

GOLD STANDARD PASSPORT

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SECTION A. Project Title

Samsun Landfill Gas to Energy Project, Turkey

SECTION B. Project description

The Project is a Landfill Gas (“LFG”) to Energy Project, developed by “Samsun Avdan Enerji Üretim ve Tic. A.Ş.” (hereafter referred to as the “Project owner”), a local project developer in the host country, Turkey. The proposed activity involves the collection and utilization of landfill gas with an electricity component. Initially, the installed capacity is 1.2 MW_e that might reach up to 4.8 MW_e throughout the investment period. The location of the proposed activity is the Samsun landfill site, Turkey. The operator of the landfill is the Samsun municipality.

The Samsun landfill site is a managed landfill located on a hill 4 km north-east of Samsun city centre. Samsun city has a population of approximately 520,000¹. The site is a slope style landfill with basic sealing, drainage, leachate system and collection pond and fenced entrance control. Some degassing equipment is already in place, and the collected LFG is being emitted freely into the atmosphere. The old landfill was filled in 2008 and the new landfill site, the location of the Project activity, has been in use since 2008.

Before 2008, the municipal solid waste of Samsun was being dumped in the Yılanlıdere river and its vicinity in an uncontrolled manner. This led to serious environmental concerns and indirect local contamination of the Black Sea. The managed landfill site of Samsun is financed by development aid funds and is a successful example of proper solid waste management. It has also resulted in know-how transfer and capacity building locally. In this sense, the Project contributes to local sustainable development in technological, economical, social and environmental terms.

In 2010, the Samsun Metropolitan Municipality opened a tender for the transfer of rights regarding the use of the landfill gas from its landfill. Following the tender, the Project owner has acquired the rights to commercially operate the landfill. The Project aims not only to utilise the existing waste but will make use of new waste dumped during the operation of the Project. Permits and the generation license are being acquired. The business model of the proposed Project is LFG utilisation, without any landfill site management responsibilities.

The Project is located within the existing landfill site and a small building plot has been leased from the Municipality. The operational activities as well as leachate management are carried out by the Municipality.

The Project design is modular, allowing capacity expansions in coming years. The Project will initiate with a capacity of 1.2 MW and depending on the actual performance the capacity can be increased up to 4.8 MW (4 gen-sets) by adding new generation capacity.

The mobilisation of the landfill site started as of 13.09.2010. The Project is expected to start its operations on 01.06.2011.

¹ Feasibility Study, p.2

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SECTION C. Proof of project eligibility

C.1. Scale of the Project

Project Type	Large	Small
	☐	☐
	☐	☐
	☐	☐
	☒	☐
	☐	☐

	☐
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C.2. Host Country

The host country is Turkey.

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C.3. Project Type

Project type	Yes	No
Does your project activity classify as a Renewable Energy project?	☒	☐
Does your project activity classify as an End-use Energy Efficiency Improvement project?	☐	☒

Please justify the eligibility of your project activity:

The Project has two components: landfill gas destruction and electricity generation. The electricity generation component is below the UNFCCC small scale limits of 15 MW. However, the methane destruction component exceeds the 60,000 tCO₂ limit for small scale project activities (for some years). Therefore, the Project is defined as large scale.

Turkey has officially ratified the Kyoto Protocol as of 26.08.2009 and has no GHG emission reduction targets or commitments under the Kyoto Protocol.

The Gold Standard Toolkit 1.2.3 includes landfill gas to energy projects in the Renewable Energy category.

The Gold Standard Toolkit Annex C requires electricity to be generated from landfill gas at a minimum of 65% of the total LFG collected. The current technical design estimates that this ratio will be 79% lowest and higher in forthcoming years. The Project aims at reaching this threshold and is thus eligible under the Gold Standard. The Project's revenue stream depends on power sales, therefore the Project owner plans to maximise methane combustion, compared to the flaring option. In case the combusted methane for electricity generation drops below 65%, the excess flared methane fraction will not be eligible for the Gold Standard VERs.

Pre Announcement	Yes	No
Was your project previously announced?	☐	☒
The Project was not announced to be going ahead without the revenues from carbon credits.		

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C.4. Greenhouse gas

Greenhouse Gas	
Carbon dioxide	☒
Methane	☒
Nitrous oxide	☐

C.5. Project Registration Type

Project Registration Type	
Regular	☒

Pre-feasibility assessment	Retroactive projects (T.2.5.1)	Preliminary evaluation (eg: Large Hydro or palm oil-related project) (T.2.5.2)	Rejected by UNFCCC (T2.5.3)
	☐	☐	☐

If Retroactive, please indicate Start Date of Construction dd/mm/yyyy:

The LSC report has been uploaded on 07/09/2010. The mobilisation on site has been started after this date.

