



Overview of financing energy projects

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Romel M. Carlos
COGEN 3 Financial Advisor



TYPES & SOURCES OF FINANCING

Stage	Type & Source of Financing
Pre-investment and development costs	Risk capital from project sponsors
Bidding and procurement	Risk capital from project sponsors
Financial structuring and development of security package	Equity capital from project sponsors
Agreements with institutional and other investors	Equity capital from institutional and other investors
Agreements with equipment suppliers	Long-term loans from ECA for equipment purchase

Source: UNIDO BOT Guidelines, 1996



TYPES & SOURCES OF FINANCING

Stage	Type & Source of Financing
Agreements with lead contractor and sub-contractors on cost of construction	Short-term loans from commercial banks to finance construction
Financing re-structuring as completion of construction approaches	Long-term loans from non-bank financial institutions and specialist investment funds
Financial closing Start of construction	Draw-down of equity and loan funds
Operation	Working capital from project company and short-term loans from commercial banks

Source: UNIDO BOT Guidelines, 1996



EXISTING FINANCING SCHEMES (1)

System	Scope	Financing options/Schemes
<p>Small-scale/Non-grid</p>	<ul style="list-style-type: none"> ● Solar home systems ● Small wind power systems & hybrid solar/wind/diesel systems that have no associated distribution network ● Pico- and micro-hydropower ● All energy system with capacity less than 1 MW ● Small EE projects 	<p>Should develop innovative financial mechanisms; seek assistance for capacity building.</p> <ul style="list-style-type: none"> ● Self-financing ● On-balance sheet ● Micro-credit ● Grant/subsidy ● RESCO/ESCO ● Leasing ● First-cost subsidies & lower import duties ● Mortgage financing ● Vendor credit ● Dealer credit ● Financial bundling



EXISTING FINANCING SCHEMES (2)

System	Scope	Financing options/Schemes
<p>Medium-scale/Isolated-grid/Grid-connected</p>	<ul style="list-style-type: none"> ● Mini-hydropower ● Biomass gasifiers & cogeneration systems ● Wind/diesel/solar hybrids & other medium-scale energy systems in the range of 1-15 MW ● Larger EE projects 	<p>Should use innovative financing mechanisms, while exploiting the benefits of financing schemes applied to conventional energy.</p> <ul style="list-style-type: none"> ● On-balance sheet ● Equity financing ● Venture capital ● Project finance (ltd. recourse) ● Corporate guarantee ● Grant/subsidy ● RESCO/ESCO ● Leasing ● Vendor credit ● Targeted project credit ● Financial bundling





EXISTING FINANCING SCHEMES (3)

System	Scope	Financing options/Schemes
Large-scale/Grid-connected	<ul style="list-style-type: none"> All energy systems with capacity greater than 15 MW 	<p>Should operate within the same financing rules applied to conventional energy projects.</p> <ul style="list-style-type: none"> Project finance (limited/non-recourse) Venture capital Multilateral lending ECAs Political risk guarantee Bonds issuance Refinancing

➤ *Despite the existence of the foregoing mechanisms, there is still a dearth of examples of projects that have been financed in a more sustainable way, i.e., on a purely commercial basis without full recourse to the sponsors.*



COGEN 3 FSDPs in ASEAN



CAMBODIA
Angkor Kasekam Roongroeng Co. Ltd.
 1.5 MW rice husk-fired cogeneration plant

MALAYSIA
Bell Thermal Power Sdn. Bhd.
 6 MW cogeneration plant using oil palm empty fruit bunches (EFBs), shells & fibers as fuels

BB Biogas Sdn. Bhd.
 1.5 MW cogeneration plant using biogas produced from palm oil milling effluent (POME)

Bumi Biopower Sdn. Bhd.
 6 MW cogeneration plant using oil palm EFBs and shells as fuels

ENCO Energy Sdn. Bhd.
 0.5 MW cogeneration plant using wood waste & oil palm pressed fibre as fuels

Kelang Beras Co., Titi Serong Sdn. Bhd.
 1.5 MW rice husk-fired cogeneration plant

