Appendix2　PDD

2-1 Draft PDD（PV）

2-2 Draft PDD（RB）

2-3 Draft PDD（CR）

2-4 Draft PDD（TR）

JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Solar PV System Development on Payatas Landfill in Quezon City, Philippines

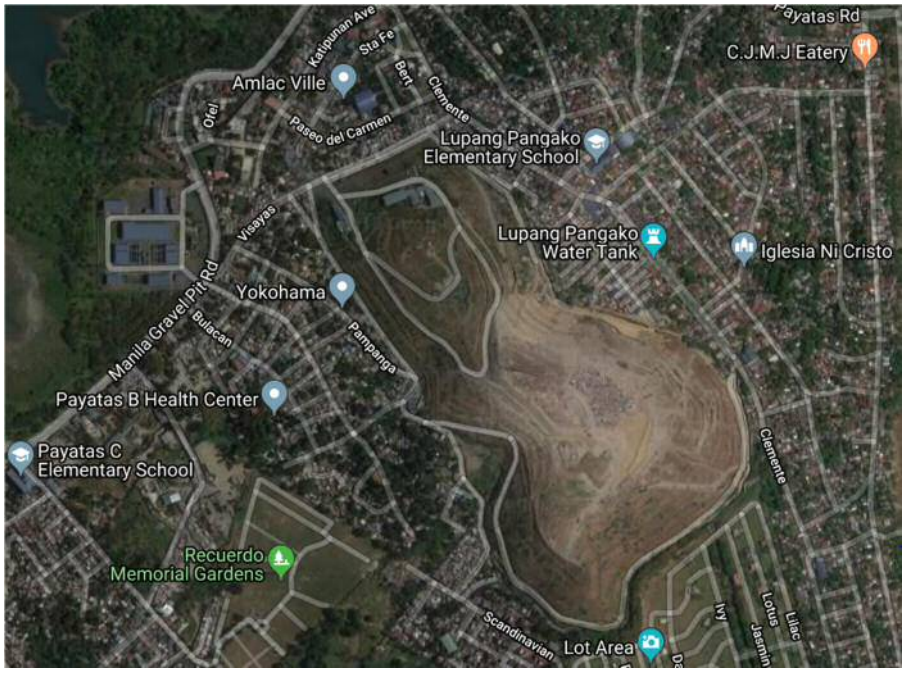
A.2. General description of project and applied technologies and/or measures

The project introduces a solar PV system to Payatas landfill, a closed landfill in Quezon City, Philippines. A 2.9 MW solar PV system is to be installed on the landfill, which was closed in 2017. In Philippines, capacity limit for connecting to grid through "net metering system" is up to 100kW. Moreover, there is no Feed in Tariff (FIT) scheme anymore for solar power generation projects. Therefore, the system in the project is an on-grid system, which provides electricity to the grid based on the negotiations and a PPA agreement with Manila Electric Company (MERALCO) in due course of time.

A private company, which owns a part of the landfill and is operating a power generation plant (landfill gas power generation) at the site, is expected to implement the project.

Regarding the solar PV system, Japanese solar panels and power conditioners are applied to ensure the efficiency of the system.

The estimated CO_2 emission reduction from the project, which installs a solar PV system on the part of land owned by the private company, is around 1,598 ton/year.



Bird's Eye View of Payatas Landfill

A.3. Location of project, including coordinates

Country	The Republic of the Philippines
Region/State/Province etc.:	Metro Manila
City/Town/Community etc.:	Quezon
Latitude, longitude	7°43′49.01″N 125°05′56″E

A.4. Name of project participants

Philippines	TBD
Japan	TBD

A.5. Duration

Starting date of project operation	TBD
Expected operational lifetime of project	17 years

A.6. Contribution from Japan

The proposed project will receive financial support from the government of Japan. The project is to apply for subsidy from a JCM model project, which is supported by the Ministry of the Environment, Japan (MOE). With the financial support provided by MOE program, the initial investment cost of the proposed project can be reduced up to 50% together with low-carbon technology transferring from Japan. Through the MOE program, application of solar power generation systems to closed landfills across the country is expected to be expanded.

