GER RECYCLED PP PROJECT

Document Prepared by Guangdong Shuangtanda（Guangzhou）Technology Co., Ltd.

Project Title	**GER Recycled PP Project**
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Prepared By	Guangdong Shuangtanda Technology Co., Ltd.
Contact	Room 1105 bis, Building 16, Tianan Headquarters Center, 555 Panyu Avenue North, Donghuan Street, Panyu District, Guangzhou, Guangdong Province, P.R.China Tel: +86 17322218846 Email: flmao@gdstdkj.com Website: http://www.gdstdkj.com/

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1 PROJECT DETAILS

1.1 Summary Description of the Project

GER Recycled PP Project (hereinafter called “the Project") aims to recycled PP plastic particles by using waste PP products (like packaging bags, sheeting, pipes, household daily necessities etc.) and to replace the same PP produced from the raw materials. The Project located at Fengcheng Circular Economy Park, Yichun District, Fengcheng City, Jiangxi Province, China and is developed and operated by Jiangxi Green Recycling Co.,Ltd. (hereinafter called “The Project Proponent").

Prior to the project implementation, the same amount of PP particles would be produced from raw materials (crude oil and natural gas) which is also the baseline scenario of the project. Therefore, the GHG emission reduction will be generated through the implementation of the project by avoiding the consumption of the equivalent raw materials and reducing related energy consumption as well. The project has started constructed since 03/2021, and the date of production line putting into operation is 31/12/2021.

The project activity will reduce GHG in the atmosphere through an avoiding extraction of raw materials and production of virgin materials. It is estimated that the project will result a total of 137,200 tCO_2e emission reductions in the first crediting period of 7 years and with annual average of 19,600 tCO_2e emission reduction in the 1st crediting period.

1.2 Sectoral Scope and Project Type

The project falls into sectoral scope 13: Waste handling and disposal.

The project is not AFOLU project and is not a grouped project.

1.3 Project Eligibility

As per section 2.1.1 of VCS Standard (version 4.4), the scope of the VCS Program includes:

1) The six Kyoto Protocol greenhouse gases: The emission reduction of the Project mainly comes from: the production of recycled PP particles (by using the waste PP) instead of PP particles issued from natural gas and crude oil.

2) Ozone-depleting substances: Not Applicable.

3) Project activities supported by a methodology approved under the VCS Program through the methodology approval process: Not Applicable.

4) Project activities supported by a methodology approved under a VCS approved GHG program, unless explicitly excluded under the terms of Verra approval: The applied methodology AMS.III.AJ (Version 9.0) of the project are methodologies approved under CDM Program, which is a VCS approved GHG program.

5) Jurisdictional REDD+ programs and nested REDD+ projects as set out in the VCS Program document Jurisdictional and Nested REDD+ (JNR) Requirements: Not Applicable.

The project activity aims to produce the PP particles by using waste PP products (like packaging bags, sheeting, pipes, household daily necessities etc.), which has not generated GHG emissions primarily for the subsequent reduction removal or destruction. And the project is not belonged to the projects excluded in Table 1 of VCS Standard 4.2. Thus, the project is eligible under the scope of VCS program.

1.4 Project Design

The Project has been designed to include a single installation of an activity as per the proposed project description in Section 1.1 and the detail of installed technology in Section 1.11. The proposed project location is described in Section 1.12.

Eligibility Criteria

The Project is not a grouped project, this section is not applicable.

1.5 Project Proponent

Organization name	Jiangxi Green Recycling Co.,Ltd.
Contact person	Yunyan Liang
Title	Manager
Address	Fengcheng City, Jiangxi Province, resource recycling industrial base
Telephone	+86 18403559765
Email	liangyunyan@ger.com.cn

1.6 Other Entities Involved in the Project

Organization name	Guangdong Shuangtanda Technology Co., Ltd.
Role in the project	Project Consultant
Contact person	Fulin Mao

Title	Manager
Address	Room 1105 bis, Building 16, Tianan Headquarters Center, 555 Panyu Avenue North, Donghuan Street, Panyu District, Guangzhou
Telephone	+86 17322218846
Email	flmao@gdstdkj.com

1.7 Ownership

All interests in this project are owned by Jiangxi Green Recycling Co.,Ltd.. The business license of Jiangxi Green Recycling Co.,Ltd. is the evidence for right of use. The approval of Environmental Impact Assessment (EIA) report is the evidence for legislative right. Accordingly, Jiangxi Green Recycling Co., Ltd. shall have the sole right to distribute and utilize the VCUs generated from the Project.

1.8 Project Start Date

According to VCS Standard version 4.4, the start date of the project activity is 01-Jan-2022, the project has started constructed since 03/2021, and the date of production line putting into operation is 31/12/2021. Therefore, the start of this project is set for January 1, 2022

1.9 Project Crediting Period

This project adopts a 7-year renewable crediting period, from 01-January-2022 to 31-December-2028 (both days included). This project will be renewed twice.

1.10 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√
Large project	

Year	Estimated GHG emission reductions or removals (tCO_2e)
01-January-2022 to 31-December-2022	19,600
01-January-2023 to 31-	19,600

December-2023	
01-January-2024 to 31-December-2024	19,600
01-January-2025 to 31-December-2025	19,600
01-January-2026 to 31-December-2026	19,600
01-January-2027 to 31-December-2027	19,600
01-January-2028 to 31-December-2028	19,600
Total estimated ERs	**137,200**
Total number of crediting years	**7**
Average annual ERs	**19,600**

1.11 Description of the Project Activity

The Project activity is under the premise of ensuring the quality of the product, the factory will recycle and process the waste plastic PP instead of using the raw material to produce the PP particles. Therefore, the GHG emission reduction will be generated through the implementation of the project by avoiding the consumption of the equivalent raw materials and reducing related energy consumption as well.

The project is owned by the Jiangxi Green Recycling Co.,Ltd., its annual productivity is 35,000 tons PP particles, and the Project will recycle 36,750 tons waste plastic PP. The annual emission reduction is 19,600 tons CO_2e.

The existing scenario prior to the implementation of the project is the product being produced by using the raw material, and the baseline scenario of the project is the same as the existing scenario.

Technology description

The Project installs series of product equipment and system, the Project aims to recycle the waste plastic, and the production processes don't involve the chemical reaction and there are only a little waste gas and wastewater. The electricity for production is supplied by the East China Power Generation (ECPG).

The project production processes are shown in the Figure 1-1, the main equipment's are summarized in the Table 1-1, and the main production technologies are described in below paragraph:

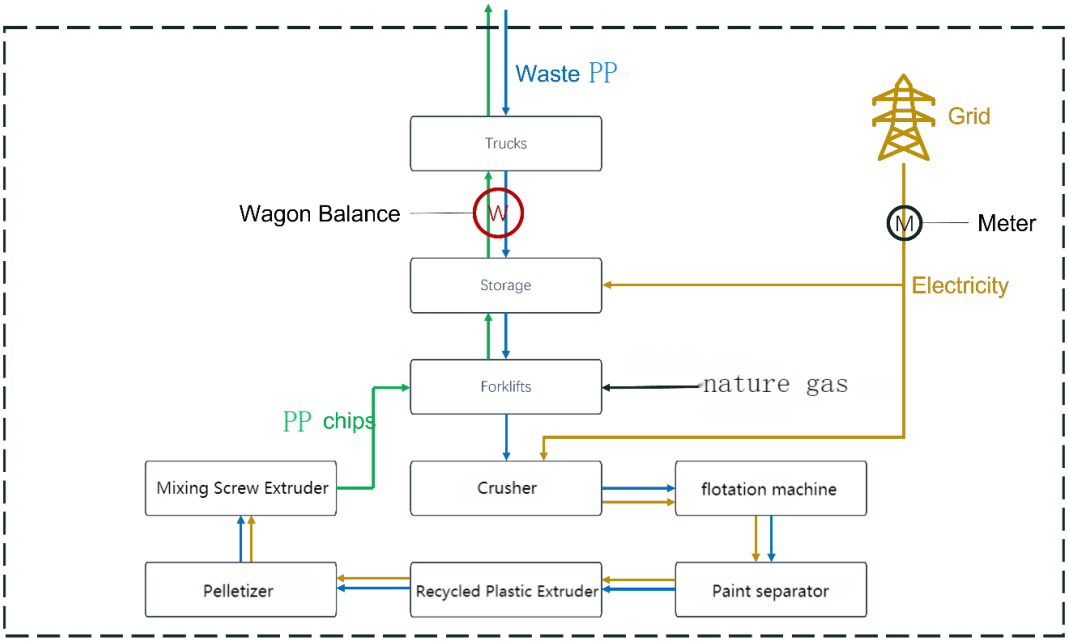


Figure 1-1Project production processes

Table 1-1 Detail of main equipment in the facility

NO	Production line	equipment.		Quantity/unit/set/piece	Remarks
1	Recycled plastic particle production line	Granulation line	baler	14	
2			Mixer	28	
3			Feeder	40	
4			CTE-75 parallel twin screw extrusion production line	28	
5			pelletizer	28	
6			crusher	3	The crusher mainly crushes unqualified products
7		Crushing, cleaning and sorting production line	Crushing and cleaning line (crusher, sorting machine)	8	
8			Central control center	1	Monitoring system and information

					collection system
9		boiler（4t/h）		1	Provide hot water for the cleaning line

(1) Classification: The waste plastic raw materials for this project need to be quickly judged and classified upon arrival at the factory. After being classified according to the waste plastic maturity evaluation system established by Jiangxi Green Recycling Co., Ltd., they are then processed through cleaning and sorting processes.

(2) Cleaning and sorting: PP plastic waste is treated by conventional cleaning and sorting process. The main process of common plastic waste cleaning line includes "unpacking, material sorting, wet crushing, friction cleaning, flotation rinsing, floating material dewatering, color sorting, packaging". The cleaned PP chips are packed and sent to the regranulation workshop for production.

(3) Plastic paint stripping and sorting process: The paint layer in plastic strictly affects the performance of plastic, plastic paint removal process is mainly designed specifically for the pain points of the industry. The process after the magnetic separation belt, shredding, magnetic separation, crushing, flotation, dewatering, paint separation kettle, friction machine, dewatering, flotation, dewatering, electrostatic sorting, packaging. In the paint separating kettle, the environmentally friendly paint stripping agent is used to remove the paint layer on the plastic surface through complex physical changes, and the paint stripping agent can be recycled while separating the paint layer.

