

*ATCO Power Ltd.*  
*Presents:*  
**Strategic Portfolio Analysis  
using AURORA**

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# *ATCO Group*

- **ATCO Ltd. is a major Canadian company engaged in:**
  - Power Generation (UK, Australia, Canada)
    - Gas Generation (3300 MW)
    - Coal (1430 MW)
  - Utilities (Canada)
  - Industrials (100+ countries)
  - Logistics and Energy Services
  - Technologies
- **Assets at 31 Dec. 2003 exceeded CAN \$6.59 billion**

# *ATCO Power Portfolio: Alberta, Canada*

- **1100 MW of capacity**
  - 820 MW Cogeneration
  - 130 MW Combined Cycle
  - 150 MW Simple Cycle
- **Generation For**
  - Site Load (Long Term Contracts)
  - Merchant Must-Run (Long Term Steam Contracts)
  - Merchant Dispatchable

# *Alberta Power Market*

- **Deregulated Jan 1, 2001**
    - Energy and Ancillary Services
  - **Peak Load: 9000 MW**
  - **Generation makeup:**
    - Coal: 5520 MW
    - Gas: 4791 MW
    - Hydro: 869 MW
    - Wind and Other: 404 MW
  - **Power Purchase Agreement (PPA) Auction**
  - **Export/Import capacity:**
    - British Columbia: 1000 MW
    - Saskatchewan: 150 MW
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# *Strategic Analysis*

## **Objective:**

- Prepare strategic medium term (1-4 years) risk analysis on our Alberta Portfolio from scratch using Aurora
- Time Available: Only a 7 Month Time Frame (Feb 2004 – Aug 2004)
- Limited Resource: One person (Fortunately already experienced with the market part of Aurora)



# *Approach*

- **Set goals in 3 areas**
  - Market
  - Risk
  - Plant/Portfolio
- **Covered all 3 areas every 3 weeks to identify critical path items early:**
  - Model Merchant as accurately as possible
  - Contain majority of analysis within AURORA
  - Minimize Run time to meet risk analysis objectives

# *Scripting*

- An Excellent tool to help model the market accurately due to its flexibility
- However, with the complexity of the functions we put into our scripts, the run-time increased significantly
- Due to our tight time schedules , we had to make the decision to minimize our run time by limiting the amount of scripting.

# *Market: What did we model?*

- Used the Database provided by AURORA
- Updated Alberta Information based on our market Expertise
  - Generating Unit Characteristics
  - Fuel Prices (Coal, Gas, Other)
  - Load
  - Hydro Conditions
  - Import/Export Characteristics

# *Risk: What did we model?*

- **Alberta Gas Price**

Based on Forward Prices, Forward Volatility, Historical Day-to-Day Correlations

- **Alberta Load Distribution**

Based on projected Load Growth and Estimated Volatility due to historical temperature fluctuations

- **Alberta Hydro Generation**

Historical Generation and Volatility

- **Alberta Generation outages**

Combination of Forced Outages and Derates based on Historical Data)

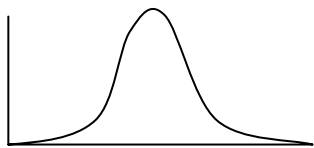
# *Portfolio: What did we model?*

- **Revenues:**
  - Contracts:
    - Floating Pool Revenues
    - Fixed Price
- **Expenses**
  - Transmission Charges:
    - Fixed
    - Variable
    - Pool price dependent

