Masters in DEVELOPMENT FINANCE

Advanced Project Finance Modeling*

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**List of Acronyms**

AAA                      Agency and Administration Agreement  
ACP                      Average Collection Period  
ACRS                     Accelerated Cost Recovery System  
ADSCR                    Annual Debt Service Coverage Ratio  
AfD                      Agence Française de Développement  
AfDB                     African Development Bank  
AfDF                     African Development Fund  
APV                      Adjusted Present Value  
AWA                      Amendment and Waiver Agreement  
BAFO                     Best and Final Offer  
BAR                      Builders’ All Risk (insurance)  
BATRI                    Borrower, Amount, Term, Repayment Method, Interest Basis plus Margins  
BBSY                     Refers to a screen (i.e., a page name) on the Reuters Monitor System that shows benchmark interest rates used to price variable rate loans  
BCA                      Basic Credit Approval  
B/E                      Bill of Exchange  
B/L                      Bill of Lading  
BIPS                     Basis Points  
BIS                      Bank for International Settlements  
BLA                      Bilateral Agency (e.g., U.S. Export-Import Bank)
bp  Basis point (1/100 of 1%, or 0.0001)
BDOT  Build-Design-Operate-Transfer
BLT  Build-Lease-Transfer
BOO  Build-Own-Operate
BOOS  Build, Own, Operate, and Sell
BOOT  Build-Own-Operate-Transfer
BOT  Build-Own-Transfer
BTO  Build-Transfer-Operate
Btu  British thermal unit
CADS  Cash Available for Debt Service
CAGR  Compound Annual Growth Rate
CapEx  Capital Expenditure
CAPM  Capital Asset Pricing Model
CBO  Collateralized Bond Obligation
CCF  Capital Cash Flow
CCR  Corporate Credit Rating
CDC  Commonwealth Development Corporation (United Kingdom)
CDO  Collateralized Debt Obligation
CDS  Credit Default Swap
CEN  Confiscation, Expropriation, and Nationalization (collectively, “CEN” perils)
CEND  Confiscation, Expropriation, Nationalization and Deprivation
CfD  Contract for Differences
CGF  Credit Guarantee Facility
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
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<td>Covered Interest Parity</td>
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<td>Commercial Interest Reference Rates</td>
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<td>Commonwealth of Independent States</td>
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<td>CLO</td>
<td>Collateralized Loan Obligation</td>
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<td>COBA</td>
<td>Cost/Benefit Analysis</td>
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<td>COD</td>
<td>Commercial Operation Date</td>
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<td>Commercial Paper</td>
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<td>Cooperative Underwriting Program</td>
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<td>DCF</td>
<td>Discounted Cash Flow</td>
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<td>DCMF</td>
<td>Design, Construct, Manage, and Finance</td>
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<td>Drawdown Cover Ratio</td>
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<td>D:E</td>
<td>Debt to Equity</td>
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<td>DFI</td>
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<td>Delay-in-Startup (insurance)</td>
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<td>DLDs</td>
<td>Delay Liquidated Damages</td>
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<td>Debt Outstanding and Disbursed</td>
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<td>Demand Side Management</td>
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<td>Direct Service Organization</td>
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<td>Debt Service Payment Account</td>
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<td>DSRA</td>
<td>Debt Service Reserve Account</td>
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<td>DT</td>
<td>Design Team</td>
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<td>Depositary Trust Company</td>
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<td>EA</td>
<td>Environmental assessment</td>
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<tr>
<td>EAP</td>
<td>Environmental Action Plan</td>
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<tr>
<td>EBIAT</td>
<td>Earnings Before Interest but After Taxes</td>
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<tr>
<td>EBIT</td>
<td>Earnings Before Interest and Taxes</td>
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<td>EBITDA</td>
<td>Earnings before Interest, Taxes, Depreciation and Amortization</td>
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<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<td>European Community</td>
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<td>ECA</td>
<td>Export Credit Agency</td>
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<td>Equity Cash Flow</td>
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<td>ECGD</td>
<td>Export Credit Guarantee Department (U.K. export credit agency)</td>
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<td>ECP</td>
<td>Euro Commercial Paper</td>
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<td>ECU</td>
<td>European Community Unit</td>
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<td>EDC</td>
<td>Export Development Canada (Canadian export credit agency)</td>
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<td>Acronym</td>
<td>Description</td>
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<tr>
<td>EFIC</td>
<td>Export Finance and Insurance Corporation (Australian export credit agency)</td>
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<td>EFL</td>
<td>External Financing Limit</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<tr>
<td>EIS</td>
<td>Environmental Impact Statement</td>
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<tr>
<td>EIB</td>
<td>European Investment Bank</td>
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<tr>
<td>EIU</td>
<td>Economist Intelligence Unit</td>
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<tr>
<td>EMBI</td>
<td>Emerging Market Bonds Index (published by J. P. Morgan)</td>
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<tr>
<td>EMU</td>
<td>Economic and Monetary Union of the European Union</td>
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<tr>
<td>EOD</td>
<td>Event of Default</td>
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<tr>
<td>EPC</td>
<td>Engineering, Procurement, and Construction</td>
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<tr>
<td>EPS</td>
<td>Earnings per Share</td>
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<tr>
<td>ESA</td>
<td>Equity Support Agreement</td>
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<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAQ</td>
<td>Free at Quay</td>
</tr>
<tr>
<td>FAS</td>
<td>Free Alongside</td>
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<tr>
<td>FASB</td>
<td>Financial Accounting Standards Board</td>
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<tr>
<td>FCF</td>
<td>Free Cash Flow</td>
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<tr>
<td>FDI</td>
<td>Foreign Direct Investment</td>
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<tr>
<td>FIAS</td>
<td>Foreign Investment Advisory Service (part of the World Bank Group)</td>
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<tr>
<td>FIFO</td>
<td>First In, First Out</td>
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<tr>
<td>FM</td>
<td>Force Majeure</td>
</tr>
<tr>
<td>FOB</td>
<td>Free on Board</td>
</tr>
</tbody>
</table>
ForEx     Foreign Exchange
FRA       Forward Rate Agreement
FV        Future Value
FX        Foreign Exchange
FY        Fiscal Year
GAAP      Generally Accepted Accounting Principles (e.g., U.S. GAAP)
GATS      General Agreement on Trade In Services
GATT      General Agreement on Tariffs and Trade
GDP       Gross Domestic Product
GDRs      Global Depositary Receipts
GJ        Gigajoule
GNF       Global Note Facility
GNI       Gross National Income
GNP       Gross National Product
GSM       Global systems for mobiles, a mobile phone standard.
GTL       Gas-to-Liquids
GW        Gigawatt (one billion watts)
G-5       Group of five countries (France, Germany, Japan, U.K., and U.S.)
G-7       The G–5 countries plus Canada and Italy
G-10      The G–7 countries plus Belgium, the Netherlands, Sweden and Switzerland. The group has 11 members but is still known as the G10. It aims to coordinate monetary and fiscal policies for a stable world economic system.
G-20      Argentina Australia Brazil Canada China France Germany India Indonesia Italy Japan Mexico Russia Saudi Arabia South Africa South Korea Turkey United Kingdom United States and the European Union
ha        Hectare
HDSCR  Historic Debt Service Cover Ratio
HoldCo  Holding Company
IA      Implementation Agreement
IBFs    International Banking Facilities
IBRD    International Bank for Reconstruction and Development (a member of the World Bank Group)
ICA     International Court of Arbitration
ICB     International competitive bidding
ICC     International Chamber of Commerce
ICRG    International Country Risk Guide
ICR     Issuer Credit Rating
ICSID   International Center for Settlement of Investment Disputes
IDA     International Development Association (a member of the World Bank Group)
IDB     Inter-American Development Bank
IDC     Interest During Construction
IDRs    International Depositary Receipts
IE      Independent Engineer
IFC     International Finance Corporation (a member of the World Bank Group)
ILFAs   Individual Loan Facility Agreements
IMF     International Monetary Fund
IMLAs   Initial Mandated Lead Arrangers
IPA     Investment Project Authorization
IPO     Initial Public Offering
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>IPP</td>
<td>Independent Power Producer (or Independent Power Plant)</td>
</tr>
<tr>
<td>IPR</td>
<td>Initial Project Review</td>
</tr>
<tr>
<td>IRB</td>
<td>Internal–Rating–Based (an approach under the Basel III Accord)</td>
</tr>
<tr>
<td>IR</td>
<td>Interest rate (risk or exposure)</td>
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<tr>
<td>IRR</td>
<td>Internal Rate of Return</td>
</tr>
<tr>
<td>IsDB</td>
<td>Islamic Development Bank</td>
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<tr>
<td>ITN</td>
<td>Invitation to Negotiate</td>
</tr>
<tr>
<td>ITT</td>
<td>Invitation to Tender</td>
</tr>
<tr>
<td>JFS</td>
<td>Joint Feasibility Study</td>
</tr>
<tr>
<td>JOA</td>
<td>Joint Operating Agreement</td>
</tr>
<tr>
<td>kJ</td>
<td>Kilojoule, a measure of energy</td>
</tr>
<tr>
<td>km</td>
<td>Kilometer</td>
</tr>
<tr>
<td>kWh</td>
<td>Kilowatt-Hour</td>
</tr>
<tr>
<td>LCAI</td>
<td>London Court of International Arbitration</td>
</tr>
<tr>
<td>LCVI</td>
<td>Liquidity, Credit, and Volatility Index</td>
</tr>
<tr>
<td>LIB</td>
<td>Limited International Bidding</td>
</tr>
<tr>
<td>LIBID</td>
<td>London Inter–Bank Bid Rate</td>
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<tr>
<td>LIBOR</td>
<td>London Inter–Bank Offered Rate</td>
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<td>LIFO</td>
<td>Last In, First Out</td>
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<tr>
<td>L/C</td>
<td>Letter of Credit</td>
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<tr>
<td>LDs</td>
<td>Liquidated Damages</td>
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<tr>
<td>LLA</td>
<td>Land Lease Agreement</td>
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<td>LLC</td>
<td>Limited Liability Company</td>
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<td>LLCR</td>
<td>Loan Life Cover Ratio</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>LNG</td>
<td>Liquefied Natural Gas</td>
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<td>LOC</td>
<td>Letter of Credit</td>
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<tr>
<td>LOI</td>
<td>Letter of Intent</td>
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<tr>
<td>LOT</td>
<td>Lease, Operate and Transfer</td>
</tr>
<tr>
<td>LOU</td>
<td>Letter of Understanding</td>
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<tr>
<td>LPG</td>
<td>Liquefied petroleum gas</td>
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<td>LP</td>
<td>Limited Partner</td>
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<tr>
<td>LSTK</td>
<td>Lump-sum Turnkey Contract</td>
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<td>LT</td>
<td>Levelized Tariff</td>
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<tr>
<td>LTMA</td>
<td>Long-Term Maintenance Agreements</td>
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<td>MAC</td>
<td>Material Adverse Change</td>
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<tr>
<td>MACRS</td>
<td>Modified Cost Recovery System</td>
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<tr>
<td>MAE</td>
<td>Material Adverse Event or Material Adverse Effect</td>
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<tr>
<td>MDB</td>
<td>Multilateral Development Bank</td>
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<tr>
<td>MIGA</td>
<td>Multilateral Investment Guarantee Association (a member of the World Bank Group)</td>
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<td>MIRR</td>
<td>Modified Internal Rate of Return</td>
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<td>MLA</td>
<td>Mandated Lead Arranger</td>
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<td>MLA</td>
<td>Multilateral Agency (e.g., International Finance Corporation)</td>
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<td>MNC</td>
<td>Multinational Corporation</td>
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<td>MOF</td>
<td>Multiple Options Facility</td>
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<tr>
<td>MOT</td>
<td>Modernize, Operate and Transfer</td>
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<tr>
<td>MOU</td>
<td>Memorandum of Understanding</td>
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<td>MPP</td>
<td>Merchant Power Plant</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>MW</td>
<td>Megawatt (1,000,000 Watts)</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NFFO</td>
<td>Non-Fossil Fuel Obligation</td>
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<td>NGO</td>
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<td>Note Issuance Facility</td>
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<td>NOPAT</td>
<td>Net Operating Profit after Tax</td>
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<td>Net Working Capital</td>
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<td>Net Present Value</td>
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<td>OECD</td>
<td>Organization for Economic Cooperation and Development</td>
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<td>OM</td>
<td>Offering Memorandum</td>
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<td>O&amp;M</td>
<td>Operation and Maintenance</td>
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<td>Organization of Petroleum Exporting Countries</td>
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<td>Operating Expenses</td>
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<td>Overseas Private Investment Corporation</td>
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<tr>
<td>p.a.</td>
<td>Per annum (annually)</td>
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<td>PCG</td>
<td>Partial Credit Guarantee</td>
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<td>PDSCR</td>
<td>Projected Debt Service Cover Ratio</td>
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<td>PE</td>
<td>Public Enterprise</td>
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<td>PFI</td>
<td>Project Finance International (a trade journal)</td>
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<td>PIM</td>
<td>Preliminary Information Memorandum</td>
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<td>Project Life Coverage Ratio</td>
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<td>PLDs</td>
<td>Performance LDs</td>
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<td>Plant Load Factor</td>
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<td>Promissory Note</td>
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<td>Power Purchase Agreement</td>
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<td>PPB</td>
<td>Provisional Preferred Bidder</td>
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<td>PPI</td>
<td>Private Participation in Infrastructure (Note: can also be the Producer Price Index)</td>
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<td>ppm</td>
<td>Parts per million</td>
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<td>PPP</td>
<td>Public-Private Partnership or Purchasing Power Parity</td>
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<td>PQQ</td>
<td>Pre-Qualification Questionnaire</td>
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<td>Private Sector Energy Fund</td>
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<td>Private Sector Infrastructure Development Corporation</td>
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<td>Private Sector Infrastructure Fund</td>
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<td>Production Tax Credit</td>
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<td>Present Value</td>
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<td>QIB</td>
<td>Qualified Institutional Buyer</td>
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<td>RAAP</td>
<td>Regulatory Accepted Accounting Principles</td>
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<td>RAP</td>
<td>Resettlement Action Plan</td>
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<td>RAROC</td>
<td>Risk Adjusted Return on Capital</td>
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<td>RCOD</td>
<td>Required Commercial Operations Date</td>
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<td>RCR</td>
<td>Repayment Cover Ratio</td>
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<td>Reserved Discretion(s)</td>
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<td>Regional Electricity Companies</td>
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<td>RFP</td>
<td>Request for Proposals</td>
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<td>RMR</td>
<td>Reliability Must Run (power plant)</td>
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<td>Return on Assets</td>
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<td>Return on Investment</td>
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<td>Return on Invested Capital</td>
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<td>ROO</td>
<td>Rehabilitate-Own-Operate</td>
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<td>Rehabilitate-Operate-Transfer</td>
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<td>Right of Way</td>
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<td>RPI</td>
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<td>Renewable Portfolio Standard</td>
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<td>Resource Supply Agreement</td>
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<td>RUF</td>
<td>Revolving Underwriting Facility</td>
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<td>S&amp;P</td>
<td>Standard &amp; Poor’s Corporation</td>
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<td>Single Currency Pool</td>
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<td>SCR</td>
<td>Sovereign Credit Rating</td>
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<td>Special Drawing Rights</td>
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<td>Securities and Exchange Commission (United States)</td>
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<tr>
<td>SIC</td>
<td>Standard Industrial Classification</td>
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<td>State-owned Enterprise</td>
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<td>Full Form</td>
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<tr>
<td>SOT</td>
<td>Supply-Operate-Transfer</td>
</tr>
<tr>
<td>SPA</td>
<td>Sales Purchase Agreement(s)</td>
</tr>
<tr>
<td>SPV</td>
<td>Special-purpose Vehicle</td>
</tr>
<tr>
<td>SRF</td>
<td>State Revolving Fund</td>
</tr>
<tr>
<td>SRI</td>
<td>Socially Responsible Investment</td>
</tr>
<tr>
<td>TDA</td>
<td>Trade Development Agency</td>
</tr>
<tr>
<td>T&amp;D</td>
<td>Transmission and Distribution</td>
</tr>
<tr>
<td>TRR</td>
<td>Target Rate of Return</td>
</tr>
<tr>
<td>TRUF</td>
<td>Transferable Revolving Underwriting Facility (RUF)</td>
</tr>
<tr>
<td>TSR</td>
<td>Total Shareholder Return</td>
</tr>
<tr>
<td>UIRP</td>
<td>Uncovered Interest Rate Parity</td>
</tr>
<tr>
<td>UNCTAD</td>
<td>United Nations Conference on Trade and Development</td>
</tr>
<tr>
<td>UNCITRAL</td>
<td>United Nations Commission on International Trade Law</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>UNEP</td>
<td>United Nations Environmental Program</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VAR</td>
<td>Value at Risk</td>
</tr>
<tr>
<td>VAT</td>
<td>Value-added Tax</td>
</tr>
<tr>
<td>VFM</td>
<td>Value for Money</td>
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<tr>
<td>VRNs</td>
<td>Variable Rate Notes</td>
</tr>
<tr>
<td>VPD</td>
<td>Vehicles Per Day</td>
</tr>
<tr>
<td>VPP</td>
<td>Volumetric Production Payment</td>
</tr>
<tr>
<td>WACC</td>
<td>Weighted Average Cost of Capital</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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</table>


Chapter 1

Overview of Project Finance

1.1 Introduction

The rise of project finance, defined as the creation of a legally-independent project company financed with nonrecourse debt, provides strong prima facie evidence that the financial structure or model is of paramount importance. In the past twenty years there has been a new wave of global interest in project finance as a tool for economic investment. Project finance helps finance new investment by structuring the financing around the project’s own operating cash flow and assets, without additional sponsor guarantees. Thus, project finance as a technique or a model for structuring the financing of a project is able to alleviate investment risk and raise finance at a relatively low cost, to the benefit of sponsor and investor alike. Though project finance has been in use for hundreds of years, primarily in mining and natural resource projects, its other possible applications—especially for financing large green-field projects (new projects without any prior track record or operating history) — have only recently received serious attention. This is particularly so in developing markets where spending on infrastructure and the built environment sector is an increasing percentage of national budgets, as countries in the developing world strive to provide services for fast growing populations that are increasingly urban.

The change in attitude toward project finance can be attributed to a number of factors, a primary one being that most countries today rely on market mechanisms to guide their economic activity and on the private sector to supply investment. Greater focus on the private sector has necessitated major regulatory reforms, which in turn have created new markets in areas previously the preserve of government activity. Governments also use project finance to provide incentives to encourage private investors to enter into new sectors. Over the past decade, the number of project finance deals worldwide (green-field and expansion projects) has expanded substantially with many of new project finance transactions being structured in developing countries.
Capital flight from emerging market destinations was greater both during and after the global financial crisis than that experienced by developed countries, with Sub-Saharan African experiencing the greatest decrease in direct foreign investment of all emerging market destinations. As a result, the investment needs in many developing markets clearly remains enormous. Meeting these needs is essential to development, not only in the more traditional sectors such as energy, but also in non-traditional areas such as school and hospital construction. For most countries, this will mean a continuing need to rely on private sector expertise and finance to meet demand. Once growth and investment resume, project finance techniques are likely to be an even more important means of sharing risks and of helping these projects get off the ground—particularly in some markets and sectors in Sub-Saharan Africa where investors have historically required an investment premium. As the experience of the crisis has demonstrated, individual projects are not a substitute for economy-wide regulatory reform designed to improve competitiveness and efficiency, or for the development of local financial markets in support of local investment. But, in the appropriate
framework, project finance can provide a strong and transparent structure for projects, and through careful attention to potential risks it can help increase new investment and improve economic growth.

Some market observers are questioning the prudence of this expanded use of project finance, especially in the wake of the global financial crisis and the dramatic deterioration that ensued in a number of the major developing markets. In short, many large projects undertaken immediately prior to the commencement of the crisis in 2008, were later found to be economically and/or financially unfeasible due to changed environmental factors. Contractual arrangements proved to be shaky—in some cases, unenforceable—and many projects, with hindsight, had failed adequately to address potential risks (including, but not only, foreign exchange risks). Private lenders and investors were much less willing to support projects facing a deteriorating policy or market environment. In a few countries these problems were exacerbated by public criticism of government support given to projects, and by allegations of corruption in the awarding of initial contracts.

According to some of the largest DFIs operating in the developing world however, project finance remains a valuable tool. Although many projects are under serious strain in the aftermath of the global financial crisis, project finance offers a means for investors, creditors, and other unrelated parties to come together to share the costs, risks, and benefits of new investment in an economically efficient and fair manner. As the emphasis on corporate governance increases, the contractually based approach of project finance can also help ensure greater transparency. For developing markets, project finance holds out the hope that a well-structured, economically viable project will attract long-term financing even if the project dwarfs its sponsors’ own resources or entails risks that they are unable to bear alone. With such a mechanism for sharing the costs, risks, and rewards of a project among a number of unrelated parties, a privatization or infrastructure improvement program will have a greater chance of raising the volume of funds it requires. As a result, it is now standard practice for large and complex projects in the major developing markets to employ project finance techniques. The number of active participants in these markets has also increased as
many international institutions (investment banks, commercial banks, institutional investors, and others) moved quickly to build up their project finance expertise.

Given the fact that it takes longer and costs more to structure a legally independent project company than to finance a similar asset as part of a corporate balance sheet, one might rationally ask, “Is it really worth it to employ project finance as a method for funding versus corporate finance?” For it to be rational, project finance must entail significant countervailing benefits to offset the incremental transaction costs and time. Yet, these benefits are not really well understood, nor have they been accurately described in academic or practitioner literature.

Drawing on existing finance theory, detailed case studies, and extensive field research, we will explore in Advanced Project Finance the primary motivations for using project finance. The motivations explain why financing assets separately with nonrecourse debt creates value, and why it can create more value than financing assets jointly with corporate debt, the most likely financing alternative. We will also take an in-depth look at project finance models, apply them to real-life case studies and develop the tools necessary to analyze and evaluate large-scale project finance transactions.

1.2 Economic Motivations for Using Project Finance

According to Benjamin C. Esty of Harvard’s Business School, the first motivation to use project finance, the agency cost motivation, recognizes that certain assets, namely large, tangible assets with high free cash flows, are susceptible to costly agency conflicts. The creation of a project company provides an opportunity to create a new, asset-specific governance system to address the conflicts between ownership and control. In many ways, the observed governance structures in project companies resemble leveraged-buyouts (LBOs).

Project structures can also reduce agency conflicts between owners and related parties. The transaction-specific nature of project assets creates a need to deter strategic behavior by suppliers of critical inputs or expropriation by host governments.
The threat of opportunistic behavior or “hold-up” is especially severe in project companies where the deals typically involve negotiations between bi-lateral monopolists. Project companies utilize joint ownership and high leverage to discourage costly agency conflicts among participants. Today, these agency cost motivations remain one of the most important reasons why firms use project finance.

In contrast to the agency cost motivation, which relates to the asset being financed, the two underinvestment motivations relate to the firms making the capital investments—these firms are known as “sponsoring firms” or “sponsors.” Although underinvestment in positive net present value (NPV) projects can occur for many reasons. Project finance solves leverage-induced underinvestment by allocating project returns to new capital providers in a way that cannot be replicated using corporate debt.

Another economic motivation already discussed, risk management, recognizes that investing in risky assets can generate incremental distress costs for sponsoring firms. When these indirect or collateral distress costs are sufficiently large, at least in expectation, they can exceed the asset’s net present value (NPV), thereby turning a positive NPV project into a negative investment (the total NPV is negative). By isolating the asset in a standalone project company, project finance reduces the possibility of risk contamination, the phenomenon whereby a failing asset drags an otherwise healthy sponsoring firm into distress. It also reduces the possibility that a risky asset will impose indirect distress costs on a sponsoring firm even short of actual default. In contrast, corporate finance is a balance sheet exercise where such risks are inherent in most corporate finance structures.

