# Panel 2 - Modeling Resources

(c) Resource-transmission adequacy/reliability – How should these issues-constraints be modeled?

© ABB Inc. - 10 - 9/9/2004

ABB

# Components for Reliable & Efficient Electric System Evaluation

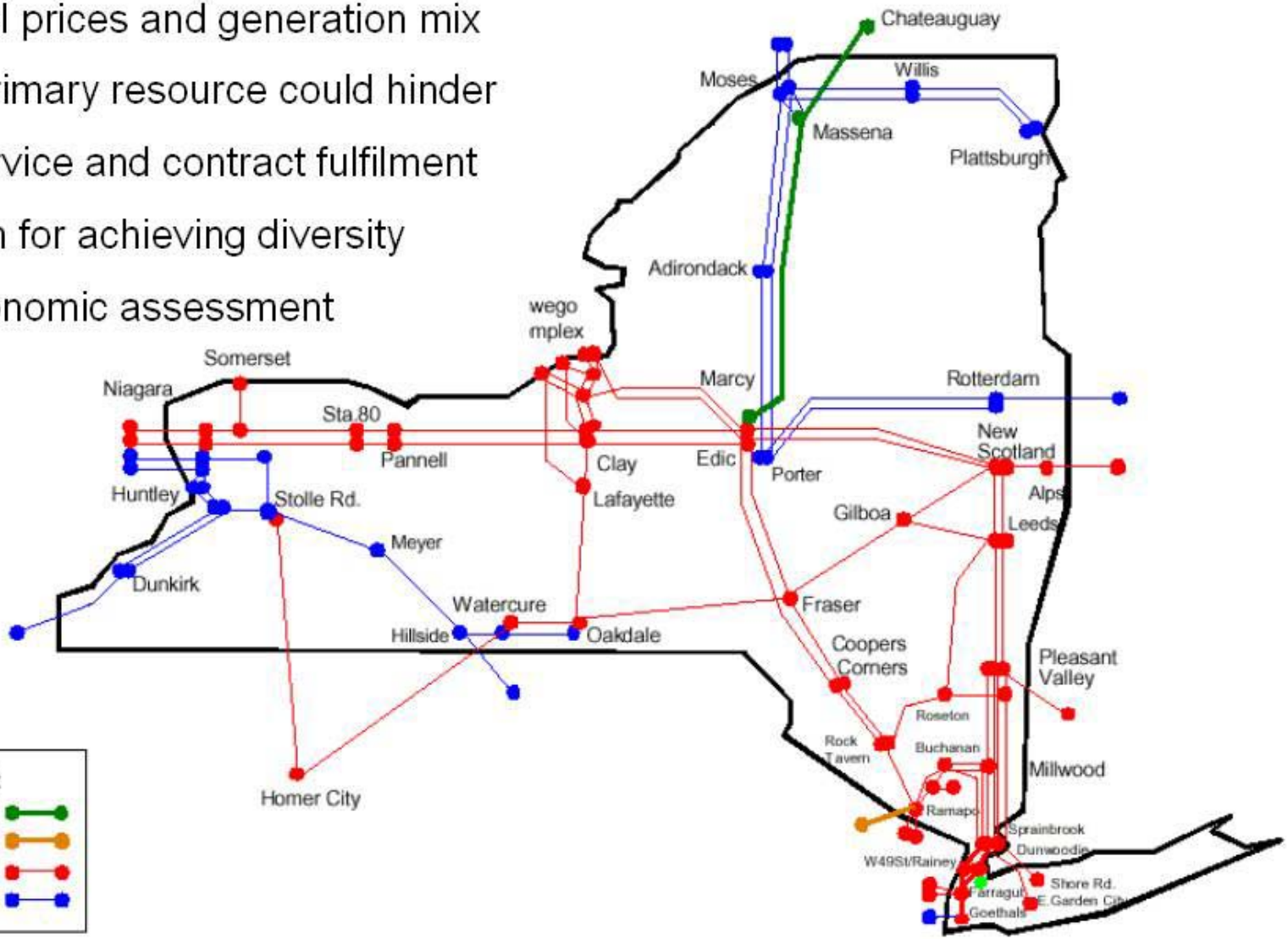
- Generation Reliability Assessment
  - Reliability assessment for available resources
  - Economic assessment for market response
- Fuel diversity analysis
- Air emissions
- Transmission infrastructure adequacy
  - transmission analyses for bulk power system
  - system performance within sub-areas
  - Economic congestion management
- Demand side response, quick-start, and distributed generation
- Correct market signal