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SECTION D. Unique project identification

D.1. GPS-coordinates of project location

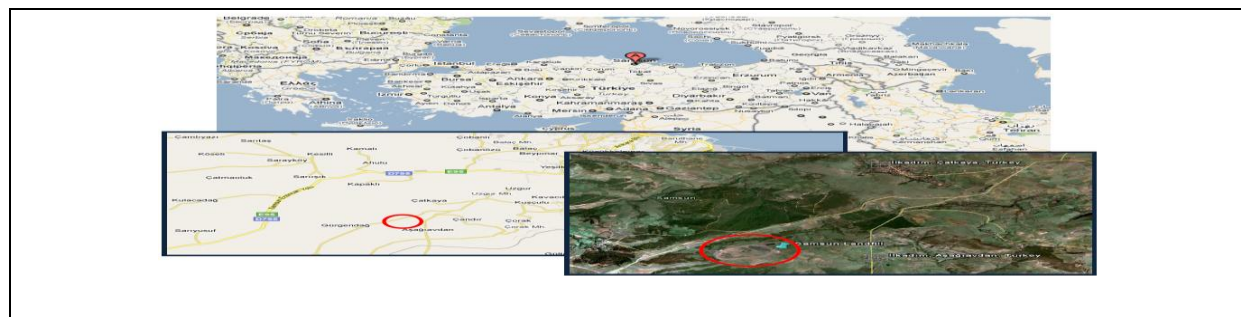
	Coordinates
Latitude	41°14'45"N (41.245833)
Longitude	36°13'16"E (36.221111)



Explain given coordinates

The Project is located at the eastern side of the new Samsun landfill site, in Samsun province, Turkey. It is approximately 8 km. from Samsun city centre, whilst the closest neighbourhoods are Gurgendag and Asagiavdan, both located approximately 1 km away.

D.2. Map



SECTION E. Outcome stakeholder consultation process

E.1. Assessment of stakeholder comments

The Project was acquired by the Project owner by a tender organised by the Samsun Greater Municipality. The Project and its conditions are clearly set out with a mutual agreement and the Municipality is satisfied with the Project. The Project owner has agreed to pay a fee to the municipality, based on its earnings, against the right of use of the landfill gas.

According to the national legislation of the host country, an EIA assessment is not

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required. Therefore no EIA stakeholder meeting was organised. The comments of stakeholders will be collected with a separate Local Stakeholder Consultation (LSC) process.

It is known that some local people around the landfill site (baseline scenario) are unhappy about the landfill's environmental impacts. The Project, in this sense, is expected to result in limited but positive impacts.

The LSC has the following outcome:

Stakeholders are interested in the Project and its design. In general, participants believe that the Project will positively contribute in many ways, including but not limited to energy generation, odour and health improvement, municipality budget and local development. Creative and supportive suggestions are proposed, indicating that stakeholders are knowledgeable about waste management and aware of the current practice and Project's expected impacts. After the consultation process, there is no outstanding issue left and the stakeholders are satisfied with the answers they received and the Project itself.

E.2. Stakeholder Feedback Round

Please describe report how the feedback round was organised, what the outcomes were and how you followed up on the feedback.

This section will be elaborated after the SFR.

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SECTION F. Outcome Sustainability assessment

F.1. 'Do no harm' Assessment

Safeguarding principles	Description of relevance to my project	Assessment of my project risks breaching it (low/medium/high)	Mitigation measure
1. Human rights abuses or negative impacts on dignity, cultural property or indigenous people	There are no indigenous people inhabiting the project area.	low	N/A
2. Involuntary settlement	No relocation of people is necessary.	low	N/A
3. Alteration, damage or removal of critical cultural heritage	There is no cultural heritage on or around the site.	low	N/A
4. Employee's freedom of association	Employees will be able to have the freedom of association. The Turkish Government has ratified the ILO conventions 87 (freedom of association) and 98 (right to collective bargaining.)	low	N/A
5. Forced labour	The Turkish Government has ratified the ILO conventions 29 and 105 on elimination of forced and compulsory labour.	low	N/A
6. Child labour	The Turkish Government has ratified the ILO conventions 138 (minimum age) and 182 (worst form of child labour).	low	N/A
7. Discrimination	The Turkish Government has	low	N/A

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	ratified the ILO conventions 100 (equal remuneration) and 111 (discrimination in employment/occupation).		
8. Safe and healthy work environment for workers	Workers can get injured.	low	All relevant environment, health and safety regulations will be applied as required and all necessary precautions will be taken ² .
9. Precautionary approach for environmental challenges	Earthquake is a risk. * Water contamination is a possibility. * Flare unit might not be operated.	low	The Project site is located on a 1st level earthquake risk geography, which has probability of earthquakes³. * The landfill has been designed and realised with the support of international development aid and technical assistance grants and represents a good practice example. There already exists a leachate collection and storage system in the landfill area, which is maintained by the municipality. The Project has no activity related to water contamination or waste covering. Therefore no positive or negative impact is expected as a result of the Project. * Emission reductions from flaring above 35% of the collected LFG are not accepted under the Gold Standard. In case of an unexpected generator failure or overproduction of LFG, the Project owner will operate the flare unit in order to minimise health and safety risks⁴.
10. Degradation of natural habitats	There is no natural habitat on the site. The surrounding of the landfill and the Project show no particular	low	The Project will be constructed on an already-existing building site right next to the landfill site. In coming years, a new building next to this existing building

² Justification: Compliance to the “Regulation on Labourer Health and Labour Safety”. Please note that the Project activity will be under the monitoring responsibility of local authorities (e.g. Provincial Directorate of Environment and Forestry, Municipal Environmental Protection Department). However the PP is not required for any periodic reporting.

