Convertible Static Compensator(CSC)

Presentation To The ISO Board

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What is the CSC Project?

Power Electronics Flexible Alternating Current Transmission Systems(FACTS)

+

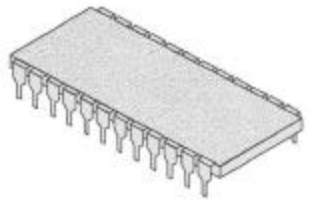
Conventional Technology

(Capacitor Banks)

FACTS

Flexible
Alternating
Current
Transmission
Systems

FACTS are a collection of power transmission control technologies based on very high power solid state electronic devices.

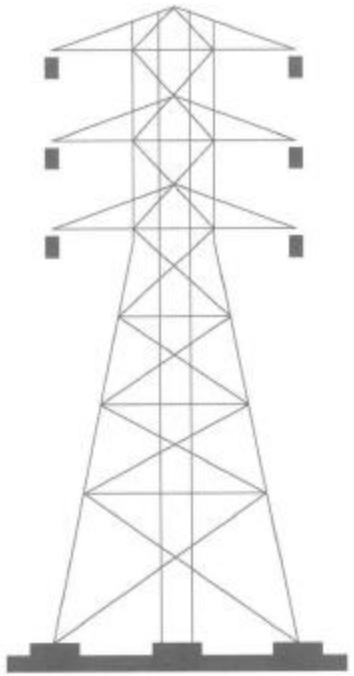


FACTS

Q: What are these systems used for?

A: Fast and continuous active control of the transmission network

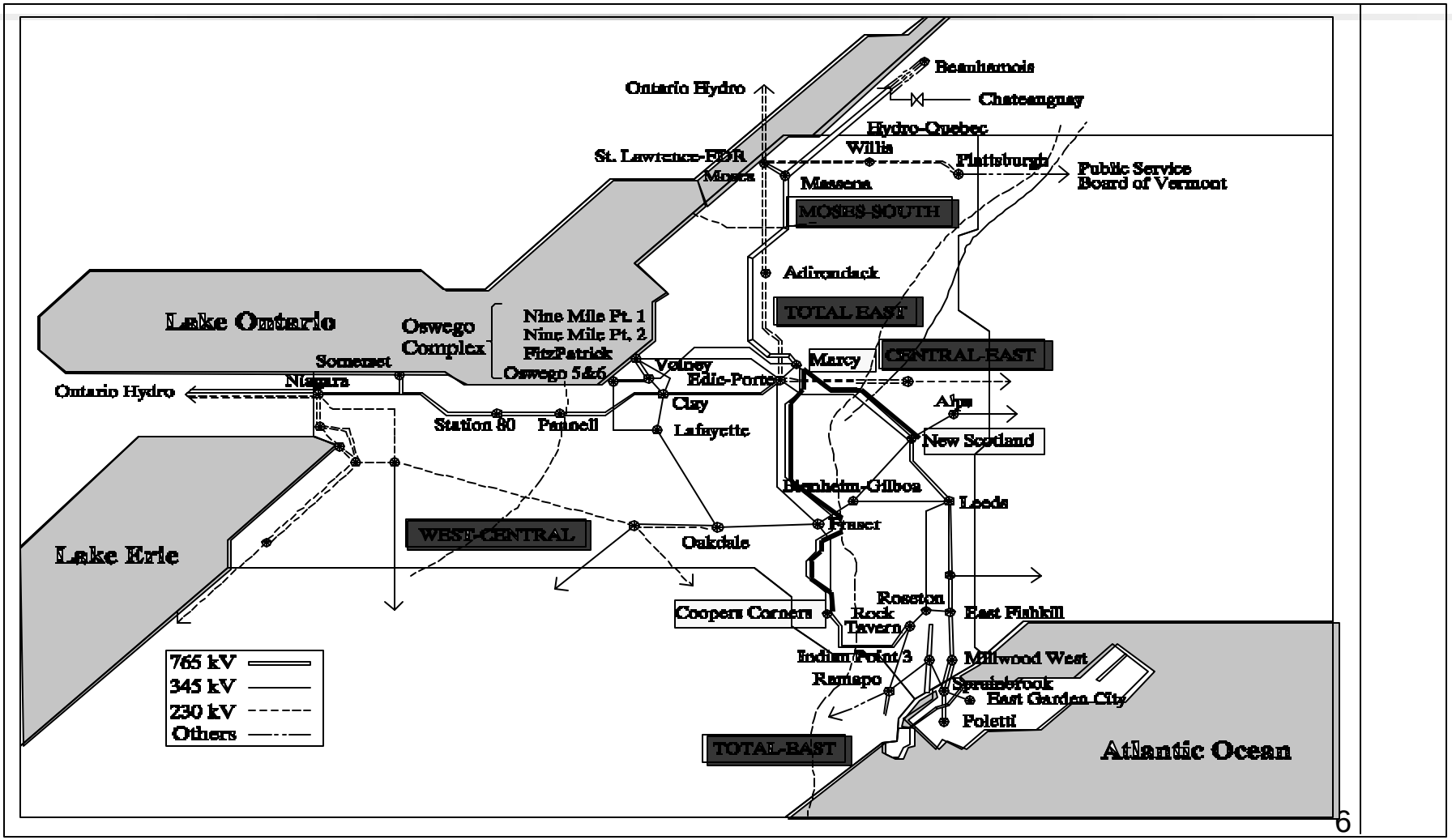
- Control of power flow
- Control of network instabilities
- Control of voltage