© ABB Inc. - 11 - 9/9/2004

ABB

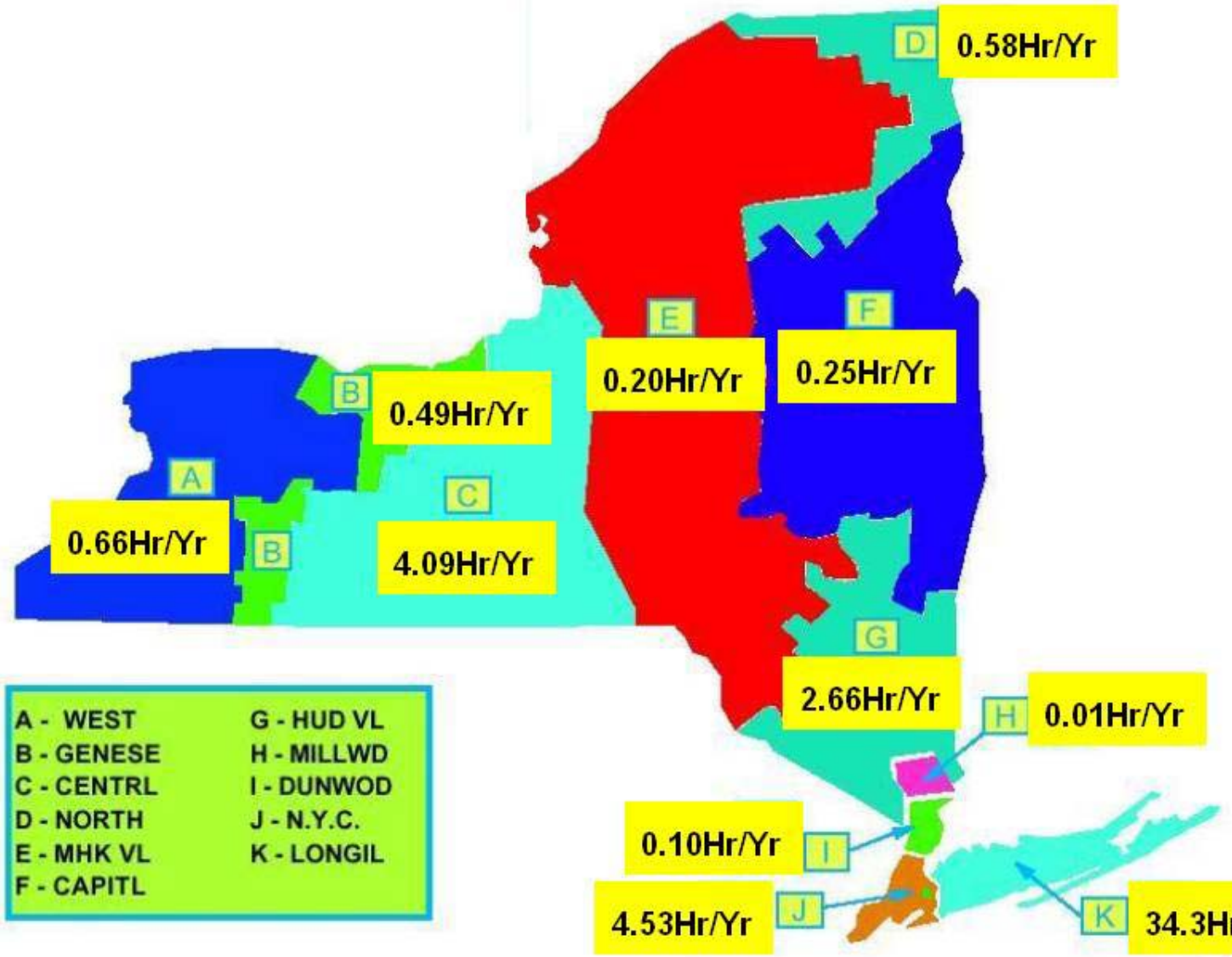
# Selected Applications – New York State Transmission Systems

