

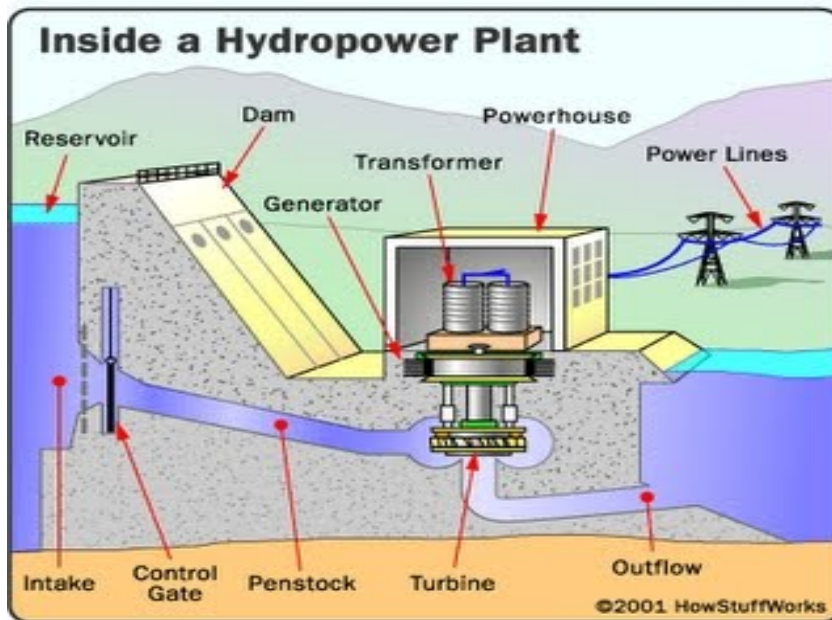


Sustainable Hydropower Financing in the Mekong River Basin Centara Grand, Bangkok 24 September 2010

Risks Assessment in Hydropower Financing



How Hydropower Works



Advantages

- Renewable
- No GHG emission
- Long life
- Low and constant costs to operate
- Irrigation and flood control

Disadvantages

- High investment costs
- Loss of land and forest
- Impact wildlife living in the area
- Change in river and stream quality
- Environmental and social impacts

$$\text{Power (kW)} = \text{Flow (m}^3\text{/s)} * \text{Head (m)} * 9.81 * \text{efficiency}$$

Project Risks

In a limited-recourse project financing, debts are repaid solely from cash flow of the Project. Therefore, assessment of particular risks and mitigation is critical.

- **Construction risks:**
 - delay, overrun, performance
- **Hydrological risks**
 - sufficient water to generate electricity
- **Environmental risks**
 - Compliance with ESH standards and guidelines, EMP, RAP, etc.
- **Political risks**
- **Force majeure risks**
- **Technology risks**
 - proven technology with established track record
- **Offtake risks**
 - Credit, tariff, take-or-pay
- **Operation risks**
 - Experienced operators
- **Currency and interest rate risks**
 - Impacts on project costs and debt service
- **Legal / Regulatory risks**
 - Legality, validity and enforceability
 - Approvals, licences, permits and concession