1.3 Project Finance Model – Identifying and Mitigating Risk

Throughout this course, we will continue to talk extensively about using project finance modeling as a tool for identifying and mitigating risks. There are generally four categories of risk associated with projects that involve a substantial private sector component: (1) social/environmental risk; (2) host country risk; (3) economic/financial risk; and (2) and technical risk. Each of these risk categories is elaborated below:
Social/Environmental Risk

Projects frequently need to deal with environmental externalities and social justice concerns. Traditionally, the environment and the broad set of societal stakeholders have often not been taken into account during the planning phases of the project. Further, metrics and processes to evaluate the effect of the projects on local communities are not readily available. Project implementation may lead to destruction of ecosystems, displacement of habitats, loss of jobs and potential health repercussions due to pollution of air, water and land. The mere anticipation of such outcomes sets into motion protests and resistance by groups that represent the local stakeholders, including local, regional, national and increasingly transnational NGO’s. The recent case of the refusal of citizens in the Province of Gauteng in South Africa to pay tolls on the newly completed N1 highway is a relevant case in point.

The above example illustrates a type of social and environmental risk that private infrastructure investors might face in certain sectors of the industry. Historically, in the overall analysis, decisions to invest in private infrastructure have largely been made on purely financial or economic grounds. This leads to problems, as social and environmental issues are ignored until the later stages of a project. What might be called for in these historical cases, is a ‘triple bottom line’ approach, wherein attention is paid to identifying and dealing with environmental and social issues at the planning stage of a privatization project. This can then help mitigate the social/environmental risk that private investors might face.

Recognition of the importance of social and environmental issues in project design has however indeed increased dramatically in recent years, first among multilateral institutions financing private infrastructure projects and subsequently among project sponsors. In many cases today, social and environmental issues are not ignored until the later stages of a project, and are considered during the shaping phases of the project. Multilateral development banks such as the IFC have also developed metrics to assess environmental and social concerns. The existence of these metrics and toolsets coupled with explicit mandates form the multilateral institutions that these
tools be used, has also led to social and environmental risks being included in the evaluation of project proposals.

Host-Country Risk

By far, the most commonly considered set of risks in the academic literature are a group of regulatory, legal and political risks that we will call ‘Host-country Risks’, as they relate to legal frameworks and institutions that are prevalent in the country in which the infrastructure service is being provided. In this section, we will briefly review some of the risks in this category.

There are many traditional political risks that projects are exposed to. One such risk is the risk of political violence – which may spring from war, insurrections or sabotage that may terminate private infrastructure enterprises. Government’s inability to maintain law and order may also lead to privately owned infrastructure being harmed or held hostage by internal groups. The risk of expropriation, where the host government will nationalize the assets or the equity of an enterprise in a completely arbitrary manner, is also a huge concern for most private investors, especially in developing economies. These types of risks are key components of a country’s risk profile compiled by private rating agencies such as Moody’s and Fitch. International investors often consider a country’s sovereign debt rating when pricing financing terms. Therefore, the perception of these types of risk plays a critical role in a project’s financial architecture.

Private infrastructure providers may also find that all parties within the government are not equally supportive of their efforts. Therefore the re-election of a new government in the midst of a private infrastructure investment can lead to a lot of pressure being applied on the private investor, if the newly elected party is not in favor of the private investment – this can lead to a derailment of the project. Insufficient coordination between various government agencies could also lead to issues on projects. As an example, a private telecommunications provider in Zimbabwe in the 1990’s had a license awarded to them by the Supreme Court, but were simultaneously branded as
an illegal operation by a presidential decree. Huge delays resulted as this issue was being sorted out.

Apart from political risks, private investment in infrastructure is also subjected to Regulatory risks. Government regulations with regard to price, entry into the industry, quality of service and so on can affect the success of a private infrastructure project. Private investors may be subjected to detailed industry regulation that may hamper profitability. If host authorities can control price settings, volume or the service that is provided, this could potentially constitute a large risk to the private investors. Unclear rules regarding property rights and lack of regulation can also lead to problems. Unclear land titles for instance could lead to a situation wherein the rights to the land are contested after the private investor has embarked on the project. Addressed more broadly, as governments have moved from owning and operating infrastructure utilities to regulating private sector utilities providing such service, they have attempted to create new ‘independent’ regulators as part of the project’s legislative framework. However, the creation of such new regulatory institutions has been quite slow, and as a result, private sector infrastructure suffered from the ‘immaturity’ of the regulatory regimes to which they have subjected.

Political, Regulatory and Legal risks are therefore extremely crucial parameters that must be taken into account while considering private investment in infrastructure. Chapter 4 below discusses in details the legal and regulatory framework governing the world of project finance.

**Economic/Financial Risk**

In addition to regulatory, legal and political issues that need to be addressed in a host-country environment, financial and economic risks also beset private infrastructure investors and projects. Foremost amongst these risks is the risk due to currency fluctuations. Frequently, private infrastructure providers invest a large amount of capital up front, with the intention of recovering their investment down the line, either through operational revenues, or through a transfer back to the host government. However, falling currency exchange rates in the interim, a feature that may well occur
in many developing economies, may lead to rapid devaluation of the infrastructure provided by foreign private providers, thus resulting in a loss on their investment. In most cases, revenues of the project company (or its offtaker, under a Power Purchase Agreement in the case of projects in the Power sector) are in the currency of the host country, while financing is obtained largely in foreign currencies. The risks of modest foreign exchange fluctuations might generally be borne by the firm undertaking the project, but costs arising from more substantial fluctuations are dealt with through other means—either through guarantees offered by the host government, or through entitlements towards an adjustment in the tariffs charged for the use of the infrastructure utility. This has often led to problems. During the economic crisis in Asia and in Argentina, the collapse of the foreign exchange rates meant that politically and economically unsustainable government payments or tariff increases were required.

Furthermore, the economic climate in the host country will determine the extent to which the built infrastructure is put to use, and thereby, in many cases, the profitability of the infrastructure service provider. Under certain conditions, if the private sector infrastructure provider plans on recovering their investment through tariffs paid by people using the system, a lack of activity could signal reduced revenues and thereby, in certain cases even termination of the venture (See, example of the N1 toll road in South Africa noted above). The transportation sector is particularly susceptible to such risks.

Another toll road example is Portugal’s Vasco da Gama bridge which was built and operated by an international consortium under the assumption that a toll of US$2 would be levied on commuters. However, violent commuter revolts and a lack of activity on the bridge indicated that the tariff was too high. As a result, government subsidies were used in order to promote traffic on the toll bridge, thereby leading to a situation where the taxpayers and not the users, were paying the bills. As another example, the Dulles Greenway in Virginia was one of the first private toll roads in the United States. The initial traffic flow predictions were extremely optimistic and the actual traffic volume fell short by over a third. This led to the toll prices being reduced by nearly 40% in order to attract more customers. In late 1997, this reduction in
revenue led to a major and unavoidable refinancing and debt restructuring of the project.

Unclear market entry conditions also pose risks to private infrastructure projects. Private firms, especially in the telecommunications industry, may in many countries need to rely on access to facilities owned by state-owned operators, such as in the case of cellular operations. As the state operators tend to view these cellular operators as competitors, the access to these resources is sometimes contentious and could therefore lead to project failure. The challenges faced by MTN’s attempt to enter the market in Nigeria is one such relevant example in Sub-Saharan Africa.

**Technological Risk**

A class of risks that have seldom been addressed in academic literature on infrastructure development, but have obtained more prominence in the engineering or the project management literature, are risks that are related to the physical construction, operation and maintenance of the system under consideration. Foreign Direct Investment in infrastructure in many emerging markets runs the risk of encountering insufficient expertise in local environments. A lack of local technical expertise especially on topics such as safety and quality procedures coupled with a lack of understanding of the legal and financial aspects of convoluted contractual structures can sometimes lead to problems such as cost escalations and project delays. In Chapters 5 through 7 below, we begin to model the effects of such problems on the value of the project.

Further, lack of knowledge of local work practices, project procurement systems, cultural norms and values, availability and use of building materials and so on, can lead to private firms (especially foreign ones) encountering a series of impasses as they endeavor to build and operate infrastructure services. Frequently, lack of local knowledge can lead to project designs that might include materials that are not indigenously available and are very costly to import. Project plans can easily be derailed if lead times and delivery processes are not well understood within a local context. The difficulty of finding reliable partners and subcontractors in the local
environment has also posed difficulties for foreign private investors and infrastructure builders/providers. In major emerging market private infrastructure projects, many of these risks have been addressed in EPC (engineering, procurement and construction) contracts on a turnkey basis, with major international engineering companies often partnering with host country contractors. However, while it is important to understand the overall context in which project finance modeling occurs, these issues are tangential to the actual exercise of constructing a financial model. We will therefore not go into them in more detail in this course, but will continue to incorporate the associate risk elements as we learn to use project finance modeling as a tool for evaluating and assessing projects.

Chapter 1 - Summary

To summarize, the preceding discussion was intended to highlight the many advantages of using project finance as a financing tool. These include the fact that project finance can raise larger amounts of long-term, foreign equity and debt capital for a project. It protects the project sponsor’s balance sheet. Through properly identifying, understanding and allocating risks, it allows a sponsor to undertake a project with more risk than the sponsor is willing to underwrite independently. It applies strong discipline to the contracting process and operations through proper risk allocation and private sector participation. The process also applies tough scrutiny on capital investment decisions. By involving numerous international players including multilateral institutions, it can provide a kind of de facto political insurance.

On the other hand, the financing technique also presents certain disadvantages. It is a complex financing mechanism that can require significant lead times. High transaction costs are involved in developing these one-of-a-kind, special-purpose vehicles (SPVs). The projects have high cash flow requirements and elevated coverage ratios. The contractual arrangements often prescribe intrusive supervision of the management and operations that would likely not be tolerated in a corporate finance environment. Comparing and contrasting project finance and corporate finance is another useful method for understanding and appreciating the advantages and motivations for utilizing project finance as a financing mechanism.
In Chapter 1 we also identified four categories of risks that most projects are likely to face. However, not all of these risks are equally important and although it is very common for all four varieties of risks to be present on a single project, on any given project some of the above mentioned risks are likely to be more prominent than others. Depending on the type of infrastructure, the political, legal, technical, socio-cultural and environmental parameters that influence a project, one or more of these risks may manifest themselves more keenly than the others. The preceding discussion merely provides a framework to analyze the challenges and risks faced by private firms that provide infrastructure services. Project sponsors and financiers analyzing project risks typically identify several specific risk elements to then be allocated contractually among the parties involved in the project. In Chapter 4 below, we will introduce a paradigm that private investors have traditionally used to identify, mitigate and appropriately allocate some of these risks.
Chapter 2
Project Finance vs Corporate Finance

2.1 Project Finance Basics

The term “project finance” is used loosely by academics, bankers and journalists to describe a range of financing arrangements. Often bandied about in trade journals and industry conferences as a new financing technique, project finance is actually a centuries-old financing method that predates corporate finance. However, with the explosive growth in privately financed infrastructure projects in the developing world, the technique is enjoying renewed attention. The objectives of this section is to provide a basic review of project finance, contrast project finance with traditional corporate financing techniques, and highlight the advantages and disadvantages of project finance. It is also proposed that a single structure underlies every project finance transaction; and to explain the myriad of risks involved in these transactions.

Although project finance is defined above as, the creation of a legally-independent project company financed with nonrecourse debt, there really is no singular definition of project finance. For example, a major player in sponsoring infrastructure projects and providing financing in developing countries, the World Bank, defines project finance as the “use of nonrecourse or limited-recourse financing.”

Nonrecourse project finance is an arrangement under which investors and creditors financing the project do not have any direct recourse to the sponsors, as might traditionally be expected (for example, through loan guarantees). Although creditors’ security will include the assets being financed, lenders rely on the operating cash flow generated from those assets for repayment. Before it can attract financing, then, the project must be carefully structured and provide comfort to its financiers that it is economically, technically, and
environmentally feasible, and that it is capable of servicing debt and generating financial returns commensurate with its risk profile.

*Limited-recourse project finance* permits creditors and investors some recourse to the sponsors. This frequently takes the form of a pre-completion guarantee during a project’s construction period, or other assurances of some form of support for the project. Creditors and investors, however, still look to the success of the project as their primary source of repayment. In most developing market projects and in other projects with significant construction risk, project finance is generally of the limited-recourse type.

In building a more robust picture of project finance, it is helpful to articulate the full list of characteristics and to contrast project finance with corporate finance. *How can a project financing be identified? What details should we expect to find about the transaction?* Not every project financing transaction will have every characteristic, but the following provides a preliminary list of common features of project finance transactions.

**Capital-intensive.** Project financings tend to be large-scale projects that require a great deal of debt and equity capital, from hundreds of millions to billions of US dollars. Infrastructure projects tend to fill this category.

**Highly leveraged.** These transactions tend to be highly leveraged with debt accounting for usually 65% to 80% of capital in relatively normal cases.

**Long term.** The tenor for project financings can easily reach 15 to 20 years.

**Independent entity with a finite life.** Project financings frequently rely on a newly established legal entity, known as the project company, which has the sole purpose of executing the project and which has a finite life. As such, it cannot outlive its original purpose. In many cases the clearly defined conclusion of the project is the transfer of the project assets.
**Non-recourse or limited recourse financing.** The project company is the borrower. Since these newly formed entities do not have their own credit or operating histories, it is necessary for lenders to focus on the specific project’s cash flows. Thus, it takes an entirely different credit evaluation or investment decision process to determine the potential risks and rewards of a project financing as opposed to a corporate financing. In the former, lenders place a substantial degree of reliance on the performance of the project itself. As a result, they will concern themselves closely with the feasibility of the project and its sensitivity to the impact of potentially adverse factors. Lenders must work with engineers to determine the technical and economic feasibility of the project. From the project sponsor’s perspective, a key advantage of project finance is that it represents a source of off-balance sheet financing.

**Controlled dividend policy.** To support a borrower without a credit history in a highly-leveraged project with significant debt service obligations, lenders demand receiving cash flows from the project as they are generated. The project’s income generally goes to servicing the debt, covering operating expenses and generating a return on the investors’ equity. This arrangement is usually contractually binding. Thus, the reinvestment decision is removed from management’s hands, unlike the case in most corporate financings.

**Many participants.** Project finance transactions frequently demand the participation of numerous international participants. It is not rare to find over ten parties playing major roles in implementing the project. The different roles played by participants is described on Chapter 3 below.

**Allocated risk.** Because many different types of risk are present in project finance transactions, often the crucial element required to make the project go forward is the proper allocation of these risk. This allocation is achieved and codified in the contractual arrangements between the project company and the other participants. The goal of this process is to match risks and corresponding returns to the parties most capable of successfully managing them. For example, fixed-price, turnkey contracts for construction which typically include severe penalties for delays put the construction risk on the contractor instead of on the project.
Costly. As mentioned above, raising capital through project finance is generally more costly than through typical corporate finance avenues. The greater need for information, monitoring and contractual agreements increases the transaction costs. Furthermore, the highly-specific nature of the financial structures also entails higher costs and can reduce the liquidity of the project’s debt. Margins for project financings also often include premiums for country and political risks since so many of the projects are in countries that investors consider relatively high risk. Or the cost of political risk insurance is factored into overall costs. As already noted, project finance is tailored to meet the needs of a specific project. Repayment of the financing relies on the cash flow and the assets of the project itself. The risks (and returns) are borne not by the sponsor alone, but by different classes of investors (equity holders, debt providers, quasi-equity investors). Because risks are shared, one criterion of a project’s suitability for financing is whether it is able to stand alone as a distinct legal and economic entity. Project assets, project-related contracts, and project cash flows need to be separated from those of the sponsor. See also the discussion above relating to the two basic types of project finance: nonrecourse project finance and limited-recourse project finance.

2.2 A Comparison of Project Finance and Corporate Finance

Much has been written by academicians comparing project finance to corporate finance. In actual practice, most actual projects fall somewhere between the two theoretical definitions.

Another means of understanding project finance is to relate it to corporate finance by drawing the following comparison:

(1) **Corporate Finance** - Generally when a corporation chooses to undertake an investment project, cash flows from existing activities fund the newcomer; and management has the option to roll over the project’s capital into still newer ventures within the company later on - - without submitting them to the discipline of the capital market.
(2) **Project Finance** - With project financing, by contrast, the assets and cash flows associated with each project are accounted for separately. Funding for the new project is negotiated from outside sources, and creditors have recourse only to the assets and cash flows of a specific project. As the project runs its course, furthermore, the capital is returned to the investors, and they decide how to reinvest it.\textsuperscript{vii}

When evaluating a project, however, it is useful to think of it falling somewhere along a corporate finance versus project finance continuum.

The following chart summarizes the key differences between the two types of financing:
### Corporate Finance-Project Finance Continuum

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Corporate finance</th>
<th>Project finance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financing vehicle</td>
<td>Multi-purpose organization</td>
<td>Single-purpose entity</td>
</tr>
<tr>
<td>Type of capital</td>
<td>Permanent - an indefinite time horizon for equity</td>
<td>Finite - time horizon matches life of project</td>
</tr>
<tr>
<td>Dividend policy and reinvestment decisions</td>
<td>Corporate management makes decisions autonomous from investors and creditors</td>
<td>Fixed dividend policy - immediate payout; no reinvestment allowed</td>
</tr>
<tr>
<td>Capital investment decisions</td>
<td>Opaque to creditors</td>
<td>Highly transparent to Creditors</td>
</tr>
<tr>
<td>Financial structures</td>
<td>Easily duplicated; common forms</td>
<td>Highly-tailored structures which cannot generally be re-used</td>
</tr>
<tr>
<td>Transaction costs for financing</td>
<td>Low costs due to competition from providers, routinized mechanisms and short turnaround time</td>
<td>Relatively higher costs due to documentation and longer gestation period</td>
</tr>
<tr>
<td>Size of financings</td>
<td>Flexible</td>
<td>Might require critical mass to cover high transaction Costs</td>
</tr>
<tr>
<td>Basis for credit evaluation</td>
<td>Overall financial health of corporate entity; focus on balance sheet and cashflow</td>
<td>Technical and economic feasibility; focus on project’s assets, cash flow and contractual Arrangements</td>
</tr>
<tr>
<td>Cost of capital</td>
<td>Relatively lower</td>
<td>Relatively higher</td>
</tr>
<tr>
<td>Investor/lender base</td>
<td>Typically broader participation; deep secondary markets</td>
<td>Typically smaller group; limited secondary markets</td>
</tr>
</tbody>
</table>
Given the previous discussion, the advantages of project finance as a financing mechanism become apparent. It can raise larger amounts of long-term, foreign equity and debt capital for a project. It protects the project sponsor’s balance sheet. Through properly allocating risk, it allows a sponsor to undertake a project with more risk than the sponsor is willing to underwrite independently. It applies strong discipline to the contracting process and operations through proper risk allocation and private sector participation. The process also applies tough scrutiny on capital investment decisions. By involving numerous international players including the multilateral institutions, it can provide a kind of *de facto* political insurance. Further, the finite life and fixed dividend policy aspects of project finance mean that investors rather than managers get to make the decisions about reinvesting the cash flows from the project.

On the other hand, the financing technique also presents certain disadvantages. It is a complex financing mechanism that can require significant lead times. High transaction costs are involved in developing these one-of-a-kind, special-purpose vehicles. The projects have high cash flow requirements and elevated coverage ratios. The contractual arrangements often prescribe intrusive supervision of the management and operations that would be resented in a corporate finance environment.

**Chapter 2 – Summary**

Traditional finance is corporate finance, where the primary source of repayment for investors and creditors is the sponsoring company, backed by its entire balance sheet and not the project alone. Although creditors will usually still seek to assure themselves of the economic viability of the project being financed so that it is not a drain on the corporate sponsors’ existing pool of assets, an important influence on their credit decision is the overall strength of the sponsors’ balance sheet, as well as their business reputation. If the project fails, lenders do not necessarily suffer, as long as the company owning the project remains financially viable. In Chapter 3, we take a more in depth view of how lenders protect themselves in a non-recourse lending scenario.
Another distinguishing feature is that corporate finance is often used for shorter, less capital-intensive projects that do not warrant outside financing. The company borrows funds to construct a new facility and guarantees to repay the lenders from its available operating income and its base of assets. However some private companies avoid this option, as it strains their balance sheets and capacity, and limits their potential participation in future projects. Project financing is different from traditional forms of finance because the financier principally looks to the assets and revenue of the project in order to sure and service the loan.

In project finance a team or consortium of private firms establishes a new project company to build, own and/or operate a separate infrastructure project. Chapter 3 discusses in greater detail the various types of project finance transactions where the new project company or “SPV” may build, but not own or operate the infrastructure project. In either case, the new project company is capitalized with equity contributions from each of the sponsors. In contrast to an ordinary borrowing situation, in a project financing the financier usually has little or no recourse to the non-recourse assets of the borrower or the sponsors of the project. The project is not reflected in the sponsor’s balance sheet.

In conclusion, most project finance transactions contain elements of both corporate finance and project finance. Inherent in the developing of the capacity to identify projects that may be appropriate for project finance structuring, are the skills required to determine why project finance and when.
Chapter 3

The Structure of Project Finance

3.1 Structural Attributes of Project Companies

Key to understanding the relevancy of project finance and how to model project finance transactions, is the ability to identify when project finance may be appropriate for a given transaction. The structure of project finance matters. It is a key element that drives the financial model. Below is an in-depth discussion of the structure of project finance, including an over of the legal and regulatory issues that have direct implications for how we model project finance transactions.

**Organizational Structure:** Project companies involve separate legal incorporation. purpose vehicles (SPV’s, or special purpose entities, SPE’s) created to facilitate asset securitization share this feature of separate incorporation. Secured debt, a corporate obligation, does not.

**Capital Structure:** Project companies employ very high leverage compared to public corporations. Whereas few project companies have leverage ratios below 50%, almost 30% of public corporations have leverage ratios less than 5%. From this perspective, project companies resemble leveraged buyouts (LBOs).

**Ownership Structure:** Project companies have highly concentrated debt and equity ownership structures. Most of the debt comes in the form of syndicated bank loans, not bonds, and is nonrecourse to the sponsoring firms. As a result, creditors must look to the project company itself for debt repayment.

In terms of equity ownership, the typical project company has from one to three sponsors, and the equity is almost always privately held. Looking only at the concentrated equity ownership structure, project companies resemble venture-backed companies. In the average project company, the largest single sponsor holds 65% of the equity; in 30% of all projects, a single sponsor holds all of the equity. The
concentrated equity ownership resembles pre-IPO venture-backed companies, except that managers do not typically own any project equity.

**Board Structure:** Project boards are comprised primarily of affiliated (or “gray”) directors from the sponsoring firms. In terms of size, the typical project board has around 10 members for large members and generally not less than 7 for smaller projects. There is a weak, but significant positive relation between project size and board size.

**Contractual Structure:** Project finance is sometimes referred to as “contract finance” because a typical transaction can involve as many as 15 parties united in a vertical chain from input suppliers to output buyers through 40 or more contractual agreements. The four major project contracts govern the supply of inputs, purchase of outputs (known as off-take or purchase agreements), construction, and operations. Larger deals can have several hundred and up to several thousand contracts.

At first, many of the structural features of project finance may appear counter-intuitive especially, when compared to the alternative of using corporate finance. Creating a stand-alone project company takes more time (from 6 to 18 months more) and requires significantly greater transaction costs than financing an asset on an existing balance sheet. For example, the total transaction costs for infrastructure projects is generally estimated to be on average 3% to 5% of the amount invested, but can be as high as 10% for smaller and unique or first-of-a-kind projects. Project debt is often more expensive than corporate debt—spreads (promised yields) can be 50 to 400 basis points more—because creditors cannot rely on the cross-collateralized cash flows and assets the way they can with corporate debt. Finally, the combination of high leverage and extensive contracting severely restricts managerial discretion. For long-term projects with uncertain futures, managers of both sponsoring firms and project companies might prefer greater discretion. In reality, however, the individual structural components fit together in a very coherent and symbiotic way, and can reduce the net financing costs associated with large capital investments.
The diagrams below provide an overview of the project finance structure.

**Project Finance Structure**
3.2 The Major Players – Project Finance Transactions

**Government.** Though local governments generally participate only indirectly in projects, their role is often most influential. The local government’s influence might include: approval of the project, control of the state company that sponsors the project, responsibility for operating and environmental licenses, tax holidays, supply guarantees, and industry regulations or policies, providing operating concessions.

