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DGCF
Double Green Cores Fund

Impact Investment for Innovative Upstream-Downstream Waste Management Solution through Waste Value Creation

The Problems: Shortage of sustainable waste management and sustainable power production.

Municipal waste production in Bogor, Indonesia, is growing by 5% per year on average. In 2015 alone waste production was up to 1,940 m^3 tonnes per day and 73% of it ended up in landfill[1]. Moreover, waste is managed using conservative ways such as open dumping and sanitary landfill[2]. Government-owned cleanliness department –managed under Ministry of Environment – is only able to manage 60-65% waste in urban areas, left 715 m^3 tonnes waste in streets, rivers, and drains[3].

The region of Bogor consist of urban and suburban areas with densed population. There are about 30% from total population or 163,200 middle-low-income habitants live in highly densely populated settlements in urban area[4]. Waste is severely unmanaged in this settlements. Neighborhood communities provide compensation to unofficial waste caretaker such as scavengers. Moreover, low awareness to separate organic and unorganic waste makes waste management even more difficult.

In other hand, the value of waste is remain unexposed. One of the strategic way to increase the value of waste is by converting it to power. Through public-private partnership, Waste Power Plant (WPP) was build nearby landfill in Bogor with 1.6 megawatt maximum capacity from 250 m^3 tonnes of waste per day[2]. Converting waste to power is consistent with government's long-term goals to close 25% shortage of power production and increase renewable energy which currently only accounted for 13% from total energy produced.

Main Issues: No economic incentives and low-calories waste.

- Shortage of sustainable waste management. There is no economic incentive for urban residents to separate their organic and unroganic waste. Littering habit increases polution from municipal waste. Cleanliness department is hardly manage the densed settlement due to discrepancy of authority and limited cleaning units.
- Shortage of sustainable power production. WPP is one of strategic solution to increase sustainable waste management and power production. To operate on optimum level, WPP requires high-calories waste. Unfortunetly, waste in landfill is not separated causing it contains 80% of water.

Impacted Stakeholders

- Highly populated urban residents pay waste retribution fee from IDR 750,000 – IDR 900,000/house yearly in average to unofficial waste caretakers. A lot of waste end up in rivers and drains which led to flood that in 2014 alone caused economic loss of IDR 1.5 trillion. Meanwhile, few people are aware of the economic value of waste[5].
- The WPP is producing electricity below its optimum capacity due to wet waste. WPP losses IDR 6 billion since 2009 and need to be subsidied by the government. High liquid waste also severely damaging plant's cumbustion engine[6]. The wet waste only produce 800 Kcal/kg. With current situation, maximum waste input of 250 m^3 tonnes per day only produces 0.2326 Mw or only 13.86% from total capacity of 1.6 Mw[2].

Current Residential Solution: Unofficial Scavengers and Waste Bank

- The unofficial waste caretakers are managed autonomously by the local residents. However, a lot of waste collected from residents are delivered to nearest illegal landfill which cause severe environment damage.
- Not increase awarness to separate their organic and anorganic waste, and create no value added for them.
- Waste Bank is one of the creative solutions towards waste management by buying waste from residents. There are several Waste Banks has been operating in suburbans and rurals. However, Waste Banks have limited scalability, operating in scattered management, lack of profit orientation and suffering from weak financial resource.

Current WPP Solution: Waste Dripping

- The power plant company manage waste dripping process to decrease water content to 45%[7]. However, this solution is inefficient in several ways; (i) dripping process is done in open field and the result is very dependent to weather condition, (ii) lack of standard, and (iii) require additional workforce. To enhance electricity production, power plant need to be supplied by complementary substance such as gas or gasoline which leading to high cost.

Main Challenges:

- The main objective of WPP is to increase waste turnover in landfill, producing renewable energy is secondary objective. However, this project is depleting government budget.
- Middle-lower-income urban residents are reluctant to change their behavior. There have to be a proactive campaign strategy to weld support from urban residents. Moreover, the overhead cost to operate in urban areas is higher than in suburbans and rurals.