(4) Waste plastic regeneration granulation: The main function of the waste plastic extrusion granulation workshop is to clean the plastic flakes further remove the non-melt impurities and improve the homogeneity of the plastic flakes being cleaned and sorted in in the front-end process by heating, melting and passing through the metal filter. The raw material for extrusion and pelletizing is clean plastic flakes from the cleaning and sorting workshop, which are firstly premixed by batch material homogenization and then fed into the pelletizer barrel through the feeding screw from the filling port, melted and plasticized by the barrel and screw, continuously and steadily filtered by the metal screen to remove the non-melting impurities and extruded through the die; the material is cooled and shaped by the water tank, then removed from the water by the blower and entered into the pelletizer for pelletizing, and then screened by vibration for pellets. After that, it is transported by the conveying fan for hot air-drying treatment, and finally into the silo.

(5) Plastic modified granulation: Modified pelletizing raw materials for the first two stages of the process output of waste plastic particles (recycled plastic particles) or high cleanliness waste plastic flakes, purchased new material granular material (petrochemical synthetic resin), auxiliary materials (powder or liquid), through the formula design, in the corresponding process, through the mixing equipment and twin-screw processing extrusion pelletizing.

(6) Product flow: Through crushing, cleaning, sorting, granulation and modification of waste plastics, we can produce stable recycled plastic pellet products that are close to or exceed

the performance of virgin resin. They are mainly used in auto parts, home appliances, electronic product shells, packaging, household, building materials, toys and other fields.

1.12 Project Location

The project located in the resource recycling industrial base of Fengcheng, Jiangxi,China. Between latitude 28° 05′ 55″ and 28° 06′ 22″ north and longitude 115° 46′ 48″ and 115° 47′ 13″ east.

Figure 2: Project Location for Project Activity

Figure 3: Boundary of Facility for Project Activity

1.13 Conditions Prior to Project Initiation

The condition existing prior to the project initiation is that the factory produced PP particles by using the raw material, which is the crude oil and nature gas, these raw materials all come from the oil exploitation. The condition prior is the same as the baseline scenario, please refer to the Section 2.4.

1.14 Compliance with Laws, Statutes and Other Regulatory Frameworks

Environmental Protection Law of the People's Republic of China[1]

Environmental Impact Assessment Law of the People's Republic of China[2]

Law of the People's Republic of China on the Prevention and Control of Water Pollution[3]

Air Pollution Prevention and Control Law of the People's Republic of China[4]

Law of the People's Republic of China on prevention and Control of Noise Pollution[5]

Law of the People's Republic of China on the Prevention and Control of Environmental Pollutionby Solid Waste[6]

Law of the People's Republic of China on the Prevention and Control of Soil Pollution[7]

Regulations on safety Administration of Hazardous Chemicals[8]

Regulations on the Administration of Environmental Protection of Construction Projects[9]

VOCs pollution prevention and control technology policy[10]

Technical specification for recycling of waste plastics[11]

Identification standards for solid wastes General rules[12]

[1] https://flk.npc.gov.cn/detail2.html?MmM5MDlmZGQ2NzhiZjE3OTAxNjc4YmY3NmMxZDA3MTc%3D

[2] https://flk.npc.gov.cn/detail2.html?ZmY4MDgwODE2ZjEzNWY0NjAxNmYyMGU4OWVmZjE3MGE%3D

[3] https://flk.npc.gov.cn/detail2.html?MmM5MDlmZGQ2NzhiZjE3OTAxNjc4YmY4NTA0NTA5ZmI%3D

[4] https://flk.npc.gov.cn/detail2.html?ZmY4MDgwODE2ZjEzNWY0NjAxNmYxY2QzNzgzNjExNTU%3D

[5] https://flk.npc.gov.cn/detail2.html?ZmY4MDgxODE3ZGVhOWMxODAxN2RlYjcwZGRjNzAxMzE%3D

[6] https://flk.npc.gov.cn/detail2.html?ZmY4MDgwODE3MjljNjVkODAxNzI5ZDQ1NWZhZDA0YmU%3D

[7] https://flk.npc.gov.cn/detail2.html?MmM5MDlmZGQ2NzhiZjE3OTAxNjc4YmY4YmIxMTBiOGI%3D

[8] https://flk.npc.gov.cn/detail2.html?ZmY4MDgwODE2ZjNjYmIzYzAxNmY0MDg3Y2RjYzAzZDk%3D

[9] https://flk.npc.gov.cn/detail2.html?ZmY4MDgwODE2ZjNjYmIzYzAxNmY0MGYzN2JhMzBkYTc%3D

[10] https://www.mee.gov.cn/ywgz/fgbz/bz/bzwb/wrfzjszc/201306/t20130603_253125.shtml

[11] http://c.gb688.cn/bzgk/gb/showGb?type=online&hcno=EA2DFF0DACCCF756192644A98E8C8AAB

[12] http://std.samr.gov.cn/gb/search/gbDetailed?id=71F772D81D4FD3A7E05397BE0A0AB82A

Classified Management Catalogue of Environmental Impact Assessment of Construction Projects[13]

Regulations on the Prevention and Control of Environmental Pollution in Jiangxi Province[14]

Regulations on the Prevention and Control of Air Pollution in Jiangxi Province[15]

1.15 Participation under Other GHG Programs

1.15.1 Projects Registered (or seeking registration) under Other GHG Program(s)

The project has neither been registered nor seeking registration under any other GHG programs.

1.15.2 Projects Rejected by Other GHG Programs

The Project hasn't been rejected by other GHG Programs.

1.16 Other Forms of Credit

1.16.1 Emissions Trading Programs and Other Binding Limits

China has a national emissions trading scheme only cover the high-emission industries, such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non- ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO_2e/year, not including renewable project[16] . And the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the Project Proponent according to the enforced company list[17] in public information. Hence, it is confirmed that the emission reductions will not be double counted.

The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.16.2 Other Forms of Environmental Credit

The project hasn't sought or received another form of environmental credits.

[13] http://www.mee.gov.cn/ywgz/fgbz/guizhang/201805/t20180502_435786.shtml

[14] https://flk.npc.gov.cn/detail2.html?NDAyOGFiY2M2MTI3Nzc5MzAxNjEyODUzYzJjOTEzNTY%3D

[15] https://flk.npc.gov.cn/detail2.html?NDAyOGFiY2M2MTI3Nzc5MzAxNjEyODA5MmMwZDRiMTU%3D

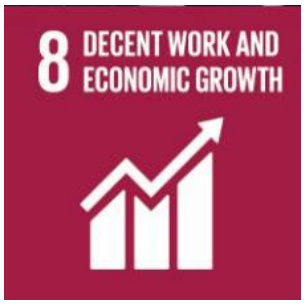
[16] https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202203/t20220315_971468.html

[17] http://sthjt.jiangxi.gov.cn/art/2022/10/12/art_42208_4172605.html

1.17 Sustainable Development Contributions

1.17.1 Sustainable Development Contributions Activity Description

The project will contribute to sustainable development on a local and national level in the following ways:



• **Goal 8 Decent Work and Economic Growth**: "Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all": The project activity will need manpower to operation, management and maintenance, which will directly increase the employment opportunities for local resident or for migrant workers. This contributes to one of the China's actions or promoting sustainable developing, "Fully implement the policy of Employment Priority, and promote more productive and high-quality employment through multiple channels".

• **Goal 12 Responsible consumption and Production**: "Ensure sustainable consumption and production patterns": The project activity produces recycled PP particles by utilizing waste PP products (like packaging bags, sheeting, pipes, household daily necessities etc.), which replaces the same PP product produced from the raw materials to avoid the consumption of the equivalent raw materials, to reduce the related energy consumption, MSW (Municipal Solid Waste) disposal and accumulation. This contributes to one of China's actions for promoting sustainable developing, "achieve carbon peaks in 2030, and achieve carbon neutralization before 2060, accelerating the establishment and improvement of green low- carbon circulation economic systems, and promoting the comprehensive green transformation of economic and social development".

• **Goal 13 Climate Action**: "Take urgent action to combat climate change and its impacts": GHG emission reductions will be generated through the implementation of the project activity by avoiding the consumption of the equivalent raw materials and reducing related electricity and fossil fuel consumption. This contributes to achieve one of China's stated sustainable development priorities "Promote the implementation of the national strategy to actively respond to climate change and achieve the carbon intensity reduction target ahead of schedule".

1.18 Additional Information Relevant to the Project

Leakage Management

According to applied CDM methodology AMS-III.AJ. (Version09.0), leakage is not considered.

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Further Information

No further information is required.

2 SAFEGUARDS

2.1 No Net Harm

There are tiny potential negative environmental impacts during the construction and operation of the project. These environmental impacts have been carefully and strictly assessed and measures are taken during the construction and will be taken during the operation to make sure there is no net harm. See Section 2.3 for details.

There are no negative socio-economic impacts related to the project. The project construction offers jobs and boosts local economy. Once the construction is finished, the project buildings will host a great number of offices and several malls, contributing to the prosperity of local economy as well.

2.2 Local Stakeholder Consultation

The stakeholder consultation was held in office of Project Proponent in 01/03/2021. The stakeholder consultation was conducted by the Project Proponent, including local residents and employees attended the meeting. Before the stakeholder consultation meeting, stakeholders were identified and informed through oral and written means. Invitation notice were put on the bulletin of local villages and distributed to participants nearby the project site. The invitation process was conducted 2 weeks prior to the meeting date.

Meeting Agenda

- Registration
- Welcome speech and purpose of the meeting by representative of Project Proponent.
- Description of the background of the project implementation.
- Description of the project and environmental impacts.

- Questions and Answers session
- Completing questionnaires

Compilation of received comments

The survey was conducted through distributing and collecting responses to the questionnaire.

The questionnaires mainly focus on following issues:

1. Do you agree with the development and construction of the project?

2. Will the project have a negative impact on your environment of living, studying and working?

3. Will the project have a negative impact on the environment, such as noise, water or air quality?

4. Will the project have a negative impact on the ecosystem?

5. Do you think the Project will have promotion in local economic development?

6. Do you have any suggestions about the project?

The results of the surveyed are as follows:

Following is a summary of the local survey. The survey forms are available from the Project Proponent.

The questionnaires were sent to 40 households and the survey had a 100% response rate. The result of the survey indicated the support to the project.

The statistic of opinion:

• Among the respondents, 30 people are male, and 10 people are female.

• Among the respondents, 9 people are between 21 and 30, 30 people are between 31 and 40, 1 people are between 41 and 50.

• Among the respondents, 10 people finished the education of primary school, 24 people finished the education of junior high school, 6 people finished the education of senior high school/technical secondary school.

• Among the respondents, 27 people are farmers, 5 people are workers, 8 people have other occupations.

It can be seen that respondents are representative of the public opinions in terms of their gender, age and educational levels. Therefore, it can be considered that responses to the survey have comprehensively reflected the attitudes towards the Project of the villagers possibly affected by the Project.

