated by the Applicant is Sławomir Juszczyk.

7. As a substitute, in exceptional cases (such as the person responsible long absence due to various reasons), the duties associated with monitoring will take over Danuta Orzechowska or Edyta Kryszkiewicz.

8. Summary data for the previous year, together with the calculation should be collected by the person responsible for the January 31 of the calendar year.

9. For the validation of the data used, their proper storage, calculation of emission reduction units, etc., Wojciech Ratowski will be responsible to manage the entire process of monitoring.

10. If the calculation of emission reduction units will carry out Danuta Orzechowska lub Edyta Kryszkiewicz (in place of the person responsible for it), internal control and acceptance shall be conducted by Wojciech Ratowski.

11. Internal control input data, calculations and records for the previous year - ie monitoring report prepared by the responsible person - should be completed by February 10 of the calendar year..

12. In the case of incomplete data, wrong assumptions, errors in calculation formula or other irregularities, Wojciech Ratowski should recommend an amendment and supplement of the person responsible for the preparation of the report, or do these things yourself, within 10 days ie up to 20th February.

13. Reports for the previous year should be sent to the national competent authorities no later than March 1 of the calendar year.

14. The person responsible for preparation of reports should be in every year, at a certain time, send to the verifier together with a report on the amount of GHG reduction, copies of the references used to calculate the parameters.
Number of emission reduction units will correspond to the sum of the products of:
- The quantity of each type sold binders produced by the project,
- Replacement pointer of cement by type of cement binder
- Benchmark from production of cement clinker.

15. Correctness of used to accountings designs should be verified by Wojciech Ratowski and protected against data modification. In the case of electronic media should be used eight-character password. In the case of a paper should be prepared in two copies signed by Wojciech Ratowski. One copy should be placed in a room with restricted access, the seat Ekotech – Inżynieria Popiołów Sp. z o.o.

16. The main source allows for verification of information on the quantities of the various types of hydraulic binders provided by the Applicant to the end user will be invoiced sales of particular types of binders and appropriately selected cement replacement rates for different types of adhesives, along with the methodology of calculation..

C. Corrective actions procedure for the Monitoring Plan

1. Aim of the procedure

The aim of the procedure is to ensure that in case of non-conformance or threat to the quality of actions resulting from the Monitoring Plan, an adequate corrective or preventive measures are undertaken to eliminate the cause of the non-conformance and threats, depending on the degree of the problem's importance and the occurring threats.

2. Subject of the procedure

The Procedure incorporates the course of conduct to be followed during implementation of the corrective (preventive) measures from the time of the non-conformance (threats to quality) ascertainment to the time of the documented confirmation of the effectiveness of the measures and implementation of possible changes to the quality system documentation.

3. Responsibility

Below there are listed responsibilities of the employees in connection with the procedure of corrective actions undertaken in the case of a breach of the Monitoring Plan:

3.1. Wojciech Ratowski is responsible for:
- • the management of the entire process of monitoring,
- • supervise the procedure for corrective action,
- • direct supervision of the activities carried out by a person appointed by the IP Ekotech project management,
- • overseeing the correct implementation of the corrective procedure covered under the Plan Monitoring,
- • View the entries made in the Monitoring Plan, in order to detect and eliminate inconsistencies / risks to the effective functioning of the Monitoring Plan
- • making records in the incompatibilities report.

3.2. The person designated by Ekotech - IP Project management is required to carry out activities under the Monitoring Plan and to report the non-compliance to Wojciech Ratowski or potential threat to the quality of the Monitoring Plan.

4. Course of action

4.1. Detection of non-compliance or potential threats quality is usually a result of direct observations and insights during the so-called cross-checking and balancing of the following documents:
- Receipts weight,
- ales invoice.

Monitored variables are checked by the cross, through mutual observation. Notification of non-compliance or risk quality makes the person who detected them, declaring this fact verbally or by telephone to other persons responsible for monitoring documents.

In addition, controls the following documents:
• Reports from the monitoring annual

• Verification reports.

4.2. Non-Conformance Analysis/ Threat to Quality:
Designited by EKOTECH as Project manager person - Slawomir Juszczyk – makes analyzes of non-compliance or risk and determines their causes.

4.3. Drawing up corrective/preventive actions program:
Wojciech Ratowski develop corrective / preventive activities by making an entry in the Report of Discrepancies.

4.4. Implementation of corrective/preventive actions:
Wojciech Ratowski implement corrective / preventive accordance with the program.

4.5. Examination of effectiveness of corrective/preventive actions:
After the implementation of corrective actions Wojciech Ratowski verify the effectiveness of the taken actions and make appropriate entry in the Report incompatibilities.

D. Justification of the selected method of monitoring

This monitoring methodology has been developed to ensure the effective way to monitor the project. This methodology does not require the monitoring of complex variables, and is distinguished by simplicity and high efficiency at the same time.

In this project monitoring during the crediting period shall be the amount sold to the end user based on hydraulic binders based on sales invoices and proper selection of cement replacement ratio for different types of hydraulic binders, and therefore, the different ways of using binders.