- Impact of fuel prices and generation mix
- Scarcity in primary resource could hinder customer service and contract fulfilment
- Transmission for achieving diversity
- Risk and economic assessment




© ABB Inc. - 12 - 9/9/2004

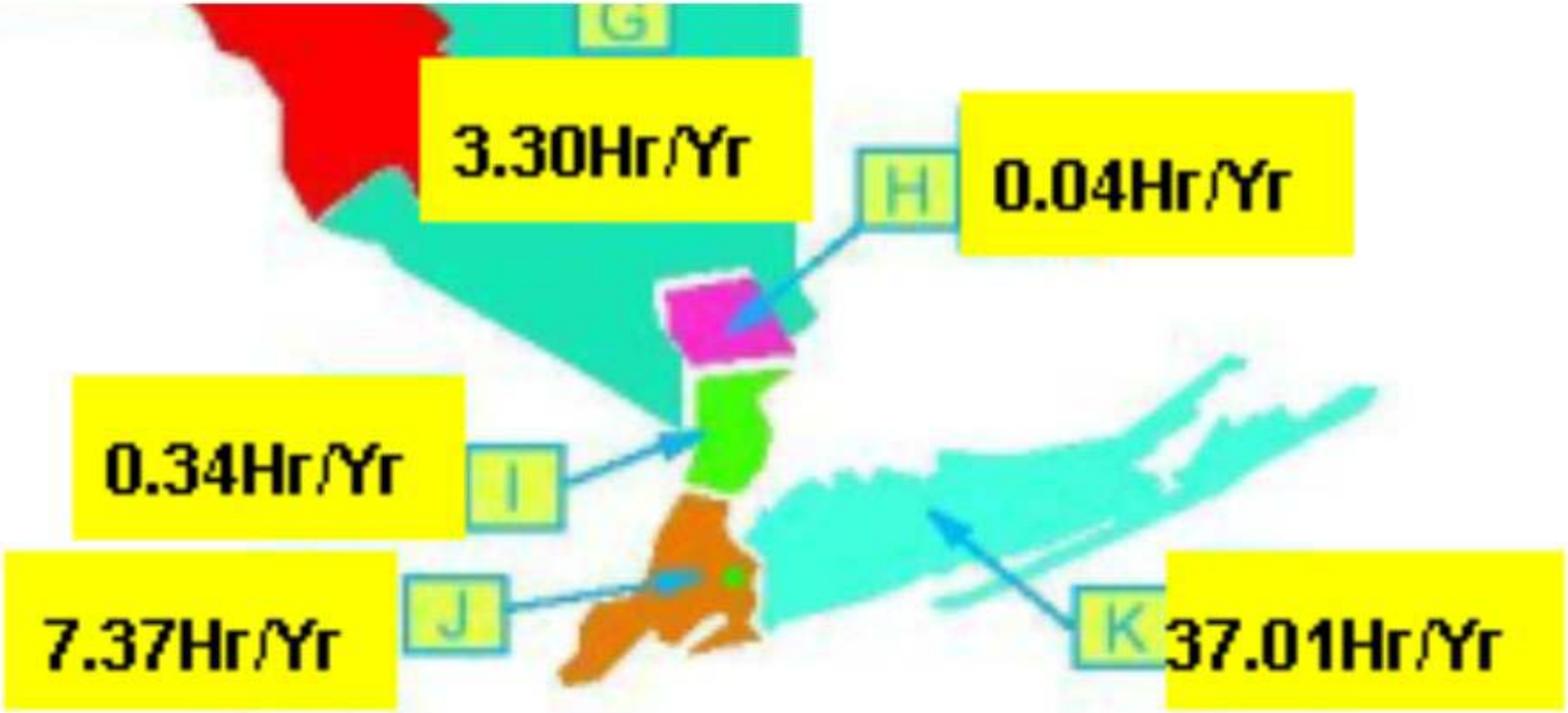
# NYCA System – Multi-area Reliability Assessment