• 100% of respondents agreed with the development of the Project.

• 95% respondents believed that the project construction will not do harm to the environment, 5% did not respond.

• 97.5% believed that the project construction will do no harm to the ecosystem, 2.5% did not respond.

• 97.5% believed that the project construction will have no impact to the environment of living, studying and working, 2.5% did not respond.

• 100% believed that the project construction will have positive impact on local economic development.

• 100% had no further suggestion.

Conclusions from the survey

The survey shows that the Project has strong local support among the local people. They all believe the Project will promote the local economic development and agree the project construction.

According to all the comments and advice received, all the shareholders support the construction of the proposed project. The local residents believe if the Project Proponent strictly follow the Environmental Impact Assessment Report, the limited impacts caused by the proposed project will be negligible.

Local stakeholders' on-going communication mechanism

Besides the questionnaires surveys before the implementation of the project and throughout the whole lifetime of the project, the project proponent will maintain a direct line of communication with community members and relevant stakeholders regularly, they can raise their opinions, suggestions and concerns directly. Then they will establish a commitment to keep stakeholders informed of the processes of project activities including implementation, production, maintenance, monitoring and VCS validation and verification process. The local government agencies also regularly conduct the spot checks on the project factory environment and products.

The project staff in the factory organized a personal meeting to keep in touch with the community groups and other stakeholders on 1/3/2023. Representatives of local residents and project employees attended the meeting. The project proponent briefed the project operation during the monitoring period first and then asked the stakeholders to raise their questions and comments. The stakeholders were all satisfied with the project activity since there was no accident or suspend production till now, and they also showed interests on the carbon credits expected to be generated from the project and wished to be involved in the following VVB audit process. No negative comments received during this meeting. The project proponent would maintain the communication with the stakeholders through the regular stakeholder meeting, and the stakeholders can also write comments in the grievance book located in the project site, any recommendations or suggestions received will be taken into account to improve methods as necessary.

2.3 Environmental Impact

The Environment Impact Assessment (EIA) for the Project was approved by Fengcheng Bureau of Ecology and Environment in 24-3-2021 (Feng Huan Ping Zi [2020] No.22). The EIA report shows that the Project has no significant impacts on environment. Generally, the Project will bring more positive environment benefit than the adverse impacts. The Project

uses the post-consumer municipal solid waste PP to produce the PP recycled particles, and the whole production process does consume few fossil fuels and electricity.

A summary of the impacts for the project activity are presented as bellows:

Air quality

During civil construction period, the construction will cause dust emission. The project proponent had taken some measures to protect the workers:

- Wet treatment: sprinkling or atomizing the workers' working environment, construction site and stacked bulk materials to reduce the generation of dust. During the civil construction and installation of equipment, the project proponent took the wet treatment to prevent the dust escape.
- Wearing dustproof mask: dustproof mask is the most direct and effective link in the prevention of pneumoconiosis. The dustproof ability of dustproof mask directly determines the effect of pneumoconiosis prevention. The project proponent had distributed the dustproof mask to worker regularly to ensure their health.

After putting into operation, the element of waste gas is dust and NMHC (non-methane hydrocarbon). In order to reduce the impact of waste gas, the Project decided to take the following measure:

- The workshops are discharged the waste gas through “spraying + fog removing + adsorption and desorption of secondary activated carbon + catalytic combustion +15m high exhaust cylinder."

A certain amount of malodorous gas is produced in the process of waste plastic melting and extrusion. This project is evaluated by odor. The temperature of the project waste plastic extrusion did not reach the plastic decomposition temperature. As a result, plastic waste does not break down during heating, resulting in less odor. The odor concentration of this project can meet the requirements of "Discharge Standard for Odor Pollutants" (GB14554-93), and it has little impact on the environment.

Water quality

The wastewater discharged during civil construction mainly includes construction sewage, machinery equipment washing water and domestic sewage, etc. The sewage would be reused or discharged directly into the urban sewage system after treatment. The sewage discharge was allowed to carry out when the suspended solids in sewage reach the second level of “Comprehensive sewage discharge standards” (GB8978-2002). Therefore, there is no significantly negative impact on the environment.

The sewage during the operation period of the project mainly includes production wastewater (circulating cooling wastewater, ultrasonic cleaning wastewater, spray wastewater) and initial

rainwater. The production wastewater and initial rainwater shall be taken over and discharged into the local municipal sewage pipe network after reaching the standard of treatment by the plant sewage treatment station, and finally discharged into the sewage treatment plant for centralized treatment.

Noise

The noise during civil construction will originate from operating equipment and transportation vehicles. To reduce the impacts of noise, the construction time and interval was controlled strictly. Moreover, the surrounding areas of the project site are no residents around. Thus, the construction noise will cause no effects on the surrounding environment as long as the construction is implemented reasonably.

The main noise source of the Project is the mechanical noise generated during the operation of drying equipment, screw extruder, metering pump, baler, regenerated air dehumidifier and air compressor. The high-noise equipment is located in the production workshop. The noise reduction measures adopted by the project are mainly in the following aspects:

- Noise reduction from sound sources: According to the noise source characteristics of the project, the project proponent chose the low-noise equipment, such as low-noise fans, extruders, pumps, etc., to reduce the noise of the equipment itself from the sound source.
- Noise reduction from the way of transmission: for high noise production equipment such as fans, by adding damping pad, the wall adopts noise silencing material, workshop indoor adopts sound absorption structure, can reduce reverberation sound, part of the equipment adopts fully closed and semi-closed sound insulation cover and vibration reduction measures.

After the implementation of equipment, the project proponent will maintain the machines regularly and monitoring the noise volume to ensure no significant noise impact for the environment.

Solid waste

During the construction period, the main types of solid waste are construction residue, like steel, brick and gravel, and waste bulk building materials, e.g., the cement and lime. The recyclable materials were recycled and reused in another field, for the other material, the project proponent applied the separation, crushing and compaction to reduce the amount and volume, then transported to landfill or storage.

The general industrial solid waste of the Project mainly includes screening waste, waste residue (coarse filtration impurity, fine filtration impurity, etc.) and sedimentation tank sludge. The sedimentation tank sludge is collected and disposed by sanitation, and the rest of the general industrial solid waste is collected and recycled. As a result, the general industrial

solid waste from the project is properly disposed of without being discharged and will not adversely affect the environment.

2.4 Public Comments

Besides, as per section 3.17.6 of the VCS Standard (Version 4.4), all projects are subject to a 30-day public comment period. The date on which the project is listed on the project pipeline marks the beginning of the project's 30-day public comment period. This project will be open for public comment on the verra website. The project shall be listed, and comments shall be incorporated later.

2.5 AFOLU-Specific Safeguards

The project is non-AFOLU project.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Methodology

AMS-III.AJ.: Recovery and recycling of materials from solid wastes (Version 09.0) is used for the project.

https://cdm.unfccc.int/UserManagement/FileStorage/WDFQ1I93T5S7J2EXHC84LOZUBPKM0G

Other tools used for the Project activity:

TOOL07: "Tool to calculate the emission factor for an electricity system (Version 07.0)"

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

TOOL03: "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (Version 03.0)"

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf

TOOL21: "Demonstration of additionality of small-scale project activities (Version 13.1)"

https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf

3.2 Applicability of Methodology

The Project applies the small scale CDM methodology: AMS-III.AJ.: Recovery and recycling of materials from solid wastes (Version 09.0).

The methodology comprises activities for the recovery and recycling of materials in municipal solid waste (MSW) to process them into intermediate or finished products, displacing the production of virgin materials in dedicated facilities, thereby resulting in avoidance of energy use.

The Project comprises the activities from the recovery and recycling of materials in municipal solid waste (MSW) to process them into intermediate and finished products (PET particles), displacing the production of virgin raw materials in dedicated facilities, thereby resulting in avoidance of energy consumption.

The methodology covers the emissions associated with:

a. Production of virgin pellets of plastics consisting of either high density polyethylene (HDPE), low density polyethylene (LDPE), Polyethylene Terephthalate (PET) or Polypropylene (PP). For the sake of this methodology, “plastic" means HDPE, LDPE, PET and PP, unless otherwise specified.

b. Production of container glass using virgin input (“container glass" hereafter) that is displaced by the recycled container glass (“container glass cullet" hereafter) due to the project activity.

c. Production of metals (i.e. aluminum and steel) from mined ore or virgin raw materials that is displaced by the recycled metals due to the project activity.

The Project activity is recycling PP wastes and reducing energy consumption that would otherwise be required for the production of plastic made of virgin inputs for the production of plastic products, and consequently reducing GHG emissions.

The analysis of applicability is detailed in the Table 3-1:

Table 3-1 Analysis of methodology applicability

Applicability	Project situation
Case A: Project activities that target the participation of the informal waste sector Case B: Greenfield facility and/or capacity addition to existing facilities with formal sector participation	According to the definition in the CDM methodology: AMS-III.AJ. The formal waste sector is: “solid waste management activities planned, sponsored, financed, carried out or regulated and/or recognized by the local authorities or their agents, usually through contracts, licenses or concessions.”

