





## WG4: Financial & Tariff Analysis

The Chugoku Electric Power Co., Inc.

### 1. JICA Team

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## 2-1. Tentative schedule

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2021 December (Cambodia Time)						
			1 Wed.	2 Thu.	3 Fri.	4 Sat.
5 Sun.	6 Mon.	7 Tue.	8 Wed.	9 Thu.	10 Fri.	11 Sat.
12 Sun.	13 Mon.	14 Tue.	15 Wed.	16 Thu.	17 Fri.	18 Sat.
19 Sun.	20 Mon.	21 Tue.	22 Wed.	23 Thu.	24 Fri.	25 Sat.
		14:00- 16:00				
26 Sun.	27 Mon.	28 Tue.	29 Wed.	30 Thu.	31 Fri.	

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## 2-2. Tentative schedule

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2022 January (Cambodia Time)						
						1 Sat.
2 Sun.	3 Mon.	4 Tue.	5 Wed.	6 Thu.	7 Fri.	8 Sat.
				10:00- 12:00		
9 Sun.	10 Mon.	11 Tue.	12 Wed.	13 Thu.	14 Fri.	15 Sat.
		10:00- 12:00		10:00- 12:00		
16 Sun.	17 Mon.	18 Tue.	19 Wed.	20 Thu.	21 Fri.	22 Sat.
		10:00- 12:00				
23 Sun.	24 Mon.	25 Tue.	26 Wed.	27 Thu.	28 Fri.	29 Sat.
30 Sun.	31 Mon.					

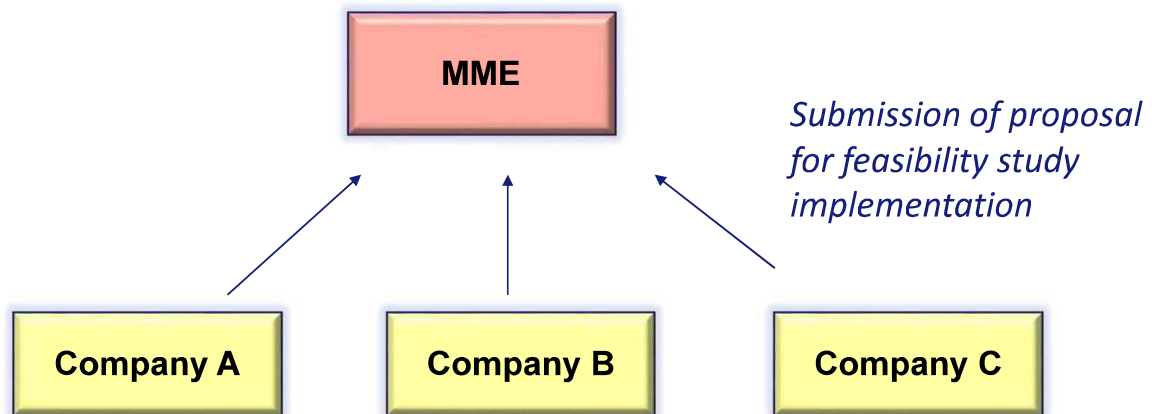
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### 3. Purpose of this training

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- The Ministry of Industry Mines and Energy (MME) is in a position to grant approval for the Feasibility Studies (FS) proposal submitted by private companies.
- Therefore, it is necessary for MME to properly check and confirm that the FS proposal does not have any issues in terms of feasibility and viability.
- **The purpose of this training is to explain the basic knowledge for judging whether the FS proposal submitted by the private companies are reasonable and feasible from a commercial point of view.**



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### 4. Scope of the training

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- **This training covers the following items in the FS report** submitted by the private companies.

FS Sample: Table of Contents

1. General Information (Overview)
2. Major Component of the Project
  - 2.1 Turbine
  - 2.2 Generator

⋮

- 3. Investment Cost**
  - 3.1 Project Cost**

- 4. O&M Cost**

- 5. Tariff structure, etc.**

- 5.1 Finance Assumptions used in the Financial Model**
  - 5.2 Tariff**

- 6. Annexure: IRR Calculation (Financial Model)**

The part to be checked technically

Scope of this training

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**Chapter1 : Profitability**

**Chapter2 : Revenue**

**(Including an explanation of PPA)**

**Chapter3 : Tariff structure**

**Chapter4, 5 : Financing**

**Corporate finance**

**Project finance**

**Chapter6 : Others**

## 6. Financial model

- The image of a financial model is shown below.
- Basically, it is preferable to receive an excel-based financial model. In addition, you should carefully check its contents since there are various contents included in the model.
- In this training, I will explain the major items of the financial model and the related contents.

### Sample: Income Statement and IRR Calculation

Income Statement and IRR Calculation							
	2021	2022	2023	2024	2025	2026	2027 ...
Revenue	0	0	0	77	77	77	77
Cost	0	0	0	65	65	64	64
Total profit	0	0	0	12	12	13	13
Tax	0	0	0	2.4	2.4	2.6	2.6
Net profit after tax	0	0	0	9.6	9.6	10.4	10.4
Repayment of remaining loan principle	0	0	0	8	8	8	8
Dividend	0	0	0	1.6	1.6	2.4	2.4
Total investment	260	55	155	50			
Equity	78	16.5	46.5	15			
Loan	182	38.5	108.5	35			
Finance cost	7%						
IRR on Equity	12%						



# Chapter1 : Profitability

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## 1-1. Confirmation of Profitability

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- When you review the FS proposal, **it is easy to start by checking the level of the project profitability** expected by the private companies submitting it.
- **Equity Internal Rate of Return (EIRR)** is often used as an indicator of profitability in FS proposal.

### Sample: Income Statement and IRR Calculation

Income Statement and IRR Calculation							
	2021	2022	2023	2024	2025	2026	2027 ...
Revenue	0	0	0	77	77	77	77
Cost	0	0	0	65	65	64	64
Total profit	0	0	0	12	12	13	13
Tax	0	0	0	2.4	2.4	2.6	2.6
Net profit after tax	0	0	0	9.6	9.6	10.4	10.4
Repayment of remaining loan principle	0	0	0	8	8	8	8
Dividend	0	0	0	1.6	1.6	2.4	2.4
<b>Total investment</b>	<b>260</b>	<b>55</b>	<b>155</b>	<b>50</b>			
<b>Equity</b>	<b>78</b>	<b>16.5</b>	<b>46.5</b>	<b>15</b>			
Loan	182	38.5	108.5	35			
Finance cost	7%						
<b>IRR on Equity</b>	<b>12%</b>						

EIRR is calculated by using the Dividend and Equity.

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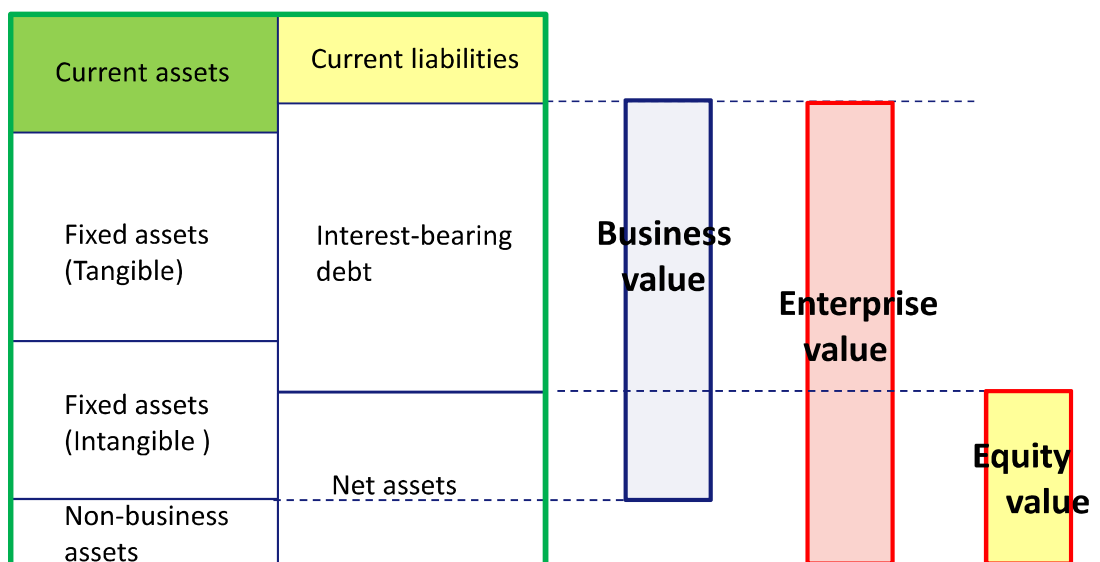
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■ There are different types of Corporate Values.

## Different types of Corporate Value

<b>1.Business value</b>	<p>✓ <b>Total present value of future economic benefits (cash flows, etc.) to be generated by business activities</b></p> <p>Business value = Net working capital (Current assets - Current liabilities) + Property, plant and equipment + Intangible assets</p> <p><i>All assets, liabilities, and equity are based on market value.</i></p>
<b>2.Enterprise value</b>	<p>✓ <b>Overall corporate value</b> (= business value + non-business asset value)</p>
<b>3.Equity value</b>	<p>✓ <b>Value attributable to shareholders</b> (= corporate value - interest-bearing debt)</p>

## Balance sheet based on market value



*Business value = Net working capital (current assets – current liabilities) + Fixed assets (Tangible) + Fixed assets (Intangible)*

*Enterprise value = Business assets + Non-business asset*

*Equity value = Enterprise value - Interest-bearing debt*

■ In general, there are 3 methods:

**(1) Cost approach, (2) Market approach, (3) Income approach**

### (1) Cost approach

Evaluation method	✓ <b>Consolidates the market value of the individual assets, liabilities and shareholders' equity.</b>
Typical evaluation methods	✓ Book value net asset method, market value net asset method (the replacement cost method, etc.)
Strong point	✓ It is easy to obtain <b>an objective evaluation</b> from books of accounts and market value information.
Weak point	✓ <b>It does not reflect future possibilities</b> , such as potential profitability, which are not shown in the book values since this method is based on balance sheet figures in the past.