B. Application of an approved methodology(ies)

B.1. Selection of methodology (ies)

Selected approved methodology No.	Solar PV Systems Introduction to Closed Landfills (need approving)
Version number	01.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Eligibility criteria	Descriptions specified in the methodology	Project information
Criterion 1	Projects for construction and operation of a new solar PV system or capacity addition of an existing power generation unit that uses renewable energy sources.	The project installs a new solar PV system

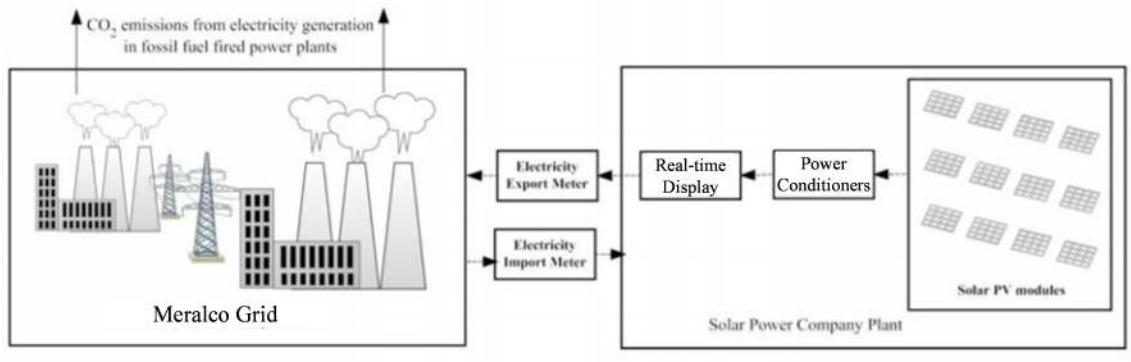
Criterion 2	Projects that displacement of electricity that would be provided by a grid or captive power generator.	The project displaces electricity that would be provided by a grid in the case of without the project
Criterion 3	Net electricity generated from the solar PV system can be measured and monitored.	The solar PV system includes monitoring system with a display that measures net electricity generated and electricity consumed by the system itself
Criterion 4	The PV modules are certified for design qualifications (IEC 61215, IEC 61646 or IEC 62108) and safety qualification (IEC 61730-1 and IEC 61730-2).	The PV modules applied in the system are Japanese technologies, which conform the technological and environmental requirements of host country
Criterion 5	Power conditioners in the solar PV system have efficiencies higher than 95%.	The project deploys power conditioners with efficiency higher than 95%.

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
Consumption of the same amount of grid electricity as generated by the project PV system	CO_2
Project emissions	
Emission sources	GHG type
Electricity consumption of the system, if any	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project



The source of emissions in the project is consumption of electricity in the solar PV system. The

electricity generated and consumed is measured continuously through power meters installed at the system as shown in the figure above. The measured data is cross-checked with the bills or receipts of sale or buy of electricity

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2020	1,631	33	1,598
2021	1,631	33	1,598
2022	1,631	33	1,598
2023	1,631	33	1,598
2024	1,631	33	1,598
2025	1,631	33	1,598
2026	1,631	33	1,598
2027	1,631	33	1,598
2028	1,631	33	1,598
2029	1,631	33	1,598
2030	1,631	33	1,598
2031	1,631	33	1,598
2031	1,631	33	1,598
2032	1,631	33	1,598
2033	1,631	33	1,598
2034	1,631	33	1,598
2035	1,631	33	1,598
Total (tCO_{2e})	27,727	561	27,166

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Stakeholder meetings regarding the project will be organized in due course.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received

F. References

Reference lists to support descriptions in the PDD.

1) Google map: http://www.maplandia.com/philippines/ncr/manila/payatas/

2) https://latitudelongitude.org/ph/quezon/

Annex

Revision history of PDD

Version	Date	Contents revised
01.0	14 February 2019	First edition

JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Introduction of Regenerative Burners at a Steel Mill in Quezon City, Philippines

A.2. General description of project and applied technologies and/or measures

The project introduces regenerative burners to a reheating furnace at a steel mill in Quezon City, Philippines. Japanese regenerative burner technology is to be introduced to one of the factories of Cathay Pacific Steel Corporation, which is one of the biggest steel mills in Philippines.

