Hydropower Financing and Risk Management Nepal

ECONOMIC AND FINANCIAL ANALYSES: PROCEDURES IN FEASIBILITY STUDIES

KATHMANDU
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NEPAL
MAIN CHALLENGES TO MOBILIZING DOMESTIC FINANCING FOR HP DEVELOPMENT

• AS PER WB PROJECT DOCUMENT, AUGUST 2018: FIRST PROGRAMMATIC ENERGY SECTOR DEVELOPMENT POLICY CREDIT (p. 42):
  – “There are major challenges to mobilizing domestic financing for hydropower development
    • Nepal’s financial institutions are expected to have US$14 billion in debt financing available for hydropower financing by 2030
    • There continues to be significant appetite among domestic investors and financial institutions to develop hydropower projects
    • However, the ability of developers to access this financing remains limited because of:
      (a) the elevated risk perception of hydro among lenders due to poor credit worthiness of NEA
      (b) the lack of availability of long tenor loans
      (c) poor capacity of financing institutions to appraise hydropower projects, and
      (d) unavailability of nonrecourse project finance in the sector.”
STUDY ON CONSTRAINTS TO INVESTMENTS IN THE ELECTRICITY GENERATION INDUSTRY: COUNTRY FINDINGS

• LENDERS’ MAIN CONCERNS
  – PROJECT CASH FLOW
    • YIELD A REASONABLE ROE
    • PROVIDE A SUFFICIENT DEBT SERVICE CUSHION
  – GUARANTEES
    • COMPLETION, PERFORMANCE, POLITICAL RISK
    • BUYER’S PAYMENT OBLIGATION
  – MAIN COLLATORAL
    • PPA, IA, THE LICENCE
  – OUTPUT
    • TAKE-OR-PAY CONTRACT
    • TARIFF WITH ESCALATION CLAUSES
    • END-USER TARIFFS: VIABILITY, NON-INTERFERENCE
  – PROJECT SPONSOR
    • OVERALL TRACK RECORD
    • EXPERIENCE IN THE POWER SECTOR
    • FINANCIAL STRENGTH / ABILITY TO RAISE EQUITY
    • CONTRACTUAL ARRANGEMENT WITH CONTRACTOR ETC.
  – REGULATORY ENVIRONMENT
    • LEGAL STABILITY & PREDICTABILITY
    • REGULATOR’S INDEPENDENCE
    • PREDICTABLE TAXATION REGIME
  – THE ECONOMY
    • MACROECONOMIC STABILITY / GOVERNANCE

• LENDERS’ CHALLENGES
  – OWN LIMITED EXPERIENCE WITH - / EXPERTISE IN HPPs
  – LONG PROJECT LEAD TIME
  – LOAN APPRAISALS: HIGH COSTS, ESP. FOR SMALL HPPs
  – INTERFACE WITH ENVIRONMENTAL LOBBY GROUPS
  – GOVERNMENT INTERFERENCE IN TARIFF SETTING ETC.
  – RISK ALLOCATION
  – INEXPERIENCED COMPANIES (SPONSORS)
  – POORLY DONE FEASIBILITY STUDIES!
THE PROJECT CYCLE

Through IRP
PROCEDURE TO ASSESS A HYDROPOWER PROJECT IN ECONOMIC AND FINANCIAL TERMS

1. DEFINE PROJECT OBJECTIVES ← BASIS/PREMISE FOR ANALYSES
2. ESTABLISH THE DEMAND FOR MORE POWER ← TEST 1
3. IDENTIFY THE LEAST-COST ALTERNATIVE ← TEST 2
4. ESTABLISH THE ECONOMIC VIABILITY (CBA) ← TEST 3
5. DETERMINE FINANCIAL ATTRACTIVENESS ← TEST 4

IN THE FEASIBILITY STUDY, AND PRIOR TO ECONOMIC AND FINANCIAL ANALYSIS:

• TECHNICAL STUDIES AND COSTING
• ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)
VARYING OBJECTIVES OF A HYDROPOWER PROJECT

- THE OBJECTIVE(S) OF THE HYDROPOWER PROJECT
  - HAS A STRONG BEARING ON THE ECONOMIC AND FINANCIAL ANALYSES OF THE PROJECT
  - WILL STEER US TOWARDS THE TYPE OF BENEFITS WE WILL BE LOOKING FOR

- WILL THE PROJECT:
  - MEET INCREASING DEMAND? OR
  - REPLACE EXISTING EXPENSIVE THERMAL CAPACITY?
  - PROVIDE PRIMARILY MORE
    - CAPACITY OR ENERGY, I.E. MORE MW OR kWh?
    - PEAKING ENERGY OR MORE BASE LOAD ENERGY?
  - PROVIDE MORE ENERGY PRIMARILY FOR
    - DOMESTIC PURPOSES? OR
    - EXPORT?

