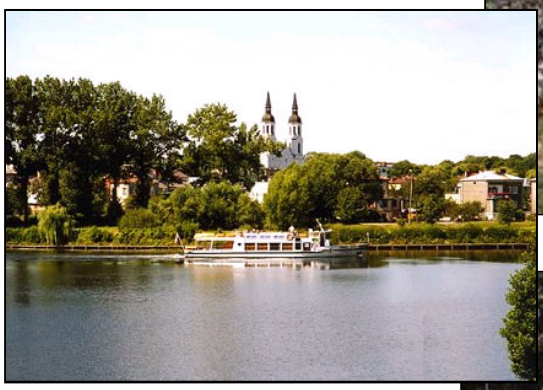
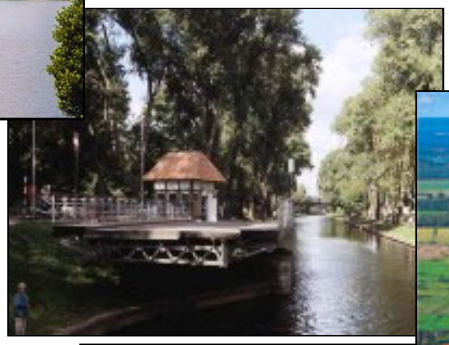
Mazurskie
Landfill Gas Package, Poland

Olecko

Augustow

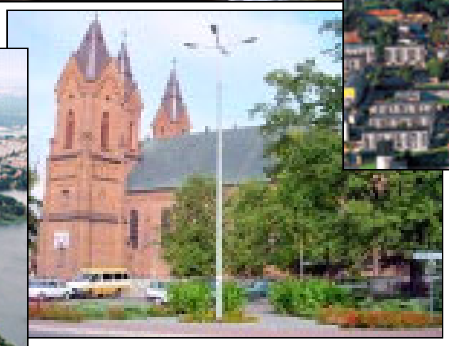




Gizycko

Pisz

Ełk



Ostrow Maz.

Torun

Project Design Document
Version 1.1
Prepared by AAEN A/S
10th August 2005

List of content

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ANNEXES

List of content

A General description of project activity

A.1 Title of the project activity

Mazurskie Landfill Gas Package, Poland

A.2 Description of project activity

Warminsko Mazurskie is one of Poland's most frequented tourist areas visited by millions of people each year. Most of them are tourist searching for recreation in this region of Poland because of its beautiful nature with lots of lakes and forests. The tourists include people from all over Poland as well as from the rest of Europe. Warminsko Mazurskie insists on preserving a clean environment in spite of a fast development in tourism and production and the need for proper handling of waste is of major priority.

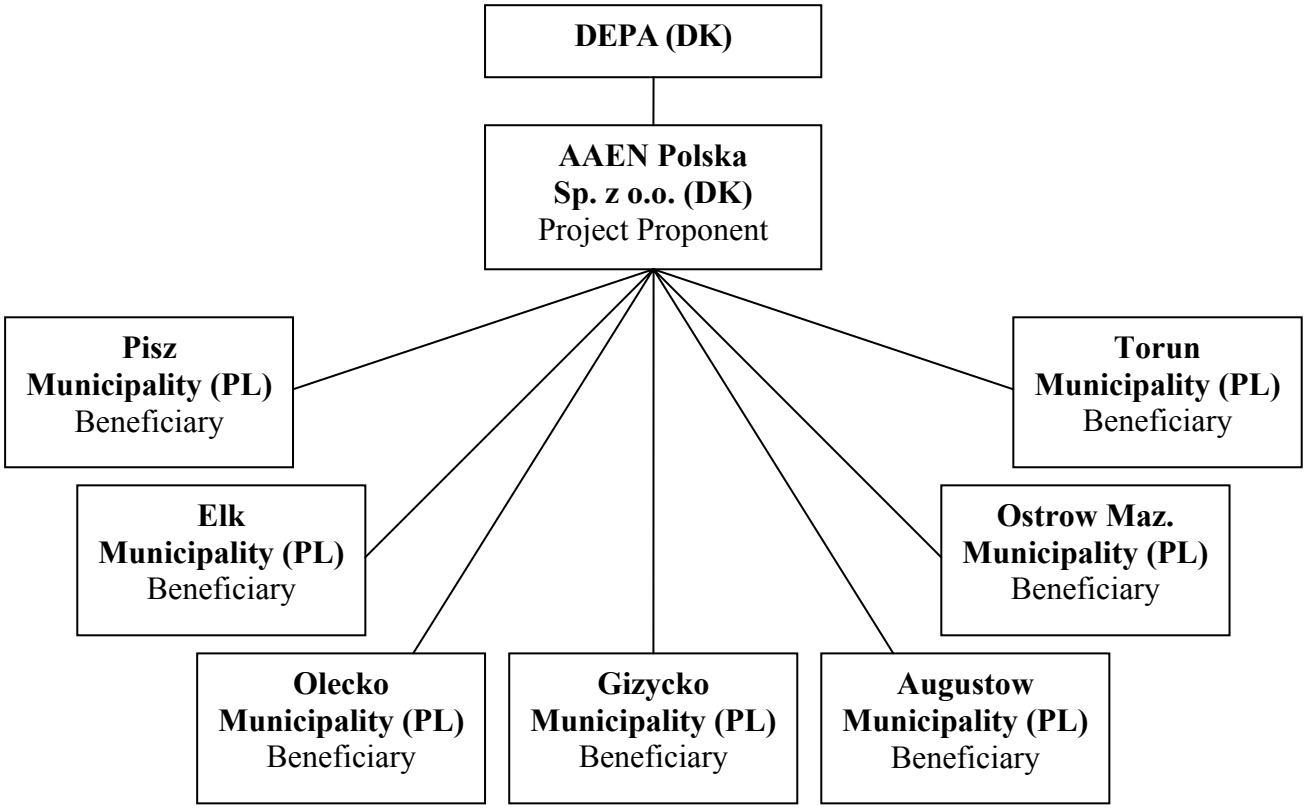
The resent years of heavy activities and investments in Waste Management and Drinking Water Management have been made with support from national and international funds.

This project aims to assist in the handling of landfill gas by establishing a number of plants for utilization of gas from several landfill sites. The methane gas from the landfill sites will be burned in gas-engines producing electrical power and district heat for the nearby cities.

A.3 Project participants

The consortium established for this project is based on previous successful corporation between the partners in the field of environmental protection projects in Mazurskie and surrounding areas whenever appropriate.

The overall organization of the project will be as shown in the figure below.



In Annex 1 are listed data for each of the partners. The partner's main tasks and responsibilities in the project are described below:

Municipalities / Beneficiaries
- Review for planes
- Participation in Project Meetings
- Administration and funding
- Public information
- Landfill administration
- Establishment and maintenance of landfill gas system

AAEN Polska Sp. z o.o.
- Technical expertise concerning establishment of a landfill gas plan
- Project application and design
- Project administration and project management meetings
- Project progress, reporting and minutes of meetings
- Funds administration
- Assistance in tendering and contracting
- Supervision during construction
- Technical training of personal
- Monitoring and verification of ERU's

A.4 Technical description of the project activity

A.4.1 Location of the project activity

A.4.1.1 Host Country

The Host Country is Poland.

A.4.1.2 Region

The region in Poland of the project areas is: Mazurskie Region and surrounding municipalities.