Kumpulan Guthrie Berhad
 2 MW cogeneration plant using oil palm fibres and shells as fuels

TSH Bio-Energy Sdn. Bhd.
 14 MW cogeneration plant using oil palm EFB as fuel

THAILAND
Dan Chang Bio-Energy Co., Ltd.
 41 MW sugarcane bagasse-fired cogeneration plant
Karoon Farm Biogas
 0.3 MW cogeneration plant using biogas produced from pig manure
Phu Khieo Bio-Energy Co., Ltd.
 41 MW sugarcane bagasse-fired cogeneration plant
Rayong Municipality
 0.6 MW landfill gas-fired cogeneration plant

PHILIPPINES
La Suerte Rice Mill
 1 MW rice husk-fired cogeneration plant

SINGAPORE
Bee Joo Industries Pte. Ltd.
 1 MW wood waste-fired cogeneration plant

ECO Special Waste Management Pte. Ltd.
 0.5 MW wood waste-fired cogeneration plant

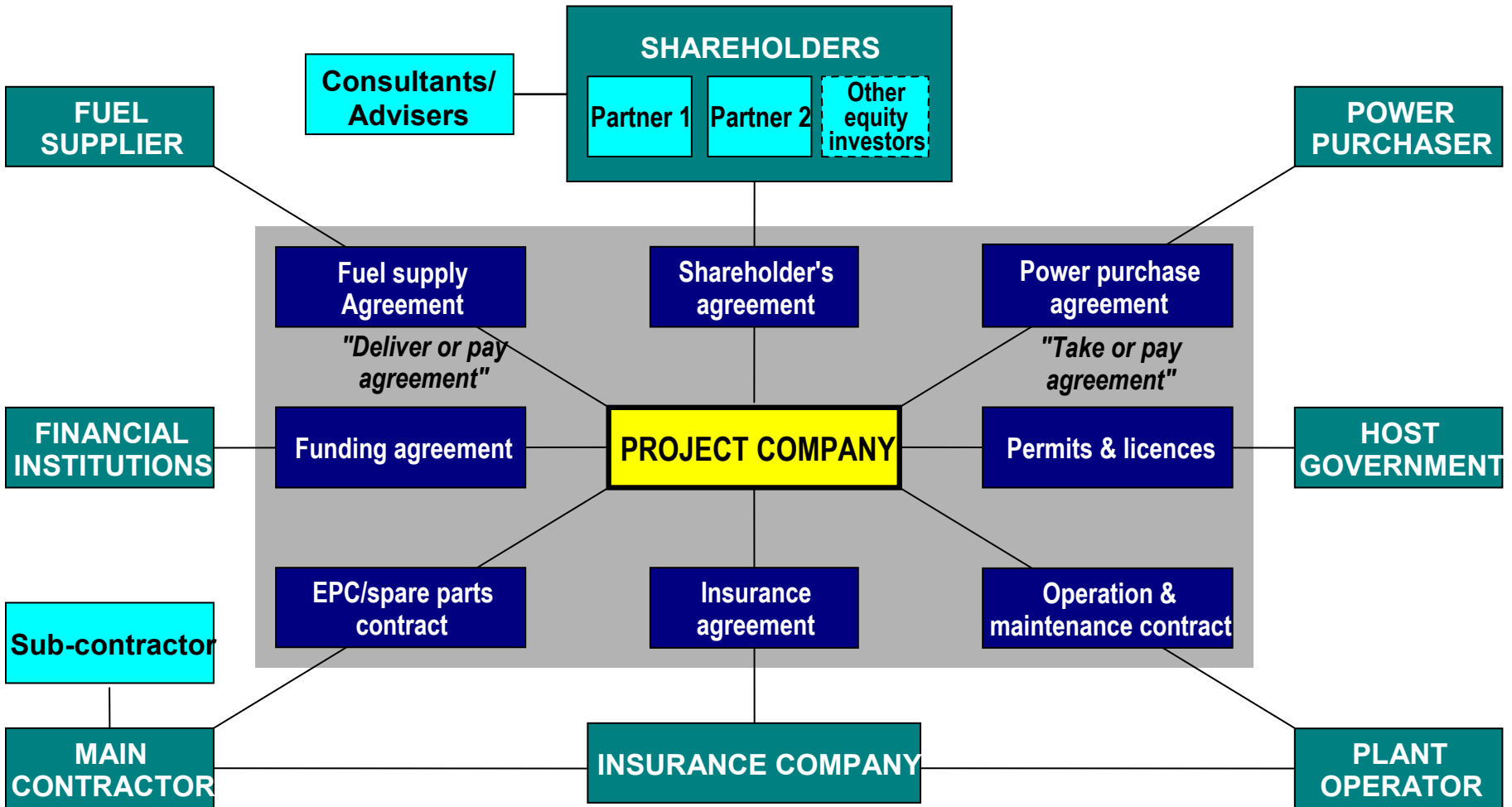
INDONESIA
PD. Gadasera
 4.2 MW rice husk-fired cogeneration plant