- OTHER PURPOSES?
ELECTRICITY DEMAND FORECASTS AND MARKET ANALYSIS

- NEEDED FOR SEVERAL PURPOSES:
  - **BASIS FOR PLANNING:**
    - FOR DETERMINING THE NEED FOR MORE CAPACITY
    - FOR DESIGN AND OPTIMISATION: HOW WELL DOES THE PROJECT FIT IN WITH EXPECTED SYSTEM, DEMAND AND SUPPLY, AND HOW SHOULD IT BE DESIGNED?
  - PROVIDE DATA FOR ECONOMIC AND FINANCIAL ANALYSIS

\[
\text{NPV} = B - C
\]

where:

- \( B \) = PRESENT VALUE OF BENEFITS (OR REVENUE)
- \( C \) = PRESENT VALUE OF COSTS
DILEMMA OF POWER FORECASTING

• PREDICTING THE FUTURE IS INHERENTLY UNCERTAIN

• GALBRAITH: "The purpose of economic forecasting is to make astrology look respectable."
IMPORTANCE OF SOUND FORECASTING PRACTICES

• DEVOTING TOO LITTLE ATTENTION AND RESOURCES TO DEMAND FORECASTING HAS NEGATIVE CONSEQUENCES AND COSTS SINCE:

  • EXPANSION OF SUPPLY SYSTEMS TAKES YEARS TO PLAN AND IMPLEMENT

  • POWER PROJECTS ARE CAPITAL INTENSIVE INVESTMENTS, IN PARTICULAR HYDROPOWER PROJECTS, MEANING THAT WE SHOULD BUILD NEW CAPACITY WHEN IT IS NEEDED
    • NOT TOO SOON
    • NOT TOO LATE
LOSSES RESULTING FROM FORECASTING ERRORS

- COST OF EXCESS CAPACITY:
  - TYING UP CAPITAL (INTEREST COST)
  - CROWDING OUT INVESTMENTS

- LOSSES DUE TO FORECASTING ERRORS:
  - BLACK-OUTS
  - SCHEDULED RATIONING
  - INSTALLATION OF HIGH COST PLANTS
  - USE OF OBSOLETE PLANTS
MAIN METHODS OF DEMAND FORECASTING

• TREND ANALYSIS
• ECONOMETRIC MODELS
• SURVEYS
• A COMBINATION OF METHODS
TREND ANALYSIS

• APPROACH
  • EXTRAPOLATES HISTORICAL TRENDS

• ADVANTAGE
  • SIMPLICITY
  • USEFUL MAINLY FOR THE SHORT TERM
  • TRENDS IN OTHER COUNTRIES/REGIONS OF SIMILAR CHARACTER CAN BE A USEFUL GUIDE

• DISADVANTAGE
  • OFTEN LITTLE DISCUSSION OF UNDERLYING FACTORS
  • OVERLOOKS STRUCTURAL CHANGES IN THE ECONOMY OR MAJOR EXPANSIONS

• REQUIRES
  • HISTORICAL TIME SERIES - NOT ALWAYS AVAILABLE
Historical Consumption and Trend Forecast

- Years:
  - 1982
  - 1987
  - 1992
  - 1997
  - 2002
  - 2007
  - 2012
  - 2017
  - 2022
  - 2027

- GWh:
  - 0
  - 50
  - 100
  - 150
  - 200
  - 250
  - 300

- Graph showing actual consumption and trend forecast.
ECONOMETRIC MODEL

• APPROACH
  • ESTIMATES HISTORICAL COEFFICIENTS AND PROJECTS FUTURE EXPLANATORY VARIABLES
  • FUTURE DEMAND: A FUNCTION OF EXPLANATORY VARIABLES AND HISTORICAL COEFFICIENTS

• ADVANTAGE
  • TAKES EXPLICIT ACCOUNT OF A NUMBER OF EXPLANATORY VARIABLES AND THEIR EXPECTED FUTURE DEVELOPMENT

• DISADVANTAGE
  • RELIES ON STABLE COEFFICIENTS
  • DATA INTENSIVE AND TIME CONSUMING
  • MAINLY APPLICABLE TO MATURE POWER SECTORS/ECONOMIES
  • STRUCTURAL CHANGES MAY BE DIFFICULT TO ANTICIPATE

