Ruaha+10 Seminar
11-12/Dec03-ICE, Morogoro

Hydropower Management

Lessons Learnt from Water Shortage In Great Ruaha River

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Outline

1. Background
2. Power System Master Plan Studies
3. Operation
4. Challenges
5. Strategies

Existing Grid System

HYDROPOWER

- Kidatu 204 MW
- Mtera 80 MW
- Pangani Falls 66 MW
- Hale 17 MW
- NYM 8 MW

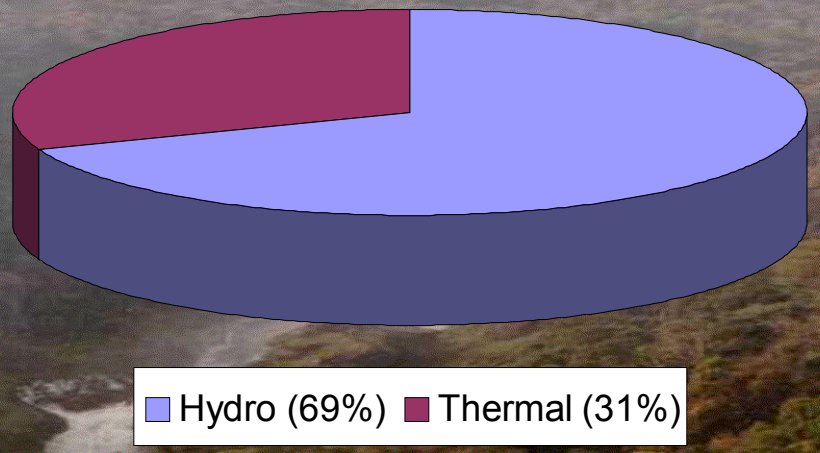
- **Total 555 MW**

THERMAL

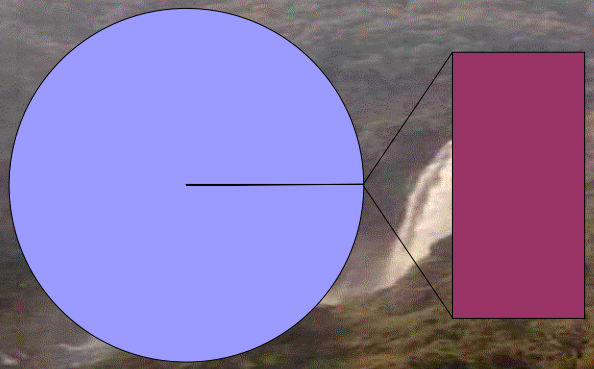
- UB. ABB 37.5 MW
- UB. EPP 75.0 MW
- Tegeta 100.0 MW
- Diesel 35.3 MW

- **Total 247.8 MW**

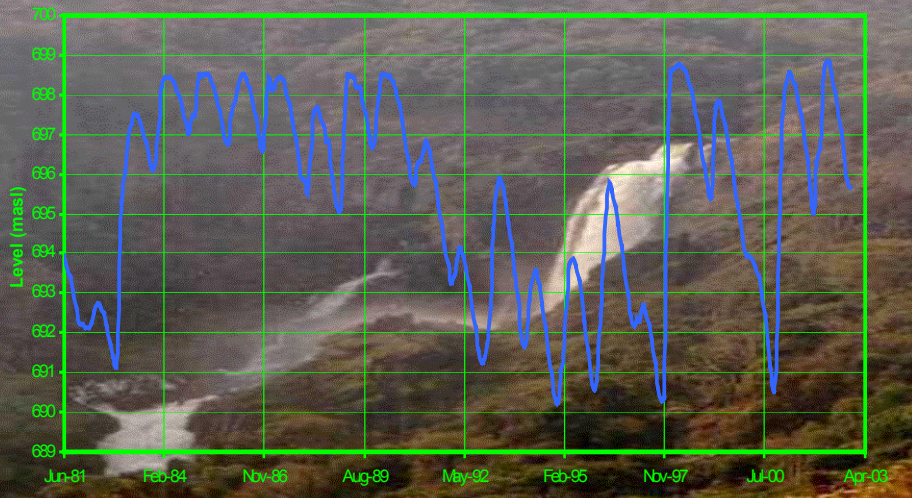
Installed Capacity



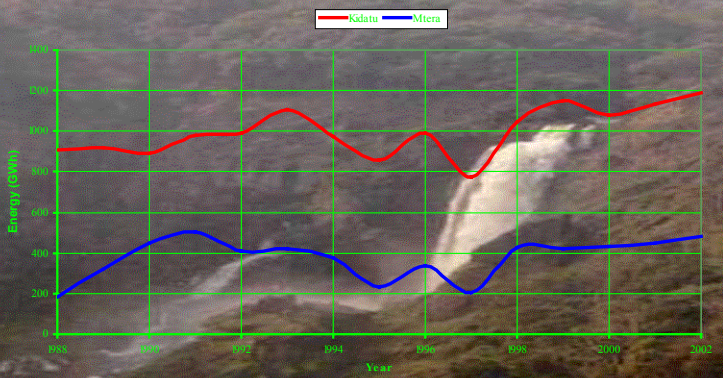
Energy Generated (2002)