### (2) Market approach

Evaluation method	✓ <b>Use the stock price of a similar listed company or the acquisition price of a similar transaction.</b>
Typical evaluation methods	✓ Market Price Method, Price Multiplier Method, Takeover Case Multiplier Method
Calculation	✓ Valuation target company's profit, etc. multiplied by profit multiplier of similar public companies
Strong point	✓ it is <b>the most objective valuation</b> since the valuation is based on the stock price of the target company or similar company in the stock market.
Weak point	<p>✓ <b>If the target company or similar company is not listed, it cannot be used.</b></p> <p>✓ In addition, the market price may be affected by speculative demand fluctuations, market rumors, etc., and may deviate from the economic theoretical price such as the present value based on the future cash flows.</p>

**(3) Income approach**

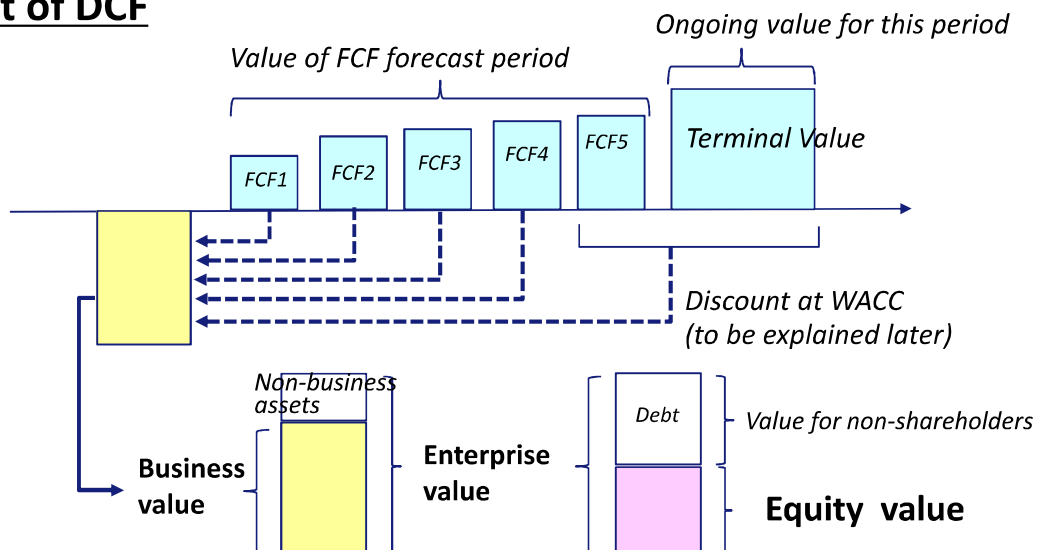
Evaluation method	✓ Calculate by discounting a series of economic benefits (profits, cash flows, etc.) that will be generated in the future by the assets and liabilities of the company.
Typical evaluation methods	✓ Discounted Cash Flow (DCF)
Calculation	✓ Economic profit discounted by Discount rate
Strong point	✓ It is a method that can calculate the Enterprise value based on the future potential of the target company. Therefore, the DCF is said to be an easy method to accurately calculate the Enterprise value.
Weak point	✓ Arbitrariness based on predictions can easily entered in the calculation of future business profits and losses, discount rates, and residual values.

✂ In terms of predicting the future value, the DCF is commonly used in FS.

**1-7. DCF method**

- DCF is a method of calculating the present value by discounting the free cash flow (FCF) that the project is expected to earn in the future.
- DCF is commonly used to evaluate the profitability of the projects in FS.

**Concept of DCF**

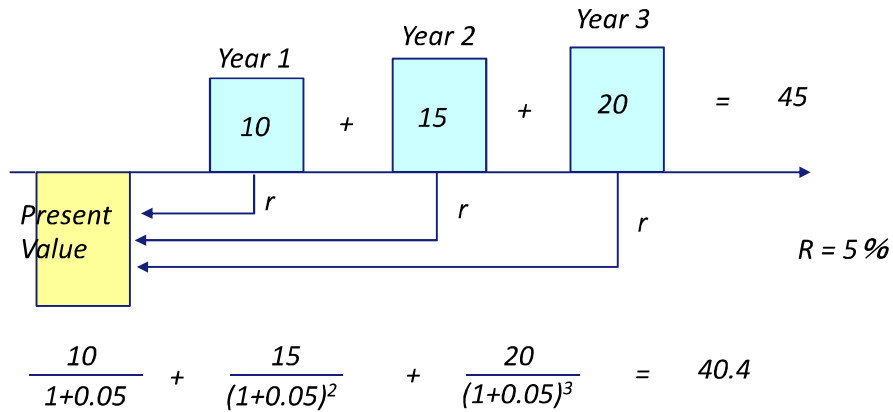


**1. Opportunity cost of capital**

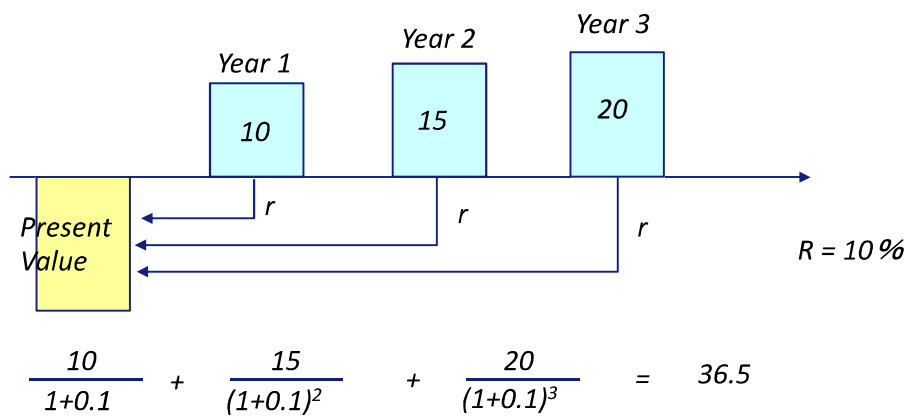
- Opportunity cost of capital is **the so-called “Opportunity cost” of investing in one business and losing the opportunity to invest in another business.**
- It is variously referred to as the Discount rate, Investor demand yield, Hurdle rate, etc.

**Example**

You expect the free cash flow that a business will earn over the next 3 years. If the opportunity cost of capital (r) is 5%, how much would you need to invest in this business?



You expect the same free cash flow to be earned over the next 3 years as on the previous page. However, if you change the opportunity cost of capital (r) to 10% from 5%, how much would you need to invest in this business?



It should be noted that **when the opportunity cost of capital changes, the discounted present value assumed at present also changes.**

■ When you discount future free cash flows to its present value, it is necessary to consider the Discount rate.

◆ In the calculation, you need to consider that there are 2 types of cash in a company:

① Cash that belongs to creditors, ② Cash that belongs to shareholders

➤ The cash attributable to creditors:

To be discounted by using the Cost of debt<sup>※1</sup>

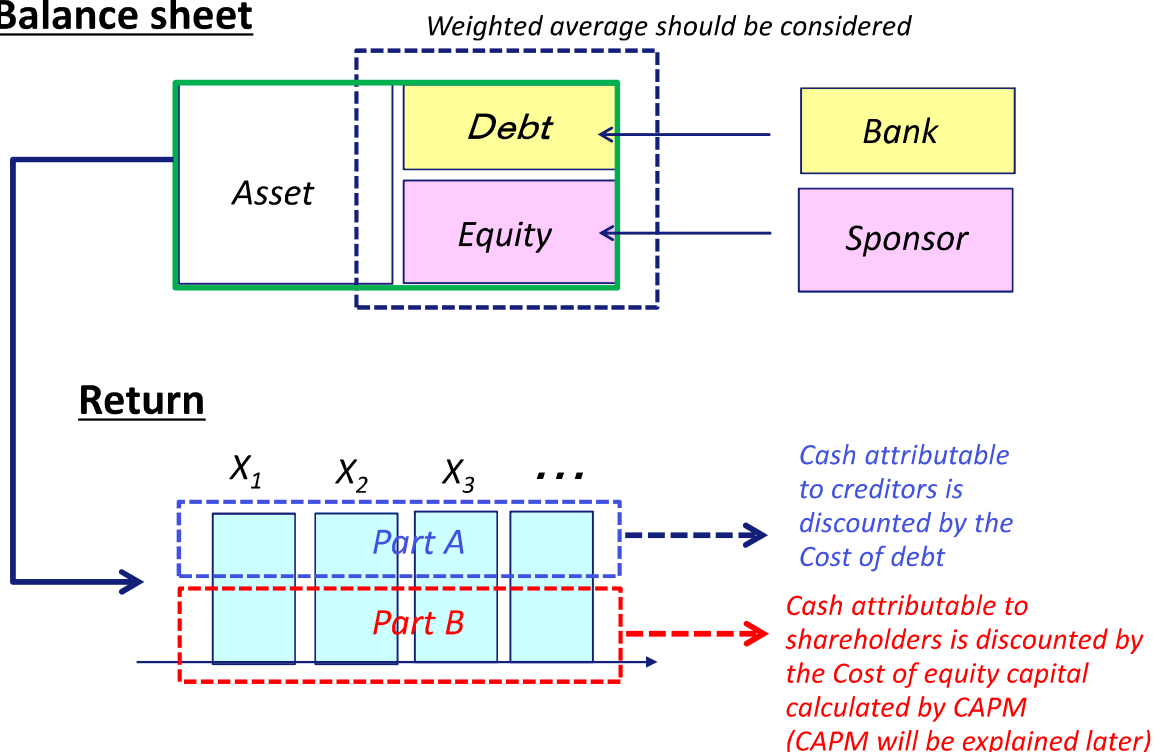
➤ The cash attributable to shareholders:

