



CALIFORNIA ISO

California Independent
System Operator

“The Northeast BLACKOUT”

**IEEE Spring Banquet
San Francisco Chapter**

April 15, 2004

Terry M. Winter
President and Chief Executive Officer
California ISO



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August 14, 2003



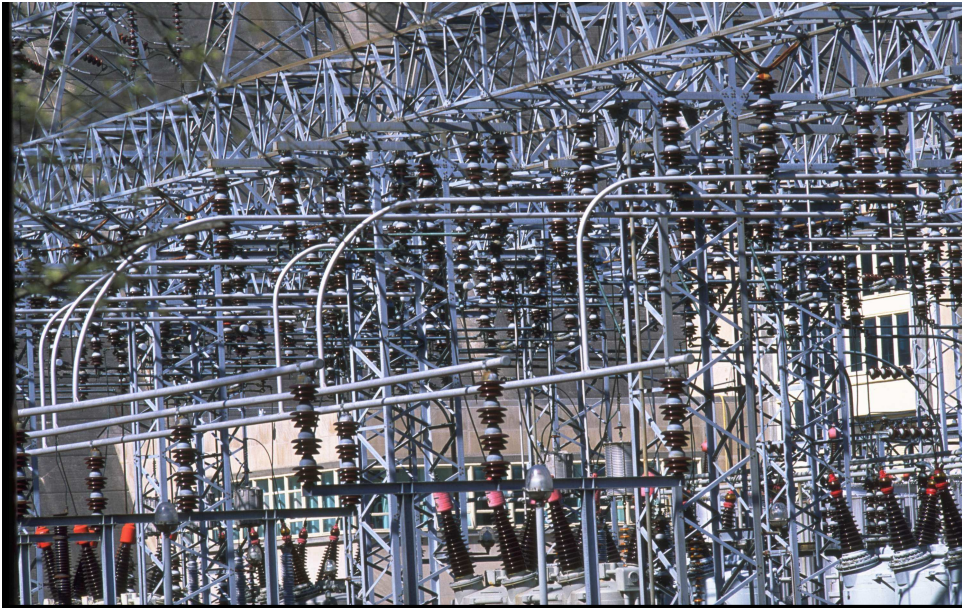


A Big Machine



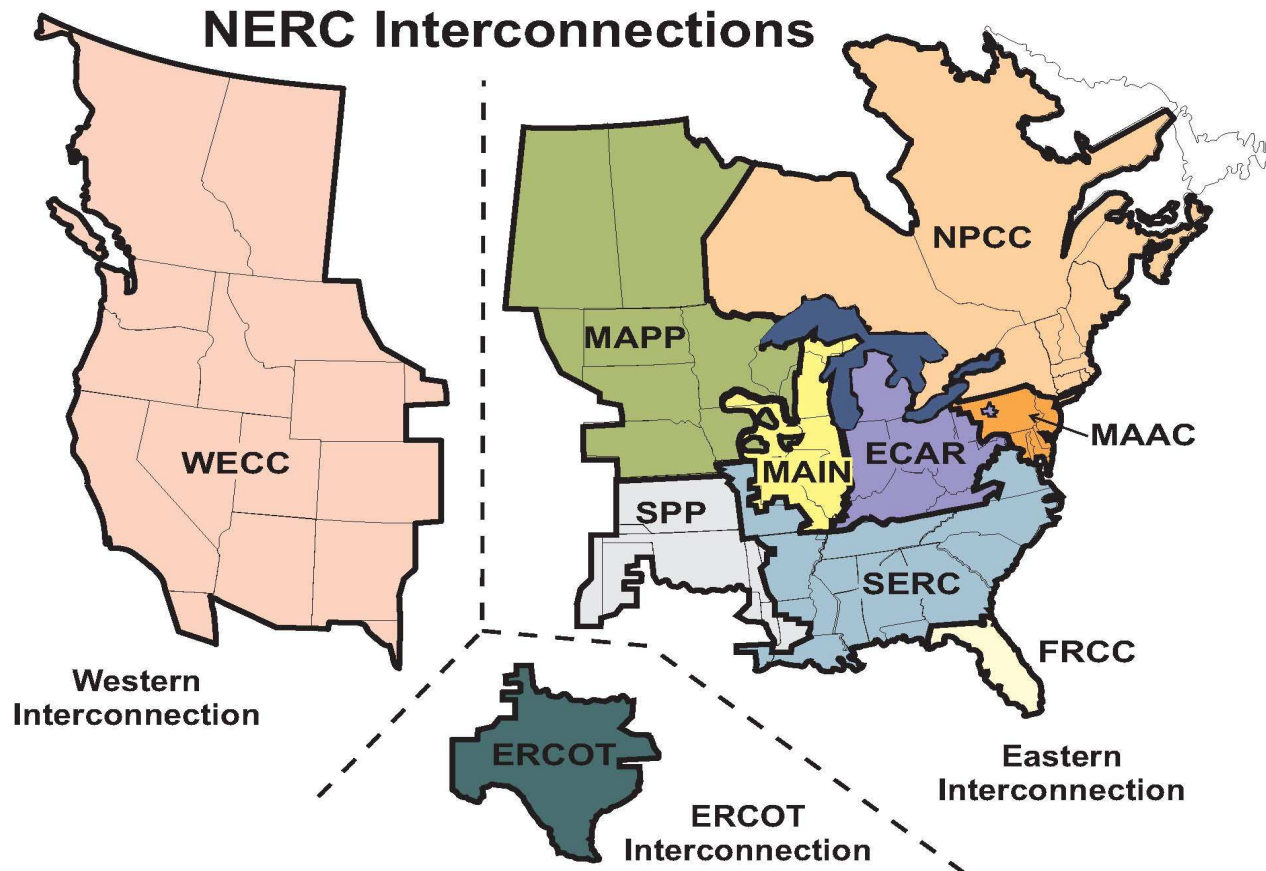


The World's Biggest Machine





3 Interconnections / 10 NERC Regions





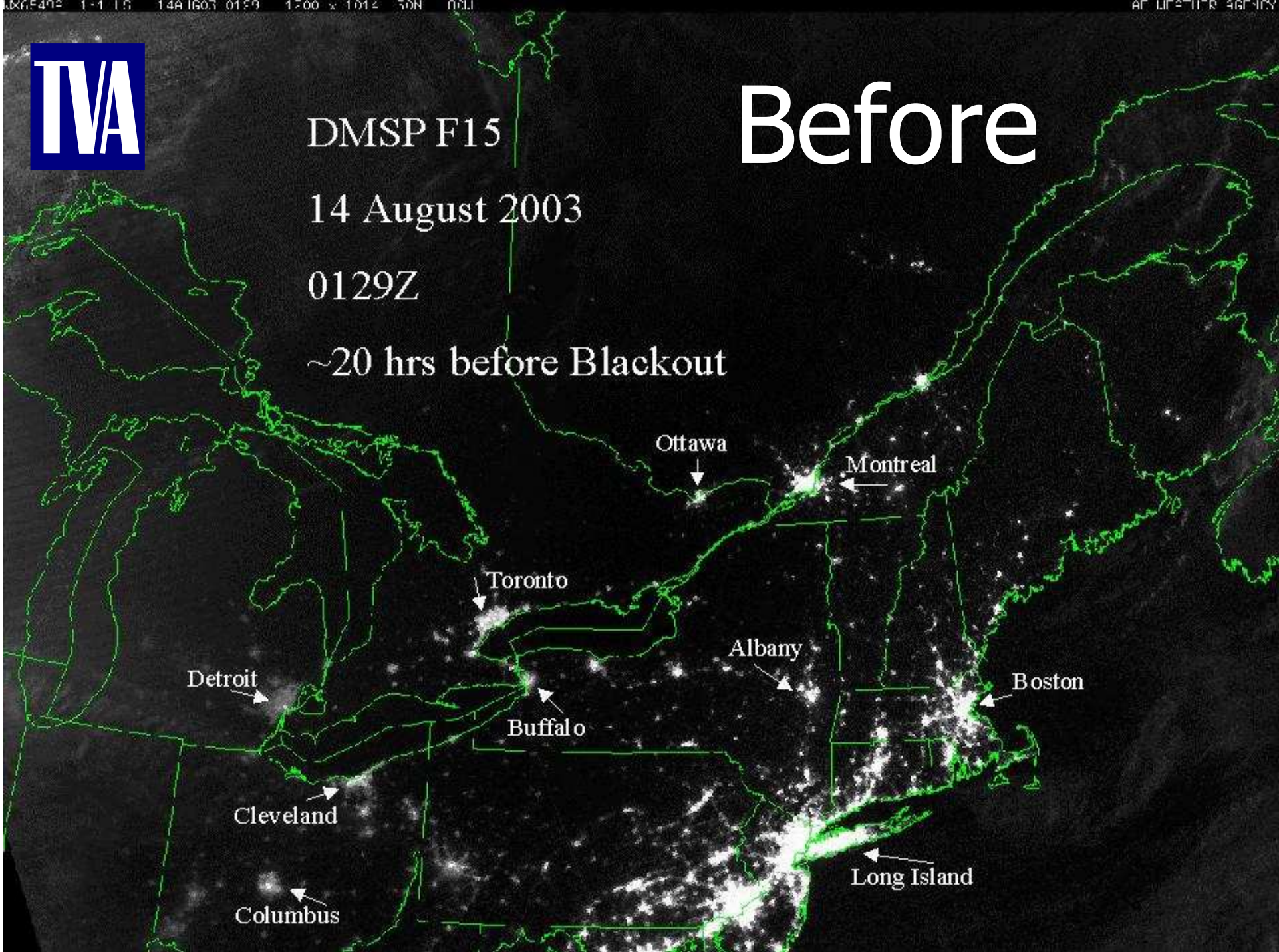
DMSF F15

Before

14 August 2003

0129Z