A.4.1.3 Cities

The specific cities in Mazurskie and surrounding municipalities are:
- Ełk with approximately 70.000 inhabitants
- Pisz with approximately 20.000 inhabitants
- Olecko with approximately 16.000 inhabitants
- Augustow with approximately 35.000 inhabitants
- Gizycko with approximately 35.000 inhabitants
- Ostrow Maz. with approximately 15.000 inhabitants
- Torun with more than 150.000 inhabitants

At this time the above cities are included in the project. However, based on approvals by the Polish Ministry of Environment the landfill sites can be exchanged and other cities can be included in the project. Exchange of cities will be based on future data for amount and quality of methane gas in the landfill sites based on test pumping results. The exchange of site shall finally be approved by DEPA and included in an amendment to the ERPA.

A.4.1.4 Details of location

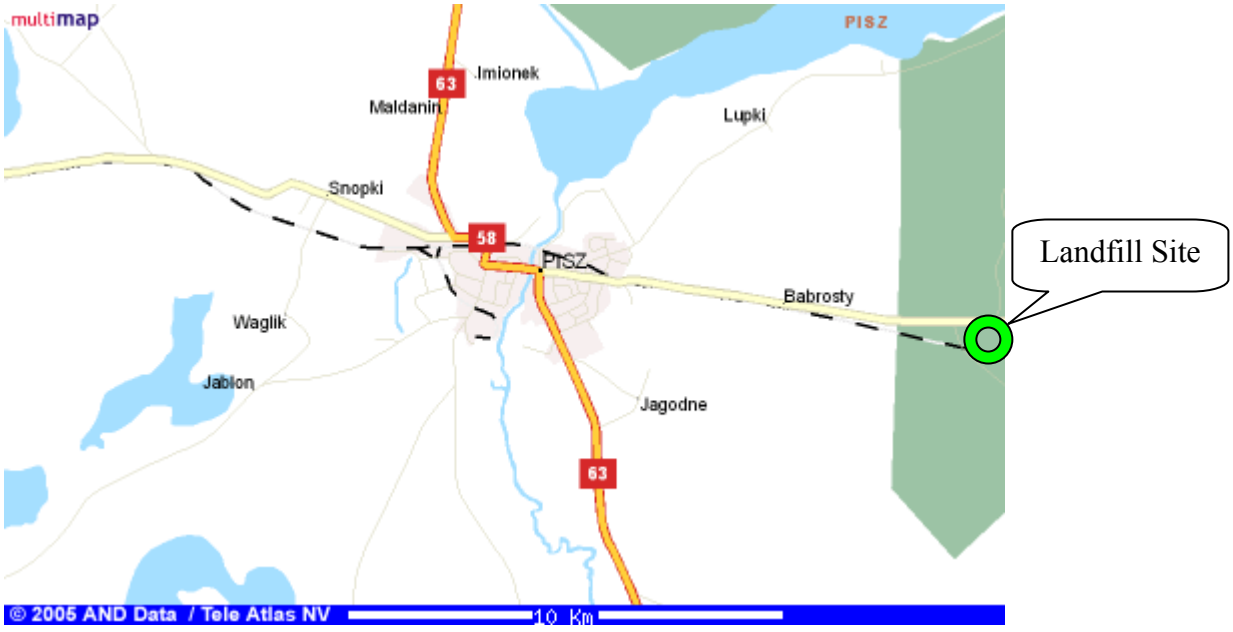
Below is shown the location of the above mentioned cities.

On the following pages are shown maps and on the front page of this report are shown pictures from each of the cities.

Ełk

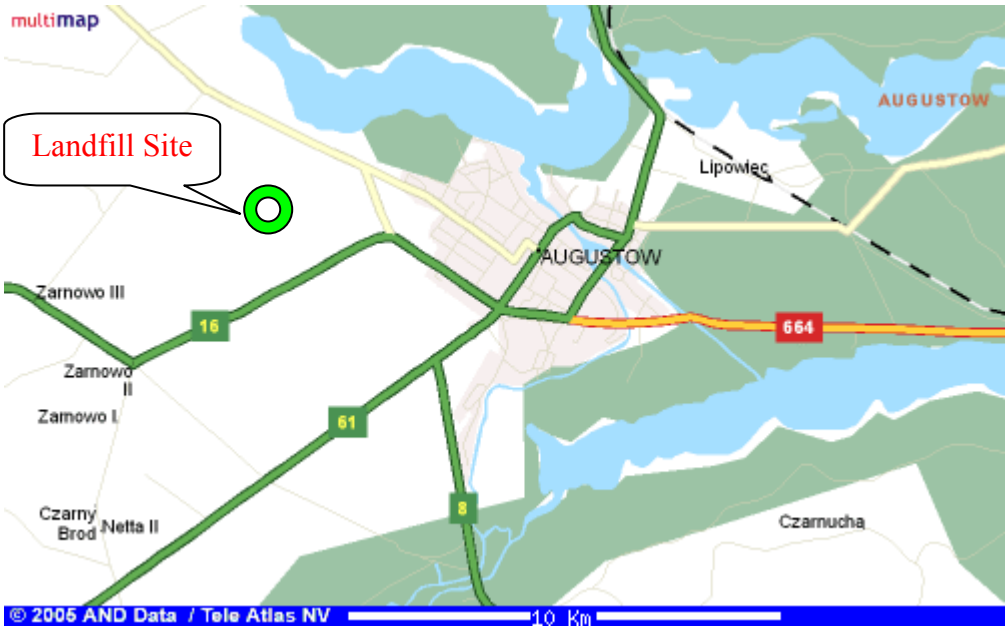

multimap
Landfill Site
Konieczki
Chrzanowo
Siedliska
65
16
Ełk
PGR
Ełk
65
Buczki
Szeligi
Buniaki
Szyba
Mrozy
Wielkie
ELK
Szarejki
Chrusciele
Regielnica
Barany
65
© 2005 AND Data Ireland, Ltd.
10 Km

Pisz


multimap
PISZ
63
Imionek
Maldanin
Lupki
Snopki
58
PISZ
Landfill Site
Babrosty
Waglik
Jablon
Jagodne
63
© 2005 AND Data / Tele Atlas NV
10 Km

Olecko

Augustow



Gizycko

Ostrow Maz.

Torun

A.4.2 Category of Project Activity

The project activities are within the categories of: Environmental Protection and Energy Efficiency.

A.4.3 Technology to be implemented by the project activity

A description follows of the technology involved in the main activity of the project.

The project idea is to establish a landfill gas plant in connection with cities landfill sites. There will be established wells on the landfill site for extraction of the landfill gas and burning of the gas in a flare. The methane from the gas can be utilized as fuel for a gas engine for production of power, which will be distributed in present electrical grid.