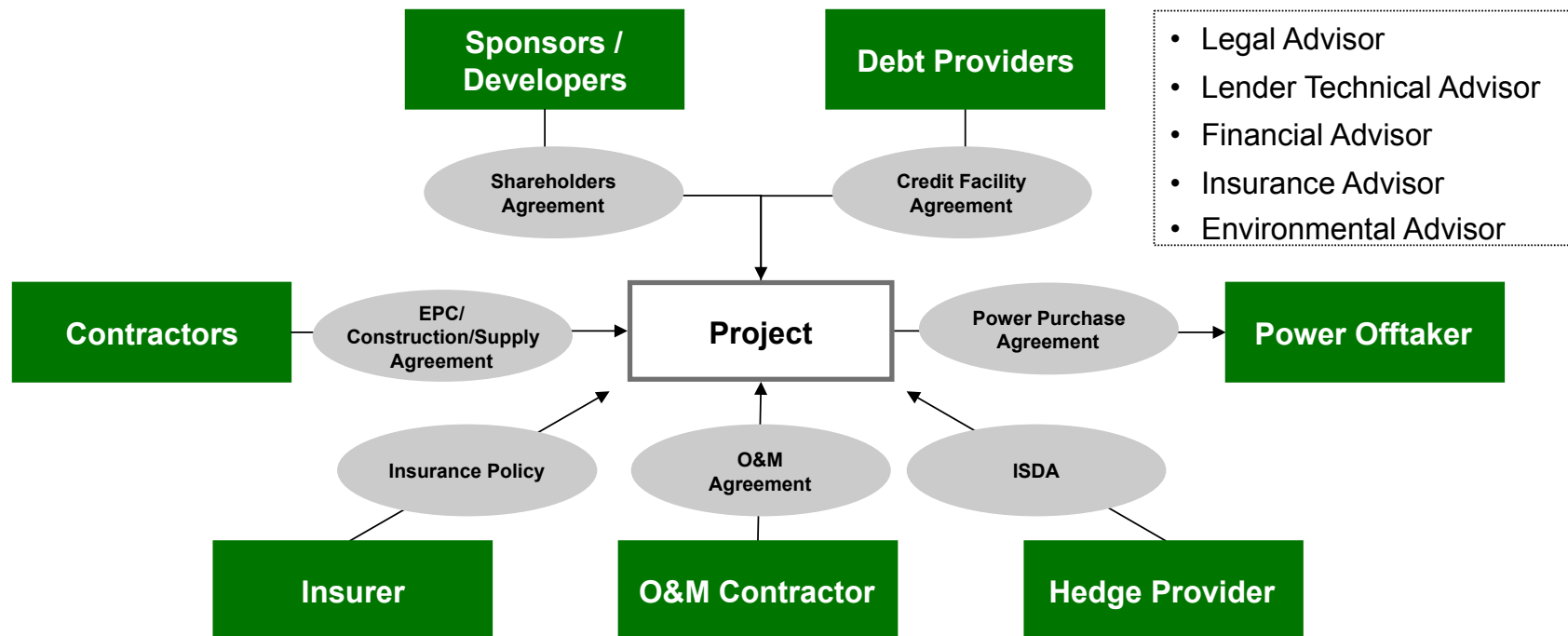
Key Risks Mitigation

	Description	Mitigation
Completion	<ul style="list-style-type: none"> On time Within budget Up to performance specification 	<ul style="list-style-type: none"> Fixed price, turn key EPC contract from reputable contractor with appropriate delay and performance liquidated damages <ul style="list-style-type: none"> Performance, retention bond/guarantee Test on completion Completion guarantees
Hydrology	<ul style="list-style-type: none"> Water Supply Sufficiency 	<ul style="list-style-type: none"> Data collection of rainfall and river flow with high reliability Analysis of hydrological data by experts Satisfactory due diligence report from Lender Technical Advisor
Environmental and Social	<ul style="list-style-type: none"> Site and Location Water Impact Fish 	<ul style="list-style-type: none"> Compliance with environmental and social standards Resettlement action plan and management system Public consultation and disclosure
Financing	<ul style="list-style-type: none"> Foreign Exchange Interest Rate 	<ul style="list-style-type: none"> Effective and efficient hedging program