To be discounted by using the Cost of equity capital<sup>※2</sup>

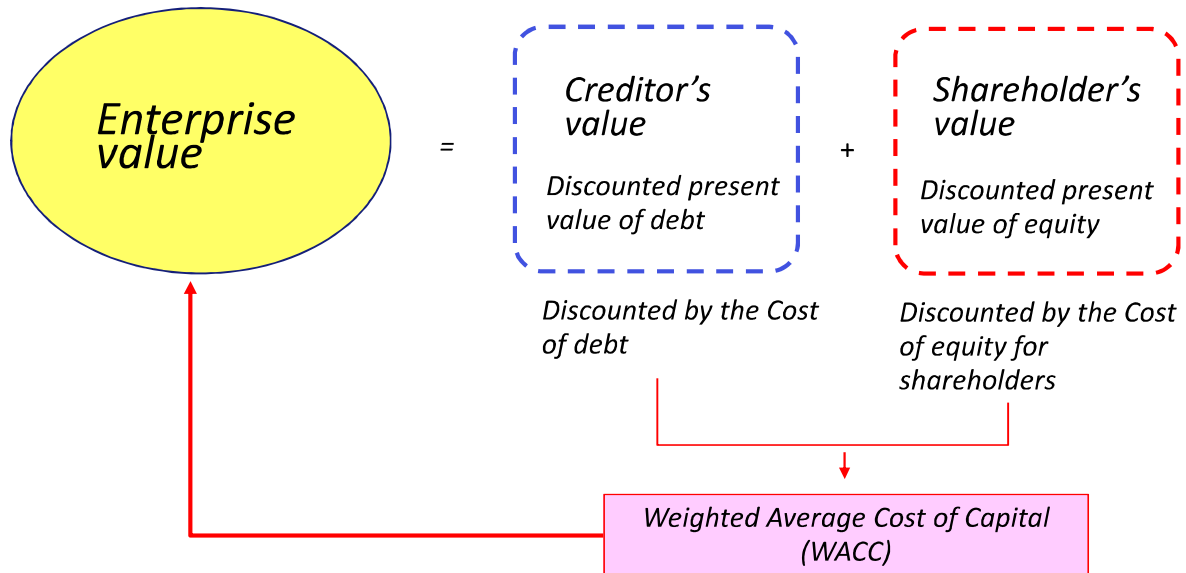
※1 Cost of debt is the rate of return expected by creditors which is the interest rate on interest-bearing debt (interest expense divided by the balance of interest-bearing debt) or the yield on corporate bonds.

※2 Cost of equity capital is the rate of return that investors expect on their investment. Cost of equity capital is calculated mainly by using the CAPM.

Balance sheet



- Enterprise value is the sum of the value attributable to creditors and the value attributable to shareholders.



## 1-13. Weighted Average Cost of Capital : WACC

- Weighted Average Cost of Capital (WACC) is a weighted average of the debt and equity ratios after determining the cost of debt and equity capital.
- WACC is used as the Discount rate in order to estimate the Enterprise value.
- The calculation formula of WACC is shown below.

$$WACC = \frac{E}{D + E} k_e + \frac{D}{D + E} k_d (1 - T)$$

$E$  = Shareholders' equity (market value)

$D$  = Debt (market value)

$k_e$  = Cost of equity capital

$k_d$  = Cost of debt

$T$  = Corporate tax rate

$$WACC = \frac{E}{D + E} k_e + \frac{D}{D + E} k_d (1 - T) \quad \leftarrow \text{Why (1-T) ?}$$

### Example

- Company A : Income is 1,000 and expenses are 0.
- Company A' : Company A borrows money and incurs 100 interest payments.

	<u>Company A</u>	<u>Company A'</u>	
<b>Revenue</b>	1,000	1,000	
<b>Expense</b>	0	-100	
<b>PBT</b>	1,000	900	
<b>Tax</b>	-200	-180	
<b>Net income</b>	<b>800</b>	<b>720</b>	<p>Tax decreases by 20 because Expense increases by 100. So, Net income decreases by only 80 instead of 100.</p>

(Corporate tax rate = 20%)

# 1-15. Cost of equity capital

- The Cost of equity capital is the cost of funds that a company raises by issuing stock (i.e., shareholders' equity).
- The formula for calculating the cost of equity capital is shown below.

$$\text{Cost of equity capital} = \text{Risk-free rate (R(f))} + \beta \times \text{Market risk premium (R(p))}$$

Risk-free rate (R(f)) : The yield on government bonds is generally used as a risk-free rate.

$\beta$  :  $\beta$  is the sensitivity of a project to the overall market portfolio. If the target company is unlisted,  $\beta$  of similar public companies is used as a reference.

Market risk premium (R(p)) : Investors' expected risk premium for the project. The market risk premium is the excess rate of return that investors expect on risky assets. It is calculated by subtracting the yield on risk-free assets (e.g., government bonds) from the expected yield on the market portfolio.



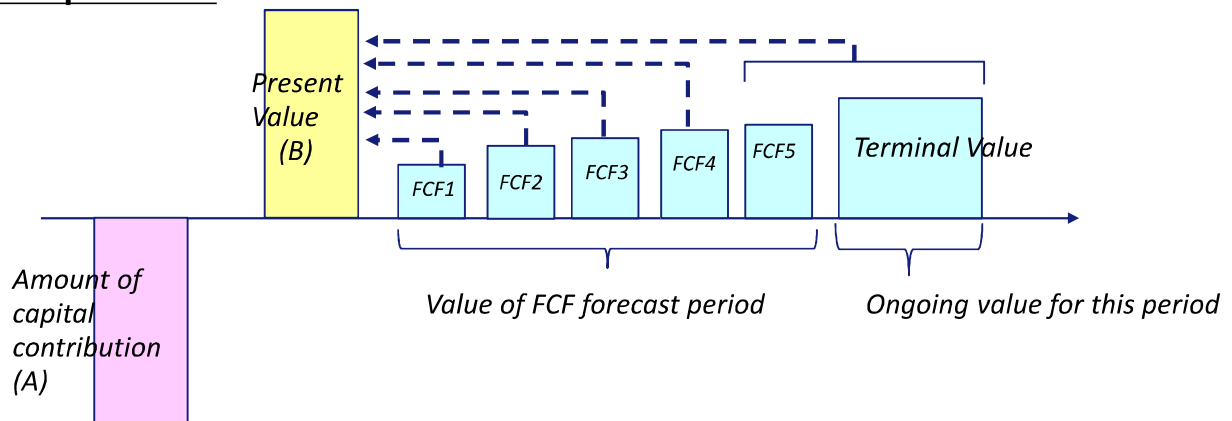
## 1-16. Equity Internal Rate of Return (EIRR)

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■ In order to understand the profitability of FS, it is necessary to know the concept of EIRR.

- EIRR is the Discount rate at which the net present value of the sum of the funds contributed by a company to a project and the future cash generated by its investments is zero.
- It is an index to determine whether or not an investment is reasonable based on the return of investment.

### Concept of EIRR



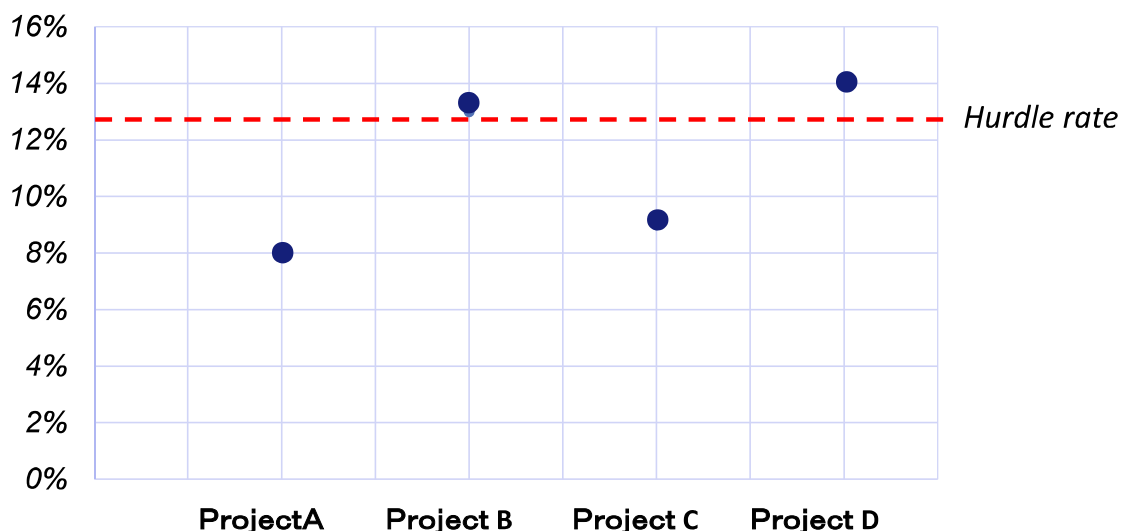
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## 1-17. Hurdle rate (1/2)

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- It is common for each company to have it's own Hurdle rate for deciding whether or not to invest. The calculation method and its level are different depending on the companies.
- If EIRR of a project is less than the Hurdle rate, the company will give up considering that project.
- In general, the Hurdle rate is set higher for high-risk projects and lower for low-risk projects.