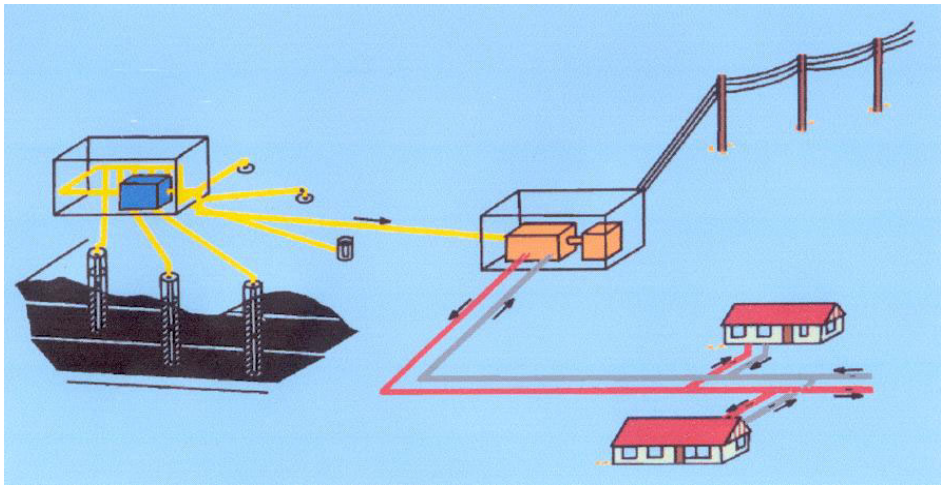
The project includes:

- A technical survey of the actual landfill gas extracted.
- Construction of all needed wells, piping, flare and engine set for the gas utilization
- Training and supervision of personal.

The landfill gas plant must be optimized to obtain the maximal gas production.

Results from the project will be:

1) Hygienic treatment of the landfill gas
The utilization processes will reduce the existence of harmful and potential exploding danger by build up concentration of the produced landfill gas.



2) Reduction of smell
Problems with smell from the produced landfill gas will be eliminated by burning of the gas.

4) Electricity
The total production of electricity from all landfill gas plants when fully implemented will be sufficient to supply at least 10.000 households with electricity.

5) Optimization of collection of landfill gas
The technical survey of the potential landfill gas production and changes in the system will help to optimize the processes resulting in a more efficient utilization of the landfill gas.

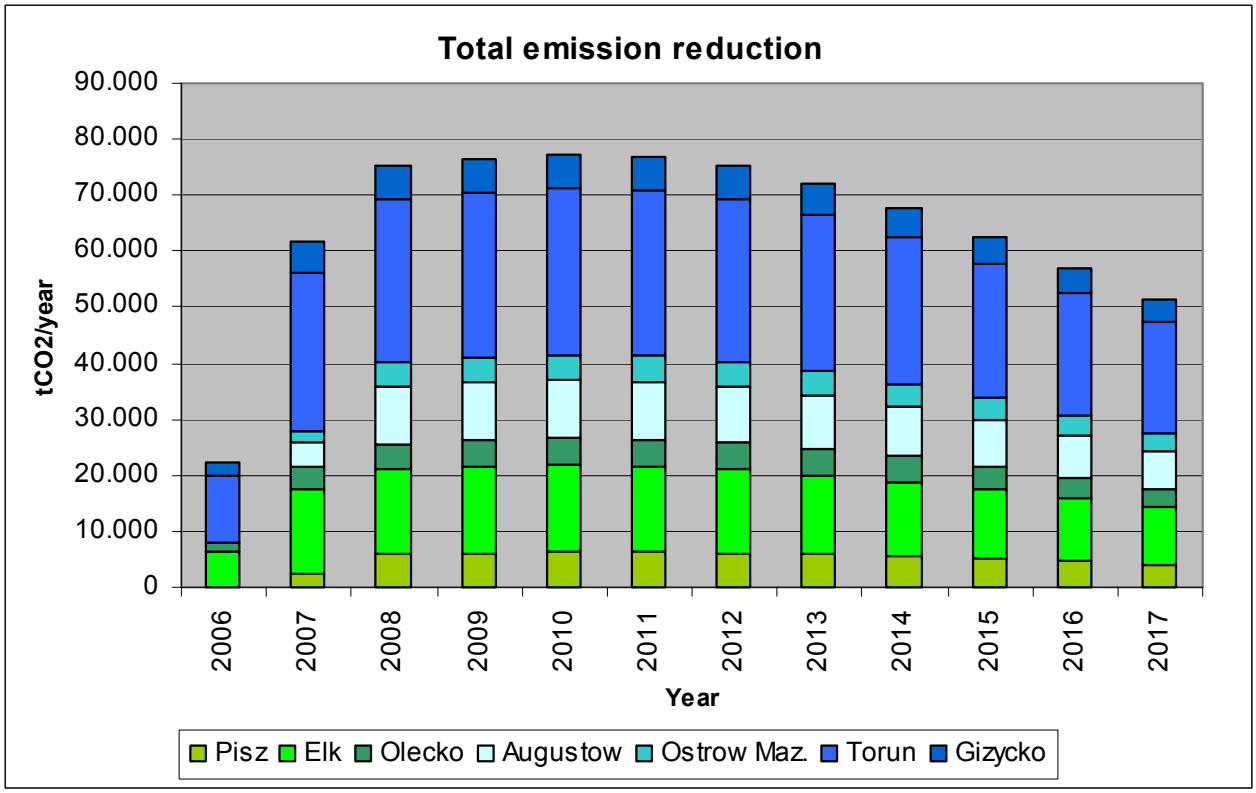
A.4.4 GHG emission reduction

A description follows of the GHG emission reduction in the main activities of the project.

The landfill sites have been paid no further attention concerning landfill gas and concentration has been on preparing of future dumping of waste. Expansion and daily maintenance and operation of the landfill sites have been very expensive for the municipalities. Furthermore, a landfill gas utilization plant will not be feasible for the municipalities without additional funding from the JI program. The cost savings from energy utilization on the landfill sites, if implemented, can not justify the investment, operation and management costs. Therefore, the emission reductions would not occur in the absence of the proposed project activity.

A.4.4.1 Estimated amount of emission reductions over the chosen crediting period

Below is shown the anticipated reductions in tones of CO_2-equivalents with each color representing the emission reduction from each landfill gas plant. Details of the calculated emission reduction are provided in section E.



As can be seen from the above figure the maximum total expected emission reduction will be approximately 75.000 tons CO2/year when fully implemented. . The drop from the year 2011 and 2012 and onwards in the landfill gas emission reduction is caused by the EU landfill directive. For details concerning the LFG sections and municipalities mentioned please refer to the section E. Below are indicated results from the calculations.

Year 20xx	06	07	08	09	10	11	12	06-07	08-12
Estimated baseline emission in 1000 ton CO_2 equivalents	71	73	75	77	77	77	75	144	381
Annual project emission reduction in 1000 ton CO_2 equivalents	22	62	75	77	77	77	75	84	381

A.4.5 Public funding of the project activity

The Danish Government's purchase of ERUs (and related monitoring, verification and certification of emission reductions) under the JI program does not use or cause a diversion of Official Development Assistance (ODA) Funds. The ERU purchase is separate from, and not counted towards, the Government of Denmark's financial obligations under the UNFCCC and the Koyoto Protocol.

B Application of a baseline methodology

B.1 Title and reference of the approved baseline methodology

For the landfill gas plant the approved consolidated baseline methodology ACM0001/Version 1, 3rd September 2004, titled: "Consolidated baseline methodology for landfill gas project activities" has been applied.

The stepwise calculations specified in the "Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories" has been used to present the results of the above mentioned consolidated baseline methodologies. Furthermore, the "Clean Development Mechanism Proposed New methodology: Baseline (CDM-NMB) version 01 – in affect as of 1st of July 2004" has been used as list of content for this chapter of the PDD.