4



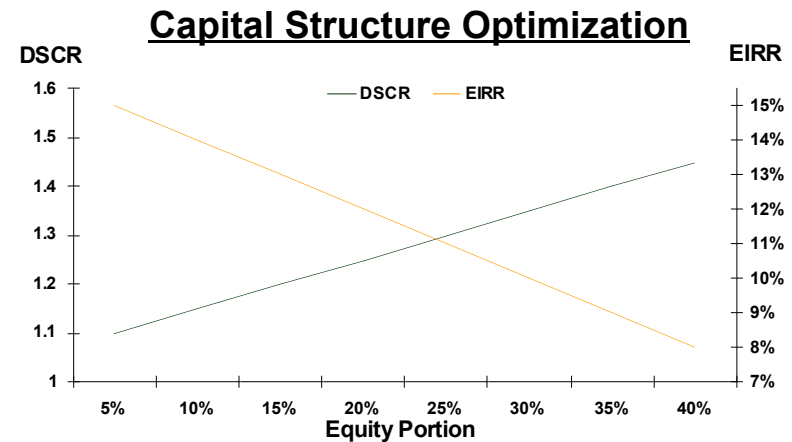
Project Parties and Contractual Arrangement



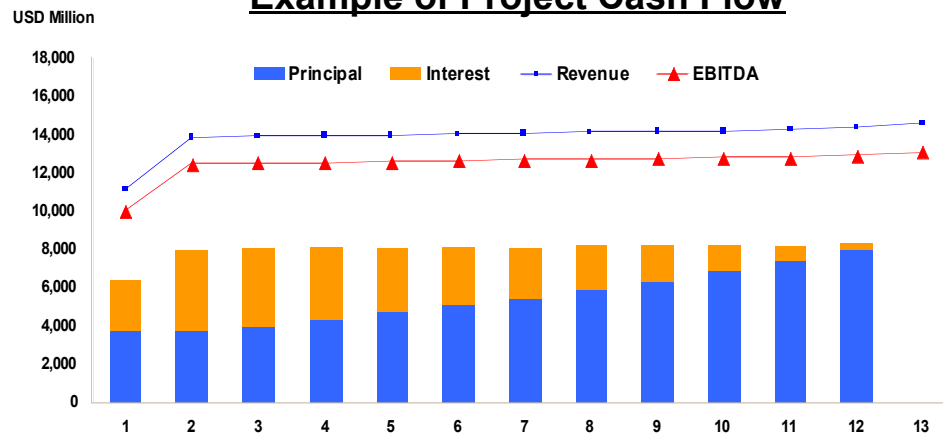
- Various Project risks need to be identified, assessed, transferred, guaranteed, insured and hedged.

Financing the Deals

Uses	Sources
Construction Cost [50-70]%	Debt = [X]%
Transmission Line [5-10]%	
ES Cost [1-5]%	
Development Cost [5-10]%	Equity = [Y]%
Financing Cost [10-20]%	
Contingency Cost [5-20]%	



Example of Project Cash Flow



Strictly Private & Confidential

- **DSCR** as a key indicator of the Project's performance and ability to repay debts. Lenders normally required a minimum required DSCR for financial and/or distribution test.
- **LLCR / PLCR** as a measurement of cash flow coverage over loan life/ project life

6

Financing Structure

Hydropower Project Financing involves large amount of debts. Financial Institution usually share risks via loan syndication.

Loan Market

- Commercial banks (local and international)
 - Cash flow currency matching, pricing, etc.
- ECAs
 - Provide financing of equipment at attractive rate with longer tenor
- Multilateral Agency (e.g. IFC, ADB)
 - Direct lend at longer tenor than commercial banks
 - Guarantee partial or long tenor portion
 - Cover political risks

Terms and Conditions

- Facility
- Use of Proceeds
- Conditions Precedent
- Representation and Warranties
- Affirmative / Negative Covenants (including compliance with environmental standards)
- Events of Default
- Security Packages
- Collateral Accounts and Cash Flow Application
- Governing Law
- Intercreditor Provisions
- Increased Costs / Market Disruption / M.A.E & Others



Feel free to contact:

Thongchai Kangvanchai
Head – Investment Banking
Capital Markets Business Division
KASIKORNBANK PCL.
Tel: 662-470-1037
E-mail: thongchai.k@kasikornbank.com



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