³ Source: <http://www.deprem.gov.tr/Sarbis/depbolge/samsun.gif>

⁴ Justification: Compliance to the “Regulation on the Assessment and Management of Environmental Noise” and “Regulation on the Control of Solid Wastes”.

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	ecological sensitivity.		could be built. Therefore the Project has minimum involvement with its surroundings.
11. Anti-corruption	The Project is not related to any kind of corruption.	low	The Project owner has no negative track record relating to corruption or any such activity whatsoever. The Project was acquired by the Project owner through an open tender, which was announced publicly on 01.06.2010 by the Samsun Greater Municipality on its website and in other public media⁵. The tender was organised on 18.06.2010 in accordance with the State Procurement Law⁶ regulated by the Public Procurement Authority. Four experienced companies submitted application documents for the tender, three of which were inadequate⁷. In order to ensure competitive bidding, the Samsun Municipality cancelled the tender and repeated it on 18.06.2010, which the same companies attended to. This has ensured transparency throughout the entire process.

⁵ Newspapers: Yeni Asya Gazetesi 07/05/2010; Hedef Gazetesi 07/05/2010, 14/05/2010

⁶ "Kamu İhale Kanunu", Nr. 2886-35(a) (<http://www.mevzuat.adalet.gov.tr/html/637.html>)

⁷ The format and content of the technical application documents submitted by some bidders have been considered by the Municipality not to be adequate.

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F.2. Sustainable Development matrix

In order to assess the sustainable development aspects, UNDP human development indicators are analysed. The human development index is a UNDP-created parameter looking beyond GDP to a broader definition of well-being. The rankings (rank of 1 being the best) of Turkey are as following:

Table 1. Human Development Performance of Turkey⁸

Indicator	Turkey's Rank (2010)	Out of ...	Explanation of Indicator
Human Development Index (HDI) ⁹	83	169 countries	Composite measure of three dimensions of human development: life expectancy as years , being educated and having a decent standard of living. Turkey is among the last 3 countries of “high human development” category countries
Multidimensional Poverty Index (MPI) ¹⁰	38	118 developing countries	The index identifies deprivations across the same three dimensions as the HDI and shows the number of people who are poor (suffering a given number of deprivations) and the number of deprivations with which poor households typically contend. Among “high human development” countries, Turkey is ranked as the last.
Gender Inequality Index (GII) ¹¹	77	132 countries	Built on the same framework of Human Development Index, Gender Inequality Index concludes maternal mortality, adolescence fertility rates and differences between men and women in terms of political participation, labour force participation and educational attainments.

Turkey is ranked in the last 3 countries of “High Human Development” category of Human Development Index. These rankings and index values suggest that Turkey is not very well developed in terms of gender equality, human development and well being, despite being categorized as a high human development country. Again according to the UNDP, Turkey faces challenges in 4 of the 8 MDGs¹²;

Relevant UNDP Millennium Development Goal	Nr	Targets	Project's Overall Impact
Eradication of Poverty and Hunger	Goal 1	Target 1a: Reduce by half the proportion of people living on less than a dollar a day	Medium
		Target 1b: Achieve full and productive employment and decent work for all, including women and young people	Medium

⁸ Source: UNDP (http://hdr.undp.org/en/media/HDR_2009_EN_Table_H.pdf)

⁹ Source: UNDP (http://hdr.undp.org/en/media/HDR_2010_EN_Table1_reprint.pdf)

¹⁰ Source: UNDP (http://hdr.undp.org/en/media/HDR_2010_EN_Table5_reprint.pdf)

¹¹ Source: UNDP (http://hdr.undp.org/en/media/HDR_2010_EN_Table4_reprint.pdf)

¹² Source: UNDP Turkey-MDG (<http://www.undp.org.tr/Gozlem2.aspx?WebSayfaNo=1123>)

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		Target 1c: Reduce by half the proportion of people who suffer from hunger	Low
Gender Equality	Goal 3	Target 3a: Eliminate gender disparity in primary and secondary education preferably by 2005, and at all levels by 2015	Low
Child Mortality	Goal 4	Target 4a: Reduce by two thirds the mortality rate among children under five	Low
Maternal Mortality	Goal 5	Target 5a: Reduce by three quarters the maternal mortality ratio	Low
		Target 5b: Achieve, by 2015, universal access to reproductive health	Low

Among these 4 MDGs, the Project activity is expected to achieve particularly strong results towards MDG 1 “Eradication of Poverty and Hunger”, which is described below in more detail.