© ABB Inc. - 13 - 9/9/2004

# Second Level of Details -

Normally, the resource adequacy assessment does not address operational and local transmission problems internal to the Sub-areas which could result in other reliability problems. Even if this type of analysis indicates that the system is meeting LOLE criteria, there may still be any number of reliability concerns that more detailed system assessment is required.




© ABB Inc. - 14 - 9/9/2004

# Reliability Benefit of Transmission Expansion

| Load Area/Zone | EENS (MWh) | | | LOLE (Hrs) |
|---|---|---|---|---|
| | Mean | Std. Dev | Max | Mean |
| Capital | 10.8 | 33.1 | 250.2 | 0.25 |
| NY City | 697.2 | 2141.3 | 19525.0 | 4.53 |
| West | 27.3 | 46.4 | 185.4 | 0.66 |
| Central | 18.4 | 76.0 | 553.1 | 4.09 |
| Dunwoodie | 18.1 | 75.7 | 687.5 | 0.10 |
| Genessee | 26.2 | 261.3 | 2676.3 | 0.49 |
| Hudson Valley | 42.7 | 60.4 | 675.1 | 2.66 |
| Long Island | 5187.2 | 1300.1 | 8965.1 | [illegible] |
| Millwood | 0.7 | 9.4 | 133.2 | [illegible] |
| Mohawk Valley | 4.4 | 16.6 | 136.3 | [illegible] |
| North | 26.8 | 223.9 | 2903.8 | [illegible] |