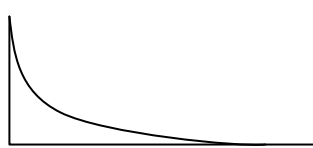
# Market Analysis

- Generator Data
- Load Data/Profile
- Tie-Line Capacity

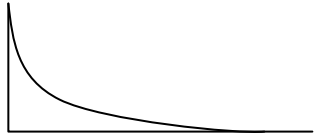
# Risk Analysis



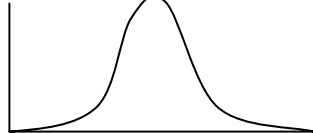
Load



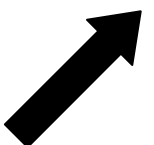
Gas Price



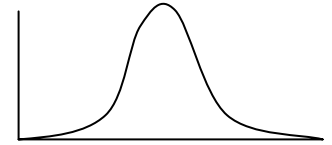
Forced Outages



Hydro

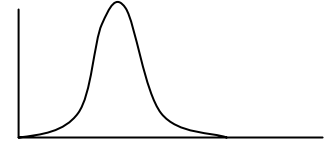


# Portfolio Analysis

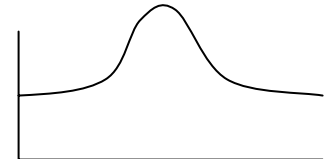


Portfolio Gross Margin

And