~20 hrs before Blackout





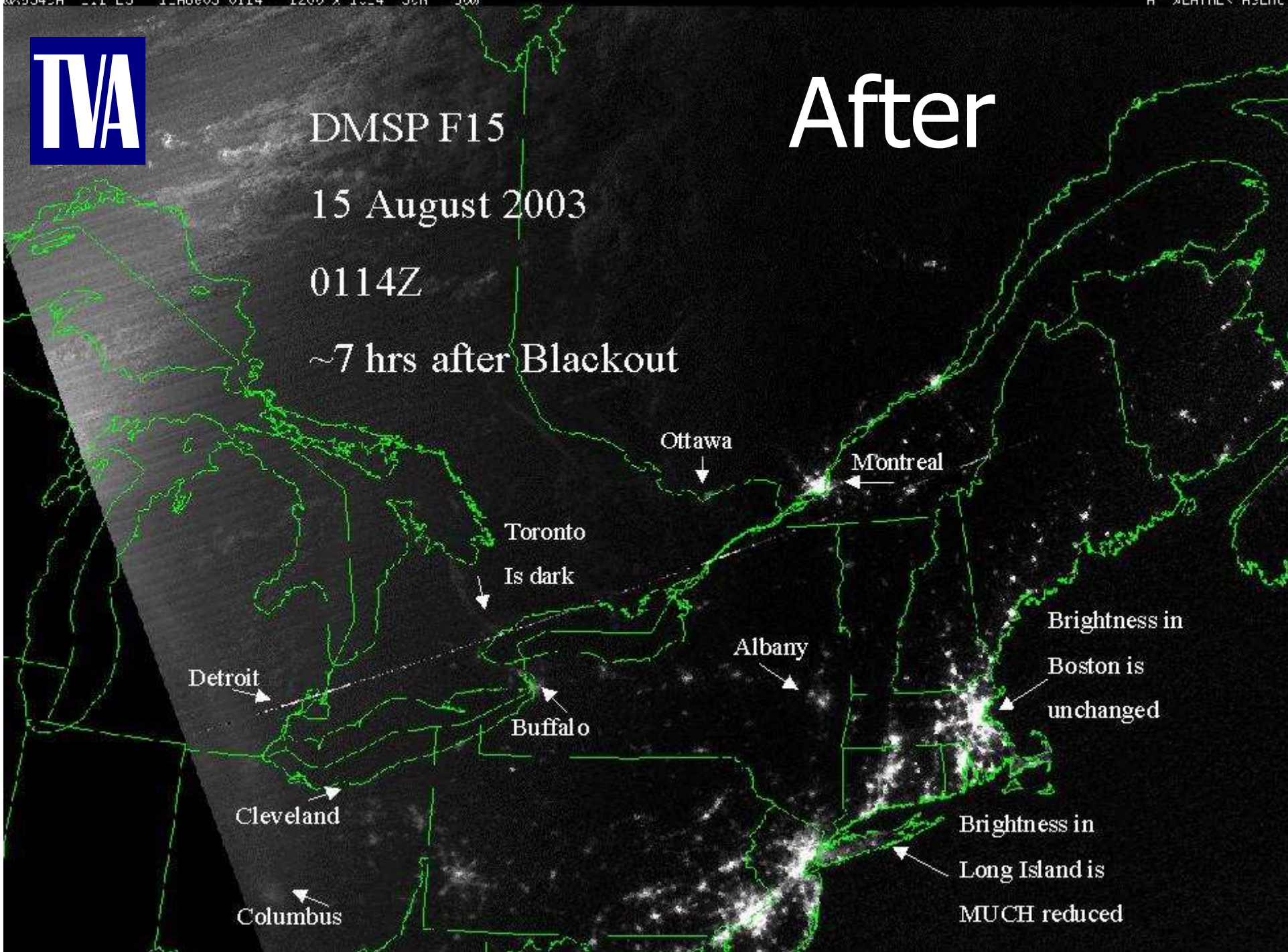
After

DMSF F15

15 August 2003

0114Z

~7 hrs after Blackout



Ottawa

Montreal

Toronto
Is dark

Albany

Brightness in
Boston is
unchanged

Detroit

Buffalo

Brightness in
Long Island is
MUCH reduced

Cleveland

Columbus



2003 Blackout Aftermath

- 50 million people in US and Canada in the dark
- 62,000 MW of generation suddenly separated from the grid
- 531 generators tripped off line, including 19 nuclear generators
- Estimated cost to U.S. and Canadian economies: Billions of dollars