**Project sponsors or owners.** The sponsors are the generally the project owners with an equity stake in the project. It is possible for a single company or for a consortium to sponsor a project. Typical sponsors include foreign multinationals, local companies, contractors, operators, suppliers or other participants. The World Bank estimates that the equity stake of sponsors is typically about 30 percent of project costs. Because project financings use the project company as the financing vehicle and raise non-recourse debt, the project sponsors do not put their corporate balance sheets directly at risk in these often high-risk projects. However, some project sponsors incur indirect risk by financing their equity or debt contributions through their corporate balance sheets. To further buffer corporate liability, many of the multinational sponsors establish local subsidiaries as the project’s investment vehicle.

**Project company.** The project company is a single-purpose entity created solely for the purpose of executing the project. Controlled by project sponsors, it is the center of the project through its contractual arrangements with operators, contractors, suppliers and customers. Typically, the only source of income for the project company is the tariff or throughput charge from the project. The amount of the tariff or charge is generally extensively detailed in the off-take agreement. Thus, this agreement is the project company’s sole means of servicing its debt. Often the project company is the project sponsors’ financing vehicle for the project, i.e., it is the borrower for the project. The creation of the project company and its role as borrower represent the limited recourse characteristic of project finance. However, this does not have to be the case. It is possible for the project sponsors to borrow funds independently based on their own balance sheets or rights to the project.
**Contractor.** The contractor is responsible for constructing the project to the technical specifications outlined in the contract with the project company. These primary contractors will then sub-contract with local firms for components of the construction. Contractors also own stakes in projects.

**Operator.** Operators are responsible for maintaining the quality of the project's assets and operating the power plant, pipeline, etc. at maximum efficiency. It is not uncommon for operators to also hold an equity stake in a project. Depending on the technological sophistication required to run the project, the operator might be a multinational, a local company or a joint-venture.

**Supplier.** The supplier provides the critical input to the project. For a power plant, the supplier would be the fuel supplier. But the supplier does not necessarily have to supply a tangible commodity. In the case of a mine, the supplier might be the government through a mining concession. For toll roads or pipeline, the critical input is the right-of-way for construction which is granted by the local or federal government.

**Customer.** The customer is the party who is willing to purchase the project’s output, whether the output be a product (electrical power, extracted minerals, etc.) or a service (electrical power transmission or pipeline distribution). The goal for the project company is to engage customers who are willing to sign long-term, off-take agreements.

**Commercial banks.** Commercial banks represent a primary source of funds for project financings. In arranging these large loans, the banks often form syndicates to sell-down their interests. The syndicate is important not only for raising the large amounts of capital required, but also for de facto political insurance. Even though commercial banks are not generally very comfortable with taking long term project finance risk in emerging markets, they are very comfortable with financing projects through the construction period. In addition, a project might be better served by having commercial banks finance the construction phase because banks have expertise in loan monitoring on a month-to-month basis, and because the bank group has the flexibility to
renegotiate the construction loan. In addition to commercial banks, DFIs play an important role in syndication for projects located in developing countries. xii

**Capital markets.** Over the past decade, major investment banks completed a number of capital market issues for international infrastructure projects. Through the private placement market, these banks have successfully raised capital from institutional investors. As a consequence, many pundits are touting the capital markets as the instrument of choice for financing emerging markets transactions. The capital market route can be cheaper and quicker than arranging a bank loan. In addition, the credit agreement under a capital market is often less restrictive than that in a bank loan. Furthermore, these financings might be for longer periods than commercial bank lending; might offer fixed interest rates; and can access wider pool of available capital and investors such as pension funds. One of the challenges of project financing in emerging markets, particularly in Sub-Saharan Africa, is the lack of market liquidity that makes raising capital via private placements a major obstacle for investors in these markets.

The disadvantages of capital market financings include: the necessity of preparing a more extensive disclosure document; capital market investors are less likely to assume construction risk; the bond trustee plays a greater role; more disparate investors - not a club of banks; unlike bank debt, proceeds are disbursed in a single lump sum, leading to negative carrying costs. Credit agency ratings for project finance transactions, however, are making the capital market route much smoother by making credit evaluations more transparent.

**Direct equity investment funds.** Private infrastructure funds represent another source of equity capital for project financings. Examples of these funds include AIG Asian Infrastructure Fund, Peregrine’s Asian Infrastructure Fund, Global Power Investments, the Scudder Latin America Infrastructure Fund, the Emerging Africa Infrastructure Fund, Harith’s Pan African Infrastructure Development Fund and the EU-Africa Infrastructure Trust. These funds raise capital from a limited number of large institutional investors. Then their advisory teams screen a large number of infrastructure projects for potential
investment opportunities. The funds typically take minority stakes of the infrastructure projects in which they invest.

**Multilateral agencies.** The World Bank, International Finance Corporation, the African Development Bank and regional development banks often act as lenders or co-financers to important infrastructure projects in developing countries. In addition, these institutions often play a facilitating role for projects by implementing programs to improve the regulatory frameworks for broader participation by foreign companies and the local private sector. In many cases, the multilateral agencies are able to provide financing on concessional terms. The additional benefit they bring to projects is further assurance to lenders that the local government and state companies will not interfere detrimentally with the project.xiii

**Export credit agency.** Because infrastructure projects in developing countries so often require imported equipment from the developed countries, the export credit agencies (ECAs) are routinely approached by contractors to support these projects. Generally, the ECA will provide a loan guarantee or funding to projects for an amount that does not exceed the value of exports that the project will generate for the ECA’s home country. Over the past decade, ECA participation has increased rapidly from zero to an estimated $10 billion a year. Again, ECA participation can bolster a project’s status and give it a certain amount of de facto political insurance. The African Export-Import Bank is an important ECA for infrastructure projects on the continent of Africa.xiv

A range of other participants also play important roles. Insurers, such as national agencies, private insurers and multilateral institutions, offer political risk and other insurance to project sponsors. Legal advisers play a role in assembling project finance transactions given the number of important contracts and the need for multi-party negotiations. Legal advisers also play a role in interpreting the regulatory frameworks in the local countries. From the outset, the project sponsors might work with a financial adviser, e.g., commercial bank, investment bank or independent consultant, to structure the financing for the project. The trustee is typically responsible for monitoring the project’s progress and adherence to schedules and specifications, usually working with
the independent engineer to coordinate fund disbursements against a project’s actual achievement.

Chapter 3 - Summary

Many of the factors enumerated above are considered by lenders when deciding whether to finance a project. These factors also determine a project’s “architecture” or how the financing of the project will be structured. What convinces the lender to extend a finance facility is an assurance that, irrespective of the project’s success or failure, the project finance provides a “win-win” situation for the lender. To this end, the project’s legal advisors prepare volumes of documents to record the rights and obligations of the parties. Up until all the obtained finances have been repaid by the borrowing project company, these lenders – playing their back-stage role – have a lot more power than what the owners of these large-scale projects are thought to possess.
Chapter 4

The Project Finance Legal Framework

As noted above, the parties involved in project-finance transactions may include insurance companies, general contractors, credit providers, government agencies, financial institutions, and corporations. Project financing can involve multiple banks and lenders, with varying degrees of risk. It is a complicated process, and with so much at stake it must be carefully structured and documented.

In order to safeguard against and mitigate the various risks that are prevalent on private infrastructure investments, large infrastructure projects have historically adopted a legal framework that can be titled the ‘Global Projects Legal Paradigm’. The global projects legal paradigm consists of the following broad categories: evaluation of the domestic legal framework and context in the host country, contract structure (comprising both risk allocation and incentive aligning measures), choice of law provisions, arbitration and other dispute resolution mechanisms.

4.1 The Domestic Legal Framework

There are two broad aspects of the domestic legal framework that are taken into account on private infrastructure projects. The first is the general quality of law – whether an appropriately regulated legal environment exists in the host country, to what extent property rights are respected and enforced, and so on. Secondly, specialized laws relating to private infrastructure projects also need to be taken into consideration. BOT laws or variations thereof (e.g., BOO, BLT, BTO, etc.) for green fields; laws relating to privatization and concessions (laws that regulate the rates that can be charged by utilities or the amount of profit that can be made) for brown fields; the presence of independent regulatory agencies, their motivations and incentives, and the amount of influence that they can exert on these projects; specialized laws that may apply to different infrastructure sectors (for instance, regulatory or entry barriers that are set in the telecommunications sector in countries like South Africa, or tariff price caps in the water and sanitation sectors and so on); general laws and parameters that pertain to
Foreign Direct Investment, such as foreign exchange reserves, currency fluctuations, tax incentives and structures, obtaining licenses and approvals; infrastructure sector reforms and issues pertaining to modes of bidding for contracts; and guarantees that are provided by host governments (including the historical performance of the government on these guarantees, the nature, risk and uncertainty of the guarantees and so forth) are all issues that need to be considered and managed in terms of project risks related to the domestic legal framework.

**Contract Structure and Risk Allocation:**

There are several issues to be considered and planned for while drawing up the contract, building, operating and maintaining the infrastructure facility. Below, we discuss in detail the legal framework, but for now – keep in mind that project agreements are driven in large part by the factors briefly set out below:

- **Construction and Performance Risk.** These are sets of risks, as enumerated in the Chapter 7 below, that pertain to the Procurement and Construction of these projects. These risks have traditionally been allocated to the EPC (Engineering Procurement and Construction) Contractor and to the Operator in the contract documents and other relevant agreements that pertain to the physical building of the infrastructure.

- **Fuel Risks.** For certain types of infrastructure (in the power sector in particular), there are risks pertaining to fuel supply such as the timely availability of adequate amounts of fuel, price fluctuations and so on that must be considered. Most investors prefer to allocate these risks to the host government; either by having the government provide the fuel directly, or by obtaining a contractual fuel pass-through agreement, wherein the tariff charged for usage of the service provided by the infrastructure (e.g. the cost of electricity in the local setting), reflects the cost of the fuel.

- **Force Majeure or ‘Acts of God’** that are both unexpected and out of the control of the project participants are also risks that may beset private infrastructure projects. This risk is usually mitigated through the procurement of project insurance from entities such
as the Overseas Private Investment Corporation (OPIC) and the Multilateral Investment Guarantee Agency (MIGA).

- Political risk has been difficult to allocate effectively. Political risk insurance and Sovereign Guarantees are strategies that have historically been used to mitigate political risk. However, standard political risk insurance rarely provides complete coverage against every possible manifestation of political uncertainty, because the distinction between political risk and appropriate regulatory discretion exercised by the host government, is often unclear. Sovereign guarantees have, in some high-profile cases been difficult or impossible to enforce for investors.

As mentioned above, many of these risks can be dealt with through the contractual and financing structures that are created for these projects. The financial architecture of a project has the dual role of allocating risk and making effective renegotiation possible. For instance, the sale of an equity stake on a project to a multilateral institution such as the World Bank, would then shift certain political risks and the risk of expropriation on to this institution, thereby providing it with the incentives to combat any attempts at renegotiation by the host government. The leverage ratio while financing a project can also be used to allocate risks. Downside risks that must be minimized such as the risk of expropriation can be dealt with by raising debt from parties that might be able to control this risk, such as national banks and export credit agencies. Upside risks such as operating risks are best dealt with by issuing equity stakes to operators, contractors and perhaps even suppliers on projects. Financing sources for a project should therefore be carefully chosen to allocate risks to those parties that are best qualified to bear these risks.

- Project insurance is another issue that merits attention for private infrastructure investment.

- Co-investors or partners must be chosen using appropriate criteria such as financial sustainability, experience, ease and openness of communication and so on.
• Commercial Risk. Purchase agreements with host governments, such as PPA’s need to be carefully considered in order to ensure profitability of a project and reduce the risk of renegotiation. In the case of regulated industries, this risk is generally allocated to the host-government through reliance on long term purchase contracts such as PPAs in the power sector.

4.2 Choice of Law

Project Sponsors must decide the type of law that will govern the contractual structure of the project. Using foreign laws from developed countries is an option on many projects, which may lead to less uncertainty in contract interpretation. Conventional project documentation almost always specifies that New York, British, or French law will control matters of contract interpretation. However, there may be great difficulties in enforcing these laws in the local environments. Furthermore, many aspects of the projects, particularly the rights of creditors over the project assets, are almost always governed by domestic law in the host country. Thus, the management of risks of this type is handled through evaluation of the legal context in the host country, as has been discussed earlier.

Arbitration and Dispute Resolution:

In terms of arbitration and mediation, choices must be made as to whether disputes will be resolved locally or offshore. By using tribunals or courts overseas, project stakeholders may be able to avoid corrupt courts in emerging countries. The methods by which awards/settlements will be enforced (public agencies vs. private enforcement) must also be considered.

The rapid expansion of trade and commerce accompanied by large investments has led the developing world to accept arbitration as the norm. In order to attract private foreign investment in infrastructure, many emerging markets have paid a large amount of attention to setting up arbitration centers with established rules. This has been true for China for example. Studies show that many APEC (Asia-Pacific Economic Cooperation) economies have worked hard at streamlining their investment procedures which may
explain why DFI in these emerging markets dwarfs that of Sub-Saharan Africa. These studies indicate that at the heart of any international investment agreement is an effective dispute mechanism. Transparency in dispute resolution systems also results in parties being more likely to use the system. The creation of organizations such as the International Center for the Settlement of Investment Disputes (ICSID) under the auspices of the World Bank, has aided these efforts.

**Transparency:**

Finally, measures should be taken to involve the local community stakeholders in project negotiations, to use tools, methods and to disseminate information on the project so that misunderstandings are allayed. Special Interest Groups such as NGO’s must also be included in the planning and negotiation processes.

Although such concerns have not normally been an integral part of the Global Projects Legal Paradigm that firms and investors have deployed on private infrastructure projects, we would like to highlight these issues for two reasons. Firstly, there has been growing acknowledgment that the lack of transparency could play a significant role in the failure of private infrastructure investments. Secondly, in the recent past, private investors have indeed paid a lot more attention to involving local communities and stakeholders through the shaping of infrastructure projects. This suggests that transparency is indeed an implicit addition to the Global Projects Legal Paradigm.

4.3 Contract Structure and Perfecting Security in Projects

Each project gives rise to its own risks and, hence, poses its own unique challenges. Those advising on project financing need to act creatively to meet the challenges and efficiently minimise risks. Full recovery of the extended finances, along with the profit or interest returns, remains a primary concern. Therefore, a closely associated concept of security or collateral plays an integral role in all project financing.

**Security or collateral.** A security or collateral is a safeguard or remedy available with the lender in the event the borrower fails to honour its obligation to repay the obtained
finance facility. As and by way of security for the repayment of the extended finance facility, a charge is created over assets of the project and/or the sponsors in favour of the lender. Terms like mortgage, pledge, hypothecation and lien are different forms of encumbrances created over varying assets used as collateral. These collaterals may be further supplemented by individual, corporate and sovereign guarantees and assignment of rights. In the event the borrowing project company defaults in its payment obligations, the lender is generally entitled to liquidate those charged assets and settle its claims from the proceeds so realised. In practice however, the realization of the underlying securitized asset is often easier said than done.

In practice, questions like which collaterals are generally used for securing lenders in a given jurisdiction and what procedures are involved for the perfection of such collaterals are pivotal from the inception of any project. Also note that the answers to these questions will differ depending on the jurisdiction in which the project is being implemented. Only a perfected security or collateral can be enforced by the lender to satisfy its claims prior to the satisfaction of claims raised by the unsecured parties against the borrower.

The term “perfection of security” is a legal financing term that has no defined statutory or judicial meaning. It is a concept that may vaguely refer to the procedural steps required to ensure the security interest is enforceable in favour of a creditor. Therefore, perfection of security interests means different things in different jurisdictions. Creditors in whose favour a security interest has been perfected are known as secured creditors. In the event of liquidation of a security asset, secured creditors take priority over those creditors in whose favour security interests have not been perfected. In other words, the liquidation proceeds are, generally, first applied to satisfy claims of the secured creditors and the remaining amount is directed to unsecured creditors.

Generally, one or more of the following collaterals or securities are created to secure repayment of project financing:
**Land/Building Mortgage:** This is a security whereby the owner of a piece of land or a building creates a charge over that land or building in favour of the lender. In the event of default, the lender is entitled to sell the mortgaged land and apply the proceeds so realised to settle the outstanding amount due and payable by the borrower. This entitlement is subject to the applicable enforcement procedure. To evidence the creation of a mortgage, a written agreement is executed by the parties before a Notary Public. The notarised agreement is then registered at the appropriate land registration or deeds bureau.

**Business Mortgage:** Compared closely with hypothecation in some jurisdictions, a business mortgage is a charge over a “place of business”, which generally extends to cover a collection of tangible and intangible assets. These assets may in particular include, goods, furniture, industrial machinery, contracts with customers, goodwill, trade name, lease rights, intellectual property rights and licenses. A business mortgage does not, however, include immovable property. In the event these assets are not expressly stated in a written agreement, a mortgage over a place of business would, by default, only include trade name, lease rights, contracts with customers and goodwill of the business. To evidence the creation of a business mortgage, a written agreement is executed by the parties before the Notary Public. Project financier advisors must then make certain that the notarised agreement is then registered at the appropriate ministry and in some jurisdictions is also published in a local newspaper for perfection of this security. From a practical perspective, all parties with whom any contracts have been entered into are notified of the business mortgage and their acknowledgement is sought in respect thereof.

**Share Mortgage:** This is a security whereby a charge is created over the designated shares in the capital of a company along with rights over dividends and other benefits attached to such shares. However, the secured party does not have a right to attend shareholders’ meetings or participate in shareholders’ resolutions. Different rules apply for perfection of this security depending on the type of company.
**Charge over Bank Account**: This is a security whereby a floating charge is created in favour of the lender over any amount standing in a designated bank account. In the event of default, the floating charge freezes over the amount in that bank account. The bank in which the account is maintained is then notified of the charge and its acknowledgement is obtained as a pre-condition of the security. Apart from the execution of a written agreement to evidence the creation of a charge and the said notification, there are generally no other formality requirements for perfection of this security.

**Assignment of Receivable**: This is a security whereby all present and future rights in receivables (in other words, claims that are expected to be collected or received) in connection with the project are assigned in favour of the lender. All parties from whom receivables are expected are notified and their acknowledgement is obtained as a pre-condition. Apart from the execution of a written agreement to evidence assignment and the said notification of assignment, there are no other formal requirements for perfection of this security.

**Guarantee**: A commonly used term, guarantee is a security whereby the guarantor assures the lender that the borrower’s payment obligations in connection with the finance facility will be duly discharged by the guarantor in the event the borrower fails to do so. Apart from the execution of a written agreement to evidence guarantee, there are no other formal requirements for perfection of this security.

**Security Agent**: Depending on the jurisdiction where the project is located, in many cases, assets to be secured in favour of lenders for project financing will be located in the same jurisdiction also. This presents an enforcement risk for overseas lenders who are not physically present in the same locale as the project. In such situations, it is common for foreign lenders to appoint a local financial institution, generally a bank licensed by the Central Bank of the jurisdiction in which the project is located, to act as a security trustee or agent on behalf of the lenders. All securities are created in favour of the security agent who holds them for and on behalf of lenders. Security agents are also appointed in case there are multiple lenders.
**Weighing up Securities:** Collateralisation is an important and intricate process and although most financing in the project finance context is “unsecured”, lenders go to great length to secure the project’s assets to the extent possible. Securities that require registration for their perfection are weighed between their registration charges, their relative ease and associated cost of enforcement, and the level of protection they guarantee to the lenders.

Enforcement of one security may be slightly less burdensome than another. For example, enforcement of charge over bank account, assignment of receivables and guarantee may be a relatively straightforward procedure compared to enforcing land, business or share mortgages, which can entail both a lengthy and convoluted process. Yet, the value of land, business or shares may be significantly higher than all other securities combined. In the end, all such commercial considerations must be seen in light of anticipated legal and procedural hurdles.

**Chapter 4 - Summary**

This Chapter provides an overview of the legal landscape in which project finance transactions are structured. It details many of the risks and factors that are considered in structuring project finance transactions involves substantial private sector participation. It also provides a detailed overview of how project financiers structure projects in order to attempt to perfect their security interest in project assets. This discussion may, at first, seem counter-intuitive to the notion of project finance being generally “non-recourse” financing. However, it provides a basis for appreciating that although project financiers may not have recourse to the assets of the key project sponsors (i.e. government) in the event that a project fails, a large part of project finance structuring is geared towards mitigating the lender’s inherent project risk by maximizing the extent to which they have recourse to project assets.

With regards to the legal framework, one of the issues that has been raised is that there is a varying quality of host country legal systems, including BOT legislation and procedures. Further, a key requirement is the enforceability of the contractual rights
against governance agencies of the host countries, as large sums of money are usually involved in these projects. This notion has also been reinforced by the identification that although investors are prepared to accept commercial risks on projects, their decision to invest will depend heavily on the existing legal frameworks in the host country, and the potential to obtain impartial resolutions for any disputes that arise.

BOT project agreements have evolved, across developing countries and emerging markets, with substantive common features, including dispute regimes and the experience derived from completed projects, but with idiosyncratic changes on a country by country basis to reflect matters such as culture, economy, variation in legal systems, politics etc. There has also been a growth in interest in public procurement reform in developing and transitional countries, and significant procurement legislation has been introduced in regions where no procurement legislation previously existed. This process has been aided by organizations such as UNCITRAL (United National Commission on International Trade Law) that have laid down model laws and guidelines both for the procurement of goods, construction and services; as well as model legislative provisions for privately financed infrastructure. These guidelines address issues such as the setting up of appropriate legal infrastructure, aided by transparency and independent regulation, in order to successfully attract and sustain investment in private infrastructure projects.

Appendix A below contains a workbook that sets out the typical clauses in one of the principal agreements in any project finance transaction: the concession agreement. In addition, the workbook highlights key issues and notes to be considered as you familiarize yourself with the legal framework and structure of project finance. These are organised in the usual order of the concession agreements, the content headings are set out in the first column.

Where there are a number of different ways of dealing with an issue, alternatives are provided. Alternatives are not provided when the differences are not significant or mainly stylistic (for example in the case of boilerplate clauses). The example clauses are illustrative only. These example clauses are also not appropriate for use in all
circumstances, nor are these examples "perfect" in a sense that the drafting can be improved upon. The reader is encouraged to go to the actual agreement to see the clause in context. No references are provided where the clauses are drafted by us, or where the clauses are so standard as to appear in almost identical form in most agreements.
Chapter 5

The Project Finance Model

As noted in Chapter 2 above, projects are often organized as an “SPV” or special purpose vehicle. As such, a project finance vehicle is not organized as an on-going entity. This assumption is very different from corporate finance, where it is assumed that the ongoing legal entity conducting the business and receiving the investment would exist for perpetuity. Project finance is different. The SPV within the project finance context is designed to exist for a limited duration, although in the case of some large infrastructure projects, that duration may be for 20 to 30 years. Nevertheless, it is important to note in project finance modeling that the SPV exists for a specific period of time and after the purpose of the project is solved, the SPV is dissolved. That means that the horizon of analysis is NOT perpetuity or infinity, but a known time frame for which the SPV is formed.

The other typical difference is that in project finance, there are long gestation projects, with almost no cash flow in the beginning. The other factor to recall here is the large number of players involved (See, Section 3.2 above). These basic differences in the project finance versus the corporate finance structure create a host of additional factors that must be considered within the financial modeling context. For example, much has been written about the implications of the principal-agency problem in the project finance modeling context.xvi

Below is a brief cap of some of the key elements of project finance critical for the development of a sound project finance model:

Identify which type of project you are modeling? Greenfield – a fresh start, or Brownfield – expansion of an existing project.

Separate entity (Parent) and SPV status? Remember that the risk of the transaction is generally measured by the creditworthiness of the project itself rather than that of its owners (Sponsors).
Measure(s) taken by project lenders to try and create recourse? In a typical project finance context, financial institutions cannot go to the parent level to get their money back in the event that the SPV loses money. The money has to be generated at the SPV level. Typically these loans are secured by the project assets and the core project contracts.