An explanation of the methodologies and the condition under which it can be applied is provided in annex 3.

A justification of the method's appropriateness given the project circumstances are given below.

B.2 Justification of the choice of the methodology

The methodology represents the resulting baseline scenario assuming that economically rational behavior determines the most likely future baseline scenario.

Since the breakdown of Eastern Europe communism control system Poland has experienced a dramatic decrease in the economy. Now, the economic situation is improving, but in a very moderate pace.

Even though the Polish government has concerns about the GHG emission from waste, there are no plans including regulations that enforce the waste management companies to treat the waste and bring down the GHG emissions. The needed investments caused by such legislation are not prioritized among all the other important investments that need to be done in Poland.

Since there are no present or planned national guidelines or regulations which specific describe special treatment of waste on landfill sites, the methodology is deemed relevant.

However, legislation in connection with Poland as member of the EU requires that from 2012 facilities must be implemented for to ventilate and flare the collected methane gas. This has been taken into consideration in the baseline scenario.

B.3 Description of how the methodology is applied

The methodology is a financial test. In this section, the alternative treatment possibilities will be discussed in the context of the project activity and their economic performance evaluated. Hereby, the baseline scenario can be determined.

The methodology is applied in the following simplified steps:

1. Possible baseline scenarios.
2. Most likely baseline scenarios.
3. Calculate project economy, not taking carbon finance into account.
4. Evaluation of calculated project economy.
5. Economical conclusion.
6. Calculate baseline emissions.

A more detailed description of the steps above is given in section Annex 3.

B.3.1 Step 1: Possible baseline scenarios

Waste from landfill sites contain considerable amount of organic compounds. Most of the organic compounds are biodegradable, and during anaerobic conditions the waste decomposes into CH_4, CO_2 and other unpleasant smelling gasses. In order to prevent odors and emission of methane to the atmosphere and to avoid depleting of the ozone layer, the waste must be stabilized (the volatile content shall be removed).

However, a number of technical treatment possibilities as possible baseline scenarios have been identified as described below with brief description of the single technologies.

Possible baseline scenarios for the waste treatment are listed below.

a) Landfilling: The collected waste is brought to a landfill site for deposit. The organic fractions of the waste will decompose and generate methane.
b) Incineration: The collected waste is brought to an incineration plant for combustion. The chemical components for the possible methane generation will be combusted during the incineration process.
c) Recycling: The collected waste can be sorted and the recyclable fractions can be sold.
d) Methane recovery: The methane production from the deposited waste can be collected and flared or used for energy production.

B.3.2 Step 2: Most likely baseline scenario

In Annex 3 comments concerning likelihood for the step 1 potential scenarios are listed. The conclusion is the following.

For the waste treatment scenario a) concerning land filling with natural degassing represent the most likely scenario and BAU.

B.3.3 Step 3: Project economy

Apart from the above mentioned BAU scenario, the proposed project was identified as a possible baseline scenario. Therefore, a calculation of the project economy for these scenarios can be calculated. However, even with optimistic assumptions given to the project economy analysis

indicates that, the payback time calculated for this alternative is more than 10 years, which is not acceptable in any investment projects in Poland or elsewhere. The waste management company does not have any savings or other access to capital, and therefore the investment must be based on bank loans which make these solutions even more unlikely. Hence, the results show that the alternative is not an economically attractive course of action. The only other plausible scenario is BAU.

Furthermore, final price for the ERU as well as the final shares of the obtained amount of ERU to be transferred from the Polish Ministry to the Danish Ministry are 2 major points in the negotiations with the Polish and the Danish Ministry, which is ongoing and not yet completed. In fact they will not be completed before both Ministries have received a determination report of this PDD. Because of this only the PDD will be determinated at the present stage of the project and not a possible Business Plan. It is not possible to complete the final Business Plan before the negotiations with the Ministries have been completed.

B.3.4 Step 4 and 5: Formulated baseline

The baseline scenario can be described as follows:

"There will be no treatment of the landfill site produced methane gas, thus the unimpeded release of methane to the atmosphere will continue until the time when treatment of landfill gas becomes required by the national law or becomes an economically attractive course of action."

For the time being, Poland has adopted Climate Change Convention and ratified the Kyoto Protocol. Poland thereby aims at emission reduction, but no measurable and time-bound targets have been set so-far, and no CO2 reduction technologies have been appointed as preferred or recommended. Requirements from national or municipality level which are relevant to the emissions of methane from landfill sites are not expected, either.

The BAU scenario is a credible baseline scenario based on the following points:

- Financing: The financial situation of the landfill sites are such that it would not be able to finance the project totally. The individual waste management company does not have savings or other capital, and therefore the investment must be based on bank-loans. The continued waste dumped untreated on landfill sites, represent the most likely scenario from a financing perspective.
- Local support: There are no legal or policy changes foreseen in the region. However, the municipalities support the idea of changing the situation at the landfill site.
- Physical obstruction: No physical obstructions are anticipated.
- Legislation: See above under Local support.

B.3.5 Step 6: Calculation of baseline and project emissions

This methodology for estimating emission reductions include the below types of emissions:

1. GHG emission from landfill site
2. GHG emission from CHP plant

For each of the above mentioned GHG emissions the difference of CO_2 emissions between the baseline and the project is calculated.

B.3.5.1 GHG emission from landfill site

In the baseline scenario all produced methane from the landfill site will be lead out into the atmosphere. However, in the project the methane from the landfill site will be utilized for energy

production by combustion in an engine taking the EU Landfill Directive regarding LFG capture and flaring/utilization into consideration.

B.3.5.2 GHG emission from CHP plant

In the baseline scenario the energy production will be from a coal based CHP plant which is common in Poland. However, in the project the energy production will be from a gas based engine running on the methane gas from the landfill site.

B.4 Description of how the anthropogenic emissions of GHG by sources are reduced

In this section, it will be described how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered project activity including explanation of how and why this project is additional and therefore not the baseline scenario.

The application of the baseline methodology has shown the following:

1. The most likely baseline scenario is BAU, which means continued uncontrolled release of methane gas from the landfill sites.
2. The project is not an economically attractive course of action as the project payback time is to long.
3. There are no existing legal requirements for treatment of sludge, nor are such requirements expected.

The waste management companies would like to build the landfill gas utilization plant and use the produced gas for energy purposes. The project economy can be calculated based on the existing situation and even though the initial works has been done, initial economy calculations indicate that the payback time of the project is too long to fulfill the project without grants and/or sale of ERU's.