Background

- Currently, the Central-East (C-E) interface power transfers are voltage-limited to 2850 MW
- The limit is further reduced during system outage conditions
- Congestion of the C-E interface is anticipated to continue

One-Line Diagram of NYS EHV Transmission System



Solutions To Congestion

- New Generation closer to load
- New Transmission
- Utilize Existing Transmission More Efficiently Through the Use of FACTs Technology

NYPA's CSC Project

Implementation in Two Phases

- In the Short Term provides:
  - Voltage Support and Control
- In the Long-Term provides:
  - Power Flow and Voltage Control

CSC Project-Phase I

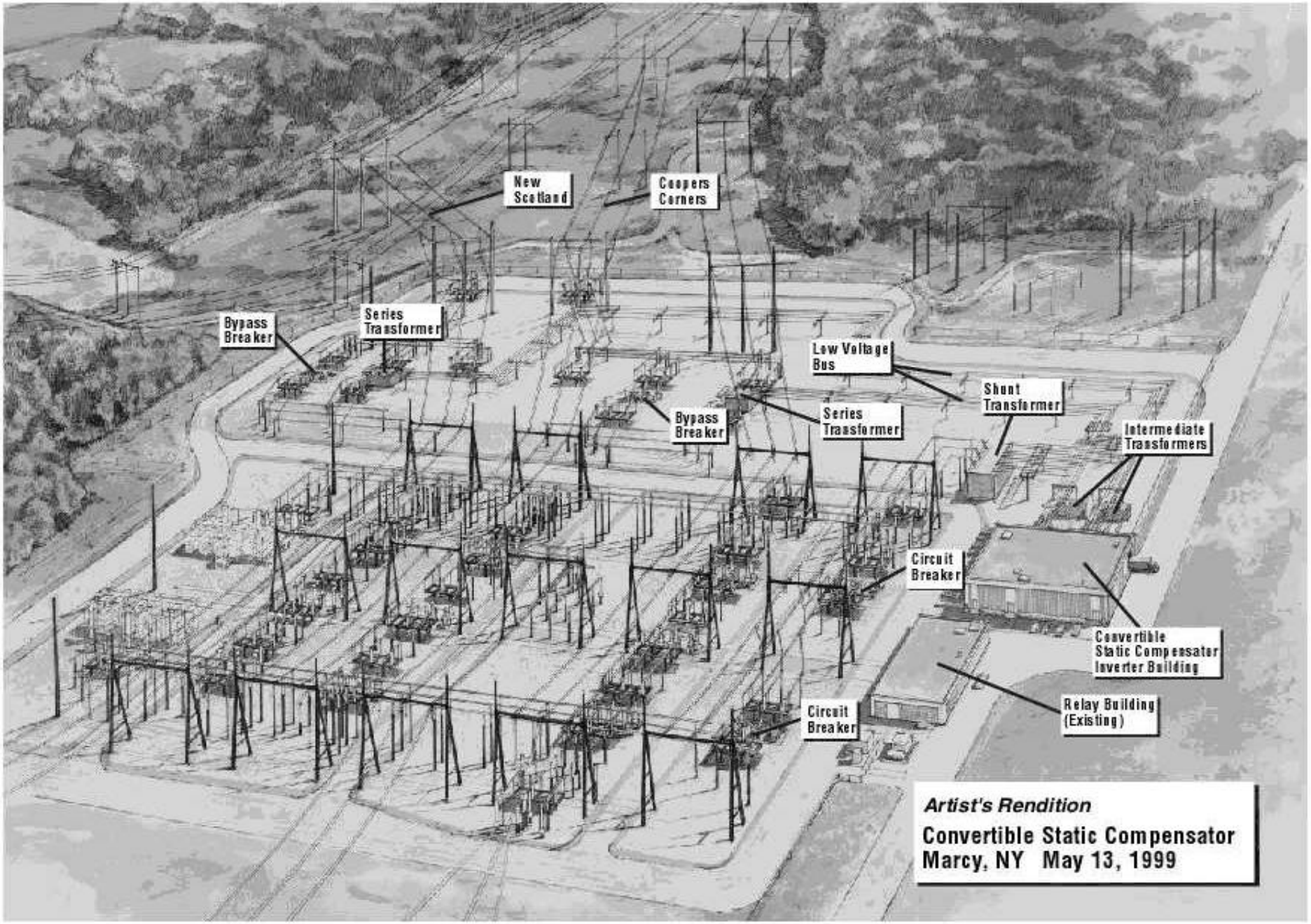
- Dynamic Voltage Support and Control at Marcy 345 kV Substation
- Capacitor Bank at Oakdale Substation
- Increase Total-East interface power transfer Capability by 120 MW and Central-East by 60 MW

