Waste-to-Energy in Lombok, Indonesia

Financing aspects

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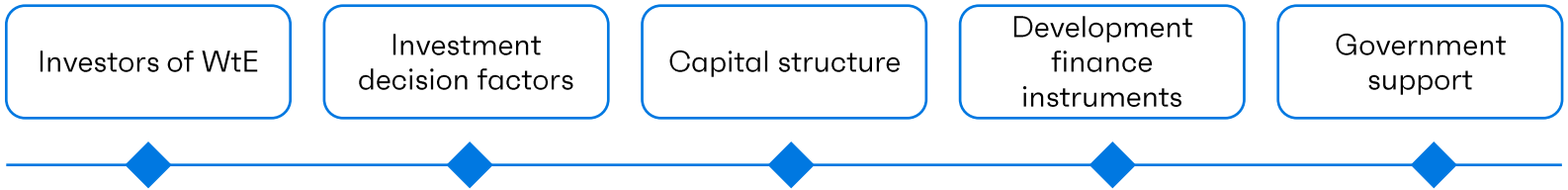
April 2023

Summary

This is a condensed report of key **financing aspects of waste-to-energy (WtE)** projects in Indonesia. The target group of the presentation is private/public developers, advisors and government agencies active in the WtE sector. The presentation is one of several deliverables under the Sustainable Island Initiative (SSI), which is a government partnership between Denmark and Indonesia focused on advancing sustainable waste management in Lombok and Batam. This report focuses on Lombok. Publications under the SII are available at https://ens.dk/en/our-responsibilities/global-cooperation/country-cooperation/indonesia

The report covers different **investor groups of WtE** and the underlying **investment decision factors** and motivations for engaging in WtE whether those are financial or non-financial. Since WtE projects can have different **capital structures**, differences between project and corporate finance are provided. The concept of cash-flow waterfall is presented to demonstrate the different risk profiles of debt and equity instruments. Lastly, as WtE projects often struggle to attract long-term financing, a review of **development finance instruments (DFI)** and **government support** is provided.



Investors of WtE may be RE consumers, RE producers or financial investors

Renewable energy consumers

Who: Commercial and industrial end-users (e.g. data centres); global companies who are concerned about their reputation
Why: savings on energy expenses; environmental, and social considerations

Renewable energy producers

Who: Independent Power Producers (IPPs) incl. large energy producers with a diverse portfolio or independent developers of WtE; investor-owned/ state-owned utilities
Why: financial return, diversification of assets (risk mitigation), reputation, baseload energy generation, regulatory/policy targets, and company-specific obligations

Financial investors

Who: Banks, institutional investors
Why: financial return, diversification of assets (risk mitigation), reputation, and company-specific obligations

Public de-risking instruments can improve the risk/reward profile for an investor

Policy derisking	Financial derisking	Financial incentives
Improving framework conditions to lower investor risk	Transfer of risks from private to public sector through e.g. concessional financing	Compensation of risks through fiscal incentives
		
Lowering risk	Transfering risk	Increasing return (IRR %)

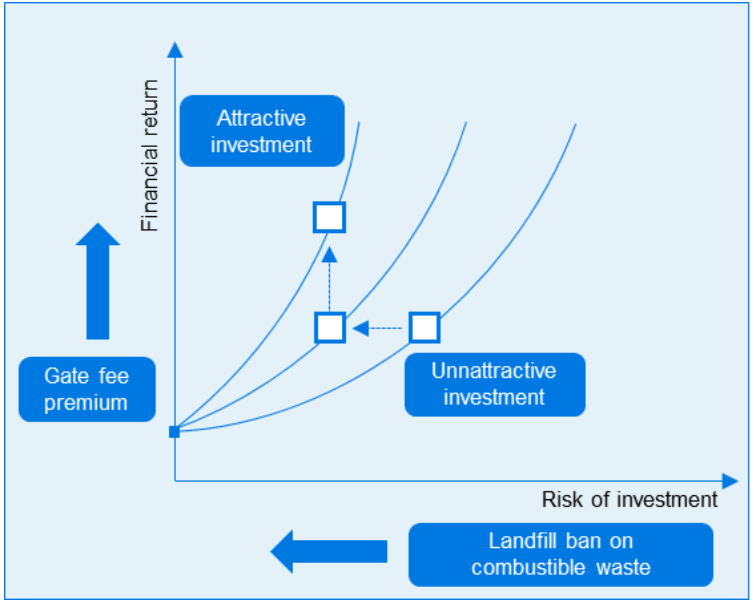
Public derisking instruments

Public de-risking instruments can turn an unattractive investment into an attractive investment

In order to make a project attractive for an investor, it is important that the project has a balanced risk/reward profile.