Timing of cash flow? The cash flows from the project comes only after the project is fully complete (takes more than a single financial year for completion) and are usually the sole means of repayment of the borrowed funds. In this regard, cash flow really is “king”. Many project fail because of flaws in the financial model relating to erroneous cash flow projections.

Who are parties involved and how do they impact the model? Sponsors/Contractors/Suppliers/Governments/Global financiers etc.

Length of gestation? From inception of an idea to Financial Close, a Project Finance deal can take years to negotiate. How does this affect the project finance model? Note also that, depending on the type of project, delay risk (discussed below) can be more relevant for projects with long gestation periods (i.e. toll roads, large real estate investments, telecoms projects etc.) due to the large upfront capital outlays required. This means that even small delays in generating cash flow can have disastrous implications for the project.

Identifying Key Risks in Your Model? The success of the project depends a lot on identifying risks, allocating them appropriately and ensuring that the responsible parties are adequately incentivized to manage their risks efficiently.

5.1 Financial Modeling – An Overview

One way to understand the need for financial models is to look at what the financial sector is dealing with. For example, you are likely to be at customer of bank in some regard. What we see as customers are products and services offered by banks, securities firms and insurance companies. The financial institutions receive our
deposits, savings and insurance premiums and offer management of investments, loans, insurance cover and pensions. With a more abstract description we could say that cash flows in and out are handled by these institutions. What is more important is that some of these cash flows may be uncertain at a given moment in time. Certain cash flows may be of a size that cannot be predicted with certainty, such as the yield on bonds or equity. In particular, some future cash-flows may turn out to be nil or non-existent, due to the default of those who should provide this cash-flow, or due to that the conditions for payment will not be satisfied, i.e. you decide to take a holiday in lieu of saving the usual monthly amount.

A basic project finance model has the following broad categories

- 1.Capital Expenditure
- 2.Revenue forecast
- 3.Expense forecast
- 4.Debt Schedule
- 5.Books of Accounts
- 6.Equity return and Valuation
- 7.Scenario Analysis

Project finance models are usually built as Excel spreadsheets and typically consist of the following interlinked sheets:

- Data input and assumptions
- Capital Expenditure
- Debt Schedule
- Revenue Sheet
- Cost Sheet
- Accounting Statements
- Analysis for Debt repayment and return on Equity
Financial Modeling Defined:

Theoretically, we define a financial model as a set of assumptions about future business conditions that drive projections of a company’s revenue, earnings, cash flows and balance sheet accounts.

As noted above, a financial model is a spreadsheet (usually in Microsoft’s Excel software) that is used to forecast a company’s future financial performance. Properly projecting earnings and cash flows into the future is important since the intrinsic value of the project company depends largely on the outlook for financial performance of the SPV. We discuss in detail the various methods for valuing the SPV in Chapter 6 below. Within the context of project finance modeling, the only difference from valuing the shares of a company within the corporate finance context is that we are modeling an SPV that has unique characteristics that must be incorporated into our model. In Chapters 1 through Chapters 4 we have discussed these unique characteristics, as well as some of the ways that Project Finance both differs from and is similar to Corporate Finance.

Simply put, a project finance model is a financial model. The spreadsheets are tables of financial data organized into fiscal quarters and/or years. In this Chapter we begin to analyse in detail the components of each table which is generally organized on separate worksheets within Excel representing the balance sheet, income statement and cash flow statement of a future quarter or year. The rows of the table represent all the line items of the SPV or project’s financial statements, such as revenue, expenses, share count, capital expenditures and balance sheet accounts. Like financial statements, one generally reads the model from the top to the bottom, or revenue through earnings and cash flows.

Each quarter or year embeds a set of assumptions for that period, like the revenue growth rate, the gross margin assumption and the expected tax rate. These assumptions are what drive the output of the model - generally, earnings and cash flow figures that are used to value the SPV or help in making financing decisions for the project being financed.
Assumptions – Using History as a Guide:

When trying to predict the future, a good place to start is the past. Therefore, a good first step in building a project finance model is to fully analyze a set of financial data for similar projects and link projections in your model to the historical data as a base for the model. If a similar project in the same geographical area has generated gross margins in the 40% to 45% range for the past ten years, then it might be acceptable to assume that, with other things being equal, a margin of this level is sustainable for your future project.

Consequently, the historical track record of gross margin can become somewhat of a basis for a future income projection. When analyzing and evaluating projects, it is always a good idea to start by examining and analyzing historical trends in revenue growth, expenses, capital expenditures and other financial metrics before attempting to project financial results into the future. For this reason, project finance model spreadsheets usually incorporate a set of assumptions and projections that are derived from an analysis of historical data and trends. These assumptions are the key drivers of the project finance model.

Example of Financial Models and Methods

With the framework that we have establish in Chapters 1 through Chapters 4 above, we can now begin to explore some concrete approaches to project finance modeling. As mentioned immediately above, it cannot be overly stressed that a firm and in depth understanding of project to be modeled is always the best starting point. It is also important to note that while our principal concern here is with developing the elements of sound project finance modeling, there are many different types of financial models that exists and are used every day by financial institutions to try and predict market behavior. For example, stock market investors use stochastic financial calculus, including models for derivative instruments in order to try and exploit arbitrage opportunities.
In addition to uses within the capital markets context, financial modeling is key to credit scoring which is being increasingly used by commercial banks to manage their portfolio risks. Life insurance companies have long used sophisticated financial modeling for pricing insurance risk. Computing as an exponentially growing technology is making certain methods or approaches to financial modeling more practical than before. One example is methods based on the Bayesian approach that can be combined with empirical data rather than subjective \textit{a priori} information (\textit{e.g.} credibility methods in insurance and the area of stochastic simulation for Bayesian inference, known as the Markov chain Monte Carlo approach).

Models describing inhomogeneous processes, especially rare or catastrophic events are of particular interest in the project finance arena, although there are limits for what can be said in such cases. Information is scarce and it may take a very long time to evaluate whether decisions based on the models were correct. Extreme value theory can be explored further, but perhaps best within the framework of sensitivity testing rather than prediction.

When measuring the total exposure to risk of a financial entity, it is clear that models should reflect various kinds of dependencies. Such dependencies occur between consecutive periods of time and between various types of activities. Models incorporating dynamic control mechanisms can explain some of the dependencies over time. In a more descriptive approach, there seems to be further work to be done in finding and describing correlation between asset types and correlation between types of business. One area where such interactions are studied is the area of asset liability models, where there is interaction between the two sides of the balance sheet. Future development and experience with such financial modeling can be expected.

\textbf{5.2 Deriving Revenue Projections}

In Chapter 6 we learn how to value projects. However, some elements of valuation are critical to deriving the assumptions which, in turn, drive the project finance model. For example, revenue growth rate assumptions can be one of the most important
assumptions in a financial model. Small variances in top-line factors that impact a project’s profitability can mean big variances in the project’s cash flows and therefore the project’s valuation; since in project finance, cash flows are critical as discussed on further in Chapter 5 below. For this reason, it is imperative that in analyzing and evaluation project finance transaction, you pay close attention to getting the top-line revenue projections right. Again, a good starting point is to look at the historic track record of revenue for similar projects and to make assumptions that take into consideration the present project.

Once one has examined historical trends and reviewed (to the extent possible) information from similar transactions, it is advisable to meet the project’s key management whose input and thinking is critical in development realistic and meaningful future revenue projections. From there analyze if the outlook is reasonably conservative, or optimistic based on a thorough analytical overview of the project. In this regard, scenario planning is key and it makes sense to develop different versions of the model that incorporate a range of assumptions from best case (least conservative) to worse case (most conservative). **Exercise 5.3.5** below is designed to help you to develop an appreciation for the importance of scenario planning in project finance modeling.

Below is an example of a simple formula for calculating a project’s future revenue:

A project’s future revenue projection is frequently driven by a formula in the worksheet such as:

\[ R_1 = R_0 \times (1+g) \]

- where \( g \) is a percentage growth rate
- where \( R_1 \) is next year’s revenue estimates
- where \( R_0 \) is the current year’s revenue estimates

**Operating Expenses and Margin**

We have stated that the historic trend is a good place to start when forecasting expenses. However, in start-up projects historical information is not available. Most large scale infrastructure projects, for example, will have no history or track record. As
such, acknowledging that project financials are usually pro forma at project commencement means that work must be done to make sure that assumptions are grounded in logic and sound analysis of the information that is available. There are large possible differences in the ranges of both the fixed and variable potential project costs and it is necessary to not only engage in scenario planning, but it is also important to consider both the dollar amount of costs and their proportion of revenue over time.

If general and administrative expenses for similar projects have ranged between 8% and 10% of revenue, then, all things considered, this could be the basis for a projection - again tempered by management's guidance and an outlook for the project as a whole. If economic conditions in the local economy are improving rapidly, this fact is incorporated into the revenue growth assumptions of the project and it is then likely that general and fixed expenses as a percentage of revenue may be less than 8-10%. That means that margins are likely to increase, which could be a good sign for the project's investors. A key point to remember here is that project finance modeling is a dynamic exercise and sound models are not only important to valuing the project and capital raising, but is also an important project management tool.

Expense-line assumptions are often reflected as percentages of revenue and the spreadsheet cells containing expense items usually have formulas such as:

\[ E_1 = R_1 \times p \]

- where \( E_1 \) is the expense
- where \( R_1 \) is the revenue for the period
- where \( p \) is an expense percentage of revenue for the period

**Non-Operating Expenses**

For most projects that we will be required to analyze and evaluate, non-operating expenses are primarily interest expense, as most large infrastructure projects are highly leveraged. Within the Corporate Finance context, income taxes would be the second
largest non-operating expenses. However, within the project finance arena, many projects are structured as PPPs and often enjoy tax concessions or tax credits as part of the contribution of government as a key sponsor. Accordingly, it is beneficial to have a parent of key financier of the project be an entity that has the capacity to absorb such tax credits/concessions.

The important thing to remember when projecting interest expense is that it is a proportion of debt and is not explicitly tied to operational income streams. An important analytical consideration is the current level of total debt owed by the borrowing entity or concessionaire (the SPV).

5.3 Modeling Changing Factors – Delay in Project Implementation

As we have noted, investors in typical project finance transactions normally look to the project’s cash flows for repayment. Lenders typically also rely on project cash flows for the timely repayment of project debt. Due to these and other factors discussed above that are normal within a project finance context, there are a number of competing interesting for cash flow. It follows that one of the most important category of risk to identify in project finance are those risks that have the capacity to impact the project's cash flows. Delay risk is one such risk. Delay in a project can significantly impact when the project will start to generate cash flows crucial to servicing debt and maintaining the expected project internal rates of return\textsuperscript{xxix}.

There are multitudes of ways in which various projects can be delayed. Some delays are typical to the type and nature of the specific project. Learning to identify and anticipate the different types of delays relevant to each project is important to effective project finance modeling, as each delay may have its own repercussions on the project’s cash flows and return. The following are a few types of delays typical in project finance transactions of all types:

- There is an implementation risk (delay because you could not execute the project in time);
• Delay in start of project (could be because of regulatory approvals and, as such, is also a regulatory risk);
• Delay in project commencement because no funds were available (or delay in arranging the funds); and
• Delay in collection of revenues (you build a toll road and road users refuse to pay the toll – operating risk).

Typically each of these delays would have different affect on the cash flows. For example, if you are implementing a real estate residential project and you are not able to sell the homes – you have incurred all your cash outflows and your inflows are delayed. This would spell doom for the returns. On the other hand, if there is a delay in staring the implementation because of non acquisition of land, typically your cash outflow is not there so the affect would not be that large.

Exercise 5.3 - The Case of ABC Housing Co.

ABC housing company is planning to start the project on 1 Jan 2002 and is expecting to complete the construction over a period of 3 years. The construction cost is expected to be USD 1000 Mn. It is expecting to hold the property for a period of 5 years, in which it would get a lease rental of USD 100 Mn each year. After 5 years, it would sell the property at a value of USD 2000 Mn.

<table>
<thead>
<tr>
<th>Time Period</th>
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<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Specifications</td>
<td></td>
<td>ABC Housing Analysis</td>
</tr>
<tr>
<td>Project Name</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Commisioning Assumptions</td>
<td></td>
<td>1-Jan-02</td>
</tr>
<tr>
<td>Project start date</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Construction Period Years</td>
<td></td>
<td>1000</td>
</tr>
<tr>
<td>EPC Cost USD Mn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Assumptions</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Leasing Time Years</td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Sell off Price USD Mn</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Lease Rentals USD Mn</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.3.1 Model the project delay in Microsoft Excel

In this course, you will be tested on your capacity to incorporate delays in your financial model. A key function of Excel, the date function, is a very useful tool for modeling delay. For example, if you are expecting the construction period of 1 year, you can just put this as a parameter in your date (for years) and change this to see, if the construction period increases, what would be the effect on the project IRR?

This example incorporates a simple concept that uses the counter as a counter from the start date. The EOMONTH function then calculates the end of month date of the particular month for which the date is given.

Now, we can begin to incorporate delay into our model by simply changing the beginning of the construction period and comparing the years.

<table>
<thead>
<tr>
<th></th>
<th>E3</th>
<th>=EOMONTH($C$2, E1*12)</th>
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<tbody>
<tr>
<td>A</td>
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<td>B</td>
<td>Time Period</td>
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<td>1</td>
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<td>2</td>
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<tr>
<td>6</td>
<td>5</td>
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<tr>
<td>C</td>
<td>Project start</td>
<td>1-Jan-02</td>
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<td>D</td>
<td>Month</td>
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<td>I</td>
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<td>Jan-07</td>
</tr>
<tr>
<td>J</td>
<td></td>
<td>=EOMONTH($E$2, G1*12)</td>
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</tbody>
</table>

5.3.2. A note on Assumptions

We will discuss assumptions throughout the remainder of this Course Note. It is important to note here however, that even at the beginning stages of project finance modeling, it is necessary to start making some assumptions that drive our model.

For example, in the present exercise, we assume that once the ABC housing project starts, that the cost incurred during the construction period are uniform. In reality, this assumption could be a fatal error, as construction costs can vary widely from period to period. Staying with the present example, if the construction is completed over a period of 3 years, each year 33% of the cost is incurred and if it is completed over 5 years, then 20% of the cost is incurred each year.
To model this in Microsoft Excel, let's compare the current year with the time period when the construction started and allocate the cost.

Similarly for leasing, in the example we assume that our housing is leased out one year after the construction period and after the leasing is complete, ABC is able to sell the property at the desired price. These are all assumptions that in a complete financial model, would be clearly mapped out on the assumptions page which drives our analysis.

**5.3.3 Calculating the Cash Flow**

In our current project, there are essentially two ways that we can generate cash – (1) by leasing the property; and (2) by selling the property. The cash in our simple project is to fund ABC’s capital expenditure (*versus* the repayment of debt etc.).

Assuming there are no taxes, cash generated is just a combination of all these.
5.3.4 Calculating the Return

As discussed above, the IRR is an important indicator that is often used by potential investors when considering investment prospects. It is also used by project financiers to determine whether the project is on track when compared to the pro forma financial model. Once we have developed a model of our cash, we can simply ask Excel to calculate the IRR for us. In Chapter 7, we also analyse and develop the IRR as a method for valuing projects. But in this case, since we have the exact year of cash with us, we will not use simple IRR function, but the XIRR function in Excel. This would take into account that all cash flows might not be at the year end.

Spend some time in Excel comparing the “XIRR” to the “IRR” functions.

5.3.5 Scenario Analysis

Now that we have the model with us, we can change the construction period and see its effect on the IRR. If we want to do a complete scenario analysis, we can used Data Tables in Excel to generate a complete scenario analysis.
To create the data table, the structure of the table should look like. The Chapter Summary below also contains some useful links that will help you to practice developing data tables in Excel:

<table>
<thead>
<tr>
<th>%age</th>
<th>16%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>4</td>
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<tr>
<td>5</td>
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<td>6</td>
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</tbody>
</table>

Where 1, 2, 3 etc. are the years of construction and the cell is linked to the IRR that we calculated earlier. Select the data tables option within the data tab “What if Analysis”.

Then select the changing cell as the years of construction (In this case the change is in a “column” – and not the “row”).

You can see that there is a significant change in the IRR of the project with a change in construction period.
Conclusion: A delay in the construction period from 3 years to 5 years has a significant impact on the project’s IRR which declines from 15.6% to 13.1%. Would you, as an investor, invest in the ABC Project – why or why not?

Chapter 5 – Summary

In this chapter we learned about the importance of the project finance model. In so doing, we reviewed several categories of risk initially identified in Chapter 1 above and we analysed their impact on the project’s feasibility. In project finance, the model is of critical importance because it is the basis by which we determine whether a project is capable of producing enough cash to cover all operating and debt-servicing expenses over the whole tenor of the debt. Accordingly, a financial model is needed to assess economic feasibility of the project.

In addition to being used to determine whether a project can repay financiers, project finance modeling is also used in structuring the project finance deal. Most importantly, it is used to determine the maximum amount of debt the project company or SPV can have, the debt repayment profile, what will be the return on equity for the project, what is the IRR and other parameters necessary to assess the project viability.

This course in project finance modeling is designed to assist you in developing the confidence, ability and skills to successfully evaluate and analyze projects by taking them apart. In order to deconstruct projects, it is first necessary to learn their component parts and to construct a financial model from scratch. To this end, you will be provided with an Advanced Toll Road Modeling tutorial that will assist you in building a model based in Microsoft Excel that incorporates the information contained in this chapter.
Developing both the quantitative tools (financial model) and the qualitative tools (case studies that assist you in identifying project risks and allows you to evaluate and analyze projects) is critical.

Real project finance modeling is not just an academic exercise, it involves an experiential learning component that requires that you stop reading at this juncture and begin to actually practice developing a model. The remainder of this Course Pack will assume that you have begun the web-based Advanced Toll Road Modeling tutorial referenced above.
Chapter 6

Sensitivity and Scenario Analysis in Project Finance Modeling

Behavioral and Simulation analysis is often used in financial modeling and analysis to understand the tradeoffs between quantifiable risks and returns, using a systematic methodology that adjusts for a variety of financial and business variables, to arrive at a range of outcomes that are then used to make business decisions.

The widespread availability and use of sophisticated financial modeling software applications that extend the functionality of the basic spreadsheet has greatly enhanced the use of behavioral analysis in financial modeling and analysis. In this chapter, we will touch on a number of different behavioral & simulation analysis and techniques, namely that of sensitivity and scenario analysis, decision trees and financial simulations. We also strongly suggest that you spend time exploring the numerous website tutorials once you have mastered a basic understanding of the principals driving the simulations.

6.1 Overview of Sensitivity and Scenario Analysis

In a typical financial model, variability in cash inflows and net present value (NPV) are often modeled using sensitivity and scenario analysis. Sensitivity analysis uses several possible values for a given variable, such as cash inflows, to assess that variable’s impact on the company’s return, measured here by the NPV. This technique is often used by financial analysts to get a feel for the variability of return in response to changes in a key variable.

One of the most common sensitivity approaches used in financial modeling is to estimate the NPV in relation to a number of different estimates of cash inflow, which vary from the optimistic case (best) estimates for cash flow, to the base case (expected) estimate of cash inflow, to the pessimistic case (worst) estimate of cash inflow.
However, before we proceed with manipulating NPV, let’s review the method for calculating NPV and some of the draw-backs to using traditional NPV methods for valuing projects.

**NPV Explained**

Once a number of projects are identified as possibilities, their value must be calculated. The methods of doing so most often used include: calculating the Net Present Value (NPV), the IRR, using the Payback Method or utilizing the Profitability Index.

The first step in doing this is to calculate the cash flows for each project. There are three main categories of cash flows: (1) *initial investment*; (2) *annual operating cash flows which last for the life of the project*, (3) *termination cash flows*.

<table>
<thead>
<tr>
<th>INITIAL INVESTMENT=project cost-investment tax credits - sale of existing asset +/- tax effect of asset sale</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANNUAL OPERATING CASH FLOWS =earnings after tax + depreciation</td>
</tr>
<tr>
<td>TERMINATION CASH FLOWS= income from the sale +/- tax effect +/- recovery of net working capital</td>
</tr>
</tbody>
</table>

Once the cash flows are determined, a valuation method must be chosen. The common methods for analyzing the economic feasibility of a project and its alternatives are enumerated blow:

- Present worth method
- Net present value (NPV)
- Internal rate of return (IRR)
- Annual cost
- Payback period
- Capitalized cost method
- Percent return
Benefit / Cost Ratio

Most feasibility studies use a number of the above methods such as the net present value (NPV) and discounted internal rate of return (DCF IRR) to determine the return on investment (ROI) and the return on equity (ROE). For our purposes, we will focus on NPV or asset value because it is the most commonly used approach. We will also discuss both the benefits and drawbacks of using this method to value projects.

NPV is the difference between an investment’s (i.e. a project’s) market value and its cost. Essentially, NPV measures how much value is created or added by undertaking an investment decision. Sound investment theory posits that only investments with a positive NPV should be further considered for investing. Do you agree or disagree with this statement? Why/not?

Formula for NPV:

\[
\text{NPV} = -II + \text{(sum of)} \left( \frac{OCF}{(1+R(r))t} \right) + \left[ \frac{TCF}{(1+R(r))^n} \right]
\]

Where:

- II = initial investment
- OCF = operating cash flows in year t
- t = year
- n = life span (in years) of the project
- R(r) = project required rate of return

What this equation does is take future cash flows that the SPV is expected to produce with the project, and discounts them to the present. Once this is done, NPV is found as the difference between the present value of the future cash flows and the cost of investment.

Exercise 6.1 Calculating NPV

Suppose we are given the task of deciding whether or not a new special addition soccer ball should be made by Nike in honor of the 1999 Women's World Cup. The projected cash flows for the product are $2,000 for the first year, $4,000 for the next two years, and than $1,000 for the fourth year. It will cost $5,000 to start up this project and Nike
requires a 10% return. After four years, Nike will stop producing the balls and no longer sell them because the 2003 World Cup will be underway.

SOLUTION:

\[
\text{NPV}= -5,000 + \frac{2,000}{1.10} + \frac{4,000}{1.10^2} + \frac{4,000}{1.10^3} + \frac{1,000}{1.10^4}
\]

\[
\text{NPV}= -5,000 + 1,818.18 + 3,305.79 + 3,005.26 + 683.01
\]

\[
\text{NPV}= $3,812.24
\]

***An investment should be given further consideration if the net present value is positive and rejected if it is negative.***

Although NPV is considered the most used valuation model, it is not the only model.

6.2 Disadvantages to Using NPV to Value Projects

The biggest disadvantage to the calculation of NPV is its sensitivity to discount rates. After all, NPV computations are really just a summation of multiple discounted cash flows - both positive and negative - converted into present value terms for the same point in time (usually when the cash flows begin). As such, the discount rate used in the denominators of each present value (PV) computation is critical in determining what the final NPV number will turn out to be. A small increase or decrease in the discount rate will have a considerable effect on the final output.

Open a new page in Excel and let's pretend to value a project that would cost $4,000 up front today, but was expected to pay you $1,000 in annual profits for five years (for a total nominal amount of $5,000), beginning at the end of this year. If you use a 5% discount rate in your NPV calculation, your five $1,000 payments are equal to $4,329.48 of today's dollars. Subtracting the $4,000 initial payment, you are left with an NPV of $329.28.
However, if you raise the discount rate from 5% to 10%, you get a very different NPV result. At a 10% discount rate, your project’s cash flows add up to a present value of $3,790.79. Subtract the $4,000 initial cost from this amount, and you are left with a negative NPV of $209.21. Simply by adjusting the rate, you have gone from having an investment that creates $329.28 of value to having one that destroys $209.21 instead.

Unless there was a socially compelling reason to invest otherwise, you would vote in favour of the project if 5% is the correct rate to use, and reject it if 10% is the correct rate. But how do you know which discount rate to use? Accurately pegging a percentage number to a project to represent its risk premium is hardly an exact science. If the investment is very safe, with low risk of loss, 5% may be a reasonable discount rate to use, but what if the investment harbors enough risk to warrant a 10% discount rate?