• REQUIRES
  • HISTORICAL TIME SERIES FOR COEFFICIENT ESTIMATIONS
  • A BASIS FOR PROJECTING FUTURE VARIABLES
ECONOMETRIC MODEL

• SIMPLE MODEL
  \( D_1 = D_0 \times (1 + a \times b) \)
  \( D_{2010} = 4244 \text{ GWh}(1+0.9\times0.05) \)

  coefficient explanatory variable (for example future GDP growth rate)

• EXTENDED MODEL
  \( D = f(l, P_e, P_s, \ldots, S) \)

  • HOUSEHOLDS (examples of explanatory variables):
    INCOME
    PRICE OF ELECTRICITY
    PRICE OF SUBSTITUTES FOR ELECTRICITY
    STOCK OF ELECTRICAL EQUIPMENT

  • INDUSTRY (examples of explanatory variables):
    INDUSTRIAL OUTPUT
    PRICE OF OUTPUT
    SHARE OF ENERGY IN TOTAL COST PATTERN
    PRICE OF OTHER FACTORS OF PRODUCTION
    DEGREE OF SUBSTITUTABILITY BETWEEN ELECTRICITY AND OTHER INPUT TECHNOLOGY

  • ETC.
FROM THE DEMAND FORECAST REPORT:

The model for the domestic sector is as follows:

\[ D_t = D_{t-1} (1+a_t * b)(\Delta P_t / \Delta CPI_t)^c + 0.5*\Delta N_{t-1} * d_{t-1} (1+a_t * b)(\Delta P_t / \Delta CPI_t)^c + 0.5*\Delta N_t * d_t \]

where

\[ D_t \] = Electricity consumption, period t
\[ \Delta P_t \] = Change in price of electricity, period t
\[ \Delta CPI_t \] = Change in consumer price index, period t
\[ \Delta N_t \] = New consumers connected, period t
\[ a_t \] = Real income growth rate, period t
\[ b \] = Income elasticity for electricity
\[ c \] = Price elasticity for electricity for households
\[ d_t \] = Average consumption for new consumers, period t
DEMAND FORECAST MODEL FOR NEPAL (NORCONSULT 1998)

ECONOMETRIC MODEL: DEMAND BY CONSUMER CATEGORY

![Graph showing energy demand by category from 1990 to 2020](image.png)
SURVEYS

• APPROACH
  • INTERVIEWS OF LARGE ELECTRICITY USERS ABOUT THEIR PLANS
  • SAMPLING SURVEYS OF OTHER CONSUMER CATEGORIES, AND/OR ESTIMATES OF CONSUMPTION BY SECTOR BASED ON:
    - POPULATION GROWTH
    - CONNECTION POLICY
    - INCOME AND PRICE DEVELOPMENT
    - NEW DEVELOPMENT PROGRAMMES, INCL. RE

• ADVANTAGE
  • RELIABLE IN THE SHORT/MEDIUM TERM IF ANSWERS IN INTERVIEWS ARE REALISTIC
  • NO NEED FOR EXTENSIVE HISTORICAL DATA

• DISADVANTAGE
  • CAN BE TIME CONSUMING AND COSTLY (IF MANY INTERVIEWS)
  • INTERVIEWS OFTEN GIVE TOO OPTIMISTIC PROJECTIONS
  • UNRELIABLE FOR THE LONGER TERM, ESP. IF LARGE USERS DOMINATE

• REQUIRES
  • EXTENSIVE COLLECTION OF FUTURE INFORMATION AND VERIFICATION OF FIRMNESS OF PLANS
FORECAST BASED ON COMBINATION OF REGRESSION ANALYSES AND SURVEYS
CONCLUSION ON FORECASTING (1)

• NO SINGLE, UNIVERSAL APPROACH TO FORECASTING
  • DIFFERENT METHODS HAVE DIFFERENT USES AND STRENGTHS/WEAKNESSES
  • EVERY COUNTRY AND POWER SECTOR IS UNIQUE
  • PURPOSE OF THE FORECAST VARIES (COUNTRYWIDE/REGIONAL/AREA/SUBSTATION)
  • DATA AVAILABILITY AND INFORMATION ABOUT THE FUTURE VARY
  • NEED FOR ACCURACY VARIES
  • TIME AND RESOURCES AVAILABLE FOR FORECAST VARY
CONCLUSION ON FORECASTING (2)