Indicator	Mitigation measure	Relevance to achieving MDG	Chosen parameter and explanation	Preliminary score
Gold Standard indicators of sustainable development.	If relevant copy mitigation measure from "do no harm" –table, or include mitigation measure used to neutralise a score of ‘-’	Check www.undp.or/mdg and www.mdgmonitor.org Describe how your indicator is related to local MDG goals	Defined by project developer	Negative impact: score ‘-’ in case negative impact is not fully mitigated score 0 in case impact is planned to be fully mitigated No change in impact: score 0 Positive impact: score ‘+’
Air quality*	N/A	MDG 7a: Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources MDG 7b-2: CO ₂ emissions, total, per capita and per \$1 GDP (PPP)	Sulphur oxide and nitrogen oxide emissions: SO _x and NO _x emissions will be reduced.	+
Water quality and quantity*	N/A	MDG 7.10: Proportion of the population using improved drinking water sources	Cooling water discharge: Power generation by the Project results in reduction of cooling water discharge by thermal power plants.	+
Soil condition*	N/A	MDG 7b-6: Proportion of terrestrial and marine areas protected	Waste terraces: The waste will be stored in terraces	+

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			and covered by soil, thereby reducing erosion and landslide risks on site.	
			Hazardous waste processing: The Project will not function as a hazardous waste disposal or processing facility.	
Other pollutants*	N/A	MDG 7b-6 Proportion of terrestrial and marine areas protected	Volatile Organic Compounds: VOC emissions, which can be hazardous to health, will be reduced.	+
Biodiversity	N/A	MDG 7b-4 Proportion of fish stocks within safe biological limits MDG 7b-7 Proportion of species threatened with extinction		0
Quality of employment*	N/A	MDG 1b-4 Growth rate of GDP per person employed MDG 1b-6 Proportion of employed people living below \$1 (PPP) per day	Employment conditions: Proper work environment, social security, health and safety precautions.	0
Livelihood of the poor		MDG 7b-6 Proportion of terrestrial and marine areas protected		0
Access to affordable and clean energy services*	N/A	MDG 1a-1 Proportion of population below \$1 (PPP) per day	Electricity generated: Amount of avoided fossil fuel consumption.	+
Human and institutional capacity	N/A	MDG 2a-3 Literacy rate of 15-24 year-olds, women and men	Capacity Building and awareness raising: Personnel training and familiarity of stakeholders with LFG technologies.	0

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Quantitative employment and income generation*		MDG 1b-4 Growth rate of GDP per person employed MDG 1b-5 Employment-to-population ratio MDG 1b-6 Proportion of employed people living below \$1 (PPP) per day	Income generation: Number of local people employed by the Project.	+
Balance of payments and investment*		MDG 8d Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term	Electricity generated: Economical value of avoided natural gas consumption	+
Technology transfer and technological self-reliance*		MDG 8f In cooperation with the private sector, make available the benefits of new technologies, especially information and communications	Technology and know how transfer: Technical know how support to local stakeholders.	+
Justification choices, data source and provision of references				
Air quality*	Air quality will be improved as compared to the baseline emission levels of odour, SO₂ and NO_x by the combustion of landfill gas. SO₂ and NO_x* related to energy generation from fossil fuels will be reduced by replacing electricity from fossil fuel combustion and the related fuel consumption. The reductions of SO₂ and NO_x emissions will be calculated by multiplying net electricity generation of the Project activity with the SO₂ and NO_x intensities. The reduction of other hazardous gases in the landfill gas during combustion are not monitored because of its complexity to quantify them with high quality. This is conservative. This indicator will be monitored. Source*: SO₂ and NO_x emissions from power generation are included in the National Greenhouse Gas Inventory Report of Turkey¹³			
Water quality and quantity*	Water quantity: The Project is not expected to result in a significant change of water consumption. Through substitution of electricity generated by fossil fuels, the amount of cooling water consumption in the baseline scenario is expected to drop. Water quality: A leachate pumping and storage system is already available on the site. This impact will be monitored.			

¹³ Available at:
http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/tur-2010-crf-15april.zip

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Soil condition*	As compared to the baseline scenario, the project does not generate any hazardous waste or chemical, which would infiltrate into soil and decrease the soil quality and quantity. The landfill site is operated by the Samsun Municipality and accepts household waste only (industrial waste is not accepted). Medical waste is sterilised and stored in a different part of the site outside of the Project activity. The Samsun Municipality takes specific measures (e.g. extensive soil usage) to minimise the landslide risk since the landfill is a sloped site. In this respect, the Project is expected to increase site safety and landfill site life time. <u>Erosion Control:</u> When the waste body reaches a certain elevation at its cell, the waste will be covered with a capping layer. This soil layer will provide an opportunity for the reconstruction of the site for recreational purposes, after the lifetime landfill. The waste cells will be structured in terraces* and the capping layers will help prevent landslides** and erosion. This indicator will be monitored. <u>Hazardous waste processing:</u> The Project will <i>not</i> function as a hazardous waste disposal or processing facility***. Due to the stakeholder comments, it will be ensured that the Project does not act as a hazardous waste gasification – or incineration facility. This indicator will be monitored. Source*: The terraces are included in the Project design as described in the feasibility study. Source**: In 1993, a large waste mass of 350,000 tons in the Hekimbasi landfill in Istanbul, Turkey, slid onto the nearby neighbourhood, overrunning houses and killing 32 people¹⁴. Source***: Project owner (feasibility study).
Other pollutants*	There is no nearby village that could potentially be disturbed by noise from the combustion engine utilised in the Project activity. “When NOx and volatile organic compounds (VOCs) react in the presence of sunlight, they form photochemical smog, a significant form of air pollution, especially in the summer. Children, people with lung diseases such as asthma, and people who work or exercise outside are particularly susceptible to adverse effects of smog which include damage to lung tissue and reduction in lung function”. Thermal treatment of VOCs and methane through flaring or combustion greatly reduces the emission of these compounds**. The Project will effectively collect and destroy LFG, thus reducing VOCs and related health risks. This indicator will be monitored. Source*: Wikipedia (http://en.wikipedia.org/wiki/NOx) Source**: US Environmental Protection Agency, Landfill Methane Outreach Program (http://www.epa.gov/lmop/faq/landfill-gas.html)
Biodiversity	Landfill operations can cause, inter alia, harbouring of disease vectors such as rats and flies and injuries to wildlife*. Landfills can facilitate the multiplication and dissemination of the pathogenic agents and their accompanying breed

