



Ministry of Environment  
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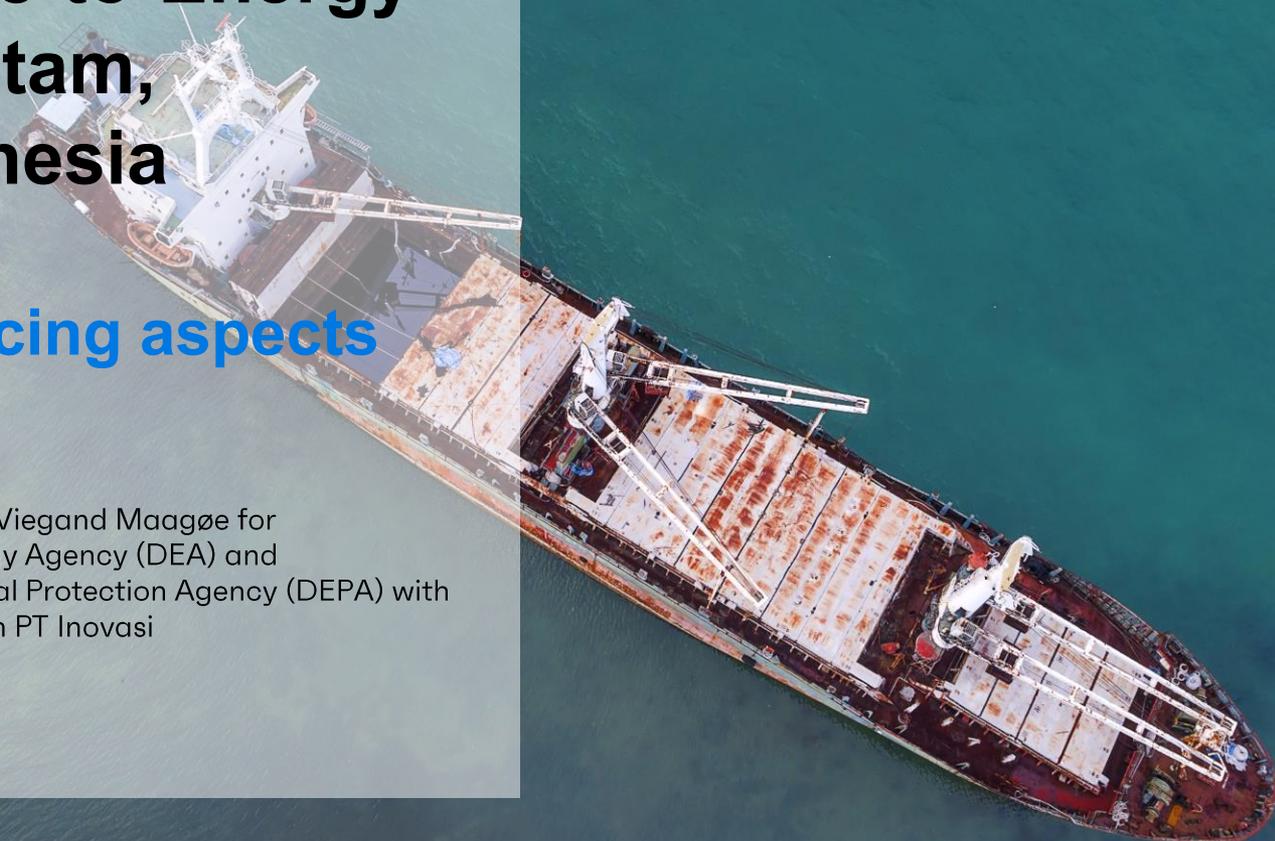
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# Waste-to-Energy in Batam, Indonesia