Phase I of the CSC Project will provide dynamic voltage support and control

CSC Project-Phase II

- Static Synchronous Series Compensator, Interline Power Flow Compensator, and Unified Power Flow Controller modes of operation
- Additional capacitor banks added
- Provides power flow control to achieve higher levels of power transfer
- Increase Total-East interface power transfer Capability by an additional 120 MW and Central-East by 60 MW

The CSC in its series configuration will provide power flow control capability on one or more lines


New Scotland
Coopers Corners
Bypass Breaker
Series Transformer
Low Voltage Bus
Shunt Transformer
Bypass Breaker
Series Transformer
Intermediate Transformers
Circuit Breaker
Convertible Static Compensator Inverter Building
Relay Building (Existing)
Circuit Breaker
Artist's Rendition
Convertible Static Compensator
Marcy, NY May 13, 1999

NYPA CSC Project
Summary

- Increase Total-East interface power transfer Capability by 240 MW and Central-East by 120 MW
- Increase system dynamic resiliency
- Improve voltage control
- Reduce transmission congestion
- Provide flexibility for system operation, and maintenance
- Reduce system losses

Project Cost & Schedule

- Estimated total project cost — $48 Million
- Industry contribution — $13 Million

- Phase I — Dec., 2000
- Phase II — July, 2002

Why Are we Building the CSC?

- As a State-Owned Utility We Are Pushing the Envelope of Technology
  - Something we believe is an appropriate role for NYPA.
- The CSC is not a Traditional Transmission Expansion
  - It will test the ISO Procedures for Awarding TCC's to Transmission Expanders

MARCY CONVERTIBLE STATIC COMPENSATOR

Industry Participation

- Allegheny Power System
- Alliant
- American Electric Power
- Baltimore Gas and Electric
- BC Hydro
- Bonneville Power Administration
- Central Hudson Gas & Electric
- Central and Southwest
- Duke Energy
- First Energy Corp.
- Georgia Transmission Corp.
- GPU Energy Corp.
- Great River Energy
- Illinois Power
- Montana Power
- Ontario Hydro
- Public Service Electric & Gas
- Salt River Project
- Southern California Edison
- Tennessee Valley Authority
- Tri-State G&T Association
- United Illuminating

The End