**LOLE Comparisons between Transmission Projects**

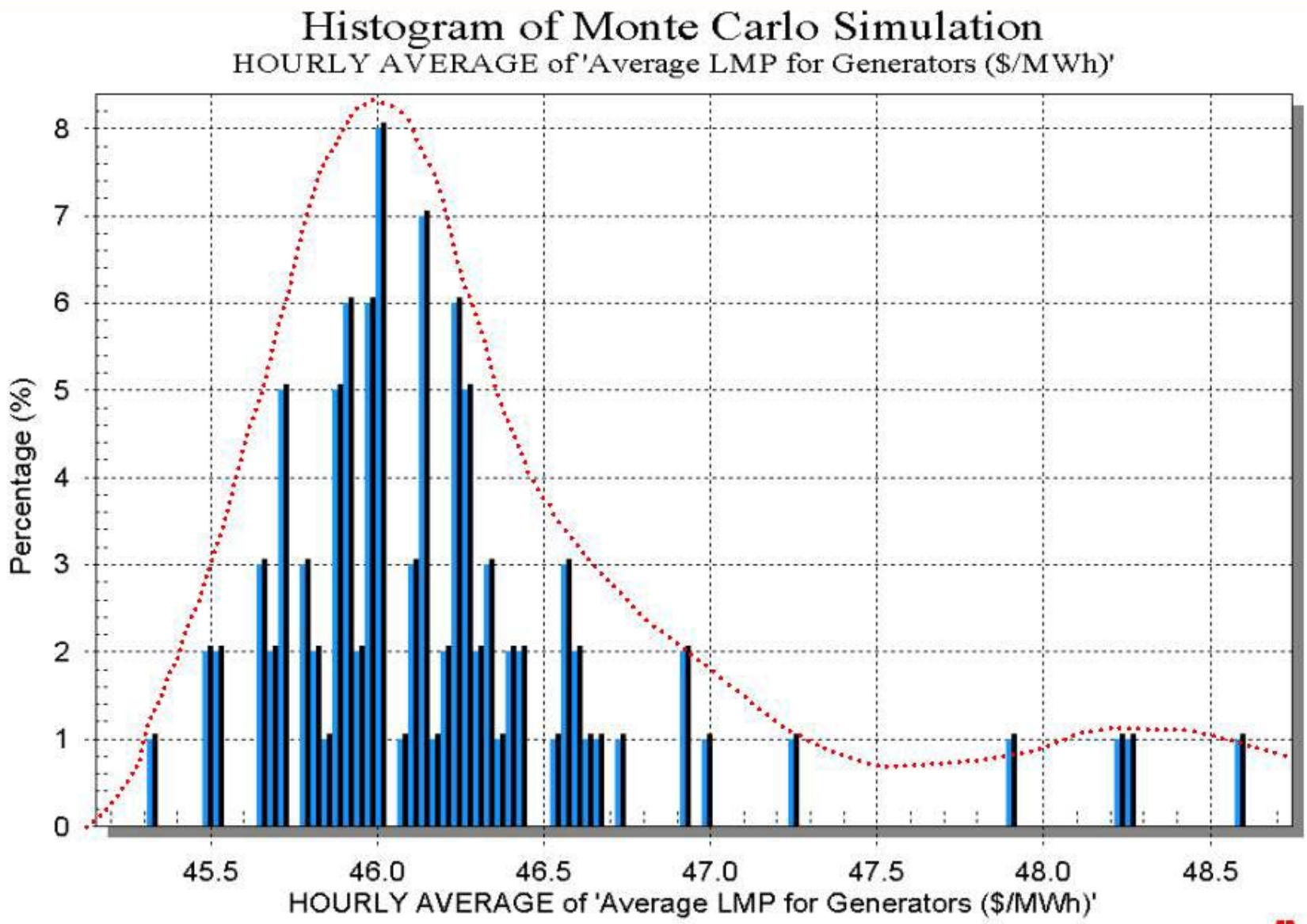
| Local Area/Zone | Mean LOLE (Hrs) | | |
|---|---|---|---|
| | Base Case | DC Link | Interface Exp. |
| Capital | 0.67 | 0.25 | 0.74 |
| NY City | 7.37 | 4.53 | 7.37 |
| West | 0.99 | 0.66 | 0.93 |
| Central | 4.33 | 4.09 | 1.81 |
| Dunwoodie | 0.34 | 0.10 | 0.33 |
| Genessee | 1.48 | 0.49 | 0.74 |
| Hudson Valley | 3.30 | 2.66 | 3.02 |
| Long Island | 37.01 | 34.30 | 36.67 |
| Millwood | 0.04 | 0.01 | 0.02 |
| Mohawk Valley | 0.21 | 0.20 | 0.26 |
| North | 0.64 | 0.58 | 1.01 |

**Note: LOLE results of 0.24 or less does not indicate that the transmission system has no reliability problems, only that resource adequacy (resources available to meet load) are acceptable.**