¹⁴ Reference: <http://www.ibb.gov.tr/en-US/Organization/Companies/Pages/ISTACAS.aspx>

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	(insects, rats, crows, stray dogs), which may harm some mammals, birds, insects deserting the area, or other beings that feed on refuse (rats, crows)**. Source*: The capping layer is included in the Project design as described in the feasibility study. Source**: Wikipedia (http://en.wikipedia.org/wiki/Bioreactor_landfill)
Quality of employment*	The Project owner will not discriminate between people (i.e. sex, gender, political inclination, race, age, religion etc.) during the selection of employees. The job(s) created will be of high quality in terms of social security, proper work environment, compliance with EHS regulations etc*. Necessary activities involving worker training, use of personal protective equipment and safe working practices will be carried out to ensure safe operation and maintenance**. With regards to general employment quality in the host country, the Project will make a positive contribution. This impact will be monitored. Source*: These are legal requirements which are frequently not fully enforced. Source**: Project owner
Livelihood of the poor	
Access to affordable and clean energy services*	Local communities already have electricity supply and no improvement is expected in additional access to energy services. The Project will contribute to energy security and the generated clean electricity will be supplied to the grid, thereby improving the overall electricity supply. Turkey imports a great amount of fossil fuels* and the Project will also reduce the dependency on foreign import of fossil fuels. This impact will be monitored. Source*: International Energy Agency, Turkey Statistics¹⁷
Human and institutional capacity	The Project activity is a new technology in the host country and is one of the first examples in Turkey. In this regard, the Project will contribute to human and institutional capacity, at limited extent.
Quantitative employment and income generation*	The Project is expected to temporarily employ, through its subcontractors, several people during construction and set-up phases. During operation, the Project is expected to create 1-2 new jobs*. Local candidates will be preferred for these new positions, if available. This will contribute to quantitative employment and income generation in the Project area. This impact will be monitored.

¹⁷ Available at: http://www.iea.org/stats/balancetable.asp?COUNTRY_CODE=TR

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	Source*: Project owner
Balance of payments and investment*	Initially, importing the equipment for the Project will have a negative impact on the balance of payments. In coming years, this impact will be reversed. Electricity generation will substitute the electricity generated from fossil fuels and thus decrease fossil fuel consumption of thermal power plants. PMUM (TEİAŞ Market Settlement Centre) is responsible for actively balancing the electricity supply among the generation companies; therefore the Project will indirectly result in reduced imports of fossil fuels and an improved balance of payments of the host country*. This impact will be monitored. Source*: Please see the justification of the indicator <i>Access to Affordable and Clean Energy Services</i>.
Technology transfer and technological self-reliance*	Transfer of knowhow is most common for equipment and knowledge for agriculture, biogas, N₂O and landfill gas projects*. The Project will directly and indirectly allow Project personnel, equipment and service suppliers to gain experience in landfill gas extraction and utilisation and will further stimulate technological self-reliance by technology transfer. The Project Owner will ensure that the landfill site is properly managed for the LFG collection and utilisation with the support of international experts, sharing their know how with the local team. This impact will be monitored. Source*: p.10 and 13, "Analysis of Technology Transfer in CDM Projects"¹⁸, Stephen Seres, Dec. 2008.

¹⁸ Available at: <http://cdm.unfccc.int/Reference/Reports/TTreport/TTrep08.pdf>

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SECTION G. Sustainability Monitoring Plan

[See Toolkit 2.4.3 and Toolkit Annex I]