PT Ecco Indonesia
 1.2 MW cogeneration plant using waste from tanning process





STAKEHOLDERS





OVERVIEW OF FINANCING TRENDS

Corporate loan or On-balance-sheet financing

Mechanism/Structure:

- Project sponsor takes out the loan to finance the project
- Loan is reflected on the balance sheet of the sponsor

Conditions/Security arrangement:

- Acceptable D/E ratio
- Collateral/guarantee to cover the amount of the loan

Documentation:

- Documents related to the creditworthiness of the sponsor

Advantages:

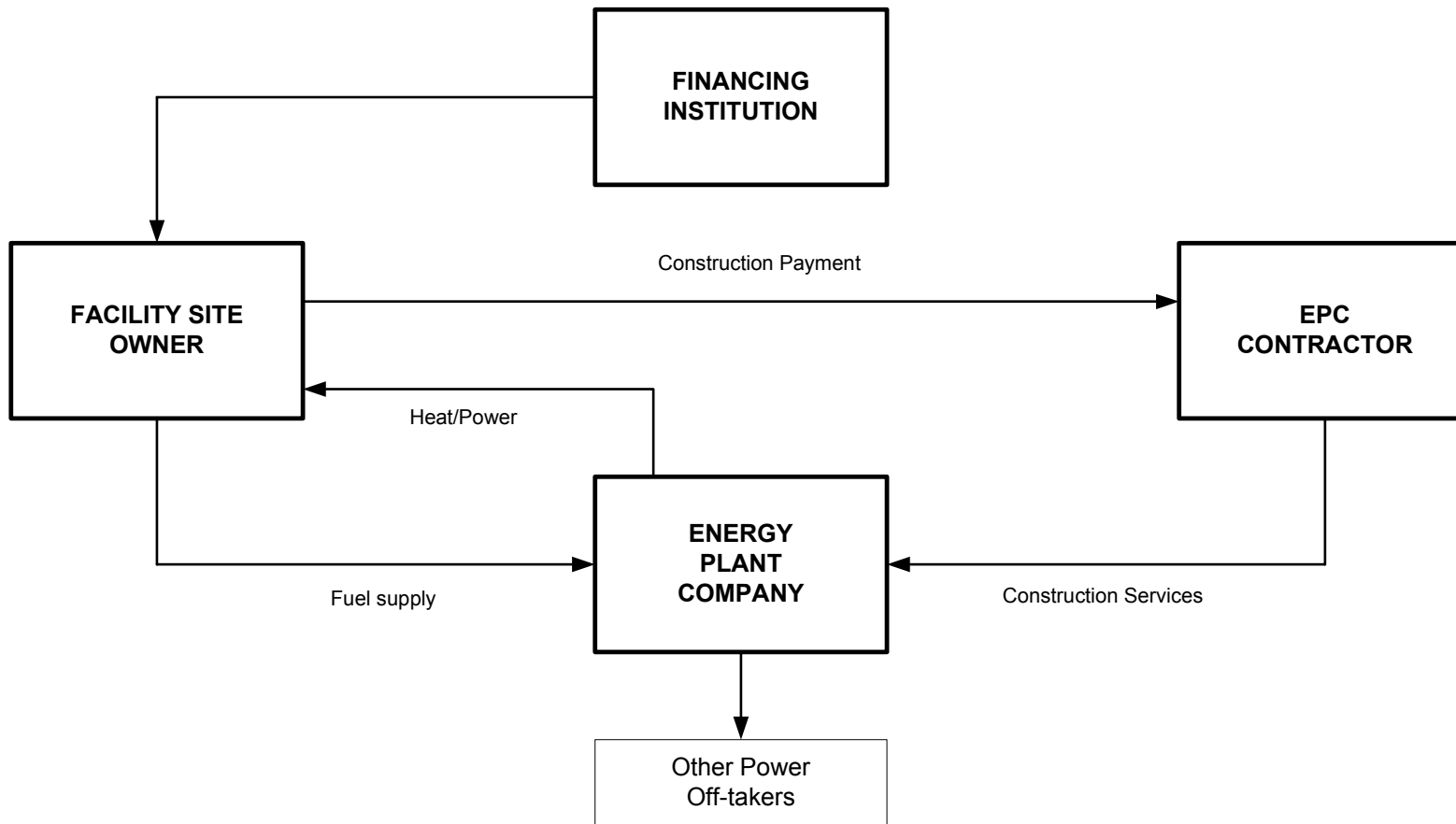
- Can be arranged quickly if conditions are met
- Simple documentation and security arrangements