## Financing aspects

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Environmental Protection Agency (DEPA) with  
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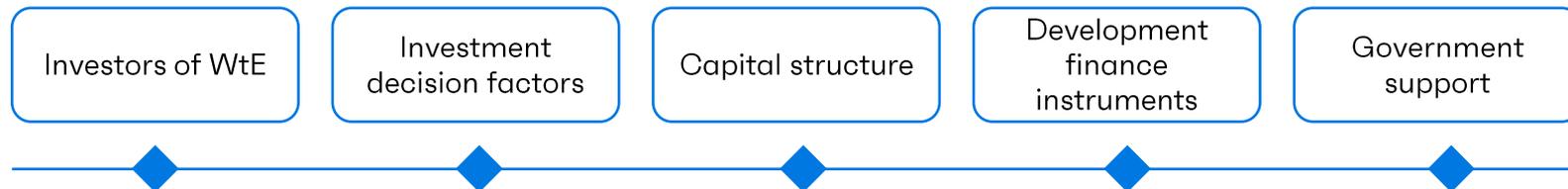




## Summary

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 Batam. 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 outlined. 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

Improving framework conditions to lower investor risk



Lowering risk

## Financial derisking

Transfer of risks from private to public sector through e.g. concessional financing



Transferring risk

## Financial incentives

Compensation of risks through fiscal incentives



Increasing return (IRR %)

Public derisking instruments

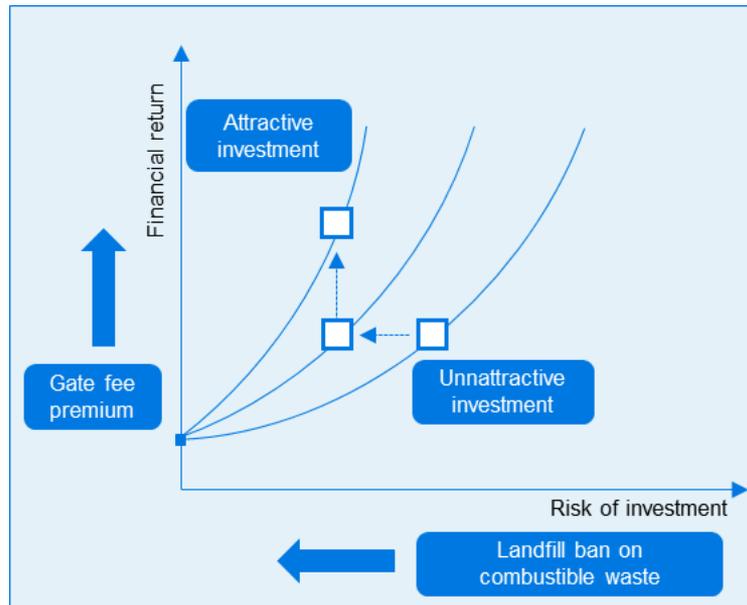
# Public de-risking instruments can turn an unattractive investment into an attractive investment

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 addressed 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



### Technology stage



### Investment horizon



### Financial return<sup>1</sup>



### Risk aversion profile



◆ = A typical investment profile behind a WtE power plant



# 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<sup>1</sup> or company-specific CO<sub>2</sub> 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 Batam 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 compliance driven.

# 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.

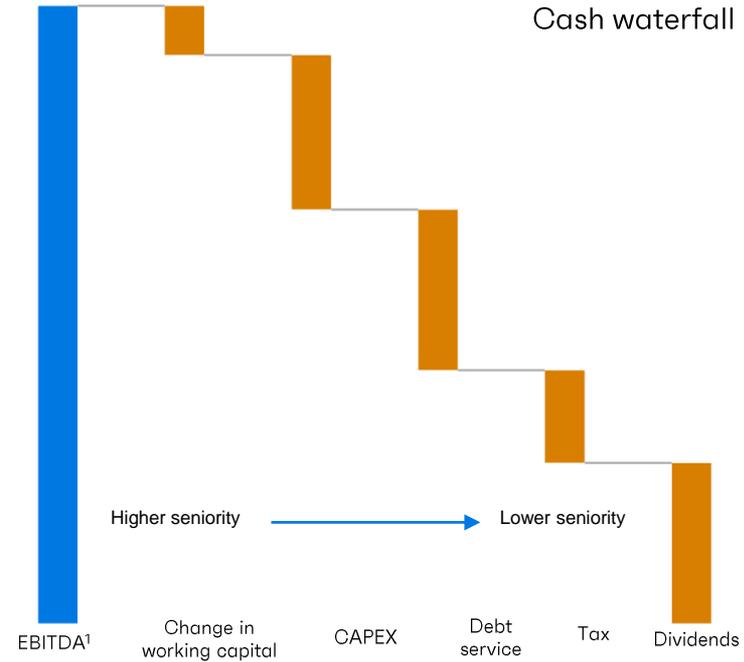
### Creditworthiness – project cashflows:

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 independent 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
<ul style="list-style-type: none"> <li>• No maturity date</li> <li>• Dividends depend on project success</li> <li>• Higher risk appetite</li> <li>• Active investor</li> <li>• Lower seniority and more exposed to risk</li> </ul>	<ul style="list-style-type: none"> <li>• Fixed and periodic repayment of principals and interests</li> <li>• Risk averse</li> <li>• Passive investor</li> <li>• Higher seniority and less exposed to risk</li> </ul>





# 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 address 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 than 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 address 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).

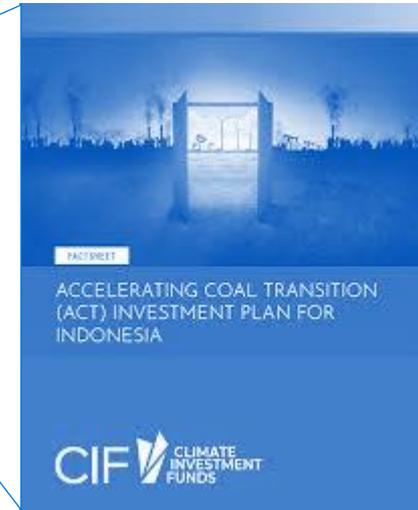
# The CIF<sup>1</sup>-ACT<sup>2</sup> provides an opportunity for renewable thermal projects, incl. WtE

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 CIF Trust Fund Committee by the Government 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 CIF-ACT governing body un-locking 500 mUSD in development funding for coal transitioning projects.*

Source: [CIF News](#); [CIF Org. - Indonesia ACT IP](#)

# 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 construction 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) conditioned 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/>;



# A business case example of a WtE project

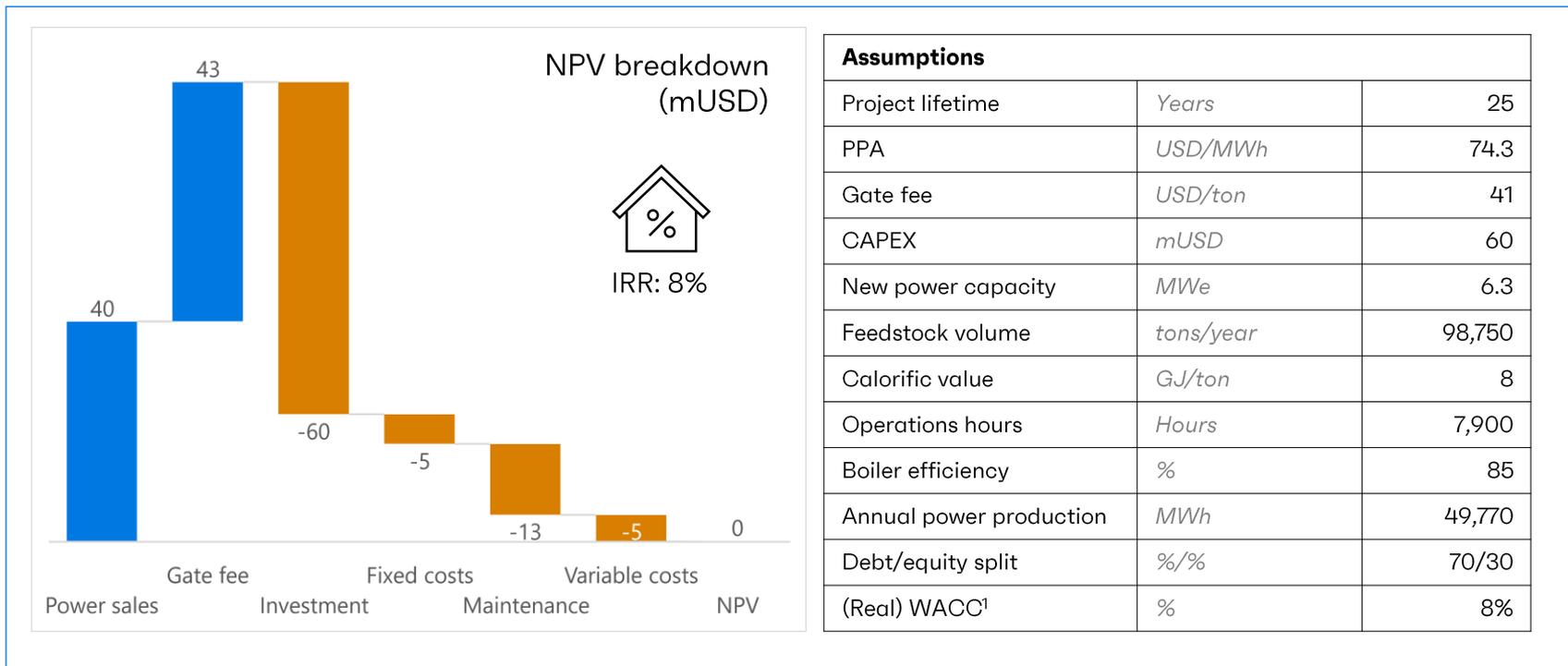
This section offers a business case example of a waste incineration project in Batam.