© ABB Inc. - 15 - 9/9/2004

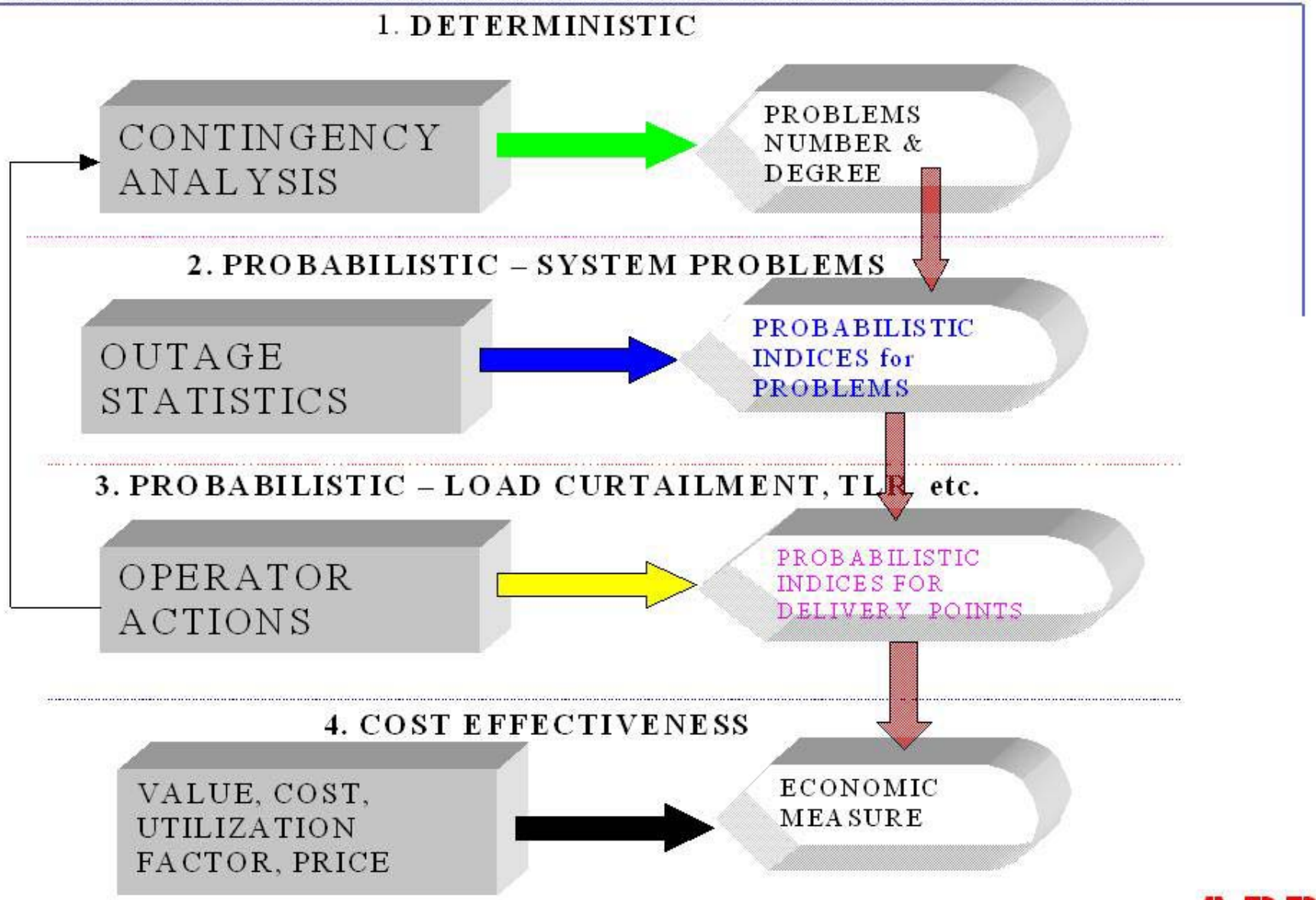
ABB

# Economic Benefit of Transmission Expansion



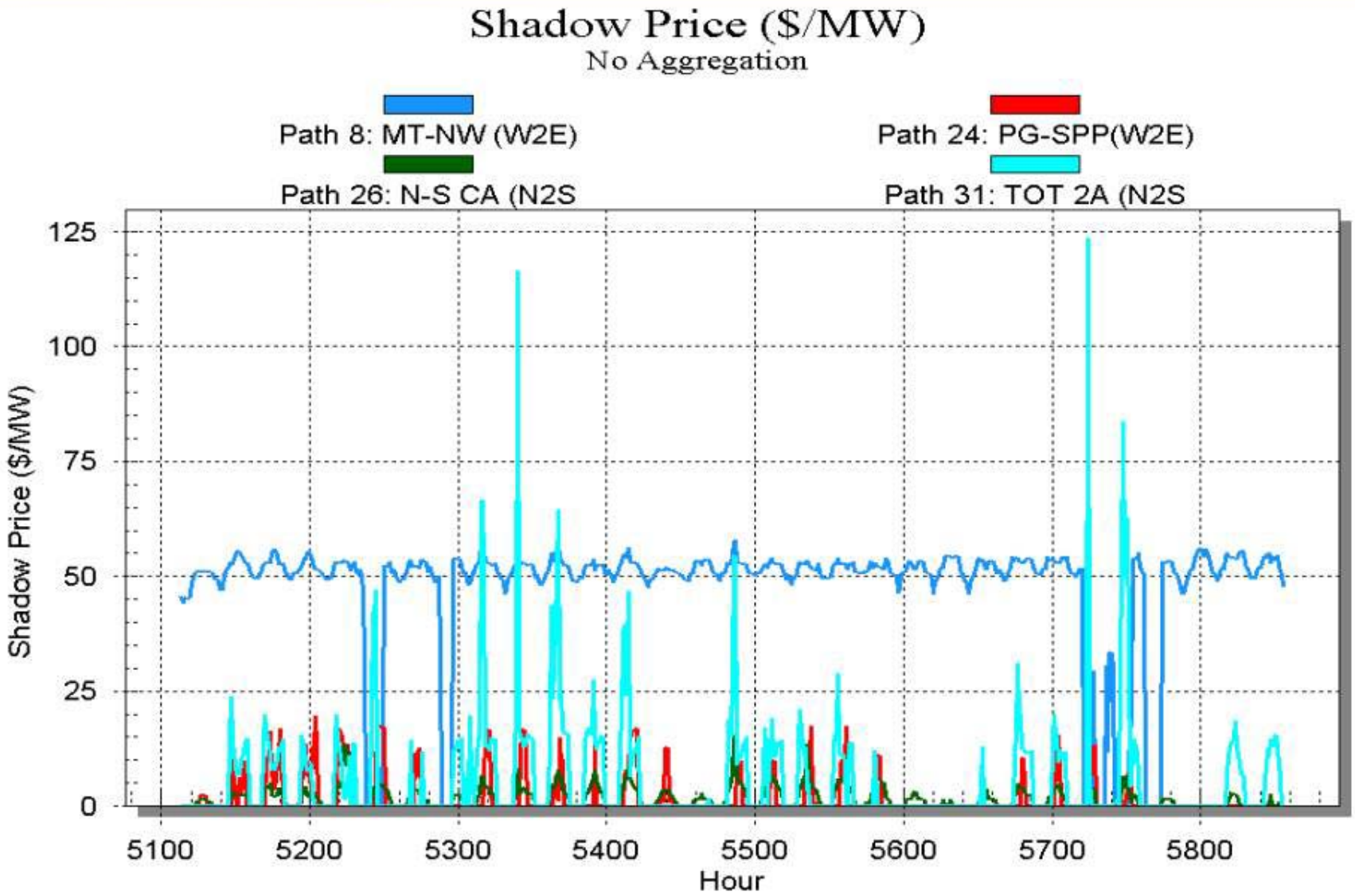

© ABB Inc. - 16 - 9/9/2004

# Four Hierarchies in Traditional Planning




© ABB Inc. - 17 - 9/9/2004

# Market Simulation – the Best Value Assessment for Transmission Expansion




© ABB Inc. - 18 - 9/9/2004

ABB