Disadvantages:

- Risks are mainly carried by the sponsors
- Loan increases the debt burden on the balance sheet of the sponsors
- Likely to be used only by strong corporate sponsors
- Repayment periods are not long (normally < 10 yrs)



On-Balance-Sheet Financing Model Facility Owner-Operated and Financed





OVERVIEW OF FINANCING TRENDS

Project finance

Mechanism:

- Special purpose company takes out the loan to finance the project
- The source of debt service (interest & principal) is primarily the cash flow from the project
- Lending entity has no or limited recourse to the sponsors

Conditions:

- Acceptable D/E ratio
- Fuel supply security
- Established viability on reliable cashflow projections
- Acceptable debt service coverage ratio

Typical structure:

- Strong involvement of local banks
- Use of both Thai Baht and foreign currency tranche
- Maturity of >10 years



OVERVIEW OF FINANCING TRENDS

Project finance (cont.)

Security arrangements:

- Assets pledged as security to the bank
- Assignment of contracts to the bank (PPA, SSA, etc.)
- Covenants related to shareholding structure, issuance of dividends, additional loan
- Accounts pledged to the lenders
- Construction guarantee
- Partial guarantee

Documentation:

- Information memorandum
- Contracts (PPA, SSA, EPC, FSA, EIA)



OVERVIEW OF FINANCING TRENDS

Project finance (cont.)

Advantages:

- Minimum risk carried by the sponsors
- Loan does not appear on the balance sheet of the sponsor
- Long maturity of loan possible to achieve

