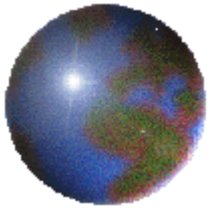


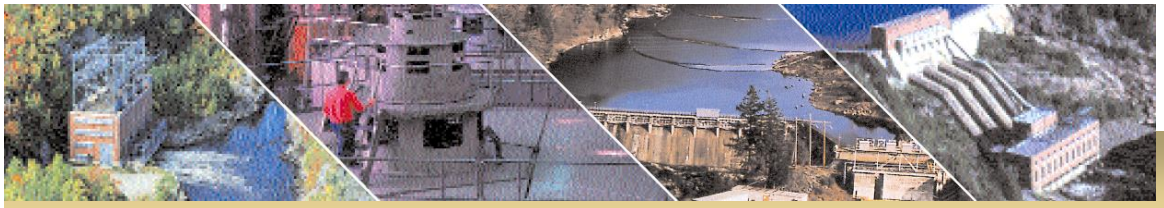
BRASCAN
POWER CORPORATION

# Using PI-ACE & PI-MDB in applications for Hydro Energy Production

February 2003

# Agenda

- Brascan Power
- PI Deployment Justification
- Functional Architecture
- ACE/MDB Applications
  - Hydrology Calculations
  - Capacity Calculations
  - Meter Validation
- Lessons Learned
- Questions



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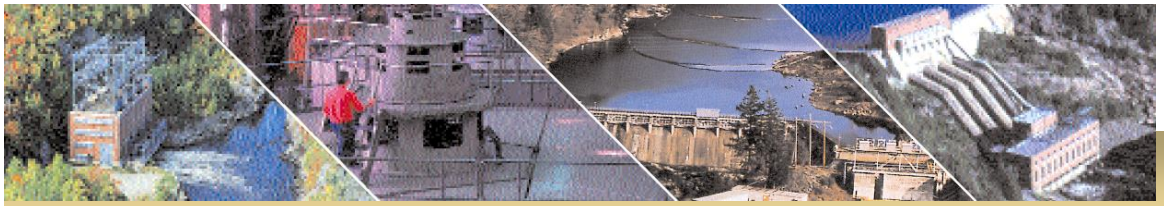
BRASCAN POWER CORPORATION

# Brascan Corporation

**Brascan owns, manages and builds businesses which generate sustainable cash flows**

- Focus in 3 core business sectors:
  - Real Estate
  - Power Generation
  - Financial
- Holds investments in the resource sector.
- Invests in high quality assets at attractive values.



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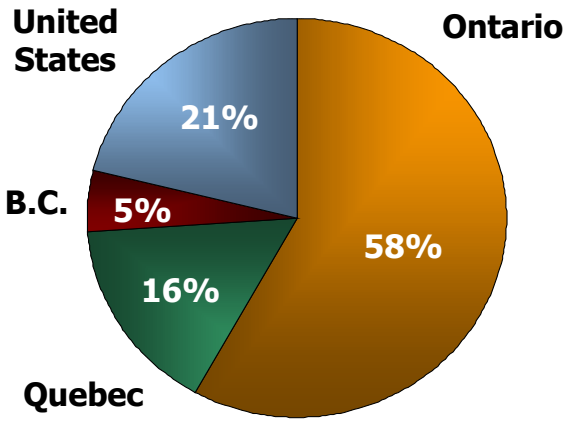
BRASCAN POWER CORPORATION

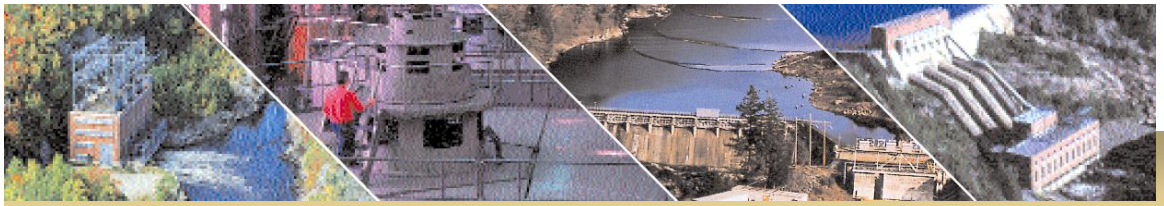
# Brascan Power Corporation

*Brascan Power is the largest independent generator and distributor of electricity in Ontario and Quebec.*