The bottom line is that since NPV calculations require a discount rate, there is no way to get around this issue; therefore, it is a big disadvantage to the NPV methodology. To make matters even more complex is the possibility that your investment won’t have the same level of risk throughout its entire time horizon. In our example of a five-year investment, how would you handle a situation in which the investment had high risk of loss for the first year, but relatively low risk for the last four? You can try to use different discount rates for each time period, but this will make your model even more complex and require a lot on your part to peg not only one discount rate accurately, but five. This is another disadvantage to using the NPV model.

Finally, another major disadvantage to using NPV as an investment criterion is that it wholly excludes the value of any real options that may exist within the investment. Consider again our five-year investment example - suppose this is a startup technology company, which is currently losing money but is expected to have the opportunity to expand greatly in three years’ time. If you know the company has this valuable real option of expansion in the future, shouldn’t you incorporate the value of that option into the total NPV of the investment? Clearly, the answer is "yes", but the standard NPV formula provides no way to include the value of real options.
Thus, NPV is a useful starting point to value investments, but certainly not a definitive answer that an investor can rely on for all investment decisions.

6.3 Utilising the Internal Rate of Return to Value Projects

The IRR is the most often used alternative to NPV. With IRR we try to find a single rate or return that accompanies the project. (The $R(r)$ in the NPV equation) This rate relies only on the cash flows of the project, not on external rates.

IRR is the required return that results in zero NPV when it is used as the discount rate.

*There is no mathematical approach to finding IRR. The only way to find an IRR is by trial and error.*

The NPV range can then be determined by subtracting the pessimistic outcome NPV from the optimistic outcome NPV. Often, by putting forward an NPV range, a good financial analyst is able to present a balanced view of a business case by highlighting both the potential downside risks as well as the potential upside of the investment, allowing business executives to make calculated decisions based on their risk appetite.

Both of these measurements are primarily used in capital budgeting, the process by which companies determine whether a new investment or expansion opportunity is worthwhile. Given an investment opportunity, a funder needs to decide whether undertaking the investment will generate net economic profits or losses for the company.

To do this, the project funders estimate the future cash flows of the project and discounts them into present value amounts using a discount rate that represents the project’s cost of capital and its risk. Next, all of the project’s future positive cash flows are reduced into one present value number. Subtracting this number from the initial cash outlay required for the investment provides the net present value (NPV) of the investment.
Let’s illustrate with an example: suppose you are an investment officer at the IFC and you are presented with an opportunity to invest in a XYZ Salt Production in Botswana. XYZ determines that the future cash flows generated by the project, when discounted at a 12% annual rate, yields a present value of $23.5 million. If the project’s chief funder is willing to sell for $20 million, then the NPV of the project would be $3.5 million ($23.5 - $20 = $3.5). The $3.5 million dollar NPV represents the intrinsic value that will be added to XYZ if it undertakes this acquisition.

So, XYZ salt production project has a positive NPV, but from a funding perspective, you would also want to know what rate of return will be generated by this investment. To do this, you would simply recalculate the NPV equation, this time setting the NPV factor to zero, and solve for the now unknown discount rate. The rate that is produced by the solution is the project's internal rate of return (IRR).

For this example, the project's IRR could, depending on the timing and proportions of cash flow distributions, be equal to 17.15%. Thus, XYZ Salt, given its projected cash flows, has a project with a 17.15% return. If there were a project that the IFC could undertake with a higher IRR, it would probably pursue the higher-yielding project instead. Thus, you can see that the usefulness of the IRR measurement lies in its ability to represent any investment opportunity’s return and to compare it with other possible investments.

6.4 Disadvantages to Utilising IRR to Compare Projects

As noted above, calculating the IRR of a project is not an exact science. In fact, it requires a complicated calculation that can only be solved through guess-and-check or a computer spreadsheet. For IRR to work, the cash flows have to be conventional in that the project has to have an initial negative cash flow, the investment, with all remaining cash flows being positive. Also, if you can only choose one of two projects, IRR may not be the best method to determine which one to choose. IRR expresses return on the return on investment, which means that it is possible that you could choose the project with the highest percentage return but that would not maximize the
value to you as the funder. Let’s illustrate with a simple example. Assume project A has a 15% return on a $100 investment and project B has a 10% return on a $200 investment. You can only choose one project. If you use IRR, you would only see the percentages and choose project A. However, the more valuable option would be project B, because it has a $20 return in comparison to A’s $15 return.

Scenario analysis in financial modeling is similar to sensitivity analysis, but broader in scope. Scenario analysis evaluates the impact of simultaneous changes in a number of variables, such as cash inflows, cash outflows, the cost of capital, or even leading revenue / cost growth rates. The combined effect of changes in these variables are then applied to evaluate the impact on the company’s return.

For instance, a company could evaluate the impact of a high or low risk-free interest rate environment on a company’s NPV. Each scenario will affect the company’s cash inflow, cash outflows, and cost of capital, thereby resulting in different levels of NPV. A financial analyst can then use these NPV estimates to assess the risk involved with respect to the interest rate environment.

6.5 Decision Trees in Financial Modeling

Decision trees use diagrams to map the various investment decision alternatives and payoffs, along with their probabilities of occurrence.

Decision trees are named as such due to their resemblance to the branches of a tree, and rely on estimates of the probabilities associated with the outcomes (payoffs) of competing courses of action. The payoffs of each course of action are weighted by the associated probability; the weighted payoffs are summed; and the expected value of each course of action is then determined.

Clearly, the alternative on the decision tree that provides the highest expected value will be chosen as the preferred course of action in a financial modeling and analysis exercise.
Exercise 6.5 Drawing a Decision Tree

You start a Decision Tree with a decision that you need to make. Draw a small square to represent this towards the left of a large piece of paper.

From this box draw out lines towards the right for each possible solution, and write that solution along the line. Keep the lines apart as far as possible so that you can expand your thoughts.

At the end of each line, consider the results. If the result of taking that decision is uncertain, draw a small circle. If the result is another decision that you need to make, draw another square. Squares represent decisions, and circles represent uncertain outcomes. Write the decision or factor above the square or circle. If you have completed the solution at the end of the line, just leave it blank.

Starting from the new decision squares on your diagram, draw out lines representing the options that you could select. From the circles draw lines representing possible outcomes. Again make a brief note on the line saying what it means. Keep on doing this until you have drawn out as many of the possible outcomes and decisions as you can see leading on from the original decisions.

An example of the sort of thing you will end up with is shown in Figure 6.5.1:
Once you have done this, review your tree diagram. Challenge each square and circle to see if there are any solutions or outcomes you have not considered. If there are, draw them in. If necessary, redraft your tree if parts of it are too congested or untidy. You should now have a good understanding of the range of possible outcomes of your decisions.

**Evaluating Your Decision Tree**

Now you are ready to evaluate the decision tree. This is where you can work out which option has the greatest worth to you. Start by assigning a cash value or score to each possible outcome. Estimate how much you think it would be worth to you if that outcome came about.

Next look at each circle (representing an uncertainty point) and estimate the probability of each outcome. If you use percentages, the total must come to 100% at each circle. If you use fractions, these must add up to 1. If you have data on past events you may be able to make rigorous estimates of the probabilities. Otherwise write down your best guess.

This will give you a tree like the one shown in Figure 6.5.2:
Calculating Tree Values

Once you have worked out the value of the outcomes, and have assessed the probability of the outcomes of uncertainty, it is time to start calculating the values that will help you make your decision.

Start on the right hand side of the decision tree, and work back towards the left. As you complete a set of calculations on a node (decision square or uncertainty circle), all you need to do is to record the result. You can ignore all the calculations that lead to that result from then on.

Calculating The Value of Uncertain Outcome Nodes

Where you are calculating the value of uncertain outcomes (circles on the diagram), do this by multiplying the value of the outcomes by their probability. The total for that node of the tree is the total of these values.

In the example in Figure 6.5.2 above, the value for 'new product, thorough development' is:

<table>
<thead>
<tr>
<th>Probability</th>
<th>Value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.4 (good outcome)</td>
<td>$1,000,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>0.4 (moderate outcome)</td>
<td>$50,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>0.2 (poor outcome)</td>
<td>$2,000</td>
<td>$400</td>
</tr>
</tbody>
</table>

$420,400
Figure 6.5.3 shows the calculation of uncertain outcome nodes:

Note that the values calculated for each node are shown in the boxes.

Calculating the Value of Decision Nodes

When you are evaluating a decision node, write down the cost of each option along each decision line. Then subtract the cost from the outcome value that you have already calculated. This will give you a value that represents the benefit of that decision.

Note that amounts already spent do not count for this analysis – these are ‘sunk costs’ and (despite emotional counter-arguments) should not be factored into the decision.

When you have calculated these decision benefits, choose the option that has the largest benefit, and take that as the decision made. This is the value of that decision node.
In this example, the benefit we previously calculated for 'new product, thorough development' was $420,400. We estimate the future cost of this approach as $150,000. This gives a net benefit of $270,400.

The net benefit of 'new product, rapid development' was $31,400. On this branch we therefore choose the most valuable option, 'new product, thorough development', and allocate this value to the decision node.

Result:

By applying this technique we can see that the best option is to develop a new product. It is worth much more to us to take our time and get the product right, than to rush the product to market. It is better just to improve our existing products than to botch a new product, even though it costs us less.
Although Decision Trees are a new method for determining the feasibility of various possible project decisions, they are useful and should be considered alongside more traditional valuation methods.

6.6 Using Financial Simulations in Financial Modeling

Financial simulation techniques, such as Monte Carlo Simulations, are statistical based behavioral approaches that apply predetermined probability distributions and random numbers to estimate risky outcomes.

By tying the various cash flow components in a financial model together in a mathematical model and repeating the process several times, the financial analyst can develop a probability distribution of project returns.

Assume that we are attempting to generate an NPV simulation model for a financial modeling exercise. The financial analyst will undertake a process of generating random numbers and use the predetermined probability distributions for cash inflows and cash outflows to determine values for each of these variables.

Consequently, by substituting these values into the mathematical model, and repeating the process perhaps a thousand times, a probability distribution of NPV values can be created.

Whilst this example only uses gross cash inflows and cash outflows as the simulated outcome, more sophisticated financial simulations can obviously be applied to individual cash inflow and outflow components, such as sales volume, sales price, raw material cost, labor cost, maintenance cost, and so on. From the distribution of returns, a financial analyst can determine not only the expected value of the return but also the probability of achieving or surpassing a given return.

Financial simulations (ex. Monte Carlo simulations) are in general considered far superior as compared to other behavioral analysis techniques used in financial
modeling and analysis, as it enables financial analysts to view a continuum of risk-return tradeoffs rather than a single point estimate.

See, http://excelmontecarlo.com/ for an online tutorial leading to the development of a Monte Carlo Model. To the extent that time permits, we will discuss the implication of this form of modeling for our N4 Toll Road Case Study.

Chapter 6 – Summary

In this Chapter 6, we began to delve further into the methodology of advanced project finance modeling. In so doing, we discussed and analysed several of the more traditional methods for evaluating the feasibility of a potential project, namely the NPV and the IRR method. We also discussed in detail some of the advantages and disadvantages associated with each of these methods, both of which involve discounting future cash flows back to the present. One of the key challenges, for example, with the IRR method is that one must assign a discount rate to the project. Many issues arise in determining which discount rate is appropriate. Furthermore, funders often use IRR to compare two alternative investment opportunities. This method only measures the “return on the return” and thus is not a basis for determining the overall potential return to the funder. This is just one example of the fatal errors that are often made in evaluating projects that have the possibility to have a major development impact on the lives of many.

It is therefore imperative that we consider innovative and more comprehensive methods of evaluating projects. One such method we discussed in Chapter 6 is the Decision Tree Method. Whilst many analysts do not embrace Decision Trees or Real Options due to their inherent complexity, these and other evolving methods for analyzing and evaluating projects should be considered, alongside more traditional methods for reasons discussed herein.
Chapter 7

Documenting Change in the Project Finance Model

It is the duty of the financial institution to find a balance or at least an acceptable level of imbalance between the cash flows that it manages. This balance is a condition for the fulfillment of liabilities to customers and the corresponding goal of stability of the financial sector motivates special legislation for the financial sector and a system of authorisation, monitoring and supervision. Some elements of this legal framework we have begun to discuss in Chapter 3 above.

It is the uncertainty about this balance, subject to financial and operational risk, that is one of the motivations for an increasing interest in financial models of use for achieving this balance or stability. Talking of risk, it is worth mentioning the other side of the coin: opportunity. Opportunity is another good reason for trying to understand the financial processes using financial models, at least as a complement to everything else that is of value for success in the financial sector: information, knowledge and competence in the field.

7.1 Uncertainty and Stability in Project Finance Modeling

Having identified uncertainty as a characteristic feature of financial activity, we turn next to aspects for managing it. Here it would seem reasonable to make some distinction between methods, tools and models, although they are quite intertwined. For the moment we will, however, make no particular effort to keep these aspects apart. Instead we will look closer at the types of uncertainty or risk that we have identified in this Course Note and put them into a wider context, in order to conclude our analysis of the meaning, usefulness and need for financial models.

The Investment Horizon

It is important to bear in mind that the practical use of models should be judged with reference to some decision situation or context. Financial modeling is not an abstract exercise. Such a context necessarily depends on some horizon or period within which
decisions have to be made. This aspect of the investment horizon has consequences for the choice of model for describing the uncertainty or risk. For example, many industrial processes have a need for reactions or decisions in real time or at least within a relatively short horizon for decisions or monitoring. Similar processes do occur in certain financial markets, such as different kind of trading activities. Most other financial activities work, however, with considerably longer horizons, ranging from days and weeks to months and years.

With a longer horizon and less frequent data it may be problematic to use models that were designed to handle continuous or highly frequent processes, mainly because the underlying reality will be too unstable or inhomogeneous to fit into such a model. This highlights another aspect of the use of models. Will they be used for predictions or will they rather be used for descriptions of experience or projections of assumptions made about the future? For processes in real time there is a need for models with predictive power for at least a very near future. There is a need for financial models in situations where there is little hope of safe prediction, for several reasons. The process modeled may be poorly understood or just intrinsically inhomogeneous. The process may be depending on unpredictable market behaviour or external events, resisting any attempt to find a truthful model.

For this reason it is important to realise that many (if not most) financial models cannot be used as sharp predictive instruments. There are, however, a number of other respectable uses of financial models. These include projections of assumptions made, assessment of possible uncertainty, risk or opportunity, including different kinds of sensitivity analysis and calculation of buffers, or margins that may be needed to compensate for adverse developments, \textit{i.e.} when things do not go your way. Such approaches are of importance for defining regulatory minimum capital requirements and for capital allocation and performance measurement.

**Modeling Escalation Factors**

Prices in a financial model often escalate, for example by inflation. However, there are two main contributors to cost variation in most large infrastructure projects: (1) delays
for each individual project that may have an impact on total program finish time, and (2) the uncertainty in the value of escalation factor, especially in multi-year projects. Fairly sophisticated computer models have been developed that are capable of modeling the escalation rates as a random variable from a normal distribution assuming escalation rates to be correlated in subsequent periods. Further, such models can handle each project duration as a random variable. This is particularly useful as large projects are actually are generally a number of smaller, multi-year projects conjoined.

By simulating the model, we can obtain distributions for total project duration and cost. Using these distributions, the management will be able to assess the extent of possible cost overruns due to cost escalation or the adequacy of the proposed budget. A few approaches consider the effect of the delay on cost but even when they perform integrated cost and schedule uncertainty analysis (i.e. the Monte Carlo simulation model noted above), they utilize a deterministic rate to consider the effect of cost escalation. Recently, researchers have begun to develop computer models that will take into consideration the uncertainty and variability of both schedule and escalation factor in a more integrated probabilistic approach.

For our purposes here, it is important to conceptualise the idea of escalation factors, clearly identify which ones are applicable to the project you are attempting to model and then practice isolating the impact of those factors on the overall budget of the project.

**Exercise 7.2 Modeling Escalation Factors (Appendix F)**

In financial modeling a problem can occur when the escalation factor (e.g. the Retail Price Index) is published at the end of one time period (e.g. quarterly), contracted prices escalate at the end of another time period (e.g. monthly, quarterly or annually) and the model itself forecasts different time periods (monthly, quarterly, or annually).

The example included in Appendix F which is attached shows you both how to get it right, and how to get it wrong in a financial model. To get it right, you need an understanding of the escalation factor itself (when does the escalation factor increase?), contractual prices (what do the contracts say about when prices increase?), the dates
used for the model (what time periods are we modeling?) and how those three things interrelate.

In a long dated model, where revenues escalate and are locked in contractually, and you have high debt costs, inaccurate modeling of escalation factors can result in a long range forecast that proves disastrously wrong - perhaps with actual profits turning out nowhere near those originally expected.

Modeling with Escalation Factors: The Right Approach

In Appendix F, Look at cell B14, it shows you how to get it right in a financial model. In the example imagine we have succeeded in understanding the escalation factor itself, how it is applied contractually, and how all that relates to the model's own time periods. In the example we have an annual escalation factor (3%) that is applied to rent prices quarterly, and we thus have a quarterly model.

The Impact on the Model:

The 3% escalation factor is an annual figure but we are imagining that, under contracts for the project, prices escalate quarterly. With prices growing or compounding quarterly, by the time we get to Q4, prices will have escalated by a factor greater than 1.03. Click on cell E4 to see how the escalation factor has been calculated. In this case, with a 3% escalation factor, with that escalation applied to contracted prices quarterly, and a quarterly model, total rent for Y2 of the model totals 35,693.3 - the correct figure.

Modeling with Escalation Factors: The Wrong Approach

In referring to line 22 in the spreadsheet on Appendix F, you will see how revenue has been calculated incorrectly. Let us assume we are operating within the same set of assumptions (annual escalation factor, applied to contracted revenues quarterly), but this time we have decided to create an annual model and, in doing so, lulled ourselves into making a careless mistake.
As a result of error in (annual vs. quarterly escalation factors applied to quarterly revenues), the escalation factors at line 21 are too low, and the forecast revenue at line 22 is too low as well.

Results:

The lesson from our advanced financial modeling course should be very clear: be careful with escalation factors. You need to make sure you are modeling correctly, given the escalation %, contractual arrangements, and the periods used for the model itself. Making a simple error could throw your model out as the forecast rolls forward. Perhaps the safest thing to do, to help you avoid any inadvertent mistakes, is to build a financial model that uses periods that relate to contractual arrangements (i.e. if contracts escalate at the end of a particular quarterly then build a quarterly based model). It may sound simple, but in the real world of project finance modeling, these seemingly simple errors in judgment cost sponsors billions of dollars of each year.

Chapter 7 – Summary

One of the key reasons that we model in Project Finance is so that we can analyze and evaluate – these are all part of how we assess the project in terms of (i) initial investment decision; (2) economic feasibility or assessment (i.e. which includes our trying to incorporate external factors); and (3) also used to see how we’re doing once the project gets started. Accordingly, reviewing projects for performance and clearly identifying key project outputs is important for overall project performance – and your own performance as one charged with feasibility and analysis of project viability.

In this Chapter 7, we looked at modeling escalation factors and discussed in detail some of the key escalation factors involved in large infrastructure projects. We also practiced modeling escalation factors by working through an example contained in Appendix F to this Course Note.

In concluding this Course Note, it may be useful to note that problems of project delay and escalation factors are not limited to projects in emerging markets. Some of the
biggest cost overruns occur in some of the most developed markets. For example, in the U.S., Boston’s Central Artery/Tunnel Project, commonly known as the “Big Dig”, was the largest, most complex, and most technically challenging highway project in American history. Larger than the Panama Canal, the Hoover Dam, and the Alaska Pipeline projects, it was built through the heart of one of the U.S.’ oldest and most historically preserved cities. Its list of engineering firsts include the deepest underwater connection and the largest slurry-wall application in North America, unprecedented ground freezing, extensive deep-soil mixing programs to stabilize Boston’s soils, the world’s widest cable-stayed bridge, and the largest tunnel-ventilation system in the world.xxvi

The Big Dig is also famous for cost increases. Its initial estimated cost was $2.56 billion. Estimates increased to $7.74 billion in 1992, to $10.4 billion in 1994, and, finally, $14.8 billion in 2007—more than five times the original estimate. The reported reasons for the cost escalation included inflation, the failure to assess unknown subsurface conditions, environmental and mitigation costs, and expanded scope. Mitigation alone required 1,500 unanticipated, separate agreements. The point: no matter how well we plan projects, having the skill required to effectively model project change is crucial.

Some key lessons we hope you take away from this Course Note:

- Teaching problem-solving skills is a major benefit and particularly necessary in emerging markets where managers may have had less exposure to sophisticated project finance models;
- Partnering between the various project partners should never replace your responsibility to independently and rigorously evaluate, analyse and oversee the successful implementation of the project; and
- Doing things as they have always been done does not work for complex projects that require constant innovation and a culture of collaboration. What is required is a new breed of project evaluator and manager; one who has the skills necessary to apply traditional approaches to modeling where appropriate, but one that also has the vision and creativity necessary to move forward creative approaches that
are key to our continuing to develop an appreciation of the efficacy of advanced project finance modeling as a tool for analysis and evaluation.
APPENDIX A

Project Finance Terms

Acceleration: A remedy available to lenders following an event of default that causes a borrower’s indebtedness to become immediately due and payable in full.

Acceptance: The positive response to an offer seeking participation in a credit facility.

Accrual Accounting: Recognizing revenues and expenses when earned or incurred.

Accrued Interest: The interest earned on a loan or note between two interest payment dates.

Administrative Agent: The arranger of a syndicated loan.

Advance: A partial upfront drawdown of a loan.

Ad Valorem Tax: A tax or duty based on the value of a good or service (Latin: “according to value”).

Affiliate: A foreign operation—either a branch or foreign—incorporated subsidiary. A corporation that directly (or indirectly) controls or is controlled by another corporation.

Agency Agreement: A legal agreement between a borrower, a group of lenders, and one or more agent banks governing the rights and responsibilities of the agent(s) in the transaction. The agency agreement is an integral part of a syndicated loan.

Agent: The bank responsible for administering a project financing.

All-In Rate: The interest rate including the loan spread, commitment fees, and other up-front fees.

All Risks Insurance: Insurance against physical damage to the project during operations.

Alternative Interest Rate Clause: A clause usually incorporated in financing documents making provisions for interest to be calculated on a different basis (typically the lenders cost of funds) where the chosen basis rate (e.g., Libor) cannot be determined. This clause is also known as the market disruption clause.

A-Loan: A loan from a multilateral agency such as the International Finance Corporation (IFC) where it is the lender of record and where it books the loan for its own account.
Amortization: Reduction of capital or up-front expenses (capitalized) over time, often with an equal amount per annum.

Annual Debt Service Coverage Ratio (ADSCR): The ratio between operating cash flow and debt service during any one-year period. This ratio is used to determine a project’s debt capacity.

Annuity: When the sum of principal and interest is equal for each period.

A/P: An abbreviation in international trade documentation for either “authority to purchase” or “authority to pay.”

Arbitrage: To take advantage of discrepancies in price or yields in different markets.

Arbitrage Pricing Theory (APT): An asset pricing model based purely on arbitrage arguments. The APT implies that multiple risk factors determine an asset’s required rate of return. In contrast, the Capital Asset Pricing Model (CAPM) uses a single risk factor (beta) to determine required rates of return.

Arms-Length Price: The price at which a willing buyer and a willing unrelated seller freely agree to carry out a transaction.

Arrangement Fee: A fee paid to a mandated bank or group of banks (lead arrangers) for arranging a transaction. It includes fees to be paid to participating banks.

Arranger: A bank or other financial institution responsible for originating and syndicating a loan transaction. The arranger always has a senior role, is often the agent, and usually participates in the transaction at the most senior level (it holds the largest share of the loan).

Ask Price: The price at which a dealer is willing to sell foreign exchange, securities, or commodities. Also called the offer price.

Asset: The physical project and its associated contracts, rights, and interests of every kind, in the present or future, which can be valued or used to repay debt.

Assignment: A transfer of legal title to an asset for security purposes.