Historical Water Levels



Historical Energy Production



Results

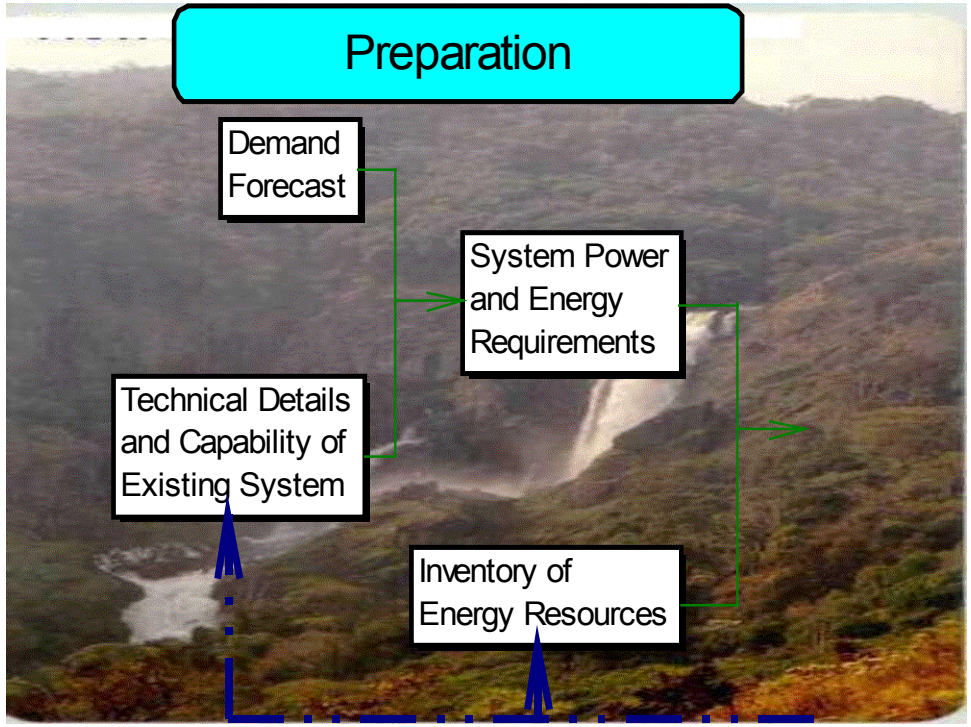
- Severe Power Rationing in 1994/95
- Accelerate Songosongo (Emergence Power Plant) to Operate on Liquid Fuel Until Completion of Gas Pipeline
- Very Expensive Undertaking
- Adverse Impact on Economic Development

Hydropower Management

- Power System Master Plan Studies
- Projects' Construction (Generation & Transmission)
- The Long-term System Operation (Civil Works 50 Years; E&M 25 years)

Master Plan Studies - I

- Least Cost Investment Plan
  - Generation
  - Transmission
- Operation
  - Operation & Maintenance
  - Rehabilitation & Uprating



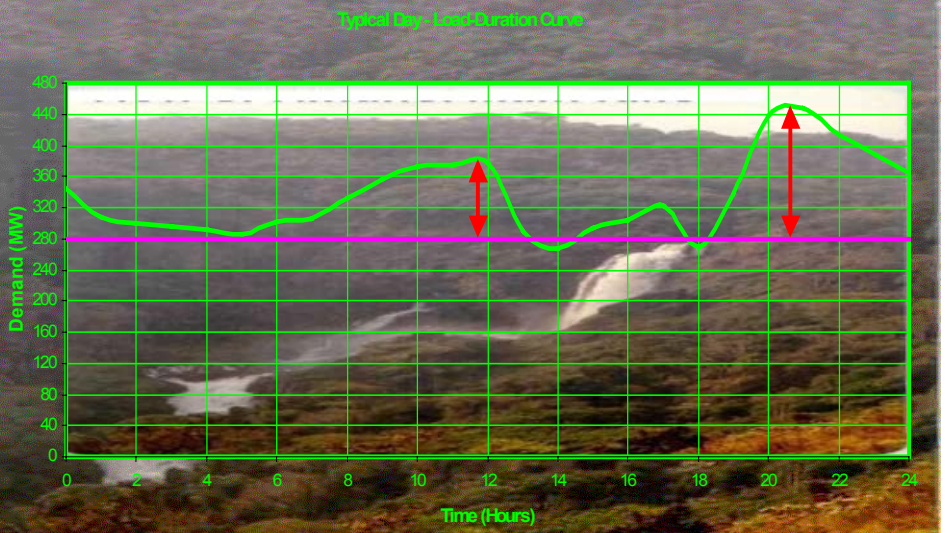
Existing Hydropower Capability

- Simulations Exceeded Long-term Historical System Energy Production by 30%
- Long-Term Historical Production Taken as HYDROPOWER SYSTEM CAPABILITY rather than DESIGN VALUES for Investment Planning

Composite System

- Grid Generation to Include Other Indigenous Resources Such as Songosongo Natural Gas Which is Now Under Construction
- Studies are Underway to Exploit Mchuchuma Coal Deposits for Power Generation
- Does Not Exclude Addition of Other Hydropower Potentials

Operation



Operation - Wet Season

- Base Load is approx 300 MW is taken by Run-of-River Plants of Kihansi, Pangani, Hale & 1 or 2 Units at Kidatu
- During Peak Hours Kidatu is Operated Fully
- Water is Electrically Diverted to Mtera for Storage

Operation – Dry Season

- Kidatu, Mtera & NYM are Operated to Cater for Base load
- Kihansi, Pangani are Operated During Peak Hours by Filling their Respective Intake Ponds During Off-Peak Periods
- When Necessary Thermal Generation is Used to Supplement Shortfalls

Challenges

- Determination of Hydropower Capability for Future Plants (Mpanga, Ruhudji, Masigira, Malagarasi, Rusumo, Rumakali etc.) Due to Status of Rivers' Flow Database
- What % of Flow Should be Allocated for Other Users (Environment, Irrigation, Domestic etc.) Before Diversion

Strategy

- Integrated Water Resource Planning & Development to Avoid Over Design and Poor Utilization of Funds.
- Collection of Data is Inevitable. Otherwise; Do We Really Know the Size & Seasonality of Our Resource? If not, How is It Allocated to Various Stakeholders?