Investment Thesis: Enhancing waste value through business-society cooperation and waste treatment.

Double Green Core Fund (DGCF) is an investment platform to establish upstream-downstream solution toward waste management issues.

The Downstream Solution: Biodrying Facility

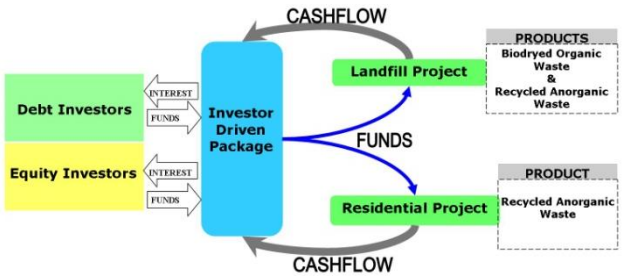
- Biodrying is a method to use metabolic heat to remove water from waste matrix the lowest possible residence time and minimal biodegradation hence preserving most gross calorific value. The end product (fuel/granules) contains a high energy value which up to 3800 – 4000 Kcal/kg[8]. It is the most effective and affordable solution to support WPP to generate electricity more efficiently. Biodrying process is well-researched and proven empirically.
- The terms of quality is determined by its costs, calories produced, time consumed, and degree of certainty. Biodried waste will increase efficiency of WPP substantially. With 250 m^3 tonnes of biodiried waste, WPP able to produce optimum utilization of 1.215 Mw, or increase 422% from dripped waste. This level of calories will substitute other expensive substance to operate WPP. By replacing diesel with biodrying waste, WPP can save up to 75% its raw material cost.
- This solution depend on sole buyer. Therefore, it requires long-term contracting with WPP to establish biodrying service for 25 years.

Upstream Solution: Proactive Waste Recycle (PWR)

- PWR establish business-society cooperation to distribute economic benefit from waste recycle value chain. PWR allows society to have a cooperation account where every anorganic waste will be priced and their value will be accumulated. The anorganic waste will be recycled to produce varieties of plastic pellets and sold to various national and international manufacturers.
- PWR operation targeting 17,000 lower-middle income residents in densed settlements in Bogor producing 1,500 tonnes anorganic waste annualy. The cooperated residents are required to segregate the waste and it will be collected through collecting agents.
- These residents are very sensitive with economic incentive that in turn will educate them of waste management. Targeted groups are collectivist, campaign strategy utilizing objective alignment with NGO that has robust community-based activities (e.g WALHI)[9].

Financial Instrument

- The Double Green Core Fund (DGCF) is a Private Equity (PE) investment package that providing attractive potential returns and diversification. The investment vehicle named Investor Driven Package (IDP) after its design to meet investors' risk profile.
- PE had been implemented in various impact investing projects, for example; (i) Indonesian green venture capital - PT. Socentix- commited direct investment in equity on sustainable energy and forestry projects[10], and (ii) Unitus Impact that manage 500 impact companies through direct investment in emerging markets including in Indonesia[11]. This structure creates a direct expert managerial guidance, open and create market, and allows business to achieve fast-growing phase faster.



- IDP utilizing Private Placement Agent to connect the project with potential investors and creditors.
- The fund will be managed by Venture Capital (VC) firm that has tremendous experience in impact investing in Indonesia (e.g PT. Pavillion Capital, PT. Socentix). The capital structure (70% equity & 30% debt) follows conservative assumption of early-stage-grow small-mid sized company where equity is dominant portion to decrease the liquidity risk in early years of cash flow.