Audit: An independent examination of the financial statements, project studies, or projections.

Availability Factor: A measure of how much a power plant is available to produce power, usually expressed as the ratio (a percentage) of a power plant's available hours to the total number of hours in such a period.

Availability Period: The period during which a loan is available for drawdown.
Available Cash Flow: Total cash sources less total cash uses before payment of debt service.

Average Debt Service Coverage Ratio (Average DSCR): The average annual debt service coverage ratio (ADSCR) calculated over the life of a loan.

Average Loan Life: The average maturity for all repayments weighted by the principal outstanding.

Avoided Costs: Incremental costs that a utility would incur to purchase or generate electricity if it did not purchase electricity from an independent power project (IPP).

Backcast: The use of historical rather than predicted information (a forecast) in a financial model. Often done to test the robustness of a project’s capital structure to changes in underlying conditions.

Back Stop Facility: Facility to advance funds only when a borrower can not obtain funds under short-term instruments, such as commercial paper.

Back-to-Back LC: A letter of credit issued on the strength of another letter of credit. The terms must be identical.

Backwardation: A market condition in which futures prices are lower in the distant delivery months than in the nearest delivery month. This condition may occur when the costs of storing the product until delivery are effectively subtracted from the price today. The opposite of contango.

Balance of Payments: A system of recording all of a country’s economic transactions with the rest of the world for a certain period. The balance is typically broken into three accounts: capital, current, and gold.

Balance Sheet: The accounts which show assets, liabilities, net worth/shareholders’ equity.

Balloon Payment: A final debt repayment that is substantially larger than the preceding repayments.

Bankable: Capable of being financed.

Barter: The physical form of countertrade.

Base Case: A cash flow projection with variables measured at their expected values.

Base Load Plant: A power plant that runs all the time, as opposed to a plant that is used only in times of peak electricity requirements (a peaking plant).
Base Rate: On a variable rate loan, it is the key underlying rate to which lenders add a spread to come up with a total lending rate for the borrower.

Basel Accord: The Basel Committee on Banking Supervision’s regulatory framework of capital standards for banks, established in 1988 to protect bank owners, depositors, creditors, and deposit insurers (e.g., governments) against financial distress.

Basis Point (bp): One-hundredth of one percent (1/100 * 1%, or 0.0001).

Basis Risk: The type of risk in which the exposure and the hedging instrument are not perfectly matched or correlated.

Bearer Bond: The bond certificate is not recorded as owned by a particular investor and is itself, therefore, negotiable.

“Behind–the–Fence”: A project or transaction that derives all of its revenues from a local customer such as a mine mouth power plant (i.e., a project that is fully integrated in some kind of manufacturing process). For power projects, the "fence" refers to the boundary between the power grid and the industrial facility. See also “Inside the Fence.”

Berne Union: The Berne Union was established in 1934 to determine sound principles for export credit and foreign investment insurance. As of 2002, the Berne Union has 51 members from 42 countries.

Best and Final Offer (BAFO): A second-stage bid in a public procurement.

Best Efforts: A very high standard of undertaking, nevertheless excusable in the event of force majeure or failure to execute the matter in question after trying to do so on a sustained, dedicated basis. Also called best endeavors.

Best Efforts Arranger: A bank or other lender that agrees to syndicate a loan but that is unwilling to guarantee successful completion of the deal.

Bid Bond: A small percentage (1% to 3%) of the tender contract price is established as a bid performance bond.

Bid Price: The price that a dealer is willing to pay to purchase a foreign exchange, security, or commodity.

Bidding Group: The banks that bid on a facility.

Bilateral Agency (BLA): An institution established by one country to promote trade with other countries, such as an export-import agency or an export credit agency (ECA).
Bill of Exchange (B/E): A written order requesting one party (e.g., an importer) to pay a specified amount of money at a specified time to the order of the writer of the bill of exchange. Also called a draft.

Bill of Lading (B/L): A contract between a common carrier and a shipper to transport goods to a specific destination. B/L also represents receipt of the goods.

Black–Scholes Option Pricing Model: A model for pricing call options based on arbitrage arguments developed by Fischer Black and Myron Scholes (with insights from Robert Merton) in 1973. The model uses the stock price, the exercise price, the risk-free interest rate, the time to expiration, and the expected standard deviation of the stock return.

Blocked Currency: A currency, which due to inconvertibility or transfer risk, cannot be moved out of the country.

B–Loan: A loan syndicated by a multilateral lender, such as the IFC, that acts as the lender of record on behalf of the funding participants (commercial banks and other institutional investors).

Boilerplate: Standardized terms and conditions in legal contracts or other documents.

Bond: The paper evidence of a legal promise by the issuer to pay the investor on the declared terms.

Bond Rating: An appraisal by a bond rating service of the soundness of a bond as an investment.

Book Runner: The bank that extends invitations for a syndication and is responsible for determining the composition of the lending group and the final hold positions.

Book Value: The value of an asset as reported in a company’s annual financial statements. This will be at the asset’s historic value less depreciation, which may differ from the asset’s market or replacement value.

Bracket: A level of commitment (underwriting or final take) and related title offered to banks invited into a syndicated transaction, such as arranger or manager.

Branch: A foreign operation not incorporated in the host country unlike a subsidiary.

Break Even: The reduction of a project finance net cash flow to zero by changing an input variable such as the output price or input costs.

Break Even Analysis: The level of sales needed to cover operating expenses.
Bridge Financing: Interim or temporary financing from a bank while a borrower obtains medium and long–term financing from the capital markets.

British Thermal Unit (Btu): The quantity of heat needed to raise the temperature of 1 pound of water by 1ºF at or near 39.2ºF.

Broker: A party which brings together sponsors, financiers, or insurers but is not acting as a principal.

Builders–All Risk (BAR): The standard insurance package used during construction.

Build–Lease–Transfer (BLT): The situation when a private owner builds an infrastructure facility, leases it for use, and then transfers it to another entity after a specified period.

Build–Own–Operate—Transfer (BOOT): The situation when a private owner builds, owns, and operates an infrastructure facility and then transfers it to another entity after a specified period.

Build–Own–Transfer (BOT): The situation when a private owner builds, owns, and then transfers an infrastructure facility to another party, often at no cost, after a specified period.

Build–Transfer–Operate (BTO): The situation when a private owner builds an infrastructure facility, transfers it to another entity, and then operates it on a contractual basis for a specified period.

Bullet Loan: A term loan with periodic installments of interest only with the entire principal due at the end of the term as a final payment. The final payment on a balloon loan is sometimes referred to as a bullet.

Bullet Repayment: A one–time repayment, often after no or little amortization of the loan.

 Bundling: A grouping of projects or services within a structure which enables them to be financed as a single transaction.

Business Day: A day on which banks are open for business in financial centers.

Business Interruption Insurance: Insurance against stoppage that is available once the project is operational.

Buy–Back: A promise to repurchase unsold production or other financial obligations.
Buydown: A single payment by a project contractor to reflect future cash flow losses from anticipated and sustained underperformance; the amount is typically paid out of liquidated damages.

Buyer Credit: An arrangement under which a bank in the supplier’s country lends to a buyer, or a bank, in the buyer’s country that enables the buyer to purchase certain goods or services.

Call Option: The right to buy a given asset at a fixed price during a particular period.

Cap: A ceiling on an interest or FX rate through a swap, options, or by agreement.

Capacity: The amount of energy, measured in kilowatts, that a plant or system is capable of producing.

Capital: The amount of money invested in a venture.

Capital Account: That portion of the balance of payments that measures international lending and investment.

Capital Asset Pricing Model (CAPM): A theoretical model that relates the return on an asset to its risk, where risk is the contribution of the asset to the volatility of a well diversified portfolio (an asset’s “beta”).

Capital Budget: The cost of planned investment projects.

Capital Expenditures (CapEx): Long-term expenditures for property, plant, and equipment.

Capital Gains/Loss: The difference between the cost of an asset held for investment and its resale price.

Capital Markets: A broad term to include tradable debt, securities, and equity as distinct from private markets or banks.

Capital Recovery: The recovery of investments in equipment. This includes the recovery of the original investment and its carrying costs.

Capital Structure: The financing mix of a company.

Capitalized Interest: During the pre-completion period, a project company can borrow to repay current interest obligations. By capitalizing interest, the principal balance outstanding increases by an amount equal to the interest due.

Cash Available for Debt Service (CADS): The amount of cash available to service debt after all essential operating expenses have been met.
Cash Deficiency Guarantee: A guarantee that requires the project sponsor(s) to contribute additional capital to the project company in the event cash deficiencies materialize due to pre-agreed causes.

Cash Flow: The cash generated by a project.

Cash Flow Cascade: The order of priorities under the financing documentation for the application of the project’s cash flow. See also cash waterfall.

Cash Flow Return on Investment (CFROI): The profit from continuing operations less cash taxes and depreciation divided by “cash investment” which is the replacement cost of capital employed.

Cash Waterfall: The order of priority for project cash flows as established under the loan and financing documents.

Charge: A fixed charge refers to a defined set of assets and is usually recorded in an official registry. A floating charge refers to other assets, which change from time to time (e.g., cash accounts, inventory, or receivables) but which become fixed charges after a default.

Claw Back Clause: The ability to recover prior project cash flows that may have been distributed to the sponsors. A claw back is used if there is a shortage of funds to meet defined operating expenses such as maintenance or debt service.

C–Loan: A full range of quasi-equity products with both debt and equity characteristics (e.g., convertible debt and subordinated loans) offered by the IFC or other multilateral agencies.

Co–Financing: The situation where different lenders agree to fund under the same documentation and security packages yet may have different interest rates, repayment profiles, and terms. The lenders typically hold different debt tranches.

Cogeneration: The production of energy from the waste heat of industrial processes.

Co–Insurance: The phenomenon whereby a surplus of cash flows from one or more assets or divisions is used to cover the financial obligations of another asset or division.

Co–Manager: A second–tier participant, ranked by size of participation in a financing.

Collar: A ceiling and floor to an interest or FX rate structure through swaps, options, hedging, or by agreement.

Collateral: Assets pledged as security under a loan to assure repayment of debt obligations.
Collateralized Bond Obligation (CBO): Securities issued against a portfolio of bonds with different degrees of credit quality.

Collateralized Debt Obligation (CDO): Securities issued against a portfolio of debt instruments with different degrees of credit quality.

Collateralized Loan Obligation (CLO): Securities issued against a portfolio of loans with different degrees of credit quality.

Combined Cycle: The waste heat from an electric generation unit is recovered as steam, which is used to generate more electricity through a steam turbine.

Commercial Interest Reference Rates (CIRR): The interest rates charged by export credit agencies on their subsidized export credits.

Commercial Operations Date (COD): The date on which the independent engineer (IE) certifies that a facility has completed all required performance tests and/or is built to the specifications outlined in the engineering procurement and construction (EPC) contract.

Commercial Risks: The various risks that can affect a project during operations, such as changes in input and output prices, fluctuations in demand, or failures in mechanical processes.

Commitment Letter: A formal letter offering an underwriting on a given set of terms and conditions, including interest basis/margin and fees.

Commitment Fee: A per annum fee applied to undisbursed balances that lenders are committed to lend; the fee is charged until the end of the availability period.

Common Law: The legal system of England and former English colonies. A body of law based on custom and general principles that serves as a precedent or is applied to situations not covered by statute.

Compensation Trade: The form of countertrade whereby an incoming investment is repaid from the units/revenues generated by that investment.

Competitive Tender: An open bidding situation where many banks may be encouraged to submit offers.

Complementary Financing: Where different lenders agree to fund a project under similar yet parallel documentation and a pro-rata security package.

Completion: The date on which the project's cash flows become the primary method of repayment. It occurs after a completion test typically involving both financial and physical performance criteria. Prior to completion, the primary source of repayment is usually from the sponsors or from the contractor.
Completion Guarantee: A guarantee that ensures a project will achieve physical and/or financial completion. A turnkey contractor guarantees physical completion (achievement of certain operating performance). The guarantees are normally secured by performance bonds and/or penalties in the form of liquidated damages. Alternatively, project sponsors sometimes provide lenders with completion guarantees by agreeing to pay the scheduled debt service in the event the project company does not or cannot pay.

Completion Risks: Construction, development, or cost overrun risk.

Completion Test: A test of the project's ability to perform as planned and generate the expected cash flows. In a limited-recourse deal, it is the time when the project moves from a full recourse to a nonrecourse financing.

Compound Interest: Interest resulting from the periodic addition of simple interest to principal; the sum then serves as the principal for the computation of interest owed during the following period.

Concession: The duration for which the private sector will operate the service/asset for. At end of the concession the asset is handed back to the government authority in a pre-agreed condition.

Concession Agreement: An agreement made between a host government and a project company or sponsor to permit the construction, development, and operation of a particular project.

Conditions Precedent (CPs): A set of preconditions that must be satisfied before the borrower can request drawdown or other credit facilities be made available under a lending agreement.

Consortium: All of the participants or developers associated with a specific project. In the early stage of a project, it may be a loose association not a legal or contractual entity or joint venture.

Constant Currency: A project's trade currency (often USD) from a base year that is used to adjust the currency of other years in order to ascertain purchasing power. The goal is to remove the effects of inflation and other forms of price escalation.

Consumer Price Index (CPI): An index measure of inflation equal to the sum of prices of a number of assets purchased by consumers weighted by the proportion each represents in a typical consumer's budget.

Contango: A market condition in which futures prices are higher in the distant delivery months than in the near-term months. The opposite of backwardation.
Contingency: An additional amount or percentage to any cash flow item (such as capital expenditures) that is needed to provide a cushion.

Contingent: For liabilities that do not yet appear on the balance sheet such as guarantees, supports, and lawsuits. For support or recourse, the trigger may occur anytime.

Contingent Equity: A standby commitment involving a specific amount of money callable by lenders for the purpose of covering cost overruns until completion.

Convertible Currency: A currency that can be exchanged freely for any other currency without government restrictions.

Cost, Insurance, and Freight (CIF): A quoted price including the cost of packaging, freight, insurance, and other charges paid from the time of loading to the arrival at a specified destination.

Cost of Capital: The rate a company must pay investors to induce them to invest in the company’s equity or debt.

Cost of Risk: The cost associated with the risk of a particular event happening.

Counter–Party: The other participant to a project agreement or a swap contract.

Countervailing Duty: An import duty charged to offset an export subsidy by another country.

Country Risk: Narrowly defined, it refers to cross-currency and foreign exchange availability risks. More broadly defined, it can also include the political risks of doing business in a given country.

Counter–Trade: One party supplies a unit or funding in return for other material or funding.

Coupon: The interest amount or rate payable on a bond.

Covenant: An agreement by a borrower to undertake (a positive covenant) or not to undertake (a negative covenant) a specific action. Breaching a covenant is considered an event of default.

Cover: The amount above 1.0x of a debt service coverage ratio.

Covered: When a loan or a tranche of a loan is protected by political risk insurance (PRI).
Covered Interest Rate Parity: The principle that the yields from interest-bearing foreign and domestic investments should be equal when the forward currency market is used to predetermine the domestic currency payoff from a foreign investment.

Crack Spread: A refinery hedging the oil intake and product mix of output results in a crack spread roughly equivalent to the gross refinery margin.

Crawling Peg: A foreign exchange rate system in which the exchange rate is adjusted frequently to reflect the rate of inflation.

Credit Enhancement: A guarantee issued by a third party assuring the payment or performance obligations of a major project participant. Credit enhancement can include other assets pledged as security for an obligation, guarantees from a project sponsor or host government, letters of credit payable to the project company as security for a project participant’s contractual undertakings, a debt service reserve fund, and/or contingent equity commitments.

Creditworthy: The risk of default on a debt obligation by that entity is considered low.

Creeping Expropriation: A series of acts that have an expropriating effect on a project’s value.

Cross–Collateral: Project participants agree to pool collateral (i.e., allow recourse to each other’s collateral in the event of default).

Cross–Default Provision: A provision under which default on one debt obligation triggers default on all other debt obligations

Crosslisting: Shares of common stock listed on two or more stock exchanges.

Cure Period: A period during which a borrower is allowed to remedy a default under a contract.

Current Account: The portion of the balance of payments that tracks the import and export of goods and services.

Current Asset: The assets that can be converted to cash within one year.

Current Dollar: Actual or real prices and costs at each point in time. Includes the effects of inflation and other forms of price escalation.

Currency of Denomination: Currency in which the borrower pledges to pay interest and repay principal.

Current Liabilities: Liabilities that are payable within one year.
Current Ratio: Current assets divided by current liabilities (a liquidity ratio).

Currency Swap: A transaction in which two counterparties exchange specific amounts of two different currencies at the outset and then repay over time according to an agreed upon contract. In a currency swap, the cash flows are similar to those in a spot and forward foreign exchange transaction.

Cushion: The extra amount of net cash flow remaining after expected debt service.

Debenture: A debt obligation secured by the borrower’s general credit rather than being backed by a specific lien on property. In other words, the debt obligation is not collateralized.

Debt: The obligation to repay an agreed amount of money.

Debt Capacity: The total amount of debt a company can prudently support given its earnings expectations, equity base, and asset liquidation value.

Debt to Equity Ratio (D:E Ratio): A ratio of a company’s debt to its total capitalization. The higher this ratio the greater the financial leverage of the company.

Debt Service: Principal repayments plus interest payable; usually expressed as the annual amount due per calendar or financial year.

Debt Service Coverage Ratio (DSCR): A quantitative measure used by lenders to determine whether a project’s prospective net cash flow from operations can support (make timely service payment on) a given amount of debt at the indicated potentially available terms. For any given debt service period, the debt service coverage ratio is defined as the cash available for debt service (CADS) divided by the total amount of debt service.

Debt Service Reserve Account (DSRA): A reserve account set up to ensure the timely payment of principal and interest.

Deemed–Tax Paid: That portion of taxes paid to a foreign government that is allowed as a credit or reduction in taxes due to a home government.

Deductible: An amount or period which must be deducted before an insurance payout or settlement is calculated.

Default: When a covenant has been broken or an adverse event has occurred. A monetary default occurs when a repayment is not made on time. A technical default occurs when a project parameter is outside defined or agreed-upon limits, or a legal matter is not yet resolved.
Default Interest: A higher interest rate payable on principal amounts after an event of default.

Deferred Tax Liability: An estimated amount of future income taxes that may become payable from income already earned but not yet recognized for tax reporting purposes.

Defeasance: The prepayment of financial obligations, often through a third party, in circumstances where the third party assumes the responsibility to discharge the financial obligations. When it occurs, the lender has no recourse to the original obligor.

Deficiency: The amount by which the project cash flow is not adequate to service the debt.

Deficiency Agreement: Where cash flow, working capital, or revenues are below agreed levels or are insufficient to meet debt service, then a deficiency or make-up agreement provides the shortfall to be provided by the sponsor or another party, sometimes to a cumulative limit.

Defined Event: The definition applicable to the trigger of a loss in an insurance policy, particularly political risk insurance.

Delayed–In–Startup (DIS): Insurance which can cover all non–site force majeures, change in laws and contingent contractor liability. Also called Advanced Loss–of–Profits insurance.

Delta: The change in an option’s price divided by the change in the price of the underlying instrument. Hedging strategies are based on delta ratios.

Demand Side Management: The practice of cutting electrical energy usage and/or costs by shifting usage patterns through incentives (e.g., time-of-day rates) or negotiating more favorable energy supply agreements.

Depreciation: Amortization for accounting (book), tax calculations, or income calculations. A regular reduction in asset value over time.

Derivative: A financial instrument based on an underlying contract or funding such as a swap, option, or hedging instrument.

Devaluation: Either a formal reduction in the spot price of a currency or a gradual reduction due to market forces.

Developing Countries: Developing countries are defined by the World Bank in terms of [INSERT MOST RECENT WORLD BANK STATISTICS FOR DEVELOPING COUNTRIES].
Development Bank: A lending agency that provides funds to encourage the creation or expansion of productive facilities in developing countries.

Development Finance Institution (DFI): A financial institution that provides debt and equity investments for projects in developing countries.

Dirty Float: A system of floating (i.e., market–determined) exchange rates in which the government intervenes on occasion to influence the foreign exchange value of its currency.

Disbursement: An accounting and financial term used to describe the actual payout or drawdowns of cash under a loan agreement.

Discount Bond: A bond selling below par.

Discount Rate: The annual percentage rate used to determine the present value of future cash flows.

Discount Securities: Non–interest–bearing money market instruments that are issued at a discount and redeemed at maturity for full face value.

Discounted Cash Flow: The future net cash flow brought to its present value using a discount rate.

Dispatch: The schedule of production for all the generating units on a power system, generally varying from moment to moment to match the production with power requirements. As a verb, to dispatch means to direct the plant to produce power.

Dividend: The amount paid out per share, usually once, twice, or four times a year, by a company from its profits as decided by the board of directors.

Dividend Trap: A restriction on a project company’s ability to pay dividends, despite having cash available to do so, because of current or accumulated losses.

Dividend Yield: The annual dividend payment divided by the market price of a share.

Double Dip: Tax depreciation which is accessed concurrently in two countries.

Double Tax Treaty: An agreement between two countries to avoid or limit the double taxation of income and gains, whereby an investor resident in one country may apply for reduction of or exemptions from taxes imposed on his business by the other and/or be entitled to relief in respect of such income or gains in the investor’s own country.

Drawdown: An actual takedown (borrowing) of money by the borrower under the terms of a loan facility.
Drop Dead Fee: An agreed upon fee to be paid a bank as compensation for its work on a transaction which is aborted.

Drop–Lock Loans: A floating rate loan, the terms of which provide that if for any interest period the rate of interest should fall below a pre-set level, the loan rate will become fixed.

Dual Currency Loans: A loan denominated in one currency which gives the banks the right but not the obligation to redenominate the loan at a future date in another currency at a predetermined exchange rate.

Due Diligence: Bank lenders to a project will undertake a thorough assessment of the transaction which covers financial, legal, technical, and insurance aspects of the project in order to ensure that there are no undisclosed or potential problems.

Earnings: Net income or profit.

Economic Value Added (EVA): The corporate goal of increasing the value of the capital that investors and shareholders have vested in the operations of the business.

Efficient Market: A market in which asset prices instantaneously reflect new information.

Enclave Project: A project whose products are exported, for which payment is received outside the host country.

Engineering Risk: The negative impact on project cash flows resulting from deficiencies in design or engineering.

Environmental Risk: Economic or administrative consequences of slow or catastrophic environmental pollution.

Equator Principles: A voluntary framework to guide project finance lenders / guarantors to act in a socially and environmentally responsible manner.

Equity: In a project financing, the cash or assets contributed by the sponsors. In accounting, the difference between total assets and total liabilities.

Equity Cash Flow (ECF): Cash flow available to equity holders. It is equal to net income plus depreciation less capital expenditures less increases in net working capital (NWC) less principal repayment plus new debt proceeds.

Equity Kicker: A share of ownership interest in a venture in consideration for making a loan.

Equity Risk Premium: The average annual return of the market over and above the return on riskless debt.
Escrow Account: A deposit held in trust by a third party to be turned over to the grantee on specified conditions. In project finance, an escrow account is often used to channel funds needed to pay debt service.

European Economic Community (EEC): Renamed the European Union (EU) in 1994, Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the U.K. comprise the EU.

Event of Default: Any event that entitles the lender to cancel a debt facility, declare all amounts owed by the debtor to become immediately due and payable, and/or enforce security.

Evergreen Facility: A renewable contract that rolls over after each agreed period until cancelled by one party.

Ex Dividend: Without dividend.

Ex Dock (Name of Port): International trade term in which seller agrees to pay for the costs (i.e., shipping, insurance, custom duties, etc.) of placing the goods on the dock at the named port.

Execute: Formally sign documentation or implement a required action.

Export Credit Agency (ECA): Organizations that assist in supporting exports from their country through the use of direct loan and guarantee mechanisms provided to importers.

Export Credits: Credit facilities or guarantee programs made available by a country for the benefit of exporters of goods or services in an effort to promote exports.

Expropriation: A forced transfer of ownership or value from a private owner to a government entity.

Face Value: The maturity value of a debt instrument. Also known as par value or nominal value.