In steel mills in which steel bars and sheets are produced through rolling process using steel blocks, plates, or billets as input material. In production process, one of the most important steps is reheating process. In this step, steel billets, plates, or blocks are heated to the temperature that will guarantee good conditions for the rolling process and the surface quality of products. The reheating step occurs in furnaces. The purpose of reheating step is to heat loaded steel from its initial temperature, generally room temperature, to the desired temperature, using as little fuel as possible and without affecting the material soak.

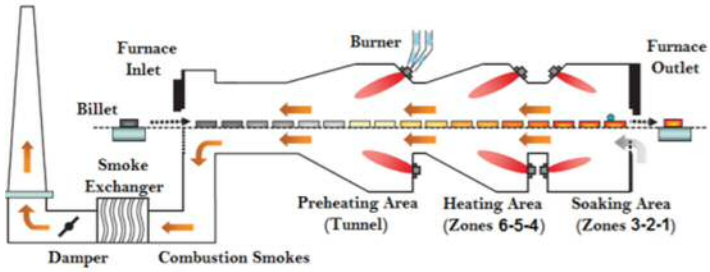


Figure 1 Structure of a pusher heating furnace

Source: Optimization of a pusher type reheating furnace: An adaptive Model Predictive Control approach, G. Astofli et al,

The operation of reheating furnaces is therefore of great importance to the ferrous metallurgy process from economic, production, and environmental viewpoints. Economically, the consumption of fuel needed for reheating can represent up to 15% of the operational cost of a rolling process. With respect to productivity, a furnace capacity commonly dictates the production rate for the rollers, which means that reheating is usually the bottleneck in achieving the maximum production volume.

In this project, regenerative burners are introduced to a conventional reheating furnace (continuous pusher reheating furnace) to reduce fuel consumption of the reheating furnace in the factory.

Regenerative burner systems are equipped with a pair of burners that each has a regenerator.

These burners fire alternately to recover the sensible heat from waste gas for the preheating of combustion air. The systems are capable of obtaining high-temperature preheated air exceeding 1,000℃ in a short timeframe, by repeated heat accumulation and combustion.

Well-proven benefits of a regenerative burner system are as follows[1].

1) Energy: approximately 20 to 50% of energy reduction is possible. The reduction range differs according to the types and condition of fuel.
2) Environment: maximum of 50% of NOx reduction is possible with high temperature combustion. The reduction range differs according to the types of furnace and condition of fuel.
3) Improve the quality of steel.
4) Increase the production of steel.
5) Reduce maintenance costs.
6) Reduce the production of crack.

The estimated CO_2 emission reduction from the project is 2,781 ton/year.

A.3. Location of project, including coordinates

Country	The Republic of the Philippine
Region/State/Province etc.:	Metro Manila
City/Town/Community etc:	Quezon
Latitude, longitude	7°43′49.01″N 125°05′56″E

A.4. Name of project participants

Philippines	Cathay Pacific Steel Corporation
Japan	TBD

A.5. Duration

Starting date of project operation	TBD
Expected operational lifetime of project	14 years

A.6. Contribution from Japan

The proposed project will receive financial support from the government of Japan. The project is to apply for subsidy from a JCM model project, which is supported by the Ministry of the Environment, Japan (MOE). With the financial support provided by MOE program, the initial investment cost of the proposed can be reduced up to 50% together with low-carbon

[1] https://www.ctc-n.org/sites/www.ctc-n.org/files/UNFCCC_docs/ref15x05_36.pdf

technology transferring from Japan. Through the MOE program, the awareness of the technology can be raised and Japanese regenerative burner technology can be diffused in other steel mills.