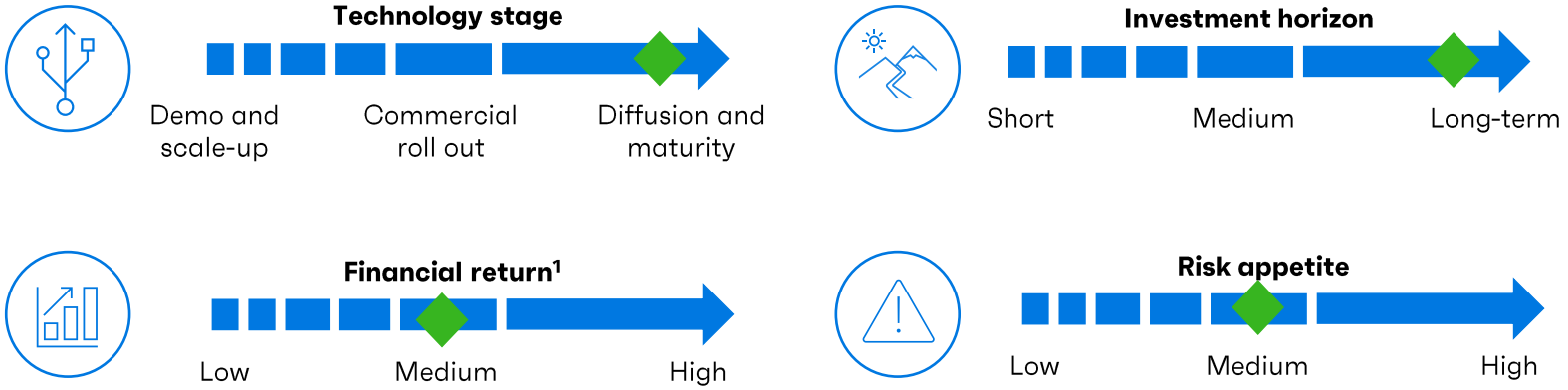
The risk/reward profile can be adressed through deployment of public instruments thereby turning an unattractive investment into an attractive investment.

Public instruments	
Policy derisking	...lowers the risk profile through e.g. improving the framework conditions for waste-to-energy.
Financial derisking	...transfers the risk faced by the investor to the public sector with e.g. government guarantees
Financial incentives	...provides a compensation for the risk through offering e.g., gate fee premiums, which increase the return of investment.



Typical investors of WtE will favour mature technologies, a long investment horizon, medium financial return and risk profile

Financial investment decisions factors and technology preferences



◆ = A typical investment profile behind a WtE power plant

1) Financial return relates to the return for equity holders. Debt holders will have lower return expectations.

Investing in WtE could be motivated by compliance, strategic or sustainability factors

Non-financial investment decision factors

Compliance

Compliance factors related to WtE could include policy obligations of the share of waste handled/reduced or company/national goals concerning the share of renewable energy in the power mix. It could also be driven by national NDCs[1] or company-specific CO_2 reduction goals.

Strategic

Strategic considerations include gaining access to new markets and investing in projects despite relatively high risks. An investor may be interested in investing in a WtE plant in Lombok since this region is a strategic market and they know that the learnings from the first project can be carried on to future projects.

Sustainability

Non-financial sustainability considerations include environmental and social factors. In the case of WtE, this may include the recognition that WtE is less harmful for the environment than continued operation of overfilled or poorly run landfills. Sustainability factors are often strategic and/or compliance driven.

1) NDC stands for national determined contributions submitted to the UNFCC. NDCs includes country specific GHG reduction goals and planned mitigation activities.

WtE can be financed via a corporate or project finance structure; the latter requires a detailed risk analysis

Corporate finance characteristics

Recourse
In the case of default or missing repayments, the lender has a legal right to collect assets or take legal action.