Fee: A fixed amount or a percentage of an underwriting or principal charged as part of a financing.

Feedstock: The raw materials supplied to a processing or refining plant.

Fiduciary: A body to whom certain property is given to hold in trust per the trust agreement.

Finance Lease: The lessor receives lease payments to cover its ownership costs. The lessee is responsible for maintenance, insurance, and taxes.
Final Take: The fractional amount of a syndicated loan allocated to a particular bank. Because of over-subscription, the amount may be less than the commitment the bank offered to take.

Financial Close: The date on which all project contracts and financing documentation are signed and conditions precedent to initial drawing of the debt have been satisfied or waived.

Financial Viability: The ability of a project to provide acceptable returns to equity holders and to service its debt on time and in full.

Financing Agreements: The documents which provide the project financing and sponsor support for the project as defined by the project contracts.

First In, First Out (FIFO): An inventory valuation approach in which the cost of the earliest inventory purchases is changed against current sales.

Fiscal Year (FY): Accounting period covering 12 consecutive months over which a company determines earnings and profits. The fiscal year serves as a period of reference for the company and does not necessarily correspond to the calendar year.

Fisher Effect: A theory that nominal interest rates in two or more countries should be equal to the required real rate of return to investors plus compensation for the expected amount of inflation in each country.

Fixed Cost: Operating cost which does not vary per unit of output.

Fixed Exchange Rate: Foreign exchange rate set and maintained by government support.

Fixed Rate: An interest rate that is fixed for a defined period.

Flexible Exchange Rates: The opposite of Fixed Exchange Rate. The foreign exchange rate is adjusted periodically by the country's monetary authorities based on their judgment and external economic indicators.

Floating Charge: A security interest created over variable or unascertainable assets such as receivables, inventories, spare parts, bank accounts, and so on.

Floating Exchange Rate: A country's decision to allow its currency value to change freely. The currency is not constrained by central bank intervention and does not have to maintain its relationship with another currency in a narrow band. The currency value is determined by trading in the foreign exchange market.

Floating Rate: An interest rate that is reset periodically.
Floating Rate Notes (FRNs): Notes where the interest is reset periodically to a floating rate.

Floor: A level which an interest rate or currency is structured not to go below.

Force Majeure: An excuse for contractual nonperformance due to events beyond the control of either party. These events are either “acts of God” (floods, fires, or other natural disasters) or political risks (war, strikes, riots, expropriation, breach of contract, etc.). Contractual performance is forgiven or extended by the period of force majeure (French: “superior force”).

Foreign Direct Investment (FDI): The purchase of physical assets in a foreign country to be managed by the parent corporation.

Foreign Exchange (ForEx or FX): The conversion of one currency into another.

Foreign Exchange Risk: The effect on project cash flow or debt service coverage from the movement in the foreign exchange rate for revenue, costs, or debt service.

Foreign Tax Credit: The amount by which a domestic firm may reduce domestic income taxes for income tax payments made to a foreign government.

Forward Contract: A contract between two parties to exchange a commodity at a set price on a future date. Differs from a futures contract in that most forward commitments are not actively traded or standardized and carry the risk from the creditworthiness of the other side of the transaction.

Forward Rate Agreement (FRA): An interbank–traded contract to buy or sell interest rate payments on a notional principal.

Free Alongside (FAS): An international trade term in which the seller’s quoted price for goods includes all costs of delivery of the goods alongside a vessel at the port of embarkation.

Free Cash Flow (FCF): Cash available for capital providers. It is defined as earnings before interest payments adjusted for taxes (EBIAT); plus depreciation, amortization, and other non-cash charges; less capital expenditures; less increases in net working capital.

Free On Board (FOB): A transportation term in which the seller’s quoted price includes the cost of delivering the goods to a specified location. The buyer assumes responsibility for all transportation costs from that point onward.

Free Trade Zone: An area within a country into which foreign goods may be brought duty free often for additional manufacture, storage, or packaging.
Full Cover: Guarantees or insurance for both political and commercial risks provided to a lender by an export credit agency or international finance institution.

Full Recourse: No matter what risk event occurs, the borrower agrees to repay the debt. *By definition, this is not a project financing unless the borrower's sole asset is the project.*

Functional Currency: The currency of the primary economic environment in which a foreign subsidiary operates and generates cash flow.

Funding Risk: The impact on project cash flow from higher funding costs or lack of availability of funds.

Futures Contract: A legal agreement between a buyer (seller) and an established exchange or its clearing house in which the buyer (seller) agrees to take (make) delivery of something at a specified price at the end of a designated period. The price at which the parties agree to transact in the future is called the futures price. The designated date at which the parties must transact is called the settlement or delivery date. These contracts are usually tradable on exchanges.

Futures Market: A market where forward contracts can be traded before their maturity.

FX Rate: One currency unit expressed in terms of another. Foreign exchange rate.

FX Risk: The effect on project cashflow or debt service from a movement in the FX rate for revenue, costs, or debt service.

Gas Turbine: Electricity generation by way of a turbine from burning natural gas or liquid fuels.

Gearing: A measure of leverage such as the ratio of debt to equity or debt to total capitalization.

General Partner: The partner with unlimited liability.

Generally Accepted Accounting Principles (GAAP): The set of standardized rules established for the reporting of a project or company’s financial results for accounting purposes. These rules are established by independent accounting organizations in each country worldwide.

Golden Share: A shareholding interest entitling the holder to exercise a degree of control over certain activities of the company.

Goodwill: The amount paid in excess of an asset’s book value, usually for intangible assets such as trademarks or licenses.
Governing Law: The legal system to which the terms and conditions of a transaction or contract are subject. The law set forth by the contract or applied by a court.

Grace Period: The period within which a default is resolved without incurring penalty interest or other charges. A period during which interest or principal is not yet payable; it usually occurs after startup, commissioning, and completion in a project financing.

Greenfield: Refers to a project being conceived and executed where no project company, assets, or operations exist. A greenfield site or project location is one where no infrastructure exists to support the project.

Guarantee: An agreement to repay a loan or ensure performance. It may be limited in time and amount.

Guarantor: A party who agrees to guarantee repayment or performance.

Haircut: A discount.

Hard Currency: A currency that is likely to maintain its value against other currencies over time and not likely to be eroded by inflation. In contrast, a “soft” currency is likely to lose purchasing power over time. Hard currencies are usually freely convertible.

Heat Rate: The amount of fuel required to generate a kilowatt hour (kwh) of electricity. The lower the heat rate, the more efficient the generating facility.

Hedging: A strategy that eliminates a risk through the spot sale of the risk or through a transaction in an instrument that represents an obligation to sell the risk in the future. The goal is to ensure that any profit or loss on the current sale or purchase will be offset by the loss or profit on the future purchase or sale.

Hell—or—High—Water Clause: An absolute commitment to perform an action with no contractual defense.

Hire Purchase: The user of the asset is entitled to purchase the asset according to a pre-agreed method. The user may be the owner for tax purposes.

Host Country: The country in which a project is located.

Hurdle Rate: A minimum acceptable internal rate of return (IRR). Projects generating returns in excess of the corporate hurdle rate are viable candidates for implementation.

Illiquid: Not easily traded or not readily converted to cash.

Incipient Default: A potential default.
Income: Operating cash flows less overheads and depreciation, either before tax or after tax earnings.

Inconvertibility: An investor's inability to exchange a local currency (i.e., profits, royalties, fees, and capital invested) into a foreign currency.

Indemnity: A legal obligation to cover a liability.

Independent Engineer (IE): A consulting firm that helps lenders by evaluating the technical aspects of a project (e.g., completion schedule, technical feasibility, etc.). See Lenders' Engineer.

Indenture of a bond: A legal statement spelling out the obligations of the bond issuer and the rights of the bondholder.

Indexed Loan: A loan with debt service repayment tied to some standard which is calculated to protect the lender against inflation or currency risk.

Indexed Rate: An interest rate linked to an index, usually the CPI.

Indicative Terms: The likely commercial terms upon which a bank will lend, subject to its internal credit approval or other conditions. It is not a firm offer to lend or arrange a loan.

Inflation Premium: The increased return on an investment which is required to compensate investors for expected inflation.

Information Memorandum: A document that describes the project and the financing details; it is issued in connection with a loan syndication.

Infrastructure Project: A project in one of the following industrial sectors: power (electricity and gas), telecom, transportation, or water/sewage.

Infrastructure Risk: The impact on project cash flows from infrastructure (i.e., transport, telecommunications, etc.) problems. Sometimes called transportation risk.

“Inside the Fence”: A project or transaction that derives all of its revenues from a local customer such as a mine mouth power plant (i.e., a project that is fully integrated in some kind of manufacturing process). For power projects, the “fence” refers to the boundary between the power grid and the industrial facility. See also “Behind the Fence.”

Insider Trading: Buying or selling of a company's securities by persons having access to non–public information regarding the company.
Institutions: Insurance companies, pension funds, trusts, foundations, mutual funds, funds managers, and bank investment departments.

Instrument: A financial tool. Sometimes a discrete type of funding or a security.

Intangible Assets: Goodwill, patents and trademarks, deferred charges, and share/bond premiums.

Inter–Creditor Agreement: An agreement between lenders, or classes of lenders, describing the rights and obligations in the event of default.

Interest During Construction (IDC): An amount that is usually equal to capitalized interest.

Interest Rate: The percentage payable to the lender calculated at an annual rate on the principal amount outstanding on a loan.

Interest Rate Parity Theorem: An expression that assumes the interest rate differential between two countries is equal to the difference between the forward foreign exchange rate and the spot rate.

Interest Rate Risk: The impact on project cash flow from higher than expected interest costs.

Intermediary: An entity standing between parties to a funding, financing, or swap agreement. An intermediary may be a risk.

Internal Rate of Return (IRR): The discount rate that makes the net present value equal to zero. Multiple IRRs occur mathematically if the periodic cash flows change signs more than once.

International Center for Settlement of Investment Disputes (ICSID): A member of the World Bank Group that helps to encourage foreign investment by providing international facilities for conciliation and arbitration of investment disputes.

International Fisher Effect: A theory that the spot exchange rate should change by an amount equal to the difference in interest rates between two countries.

International Parity Conditions: Economic theories that link exchange rates, price levels, and interest rates together.

International Swap and Derivatives Association (ISDA): An organization that produces standard documentation for interest rate swaps.

Inverse Order: Applied to the periodic repayment schedule and means from the end, or the expected maturity date. Current order means the next periodic principal repayment.
Investment Bank: The U.S. term for merchant bank.

Investment Grade: An investment rating level of BBB- or better from Standard & Poor’s Corporation or Baa3 or better from Moody’s Corporation.

Irrevocable Letter of Credit: A letter of credit that cannot be changed or cancelled without the consent of all parties involved.

Islamic Loan: Interest cannot be charged. Rather the loan is structured using discounts, a sale/lease, profit participation, or repurchase agreement.

Joint and Several Liability: Each party is liable for the full amount of the liability, but performance by one discharges the obligations for all the parties.

Joint Venture: A business venture owned by two or more other business ventures.

Junk Bond: A bond with a sub-investment grade credit rating of BB+ or lower from Standard & Poor’s Corporation or Ba1 or lower from Moody’s. Also known as speculative or high-yield debt.

Jurisdiction Clause: A clause whereby one or more parties expressly submit to the jurisdiction of specified courts and, commonly, waive any sovereign or other immunities it or they may have.

Keepwell Letter: A form of guarantee in which the guarantor agrees to keep the recipient of the guarantee covered by injecting capital as needed.

kJ: Kilojoule, a measure of energy.

KwH: Kilowatt hour, a common unit of electricity. One thousand watts delivered for one hour.

Last In, First Out (LIFO): An inventory valuation approach in which the cost of the latest inventory purchased is charged against current sales.

Latent Default: A potential default that may have always been present but unidentified.

Law of One Price: States that if the identical product or service can be sold on two different markets, and no restrictions exist on the sale or transportation costs of moving the product between markets, the product’s price should be the same in both markets.

Lead Arranger: The senior tier of arrangers in a syndicated loan facility.

Lead Bank: A senior bank involved in the negotiations for a project financing. Subordinate to a lead arranger or manager.
Lead Manager: Senior tier of lenders in a loan syndication.

League Tables: A ranking of lenders and advisors according to the underwriting, final take, or number of project finance loans or advisory mandates completed during a given period.

Lease: The owner of an asset (the “lessor”) agrees to receive lease payments from the user (the “lessee”). The lessor receives the benefit of depreciation as a tax deduction and has the asset as security.

Lease Rate: The equivalent interest rate calculated from a stream of lease payments.

Lease Term: The life of a lease including any renewal options.

Legal Opinion: Written opinions provided by the legal advisors on the validity and enforceability of all project and finance documents including security documents.

Legal Risk: The risk that a party to a contract will not be able to enforce security arrangements, enforce foreign judgments, have a choice of law, or refer disputes to arbitration.

Lenders’ Engineer: An engineering firm that advises lenders on technical matters (see independent engineer).

Lessee: The user of a leased asset.

Lessor: The owner of a leased asset.

Letter of Credit (L/C): A financial instrument issued by a financial institution for the benefit of a customer under which the financial institution agrees to pay money to the beneficiary thereof upon demand or upon the occurrence of specified events.

Letter of Intent (LOI): A letter from one company to another acknowledging a willingness and ability to do business.

Leverage: The level of debt expressed as a percentage of equity or as a ratio to equity. The U.S./Canadian word for gearing.

Leveraged Lease: A lessor borrows to finance a leased asset. Recourse may be limited to the lease rental or the asset.

Liability: The obligation to repay a defined amount or to perform a service.

Lien: A legal security interest on property to secure the repayment of debt and the performance of related obligations.
Limited Partnership: A partnership consisting of one or more general partners who are not liable for the debts of the partnership beyond the funds so contributed.

Limited Recourse: Under certain conditions (related to legal, financial, or operating conditions), lenders have access to the sponsors’ credit or other legal security to fulfill a project’s debt obligations. There is usually recourse in the event of fraud, misrepresentation, or nondisclosure. For this reason, and because lenders often have some kind of recourse prior to completion, nonrecourse is often described as “limited-recourse” financing.

Line of Credit: A bank’s commitment to a borrower to extend a series of credits under certain conditions up to an agreed amount for a specified period of time.

Liquid: Easily traded or converted to cash.

Liquidated Damages (LDs): Specific and limited amounts that a contracting party is required to pay to another contracting party in the event an agreed-upon area of performance is not achieved.

Liquidation: The process of disposal or sale of the project or project assets with the proceeds used to repay the project financing.

Liquidity Ratio: Any ratio used to estimate a company’s liquidity.

Load Factor: A utilities average demand as a percentage of peak demand.

Loan Amortization: The scheduled repayment of loan principal. A loan amortization schedule specifies the amounts of principal to be repaid and the dates on which repayments are to be made.

Loan Life Cover Ratio (LLCR): The net present value of cash available for debt service (CADS) from the calculation date to the final maturity of the debt facilities divided by the principal outstanding on the calculation date.

London Inter–Bank Offered Rate (Libor): The rate at which banks sell deposits in the market.

Long–Term: 3 years or more. In accounting, anything more than 1 year.

Loss Payee: A party to whom an insurance loss payment or settlement may be paid directly.

Macro Factors: Factors that pertain to developments in the general economy and government fiscal policy.
Maintenance Bond: A bond to provide funds for maintenance and repair of equipment or a facility.

Maintenance Reserve Account: A reserve account that builds up cash balances sufficient to cover a project’s maintenance expenses.

 Majority Banks: A group of banks within a syndicate holding a specified percentage of the commitments (typically 66.67%) with the power to bind the syndicate as a whole in calling events of default and agreeing to certain amendments or waivers.

 Make–Up: Where a cash flow or capital item is deficient, the amount of such deficiency (e.g., an interest make-up) relates to the interest amount above a ceiling percentage.

 Make–Up Agreement: Where a product contracted to be supplied cannot be provided from a certain project; a make–up agreement provides that the product will be supplied from some other source.

 Manager: A medium–level participant established according to final take.

 Mandate: The formal appointment to advise on or arrange a project financing.

 Mandated Bank: The bank given the authority to proceed into the marketplace on behalf of the borrower, on the basis of the terms and condition set out in the mandate letter. The mandated bank is often referred to as the arranger in the Euromarkets and the administrative agent in the United States.

 Margin: The amount expressed as a percent per annum above the interest rate basis or cost of funds. For hedging and futures contracts, the cash collateral deposited with a trader or exchange as insurance against default.

 Margin Ratchet: A margin linked directly to the performance of the borrower.

 Marginal Cost of Capital: The incremental cost of financing above a previous level.

 Market Flex: The unilateral right reserved for underwriters to vary the structure and conditions of a mandate if the syndication process does not raise sufficient funds. Borrowers may negotiate restrictions on this unilateral right limiting variations to price only (called “price flex”).

 Market Risk: Changes to the amounts sold or the price received which affects total revenue. Sometimes called sales risk.

 Material Adverse Change (MAC): Prior to closing, an event or occurrence that allows the lender to adjust the terms (e.g., rate) of a loan agreement. After closing, an event that gives lenders the right to refuse further drawings or to require immediate debt repayment.
Material Adverse Event (MAE): Any event or circumstance that affects a party’s ability to perform or comply with any of its material obligations under the transaction documents. Such an event may allow the party to change some aspect of the contractual agreement.

Maturity: The final date a project finance loan is repayable.

Medium Term: Two to six years.

Merchant Bank: A bank that specializes in helping corporations and governments finance by any of a variety of market and/or traditional techniques; a combination of a commercial bank and investment bank found in the U.S.

Merchant Power Plant (MPP): A power plant that sells electricity without a long-term power purchase agreement

Mezzanine Debt: Refers to a type of debt which is between senior debt and equity. The cost of mezzanine debt is greater than senior debt as there is more risk involved.

Minemouth: Usually refers to a power-generating plant located next to a coal mine.

Mini–Perm: A loan for the construction period and first few years of operations taken with the intent of refinancing with more permanent (long-term) debt at a future date.

Modeling Bank: The institution responsible for creating the lenders’ base case financial model.

Monetization: Securitization of the gross revenues of a contract.

Monoline Insurance: Insurance of an individual financial risk (rather than general casualty insurance).

Monoline Insurance Company: An insurance company which specializes entirely in providing guarantees for corporate bonds.

Monte Carlo Simulation: The use of a random number generator to quantify the effects of uncertainty in a financial model.

Mortgage: A pledge or assignment of security of particular property for payment of debt; the same as an indenture of trust or security agreement.

Most–Favored–Nation (MFN) Status: A term meaning the same as “normal trade status.” Normal trade status is the application, by a country, of import duties on the same (i.e., “most favored”) basis to all countries accorded such treatment.
Multilateral Agency (MLA): An institution organized by a group of countries to promote development (e.g., the World Bank, the IFC, and the Inter-American Development Bank).

Municipal Notes: Short–term notes issued by municipalities in anticipation of tax receipts, proceeds from a bond issue, or other revenues.

Natural Hedge: An off–setting operating cash flow, a payable arising from the conduct of business.

Negative Arbitrage: The loss of interest caused by having to draw the full amount of a bond financing and then redeposit the funds until they are required at a later date. Because borrowing rates are typically higher than deposit rates, the deposited funds earn a negative spread.

Negative Covenants: Promises by the borrower in a loan agreement to abstain from undertaking certain actions.

Negative Pledge: A covenant whereby a borrower and/or guarantor will undertake not to create or allow creation of encumbrances on its assets. Negative pledges typically are subject to numerous negotiated exceptions.

Negotiable: A financial instrument can be bought or sold by another investor, privately, through a stock exchange, or via computer trading.

Net Operating Profit after Tax (NOPAT): Earnings before interest and taxes minus taxes.

Nominal Rate: A stated rate which is usually subdivided for compounding purposes, resulting in a higher effective rate.

Nonperforming Loan: A loan on which interest or some payment due under the loan agreement is not paid as it accrues.

Nonrecourse: The lenders rely on the project's cash flows and security over the project vehicle's assets as the only means to repay debt service.

Non-tariff Barrier: Trade–restrictive practices other than custom tariffs (e.g., import quotas).


Note: An instrument recognized as a legal evidence of debt.
Notional Principal: In an interest rate swap agreement, notional principal mirrors the principal outstanding under a loan agreement at any point during the loan life.

Novation: The transfer of rights and obligations from one contracting party (which is released of those obligations) to a third party, with the agreement of each of the other contracting parties.

Off–Balance–Sheet Liability: A corporate obligation that does not appear as a liability on the company’s balance sheet or is not required to appear by the applicable accounting standards.

Offering Circular: A document that describes the terms and conditions of securities being offered for sale and provides financial information relating to the borrower and any guarantor. Also called a prospectus.

Offshore Entity: A term for any entity located outside the boundaries of a given country.

Offtake Agreement: An agreement to purchase all or a substantial part of the product produced by a project, which typically provides the revenue stream for a project financing.

Offtaker (Offtake Purchaser): The purchaser of a project’s output.

One–Sided Risks: Those variables that are likely to result in decreased cash flows only from expected cash flows (including expropriation, cross-border payment restrictions or prohibitions, political unrest, etc.).

Onlending: The process by which a multi-lateral agency or other government agency lends funds to a financial institution (or possibly another government agency) with the expectation that those funds will be used to fund loans to ultimate borrowers. Also called re-lending.

Open–Cycle: The waste energy or exhaust from a power plant is not captured.

Operating Cash Flow: Project revenues less cash operating expenses.

Operating Lease: A lease that is not a finance lease whereby the lessee uses the assets for only a portion of its useful life.

Operating Risk: Cost, technology, and management components which affect operating expenses, output, or throughput.

Operations and Maintenance (O&M) Agreement: A contract obligating a party to operate and maintain a project.
Opportunity Cost: The cost of pursuing one course of action measured in terms of forgone return offered by the most attractive alternative investment.

Overrun: The amount of capital expenditure or funding above the original estimate to complete the project.

Oversubscription: The situation when the underwriting commitments from a syndication exceed the amount sought by the borrower.

Over–the–Counter (OTC) Market: A market created by dealer trading as opposed to the auction market prevailing on organized exchanges.

Par: Face value.

Parastatal Corporation: A Corporation that performs a function typically associated with the government under its indirect control.

Pari Passu: Literally, “with equal treatment among themselves.” A legal term that refers to financial instruments that rank equally in right of payment with each other and with other instruments of the same issuer. Applies to both the right to be paid from available operating cash flow and the rights in the event of liquidation.

Partial Credit Guarantee (PCG): An instrument designed to cover private lenders against all risks during a specified period of the financing term of debt for a public investment. These guarantees are designed to extend maturities and improve commercial terms (e.g., lower spreads).

Partial Risk Guarantee (PRG): An instrument designed to cover private lenders against the risk that a government or a government–owned agency fails to perform its contractual obligations vis–à–vis a private project.

Parity Conditions: In the context of international finance, a set of basic economic relationships which provide for equilibrium between spot and forward exchange rates, interest rates, and inflation rates.

Participant: A party to a funding agreement. It usually refers to the banks at the lower levels of a syndicate.

Participant Risk: The credit of the participants and the risk of non–performance under the project contract or financing agreements.

Participation: The amount of loan/bond issue taken directly or from another direct lender/underwriter.

Partnership: The partners agree to a proportional share of profits and losses and thus have the same tax treatment.
Payback: The period of years to recover the investment or loan.

Payment Cascade: See “cash flow waterfall.”

Peaking Capacity: A portion of a utilities capacity what is used during periods of peak demand.

Peaking Unit: A plant designed to operate only during periods of peak demand.

Performance Bonds: Guarantees purchased by the project developer issued by commercial banks or insurance companies to guarantee full and successful implementation of a contract according to prespecified performance guidelines.

Perpetuity: An annuity with periodic equal payments or receipts on a continuous basis.

Physical Completion: The project is physically functioning, but not yet fully generating cash flow.

Placement: Securities are placed with a small group of investors.

Plain Vanilla: A straightforward credit facility with no bells or whistles.

Point: One percentage point on a note or bond.