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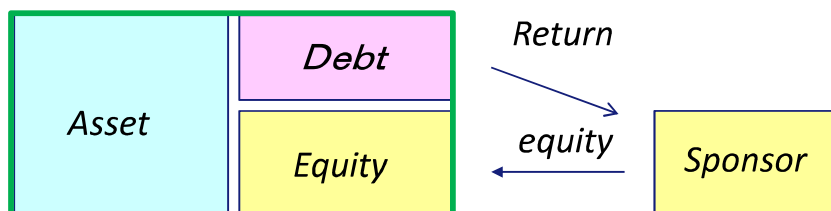
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- **The Hurdle rate is different depending on countries** and the external environment, etc.
- **Therefore, it is important to have a broad understanding of the profit level that the private companies expects to the investment in Cambodia** at the present time.
- If the FS profitability of a project that uses subsidies is too high, then the project should be rejected because it is feasible without Cambodian government subsidies. Or you may lower the assumed tariff.
- If the profitability is too low, you should check the private company's intention to continue the project even with such low profitability. Otherwise, the project may collapse in a short time.

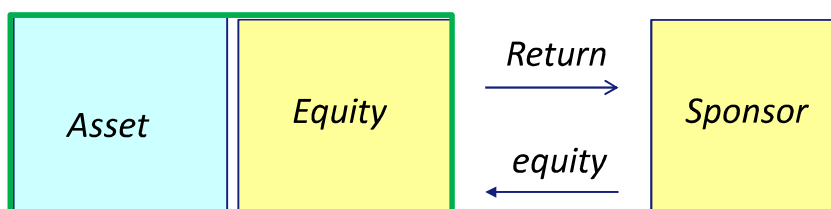
1-19. Project IRR and Equity IRR

- The project is generally financed in some proportion of Debt and Equity.
- **Equity IRR is the rate of return on the equity investment.**
- **Project IRR is the rate of return from the whole project.**
- If there is no debt portion in the project, EIRR and PIRR will be the same.

Case 1



Case 2



## Chapter2: Revenue (Including an explanation of Power Purchase Agreement)

### 2-1. Confirmation of assumptions included into the project

- The next step is to confirm the assumptions included in the FS (incl. Financial Model).

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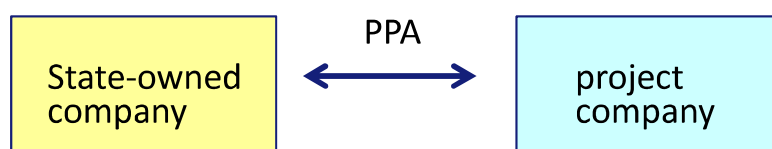
### First Step

- First of all, you need to identify what kind of income the project company is trying to get.
- In the case of a power project, **revenues are mainly generated from the sales of electricity under a Power Purchase Agreement (PPA)** with state-owned company as an off-taker. It promises to purchase electricity at a fixed price for a long period of time under certain conditions.
- On the other hand, **there are other patterns in which project companies sell electricity in the wholesale electricity market.**
- **In Cambodia**, there is no electricity wholesale market. So, it is assumed that **private companies will submit FS proposal based on the sale of electricity by PPA** at this time.

## 2-3. Power Purchase Agreement (PPA)

### Basic structure of PPA

- **PPA is a contract between state-owned company and a project company for the construction and O&M of a power plant.**
  - Under the PPA, **private company is obligated to construct the power plant by a certain date.** The company also have to **operate the project for a certain period of time.**
  - While **state-owned company is obligated to cooperate with the private company in construction.** It has to **purchase power from the project company for a certain period of time.**



### 1. Objective of PPA

- PPA is intended to **set a certain framework** between the state-owned company and the private company **for construction and O&M of a power plant.**
- **PPA is the sole source of revenue** for the project company. In addition, it provides a mechanism for the project company to obtain a reasonable return on the investment.
- PPA also plays a key role in **allocating risks between the state-owned company and the private company.**

### 2. Conditions Precedent (CP)

- PPA does not come into effect simply by the signing of the contract.
- Typically, **PPA has various CP in order to take effect.**
- The main conditions are as follows;
  - Achievement of financing
  - Providing performance bonds
  - Obtaining of government approvals and guarantees required for construction and O&M
  - Conducting an Environmental Impact Assessment (EIA)
  - Acquisition of easements for transmission lines, etc.

### 3. Construction of power plants

- It is common for PPA to specify milestones for the construction of a power plant and penalties for failure to meet these milestones.
- PPA also specifies the technical requirements of the facility to be constructed. For example, if the project company can not achieve the technical requirements at the performance test of completion, the facility is not considered to be completed.
- If the project company fails to meet the technical requirements even after taking the necessary measures by the deadline, the project company is obliged to pay the penalty.
- The following items are generally checked in the performance test.
  - Net Capacity Test
  - Net heat rate test
  - Reliability test, etc.

### 4. Construction of transmission line, etc.

- In general, a project company often constructs not only power plants, but also transmission lines from the power plant to the nearest National Grid (Substation). In such cases, the construction of such transmission lines will also be specified in PPA.
- As for this transmission line, the private company is reluctant to take the risk of O&M after construction.
- Therefore, the project company usually transfers these assets after the completion of the construction to the national transmission company free of charge, and then recovers the construction cost by the electricity price (tariff stipulated in PPA).

### 5. Power plant operation

- PPA includes the following items for O&M of the power plant.
  - O&M of the power plant after COD shall be conducted in accordance with grid codes, dispatch instructions, good utility practice and environmental emission standards, etc.
  - **Total outage period** (planned and unplanned outages)
  - **Penalty in case that the actual outage period exceeds the allowed outage period.**
  - **Penalty for failing to meet the specified performance standard** at the time of periodical performance test, etc.

### 6. Force Majeure

- **Force Majeure can be divided into “Natural Force Majeure ” and “Governmental Force Majeure”.**

#### Natural Force Majeure ;

- earthquakes, epidemics, fires, floods, lightning, storms, typhoons, hurricanes, tornadoes, windstorms, snowstorms, etc.
- accidents, invasions, wars, civil wars, civil disturbances, blockades, interruptions or shortages of electricity, gas, water and oil supplies, explosions, strikes, hijackings, terrorism, etc.

#### Government Force Majeure ;

- expropriation that prevent the parties from fulfilling their contractual obligations, etc.

- **The Force Majeure clause becomes applicable when the party concerned is unable to fulfill its obligations under the PPA.**
  
- **In both cases, the party that is unable to fulfill its obligation under PPA for some reason can be exempted from the legal performance obligation by making the necessary application defined in PPA beforehand.**

- **Natural Force Majeure is an event in which neither party is involved.** However, in the case of **Government Force Majeure, the government is responsible for it.** Therefore **there are usually differences in the treatment of the two events.**
  - For example, if a force majeure occurs before COD, the planned COD timing will be postponed by the period the event occurs in the case of Natural Force Majeure.
  - On the other hand, in the case of Government Force Majeure, the concept of "deemed commissioning" may be used and the government may be obliged to pay fixed electric fee (Capacity Payment) from the planned COD.
  
- **It's hard to explain the standard treatment because its treatment is different from country to country and timing of when PPA was signed.**



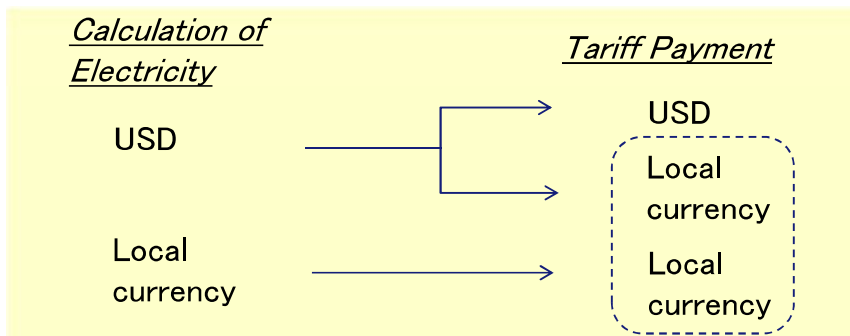
- If Force Majeure occurs and **PPA is terminated after COD**, there is usually a clause that stipulates **the government to pay termination payment** to the project company.
  - In the case of **Government Force Majeure**, the **termination payment includes not only the remaining balance of senior loan but also a certain amount of profit** of the project company. This is because the government is responsible for its occurrence in the case of Government Force Majeure.
  - In the case of **Natural Force Majeure**, **profit of the project company is not included** in the termination payment.
- Compared to Natural force majeure, **Government Force Majeure often includes conditions that are more favorable to the project company.**

### 7. Change in law

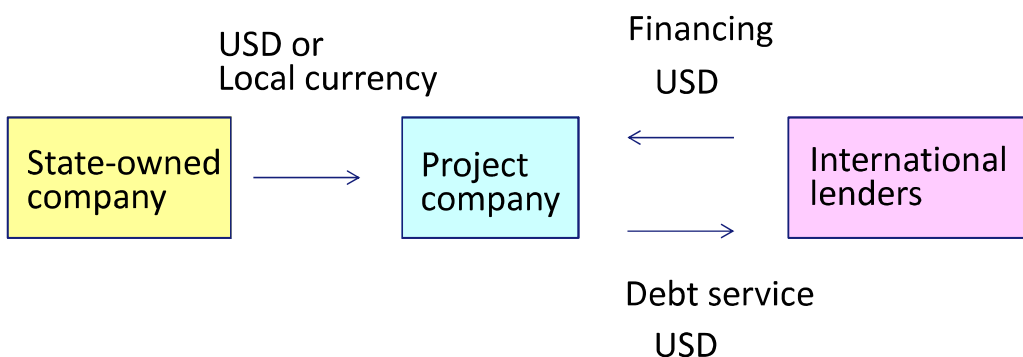
- Change in law is a concept similar to the Government Force Majeure.
- For example, Change in law is an event in which an additional costs are incurred in order for project company to comply with new environmental measures by the Government due to a change in environmental laws after PPA was concluded.
- PPA usually includes a clause stipulating that **the additional costs will be borne by the state-owned company (or government)**, since the additional costs were incurred due to the change in government policy.