B. Application of an approved methodology(ies)

B.1. Selection of methodology (ies)

Selected approved methodology No.	Replacement of Conventional Burners with Regenerative Burners for Reheating Furnaces in Steel Mills (need approving)
Version number	01.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

Criterion 1	The project replaces conventional burners with regenerative burners for a reheating furnace in the target steel mill
Criterion 2	The proposed technology is applied to an existing furnace

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
Combustion of heavy oil in the reference furnace	CO_2
Project emissions	
Emission sources	GHG type
Combustion of heavy oil in the project furnace	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project

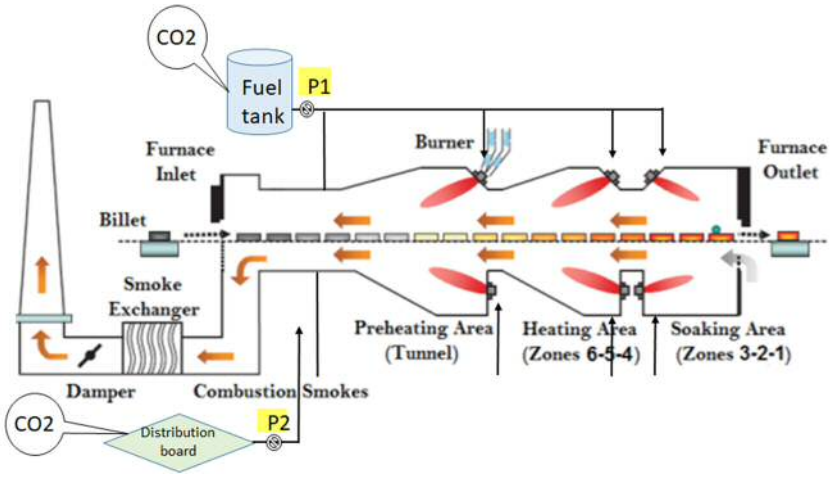


Figure 2 Monitoring points and emission sources

Te source of emissions in the project is consumption of fossil fuel and electricity in the furnace. The fossil consumption is measured through a flow meter at the point 1 shown in the figure 2 above. The electricy consumption is also meaured continuously through a power meter at the point of 2 shown in the figure 2. The measured data is cross-checked with the bills or receipts of fuel and electricity procurement. The amount of steel produced is recorded and compiled daily from the logbooks of production and sales in the factory.

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2020	27,810	25,029	2,781
2021	27,810	25,029	2,781
2022	27,810	25,029	2,781
2023	27,810	25,029	2,781
2024	27,810	25,029	2,781
2025	27,810	25,029	2,781
2026	27,810	25,029	2,781
2027	27,810	25,029	2,781
2028	27,810	25,029	2,781
2029	27,810	25,029	2,781
2030	27,810	25,029	2,781
2031	27,810	25,029	2,781
2032	27,810	25,029	2,781
2033	27,810	25,029	2,781

Total (tCO_{2e})	389,340	350,406	38,934

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Stakeholder meetings regarding the project will be organized in due course.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received

F. References

Reference lists to support descriptions in the PDD.

1) Optimization of a pusher-type reheating furnace: An adaptive Model Predictive Control approach, G. Astofli et al, 2017.
2) Technology Fact Sheet Regenerative burner combustion system (RBCS) https://www.ctc-n.org/sites/www.ctc-n.org/files/UNFCCC_docs/ref15x05_36.pdf
3) https://latitudelongitude.org/ph/quezon/

Annex

Revision history of PDD

Version	Date	Contents revised
01.0	14 February 2019	First edition

JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Condensate Recovery in a Food Processing Factory in Quezon, Philippines

A.2. General description of project and applied technologies and/or measures

The project introduces the system of condensate recovery to a food-processing factory in Quezon City, Philippines. The core part of the condensate recovery system is a pump system, which uses a side-channel pump combined with an ejector. The jet pump ensures that even with a minimum filling head (min. 1m), high temperature condensate can be pumped without the risk of cavitation. In food processing factories, steam is used for heating and drying purposes. Application of steam for heating process usually generates condensate, which is the liquid formed when steam passes from the vapor to the liquid state. In a heating process, condensate is the result of steam transferring a portion of its heat energy, known as latent heat, to the product, line, or equipment being heated. The condensate should be returned to boiler directly or through a feed water tank. However, in most food processing factories in Philippines, the dominant practice is not recovering or partly recovering condensate generated. Therefore, the project aims to recover condensate in the factory of Food Processing Company in Quezon City, which is one of the biggest edible oil refiners and distributers in Philippines. The condensate recovery system includes condensate pumps, stainless pipes, steam traps, and a condensate storage tank. Through the project, the quantity of heat energy used for producing steam in boilers can be reduced. The estimated CO_2 emission reduction from the project, which recovers 50% of condensate in the factory, is 445 ton/year.