**Power Production Base**
*(Installed Capacity by Region)*




- Brascan's energy operations are among the lowest cost producers of electric power in North America.
- Operations include:
  - 37 hydroelectric plants on fourteen river systems in Ontario, Quebec, British Columbia, Maine, New Hampshire and Louisiana, with a capacity of 1,636 megawatts.
  - A combined cycle co-generation facility with a capacity of 110 megawatts.
  - Key interconnections and power transmission facilities in central Canada and the U.S. northeast.
  - Five hydroelectric projects under construction in British Columbia, Ontario and Brazil totalling almost over 150 MW.



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BRASCAN POWER CORPORATION

# Agenda

BRASCAN POWER CORPORATION

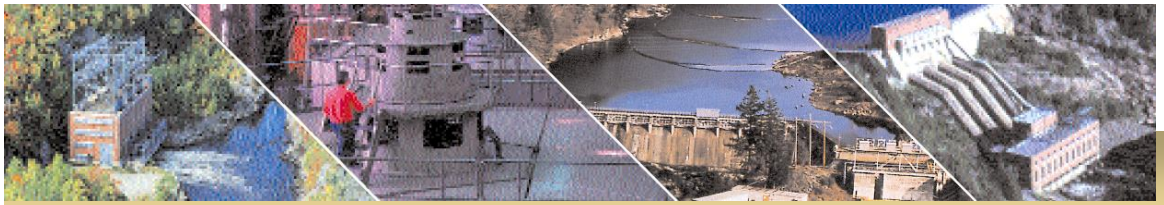
- BRASCAN ENERGY MARKETING INC.
- BRASCAN POWER SERVICES INC.
  - Great Lakes Power – *T & D*
  - Great Lakes Power – Generation
    - Mississagi Power
  - Powell River Energy
  - Lake Superior Power
  - Valerie Falls Power
  - Lièvre River Power
    - Pontiac Power
  - Maine Power
    - New Hampshire Power
  - Louisiana Power

**Marketing Unit's responsibility:**

- Optimize value of BPC generation portfolio
- Support growth strategy
- Assist affiliates with supply requirements

**The Operating Unit's responsibility:**

- Manage operations
- Prepare and implement 20-year capital program
- Manage Health & Safety
- Manage Environment
- Administration of the business



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BRASCAN POWER CORPORATION

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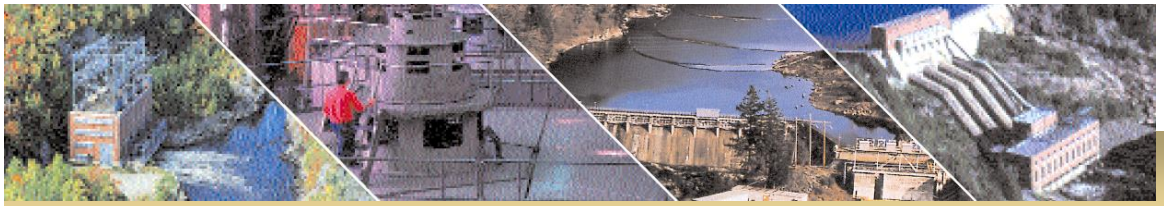

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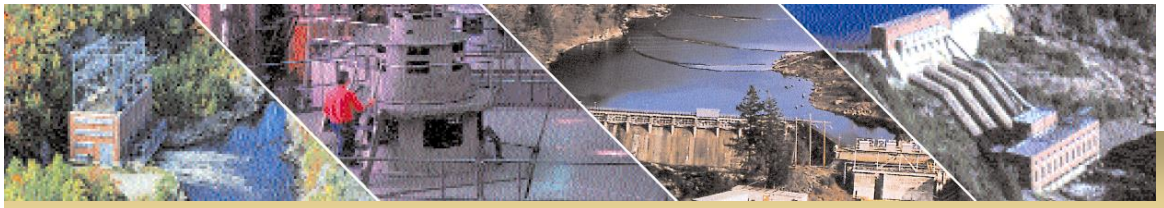
# PI Project Justification