Policy Based Guarantees (PBG): An instrument designed to cover a portion of debt service on a borrowing by an eligible World Bank member country from private foreign creditors in support of agreed structural, institutional, and social policies and reforms.

Political Risk: Eight risks associated with cross-border investment and financing: currency inconvertibility, expropriation, war and insurrection, terrorism, environmental activities, landowner actions, nongovernmental activists, and legal and bureaucratic approvals. The first three are insurable. It overlaps with the political component of force majeure risk.

Portfolio Financing (hybrid): A financing transaction involving multiple projects or assets. Because the financing incorporates elements of both corporate and project finance, it is known as a hybrid financing.

Positive Covenants: Promises made under a loan agreement by the borrower to undertake certain actions.

Potential Default: A condition where a default would occur in time or where a notice or default event has not yet been formalized.
Power Purchase Agreement (PPA): A contract for a large customer to buy electricity from a power plant. This is usually the most important contract underlying the construction and operation of a power plant.

Praecipium: The amount of the front-end fee paid to the arranger for the human resources and technical skills it provided to make the transaction successful.

Preferred Creditor Status: A designation given to the International Monetary Fund (IMF), all World Bank Group member institutions, and many of the regional multilateral banks. These institutions are only able to lend to member countries if there is recognition that in the event of a foreign exchange crisis, the preferred lenders have first call on available foreign exchange.

Preferred Stock: Preferred equity owners have privileges over common shareholders, but have no voting rights and typically are paid with fixed dividends.

Premium: The cost of an insurance policy or the price of an option. An extra margin payable with prepayment of principal.

Premium Bond: A bond selling above par.

Prepayment: Repayment of greater than the scheduled principal amount. If a project company is forced to prepay principal with excess cash flow, then it is referred to as a mandatory prepayment.

Pre–Qualification Questionnaire. This questionnaire assesses the suitability and quality of bidders who have been selected following the Expression of Interest (EOI) stage. It is used to produce a shortlist of bidders during the second stage of the OJEC process.

Present Value Factor: A factor used to calculate the present value of an amount to be received at a future point in time. If the opportunity cost of funds is 10% over next year, then the present value factor is equal to 0.909 [= 1 / (1 + 0.10)].

Price Elasticity of Demand: The percentage change in the quantity of goods demanded as a result of the percentage change in price of the goods.

Pricing Grid: When a borrower agrees to pay a margin the level of which varies by reference to specific financial ratios (e.g., leverage) or external credit ratings, the transaction is said to contain a pricing grid or matrix.

Primary Market: The market for new issues during the syndication period.

Prime Rate: The rate at which U.S. banks lend U.S. dollars to their most creditworthy customers.

Principal: The quantity of the outstanding project financing due to be paid.

Private Placement: A private placement occurs when a security is not registered with the relevant securities and exchange commission (i.e. US SEC). Disclosure requirements for private placements are less stringent though no less complete than for a public placement.

Proceeds Account: The account into which all advances under the loan facilities, proceeds of base equity and contingent equity, and all project revenues are paid. The borrower is permitted to make withdrawals from the proceeds account only to make payments in connection with project costs and transfers to other accounts in accordance with prescribed cash waterfall.

Production Payment: A defined portion of the proceeds of production up to a capped amount; the amount that is required to repay a loan with interest and fees.

Production Loan: A project financing where the repayment is linked to some kind of production.

Pro Forma: A financial projection based on a set of assumptions.

Project: The asset constructed or acquired with a project financing, which is expected to produce cash flow at a debt service ratio sufficient to repay the project financing.

Project Appraisal Report: A formal assessment of the viability of the proposed undertaking and the robustness and predictability of revenue generation.

Project Company: A special-purpose entity created to develop, own, and operate a project.

Project Completion: Occurs when a defined set of technical and financial tests have been met as stipulated in the financing documents.

Project Contracts: The suite of agreements underlying a project.

Project Finance: Involves a corporate sponsor investing in and owning a single-purpose industrial asset (usually with a limited life) through a legally independent entity financed with nonrecourse debt.

Project Funds Agreement: Agreement, usually by sponsors, to provide additional funds as needed until project completion or other agreed date.

Project Life Cover Ratio (PLCR): The net present value of a project's cash available for debt service (CADS) over the project’s defined life divided by the amount of principal outstanding at the time of calculation.
Project Holding Company: A company that owns and finances several stand-alone projects. Because some of the corporate liabilities are secured by multiple assets, it represents a hybrid form of financing with elements of both project and corporate finance.

Promissory Note: An unconditional promise in writing undertaking to pay a specific sum on demand or at a future date.

Pro Rata: Shared or divided according to a ratio or in proportion to their participations.

Pro Rata Sharing Clause: A clause in a loan or inter-creditor agreement whereby banks agree to share among themselves amounts received or recovered from the borrower and/or guarantors pro rata to their participation in the financing.

Prospectus: A document that describes the terms and conditions of securities being offered for sale and provides financial information relating to the borrower and any guarantor; also called an offering memorandum.

Purchasing Power Parity (PPP): A theory that the ratio between domestic and foreign price levels should equal the equilibrium exchange rate between domestic and foreign currencies.

Public Private Partnerships (PPP): Projects, typically infrastructure developments, which involve both the public and private sectors.

Put Option: An option to sell an asset at a given price.

Put–or–Pay Agreement: An agreement whereby a supplier undertakes to supply an agreed quantity of materials to the project company and to make payments sufficient to enable the company to obtain alternative supplies in the event of supplier failure.

Qualified Institutional Buyer (QIB): An institutional investor that is qualified to buy unregistered or private-placement securities according to the rules of the governing securities and exchange commission or agency.

Qualifying Facility (QF): A non-utility power producer or co-generator that meets specific operating, efficiency, size, and fuel source standards, established by the governing energy regulator.

Quasi–Equity: A type of deeply subordinated debt security or senior equity security (e.g., preferred shares) whose holders are paid before ordinary shareholders but after senior debt holders. Other forms of quasi-equity can include various kinds of convertible debt.

Rate Base: The value of that part of a utility’s plant and equipment that is in use or deemed by regulators to be useful for future public service. The utility is only allowed
recovery of and a return on investments that are allowed into rate base by the regulators.

Rating: An evaluation of creditworthiness provided by a rating agency such as Standard & Poor’s Corporation or Moody’s.

Rating Agency: A company providing an independent view on the creditworthiness of a country’s sovereign debt, a project company or some other security.

Real Exchange Rate: An index of foreign exchange adjusted for relative price level changes since a base period. Used to measure purchasing power–adjusted changes in exchange rates.

Real Option Analysis: The application of option theory to capital budgeting decisions.

Receiver: A person or entity appointed under the legal security documents to administer the security on behalf of the project financiers.

Recourse: In the event a project cannot service the financing or achieve completion, the financiers have recourse to either cash from the sponsor or other non-project security.

Refinancing: Prepayment of the existing debt and substitution of new debt on more attractive terms (e.g., at a lower cost, with a longer maturity, or with fewer or less restrictive covenants).

Remittance: A transfer of funds from one place to another, not necessarily a payment of an obligation.

Representations: A series of statements of fact or law made by one party to an agreement on the basis of which the other party undertakes to enter into the agreement. The representations will typically cover such matters as the legality and enforceability of documentation, the financial condition of the borrower, and the absence of any material litigation or other proceedings against the borrower. Material inaccuracies in the representations will normally constitute default under the loan agreements.

Request for Proposals (RFP): An invitation to bid on a public procurement.

Reserve Account: A separate cash account used to meet future payment obligations such as debt service, maintenance, or capital expenditure.

Reserve Margin: The percent difference between peak demand and capacity, where capacity includes the utility’s own power generation capacity and power available from other producers via contracts. Generally, a 15% to 20% reserve is adequate.
Reserve Tail: Proven reserves available after the final maturity of the debt; applies to projects involving natural resources.

Residual: The assumed value of an asset at the end of a loan, lease, or pro forma cash flow.

Residual Asset Value: The value of an asset at the conclusion of a lease term.

Residual Cover: The cash flow remaining after a project financing has been repaid expressed as a percentage of the original loan.

Residual Cushion: The amount of net cash flow from the project after the project financing has been repaid.

Retail Wheeling: A scheme when retail customers can contract to purchase power directly from any provider without regard to currently existing service areas.

Retained Earnings: Earned surplus retained and reinvested in a business and not distributed as dividends.

Retention: An amount held back from construction contract payments to ensure the contractor completes the construction before the retention (typically 5-15% of the contract price) is returned to the contractor.

Revenues: Sales or royalty proceeds. Quantity times price realized.

Revenue Bond: A municipal bond secured by revenue from tolls, user charges, or rents derived from the facility that was financed.

Revocable Letter of Credit: A letter of credit that can be changed or cancelled by the issuing bank or by any party involved until payment is made.

Revolving Credit Agreement: A legal commitment on the part of a bank to extend credit up to a maximum amount for a definite term. The notes evidencing debt are short term, such as 90 days. As notes become due, the borrower can renew the notes, borrow a smaller amount, or borrow amounts up to the specified maximum throughout the term of commitment.

Risk: The event which can change the expected cash flow forecast for the project financing.

Risk Adjusted Return on Capital (RAROC): The return on capital of an asset portfolio taking into account the risk weighting (as established in the Basel Accord) of each asset.
Risk Contamination: The phenomenon whereby a failing division (or asset) drags an otherwise financially healthy division into default.

Risk Free Interest Rate: The interest rate prevailing on a default–free bond in the absence of inflation.

Royalty: A share of revenue or cash flow to the government or grantor of the concession or license. Compensation (i.e., royalty fees) for the use of intellectual property belonging to another party, usually calculated as a percentage of sales.

Running the Books: In the central task to execute a syndication, a bank appointed to run the books is responsible for issuing invitations, disseminating information to interested banks, and informing the borrower and management group of daily progress. The role is very visible vis-à-vis the borrower and the general market. As such, it is generally considered the most desirable syndicate task.

Sale and Leaseback: A transaction in which an investor purchases assets from the owner and then leases them back to the same individual.

Sales Completion: The project has reached physical completion and has delivered product or generated revenues in satisfaction of a sales completion test.

Salvage Value: The estimated selling price of an asset once it has been fully depreciated.

Secondary Market: After the initial distribution of bonds or securities (in the primary market), additional trades occur between investors in what is known as the secondary market.

Securitization: Packaging up a stream of receivables or assets to fund via a capital markets, tradable funding.

Security: A legal right of access to value through mortgages, contracts, cash accounts, guarantees, insurances, pledges, or cashflow, including licenses, concessions, and other assets. A negotiable certificate evidencing a debt or equity obligation/shareholding.

Selling Short: A speculation technique in which an individual sells an asset (e.g., foreign currency, securities, or commodities) to another party for delivery at a future date.

Senior: The highest ranking for repayment, security, or action.

Sensitivity Analysis: Analysis of how changing an input variable in a financial model affects the value, performance, or solvency of a given project.
Service Level Agreements: Contractual agreement defining the level of services between service providers and service customers.

Set–Off Clause: A claim made by someone who allegedly owes money that the amount should be reduced because the other person owes him or her money.

Several Liability: A legal term that conveys the meaning that nonperformance by one entity of its obligations will not affect or alter the obligations of the other parties.

Shadow Tolls: Tolls based on project use but payable by the government or other contracting authority rather than the general public.

Shareholders Agreement: The generic term for any contract between two or more shareholders governing their conduct in relation to the corporation, or partnership, in which they own shares.

Shareholders Equity: Net worth. Book value of total assets less total liabilities.

Share Retention Agreement: An agreement, usually by sponsors, not to sell their shareholding(s) in the project company (or to maintain an agreed-percentage shareholding).

Short: A market participant assumes a short position by selling a commodity or security he does not own.

Short–Term: Up to 12 months.

Simple Interest: Only the principal earns interest for the life of the transaction.

Sinking Fund: A regular debt payment is set aside in anticipation of a future payment.

Solvency: The state of being able to pay debts as they become due.

Sources and Uses Statement: A document showing where a company intends to get its cash and where it intends to spend the cash over a specific period.

Sovereign Guarantee: A government guarantee of its obligations under project documents.

Sovereign Immunity: A doctrine under which it may be impossible to sue or seize the assets of a state or state equity.

Sovereign Risk: The risk that the host country government will default in its contractual undertaking with the project or another project participant, such as under guarantees, indemnity agreements, or input and offtake contracts.
Special Purpose Entity (SPE): An entity established for a particular purpose, such as obtaining off-balance sheet financing, gaining tax advantages, or isolating the sponsors' other assets from the project's creditors.

Special Purpose Vehicle (SPV): See Special Purpose Entity.

Sponsor: A party wishing to develop and finance (with equity) a project. Shareholders of project companies are known as sponsors.

Spot Market: The market for buying and selling a specific commodity, foreign currency, or asset at the prevailing price for immediate delivery.

Spot Price: The current market price of the actual physical commodity. Also called the cash price.

Standby Letter of Credit: A letter of credit that provides for payment to a beneficiary when that beneficiary provides certification that certain obligations have not been fulfilled.

Step-In Rights: The right of lenders to assume sole or principal responsibility for carrying out all or part of the project’s contractual responsibilities or to make arrangements for carrying them out. Step-in rights are designed to ensure continuity of the project and its ability to operate following a default by the sponsor.

Step-Up Margin: A margin which increases during the term of the loan.

Stranded Costs: Costs that will be unrecoverable through rates in an open market.

Stripped Bonds: Bonds issued by investment bankers against coupons or the maturity portion of original bearer bonds, where the original bonds are held in trust by the investment banker. A stripped bond is essentially a zero coupon bond manufactured by an investment banker.

Structural Subordination: Occurs when a bank or other institution lends to a holding company that uses the loan proceeds to infuse capital, in the form of equity or deeply subordinated shareholder loans, into one or more newly purchased operating companies. The holding company lender is structurally subordinated in right of payment relative to third-party lenders that may be extending credit directly to the operating subsidiaries.

Structure: How a project financing is drawn down, repaid, and collateralized.

Subordinated: The subordinated party accepts a lower priority of repayment and/or security than the senior party.
Subsidiary: A foreign operation incorporated in the host country and owned 50% or more by a parent company.

Sub–Sovereign Risks: Risks relating to a public-sector entity other than the central government (e.g., local and state governments).

Sunk Costs: Capital that is already spent.

Supplier Credit: A financing arrangement under which the supplier agrees to accept deferred payment terms from the buyer, and funds itself by discounting or selling the buyer’s bill or promissory notes with a bank in its own country.

Supply–or–Pay Contract: A contract in which the supplier agrees to provide goods or services to a project over time for a negotiated fee. If it is unable to do so, it must either provide the goods or services from an alternative source at its own expense or pay damages to the project for expenses incurred by the project in securing the goods or services itself.

Supply Risk: The raw materials or input to a project change from those assumed or projected. For a resources production project, this is called reserves risk.

Surety Bond: A form of guarantee to ensure contractual performance. For example, an insurance company can guarantee that a contractor will complete a project by issuing a surety bond payable in the event the contractor fails to complete the project.

Swap: An arrangement in which two entities lend to each other on different terms, for example, in different currencies or at different interest rates, fixed or floating.

Sweep: Typically a covenant that requires all or a specified fraction of available cash flow to be used for debt service, including prepayments of principal.

Swingline: A credit facility that appear in major loan transactions where a lead lender provides a small operating credit facility that is carved out from the lead lender’s participation in one of the other credit facilities, and that is available to the borrower to deal with the need to obtain small advances or where the borrower needs an overdraft. It is usually made available to a borrower in connection with its commercial paper program.

Swingline Agent: The bank which administers the swingline facility.

Syndicated Loan: A commercial banking transaction in which two or more banks participate in making a loan to a borrower, typically a large multinational firm or government.

Syndication: The selling of a project finance to a group of prospective participants (a.k.a., the syndicate).
Synthetic Lease: A kind of lease that combines the tax treatment of a capital lease with the accounting treatment of an operating lease. Thus, the lessee can deduct depreciation and interest expenses for tax purposes but does not record those expenses on its GAAP accounting statements.

Synthetic Loan: Typically, a floating rate instrument created by combining an interest rate swap with a bond. For instance, by using an interest rate swap, floating rate interest payments can be created and linked to coupon payments under a fixed interest rate bond. The resulting floating rate instrument is synthetic—that is, it has been created after issuance of the underlying bond, and its terms, therefore, might not otherwise be available in the market.

Systematic Risk: Risk associated with the market, which cannot be diversified away. Also known as non-diversifiable risk (as measured by an asset’s beta).

Tail: The remaining reserves after the project financing has been repaid. Sometimes called the residual.

Take–and–Pay Contract: A contract that requires the buyer to take and pay for the good or service only if it is delivered.

Take–or–Pay Contract: A contract that creates an unconditional obligation on the part of the buyer (off-taker) to pay for the good or service even if it is not produced or available from the seller.

Takeout: A new financing to refinance an existing loan.

Tariff: A duty or tax on imports that can be levied based on a percentage of cost or specific amount per unit.

Tax Haven: A country with either no or very low tax rates that uses its tax structure to attract foreign investment or international financial dealings.

Tax Holiday: A benefit granted to a project that provides project owners an exemption from taxation for a negotiated or statutory period.

Tenor: The number of years a loan is outstanding (i.e., the final maturity or term).

Term: The loan life or tenor; the period to a loan’s final maturity.

Term Loan: A loan with an original or final maturity of more than one year, repayable according to a specified schedule.

Term B Loan: Medium–term (typically 5 to 7 years) heavily collateralized loans from non–bank lenders (e.g., mutual funds, hedge funds, and other institutions) with very high interest rates. This loan, which resembles a bond with back–end amortization but
with bank–type covenants, has been used in corporate finance since the mid–1990s and more recently in project finance.

Term Sheet: A document that outlines in general terms the key agreements to be contained in a legal document; other terms loosely associated and often used interchangeably are a letter of understanding (LOU) and a memorandum of understanding (MOU).

Third–Party Liability Insurance: Insurance against damage or injury caused by the project to third parties.

Throughput Agreement: A throughput agreement is a hell-or-high-water contract to put and pay for material through a facility.

Tolling Agreement: An agreement under which a project company imposes tolling charges on each project user as compensation for processing raw material.

Tombstone: An advertisement describing some kind of capital raising that lists the sponsor, amount raised, participants, and key roles played by the participants.

Total Shareholder Return (TSR): A measure of corporate performance based on the sum of share price appreciation and current dividends.

Tranche: A separate portion of a project financing, perhaps with different lenders, margins, and terms.

Transaction Advisor: Individuals, firms, and companies with expertise in financial, economic, legal, and environmental analysis, contracts, the tender process, and engineering and cost estimating who assists in bringing a project from conception, through public bidding and award, to actual execution.

Transfer Risk: Currency cannot be sent out of the country, usually due to Central bank restrictions or a national debt rescheduling.

Trustee: An independent or nominated third party who administers corporate or financial arrangements.

Turnkey Contract: A construction contract that provides for the complete engineering, procurement, construction, and start-up of a facility by a certain date, for a fixed price and at guaranteed performance levels.

Two–Sided Risks: Risk components that can cause the cash flow returns of an investment to be higher or lower than generally expected. Also known as symmetric risks.
Undersubscription: The situation when the underwriting commitments from a syndication are less than the amount sought by the borrower.

Unsystematic Risk: The amount of risk in a portfolio that can be eliminated by diversification.

Underwrite: An arrangement under which a financial house agrees to buy a certain agreed amount of securities of a new issue on a given date and at a given price, thereby assuring the issuer the full proceeds of the financing.

Underwriting: The commitment to fund is not contingent upon successful syndication.

Unsecured: The financier has no security other than a legal commitment by the borrower to repay the loan.

Unwind: To reverse a swap or hedge position.

Value–Added Tax (VAT): A type of national sales tax collected at each stage of production or sale of consumption goods, and levied in proportion to the value added during the stage.

Value for Money (VFM):

Vendor Finance: Debt provided by a supplier of equipment or services to the project company.

Venture Capital: Risk capital extended to start–up or small going concerns.

Volumetric Production Payment (VPP): A financing structure whereby a buyer, typically a financial institution, advances funds to a seller, usually an oil & gas producer, in exchange for non-operating interest in oil and gas properties. VPPs provide the seller with a piece of their cash flows today.

Warranty: A guarantee that a given fact will exist at some future date, as promised.

Withholding Tax: A tax on interest, royalty, or dividend payments, usually those paid overseas.

Working Capital: Cash required to fund inventories and accounts receivables. Accounting definition is current assets less current liabilities. It is recovered in full when the project ceases.

Workout: The project financiers are responding to work out a potential problem or have arranged to take over the operation after a default to rehabilitate the project’s cash flow generating capacity.
Worldwide Approach Tax Structure: An approach which levies taxes on the income earned by firms that are incorporated in the host country, regardless of where the income was earned.

Wrapped Bonds: Bonds that carry a significantly lower corporate spread because they are guaranteed by a monoline insurance company.

Yield: The financial return usually expressed as a percentage per annum.

Yield to Maturity: The rate of interest (discount) that equates future cash flows of a bond (both principal and interest) with the present market price. Yield to Maturity is the time-adjusted rate of return earned by a bond investor.

Zero Coupon Bond: A bond that pays no periodic interest, but returns a given amount of principal at a stated maturity date. Zero coupon bonds are sold at a discount to the maturity amount to provide the holder with a compound rate of return for the holding period.
Appendix B

Legal Framework & Document Worksheet
Appendix C

South African Treasury Case Study – N4 Toll Road
Appendix D

Weighted Average Cost of Capital Worksheet
Appendix E

Capital Budgeting Worksheet
Appendix F

Project Escalation Factors Worksheet
Many of the definitions contained in this list of acronyms come from or were created from one or more of the sources listed in the Bibliography under “Acronym Sources”. The definitions have been revised to make them current and consistent across the glossary.


Development Bank of Southern Africa (DBSA) web site: www.dbsa.org/privatesector/project_finance.htm

Harvey, C., Hypertextual Finance Glossary: http://www.duke.edu/~charvey/Classes/wpg/glossary.htm


MZ Project Finance web site (Produced by Mauro Zajec): www.mzprojectfinance.com/project_finance/glossary.htm


The triple bottom line concept refers to the incorporation of social and environmental externalities into a firm or a projects balance-sheet bottom line. Currently, most bottom lines incorporate purely economic analyses. Adding environmental and social equity concerns to the economic bottom line gives us a triple bottom line approach. See, Hart, Stuart L. (1997). “Beyond greening: strategies for a sustainable world”, Harvard Business Review Vol 75 (1), Pp 66-76.


For ease of reference in this Course Note, we will refer to a project’s currency in terms of US “dollars”. Many large infrastructure projects that involve international financiers are denominated in what are commonly referred to as “vehicle currencies” (i.e. USD, GBP, Euros etc.). However, several case studies will require participants to develop models that may be based in local currencies.

Project Finance Teaching, by Bruce Comer for Professor Gordon M Bodnar, The Wharton School of Business, 1996.

Este, p 7.


See also, Hainz and Kleimeier above.


Principal – Agency problem exist because of large number of parties, everybody trying to maximize their returns in a short time, propensity to wait decreases significantly and the initial project gestation period is critical to success of project. See, “Principal-agency Risk in Project Finance”, L.M.Farell, International Journal of Project Management, Volume 21, Issue 8, November 2003, pages 547-561.


Pro forma describes a presentation of data, typically financial statements, where the data reflect the world on an 'as if' basis. That is, financial statements that are not based on historical data. http://economics.about.com/od/economicsglossary/g/proforma.htm

A project’s internal rate of return or “IRR” measure the profitability of the project and does not take into consideration external or environmental factors. As such, we distinguish the IRR from a project’s ROI that is often used to compare different projects. See, Chapter 7 for a discussion of the method used to calculate IRR.


See also, Section 5.3.4 in Chapter 5 above for a review of how to calculate a project’s IRR using Excel.

See, http://www.youtube.com/watch?v=8mzWtE9bHFF

See further discussions of disadvantages of NPV at: http://www.investopedia.com/ask/answers/06/npvdisadvantages.asp#axzz23v5RH9z.

See, for example, model developed by the Construction Research Congress. http://cedb.asce.org/cgi/WWWdisplay.cgi?146461.

Ibid.