A.3. Location of project, including coordinates

Country	The Republic of the Philippines
Region/State/Province etc.:	Metro Manila
City/Town/Community etc:	Quezon
Latitude, longitude	7°43′49.01″N 125°05′56″E

A.4. Name of project participants

Philippines	Food Processing company
Japan	TBD

A.5. Duration

Starting date of project operation	TBD
Expected operational lifetime of project	12 years

A.6. Contribution from Japan

The proposed project will receive financial support from the government of Japan. The project is to apply for a JCM model project, which is supported by the Ministry of the Environment, Japan (MOE). With the financial support by MOE program, the initial investment cost of the proposed project can be reduced up to 50% together with low-carbon technology transferring from Japan. Through the MOE program, the awareness of the technology and practice can be raised, and condensate pumps can be applied in other related processing factories.

B. Application of an approved methodology (ies)

B.1. Selection of methodology (ies)

Selected approved methodology No.	Condensate Recovery and Utilization in Food Processing Factories (need approving)
Version number	01.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

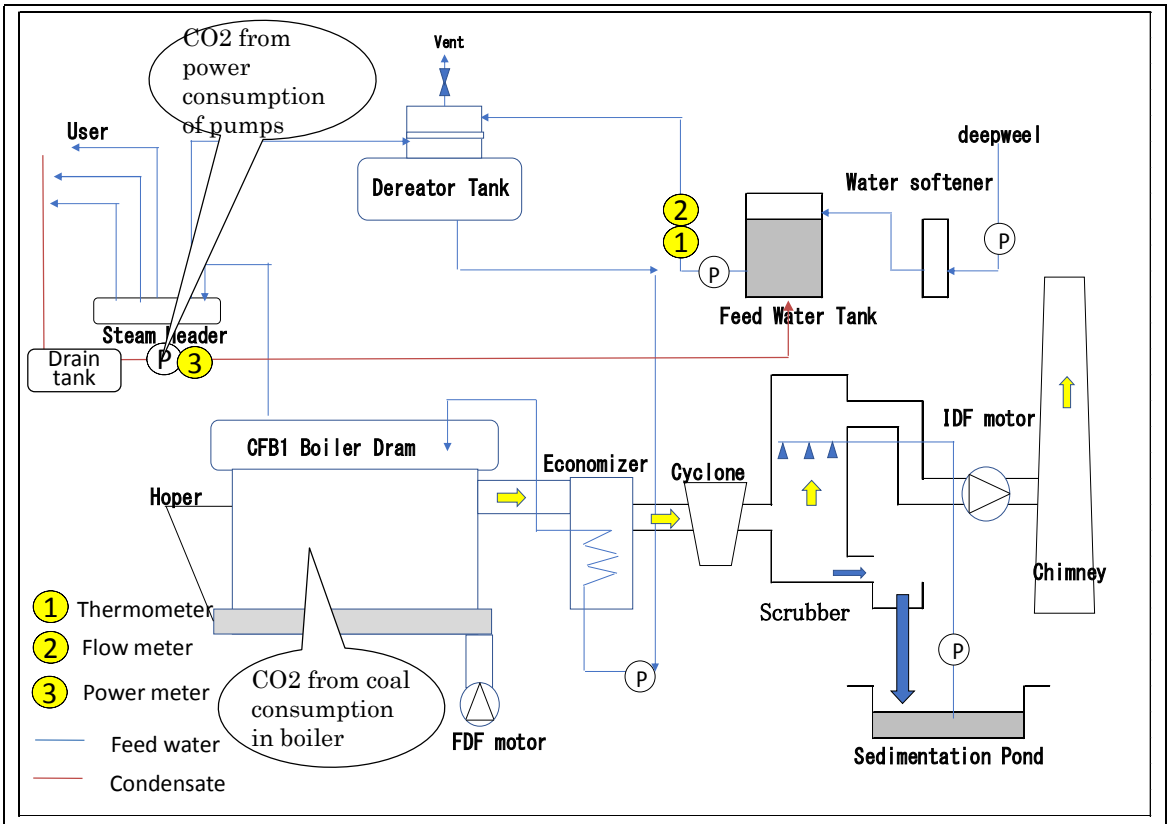
Criterion 1	The project recoveries condensate in an existing food-processing factory.
Criterion 2	Specialized centrifugal pumps with ejectors are applied