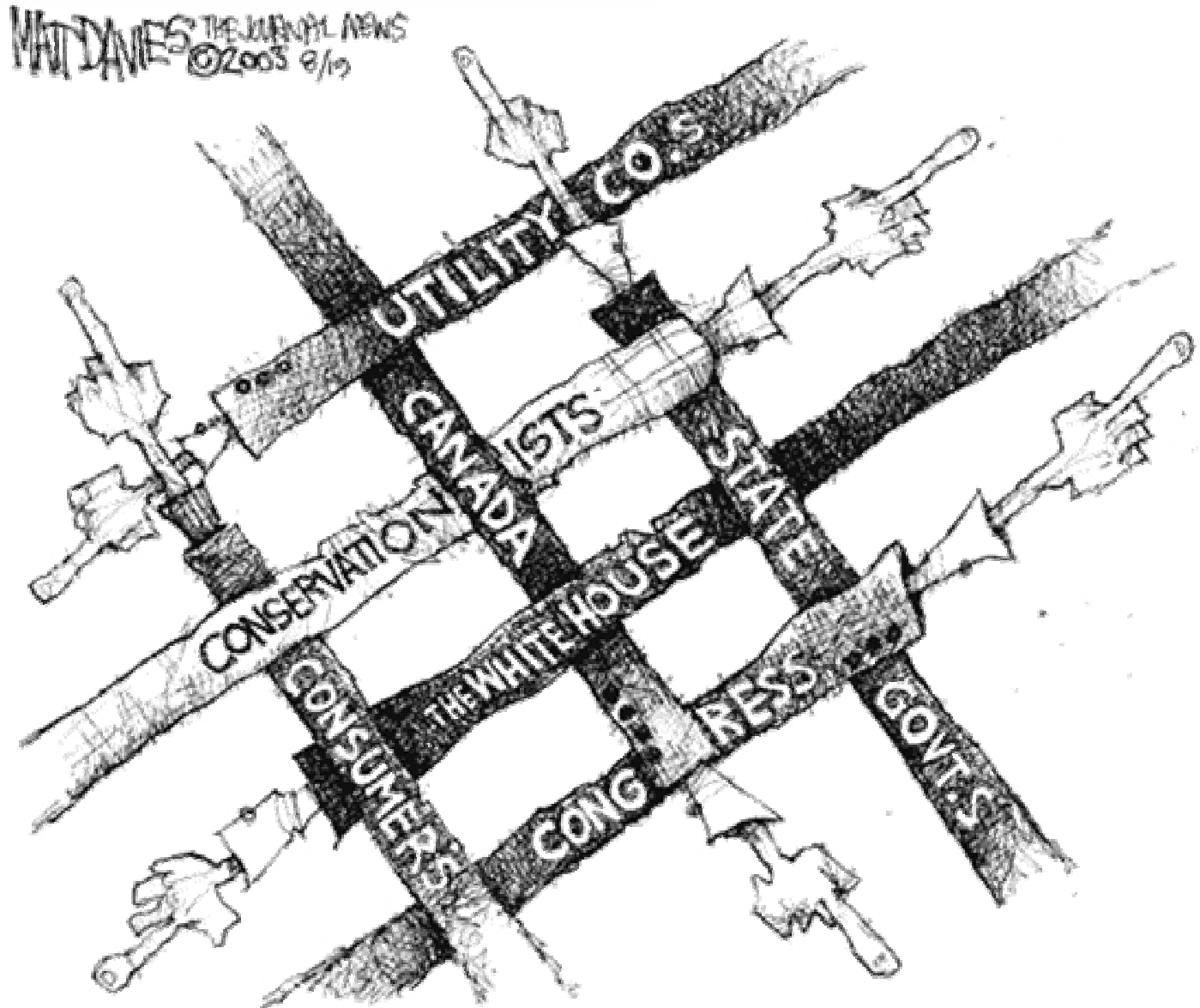


About the Blackout

- The initiating events – trees, lightning, birds, equipment failure (i.e. insulators)
- Automatic relaying is to protect equipment
- Operational practices and systems are to prevent wide-spread blackouts



The Grid



Recent Major Blackouts

West Coast '96

Detroit '00

Northeast '03

Chicago '99

New York '99

Northern California '01

Delaware '99

San Francisco '00

Atlanta '99

New Orleans '99



What needs to be done at the policy level?

- Mandatory reliability requirements
- Transmission infrastructure investment
- Transparency to operating practices