	And the informal waste sectors are “individuals or a group of individuals who are involved in waste management activities but are not formally registered or formally responsible for providing the waste management services. Newly established formalized organizations of such individuals, that is cooperatives, can also be considered as the informal sector for the purpose of this methodology.” After checking the project proponent background, reviewing the public information, the project factory is not planned, sponsored, financed, carried out nor regulated and/or recognized by the local authorities or their agents. The project is run by individual, who is not formal sector. Therefore, the project belongs Case A.
In Case A, the recycling facility is operated by the informal sector. The recycling facility may also receive wastes collected by the formal waste sector (e.g. public collection system). Waste fractions that were already being recycled in the baseline by enterprises in the formal sector cannot be included in the calculations.	Applicable, the recycling facility is operated by the informal sector who only purchases the waste PET collected by private parties, andthe recycling facility does not receive wastes collected by the formal waste sector.
The recycling facility may be an existing facility, or a newly implemented facility.	The recycling equipment and production lines are all newly built.
It is possible to directly measure and record the final output of the recycling facility, that is the weight of materials leaving the recycling facility (on a dry basis), segregated by type.	Applicable, PP particles produced by the same production line are of the same type, the performance can be different according to the client’s demand, they can be segregated by type, and the Project is equipped with wagon

	balance for measuring the final output of the recycling facility, that is the weight of materials leaving the recycling facility (on a dry basis).
Each type of recycled material is sold directly to a processing/manufacturing facility, or to a chain of intermediary retailers that are able to transfer the materials to final identifiable processing/manufacturing facilities that process the segregated fractions.	Applicable, the produced PP particles are sold directly to downstream processing plants, which process these PP particles into final products.
The Project Design Document (PDD) shall explain the procedures such as contractual agreements proposed to eliminate double counting of emission reductions, for example due to the formal waste sector or the processing/manufacturing facility, or other parties possibly claiming credits for emission reductions. Similarly, through contractual agreement and other means such as survey/analysis undertaken by a third party, credible proof shall be provided to show that the materials supplied from the recycling facility are used for processing/manufacturing and not for other purposes such as a source of fuel or disposal.	Applicable, the Project proponent can provide the relative evidence and contractual agreements to prove that all the waste PP was purchased from the companies or the individual, there is no formal waste sector involved. The project proponent will purchase the waste PP from the waste sector and produce the recycled PP particles. The sales invoice provided by the project proponent can prove that the recycled PP particles produced from the project proponent facility are sold to downstream processing plants. According to the historical records provided by downstream processing plants, all the purchased PP particles were used for manufacturing, not for fuel source or disposal. Project supporters are located in their own industrial parks from the purchase of waste plastics to the production of recycled PP particles that can be directly used as raw materials for the final product, so there are no other abatement parties. As described in Section 1.16.1, this project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the Project Proponent according to

	the enforced company list in public information. Hence, it is confirmed that the emission reductions will not be double counted.
Emission reductions can be claimed for the difference in energy use for the production of materials from virgin inputs versus production from recycled material. In the case of paper or cardboards, emission reductions due to the avoidance of methane formation in anaerobic decay may be claimed if the baseline scenario is the waste disposal in a disposal site without methane recovery.	Applicable, the Project's emission reduction can be claimed for the difference in energy use for the two kinds of products. The product is not paper, the other case is not considered.
In any of the above cases the project proponent shall be able to demonstrate, using threeyears4 historic data (market data, official statistics etc.) prior to the start date of the project activity, that the finished products (HDPE, LDPE, PET PVC, PP, steel aluminum, paper and cardboard and glass) were manufactured in the host country of the CDM project using either virgin raw materials produced in country or virgin raw materials imported from another non-Annex I country. This analysis may be limited to only those finished products where recycled materials have proven to be a technically viable option, that is those types of products that are expected to be the end products produced from materials recycled as part of the project activity.	Since it is not possible to obtain accurate information on whether the original raw materials used in the production of the final product are domestic or imported, a conservative estimate is used based on the academic forum article, which states that 85% of PP plastics are produced domestically and 15% are of imported origin (see section 4.1 for details), so the portion of the imported origin is to be corrected in accordance with the requirements of paragraph 25 of the methodology AMS-III.AJ.
As an alternative to the requirement stipulated in paragraph 8 above, the	Not applicable, because through the demonstration mentioned above, prior to the

project proponents may choose to adjust the baseline emissions by using the baseline correction factor (B) as described under the baseline section below.	start date of the project activity, the finished product, the recycled PP particles, were manufactured in China by using virgin raw materials produced in China.
The recycling facility sha source its materials from MSW: materials from an unknow source are not eligible under this methodology. The project activity consists of separation of the recyclables from bulk MSW by means of manual or magnetic or mechanical separations. If the project activity involves the collection of wastes on a door to door basis or collection at recipient's containers for the voluntary dispensing of wastes by the noncommunity, all recyclables (paper, plastics, glass, etc.) processed by the recycling plant shall be collected together, selective collection of metals or any other wastes is excluded As a consequence, wastes not pertaining to the identified baseline waste collection and destination stream that would not be delivered to the baseline disposal site and/or treatment plant (e.g. incineration) are not eligible.	Applicable， the waste PP are collected by supplier from the waste yard. The supplier will classify and simply dispose of the collected waste plastic (crushing, cleaning), and then package and send it out. The project proponent will sign the contract with the supplier to demonstrate that the PP waste plastics transporting to the recycling facility are from MSW. The Project activity utilizes magnetic separation followed by flotation to separate the recyclables from the bulk MSW. Specific separation processes can be found in Section 1.11. The incoming materials for this project activity are purchased only from suppliers and there is no door-to-door collection, etc.
In the specific case of metals, the methodology excludes collection of the scraps generated from the production process of primary/ secondary/ finished metal and materials or in the processing of the finished metal and materials into final products, and it covers only postconsumer obsolete wastes. Project proponents shall provide evidence that the materials recycled under the project activity are recovered only from end-of-life-wastes and project activity does not divert waste from any historically	Not applicable, the project activity is the reprocessing of other types of plastics such as PP type, not metals.

existing informal or formal recycling activity.	
The amount of fuel and electricity consumed by the recycling facility can be measured and recorded.	Applicable，the project proponent has installed the meter in the facility to measure the consumption of electricity, and the project proponent has reserved the natural gas purchase invoice during the crediting period. Therefore, the amount of the fuel and electricity consumed by the recycling facility can be measured and recorded.
Project proponents shall demonstrate that the properties of the materials produced from waste recycling are the same as those from virgin materials. For example, if the waste materials such as recycled plastic bottles are converted into building blocks or roof tiles the emission reductions based on displacement of original virgin materials cannot be claimed under this methodology. For recycled materials, project proponents shall provide documentation proving that the properties of the materials produced are comparable according to standard testing methods for each material.	Applicable, through laboratory analysis, the properties of recycled PP particles are similar to those of PP particles produced from raw materials. Through the modification process, the properties of PP particles are even better than those of PP particles produced from raw materials. Recycled pp particles meet the requirements of China's PP resin standard (GB/T 12670-2008)[18],etc.
Measures are limited to those that result in aggregate emission reductions of less than or equal to 60 ktCO2 equivalent annually.	Applicable, the project annual emission reduction is 19600 tCO_2 which is less than 60 $ktCO_2$.

Through the analysis above, the methodology AMS-III.AJ.: Recovery and recycling of materials from solid wastes (Version 09.0) is applicable to the project.

[18] http://c.gb688.cn/bzgk/gb/showGb?type=online&hcno=AD727D319504434FFED35AE5AEE1662B

The analysis of applicability of the tools used in the report is listed in the table 3-2 below:

Table 3-2 Analysis of tool applicability

Applicability	Project situation
TOOL03: tool to calculate project or leakage CO2 emissions from fossil fuel combustion	
It can be used in cases where CO2 emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties.	Applicable, the Project fossil fuel consumption will be recorded regularly, both the quantity and name of fossil fuel will be recorded. During the project production activity, the fossil fuel consumed is natural gas, and the combustion process of natural gas is the provide hot water for the cleaning line.
TOOL07: Tool to calculate the emission factor for an electricity system	
1. This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid.	Applicable, the project activity aims to save the electricity consumed by using the waste plastic as raw material to re-produce the product instead of using the crude oil and nature gas.
2. Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub- options under the step 2 of the tool are available to the project participants.	Applicable, the Project electricity system is only nation grid.
3. Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	Applicable, the value applied to the emission factor of biofuels is zero.
TOOL21: demonstration of additionality of small-scale project activities	

1. The use of the methodological tool "Demonstration of additionality of small- scale project activities" is not mandatory for project participants when proposing new methodologies. Project participants and coordinating/managing entities may propose alternative methods to demonstrate additionality for consideration by the Executive Board.	According to the methodology AMS-III.AJ. Version 09.0, this tool should be used to demonstrate the additionality of project activity. The project's aggregate size is less than SSC thresholds(60ktCO_2e/y), and the project's technology isn't comprised of any technologies from the positive listed in the TOOL32. The project's aggregate size is smaller than MSC thresholds (20ktCO_2e/y), and the project activity does not meet the conditions of Tool 19 Section 5.13. As per the Appendix, "provisions of small-size and microscale tools for automatic additionality" in TOOL21, with such aggregate size, the project will use the regular additionality procedure as stated in the TOOL21.
2. Project participants and coordinating/ managing entities may also apply "TOOL19: Demonstration of additionality of microscale project activities" as applicable.	Not applicable, as demonstrated above, the project's aggregate size is smaller than MSC thresholds (20ktCO_2e/y), and the project activity does not meet the conditions of Tool 19 Section 5.13. Therefore, the TOOL19 is not applicable, and the project proponent would apply the TOOL21 to demonstrate the additionality.

3.3 Project Boundary

According to the methodology, the project boundary includes the physical geographical sites of:

(a) Waste collection sites

(b) The recycling facility.

(c) Processing/manufacturing facility

(d) Virgin material production

(e) MSW disposal site or treatment plant in the baseline scenario.

The transport by truck of the input and output material is not included in the project boundary.

The Figure 3-1 presents the project boundary and the process involved, and the Figure 3-2 presents the equipment, processes, energy and masse flow in the project facility.