The project will generate emission reductions through the following:

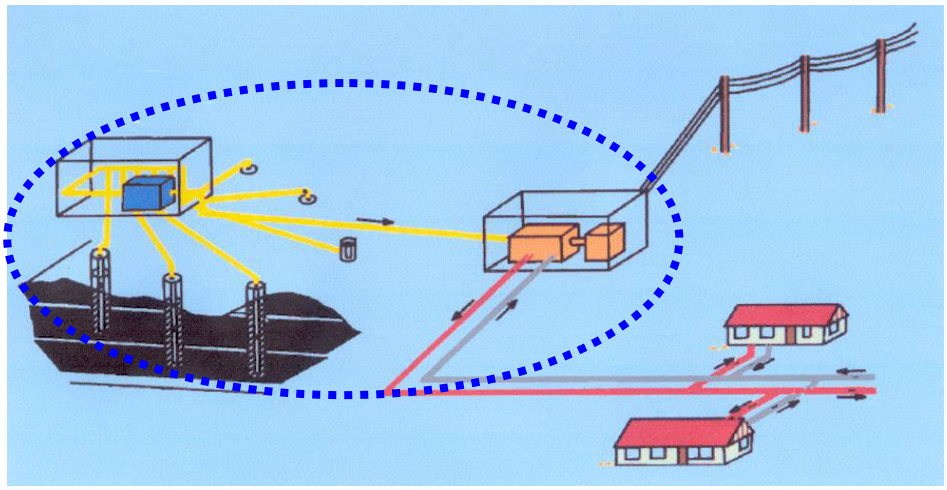
a) The capture of methane gas and combustion in a gas engine would otherwise have been released in an uncontrolled manner to the atmosphere (baseline scenario).
b) Due to CHP produced from the captured gas coal based CHP capacity can be saved and thereby saved emission of GHG from the combustion of coal compared with the combustion of methane gas in a gas engine.

Details of the calculation of estimated emission reductions are provided in section E.

B.5 Project boundary

In this section, it will be described how the definition of the project boundary related to the baseline methodology selected is applied to the project activity.

To the right is shown the project boundaries for the landfill gas utilization plant indicated by the dotted line shown on the figure previously shown in section A.4.3.



B.6 Details of baseline information

B.6.1 Date of completion of the baseline study

The baseline study was completed as the date of the submission of this application.

B.6.2 Name of person (s)/entity (ies) determining the baseline

The total scheme for the baseline studies was conducted in accordance with the project design established by AAEN Consulting Engineers A/S. The need for baseline audit must be determined by the DANCEE (DEPA) and if needed the accredited audit company or person is to be nominated.

C Duration of the project activity / Crediting period

C.1 Duration of the project activity

C.1.1 Starting date of the project activity

The starting date of the project activity is expected to be the 1st of January 2006 and is defined as the start of the detailed designing of the gas collection systems.

C.1.2 Expected operational lifetime of the project activity

The expected operational lifetime of the project activity is 20-30 years, depending on maintenance of the equipment.

C.2 Choice of the crediting period and related information

The crediting period will be specified in the agreement between Poland and Denmark for the project as well as in the Emission Reduction Purchase Agreement (ERPA) between DEPA and AAEN Polska Sp. z o.o. For the first commitment period, the framework for setting the crediting period is given in C.2.1.

C.2.1 Renewable crediting period

The ERPA between the Danish Ministry and AAEN Polska Sp. z o.o., which is expected signed before 1st of January 2006, will include the below definitions concerning the crediting period.

- *"Assigned Amount Unit" or "AAU" means a tradable unit equivalent to one metric tones of carbon dioxide emission or an amount of any other Green House Gas (GHG) with an equivalent global warming potential that are listed in Annex A and transferred on the basis of Article 17 of the Kyoto Protocol.*
- *"Early AAU's" means AAU's provided by a Host Country Government in respect of a GHG reduction achieved by a JI project in the period 2006 to 2008."*
- *"Crediting Period" means the period from the 1st of January 2006 to 31st of December 2012 during which the project is expected to generate emission reduction."*

The EU landfill directive has been taken into consideration since only waste deposited up until 2012 has been considered. Furthermore, an adjustment phase has been considered from 2006 until 2012.

C.2.1.1 Starting date of the first crediting period

The starting date of the first crediting period is expected to be the 1st of January 2006. However, emission reduction will first be obtained after commissioning of the plants expected 1st of July 2006.

C.2.1.2 Length of the crediting period

Length of the crediting period will be from 1st of January 2006 to 31st December 2012 equals 7 years.

C.2.2 Fixed crediting period

C.2.2.1 Starting date

Not applicable

C.2.2.2 Length

Not applicable

D Application of a monitoring methodology and plan

D.1 Name and reference of approved monitoring methodology

For the landfill gas plant the approved consolidated monitoring methodology ACM0001/Version 1, 3rd September 2004, titled: "Consolidated monitoring methodology for landfill gas project activities" is applied.

An explanation of the methodologies and the condition under which it can be applied is provided in annex 4.

A justification of the method's appropriateness given the project circumstances are listed below.

D.2 Justification of the choice of the methodology

For the landfill gas utilization plant it is most appropriate to accurately measure the captured amount and quality of the landfill gas giving a curtain amount of methane that in the baseline was to be released.

Characteristic for the project of the kind described above is that the emissions not released to the atmosphere can directly be monitored. The emission reductions achieved by the project do not have to be derived from a comparison between baseline and project emissions, because every ton of methane determined equals a certain amount of methane not released to the atmosphere. When the extra CO_2 emission the project courses by CHP production are taken into account the total emission reduction can be calculated.

In other words, a monitoring and emission reduction calculation method can be used that does not rely on information about baseline emissions, i.e. the quantity of emissions in the baseline scenario can remain unknown. This is convenient, since the monitoring of baseline emissions from landfill sites is unpractical, and maybe even impossible.

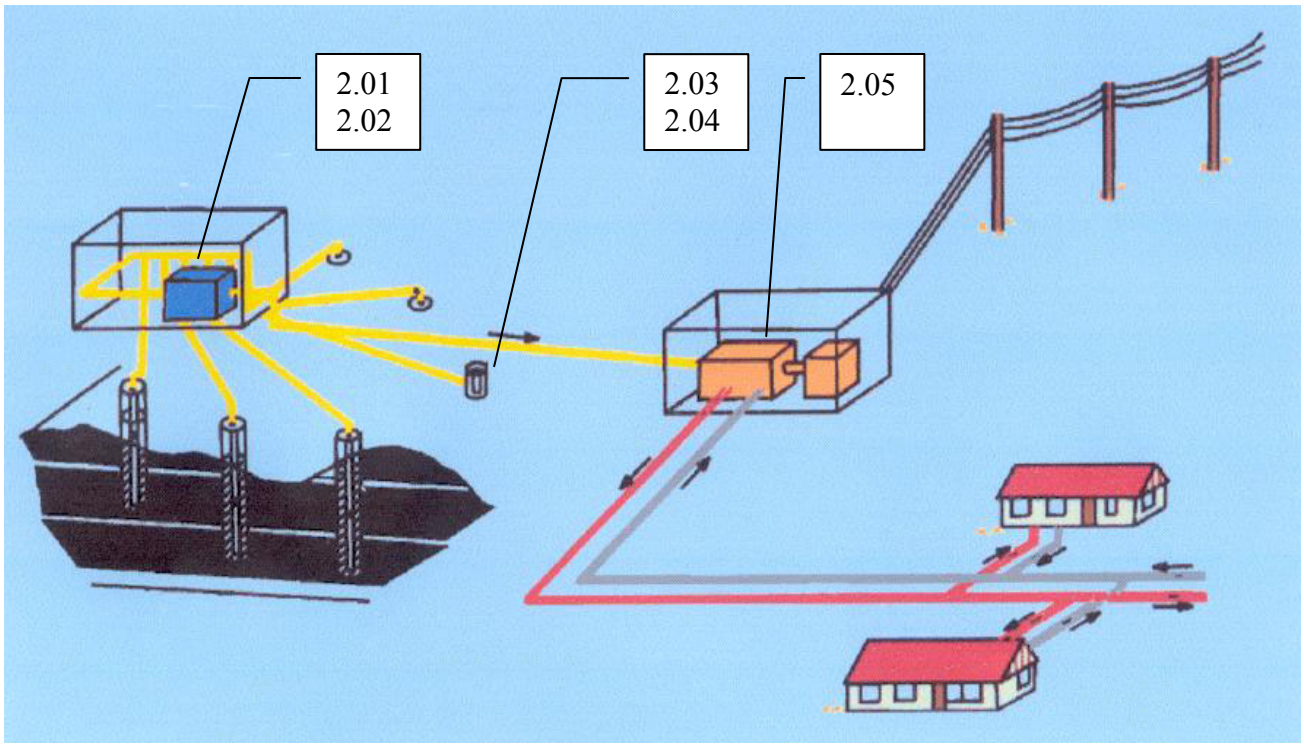
The proposed monitoring and emission reduction calculation method can also be expected to be more accurate than an attempt to derive emission reductions as the difference between monitored or estimated baseline and project emissions.