- Corporate Objectives
  - Standardization
    - PI already used at Great Lakes and Maine
    - Standard interfaces and Batch Files
  - Integration of new acquisitions
  - Data volume!!!
  - Lower TCO
    - Shared applications
    - Support (esp. small plants)
    - DataWarehouse for Business Processes & BI



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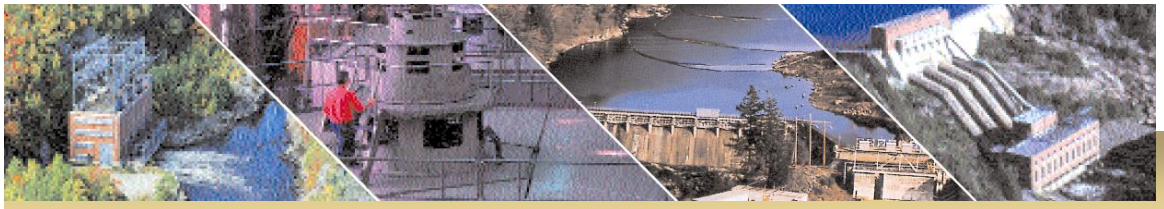
# PI Project Justification

- Operations Objectives
  - $I^3$ – Integrate Information Islands
    - Weather & hydrology
    - GS operations
    - Metering/billing
    - Other production centers
  - Automated Reporting
  - Bad or missing data
  - Ease of use



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BRASCAN POWER CORPORATION

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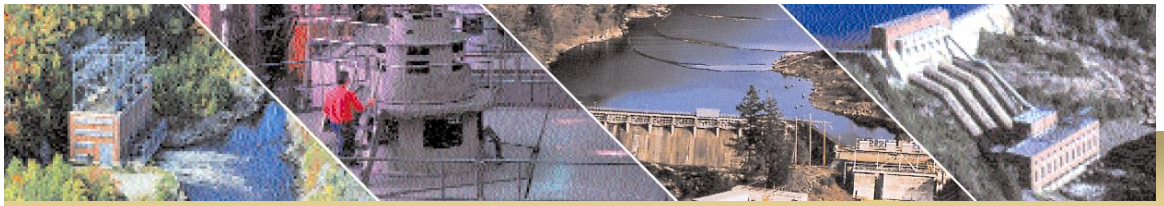

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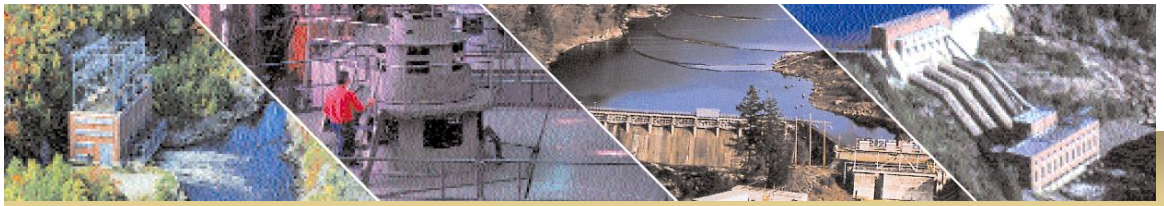
# Functional Architecture