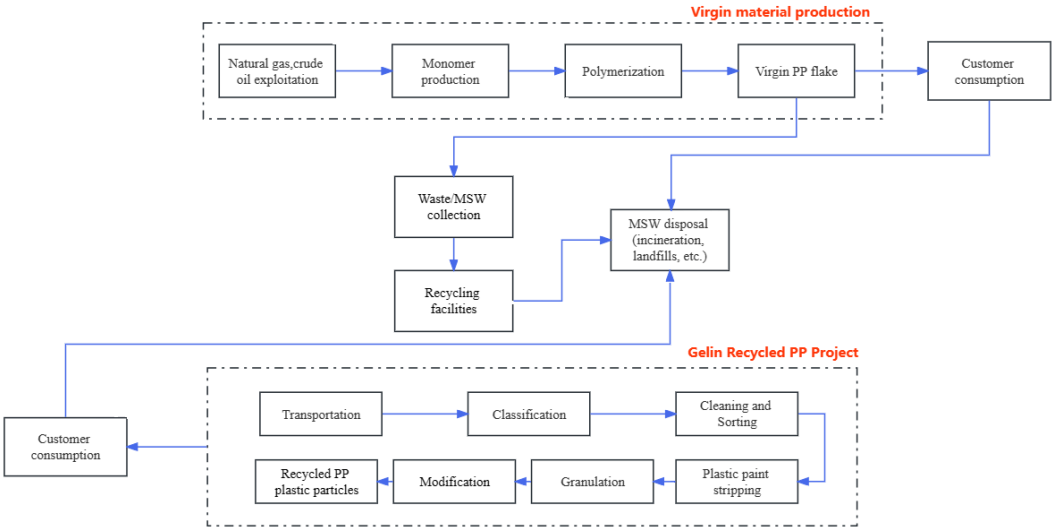


Figure 3-1Project boundary

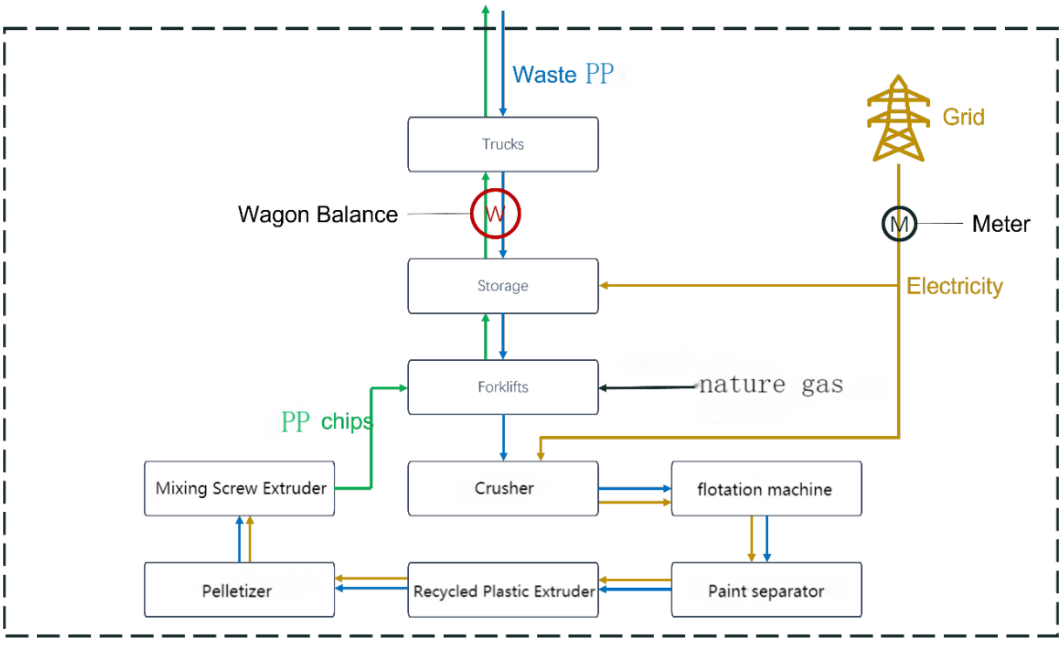


Figure 3-2 Project production processes

Source		Gas	Included?	Justification/Explanation
Baseline	Electricity Consumption	CO_2	Y	Main emission source
		CH_4	N	Minor emission source
		N_2O	N	Minor emission source
		Other	N	Minor emission source
	Fuel Consumption	CO_2	Y	Main emission source
		CH_4	N	Minor emission source
		N_2O	N	Minor emission source
		Other	N	Minor emission source
Project	Electricity Consumption	CO_2	Y	Main emission source
		CH_4	N	Minor emission source
		N_2O	N	Minor emission source
		Other	N	Minor emission source
	Natural gas Consumption	CO_2	Y	Main emission source
		CH_4	N	Minor emission source
		N_2O	N	Minor emission source
		Other	N	Minor emission source

3.4 Baseline Scenario

The identified credible alternatives are:

a. The implementation of project activity without VCS and produce PP particles by utilizing the waste PP products (like packaging bags, sheeting, pipes, household daily necessities etc.).

b. The continuation of current business-as-usual scenario, PP product would be produced by using the crude oil and nature gas from the oil exploitation as raw material.

For the alternative (a), the project will face the investment barrier, please refer to the Section 3.5 below, and for the alternative (b), it is the current common situation, there is no barrier. Therefore, the baseline scenario would be alternative (b), the PP particles is produced by using the crude oil and nature gas from the oil exploitation as raw material.

3.5 Additionality

The additionality of the project is demonstrated as per the TOOL21 "Demonstration of additionality of small-scale project activities" required by the Methodology.

The project's aggregate size is less than SSC thresholds(60ktCO2e/y), and the project's technology isn't comprised of any technologies from the positive listed in the TOOL32. The project's aggregate size is smaller than MSC thresholds (20ktCO2e/y), and the project activity does not meet the conditions of Tool 19 Section 5.13. As per the Appendix, "provisions of small-size and microscale tools for automatic additionality" in TOOL21, with such aggregate size, the project will use the regular additionality procedure as stated in the TOOL21.

According to the TOOL21, project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

a. Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions.

b. Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions.

c. Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.

d. Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

The project activity would not have occurred anyway due to investment barrier. The investment barrier is demonstrated as below.

- **Investment barrier**

There are 2 identified alternatives mentioned in the Section 3.4, the alternative (b) is the continuation of current business-as-usual scenario, that the PP product would be produced by using the crude oil and nature gas from the oil exploitation as raw material, which does not involve an investment from the project participants and therefore no investment analysis is required for this scenario.

The alternative (a) is the implementation of project activity without VCS, produces PP particles by utilizing waste PP products (like packaging bags, sheeting, pipes, household daily necessities etc.). As the project generates financial and economic benefits other than VCS related income through the sales of PP particles. A Benchmark Analysis was chosen

and conducted for investment analysis of alternative (a) and the financial indicator - IRR, was chosen. The project belongs to “the primary of plastics and synthetic resin manufacturing" in the “petrochemical industry". According to the table[19] of values of financial base rate of return for construction projects in the “Methods and Parameters for Economic Evaluation of Construction Projects” issued by the National Development and Reform Commission and the Ministry of Construction, the financial base rate of return (after tax) for this project is 16%. Thus, 16% is adopted as the benchmark of Equity IRR.

Since this project not only recycles waste PP plastics, but also other types of waste plastics, but only PP plastics comply with methodology AMS-III.AJ. The maximum capacity of this project is designed to be 100,000 tons, so the wealth analysis is analyzed according to the annual output of 100,000 tons of waste PP plastics.

Table 3-3 IRR calculation parameter

Parameter name	Project data	Data source
Waste PP consumed (t)	105,000	Financial analysis report, environmental assessment report
Waste PP price (CNY/t)	3,650	Financial analysis report
Annual PP production (t)	100,000	Financial analysis report, environmental assessment report
PP product price (CNY/t)	7,450	Financial analysis report
Modified additives consumed (t)	21,830	Financial analysis report
Modified additives costs (CNY/t)	8,020	Financial analysis report
Static total investment (CNY)	289,840,000	Financial analysis report
Fixed assets (CNY)	240,570,000	Financial analysis report
Annual O&M cost (CNY)	122,086,950	Financial analysis report
Annual maintenance cost (CNY)	84,199,500	Financial analysis report
Annual staff salary and welfare (CNY)	18,331,200	Financial analysis report
Annual electricity and Annual water cost (CNY)	7,301,000	Financial analysis report

[19] https://www.ndrc.gov.cn/fggz/gdzctz/tzfg/201907/t20190729_1197578.html

R&D costs(CNY)	8,344,000	Financial analysis report
Sales costs(CNY)	3,911,250	Financial analysis report
Calculated life of the project (year)	20	Financial analysis report
Product VAT	13%	Tax of goods sale[20]
Income tax	25%	"Law of the PRC on Enterprise Income tax"[21]
Waste PET VAT	13%	Tax of goods sale
Urban maintenance and construction tax	7%	"Tax Law of the People's Republic of China on Urban Maintenance and Construction"[22]
Surtax for education	5%	"Decision of The State Council on amending the Interim Provisions on levying Additional Education Fees"[23]

The equity IRR of the project is calculated according to the basic parameters from feasibility study report (FSR) of the proposed project, and the comparison of the proposed project IRR with and without VER are shown below:

	Equity IRR (%)
Without VER income	9.66%
Equity IRR	16%

From the calculation, it can be seen that without VER revenue, the equity IRR of the project is below the benchmark 15%, and the financial status with VER revenue will be significantly improved.

According to the tool, the project activity has a lower IRR than the benchmark, then the project activity cannot be considered as financially attractive.

[20] https://www.gov.cn/fuwu/2019-08/12/content_5420594.htm

[21] https://www.gov.cn/zhengce/2007-03/19/content_2602200.htm

[22] http://www.chinatax.gov.cn/chinatax/n365/c5155445/content.html

[23] https://www.gov.cn/zhengce/content/2008-03/28/content_5555.htm

- **Sensitivity analysis**

The objective of sensitivity analysis is to show whether the conclusion regarding to the financial attractiveness is robust to reasonable variation under the critical assumptions. For the Project, the static total investment and annual O&M cost constitute more than 20% of total project costs, the variables that can impact the total project revenues, like annual PP production and reproduced PP prices are considered in the sensitivity analysis. For the total waste PP cost (waste PP consumption * waste PP price), since the waste PP consumption is strong positively correlated with reproduced PP production while waste PP price is also strong positively corelated with reproduced PP price, the sensitivity analysis of waste PP cost has been therefore combined with annual PP production and reproduced PP prices respectively. In conclusion, the Static total investment, Annual PP production, Reproduced PP price and Annual O&M cost have been selected to assess their impact on the project IRR.

Results of the four parameter factors are shown on the table below:

Table 3-5 Sensitivity analysis result

Range	-10%	-5%	0	5%	10%
Static total investment	11.1	10.35	9.66	9.02	8.42
Annual PET production	3.92	6.97	9.66	12.1	14.37
Annual O&M cost	13.2	11.48	9.66	7.70	5.57
Reproduced PET price	0.05	5.43	9.66	13.3	15.77

Outcome: It can be shown that the IRR is still below 16% of the benchmark in the variations of all the four key factors with the range of ±10%, thus it can be concluded that the project is unlikely to be financially/economically attractive.

Therefore, according to TOOL21 “Demonstration of additionality of small-scale project activities", the project activity would not have occurred anyway due to investment barrier, therefore, the project can be demonstrated as additional.

3.6 Methodology Deviations

The project does not involve any methodology deviation.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

According to the methodology, the baseline emission include:

a. For the production of plastic, the emissions associated with energy consumption for the production of plastic pellets from virgin plastic materials.

b. For paper and cardboard, the emissions associated with the anaerobic decay within a disposal site may be claimed.

c. For the production of glass, emissions associated with the energy consumption for the production of virgin container glass corresponding to the preparation and mixing of raw materials before the melting stage.

d. For the production of metals, emissions associated with energy consumption for the production from virgin materials.