Creditworthiness – project cash flows + balance sheet:
When lenders assess a corporate finance transaction, the creditworthiness of the project is based on expected cash flows from the project *and* the project owner's balance sheet. This form of lending would be applicable if the investor was a corporate developer, like a utility, looking to expand its portfolio of assets.

Project finance characteristics

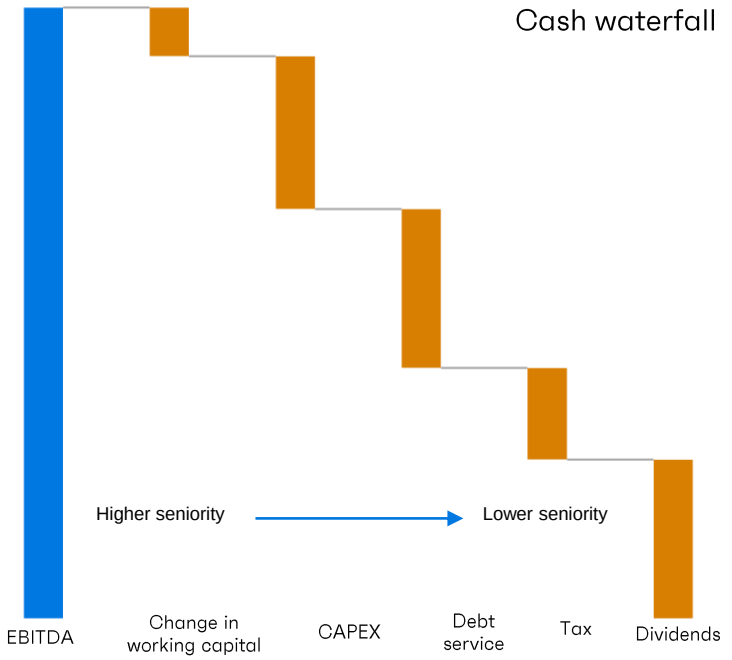
Limited recourse:
The lenders legal right to collect against other assets than the investment is often limited in project finance. A lender will thus require a detailed risk analysis and financial modelling before engaging in project finance.

Creditworthiness – project cashflows:
The lenders' assessment of a project finance structure primarily concerns the expected future cash flows of the specific project. The reason is that equity for project finance is injected into a legally and financially indepedent special purpose vehicle (SPV) or project company. As a result, lenders do not have access to the cash flows of existing generation assets of the equity providers.

The capital structure typically consists of both debt and equity

WtE project financing is typically based on a capital structure of debt and equity instruments. Debt holders will often require a certain equity share to lower risk since dividends are repaid after debt service (cash waterfall).

Equity	Debt
• No maturity date • Dividends depend on project success • Higher risk appetite • Active investor • Lower seniority and more exposed to risk	• Fixed and periodic repayment of principals and interests • Risk averse • Passive investor • Higher seniority and less exposed to risk



Development finance instruments (DFI) can lower perceived financing risk resulting in lower risk premiums

There are three types of development finance instruments (DFI): Guarantees, concessional loans and grants. They can be issued independently or blended. DFI are used to adress the lack of available long-term financing.

Guarantees

Guarantees are a form of insurance paid to the borrowers

Guarantees can be issued by multilateral/national organisations, multilateral guarantees agencies (MIGA) and Export Credit Agencies.

A guarantee may be linked to political risks or off-take risks.

Concessional loans

Concessional loans are loans on more attractive conditions that what can be achieved in the market

Borrowers of concessional loans are required to provide a guarantee contract which states the terms under which the national/local government steps in, in case of default or other issues related to repayment.

Grants

Upfront grants (frontloading) can adress the financing gap during the capital intensive and high-risk start-up phase of a project

Payments may be offered upon achievement of pre-defined performance indicators (result based).

The CIF[1]-ACT[2] provides an opportunity for renewable thermal projects, incl. WtE

CIF-ACT is a financing support program targeting countries that are particularly challenged to meet Paris Agreement goals due to a heavy reliance on coal power.

The purpose of the program is to help the transitioning away from coal through development finance instruments targeted development of renewable power generation and accelerated retirement of coal power generation plants.

Indonesia has been selected as a one of four countries in the first round of financing.

The proposed investment plan* submitted to the CIT Trust Fund Committee by the Goverment of Indonesia includes a proposal of 170 mUSD in co-financing for >300 MW of renewable thermal capacity. Alongside solar PV, WtE technologies are identified as one of the key technologies when it comes to replacing coal power generation.