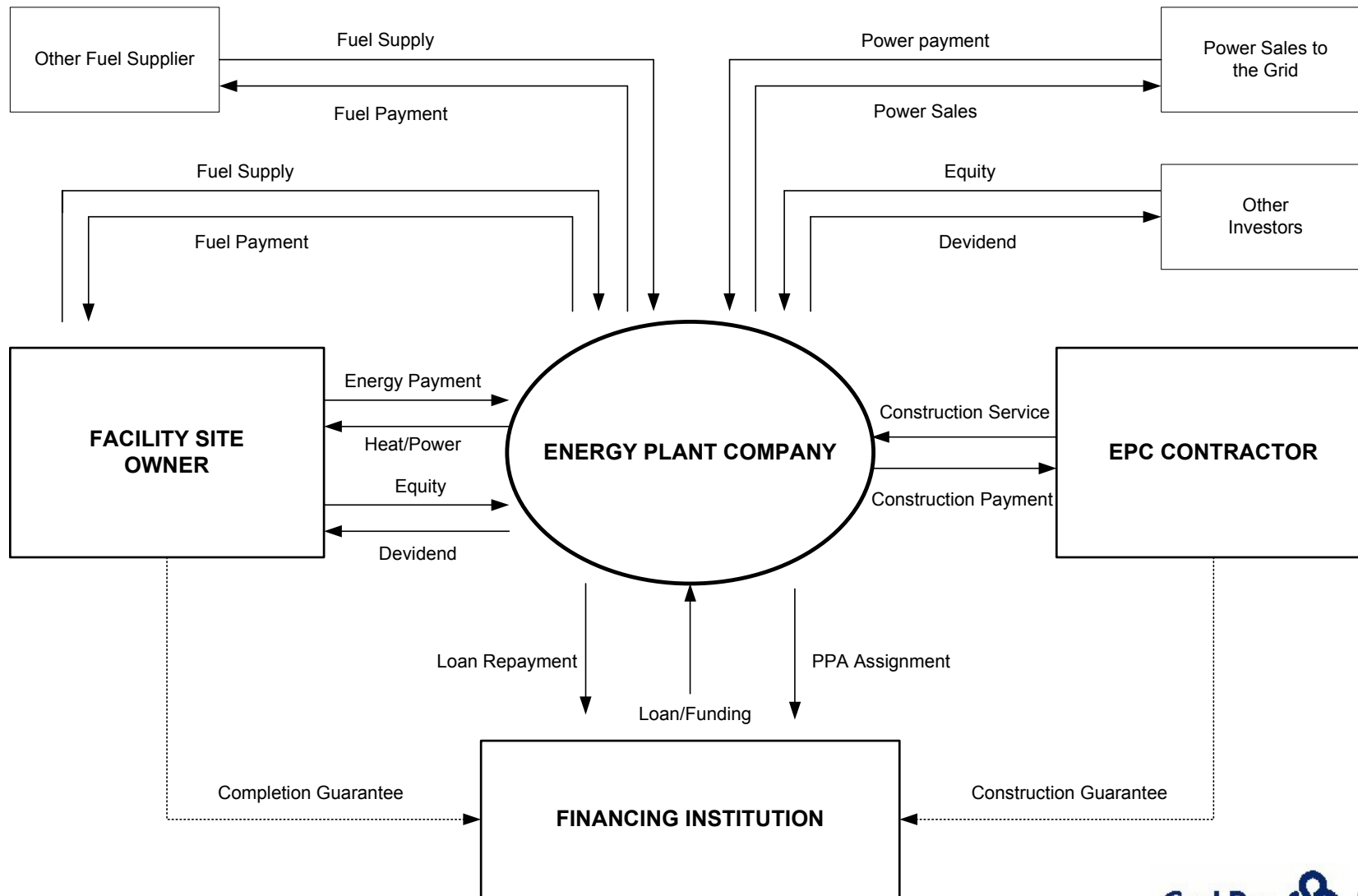
Disadvantages:

- May take longer time to reach financial close
- Involves complex legal documentation and contractual arrangements
- Strict requirements for due diligence as well as legal and technical assessments
- High compliance for administration & reporting requirements



Project Finance Model

Financing Directly to Project





CASE STUDIES

Case study 1: 1.5 MWe Rice husk-Fired Cogeneration Project

Project type: Rice husk-fuelled energy plant

Location: Parit Buntar, Perak, Malaysia

Description: high pressure steam from boiler is led into extraction condensing turbo-generator system, to generate between 700 to 1500 kWe of electricity and low pressure steam for process demand. Rice husk from own rice mill is used as fuel. High quality ash is produced as by-product.

Commercial operation date: September 2004



CASE STUDIES

Case study 1: 1.5 MWe Rice husk-Fired Cogeneration Project

Total project cost: EURO 1.714 million

Shareholders' equity: ~56 % = EURO 922,000

Loan: ~44 % = EURO 792,000

Financing institution: Local bank

Interest rate: MLR + 1.75%

Maturity: 5 years (including grace period)

Grace period: 1 year

Security arrangements:

- Mortgage of all land, building and equipment to the bank
- Additional joint and several guarantee of all the directors of the company
- Leverage ratio not to exceed 3.0x and current ratio not fall below 0.6x
- All risk insurance for equipment & all assets in the name of the bank.