Baseline emission shall be determined as:

$$BE_y = BE_{plastic,y} + BE_{glass,y} + BE_{paper,y} + BE_{metal,y} \quad (1)$$

Where:

BE_y = Baseline emission in year y (tCO_2e)

$BE_{plastic,y}$ = Baseline emissions associated with the recycling of plastic in year y (tCO_2e)

$BE_{glass,y}$ = Baseline emissions associated with the recycling of glass in year y (tCO_2e)

$BE_{paper,y}$ = Baseline emissions associated with the recycling of paper in year y (tCO_2e)

$BE_{metal,y}$ = Baseline emissions associated with the recycling of metal in year y (tCO_2e)

The project only recycled and fabricated the plastic product (PP particles), the baseline emissions associated with the other materials are equal to 0, therefore:

$$BE_y = BE_{plastic,y} \quad (2)$$

As per the methodology, the baseline emission for plastic recycling is calculated through:

$$BE_{plastic,y} = \sum_i \left[Q_{i,y} \times L_i \times \left(SE_{i,in-country,y} \times W_{i,in-country,y} + SE_{i,imported,y} \times W_{i,imported,y} \right) \right] \quad (3)$$

Where:

$BE_{plastic,y}$ = Baseline emissions in year y associated with the recycling of plastic (tCO_2e)

i = Indices for material type i (i = 1,2,3,4 for HDPE, LDPE, PET and PP)

$Q_{i,y}$ = Quantity of plastic type i recycled in year y (t/y)

L_i	=	Net to gross adjustment factor to cover degradation in material quality and material loss in the production process of the final product using the recycled material (use 0.75)
$w_{i,in\text{-}country,y}$	=	Percentage of plastics produced in the host Country out of total plastic consumed in year y (%)
$SE_{i,in\text{-}country,y}$	=	Specific emissions in the baseline for the production of virgin plastics type i in the host Country in year y (tCO_2/t_i)
$w_{i,imported,y}$	=	Percentage of imported plastics out of total plastic consumed in year y (%)
$SE_{i,imported,y}$	=	Specific emissions in the baseline for virgin plastics type i imported in year y (tCO_2/t_i)

Specific emissions in the baseline for the production of virgin plastics type i in the host country ($SE_{i,in\text{-}country,y}$) are determined based on the equation below:

$$SE_{i,in-country,y} = \left(SEC_{BL,i} \times EF_{BL,el,y} + SFC_{BL,i} \times EF_{BL,FF,CO2}\right) \quad (4)$$

Where:

$SEC_{BL,i}$	=	Specific electricity consumption for the production of virgin material type i (MWh/t_i), take value specified in Table 4-2
$EF_{BL,el,y}$	=	Emission factor for the baseline electricity consumption for virgin plastic production in the host party (tCO_2/MWh)
$SFC_{BL,i}$	=	Specific fuel consumption for the production of virgin material type i (GJ/t), take value as specified in Table 4-2
$EF_{BL,FF,CO2}$	=	CO_2 emission factor for fossil fuel (tCO_2/GJ). Project participants shall assume that the baseline fuel is natural gas when it's not possible to identify the type of fuel consumed for the production of plastics from virgin materials

Specific emissions in the baseline for virgin plastics type i imported ($SE_{i,imported,y}$) are determined based on the equation below:

$$SE_{i,imported,y} = \sum_i \left[B_i \times \left(SEC_{BL,i} \times EF_{el,imported} + SFC_{BL,i} \times EF_{FF,imported,CO2}\right)\right] \quad (5)$$

Where:

B_i	=	Correction factor based on share of production in non-Annex I countries, as specified in Table 4-1.

$EF_{el,imported}$ = Emission factor for the baseline electricity consumption for the portion of plastic that is imported (tCO_2/MWh). Apply a default value of 0.24 tCO_2/MWh

$EF_{FF,imported,CO2}$ = CO_2 emission factor for fossil fuel (tCO_2/GJ). Assume that natural gas supplies the energy needed to produce the virgin plastic imported if it is not possible to identify the fuel type

In 2020, the polypropylene capacity will be 2816×10^4 t/a, the production will be 2554.4×10^4 t, and the apparent consumption will be 2968.4×10^4 t. It is expected that the polypropylene capacity in China will reach 3251.0×10^4 t/a in 2022. It is expected that the apparent consumption of polypropylene in China will reach 3362.4×10^4 t in 2022[24]. Production accounts for 86% of consumption in 2020, and capacity is expected to rise by 15% by 2022. Assuming a 15% rise in production in 2022 as well, production is projected to be 87% of consumption in 2022.

Apparent polypropylene consumption has stabilized from 2016 to 2018 and is projected to be about 25.00 Mt by 2020.The domestic consumption market is saturated as domestic self-sufficiency tends to be 100 percent[25].

- Therefore, using a conservative estimate, domestic pp production accounts for 85% of consumption, and pp imports account for 15% of consumption.
  $W_{i,imported,y}$=0.15 and $W_{i,in\text{-}country,y}$=0.85

Only the baseline emissions which would take place in non-Annex I countries shall be credited. Therefore, in cases where the requirements set out in paragraph 8 of methodology AMS-III.AJ cannot be fulfilled, the baseline emissions calculated for the total amount of recycled materials obtained in the project activity are adjusted by a correction factor *Bi*, calculated as the ratio of the production of the material *"i"* in non-Annex I countries and the total production of this material in the world. See the Table 4-1 below. These correction factors shall be updated at each renewal of the crediting period, and project participants shall use the values from the latest version of the methodology at renewal of the crediting period.

Table 4-1Baseline correction factor for metals, plastics and glass from virgin materials

Plastic	Bi adjustment factor based on the share of the production in non-Annex I countries
PP	0.6

[24] [1] Chang Min. Global polypropylene supply and demand analysis and forecast[J]. World Petroleum Industry,2021,28(04):44-50+65.

[25] [1] Xu Runjun. Supply and demand analysis of domestic polypropylene market[J]. Qilu Petrochemical,2019,47(02):159-164.

1) Determination of $SEC_{BL,i}$ and $SFC_{BL,i}$

The values of the parameters $SEC_{BL,i}$ and $SFC_{BL,i}$ are illustrated in the Table 4-2.

Table 4-2 Values of specific energy and fuel consumptions for the production of different types of plastics from virgin materials

Plastic types	$SEC_{BL,i}$ (MWh/t_i) [(a)]	$SFC_{BL,i}$ (GJ/t_i) [(a)]
PP	0.56	11.6

The following conservative assumptions were made to derive the default values contained in the table above:

1. The virgin monomers Ethylene, Propylene, Ethylene Glycol and Terephthalic Acid[26] are produced through thermal cracking of naphtha.

2. A value of 15 GJ/tons of energy needed to produce ethylene from thermal cracking of naphtha was selected from Table 4.3 of the IEA (2007)[27],

3. A value of 11.6 GJ/t of energy needed to produce propylene from thermal cracking of naphtha was sourced from Saygin et al (2011)[28], as the sum of the specific energy consumed from the best practice technologies (13.1 GJ/t) and the specific energy needed to produce the steam (-1.5 GJ/t) provided in Table 1;

4. A value of 25.7 GJ/t of energy needed to produce virgin vinyl chloride monomer (VCM) was determined based on the sum between the energy needed to produce ethylene (15 GJ/t, see above), chlorine (1.11 GJ/t based on Saygin et al, 2011, and assuming a ratio 0.586 t_{Cl2}/t_{VCM}), ethylene dichloride-EDC (6.98 GJ/t based on Table 4.18 of IEA, 2007, and assuming a ratio 1.58 t_{EDC}/t_{VCM}) and VCM (2.7 GJ/t based on Table 4.18 of IEA, 2007);The energy needed for the production of the polymers is supplied by electricity:

    a) For HDPE, LDPE and PP, the most conservative values from Table 4.9 of the IEA (2007) were selected and divided by 3.6 to convert to MWh/t;

    b) For PET, a conservative value of 4.0 GJ/t (divided by 3.6 to convert MWh/t) was sourced from Table 1 of Saygin et al (2011).

    c) For PVC, a conservative value of 0.18 MWh/t was determined as the weighted average between the PVC produced from suspension and emulsion processes,

[26] For the production of the monomers Ethylene Glycol Terephthalic Acid, it was conservatively estimated that the energy needed is the same for the production of the same mass of ethylene through thermal cracking.

[27] International Energy Agency (IEA). 2007. *Tracking Industrial Energy Efficiency and CO2 emissions*. Paris: Head of Communication and Information Office.

[28] Saygin D, Patel MK, Worrell B, Tam C, Gielen DJ. 2011. *Potential of best practice technology to improve energy efficiency in the global chemical and petrochemical sector*. Available at <https://www.sciencedirect.com/science/article/abs/pii/S0360544211003446?via%3Dihub>, accessed on 12 May 2021.

where the ratios of each production processes over the global production of PVC (85% through S-PVC and 15% through E-PVC) and the specific electricity consumed by each production process are sourced from Plastics Europe and ECVM[29].

5. The remaining steps of virgin pellet production (melting and shaping, pelletizing, compounding) require relatively negligible amounts of energy and hence are ignored.

2) Calculation of fossil fuel emission factor $EF_{BL,FF,CO2}$

For the production of PP, it's hard to identify the type of fuel consumed for the production, as per the methodology, the baseline fuel is natural gas. Based on IPCC 2006 GHG inventories:

- $EF_{FF,CO2}=EF_{natural\ gas}$=54,300kgCO2/TJ=0.0543tCO2/GJ

3) Calculation of grid electricity emission factor $EF_{BL,el,y}$

The emission factor for the baseline electricity consumption for virgin plastic production in the host party (parameter $EF_{BL,el,y}$) shall be determined based on the weighted average consumption of electricity from the electric grid(s) and from captive power plant(s) as indicated in the equation below. Project participants may choose to fix this parameter ex-ante and update it at the renewal of the crediting period or monitor this parameter ex-post. If the parameter is fixed ex-ante, it shall be calculated using the most recent data available.

$$EF_{BL,el,y} = \frac{\sum_k (EF_{BL,grid,k,y} \times EC_{BL,grid,k,y}) + \sum_j (EF_{BL,captive,j,y} \times EC_{BL,captive,j,y})}{\sum_k EC_{BL,grid,k,y} + \sum_j EC_{BL,captive,j,y}} \quad (7)$$

Where:

$EF_{BL,grid,k,y}$	=	Emission factor of the grid k supplying electricity to produce virgin plastics in the host party in year y (tCO_2/MWh)
$EC_{BL,grid,k,y}$	=	Electricity consumed from the grid k to produce virgin plastics in the host country in year y (MWh)
$EF_{BL,captive,j,y}$	=	Emission factor of the captive power plant j supplying electricity to produce virgin plastics in the host party in year y (tCO_2/MWh)
$EC_{BL,captive,j,y}$	=	Electricity consumed from the captive power plant j to produce virgin plastics in the host country in year y (MWh)

In China, the electricity used for producing the plastic is normally supplied by the national grid, therefore, the equation (7) will be simplified as:

[29] Association of Plastics Manufacturers in Europe (PlasticsEurope), European Council of Vinyl Manufacturers (ECVM). 2015. *Eco-profiles and Environmental Product Declarations of the European Plastics Manufacturers: Vinyl chloride (VCM) and Polyvinyl chloride (PVC).*

$$EF_{BL,el,y} = EF_{BL,grid,k,y} \quad (8)$$

In order to more accurately and conveniently develop CDM projects in China's key emission reduction areas and China's voluntary greenhouse gas emission reduction projects (CCER projects) in compliance with the CDM rules, the Department of Climate Change of the Ministry of Ecology and Environment (MOE) studied and determined the baseline emission factors of China's regional power grids for the FY2019 emission reduction projects, and consulted with the relevant departments and the Designated Operational Entities (DOE). The above organizations unanimously agreed that the data of the baseline emission factor for China's regional power grid for the 2019 emission reduction project is true, the calculation is reasonable and the result is credible. The calculation process and results are now announced. The calculation process and results are as follows, which can be used as reference by owners and developers of CDM and CCER projects, DOE, etc., when preparing and finalizing project documents and calculating emission reductions[30].