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
Fossil fuel consumption for generating the same amount of energy recovered from condensate	CO_2
Project emissions	
Emission sources	GHG type
Electricity consumption by the condensate recovery system	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project



The source of emissions in the project is consumption of electricity in the condensate recovery system. The temperatures, boiler feed water and consumption of electricity are measured continuously through thermometers (the point 1 in the figure above), a flow meter (the point 2 in the figure above), and a power meter (the point 2 in the figure above).

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2020	462	17	445
2021	462	17	445
2022	462	17	445
2023	462	17	445
2024	462	17	445
2025	462	17	445
2026	462	17	445
2027	462	17	445
2028	462	17	445
2029	462	17	445

2030	462	17	445
2031	462	17	445
Total (tCO_{2e})	5,544	204	5,340

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Stakeholder meetings regarding the project will be organized in due course.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received

F. References

Reference lists to support descriptions in the PDD.

1) https://latitudelongitude.org/ph/quezon/

Annex

Revision history of PDD		
Version	Date	Contents revised
01.0	14 February 2019	First edition

JCM Project Design Document Form

A. Project description

A.1. Title of the JCM project

Retrofitting the Engines of Solid Waste Collection Trucks in Quezon City, Philippines

A.2. General description of project and applied technologies and/or measures

The project introduces Diesel-Duel-Fuel (DDF) technology to trucks, which are operated for collecting municipal solid wastes in Quezon City, Philippines. The amount of municipal solid wastes generated in Quezon City is average 2,700 ton/day and the City Government outsources collection and transportation of the municipal solid wastes in its six districts to private contractors/companies. Each day, nearly 500 trucks are dispatched by the companies to collect the solid wastes in the city. Each year, 6 private companies are selected responsible for conducting collection of the municipal solid wastes daily basis in Quezon City. Each company is responsible for one of the 6 districts of the city and dispatches its own trucks into the district generating around 70 trips a day. The most trucks being used are older than 15 years as used trucks are the primary source of procurement of trucks. DDF is a system, which injects diesel and Liquefied Petroleum Gas (LPG) at the same time by controlling the portion of each through an electronic control system. DDF helps reduce diesel fuel consumption, CO2 emission and other roadside air pollutant emissions as well. DDF can be developed through introducing additional kits to a regular diesel engine. Main components include a LPG tank, Engine Control Unit (ECU), and a regulator. The estimated CO_2 emission reduction from the project, which targets 6 trucks (three 6-wheel and three 10-wheel trucks) is around 38 ton/year.

A.3. Location of project, including coordinates

Country	The Republic of the Philippine
Region/State/Province etc.:	Metro Manila
City/Town/Community etc:	Quezon
Latitude, longitude	7°43′49.01″N 125°05′56″E

A.4. Name of project participants

Philippines	Municipal solid waste collecting companies
Japan	TBD

A.5. Duration

Starting date of project operation	TBD
Expected operational lifetime of project	9 years

A.6. Contribution from Japan

The proposed project will receive financial support from the government of Japan. The project is to apply for a JCM model project, which is supported by the Ministry of the Environment, Japan (MOE). With the financial support of MOE, the initial investment cost of the proposed project can be reduced up to 50% together with transferring of low-carbon technology from Japan. Through the MOE program, the awareness of DDF technology can raised and the technology can be expanded to other vehicles such buses and jeepneys.