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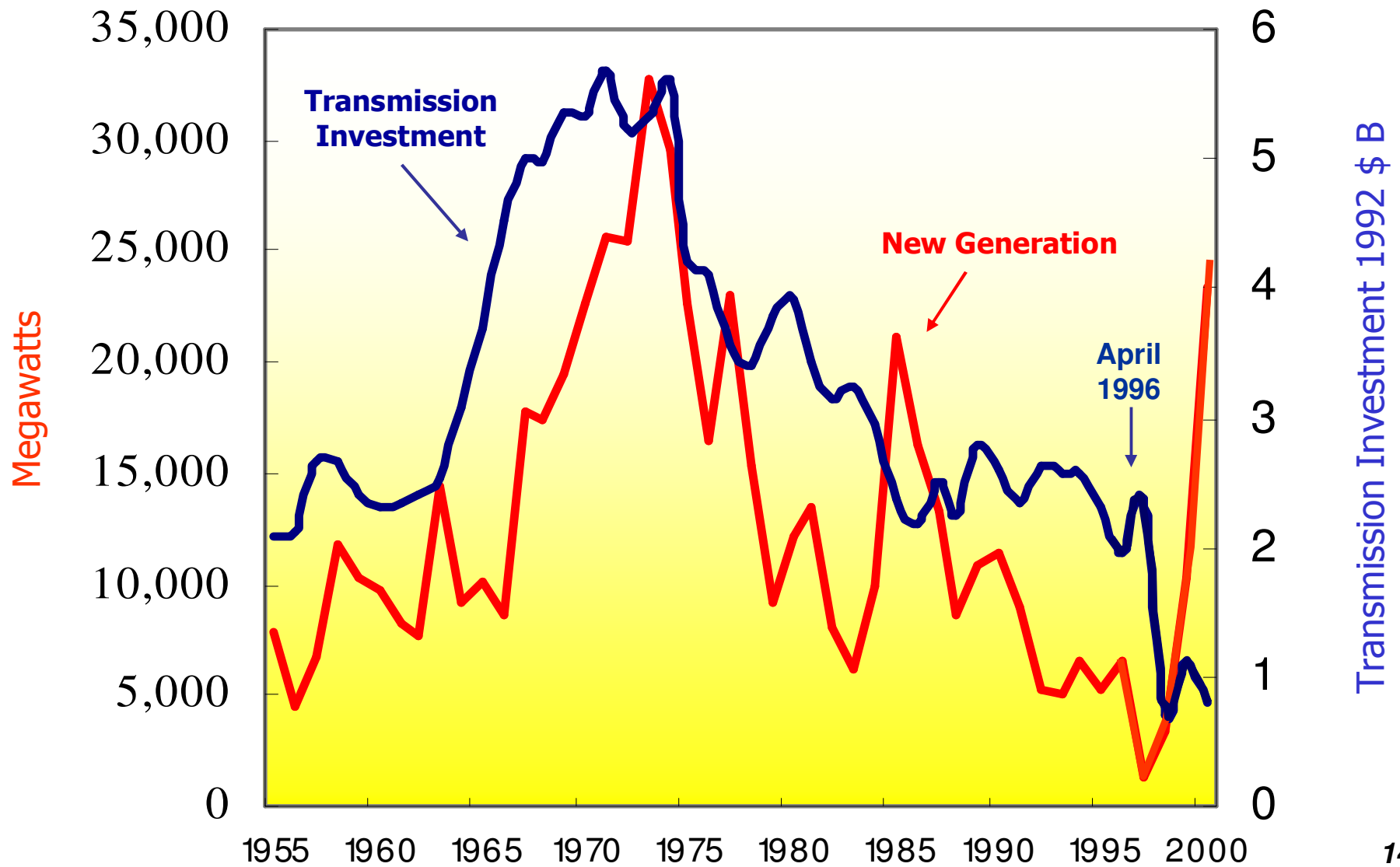
Electricity Economics

- ~\$1 trillion in total asset value
- 540,000 miles of transmission lines
- \$247 billion annual revenues
- 131 million customers
- 3,200 utilities

Without electric power, the \$10 trillion U.S. economy comes to a halt



De-coupling of Investment



Source: EEI Statistical Yearbook and Energy Information Administration



Summary

- Electric systems are huge machines
- Automatic devices protect equipment
- Operational practice & planning prevent large scale blackouts
- Mandatory reliability standards make it fair & transparent
- Transmission investment aligns the machine with the market



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Questions