It also contains an annex for the calculation of OM, BM according to TOOL07: "Tool to calculate the emission factor for an electricity system (Version 07.0)".

$EF_{grid,OM}$ =0.7921, $EF_{grid,BM}$ =0.387,W_{OM}=50%,W_{BM}=50%

$EF_{grid,CM,y}$=0.7921×50%+0.3870×50%=0.5896 tCO_2/MWh

Therefore, $EF_{BL,el,y}$= $EF_{grid,CM,y}$ =0.5896 tCO_2/MWh

4.2 Project Emissions

Project emissions include emissions associated with the energy use at recycling facility and at the processing facility and are calculated based on the equation below.

Since the project recycles not only PP plastics but also ABS plastics, PE plastics, PC plastics, it is necessary to allocate the project emissions to each mass unit of separated material at market price. According to "Methodology AMS-III.AJ", for project activities where the recycling facility includes waste sorting and treatment, the project emissions are calculated according to the following formula:

$$EC_{i,PJ,y} = EC_{PJ,y} \times \frac{Q_{i,y} \times \$_{i,y}}{\sum_s (Q_{s,y} \times \$_{s,y})} \quad (9)$$

$$FC_{f,i,PJ,y} = FC_{f,PJ,y} \times \frac{Q_{i,y} \times \$_{i,y}}{\sum_s (Q_{s,y} \times \$_{s,y})} \quad (10)$$

$$PE_y = \sum_i Q_{i,y} \times \left[EC_{i,PJ,y} \times EF_{el.PJ,y} + \sum_f \left(FC_{f,i,PJ,y} \times NCV_{f,y} \times EF_{f,CO2,y}\right)\right] \quad (11)$$

Where：

[30] https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

PE_y	=	Project emissions in year y (t CO_2/y)
i	=	Material type – plastics PP
$Q_{i,y}$	=	Quantity of material type i recycled in year y (t).
$EC_{PJ,y}$	=	Electricity consumed by the recycling facility in year y (MWh/t)
$FC_{f,PJ,y}$	=	Fuel type f consumed by the recycling facility in year y (unit mass or volume/t)
$NCV_{f,y}$	=	Net calorific value of the fossil fuel type y consumed in the recycling facility in year y (GJ/unit mass or volume)
$EF_{f,co2,y}$	=	CO_2 emission factor of the fossil fuel type y consumed at the recycling facility in year y (tCO_2/GJ)
s	=	Type of material segregated at the recycling facility with a market price, including plastic and other marketable items such as organics
$EC_{i,PJ,y}$	=	Total electricity consumption of the recycling facility in year y apportioned to product i (MWh)
$FC_{f,i,PJ,y}$	=	Total fossil fuel type f consumption of the recycling facility in year y apportioned to product i (unit mass or volume)
$Q_{s,y}$	=	Quantity of material type s segregated in the recycling facility in year y (t)
$\$_{i,y}$	=	Sale price of the product i in year y
$\$_{s,y}$	=	Sale price of the segregated material type s in year y

$Q_{i,y}$ and Q_{sy}

In 2022, 28,187 tons of waste PP plastics, 14,941 tons of waste PS plastics, and 5,681 tons of waste PE plastics, and 3,305 tons of waste ABS plastics, and 20 tons of waste PC plastics were recycled.

In 2021, 24,580 tons of waste PP plastics, 13,313 tons of waste PS plastics, and 4,241 tons of waste PE plastics, and 2,538 tons of waste ABS plastics, and 59 tons of waste PC plastics were recycled.

$\$_{i,y}$ and $\$_{s,y}$

Product sales price: average sales price: PP products 7450 yuan / t, PE products 6500 yuan / t, ABS products 10500 yuan / t, PS products 8200 yuan / t, PC products 13000 yuan / t.

Therefore，the average value of pp plastic particles sales as a percentage of total sales in 2021 and 2022 was 53.9%.

$NCV_{f,y}$

According to the "Guidelines for Corporate Accounting and Reporting of Greenhouse Gas Emissions from Electricity Generating Facilities"[31] the $NCV_{f,y}$ is 389.31 GJ/10^4Nm^3.

According to the methodology, for project activities that fall under Case A, the parameters ($EC_{PJ,y}$, $FC_{f,PJ,y}$) may be estimated based on the nameplate specific energy consumption of the equipment used and the average time of operation and level of service delivered, or based on measurement campaigns of the energy consumption under typical operation conditions.

The Project belongs to Case A, and the electricity consumption and the fuel fossil consumption for the Project activity ($EC_{PJ,y}$, $FC_{f,PJ,y}$) is determined by direct measurement.

4.3 Leakage

According to the methodology: “if it is demonstrated that organic biogenic waste segregated in the recycling facility would otherwise have been deposited in a landfill without methane recovery in the baseline scenario, or if the baseline scenario is the incineration of the wastes, then no leakage calculation is required.”

For the project, the processed material is the waste PP plastic after cleaning and classification, therefore, no organic biogenic waste is involved, the waste recycled is only plastic, and they would be incinerated in the incineration, therefore, in the project situation, no leakage calculation is required.

4.4 Net GHG Emission Reductions and Removals

Emission reduction due to the project activity during the year y are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad (12)$$

Baseline emission (BE_y)

As per the description of the EIA report, the Project plans to recycle about 35,000 tons waste PP per years, according to public and reliable document[32] published by the Department of Climate Change, Ministry of Ecology and Environment of the People’s Republic of China in 2019, the $EF_{grid,OM}$=0.7921 tCO_2/MWh and $EF_{grid,BM}$=0.3870 tCO_2/MWh. As per the Section 4.1, the electricity emission factor is:

[31] https://www.mee.gov.cn/xxgk2018/xxgk/xxgk06/202212/t20221221_1008430.html

[32] https://www.mee.gov.cn/ywgz/ydqhbh/wsqtkz/202012/t20201229_815386.shtml

- $EF_{BL,el,y}$ =$EF_{grid,CM,y}$=0.7921×50%+0.3870×50%=0.5896 tCO_2/MWh

And as per the same section 4.1, the fossil emission factor is:

- $EF_{FF,CO2}$=$EF_{natural\ gas}$=54,300kgCO2/TJ=0.0543tCO2/GJ

And as per the same section 4.1, W_i is:

- $W_{i,imported,y}$=0.15 and $W_{i,in\text{-}country,y}$=0.85

And as per the same section 4.1, B_i is:

- B_i=0.60

Based on the equation (3), the baseline emission for plastic recycling is:

$$BE_{plastic,y} = \sum_i [Q_{i,y} \times L_i \times (SE_{i,in-country,y} \times W_{i,in-country,y} + SE_{i,imported,y} \times W_{i,imported,y})]$$

=35000 t×0.75×[(0.5896×0.56+0.0543×11.6)×0.85+(0.24×0.56+0.0543×11.6) ×0.6 ×0.15]=23263 tCO_2e

Project emission (PE_y)

As per the same section 4.2,

- $NCV_{f,y}$=389.31 GJ/$10^4$$Nm^3$
- $\frac{Q_{i,y} \times \$_{i,y}}{\sum_s (Q_{s,y} \times \$_{s,y})}$=53.9%

According to the EIA report, the Project consumes 5,500 MWh and 168×10^4 Nm^3 natural gas per year. Based on the formula (11), the project emission is:

$$PE_y = \sum_i Q_{i,y} \times \left[EC_{i,PJ,y} \times EF_{el.PJ,y} + \sum_f (FC_{f,i,PJ,y} \times NCV_{f,y} \times EF_{f,CO2,y}) \right]$$

=53.9%×[5,500 MWh×0.5896 tCO_2/MWh+(168×10^4 Nm^3×389.31 GJ/10^4 Nm^3×0.0543 tCO_2/GJ)]= 3662 tCO_2e

Leakage emission (LE_y)

According to the methodology, there will be no leakage caused by the project activity. Thus LE_y=0 tCO_2e.

Emission reduction (ER_y)

The emission reduction (ER_y) by the project activity is:

$ER_y = BE_y - PE_y - LE_y$=23262 tCO_2e−3662 tCO_2e−0 tCO_2e =19600 tCO_2e

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
01-January-2022 to 31-December-2022	23,262	3,662	0	19,600
01-January-2023 to 31- December-2023	23,262	3,662	0	19,600
01-January-2024 to 31- December-2024	23,262	3,662	0	19,600
01-January-2025 to 31- December-2025	23,262	3,662	0	19,600
01-January-2026 to 31- December-2026	23,262	3,662	0	19,600
01-January-2027 to 31- December-2027	23,262	3,662	0	19,600
01-January-2028 to 31- December-2028	23,262	3,662	0	19,600
Total	162,834	25,634	0	137,200

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	L_i
Data unit	-
Description	Net to gross adjustment factor to cover degradation in material quality and material loss in the production process of the final product using the recycled material

Source of data	CDM Methodology AMS-III.AJ, Small-scale Methodology Recovery and recycling of materials from solid wastes, Version 9.0, Sectoral scope:13
Value applied	0.75
Justification of choice of data or description of measurement methods and procedures applied	From the methodology AMS-III.AJ., 5.2.1, baseline emission for plastics recycling, default value.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$W_{i,in\text{-}country,y}$
Data unit	%
Description	Percentage of plastics produced in the host party out of total plastic consumed in year y
Source of data	Public information, News and sectoral reports.
Value applied	85%
Justification of choice of data or description of measurement methods and procedures applied	In 2020, the polypropylene capacity will be 2816×10^4 t/a, the production will be 2554.4×10^4 t, and the apparent consumption will be 2968.4×10^4 t. It is expected that the polypropylene capacity in China will reach 3251.0×10^4 t/a in 2022. It is expected that the apparent consumption of polypropylene in China will reach 3362.4×10^4 t in 2022[33]. Production accounts for 86% of consumption in 2020, and capacity is expected to rise by 15% by 2022. Assuming a 15% rise in production in 2022 as well, production is projected to be 87% of consumption in 2022. Apparent polypropylene consumption has stabilized from 2016 to 2018 and is projected to be about 25.00 Mt by 2020.The domestic consumption market is saturated as domestic self-sufficiency tends to be 100 percent[34].
Purpose of Data	Calculation of baseline emissions
Comments	N/A

[33] [1] Chang Min. Global polypropylene supply and demand analysis and forecast[J]. World Petroleum Industry,2021,28(04):44-50+65.