• A MIXTURE OF APPROACHES, TREND/ ECONOMETRIC METHOD/ SURVEY, CAN BE USEFUL, FORECASTING BY CONSUMER CATEGORY
• INFORMED JUDGEMENT IS ESSENTIAL
  • “THE FORECASTER IS LIKE AN ENTREPRENEUR- HE USES QUANTITATIVE METHODS, BUT HE ALSO STUDIES HISTORY, AND RELIES ON INTUITION AND JUDGEMENT”
• IN ADDITION, REALITY CHECKS USEFUL (OTHER SIMILAR COUNTRIES/ REGIONS)
• A STRONG HISTORICAL BIAS TOWARDS OVERESTIMATION
• FORECASTING IS INHERENTLY UNCERTAIN
• CONSEQUENCE: SYSTEM EXPANSION PLANNING SHOULD BUILD ON FLEXIBILITY
TEST 2

LEAST-COST ANALYSIS

• PURPOSE: ESTABLISH WHETHER OR NOT THE HYDROPOWER PROJECT IS THE CHEAPEST WAY OF SUPPLYING MORE POWER

• REQUIREMENT: IDENTIFY THE NEXT BEST (CHEAPEST) ALTERNATIVE THAT CAN PRODUCE THE SAME QUANTITY AND QUALITY OF OUTPUT AS THE HYDROPOWER CANDIDATE

• A READILY AVAILABLE ALTERNATIVE TO A HYDROPOWER PROJECT IS OFTEN A THERMAL PLANT (OR A COMBINATION OF PLANTS)

• SYSTEM SIMULATION WILL HELP PROVIDE THE MOST REALISTIC ALTERNATIVES
LEAST- COST ANALYSIS

COMPARISON OF TWO POWER PROJECTS ABLE TO MEET THE SAME DEMAND
SAME BENEFITS → CANCEL OUT → BENEFITS NOT CONSIDERED

PROPOSED HYDRO PROJECT

DISCOUNTED COSTS

INVESTMENT COSTS
O&M COSTS
REPLACEMENT COSTS
ENVIRONMENTAL COSTS

PV

THERMAL ALTERNATIVE

DISCOUNTED COSTS

INVESTMENT COSTS
O&M COSTS
FUEL COSTS
REPLACEMENT COSTS
ENVIRONMENTAL COSTS

ECONOMIC TEST 1: IF PV COSTS OF PROPOSED HYDRO PROJECT < COSTS OF ALTERNATIVE OVER LIFETIME → SELECT PROPOSED HYDRO PROJECT FOR FURTHER ECONOMIC ANALYSIS
HYDROPOWER AND THERMAL POWER
Lifetime Cash Flow Profiles

BENEFITS DISREGARDED IN LEAST-COST ANALYSIS
MEASURES USED IN LEAST-COST ANALYSIS

- NET PRESENT VALUE
- INTERNAL RATE OF RETURN
- (LEVELISED UNIT COST)
NPV OR IRR

\[ NPV = \frac{B_1 - C_1}{(1 + r)^1} + \frac{B_2 - C_2}{(1 + r)^2} + \ldots + \frac{B_n - C_n}{(1 + r)^n} > 0 \]

\[ NPV = \frac{B_1 - C_1}{(1 + r^*)^1} + \frac{B_2 - C_2}{(1 + r^*)^2} + \ldots + \frac{B_n - C_n}{(1 + r^*)^n} = 0 \]

where: \( r^* \) = the discount rate at which NPV = 0
NPV OR IRR
(ALTERNATIVE PRESENTATION)

\[
\text{NPV} = \frac{C_{1T} - C_{1H}}{(1 + r)^1} + \frac{C_{2T} - C_{2H}}{(1 + r)^2} + \ldots + \frac{C_{nT} - C_{nH}}{(1 + r)^n} > 0
\]

where: 
- \(C_{iT}\) = thermal cost in year \(i\), \(i = 1, \ldots, n\)
- \(C_{iH}\) = hydro cost in year \(i\), \(i = 1, \ldots, n\)
- \(n\) = number of years, project’s lifetime
- \(r\) = discount rate

THERMAL COST

HYDROPOWER COST

\(C_{1T} - C_{1H}\)

\(C_{2T} - C_{2H}\)

\(C_{nT} - C_{nH}\)
### NEELUM-JHELUM HPP LEAST-COST ANALYSIS

- **Max. output:** 947 MW
- **Mean ann. energy:** 5254 GWh
- **Capital cost:** US$1251.4 million
- **Transm. losses:** 0.3%
- **O&M cost:** 0.7% p.a.