The monitoring plan sets out a number of monitoring tasks in order to ensure that all aspects of projected GHG emission reductions for the project are controlled and reported. This requires an ongoing monitoring of the project to ensure performance according to its design and that claimed ERU's are actually achieved.

D.3 Data on emissions from project entity

Instead of collecting data on emissions, data on emission reductions will be collected as indicated in the table in Annex 4.2.3.

Monitoring of most parameters will take place on-line. Registration of data will be done electronically and stored in a computer located on the wastewater treatment plant. The software installed in the computer will be able to produce reporting in formats and frequencies, ranging from on-line data to daily, weekly, to annually.
Below are shown with indicators where in the landfill gas utilization plant data are monitored.



The gas engine, the gas pumps etc. will use a minor amount of electricity. The difference in electricity consumption between baseline and project is estimated to be negligible.

D.4 Data on sources of emissions outside project boundary

Methane emission of the whole plant is expected to be brought down to only consists of possible leaks in the biogas plant and are estimated to be negligible. Only the construction of the equipment will potentially lead to some GHG emissions that would not have occurred in the absence of the project. However, these emissions are insignificant. No increase in emissions is included other than those targeted and directly monitored by the project.

D.5 Data on baseline emissions

Not applicable, because the project directly monitors and calculate emission reductions. The data mentioned in D.3 will be collected. Nevertheless, the baseline data is estimated for the calculations in section E. All data used for the baseline calculation are based on sludge and waste amounts and assumptions described in annex 3. No attempt will be carried out to determine the actual baseline emissions.

D.6 Quality control (QC) and quality assurance (QA) procedures

The QC and QA practice that will be implemented in the context of the project are as follows:

Most data monitored for the emission reduction calculations as listed in section D.3 will be registered on-line at a present determined interval (e.g. every 5 minutes). A monitoring report will be prepared on weekly basis. These reports will be checked for any anomalies before filed for future reference.

Below is shown routine records for major components within the project:

Parameter	Frequency
Gas engines The gas engines will be subject to a regular maintenance and testing regime to ensure as high efficiency as possible.	According to supplier
Gas flares The gas flares will be subject to a regular maintenance and testing regime to ensure as high efficiency as possible.	2 times a year
Routine reminder procedures A routine reminder procedure will be prepared to guide the staff through their daily, weekly and monthly routines in general for the plants and in particular for the biogas and cogeneration plant.	Daily
Site audits The responsible manger makes regular site visits of the biogas plants.	Monthly
Service sheets A specialist biogas company (e.g. the cogeneration unit supplier) carries out regular service routines. Service sheets are completed for each service to ensure all aspects of the service are completed and recorded.	According to contract with gas engine supplier

In addition to the QC and QA measures described above, the suppliers and contractors for the biogas plants, the cogeneration plants and flaring systems will prepare operational manuals. The operation manuals will include procedures for training, proper handling of equipment, service and maintenance plans, emergency plans and work security plans.

D.7 Name of person (s)/entity (ies) determining the monitoring methodology

The monitoring methodology is based on exact monitoring of output and was conducted in accordance with the project design established by AAEN Consulting Engineers A/S. The need for review of proposed monitoring methodology must be determined by the DANCEE (DEPA) and if needed the accredited audit company or person is to be nominated.

E Estimation of GHG emission by sources

E.1 Estimated GHG emissions of the project activities

This section could include a description of the formulae used to estimate anthropogenic emissions by sources of GHG's of the project activity within the project. However, this is not applicable, because the project directly monitors and calculates the emission reductions. See discussion under D.4.

The prevention of methane emission by combustion flares and engines and by ensuring aerobic degradation of leftover biodegradable organic fraction will lead to a conversion of methane emissions to CO_2 emissions.

Both the methane and the CO_2 is of organic origin, but as the projects accounts for changes of emission the CO_2 that is generated when CH_4 emission is avoided shall be accounted.

E.2 Estimated leakage

This section could include a description of formulae used to estimate leakage, defined as: the net change of anthropogenic emission by sources of GHG's which occurs outside the project boundary, and that is measurable and attributable to the project activity. However, this is not applicable. Please refer to the discussion under D.4.

E.3 Project activity emissions

This section could include the sum of E.1 and E.2 representing the project activity emissions. However, this is not applicable, because the project directly monitors and calculates the emission reduction. The only discernable yet insignificant (indirect) modification of emissions is associated with the physical construction of the project. Please refer to the discussion under D.4.

E.4 Estimated GHG emissions of the baseline

This section includes the estimated anthropogenic emission by sources of GHG's of the baseline.

For comments to the GHG emission of the baseline please refer to Annex 3.7.

E.5 Emission reductions of the project activity

This section includes the difference between E.4 and E.3 representing the emission reduction of the project activity. The monitoring plan provides for the calculation of the emission reductions in the following way.

The emission reduction due to the landfill gas collection follows the below procedure for the methane utilized as well as for the substituted coal based CHP.

1. Waste amount
2. Organic amount of waste
3. Gas production
4. Gas utilization
5. Electricity and heat production
6. Substituted coal based electricity and heat production
7. Equivalent emission reduction

E.6 Table providing values obtained when applying formulae

Due to the nature of the emission reduction monitoring and calculation process most appropriate for this project, formulas to the above mentioned procedures cannot directly be used to complete the table below. However, based on a variety of assumptions as for example waste volumes, content of organic matter, operation hours, efficiency etc., the projected emission reductions are as shown in the following tables.

Please note that these tables are only rough estimates of expected values.

E.6.1 Emission reduction

E.6.1.1 Step 1: Waste amount

Information about deposited waste has been collected and transformed into the figures given in this section. The figures from 2005 and until 2020, is based on the registered figures the years before, general development in the waste amount in Poland and taking a 3 % increase in inhabitants and tourists into consideration. Only figures until 2020 is considered, because by that time the gas production is well beyond the crediting period and general tendency hereafter is visible. Furthermore, no other significant plans beyond 2020 concerning expansion of the landfill sites have been considered yet.

History of the individual landfill sites are shown below.

Time table	Beginning	Ending
Pisz	1992	2020
Elk	1983	2020
Olecko	1960	2020
Augustow	1983	2020
Wyszkow	1971	2020
Torun	1983	2020
Gizycko	1975	2020

However, the gradual compliance to the EU Landfill Directive regarding LFG capture and flaring/utilization must be considered. This means that all waste (100%) can be considered until 2006 and then gradually decrease to zero (0 %) in 2012.