[34] [1] Xu Runjun. Supply and demand analysis of domestic polypropylene market[J]. Qilu Petrochemical,2019,47(02):159-164.

Data / Parameter	$W_{i,imported,y}$
Data unit	%
Description	Percentage of imported plastics out of total plastic consumed in year y
Source of data	Public information, News and sectoral reports.
Value applied	15%
Justification of choice of data or description of measurement methods and procedures applied	In 2020, the polypropylene capacity will be 2816×10^4 t/a, the production will be 2554.4×10^4 t, and the apparent consumption will be 2968.4×10^4 t. It is expected that the polypropylene capacity in China will reach 3251.0×10^4 t/a in 2022. It is expected that the apparent consumption of polypropylene in China will reach 3362.4×10^4 t in 2022[35]. Production accounts for 86% of consumption in 2020, and capacity is expected to rise by 15% by 2022. Assuming a 15% rise in production in 2022 as well, production is projected to be 87% of consumption in 2022. Apparent polypropylene consumption has stabilized from 2016 to 2018 and is projected to be about 25.00 Mt by 2020.The domestic consumption market is saturated as domestic self-sufficiency tends to be 100 percent[36].
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	B_i
Data unit	-
Description	**Baseline correction factor for metals, plastics and glass from virgin materials**
Source of data	CDM Methodology AMS-III.AJ, Small-scale Methodology Recovery and recycling of materials from solid wastes, Version 9.0, Sectoral scope:13
Value applied	0.60

[35] [1] Chang Min. Global polypropylene supply and demand analysis and forecast[J]. World Petroleum Industry,2021,28(04):44-50+65.

[36] [1] Xu Runjun. Supply and demand analysis of domestic polypropylene market[J]. Qilu Petrochemical,2019,47(02):159-164.

Justification of choice of data or description of measurement methods and procedures applied	From the methodology AMS-III.AJ, 5.2.1, baseline emission for plastics recycling, default value.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$SEC_{BL,i}$
Data unit	MWh/t_i
Description	Specific electricity consumption in the production of virgin material type i
Source of data	CDM Methodology AMS-III.AJ, Small-scale Methodology Recovery and recycling of materials from solid wastes, Version 9.0, Sectoral scope:13
Value applied	0.56
Justification of choice of data or description of measurement methods and procedures applied	From the methodology AMS-III.AJ, 5.2.1, baseline emission for plastics recycling, default value.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$SFC_{BL,i}$
Data unit	GJ/t_i
Description	Specific fuel consumption for the production of virgin material type i
Source of data	CDM Methodology AMS-III.AJ, Small-scale Methodology Recovery and recycling of materials from solid wastes, Version 9.0, Sectoral scope:13
Value applied	11.6

Justification of choice of data or description of measurement methods and procedures applied	From the methodology AMS-III.AJ., 5.2.1, baseline emission for plastics recycling, default value.
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$EF_{BL,FF,CO2}$
Data unit	tCO_2/GJ
Description	CO_2 emission factor of the baseline fossil fuel.
Source of data	CDM Methodology AMS-III.AJ, Small-scale Methodology Recovery and recycling of materials from solid wastes, Version 9.0, Sectoral scope:13
Value applied	0.0543 (for nature gas)
Justification of choice of data or description of measurement methods and procedures applied	2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, Chapter 1, Table 1.4
Purpose of Data	Calculation of baseline emissions
Comments	As per the methodology: project participants shall assume that the baseline fuel is natural gas when it's not possible to identify the type of fuel consumed for the production of plastics from virgin materials.

Data / Parameter	$EF_{OM,y}$
Data unit	tCO_2e/MWh
Description	Operating margin emission factor of the grid connected (ECPG).
Source of data	"2019 Baseline Emission Factors for Regional Power Grids in China" issued by China's DNA on December 12, 2020
Value applied	0.7921
Justification of choice of data or description of	China Official Data of National Bureau of Statistics of China and National Development and Reform Commission

measurement methods and procedures applied	
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$EF_{BM,y}$
Data unit	tCO_2e/MWh
Description	Operating margin emission factor of the grid connected (ECPG).
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China" issued by China’s DNA on December 12, 2020
Value applied	0.3870
Justification of choice of data or description of measurement methods and procedures applied	China Official Data of National Bureau of Statistics of China and National Development and Reform Commission
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$EF_{grid,CM,y}$ ($EF_{BL,grid,k,y}/EF_{el,PJ,y}$)
Data unit	tCO_2e/MWh
Description	Emission factor of the electric grid supplying electricity to the recycling facility in year y.
Source of data	The calculation is conducted based on data calculated by the Office of National Coordination Committee on Climate Change.
Value applied	0.5896
Justification of choice of data or description of measurement methods and procedures applied	ECPG is selected as the Project electricity supplier. China Official Data of National Bureau of Statistics of China and National Development and Reform Commission can provide credible data.
Purpose of Data	Calculation of baseline emissions

Comments	N/A

Data / Parameter	W_{OM}
Data unit	-
Description	Weighting of operating margin emission factor
Source of data	TOOL07: Tool to calculate the emission factor for an electricity system (Version 07.0)
Value applied	50%
Justification of choice of data or description of measurement methods and procedures applied	Default vale
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	W_{BM}
Data unit	--
Description	Weighting of operating margin emission factor
Source of data	TOOL07: Tool to calculate the emission factor for an electricity system (Version 07.0)
Value applied	50%
Justification of choice of data or description of measurement methods and procedures applied	Default vale
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$NCV_{f,y}$
Data unit	GJ/t

Description	Net calorific value of the fossil fuel type f consumed in the recycling facility in year y
Source of data	“2019 Baseline Emission Factors for Regional Power Grids in China" issued by China’s DNA on December 12, 2020
Value applied	389.31 (Natural Gas)
Justification of choice of data or description of measurement methods and procedures applied	Official statistic, publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	N/A

Data / Parameter	$EF_{f,co2,y}$
Data unit	tCO_2/GJ
Description	CO2 emission factor of the fossil fuel type f consumed at the recycling facility in year y.
Source of data	"Guidelines for Corporate Accounting and Reporting of Greenhouse Gas Emissions from Power Generation Facilities" issued by China's Ministry of Ecology and Environment $EF_{FF,CO2}$
Value applied	0.0556 (Natural Gas)
Justification of choice of data or description of measurement methods and procedures applied	Official statistic, publicly accessible and reliable data source
Purpose of Data	Calculation of baseline emissions
Comments	N/A

5.2 Data and Parameters Monitored

Data / Parameter	$Q_{i,y}$
Data unit	t/y

Description	Quantity of PP waste collected at the recycling facility in year y
Source of data	Incoming Material Records
Description of measurement methods and procedures to be applied	Direct weighing and recording of the weight, cross checked with company's records that is invoiced and backed by receipt of payments.
Frequency of monitoring/recording	Recorded at the time of sending each consignment from recycling facility to processing/ manufacturing facility
Value applied	35,000.00
Monitoring equipment	Wagon balance.
QA/QC procedures to be applied	The wagon balance is periodically checked and maintained; the receipt is for crosscheck.
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

Data / Parameter	$EC_{PJ,y}$
Data unit	MWh
Description	Electricity consumption of the recycling facility in year y
Source of data	Measured by meters installed at the project site, as well as electricity usage logs
Description of measurement methods and procedures to be applied	Continuous measurement and at least monthly recording
Frequency of monitoring/recording	Continuous measurement and at least monthly recording
Value applied	5500
Monitoring equipment	Electricity Meters
QA/QC procedures to be applied	The recycling plant checks completeness of invoices concerning electricity consumption. The project proponent and local grid company will check the meter together monthly, then

	the grid company issues the invoice, and the project proponent will pay the bill. The electricity meter will be calibrated annually.
Purpose of data	Calculation of project emissions
Calculation method	-
Comments	-

Data / Parameter	$FC_{f,PJ,y}$
Data unit	t or 10^4 Nm^3
Description	Quantity of natural gas combusted during the year y
Source of data	Records of gas purchases
Description of measurement methods and procedures to be applied	Based on purchase records and meter measurements at the pipeline
Frequency of monitoring/recording	Specify measurement and recording frequency
Value applied	168.00
Monitoring equipment	-
QA/QC procedures to be applied	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based onpurchased quantities and stock changes.
Purpose of data	Calculation of project emissions
Calculation method	-
Comments	-

Data / Parameter	$\$_{i,y}$ and $\$_{s,y}$
Data unit	yuan/t
Description	Sale price of the product i in year y
Source of data	Sales record

Description of measurement methods and procedures to be applied	Average calculation based on one year's sales record of PP plastics
Frequency of monitoring/recording	Once a year
Value applied	PP products 7450 yuan / t, PE products 6500 yuan / t, ABS products 10500 yuan / t, PS products 8200 yuan / t, PC products 13000 yuan / t
Monitoring equipment	-
QA/QC procedures to be applied	Annual statistics should be made based on incoming material records and sales records to check the consistency of pp plastic sales with production.
Purpose of data	Allocate the project emissions to each mass unit of separated material at market price.
Calculation method	-
Comments	-

5.3 Monitoring Plan

This section describes the process and schedule for obtaining, recording, and analyzing the monitored data set out in Section 5.2 above.

1) Monitored data

In this PDD, emission factor of the project is determined ex-ante. Therefore, the quantity of the waste PP plastic recycled in year y ($Q_{i,y}$), the quantity of electricity imported from the grid in year y (EG_y) and the quantity of natural gas consumption during the year y ($FC_{f,PJ,y}$) will be monitored.

2) Implementation of the monitoring plan

The VCS monitoring staff will be appointed by the Project Proponent, who supervise and verify metering and recording, collect data (the data on the wagon balance and meter, sales/purchasing invoice or the balance bill), calculate emission reductions and prepare monitoring report.

The VCS manager will take the responsibility for the monitoring plan implementation. A VCS team is to be established and consist of project manager, VCS manager and monitoring staff.

APPENDIX

N/A