Plant A Gross Margin



Plant B Gross Margin

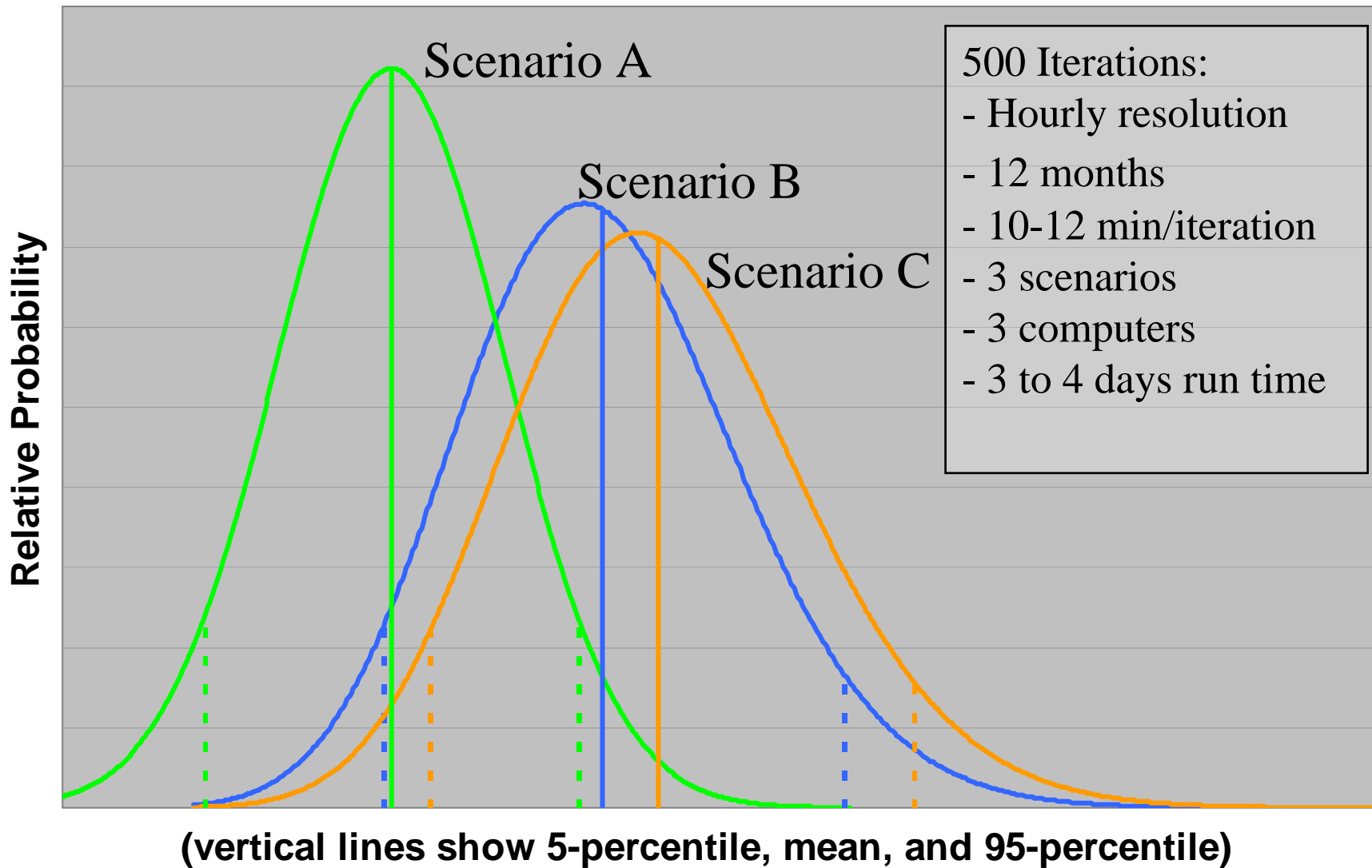
# Results

## Timeline:

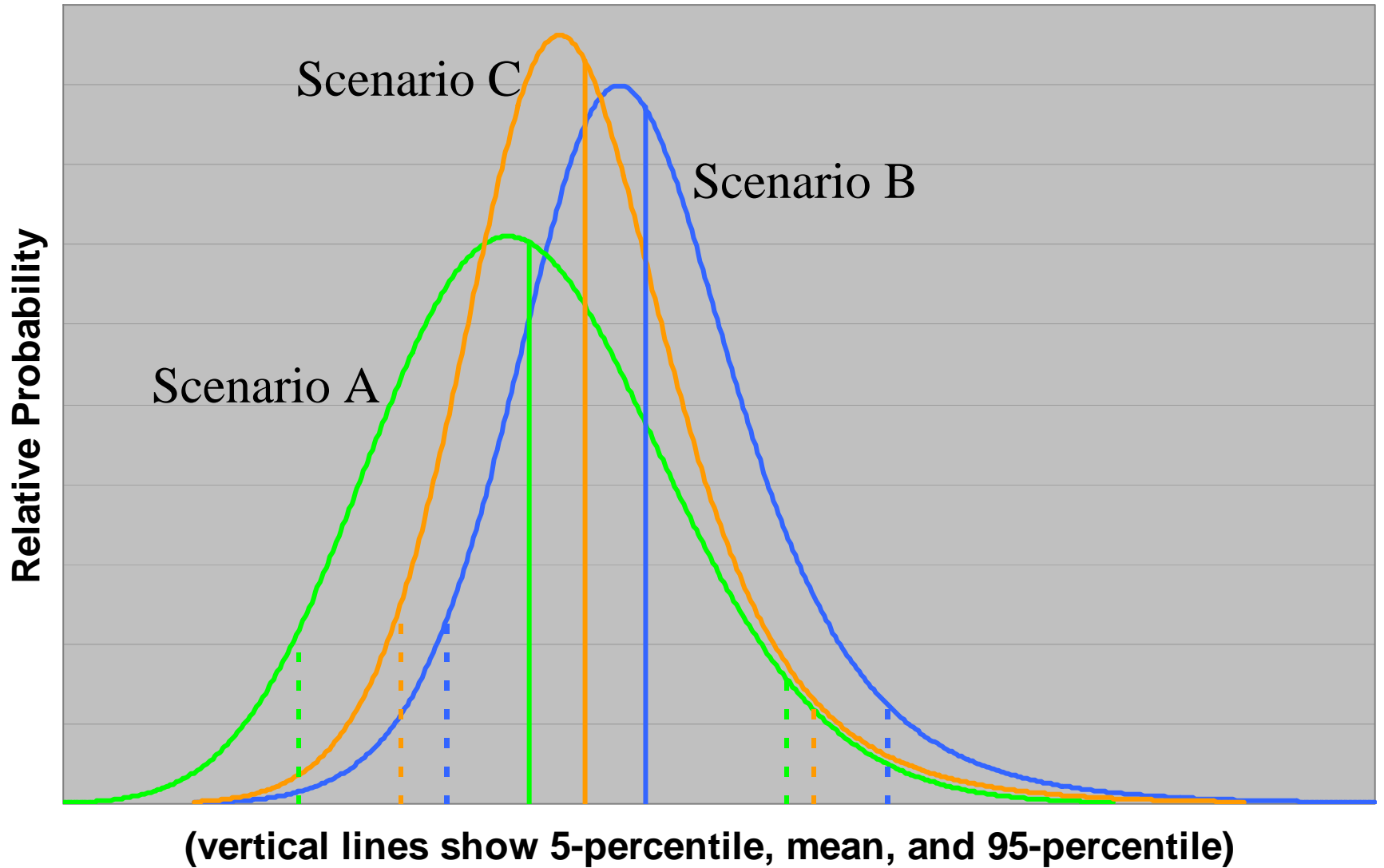


- February:
  - ✓ Commenced
- June:
  - ✓ Draft results (Market and Portfolio)
- July
  - ✓ Draft results (Risk Analysis)
  - ✓ High level review/"drill down"
    - Important to have people who understand both the market and the assets to validate analysis
  - ✓ Engaged a second person
- August:
  - ✓ Final Market, Risk and Portfolio Analysis