**8. Payment**

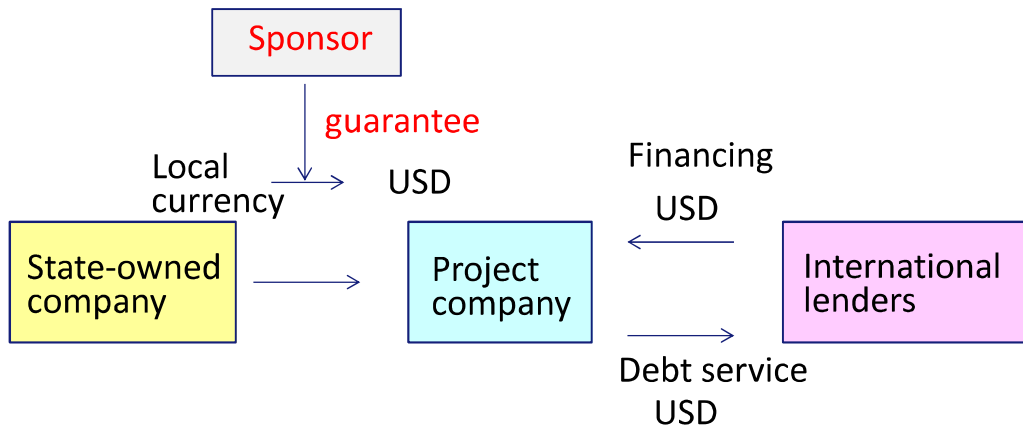
- There are 2 types of payment: **US dollar payment and local currency payment.** In case of local currency payment, there are also 2 cases of payment:
  - Case A : The electricity bill is calculated in US dollars and converted to local currency at the time of payment.
  - Case B :The electricity bill is calculated in local currency and paid in local currency.



- In the case of large project, a project company usually borrows money in US dollars from financial institutions and purchases equipment in US dollar.
- In such cases, **it is difficult for International lenders to lend money on PF basis** since there is the risk that receiving electricity tariffs in the local currency will be less than the repayment amount after conversion into US dollars at the worst case.



- In order to borrow money from International Lenders to such project on PF basis, the first way that come to mind is to provide a guarantee from the sponsor to the international lenders against the convertibility risk from local currency to US dollars. However, it is usually not easy for the sponsor to provide such guarantee.



- This is one of the major issues for the project to receive the electricity bill in local currency.

### 9. Insurance

- State owned company usually requires project company for being properly insured by PPA. The main insurance requirements are as follows;
  - Construction
  - Machinery Breakdown
  - Business interruption insurance
  - Third Party Liability
  - Marine Cargo insurance
  - Employers Liability insurance, etc.

### 10. Term

- The term should be long enough to allow for payment of debt service and for the sponsor to earn a reasonable return.
- The period usually runs from a predetermined start date (signing date of PPA, for example).
- Extension of the contract period may be granted due to force majeure.

### 11. Termination

- The PPA also contains the terms and conditions for termination. **The terms and conditions for termination of PPA are different depending on the reason** why the termination is occurred.
  - In case of State owned company's default, it must purchase the power plant.
  - In case of Project Company's default, the state owned company has option to buy the power plant.
- **The purchase price also depends on the reason.** If it is a state owned company's default, the purchase price will be the amount that covers the outstanding debt and return on investment.

### 12. Governing Law

- In many countries, the governing law tends to be the law of the country.
- However, if a project company is intend to borrow money from international lenders, at least, dispute resolution shall be solved base on the international standard such as Singapore arbitration rules for dispute resolution even if the governing law for the PPA is local law.

## 2-21. Conclusion of this Chapter

### Conclusion

- The PPA is the only revenue contract for the project company among many project documents.
- The purpose of this Chapter is to give you a general understanding of PPA.
- The penalties clause of tariff may affect revenues. However it is basically not necessary to consider the terms and conditions in the event of a force majeure, termination payments, penalties, etc. when evaluating the financial model for the base case.

## Chapter3: Tariff structure

### 3-1. Tariff structure

- The tariff structure in PPA is very complex. However it is important to make sure that this tariff mechanism is accurately included in the Financial model.
- The Financial model sometimes uses functions and macros, therefore Excel knowledge is also required.
- The following is a general tariff structure.

➤ The tariff structures are generally different depending on the technologies.

◆ Gas, Coal ( 2 part tariff )

Capacity Charge : fixed

Energy Charge: variable

◆ Hydro, Wind

Variable Charge only

- A Gas (or Coal) fired tariff generally consists of 2 parts.
  - Capacity Charge (Fixed capacity payments)
  - Energy Charge (Variable energy payments)
  
- Capacity Charge guarantees the project company a minimum income to cover fixed costs.
  
- This allows the project company to recover the fixed cost of construction, fixed O&M costs, Debt service requirements and Return on investment to the project company as long as the power plant is available for operation.

- If the project company is able to maintain the availability as stipulated in PPA, the full amount will be paid.
  
- On the other hand, if the project company can not maintain the availability, the amount of Capacity Charge will be reduced.
  
- The amount of this reduction is set larger in peak periods than in off-peak periods.

- In some case, the state-owned company puts a penalty instead of a reduction in order to compensate the cost of procuring alternative power from third party resources.
  
- In addition, when a power plant supplies too much power to the grid, the state-owned company is generally entitled to take it for free as a penalty.

- Once PPA is signed, the Capacity Charge is not usually adjusted for the reasons below.
  - Unexpected increase in construction costs (Cost overrun)
  - Unexpected increase in O&M costs
  - Unexpected increase in financing costs
  
- Even if the above occurs, the tariffs will not be changed. So, the project company's profits will deteriorate. This means that the project company is taking the above risks.



- Some or all of the Capacity Charges may be adjusted in response to changes in the following;
  - Inflation (i.e., if CPI increases and labor or raw materials costs increases, an adjustment may be allowed.)
  - Foreign Exchange (Adjustments may be allowed for the following foreign exchange fluctuations that affect the project.)
    - EPC costs of local currency
    - Fixed O&M costs of local currency, etc.

- Energy Charge covers the variable costs such as fuel cost and variable O&M costs.
- Energy Charge is generally calculated based on :
  - the assumed cost of fuel
  - the heat rate or thermal efficiency of the plant
  - the agreed level of variable O&M costs
- The reference to Heat rate is the amount of fuel required to produce a unit of electricity.

- The following are some of the adjustments that are allowed in Energy Charge.
  - Changes in Fuel cost
  - Variable O&M costs
  
- Fuel cost adjustment is conducted by referring the actual fuel costs based on long-term offtake contracts. (Cost Pass-through)

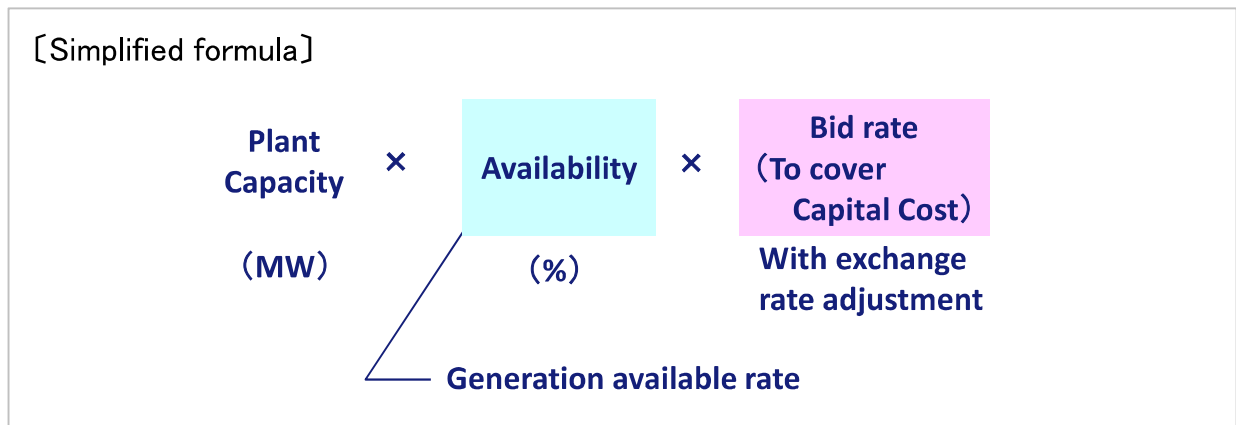
### 3-9. Sample Tariff Structure

- Tariffs are traditional 2 parts structure.
  - Capacity charge : to cover Capital Cost, Fixed O&M, Fixed costs such as Debt service and equity return
  - Energy charge : to cover Fuel costs and variable O&M costs
  
- To be more specific, there are 5 components.