Investors and achievement of initiative

- There are seven Venture Capital firms incorporated under **Indonesia Green Fund Hub/Financial Services Indonesia with total financing of US$ 200 million**[12]. Besides, DGCF also seeking investment from Government-owned Company (GoC) Fund to facilitating projects funding process through Public Private Partnership (PPP) scheme. The ownership of GoF is to create stronger long-term objective alignment in increasing waste treatment colaboration. IDP offers 20% equity position privilage for government to participate in the project. **IDP facilitates government participation in renewable energy which is supported by 2007 Renewable Energy Enactment and Statute**[17]**.**

Note: exchange rate US Dollar (USD) to Indonesian Rupiah (IDR), in March 2016, is IDR 13,247.50/USD

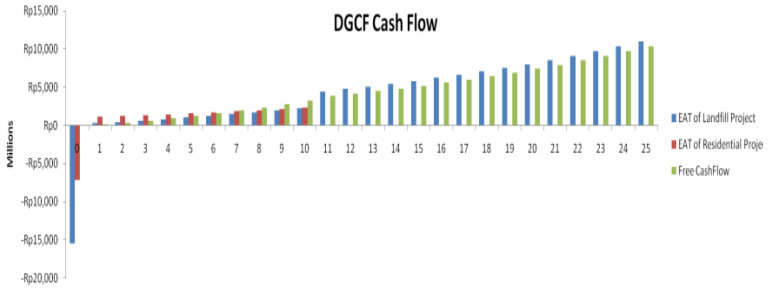
- The fund managers has long-term expertise in managing impact business through collaboration with government. IDP targeting specific pool of impact investors by utilizing private placement based on PPP scheme (e.g Solid Waste Teartment and Disposal project in 2013)[13]. Fund Manager experience in handling cooperation under PPP scheme will increase likelihood of GoC to participate in the project. Furthermore, DGCF operations is consistent with government long-term objective in enhancing waste management and sustainable energy production.
- Bogor Agriculture University Endowment Fund (BAUEF), such as IPB Kresna and IPB Syariah, with total capital of IDR 62 billion dedicated to invest in companies with impact business practices[14]. Participation of BAUEF will not only beneficial monetarily but also will increase knowledge transfer in operation methodologies to become a successful project for future nationwide application.

Stakeholder Contract and Achievement Strategy

- **Downstream project**. Based on WPP feasibility report[2], the WPP will suffer from losses for 25 years with negative NPV if it had not been supported by subsidy. The biodrying waste will replace additional expensive substance and shift WPP's NPV to positive position. The pricing consideration is based on **economic value pricing model** calculated through equally shared annual economic benefit devided with annual biodrying waste input. There are 6% increments annualy to maintain profitable position between stakeholders. Through this model, every stakeholders able to monetize the benefit and create a win-win solution.
- The contract relies on quantity and quality of biodrying waste delivered. This project cooperates with three research-based institutions under Indonesia Green Fund Hub to establish product standards.
- The PPP follows Build Own Operate Transfer (BOOT) scheme where assets will be transfered after 25 concession or contract will be renewed for going concern after 25 years. BOOT allows private parties to achieve higher margin for the projects, meanwhile it allows public party to releasing the burden on public budget for waste management.
- **Upstream project**. The PWR aims to enhance participation of residents in waste recycle process by purchase anorganic waste from residents. The buying price for used paper is IDR 1,000/kg and plastic is 2,500/kg. This pricing strategy follows market historical price with conservative assumption. The capacity of recycle facility input is 1,473.7 tonnes peryear to produce approximately 1,281.5 tonnes plastic pellets per year.
- This project relies on product quality and continuity of supply as its value proportion. This project creates innovative distribution channel with vast supply foundation. Furthermore, the start-from-beginning waste segregation creates cleaner raw materials. However, the project campaign is crucial step for success.

Summary Terms, Fees, and Cash flows

- Legal Final Maturity: The business economic life is 25 years, adhere WPP economic life. The cash flow from PWR will end at year 10. The debt portion is structured to amortize over the first 10 years.
- Use of Funds: Establish biodrying and unorganic waste recycling facilities on landfill site and unorganic waste recycle facility on residential site, and funding initial operational cost.
- IDP will be promoted through private placement agent with 2% commission derived from delivered investment.
- Incentive. DGCF include 1% annual bonus from EAT for Junior Managers and 0.5% for Senior Managers.