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

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.

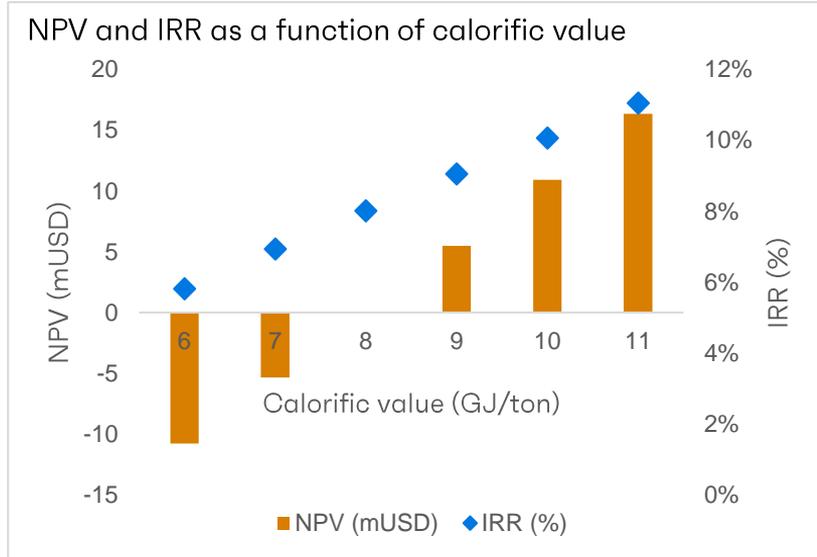


# The base case business case “breaks even” at a gate fee of 41 USD/ton



<sup>1</sup>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.

## The calorific value of waste is assumed to be 8 GJ/ton in the business case – lower calorific values return a negative NPV



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).

A calorific value of waste of 8 GJ/ton is assumed in the business case. This corresponds to the average calorific value of waste in Batam<sup>1</sup>.

Calorific values below 8 GJ/ton return a negative NPV assuming all other input parameters are held constant.

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](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 monetized. 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 74.3 USD/MWh (maximum achievable PPA price in Batam) a gate fee of 41 USD/ton is required to realise break-even (NPV=0 and IRR=8%)

IRR (%)		Power price (USD/MWh)					
		70	80	90	100	110	120
Gate fee (USD/ton)	10	0%	1%	3%	4%	5%	6%
	20	3%	4%	5%	6%	7%	8%
	30	5%	6%	7%	8%	9%	10%
	40	7%	8%	9%	10%	11%	12%
	50	9%	10%	11%	12%	13%	14%



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