Category	Components	items	
Capacity Charge	A	Capital Cost Recovery Charge	[ ] USD/kWh
	B	Fixed O&M Cost Recovery Charge	[ ] USD/kWh
	E	Transmission Cost Recovery Charge	[ ] USD/kWh
Energy Charge	C	Fuel cost	[ ] USD/kWh
	D	Variable O&M Cost Recovery Charge	[ ] USD/kWh
Total (A+B+C+D+E)			[ ] USD/kWh

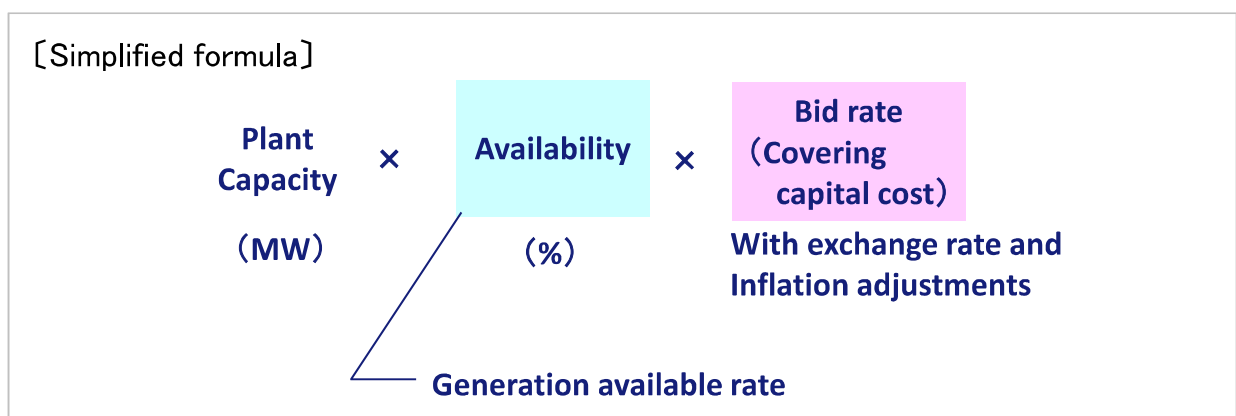
■ Component A :

- Name : Capital Cost Recovery Charge
- Payment target : Power plant construction costs
- Calculation method :  
(based on Plant Capacity and Availability)



■ Component B :

- Name : Fixed O&M Cost Recovery Charge
- Payment target : Fixed O&M costs
- Calculation method :  
(based on Plant Capacity and Availability)



■ Component C:

- Name : Fuel cost
- Payment target : Fuel cost
- Calculation method :  
(based on actual Plant dispatch amount)

[Simplified formula]

$$\begin{array}{c}
 \text{Amount of electricity sold} \times \text{Bid Fuel Price} \times \text{Actual heat rate} \div \text{Bid heat rate} \\
 \text{With exchange rate and Inflation adjustments}
 \end{array}$$

■ Component D:

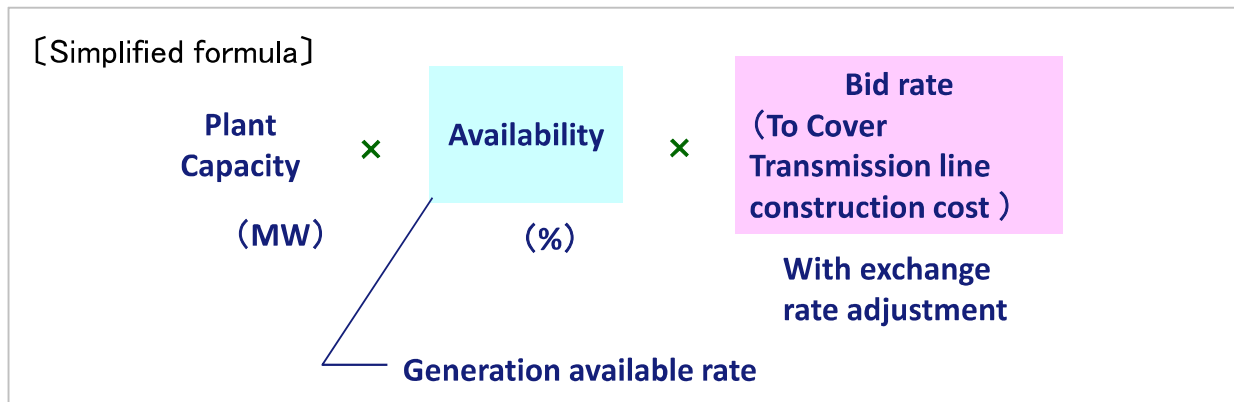
- Name : Variable O&M Cost Recovery Charge
- Payment target : Variable O&M costs
- Calculation method :  
(based on actual plant dispatch)

[Simplified formula]

$$\begin{array}{c}
 \text{Bid rate (To Cover variable O\&M costs)} \times \text{Amount of electricity sold} \\
 \text{With exchange rate and Inflation adjustments}
 \end{array}$$

■ Component E :

- Name : Transmission Cost Recovery Charge
- Payment target : Transmission line construction cost
- Calculation method :  
(based on Plant Capacity and Availability)

Conclusion

- In case that you feel the tariff in the FS submitted by a company is too high, **it is important to understand which specific part of the tariff is high.**
- **By analyzing the causes of the high tariffs and discussing with the company why the tariffs are so high, both parties can have a sense of satisfaction with the FS.**

## Chapter4: Financing (Outline of Financing and Corporate finance, etc.)

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### 4-1. Confirmation of financial conditions

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- Private companies generally borrow the necessary funds for the project from financial institutions
- There are two main methods of borrowing funds:
  - ① Corporate finance, ② Project finance

#### Sample: Income Statement and IRR Calculation

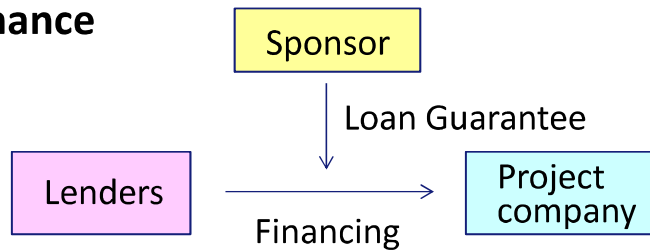
Income Statement and IRR Calculation							
	2021	2022	2023	2024	2025	2026	2027 ...
Revenue	0	0	0	77	77	77	77
Cost	0	0	0	65	65	64	64
Total profit	0	0	0	12	12	13	13
Tax	0	0	0	2.4	2.4	2.6	2.6
Net profit after tax	0	0	0	9.6	9.6	10.4	10.4
Repayment of remaining loan principle	0	0	0	8	8	8	8
Dividend	0	0	0	1.6	1.6	2.4	2.4
Total investment	260	55	155	50			
Equity	78	16.5	46.5	15			
Loan	182	38.5	108.5	35			
Finance cost	7%						
IRR on Equity	12%						

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■ Corporate finance is the finance that relies on the credibility of Sponsor.

### ➤ Corporate finance

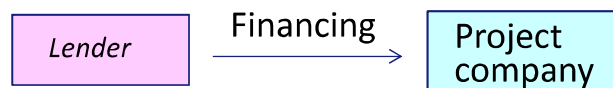


- Borrower : Project company
- Lender's evaluation target : Financial condition, rating, financial ratios of Sponsor
- Loan amount : Depends on credibility of Sponsor
- Yield : Low
- Debt protection : Unsecured
- Lender's risk : Bankruptcy of Sponsor
- Negotiation period : Short

## 4-3. Corporate finance and Project finance (2/2)

■ Project finance is the finance in which the primary source of repayment is the cash flow of a specific project and the collateral is also limited to the assets of the project.

### ➤ Project finance



- Borrower : Project company of a particular project
- Lender's evaluation target : Economic viability of the project, ability to repayment, a lot of Covenants
- Loan amount : Depends on the project
- Yield : High
- Debt protection : Collateral for all assets
- Lender's risk : Bankruptcy of the Project company
- Negotiation period : Long

### Evaluation methods

- The evaluation methods by financial institutions can be broadly divided into as follows;

- **Qualitative analysis**

To analyze and evaluate a thing using qualitative data.

- **Quantitative analysis**

To analyze and evaluate something using numerical data.

- Even if a project company borrows money from financial institutions for a particular project, the repayment obligation will be borne by the Sponsor in case of the project company's bankruptcy.
- Therefore, the financial institutions will check the credibility of the Sponsor and lend money on the conditions that match the credibility of the Sponsor.

## 4-5. Qualitative analysis (1/7)

### [ Key points in credit analysis by financial institutions ]

#### 1. Comprehensive status of the company (Sponsor)

- Background of the company, business history, main business and characteristics.
- Market, business environment and future prospects of the market to which the company belongs.
- The characteristics of the company's main products and services, performance, customer and the company's future business development.
- Ability to continue and expand its business and ability to generate profits in the future, etc.



### 2. Business strategy

- The financial institution evaluates whether the company has a reasonable business strategy that is appropriate for the business environment.
- Financial institution also checks the business strategies from the point of how the company intends to grow in the medium to long term.

### 3. Adaptability to external shocks

- Financial institution checks whether a company's business is susceptible to fluctuations in the economy, exchange rates, interest rates and market conditions, etc.
- It also checks whether appropriate counter measures are in place to mitigate these negative effects and how the company has responded to such external shocks in the past.

### 4. Regulation and protection

- The Financial Institution analyzes the legal and regulatory framework of the country in which the Sponsor is located.
- In addition, the financial institution evaluates the future prospects of various regulatory, protective and preferential measures for the company's business, etc.

### 5. Support by parent company or major shareholders

- In case that the Sponsor has a parent company or major shareholders, financial institutions check whether the Sponsor has the potential to receive support from them and whether it has received such support in the past.
- In addition, even if the Sponsor does not have such a track record, the financial institution will check the possibility, level and specific mechanism of the support, if any.

### 6. Disclosure level of information

- The extent to which information is disclosed and whether it is disclosed in a timely manner are also checked by Lenders.
- In addition, whether or not financial statements are disclosed and under which accounting standards the financial statements are prepared also be checked by Lenders.

### 7. Capacity to raise funds

- It is important for the financial institution to make sure that a Sponsor can borrow money in a stable manner when it's necessary.
- If a company has already borrowed money from lenders, the financial institutions confirm whether the company has been financed by a variety of banks and also those financial conditions.

- Quantitative analysis is the analysis using numerical values of financial statements of company (Sponsor).

◆ There are 4 main analysis types.