Cash flow assumptions: Based on government regulation, the electricity rate will be increased 30% regularly for every 5 years. The biodrying waste will be priced at IDR 12,782/tonnes. Recycled plastic will be sold for IDR 6,000/kg. These prices will be gradually increased 5-6% each year.

Capital Structure and Pricing Considerations

- The Debt portion (aiming for IDR 9.39 billions offered at par with 5% YTM). Creditors will receive 11% coupon rate bond with 10 years to maturity. Debt fund will be allocated 100% to downstream project. This project cashflow dedicated to repay the coupon payment and principle. **This bond portion is backed with biodrying contract worth IDR 62.6 billion.**
- The Equity portion (aiming for IDR 21.9 billions offered at par). This investment portion will be entitled for free cash flow (FCF) of the whole project. The targeted IRR for this portion is 12%. Based on projected FCF, **this arrangement allows investors to purchase shares with 23.2% discount.**

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Risk Management

Source of risk	Mitigation Policy
Requires support from People's Representatives for biodrying facility.	Allow government-owned company to invest in equity. Presenting most affordable and effective solution to cut WPP subsidy.
Rejection from society due to depriving scavengers income	Create a cooperation relationship. Buying their collected and sorted unorganic waste with competitive variable price.
WPP has long payable policy	Maintain sufficient liquidity, increase production of recycled plastic pellets and sell them to diverse companies with shorter payable.
Biodrying operation relies on single buyer.	DGCF creates common standard procedures as foundation for long term partnership.
BAUEF requires principal augmentation.	DGCF includes the retained earning policy for equity growth to compensate inflation rate.
Government is risk averse and has budget constraint.	No further investment for long-term maintanance. Transfer risk from public agents to private party.
Conflict between public agents and private parties	Establish formalized discussion forum in which communication, decision, and activities are coordinated and consolidated.

Market Expansion Opportunity

Government has been promoting sustainable power production especially from waste to power program with total electricity production 79.5 Mw in 7 major cities by 2019[15]. The potential market growth is 16.63% in average from 2016 to 2019. However, the success of WPP program lies in the quality of raw material. Our solution will be the pioneer project for the successful complementary service to supply high calories value waste.

Year	WPP Electricity Production	Future Market Value
2016	57.5 Mw	IDR 41,007,291,370
2017	59.5 Mw	IDR 44,979,649,855
2018	69.4 Mw	IDR 55,611,478,352
2019	79.5 Mw	IDR 67,527,078,973

According to ISWA report, the global demand for recycled plastic in 2020 will be 85 million tonnes. With projected supply grows only at 3% annually creating shortage of 32.5 million tonnes in 2020. This opportunity worth US$ 29.2 billion. China accounted for 56% of recycled plastic consumption, demand is still left unfulfiled. The amount of exported recycled plastic from Indonesia grows 20% anually on average[16].

Economic, Environment, and Social Impact to External Stakeholders

Activities	Direct Stakeholder Beneficiaries	Direct Impact	Performance Measurement
Biodrying Facility	Waste Power plant	Increase operational efficiency and lower costs.	Electricity production rate based on waste/ton.
	Citizen nearby landfill	Increase job opportnity in rural area nearby landfill.	Number of workers recruited
	Government	Lower government subsidy on power plant.	Historical vs expected subsidy on power plant.
		Increase waste sustainability in landfill	Historical vs expected waste turnover
Proactive Waste Recycle	Urban Citizen in residential areas	Decrease pollution from unorganic municipal waste.	Historical vs expected unorganic waste received in landfill.
		Increase residents awarness of waste segregation	Level of unorganic waste sold to PWR
	Government	Improve waste solution in unmanaged areas	Historical vs expected level of unmanaged waste.
	Lower-income citizen	Creating job opportunity for lower-income citizen	Number of cooperated stakeholders.

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