- Core operations
- Simplified data flow



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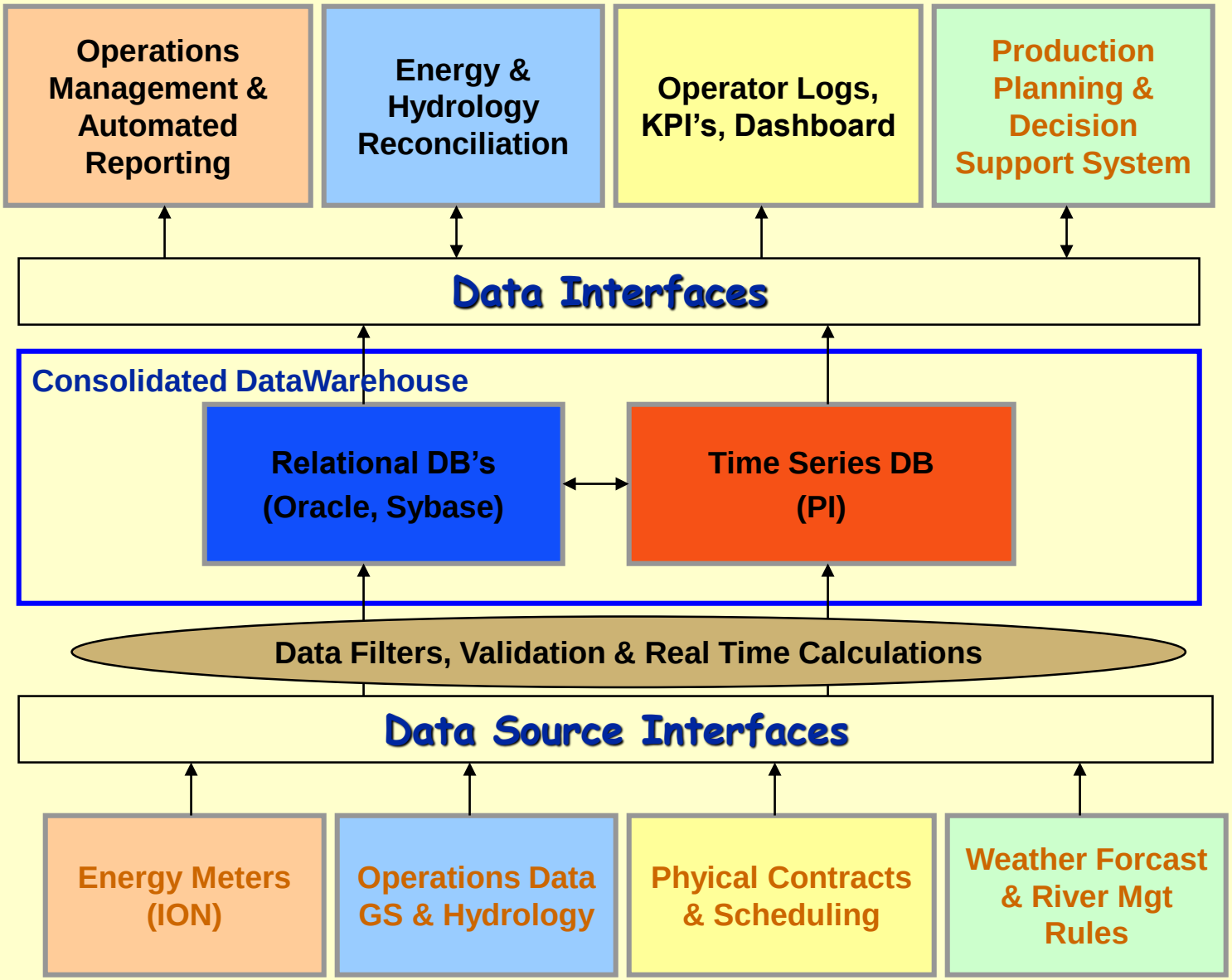
Operations Management & Automated Reporting
Energy & Hydrology Reconciliation
Operator Logs, KPI's, Dashboard
Production Planning & Decision Support System
Data Interfaces
Consolidated DataWarehouse
Relational DB's (Oracle, Sybase)
Time Series DB (PI)
Data Filters, Validation & Real Time Calculations
Data Source Interfaces
Energy Meters (ION)
Operations Data GS & Hydrology
Phyical Contracts & Scheduling
Weather Forcast & River Mgt Rules