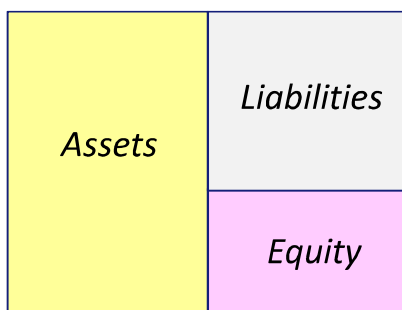
- Profitability analysis
- Productivity analysis
- Safety analysis
- Growth potential analysis

## 4-13. Basics of Accounting

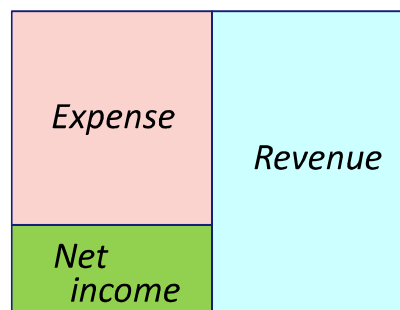
### [ Financial Analysis ]

- Accounting considers all transactions as classified into 5 elements. (assets, liabilities, equity, income and expense)
- The relationship between assets, liabilities and so on is represented as follows;
  - The total Assets is the total of Liabilities and Equity.
  - The difference between Revenue (income) and Expense (loss) is Net income (or Net loss in the negative case).

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$



$$\text{Revenue} - \text{Expense} = \text{Net income (Net loss)}$$



- A Balance Sheet is an accounting document that summarizes how a company collects money and what it spends on.
- The Balance Sheet allows us to understand the state of the company on a particular date.

Sample Balance Sheet

Assets		Liabilities	
Current assets	← [A]	Current liabilities	← [B]
● Cash and cash equivalents	× × ×	● Short-term debt	× × ×
● Inventories	× × ×		
● Other current assets	× × ×	Fixed liabilities	
		● Long-term debt	× × ×
Fixed assets		Shareholders' Equity	× × × ← [C]
● Tangible fixed assets	× × ×		
● Intangible assets	× × ×		
<b>Total</b>	× × ×	<b>Total</b>	× × × ← [D]

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- The Income Statement shows the "results of business" for a certain period of time.

Sample Income statement

Sales	[ × × × ]	← ①
Cost of goods sold	× × ×	
Gross profit	[ × × × ]	← ②
Operational expenses	× × ×	
Salaries	× × ×	
Depreciation	× × ×	
Operating income	[ × × × ]	← ③
Other income (expenses)	× × ×	
Interest income	× × ×	
Interest expense	× × ×	
Income before income tax	× × ×	
Net income	× × ×	

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## 1. Profitability analysis

- Profitability analysis is a method for measuring a company's ability to generate profits.

Indicator	Calculation Formula	Summary
Gross profit to Sales ratio	Gross profit / Net sales ( ② / ① )	<ul style="list-style-type: none"> <li>✓ It measures the profitability of a product or products.</li> <li>✓ Also known as gross profit margin</li> </ul>
Operating income to Net sales ratio	Operating income / Net sales ( ③ / ① )	<ul style="list-style-type: none"> <li>✓ It measures the sales force of a company.</li> </ul>

## 2. Productivity analysis

- Productivity analysis is an analysis of how much of the management resources (such as people and goods, etc.) that have been invested have led to results.

Indicator	Calculation Formula	Summary
Labor productivity	Value added / Number of employees  <i>*Value added = Net sales - External procurement cost</i>	<ul style="list-style-type: none"> <li>✓ It measures how much profit each employee has made.</li> <li>✓ It is evaluated that the higher this number is, the more effective the utilization of human resources is.</li> </ul>

### 3. Safety analysis

- Safety analysis is a method of assessing the risk of bankruptcy based on a company's ability to pay its expenses and so on.

Indicator	Calculation Formula	Summary
Equity ratio	Shareholders' equity / Total assets ( [C] / [D] ) <i>*Shareholders' equity = Net assets - Stock acquisition rights - Non-controlling interests</i>	✓ to check the safety of business.
Current Ratio	Current assets / Current liabilities ( [A] / [B] )	✓ to analyze short-term solvency.

### 4. Growth analysis

- Growth analysis is an analytical method to measure how much a company is growing based on changes in sales and total assets, etc.

Indicator	Calculation Formula	Summary
Net sales growth rate	(Current year's sales - previous year's sales) divided by previous year's sales	✓ It measure the amount of sales growth compared to the previous year.
Ordinary income growth rate	(Current year's ordinary income - prior year's ordinary income) divided by Prior year's ordinary income	✓ It measure how much ordinary income has increased compared to the previous year.

### [ Type of analysis ]

- There are 2 types of calculation methods used in financial statement analysis:

- ① **Ratio analysis**, ② **Real number analysis**

- Ratio analysis is a method of analysis in which various ratios are calculated based on the numerical values of financial statements.

- ※ *productivity analysis, safety analysis, and growth analysis are this ratio analysis.*

- Actual number analysis is a method of calculation using the numerical amounts of sales, expenses, etc. in financial statements.

- ※ *Sales and profit increase / decrease analysis, cost variance analysis, current balance analysis, cash flow analysis*



## Chapter5: Financing (Project finance)

### 5-1. Project finance

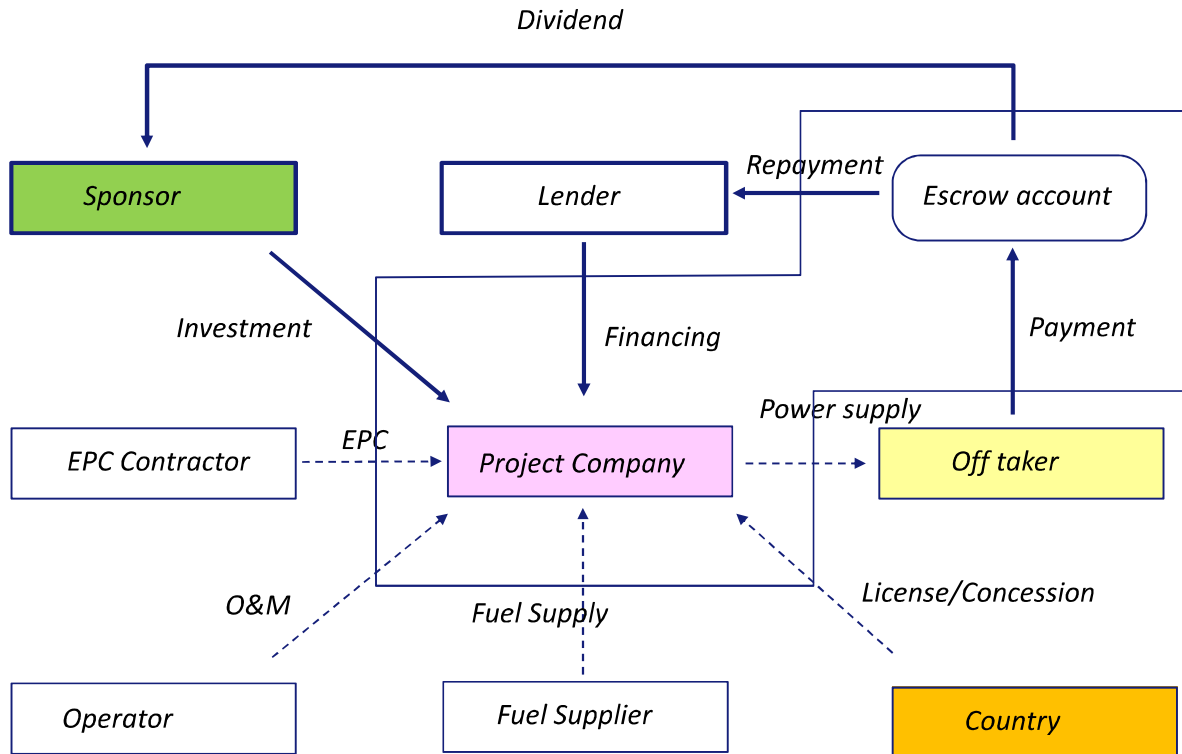
■ **Project finance is the finance in which the primary source of repayment is the cash flow of a specific project and the collateral is also limited to the assets of the project.**

#### [ Major characteristics ]

- Tailor-made for each project.
- Project company have to accept various legal and economic restrictions.
- Limited recourse from the lender to the sponsor.
- Borrowings are structured to be repaid in full (full payout) within a pre-determined business period (PPA period).

## 5-2. Relationship diagram of the parties involved

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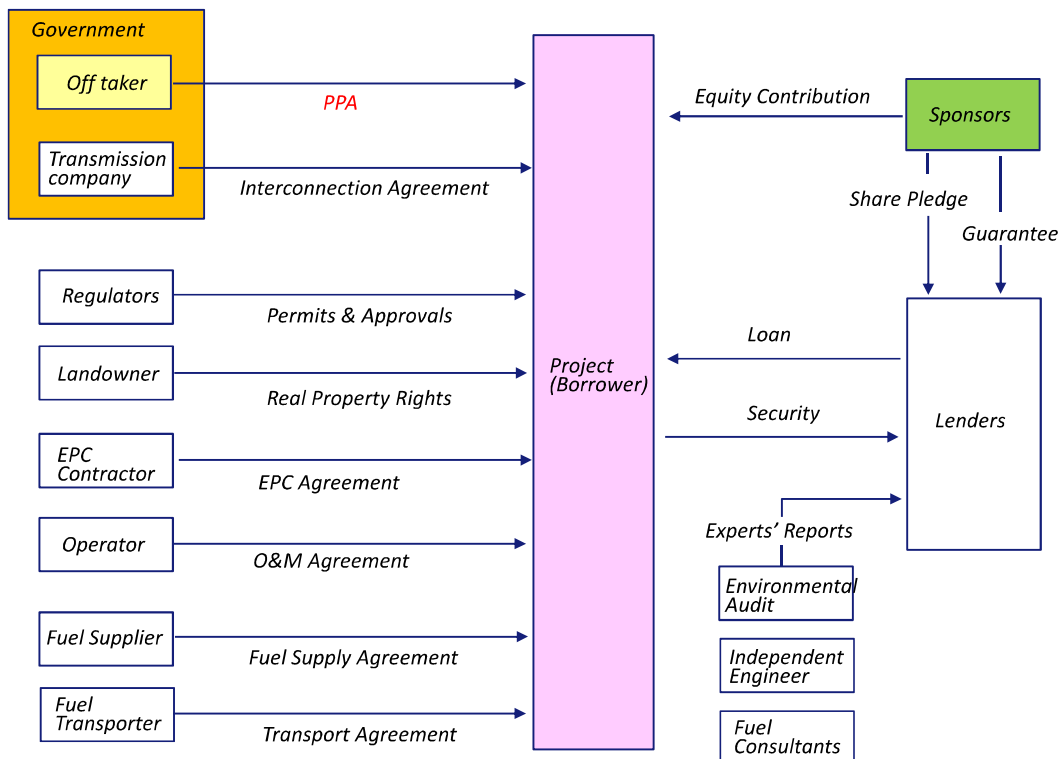