E.6.1.2 Step 2: Organic amount of waste

From analysis of the content of organic fractions in the waste it has been estimated that approximately 85 % of the waste contain organic fractions and will generate methane gas. The total amount of degradable organic carbon (DOC) has been evaluated equal the default value of DOC for Poland equal to 0,15.

E.6.1.3 Step 3: Gas production

To evaluate the gas production one have to consider the biological processes, which will start as soon as the waste is deposited. In short the initial process will be an aerobe decomposition whereby the present oxygen will be used. When the oxygen is used an anaerobe decomposition will commence from which biogas will be developed. In annex 3.4.6 is a detailed description of how the gas composition varies during time.

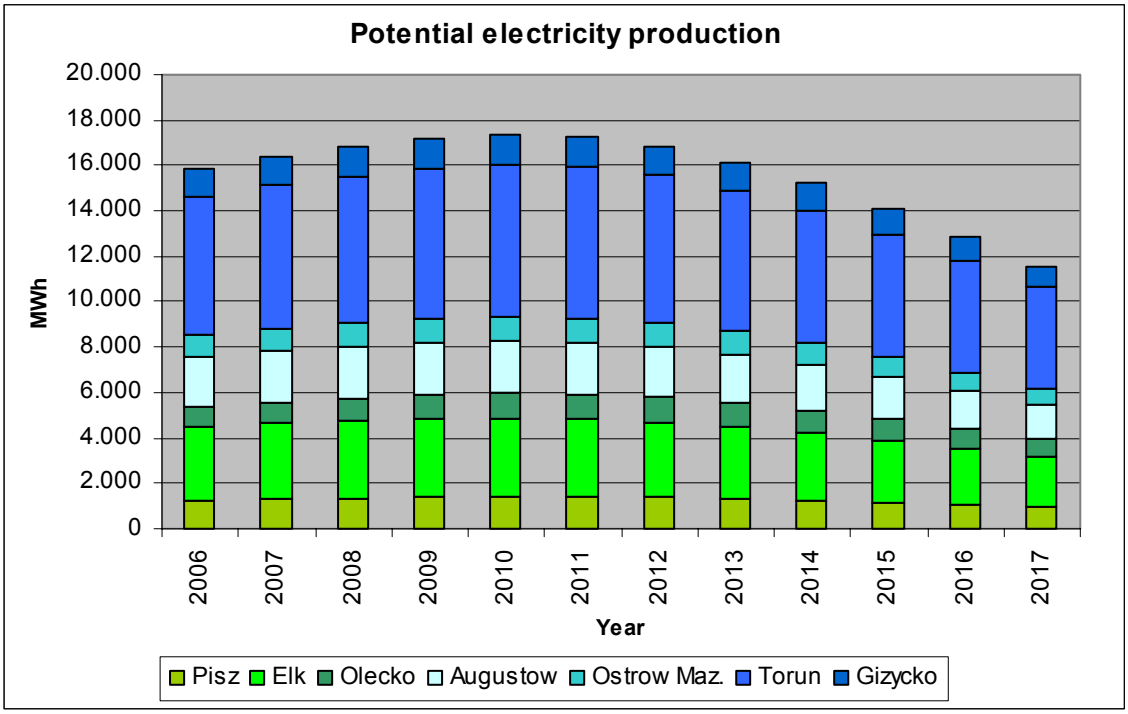
From above knowledge, general experiences, several types of formulas and actual test pumping results from the existing landfill sites the gas production can be calculated. The maximum gas production is estimated taking into consideration how large a part of the deposited waste will generate methane gas as described in step 2. Finally the calculated result is compared with actual test pumping results. The result of calculations is shown in step 4. In the calculations the maximum yearly gas production has been estimated to occur 5 years after deposit and after 25 years after deposit the gas production has been set to be close to zero.

E.6.1.4 Step 4: Gas utilization

Gas prognosis from each section of the landfill site has been calculated and compared with the actual test results for initial calibration of calculations. Only deposited waste until year 2020 has been considered, but the continuous gas production after year 2020 will occur. However, only ERU's in the crediting period up until and including 2012 have been considered.

E.6.1.5 Step 5: Electricity production

From the gas production given in step 4 and with a gas quality in average as given in step 3 the below energy production can be calculated.



The project does not include any production of heat. The engine will be cooled by heat exchanger and ventilator placed on top of the engine generator set and will be part of the contracted supply. If it is feasible the gas engine can be rebuild for utilization of the heat production, but this is not expected to be considered within the crediting period.

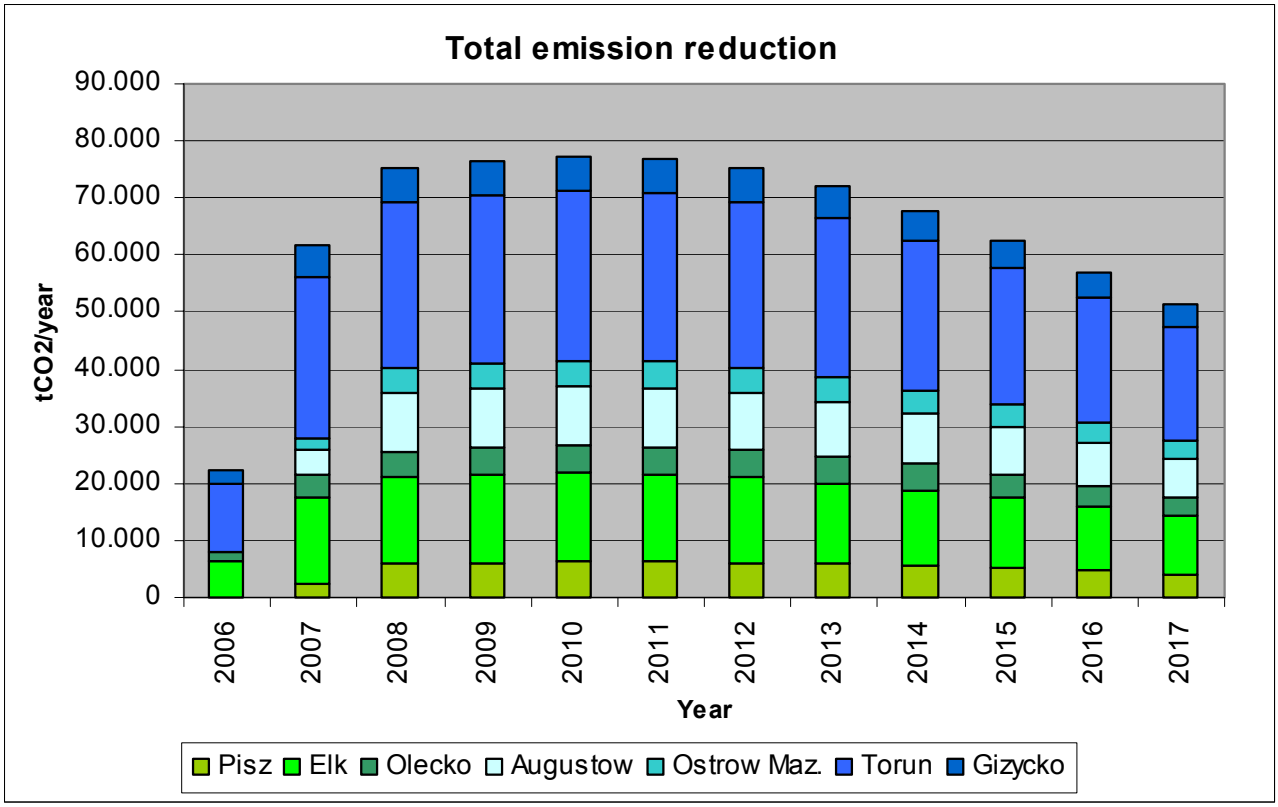
E.6.1.6 Step 6: Substituted coal based electricity and heat production

The substituted coal based electricity and heat production is equal to the in step 5 shown energy production.