CASE STUDIES

Case study 2: 65 MWe Bagasse-Fired Cogeneration Project

Owner/developer: Phu Khieu Bio-Energy Co., Ltd.

Project type: Bagasse-fuelled energy plant

Location: Phu Khieu, Chaiyapoom, Thailand

Description: Phu Khieu Bio-energy, a special purpose company, owns a 65 MW cogeneration project consisting of 41 MW new equipment and 24 MW existing equipment from the sugar mill. The plant is a state-of-the-art high pressure system implemented to supply power and steam to the adjacent sugar mill, which in turn will supply bagasse as fuel. The excess power will be sold to the Electricity Generating Authority of Thailand (EGAT).

Power Purchase Agreement: “Firm” contract, 21 years

Tariff: 1) energy payment, indexed to natural gas price
2) capacity charge, indexed to Dollar exchange rate

Incentives: BOI privileges

Commercial operation date: June 2004



CASE STUDIES

Case study 2: 65 MWe Bagasse-Fired Cogeneration Project

Total project cost: THB 2.175 million

Shareholders' equity: ~27 % = THB 580 million

Loan: ~73 % = THB 1,595 million

Financing institution: Syndicated Loan from Bank of Ayudhya and Siam City Bank

Interest rate: Fixed for 1st 3 yrs, MLR – 0.5% afterwards

Maturity: 11 years (including grace period)

Grace period: 2 years

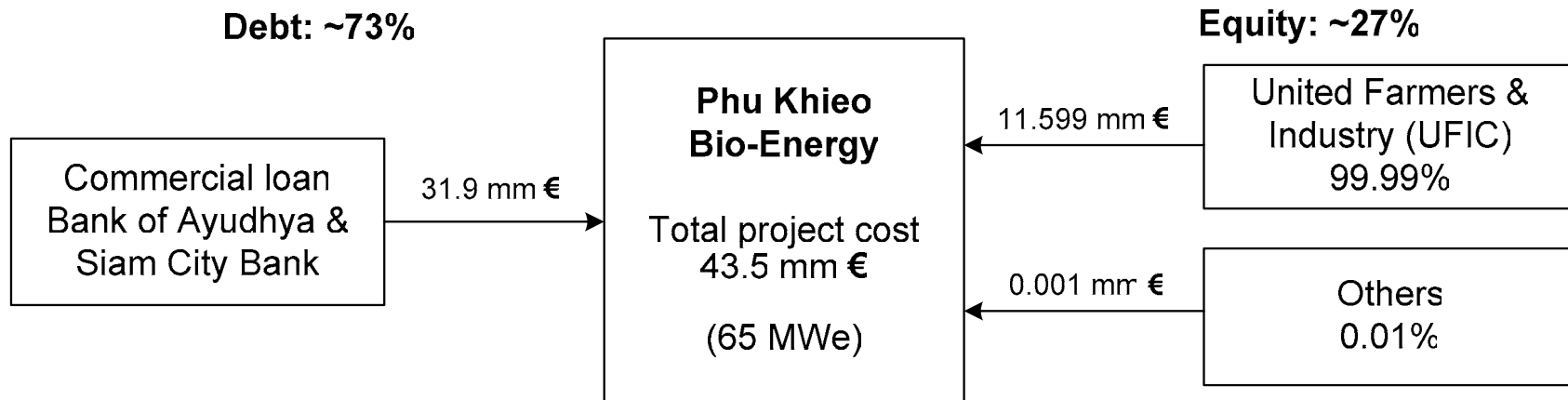
Security arrangements:

- Mortgage of all land, building and equipment to the bank
- Assignment of PPA (PK vs. EGAT)
- Assignment of Utilities Supply Agreement (PK vs. MP)
- Corporate guarantee for the whole portion of the loan (to be released when the above arrangements are fulfilled)
- All risk insurance for equipment & all assets in the name of the bank



CASE STUDIES

Financing structure of Phu Khieo Bio-Energy Co. Ltd.





For more information,
please visit COGEN 3 Website at:

<http://www.cogen3.net>

Thank You !