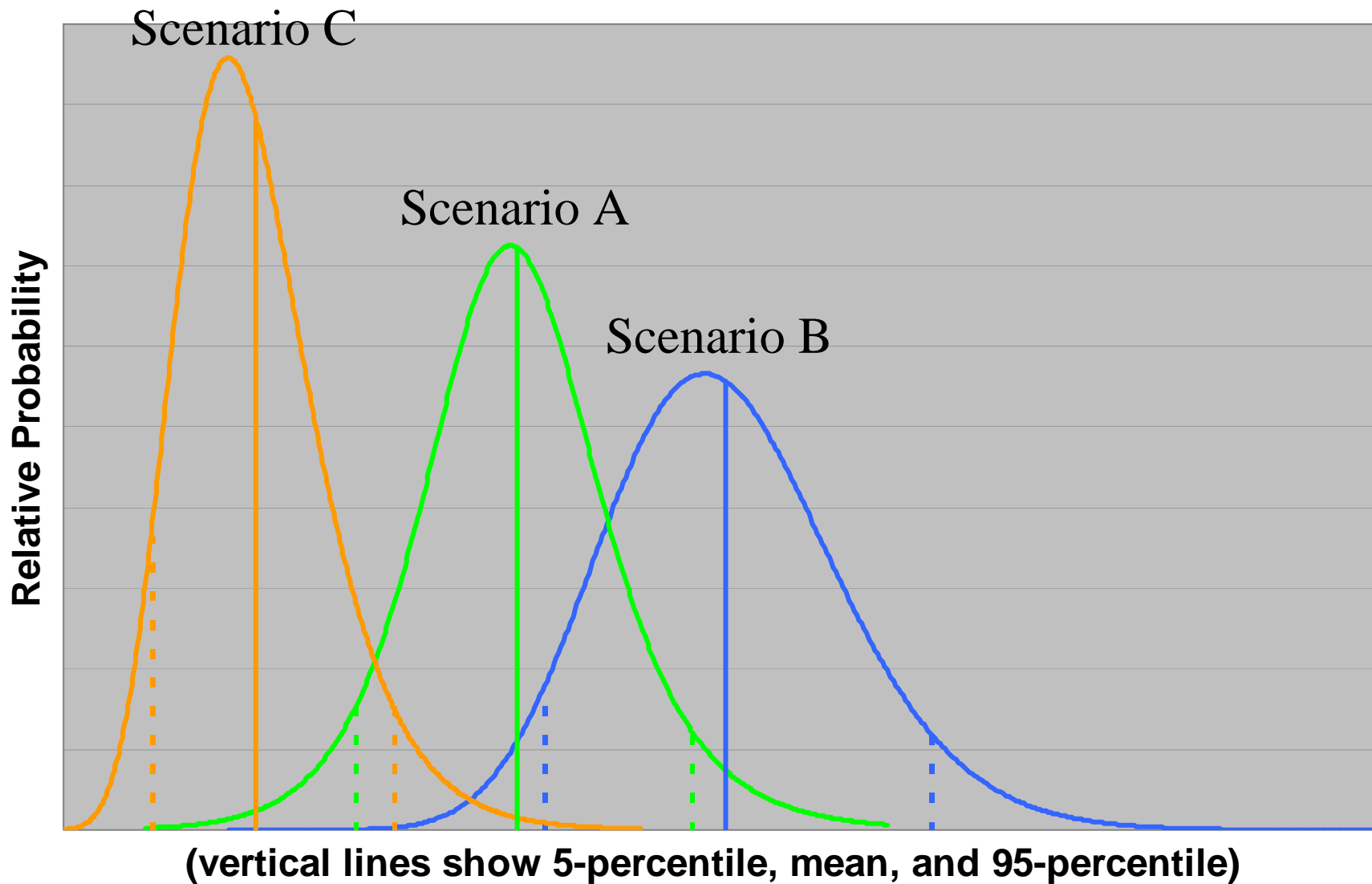
# 2005 Market Heat Rate



# Portfolio Total Gross Margin



# Plant X Gross Margin



# *What did we learn?*

- **It was possible to:**
    - Contain majority of analysis within AURORA (Current trade-off: detail vs. modeling runtime)
    - Meet tight timelines
  - **Better understanding of impact of market dynamics on individual assets**
  - **Quantification of variability of asset earnings in different market and contract scenarios**
  - **We now have a tool that can be used to:**
    - Analyze impact of potential market design developments
    - Perform Strategic analysis on our Merchant Assets
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