Copy Table for each indicator

No		01
Indicator		Air Quality
Mitigation measure		Landfill gas collection and destruction: Reduction of baseline SO ₂ and NO _x emissions: By replacing electricity from fossil fuel combustion and the related fuel consumption, the Project will reduce the baseline SO ₂ and NO _x emissions from electricity generation. Reduction of odour: By effectively collecting LFG that would otherwise be emitted freely, the Project will reduce H ₂ S (a foul smelling gas) emissions.
Repeat for each parameter		
Chosen parameter		SO₂: The air quality is related to pollutants such as SO _x which are being emitted in the baseline scenario. As a representative indicator of air pollution, SO ₂ is selected as further oxidation of sulphur dioxide may lead to acid rains and as it is a precursor to particulates in the atmosphere, both of which are environmental concerns ¹⁹ .
Current situation of parameter		Total host county emissions are 1007.78 ²⁰ tons in 2008. Net system electricity generation in 2008 is 189,762 ²¹ MWh, corresponding to 5.31 kg/MWh SO ₂ intensity.
Estimation of baseline situation of parameter		The Project is expected to generate 7,920 MWh in the first year of operation in its initial phase, therefore the Project will substitute a baseline SO ₂ emissions of: 7,920 MWh * 5.31 kg/MWh = 42.1 tons SO ₂
Future target for parameter		As the Project capacity will be expanded in later years, the net electricity generation is estimated to increase further and the avoided SO ₂ emissions will increase in parallel.
Way of monitoring	How	Indirectly; by measuring net electricity generation and multiplication with the baseline SO ₂ intensity of the Turkish grid.
	When	Continuously.
	By who	Project owner.
Repeat for each parameter		
Chosen parameter		NO_x: The air quality is related to pollutants such as NO _x which are being emitted in the baseline scenario. As a representative indicator of air pollution, nitrogen oxide is selected because

¹⁹ Source: Wikipedia (http://en.wikipedia.org/wiki/Sulfur_dioxide)

²⁰ Source: National GHG inventory of Turkey, 1990-2008, http://unfccc.int/files/national_reports/annex_i_ghg_inventories/national_inventories_submissions/application/zip/tur-2010-crf-15april.zip, Workbook TUR-2010-2008-v1.2, Worksheet: Table1s1

²¹ Source: TEIAS, [http://www.teias.gov.tr/istatistik2008/32\(75-08\).xls](http://www.teias.gov.tr/istatistik2008/32(75-08).xls)

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		mono-nitrogen oxides eventually form nitric acid when dissolved in atmospheric moisture, forming a component of acid rain ²² .
Current situation of parameter		Total host county emissions are 313.24 Error! Bookmark not defined. tons in 2008. Net system electricity generation in 2008 is 189,762 Error! Bookmark not defined. MWh, corresponding to 1.65 kg/MWh NO _x intensity.
Estimation of baseline situation of parameter		The Project is expected to generate 7,920 MWh in the first year of operation, therefore the Project will substitute a baseline NO _x emissions of: $7,920 \text{ MWh} \times 1.65 \text{ kg/MWh} = 13.1 \text{ tons NO}_x$
Future target for parameter		As the Project capacity will be expanded in later years, the net electricity generation is estimated to increase further and the avoided NO _x emissions will increase in parallel.
Way of monitoring	How	Indirectly; by measuring net electricity generation and multiplication with the baseline NO _x intensity of the Turkish grid.
	When	Continuously.
	By who	Project owner.

No		02
Indicator		Water quality and quantity
Mitigation measure		N/A
<i>Repeat for each parameter</i>		
Chosen parameter		Reduction of discharged cooling water in the baseline
Current situation of parameter		Power generated by thermal plants result in cooling water consumption, which will be substituted partially by the Project.
Estimation of baseline situation of parameter		In 2008, 4.45 billion m ³ cooling water was discharged by thermal power plants in Turkey ²³ . Net electricity generation in 2008 was 189,762 ²⁴ MWh, corresponding to 23.5 m ³ /MWh discharged cooling water intensity ²⁵ .
Future target for parameter		Estimated discharged cooling water reduction of in the first operational year is: $23.5 \text{ m}^3/\text{MWh} \times 7,920 \text{ MWh} = 186,120 \text{ m}^3$ This amount is expected to increase in forthcoming years.
Way of monitoring	How	The net electricity generation of the Project will be recorded and multiplied with the ex-ante cooling water discharge intensity.
	When	Continuously.
	By who	Project owner.
<i>Repeat for each parameter</i>		
Chosen parameter		Leachate quality

²² Source: Wikipedia (<http://en.wikipedia.org/wiki/NOx>)

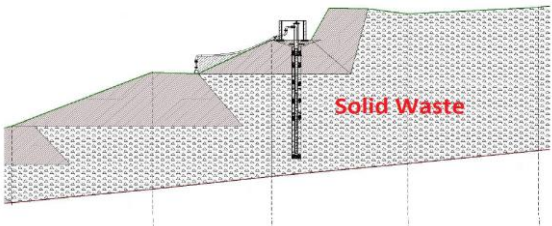
²³ Source: Turkish Statistical Institute (<http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=6171>)

²⁴ Source: TEIAS, [http://www.teias.gov.tr/istatistik2008/30\(84-08\).xls](http://www.teias.gov.tr/istatistik2008/30(84-08).xls)

²⁵ This is a conservative approach because most of the cooling water discharge stems from thermal and nuclear (not existing) power plants. The average share of thermal power is estimated to continue in coming years (see PDD for details) and the used technologies or fuel types do not indicate a clear changing trend. There is not any expected change in environmental legislation or technological requirement to limit cooling water discharges.