In 2022, Indonesia's investment plan was endorsed by CIT-ACT governing body un-locking 500 mUSD in development funding for coal transitioning projects.

Source: CIF News; CIF Org. - Indonesia ACT IP

1) CIF = Climate Investment Funds,
2) ACT = Accelerating Coal Transition

Government support for WtE projects is available to increase private sector financing in infrastructure

✓ Government viability support (VGF)

Recognizing the importance of involving the private sector in (waste) infrastructure projects, the government of Indonesia may offer government viability support in the form of financial or non-financial incentives. Examples are tax incentives, financial support for 50% of contruction work and feasibility support such as interest on loans, equipment costs and installation costs. Government support is only approved by presentation of a detailed pre-feasibility study, which clearly states risks and support needed.

✓ Government Guarantees (Indonesia Infrastructure Guarantee Fund)

Waste infrastructure projects that are structured as Public Private Partnerships (PPP) are eligible for guarantees from Indonesia Infrastructure Guarantee Fund (IIGF) given that the projects fulfil the criteria stipulated in Presidential Regulation No. 38 Year 2015 on Cooperation Between Government and Business Entities in infrastructure Provision. The guarantee ensures that the private party is compensated in case a public contracting party is unable or unwilling to pay for the contracted public service, or if government action/inaction (change of law, expropriation etc.) causes early termination of project default.

IIGF is a state-owned enterprise established in 2009 with the purpose of removing the barriers of private sector financing in public infrastructure projects.

Sources: Waste-to-energy guidebook, MoEF (2015); https://www.iisd.org/credit-enhancement-instruments/institution/indonesia-infrastructure-guarantee-fund/;

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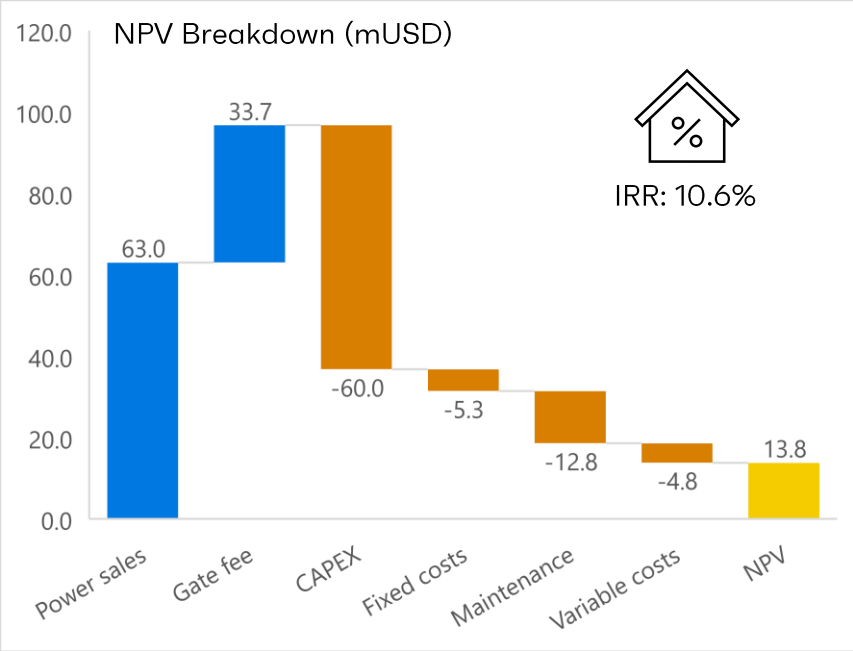
A business case example of a WtE project

This section offers a business case example of a waste incineration project in Lombok.

The input to the business case is based on experience from similar projects and adapted to the local context of Lombok.

Sensitivities on key input parameters are performed to show how uncertainties may impact the financial viability. Potential investors are recommended to conduct a thorough risk analysis and financial modelling before making final investment decisions.