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## 5-3. Main contracts to be concluded with each party

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## 5-4. Key risks [Lenders' Perspectives] (1/2)

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Major Risks	Key Points
1. Sponsor	✓ Project execution capability (Construction capability, O&M capability, Financial credibility, etc.)
2. Construction	<ul style="list-style-type: none"> <li>✓ Confirmation that the project will be constructed as planned (on time, budgetary, etc.)</li> <li>✓ Track record of Contractor (construction management capability, financial capability, etc.)</li> <li>✓ Validity of the budget and contract, etc.</li> </ul>
3. Technology	✓ Proven technology or not
4. O&M	✓ Realistic and appropriate O&M organization or not, etc.
5. Environmental Impact Analysis	✓ Environmental and social considerations being made appropriately or not.

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## 5-5. Key Risks and Lenders' Perspectives (2/2)

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Major Risks	Key Confirmation Points
6. Fuel	✓ Fuel procurement risks
7. Insurance	<ul style="list-style-type: none"> <li>✓ Probability of accidents and disasters</li> <li>✓ Appropriateness of insurance policies for such accidents and disasters.</li> </ul>
8. Political risk	<ul style="list-style-type: none"> <li>✓ Track record of political risk event</li> <li>✓ Appropriateness of the contracts and structure, etc.</li> </ul>
9. Related infrastructure	✓ The risks associated with the construction and continued use of the related infrastructure required for the project.
10. Off-take	✓ The risk by the off-takers

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### [ EPC contractor's capability ]

- Lenders check the credibility of the EPC contractor and its construction experience of similar power plant in the past. (construction management capability, financial capability, etc.)

### [ Construction cost ]

- Lenders check that proper construction costs including proper contingency are included in the assumption (Financial model).

### [ EPC Contract ]

- Lenders check that delay risk in completion or failure to achieve performance test appropriately passed to EPC contractors by penalties (Liquidated Damage) in the EPC contract.

### 1. Conditions

- Lenders check whether the EPC contract is Lump Sum and Date Certain and so on.
- If not, lenders check whether the risk is properly taken by the appropriate parties and the possibility of default is low.

### 2. Terms of contract

- Lenders check whether the contract terms are reasonable in terms of technical, financial and construction schedule.
- The lender also confirm that the construction period is consistent with the PPA.

### 3. Contractual structure

- Lenders check if the EPC contract is Single Point Responsibility.
- If the contract is divided, lenders will check that there is no risk at the interface between each EPC contract.

### 4. Liquidated Damage

- Lenders check the level of Liquidated Damage(LD).
- Lenders confirm that the level of LD is appropriate in light of industry standards.
- In addition, Lender checks if the LD of the PPA is a pass-through to the LD of the EPC contract and it covers the additional cost.

- Lenders make sure that the technology used has a proven track record and that there are no reliability issues.  
(proven technology)

### [ Credibility of Fuel supplier ]

- Lenders check whether there is no problem in the ability of the fuel supplier to fulfill its fuel supply obligations from the viewpoint of quality and quantity, including reserves.

### [ Fuel supply disruption risk ]

- In case that fuel is imported, the risk of export restrictions by fuel producing countries should also be confirmed.
- In this case, the possibility of alternative supply and the additional cost are necessary to be discussed.

### 1. Term of Fuel supply contract

- Lenders check that the fuel supply contract covers the period that the contract term is necessary for the project company to continue its business.

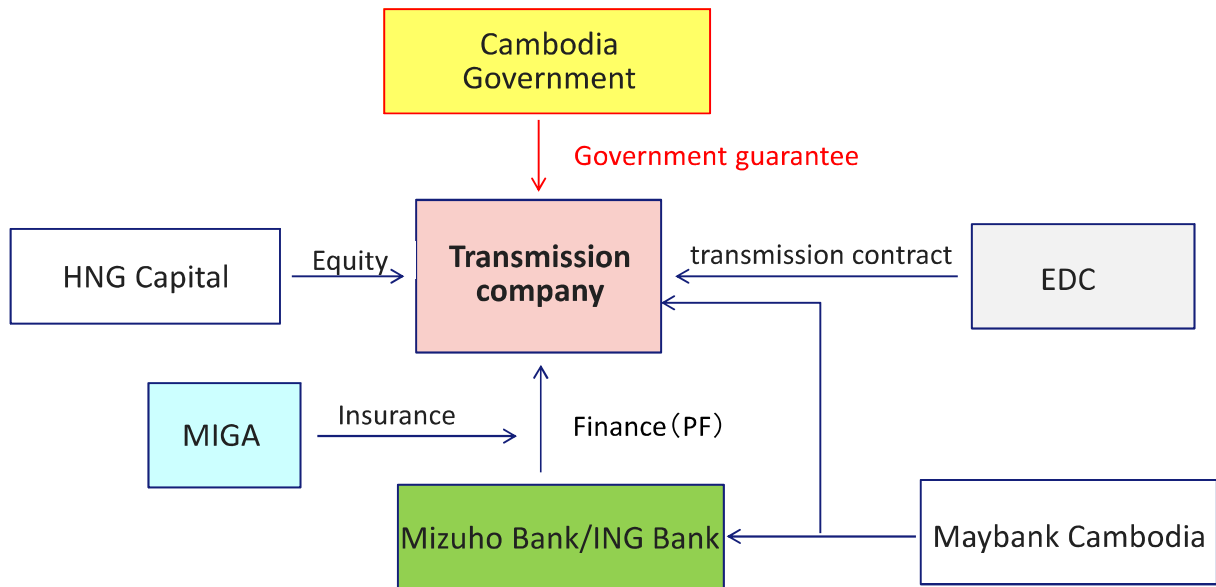
### 2. Fuel price

- Lenders also check that the price is reasonable and that the PPA and the fuel supply contract have the same conditions.
- If the conditions are different, Lenders check if there is a possibility that the project company will take the risk and not be able to repay the debt service.

### 3. Minimum off-take obligation

- If a minimum off-take obligation is imposed to the project company, the lender make sure who will bear the additional costs arising from the non-fulfillment of the minimum off take obligation if any of the following events occur.
  - Unexpected event such as Force Majeure, etc.
  - Grid authority does not issue dispatch orders to the project company that are required to use the minimum offtake amount of fuel.

- In March 2020, Mizuho Bank provided project finance to the power transmission and substation project with ING Bank.  
(Total loan amount:US\$55 million, loan period: 10 years)



Source: Compiled based on press materials

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### [ Major coverage items ]

- Guarantee of the obligation of the state-owned company to fulfill the obligations of the PPA.
- Guarantee of the electricity tariff form local currency to USD
- Exchange rate fluctuation

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### [ Off-taker's credibility ]

- Lenders checks the credibility of Off-taker through financial analysis and external ratings in order to ensure that the Off-taker has sufficient capability to continue to purchase electricity during PPA period.
  
- If the credibility is not sufficient, a government guarantee is required.

## Chapter6: Others

- In case of PF, Lenders impose a number of covenants. The major items are as follows.

### [ Affirmative covenants ]

- Submission of financial documents and business reports, etc.

### [ Negative covenants ]

- Prohibition of disposal of assets and providing collateral to a third party.
- Restriction to change the contracts that may have a material impact on the project without the lender's consent.

## 6-2. Financial covenants

- Maintain DSCR

$$\text{DSCR} = \frac{\text{CFADS}}{\text{Debt service}}$$

- It indicates how many times the Cash flow before Debt service (CFADS) payment for each fiscal year is equal to the amount of Debt service payment required for that year.
- Lenders usually require that the ratio be maintained above a certain level.

**D/E ratio = Interest bearing debt / Shareholders' equity**

- In general, the company constructs the power plant by borrowing money from lenders.
- This ratio is called Debt to Equity ratio (D/E ratio).
- The debt amount is determined by the lender on a project-by-project basis from the perspective of debt protection.
- PPA projects tend to be able to borrow more than merchant projects.

Thank you

## 【General guideline for analysis】

	Indicator	Summary
<b><u>Safety analysis</u></b>	Equity ratio	<ul style="list-style-type: none"> <li>✓ The higher the percentage, the safer it is, but if it is too high, financial efficiency suffers.</li> <li>✓ More than 50% is healthy, more than 20~30% is desirable, 15% is average for Japanese small and medium-sized enterprises.</li> </ul>
	Current Ratio	<ul style="list-style-type: none"> <li>✓ The lower the percentage, the safer it is, but if it is too low, financial efficiency is poor.</li> <li>✓ Less than 100% is healthy.</li> </ul>
<b><u>Profitability analysis</u></b>	Gross profit to Sales ratio	✓ The higher, the better.
	Operating income to Net sales ratio	✓ The higher, the better
<b><u>Productivity analysis</u></b>	Labor productivity	✓ The higher, the better
<b><u>Growth analysis</u></b>	Net sales growth rate	✓ Well-balanced growth is good.
	Ordinary income growth rate	✓ Well-balanced growth is good.