# Agenda

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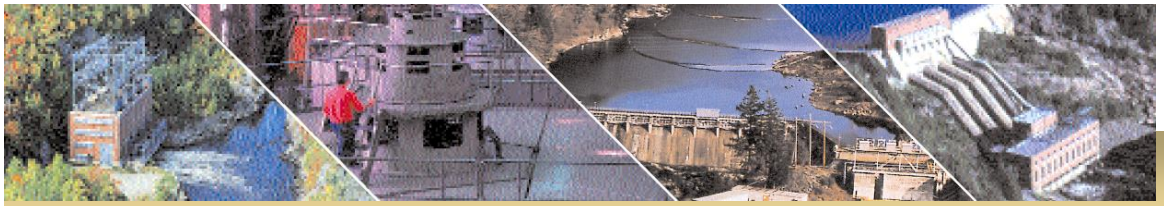

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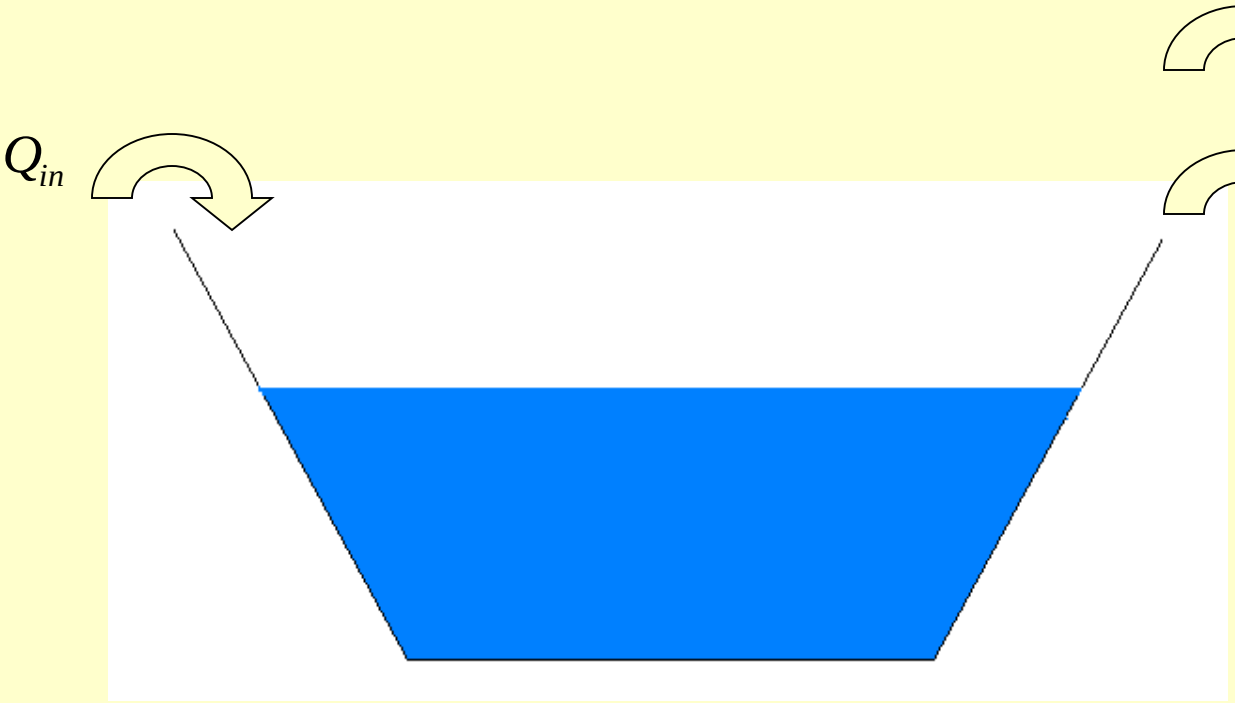
# High Falls




$$Volume = coef\ X^0 + (coef\ X)(level) + (coef\ X^2)(level^2) + (coef\ X^3)(level^3)$$

$$\text{Natural inflow}_{T=x} = \Delta Vol - Q_{in} + Q_{turbined} + Q_{spill}$$