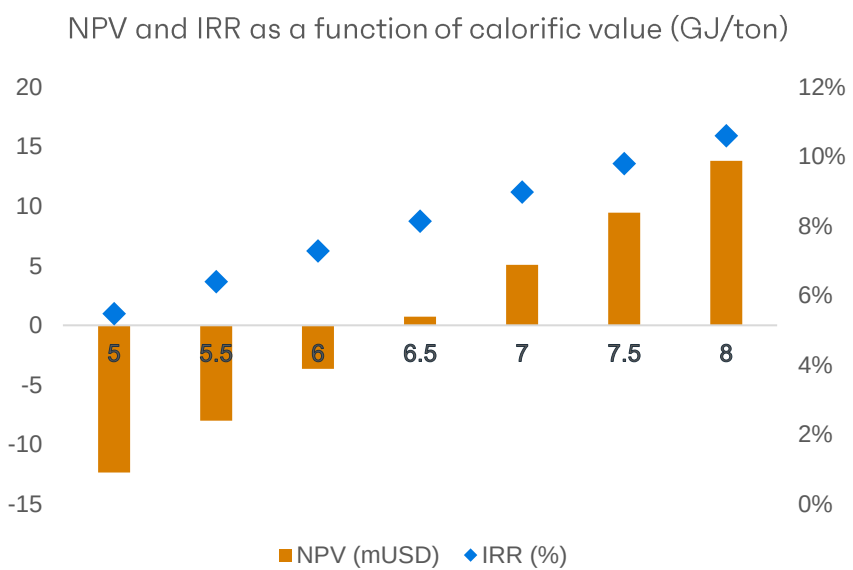
The base case business case returns an IRR of 10.6% and an NPV of 13.8 mUSD



Assumptions		
Project lifetime	*Years*	25
PPA	*USD/MWh*	117.7
Gate fee	*USD/ton*	32
CAPEX	*mUSD*	60
Net power capacity	*MWe*	6.3
Feedstock volume	*tons/year*	98,750
Calorific value	*GJ/ton*	8
Operations hours	*Hours*	7,900
Boiler efficiency	*%*	85
Annual power production	*MWh*	49,770
Debt/equity split	*%*	70/30
(Real) WACC[1]	*%*	8%

1) WACC = $Debt\ x\ cost\ of\ debt + Equity\ x\ cost\ of\ equity$. Cost of debt is assumed to be 5% while cost of equity is assumed to be 15%. WACC is provided in real terms, which means that it has been adjusted for inflation.

Calorific values above ~6.5 GJ/tons return positive NPV in the considered business case



Calorific value, also called *heating value,* has a significant impact on power production (yield).

The lower the calorific value, the lower the yield. Since production yield is correlated with power sales, lower calorific values result in lower revenues impacting the return of investment (IRR/NPV).

The average calorific value of waste in Lombok is only 5.8 GJ/ton[1]. Meanwhile, the calorific value of waste assumed for the business case calculation is 8 GJ/ton.

The calorific value of waste must be at least 6.42 GJ/ton on average over the project lifetime to realise a break-even business case where NPV=0 and IRR=8%.

1) DEPA, DEA & COWI. Cross-sectoral technology catalogue for solid waste management and waste-to-energy. Lombok and Batam/Kepri. https://ens.dk/sites/ens.dk/files/Globalcooperation/technology_catalogue_for_swm_and_wte_0.pdf

The financial viability of the business case is very dependent on guaranteed gate fees and PPA prices

The two primary revenue streams in a waste incineration project are power sales and gate fees. In places with district heating networks or industries, excess heat may also be monitized. Regulations and financial constraints impact the expected gate fee and power price. In some cases, a higher gate fee must compensate for a low electricity price and vice versa. The relationship between gate fees and power price is thus important.

An investor will often require documentation in the form of a waste supply contract and a Power Purchase Agreement (PPA) where prices and contract lengths are specified.

Break even analysis
At a PPA price of 117.7 USD/MWh (maximum achievable PPA price in Lombok) a gate fee of 19 USD/ton is required to realise break-even (NPV=0 and IRR=8%)

IRR (%)	Power price (USD/MWh)					
Gate fee (USD/ton)	80	90	100	110	120	130
10	1%	3%	4%	5%	6%	7%
20	4%	5%	6%	7%	8%	9%
30	6%	7%	8%	9%	10%	11%
40	8%	9%	10%	11%	12%	13%
50	10%	11%	12%	13%	14%	15%

A gate fee of 32 USD/ton is assumed in the business case calculation. Meanwhile, the current gate fee level in Lombok is only 3.2 USD/ton.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