#### Cash flows:

- **Price level:** Jan. 1996
- **Discount fact.:** 12%
- **SCF:** 0.9

#### HYDROPOWER COSTS

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#### PV costs:

- **PV costs:** 772.50

#### PV net benefits:

- **PV net benefits:** 1078.08
- **EIRR:** 17.30%
- **Benefit/Cost ratio:** 1.40

Discounting of lifetime net cash flows.
IMPACT OF THE DISCOUNT RATE

Hydropower vs Thermal Power

Discount Rate (%)

PV Costs (MUSD)

Hydropower
Thermal

306 MUSD

17.3% = EIRR
TEST 3
COST-BENEFIT ANALYSIS (ECONOMIC ANALYSIS)

• RELEVANCE OF CBA:
  • A MORE GENERAL APPROACH THAN LEAST-COST ANALYSIS; TAKES A BROAD VIEW OF THE ECONOMY
  • COMPLEMENTS LEAST-COST ANALYSIS, WHICH IS A NECESSARY, BUT NOT SUFFICIENT CONDITION, FOR PROJECT ACCEPTANCE
  • COMPARES HYDROPOWER COSTS WITH VALUE OF ADDITIONAL POWER SALES TO CONSUMERS
  • ALLOWS COMPARISONS OF PROJECTS ACROSS ECONOMIC SECTORS
  • GUIDES INVESTMENT DECISIONS TOWARDS MAXIMISATION OF NATIONAL INCOME
IF PROPOSED HYDRO PROJECT IS THE LEAST-COST ALTERNATIVE IT IS SUBJECTED TO A SECOND ECONOMIC TEST: CBA

DISCOUNTED ECONOMIC COSTS \textit{ARE COMPARED TO} DISCOUNTED BENEFITS

\begin{itemize}
  \item INVESTMENT COSTS
  \item O&M COSTS
  \item REPLACEMENT COSTS
  \item ENVIRONMENTAL COSTS
\end{itemize}

\begin{itemize}
  \item ECONOMIC VALUE OF:
    \begin{itemize}
      \item ADDITIONAL ENERGY CONSUMPTION
      \item OTHER BENEFITS
    \end{itemize}
\end{itemize}

ECONOMIC TEST 2: IF PV BENEFITS OF PROPOSED HYDRO PROJECT \textgreater
PV COSTS OF SAME OVER LIFETIME CONSIDER PROJECT'S FINANCIAL ATTRACTIVENESS
CRITERIA USED IN CBA

• INTERNAL RATE OF RETURN
• NET PRESENT VALUE
• BENEFIT-COST RATIO

WHERE ECONOMIC PRICES (SHADOW PRICES) ARE USED:

• BENEFITS ARE EXPRESSED IN TERMS OF WILLINGNESS-TO-PAY FOR PROJECT OUTPUT
• COSTS ARE EXPRESSED IN TERMS OF OPPORTUNITY COST
• DISCOUNT RATE REPRESENTS THE COUNTRY’S OPPORTUNITY COST OF CAPITAL
Max. output: 947 MW
Mean ann.ergy: 5254 GWh

Capital cost: 1 251 mill.
Mean O&M cost: 0,7% p.a.

General T&D: Cap. costs included
O&M for T&D: 2,0% p.a.
T&D losses: 15,5%

Benefits: Energy sales times ave. tariff: USc
40% of tariff
SCF: 0,9

Cash flows: US$ mill.
Price level: Jan.1996
Discount fact.: 12%

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PV costs: 1184,51
PV benefits: 1308,73
PV net benefits: 124,22
EIRR: 13,06%
Benefit/cost ratio: 1,10
TEST 4
FINANCIAL SUSTAINABILITY/ ATTRACTIVENESS

• MAIN REQUIREMENT:
  • CONTRIBUTE TO FINANCIAL SOUNDNESS OF UTILITY AND/OR
  • ATTRACT PRIVATE INVESTORS

• HOW IS THIS ACHIEVED?
  • BY DEMONSTRATING PROFITABILITY AND ACCEPTABLE RISKS
    - FIRR > WEIGHTED AVERAGE COST OF CAPITAL OR THE MINIMUM REQUIRED RETURN ON EQUITY
    - NPV > ZERO (WELL ABOVE IF RISK IS HIGH)
  • BY ATTRACTING LENDERS THAT TOGETHER CONTRIBUTE TO A SUITABLE FINANCING PACKAGE
CRITERIA USED IN FINANCIAL ANALYSIS