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Current situation of parameter		Leachate is successfully managed by a 3 rd party assigned by the Samsun Municipality.
Estimation of baseline situation of parameter		Leachate is successfully managed by a 3 rd party assigned by the Samsun Municipality.
Future target for parameter		Leachate is successfully managed by a 3 rd party assigned by the Samsun Municipality.
Way of monitoring	How	By assessment of publicly available documents about leachate management and/or groundwater quality.
	When	Continuously.
	By who	Project owner.

No		03
Indicator		Soil Condition
Mitigation measure		Setting up capping layers in terraces
<i>Repeat for each parameter</i>		
Chosen parameter		Waste Terraces: When the waste body reaches a certain elevation at its cell, the waste will be covered with a capping layer.  The existence of properly set-up capping layers will be monitored to check its contribution to preventing landslides and erosion.
Current situation of parameter		The solid waste is being dumped to the landfill site without a soil capping layer.
Estimation of baseline situation of parameter		With soil capping layers, the landfill site will be more robust, with a reduced risk of erosion and landslide.
Future target for parameter		With the used portion of the landfill site growing in coming years, the amount of waste and terraces will be higher, thus contributing more to erosion and landslide mitigation.
Way of monitoring	How	Visual inspection
	When	During preparation of monitoring report.
	By who	Project owner.
<i>Repeat for each parameter</i>		
Chosen parameter		Hazardous waste processing
Current situation of parameter		The landfill does not accept hazardous waste.
Estimation of baseline situation of parameter		The landfill is expected not to accept hazardous waste.
Future target for parameter		The Project shall <i>not</i> function as a hazardous waste disposal or processing facility (i.e. as a hazardous waste gasification – or incineration facility).
Way of monitoring		How Visual inspection and interviews with stakeholders.

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	When	During preparation of monitoring report.
	By who	Project owner.

No	04	
Indicator	Other Pollutants	
Mitigation measure	LFG collection and destruction.	
<i>Repeat for each parameter</i>		
Chosen parameter	Reduction of Volatile Organic Compounds.	
Current situation of parameter	The VOCs are emitted freely to the atmosphere.	
Estimation of baseline situation of parameter	The non-methane VOCs are typically roughly 2% of methane emissions²⁶. The methane destroyed by the Project in the first full operation year is 1,501 tonnes = 2,094,029 m³. Baseline VOCs emissions: 2,094,029 m³ * 2% = 41,880 m³	
Future target for parameter	The VOC destruction by combustion or flaring can be expected to be greater than 98%²⁷. This leads to the following baseline emissions of VOCs: VOCs Reduced = 41,880 m³ * 98% = 41,043 m³ The amount of methane destroyed is expected to rise in forthcoming years, increasing also the amount of VOCs reduced.	
Way of monitoring	How	By measuring the amount of methane destroyed through combustion or flaring.
	When	Continuously
	By who	Project owner.

No	05	
Indicator	Quality of employment	
Mitigation measure	Safe and healthy working conditions	
<i>Repeat for each parameter</i>		
Chosen parameter	Safe and healthy working conditions	
Current situation of parameter	N/A	
Estimation of baseline situation of parameter	N/A	
Future target for parameter	Necessary safety equipments will be available and properly used. The working environment will not present health risks or hazardous tasks.	
Way of monitoring	How	Assessment of working conditions by checking safety material, tasks of the personnel etc.
	When	Continuously
	By who	Project owner.

²⁶ "Estimating Landfill Greenhouse Gas Emissions from Measured Ambient Methane Concentrations and Dispersion Modeling", Figueroa, Cooper, and Mackie, Link: http://cee.ucf.edu/odormodeling/publications/Final_Paper_-_Figueroa_et_al_-_AWMA_2008.pdf

²⁷ "Gas Recovery and Utilization From Municipal Solid Waste Landfills", Todd Potas. Link: http://www.anl.gov/PCS/acsfuel/preprint%20archive/Files/38_3_CHICAGO_08-93_0895.pdf