Future possible heat utilization in own facilities includes administration facilities, offices and gatehouses are not included in the calculations since the heat consumption in these building are very low.

E.6.1.7 Step 7: Equivalent emission reduction

The total emission reduction from each landfill site and taking the baseline into consideration (as shown in Annex 3.7) is shown below.



The drop between 2011 and 2012 is caused by the EU landfill directive.

As can be seen in the above graph the total emission reduction by the end of the crediting period (2012) will be approximately 60 thousand tons of CO_2/year.

F Environmental Impacts

F.1 Analysis of the environmental impacts

Below is stipulated typical potential significant environmental effects from landfill sites and the impact from implementation of the projects are presented, in general terms. Implementation of the projects will have very few negative environmental impacts.

F.1.1 Human beings

Influence on health and personal safety, residential amenity and nuisance.
The risk of spreading diseases due to operation of the landfill sites and risk of exploding build up concentration of landfill gases is stopped.

F.1.2 Flora and fauna

Impact on existing terrestrial and aquatic fauna. Birds, rodents and insects as pests and disease vectors. Scavengers attracted and indirect effects from surface water pollution. Hazards to farm stocks.
Birds and scavengers will not be attracted to the closed area of the landfill site.

F.1.3 Water

Contamination by uncontrolled surface water and leakage into the groundwater.
The drainage from the landfill site is partly used for the production of methane gas and the outlet to nearby rivers is stopped.

F.1.4 Air

Generation of methane with fire and explosion hazards, odour, dust and noise from equipment and transport of waste to other landfill sites equipped with gas collecting equipment.
In general the methane emission is reduced. The controlled generation of methane and combustion will reduce the odour from the landfill site. The noise level from the gas engine, generator and cooling system will be minimum because they will be located in noise insulated containers or buildings. Noise from the gas flares will be substantial lower. Exhaust emissions from the gas after combustion will typical be:

NOX < 500 mg/m3
CO < 650 mg/m3
CH_4 ~ 0 (expected efficiency > 98 %)

Part of the remaining amount of methane of up to 2 % will during the combustion process be transferred into other chemical components in the exhaust gas. In fact results from existing and tested gas engines show that only approximately 0,1 % of the methane content in the gas input will remain in the exhaust gas. If for example the maximum ERU in the period between 2006 and 2012 of 60.000 tons of CO2 equivalents per year is considered a leakage of up to 0,1 % of the methane gives less than 60 tons of CO2 equivalents per year, which must be considered as not relevant to included in the calculations.

F.1.5 The landscape

Visual impact and change in character due to perimeter fences, bunds and signs, access roads, entrances, exposed waste, flares, smoke, fires and site structure.
There will be only few visible features from the plants, since the visible equipment needed on the landfill site will only be a container situated in connection existing building on the landfill site area.

F.2 Environmental impacts assessment (EIA)

The negative environmental impacts from a landfill gas plant and flaring or utilization systems are negligible and the impacts are considered not significant. Implementation of a landfill gas abstraction facility on an already approved and legal landfill site will not require an Environmental Impact Assessment according to EU directives. Public consultations will take place, where all questions and inquiries regarding possible environmental impacts will be discussed and clarified by specialists. Furthermore the project has already passed the initial approval procedures in the municipalities as specified in the stakeholders comments. Only requirement before for the actual construction work can begin is the final building permission.
The negative environmental impacts from the projects are therefore negligible / not existing, and the impacts are considered not significant. Hence, an EIA is not required.

G Stakeholders' comments

G.1 Comments by local stakeholders

This section includes a brief description of how comments by local stakeholders have been invited and compiled.

During the last 5 years AAEN A/S have been project manager for several DANCEE related projects in Poland including continuous cooperation with all of the partners mentioned in section A.3. Meetings are continuously held with the partners and the latest meeting was held in the summer of 2005 with representatives from all partners, see Annex 6.1. Furthermore, several meetings have been held in the Polish Ministry as well as with representatives from DANCEE.

All of the above have expressed their support to the project and letters of understanding signed and sealed by the stakeholders is included in Annex 6.2.

The Polish Ministry approved the project by the date of the LoE for further development and accept that the ERU's generated through the project can be included in there Climate Cooperation Agreement with the Danish Ministry of Environment.

Further stakeholders will be addressed by publication of this project application on the website of the municipalities or/and in local paper(s). This will take place prior to the project validation. Stakeholders to be addressed will be a possible implementing agency, municipalities, NGO's and the public. However, any stakeholders are invited to submit any report to the project or objection against the project in any time.

A 1 month of public hearing has taken place on the homepage of the Danish Ministry and the Polish Beneficiary. The PDD is expected published on the homepage of the Danish Ministry and on the Beneficiaries homepage from 1st of October 2005 till 1st of November 2005. Both places expected published without any further comments up until the date of this revised PDD.

G.2 Procedure for public consultation in the host country

There are no existing local planning/approval/permitting procedures for public consultation in the municipalities or in Poland. However, the public consultation process in the municipalities is planned to be carried out as presented in the below schedule.

Activity	Accomplished/comments
Identify all local stakeholders affected or likely to be affected by the JI-project activity	Identified stakeholders beyond partners within the project will be the Local District Heating Company, the Local Electricity Company, Representatives from inhabitants close to the Landfill Sites and relevant NGO's
Announcement of the project on the website of the municipalities and in the newspaper for invitation of further stakeholders and for comments	Will be carried out when the PDD and the Baseline Study are ready in Polish. The documents will be handed over on request. The announcement will include an invitation to participate in a workshop and call for written ore verbal comments.
Report on the consultation exercise	All written and verbal responses will be recorded an be available for all stakeholders.

G.3 Summary of the comments received

Below are summaries of the stakeholders comments received. Letters of intend is found in Annex 6: Stakeholders' letters of understanding.

In general the municipalities desires to clarify the project as a JI project for to be able to implement the proposed utilization plants according to the needed investments.

The proposed landfill gas plant, with utilization of the collected gas demands transfer of knowledge and technology and especially concerning design and dimensioning of the plants. Training by skilled personal is needed to introduce the advanced technology.

G.4 Report on how due account was taken of any comments received

Due account on the above comments have been taken according to the below initiatives taking place prior to this application.

The landfill sites deposit has been subject for detailed investigations and calculations concerning amount, composition and range of time for previous waste deposits. Furthermore forecasts calculations for future deposits have been investigated. As support and documentation a series of initial test pumping has been performed with support from the stakeholders involved in the project.

The waste management companies operating the landfill sites have been subject for investigations and investments in order to fulfill the present legislation. Changed processes and implementation of clean technology is the only possibility solution to eliminate the existing problems. The long experience and expertise for implementation of the new technology is found at AAEN A/S.