- INTERNAL RATE OF RETURN
- NET PRESENT VALUE

\[ \text{NPV} = \frac{B_1 - C_1}{(1 + r)^1} + \frac{B_2 - C_2}{(1 + r)^2} + \ldots + \frac{B_n - C_n}{(1 + r)^n} > 0 \]

WHERE:
- PRICES (COSTS AND REVENUES) ARE EXPRESSED IN TERMS OF MARKET PRICES
- DISCOUNT RATE REPRESENTS THE UTILITY’S WEIGthed AVERAGE COST OF CAPITAL, WACC (OR THE INVESTOR’S REQUIREMENT FOR RETURN ON EQUITY, ROE)
FINANCIAL ANALYSIS

IF PROPOSED HYDRO PROJECT IS ECONOMICALLY VIABLE IT IS TESTED FOR ITS FINANCIAL ATTRACTIVENESS

**PROPOSED HYDRO PROJECT**

DISCOUNTED FINANCIAL COSTS  *ARE COMPARED TO*  DISCOUNTED REVENUE

INVESTMENT COSTS  
0&M COSTS  
REPLACEMENT COSTS  

FINANCIAL VALUE OF:  
ADDITIONAL ENERGY SALES (REVENUES)

FINANCIAL TEST:

- **IF PV REVENUES > PV COSTS,** RECOMMEND PROJECT FOR IMPLEMENTATION AND PREPARE A (DETAILED) FINANCIAL PLAN
- **ALTERNATIVELY:** CONSIDER MEASURES TO IMPROVE FINANCIAL VIABILITY
### NEELUM-JHELUM HPP

**Max. output:** 947 MW  
**Mean ann.egy:** 5254 GWh  
**Firm cap.(95%):** 780 MW

**Capital cost:** £1 335 mill.  
**O&M cost:** 0.7% p.a.  
**T&D losses:** 15.5%

**Revenue:** Energy sales times ave. tariff: USc 7.0 /kWh

**Cash flows:** US$ mill.  
**Price level:** Jan.1996  
**Discount fact.:** 10 %

**PV costs:** 1426,74  
**PV benefits:** 1544,93  
**PV net benefits:** 118,19  
**FIRR:** 10,75 %

### DISCOUNTING OF LIFETIME NET CASH FLOWS

#### HYDROPOWER COSTS

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#### HYDROPOWER REVENUE

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<th>Discount fact.: 10 %</th>
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FINANCIAL ANALYSIS: TWO MAIN MEASURES
RETURN ON TOTAL CAPITAL VS. RETURN ON EQUITY

• RETURN ON TOTAL CAPITAL
  • EXPRESSES QUALITY OF PROJECT AS SUCH
  • NPV / FIRR ON TOTAL INVESTMENT
  • FINANCING
    • NOT EXPLICITLY CONSIDERED
  • EVALUATION PERIOD:
    • PROJECT LIFETIME
  • COST OF CAPITAL:
    • WACC
  • ANALYSIS IN CONSTANT PRICES

• RETURN ON EQUITY
  • EXPRESSES "WHAT'S IN IT" FOR THE INVESTOR
  • FIRR ON EQUITY OWNER’S SHARE OF INVESTMENT
  • FINANCING:
    • A MAJOR ISSUE - EQUITY FINANCES A SHARE OF INVESTMENT
    • LOANS FINANCE THE BULK OF THE INVESTMENT
  • EVALUATION PERIOD:
    • CONCESSION PERIOD
  • COST OF CAPITAL:
    • OWNER’S REQUIRED ROE
  • ANALYSIS IN CURRENT PRICES
FINANCING REQUIREMENTS

• USED TO DETERMINE THE TOTAL AMOUNT OF MONEY NEEDED TO FINANCE A PROJECT
• COMPARED TO THE INVESTMENTS AS SUCH, TWO ELEMENTS ARE ADDED:
  • INFLATION UNTIL THE END OF THE CONSTRUCTION PERIOD
  • INTEREST DURING CONSTRUCTION (IDC)
## FINANCING REQUIREMENTS
### NEEHLUM-JEHLUM HPP

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ECONOMIC AND FINANCIAL PROJECT EVALUATION ELEMENTS AND SEQUENCE