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No		06																
Indicator		Access to affordable and clean energy services																
Mitigation measure		N/A																
Repeat for each parameter																		
Chosen parameter		Avoided fossil fuel consumption. The Project will generate and supply clean energy to the national grid, improving the carbon intensity of the power mix.																
Current situation of parameter		The baseline consists of consumption of different fossil fuels. The latest available (2008) fuel consumption and electricity generation figures will be compared with the Project generation to show how much baseline fuel consumption is avoided on a fuel type basis. The fossil fuel consumption intensity (t/GWh, m³/GWh) are ex-ante and are as following³⁰: <table><tr><th>Fuel Type</th><th>Fuel Consumption Intensity [t/GWh, m3/GWh]</th></tr><tr><td>Coal</td><td>395</td></tr><tr><td>Lignite</td><td>1,585</td></tr><tr><td>Fuel Oil</td><td>301</td></tr><tr><td>Diesel Oil</td><td>492</td></tr><tr><td>LPG</td><td>0</td></tr><tr><td>Naphtha</td><td>243</td></tr><tr><td>Natural Gas</td><td>218</td></tr></table>	Fuel Type	Fuel Consumption Intensity [t/GWh, m3/GWh]	Coal	395	Lignite	1,585	Fuel Oil	301	Diesel Oil	492	LPG	0	Naphtha	243	Natural Gas	218
Fuel Type	Fuel Consumption Intensity [t/GWh, m3/GWh]																	
Coal	395																	
Lignite	1,585																	
Fuel Oil	301																	
Diesel Oil	492																	
LPG	0																	
Naphtha	243																	
Natural Gas	218																	
Estimation of baseline situation of parameter		The baseline situation is the same as the current situation.																
Future target for parameter		The Project is expected to substitute 7,920 MWh in the first year of operation. This corresponds to the following expected fuel avoidance: <table><tr><th>Fuel Type</th><th>Avoided Consumption [t/m3]</th></tr><tr><td>Coal</td><td>317</td></tr><tr><td>Lignite</td><td>3,353</td></tr><tr><td>Fuel Oil</td><td>110</td></tr><tr><td>Diesel Oil</td><td>7</td></tr><tr><td>LPG</td><td>0</td></tr><tr><td>Naphtha</td><td>1</td></tr><tr><td>Natural Gas</td><td>1,092</td></tr></table>	Fuel Type	Avoided Consumption [t/m3]	Coal	317	Lignite	3,353	Fuel Oil	110	Diesel Oil	7	LPG	0	Naphtha	1	Natural Gas	1,092
Fuel Type	Avoided Consumption [t/m3]																	
Coal	317																	
Lignite	3,353																	
Fuel Oil	110																	
Diesel Oil	7																	
LPG	0																	
Naphtha	1																	
Natural Gas	1,092																	
Way of monitoring	How	It is assumed that the net electricity generation during the monitoring																

³⁰ Details are provided to the DOE in a separate spreadsheet.

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		period will be distributed among fossil fuels with the same weight as the fossil fuels. These values will be multiplied with the fuel consumption intensities given above to find the respective reduction of fossil fuel consumption.
	When	Monthly, by recording PMUM reports.
	By who	Project owner.

No		07
Indicator		Quantitative employment and income generation
Mitigation measure		New job creation
<i>Repeat for each parameter</i>		
Chosen parameter		Number of local employees of the Project
Current situation of parameter		0
Estimation of baseline situation of parameter		0
Future target for parameter		1-2
Way of monitoring	How	By checking the social security and residence records of the personnel.
	When	Continuously.
	By who	Project owner.

No		08
Indicator		Balance of payments and investment
Mitigation measure		Reduction in fossil fuel imports
<i>Repeat for each parameter</i>		
Chosen parameter		Value of the imported natural gas avoided (conservative)
Current situation of parameter		Some portion of liquid and solid fossil fuels are extracted in the host country. However, most of the natural gas consumed in the host country is imported. Average natural gas price at the current situation is 3.8 USD/MMBtu ³¹ .
Estimation of baseline situation of parameter		The baseline situation is the same as the current situation.
Future target for parameter		The Project is expected to substitute 7,920 MWh in the first year of operation. This corresponds to a natural gas value of 142,410 USD. Almost all of this natural gas would have to be imported in the absence of the Project activity.
Way of monitoring	How	The avoided natural gas amount will be taken from the indicator “Access to affordable and clean energy services”. The energy content of this amount will then be multiplied by the ex-ante natural gas price.
	When	Monthly, by recording PMUM reports.
	By who	Project owner.

No	9
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³¹ Source: <http://www.bloomberg.com/energy/>

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Indicator		Technology transfer and technological self-reliance
Mitigation measure		Continuous know how sharing with the local team.
<i>Repeat for each parameter</i>		
Chosen parameter		Know how transfer to local stakeholders
Current situation of parameter		The Samsun Municipality has a good level of knowledge how to manage the landfill site. However, the Municipality's know how is not focused on the landfill gas collection and destruction.
Estimation of baseline situation of parameter		The baseline situation is the same as the current situation.
Future target for parameter		The local stakeholders from the Samsun Municipality will gain information and best practice applications through technology transfer.
Way of monitoring	How	The visits, training sessions and know how contributions made by international experts will be monitored.
	When	Continuously.
	By who	Project owner.

Additional remarks monitoring

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SECTION H. Additionality and conservativeness



This section is only applicable if the section on additionality and/or your choice of baseline does not follow Gold Standard guidance

H.1. Additionality

Not applicable as the section in the PDD on additionality and choice of baseline follows Gold Standard guidance.

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H.2. Conservativeness

The baseline study is provided within the PDD and follows the Gold Standard Guidance for conservative approach ensuring that the baseline does not lead to an overestimation of emission reductions.

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ANNEX 1	ODA declaration
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As Project Owner of the above-referenced project, acting on behalf of all project participants, I now make the following representations:

Mavi Sürdürülebilir Kalkınma Proje ve Danışmanlık Hiz. Ltd. Sti. ("Mavi Consultants");

I hereby declare that I am duly and fully authorised by the project owner of the above-referenced project, acting on behalf of all project participants, to make the following representations on Project Proponent's behalf:

I. Gold Standard Documentation

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