B. Application of an approved methodology(ies)

B.1. Selection of methodology (ies)

Selected approved methodology No.	Vehicle Engine Retrofitting through Introduction of Diesel-Dual-Fuel (DDF) System (need approving)
Version number	01.0

B.2. Explanation of how the project meets eligibility criteria of the approved methodology

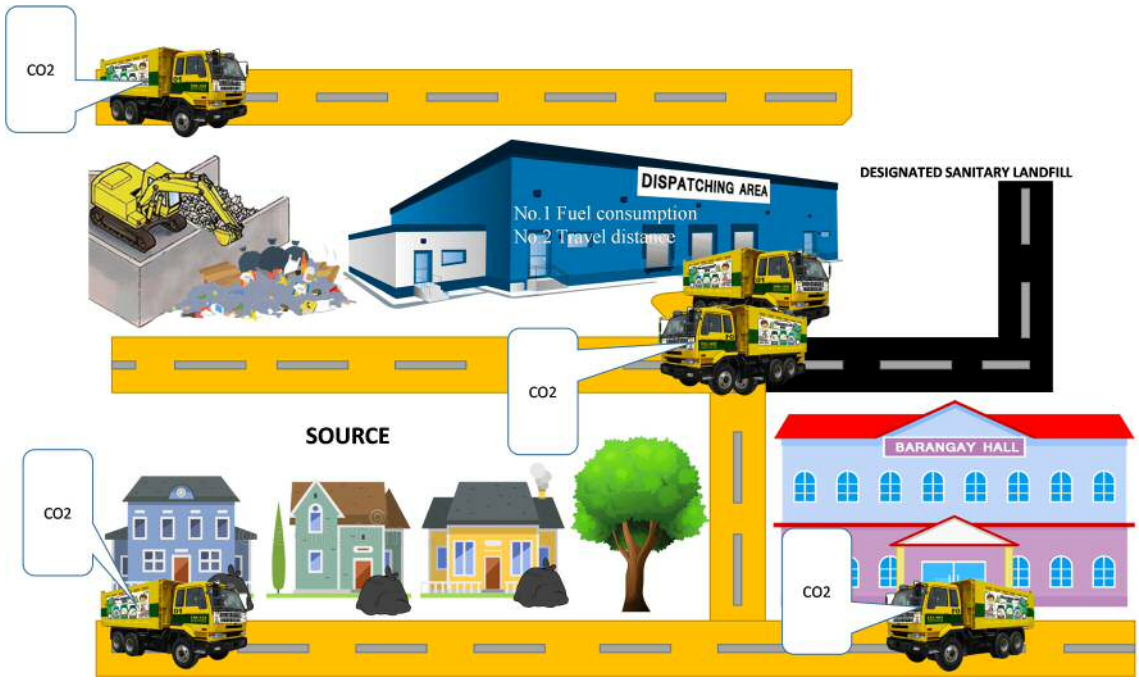
Criterion 1	The project introduces DDF to trucks in Quezon City
Criterion 2	The VKT and fuel consumption of trucks are able to be tracked
Criterion 3	The DDF helps improve engine efficiency and reduce roadside air pollutants such as NOx and PMs so that clear vehicle emission standards.

C. Calculation of emission reductions

C.1. All emission sources and their associated greenhouse gases relevant to the JCM project

Reference emissions	
Emission sources	GHG type
Fossil fuel consumption of reference trucks for running the same distance occurred in the project	CO_2
Project emissions	
Emission sources	GHG type
Fossil fuel consumption of trucks in the project	CO_2

C.2. Figure of all emission sources and monitoring points relevant to the JCM project



Project emission sources are the CO_2 emissions from consumption of fossil fuel on targets trucks. The VKT and consumption of fuels are recorded at the site of truck dispatching for each dispatch. VKT is gained through GPSs installed at target trucks and the fuel consumption is determined through reading and recording fuel gauges for each filling. The measured data is crosschecked with the bills or receipts of fuel procurement as necessary.

C.3. Estimated emissions reductions in each year

Year	Estimated Reference emissions (tCO_{2e})	Estimated Project Emissions (tCO_{2e})	Estimated Emission Reductions (tCO_{2e})
2020	106	68	38
2021	106	68	38
2022	106	68	38
2023	106	68	38
2024	106	68	38
2025	106	68	38
2026	106	68	38
2027	106	68	38
2028	106	68	38
Total (tCO_{2e})	6678	612	342

D. Environmental impact assessment	
Legal requirement of environmental impact assessment for the proposed project	No

E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

Stakeholder meetings regarding the project will be organized in due course.

E.2. Summary of comments received and their consideration

Stakeholders	Comments received	Consideration of comments received

F. References

Reference lists to support descriptions in the PDD.

1) https://latitudelongitude.org/ph/quezon/

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Revision history of PDD

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