Applied Superconductivity Conference

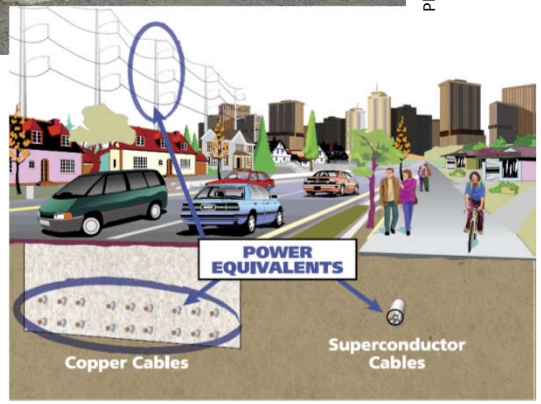
September 5th, 2016

smarter, cleaner
... better energy

Superconductor AC Power Cables
Unique Electrical Characteristics

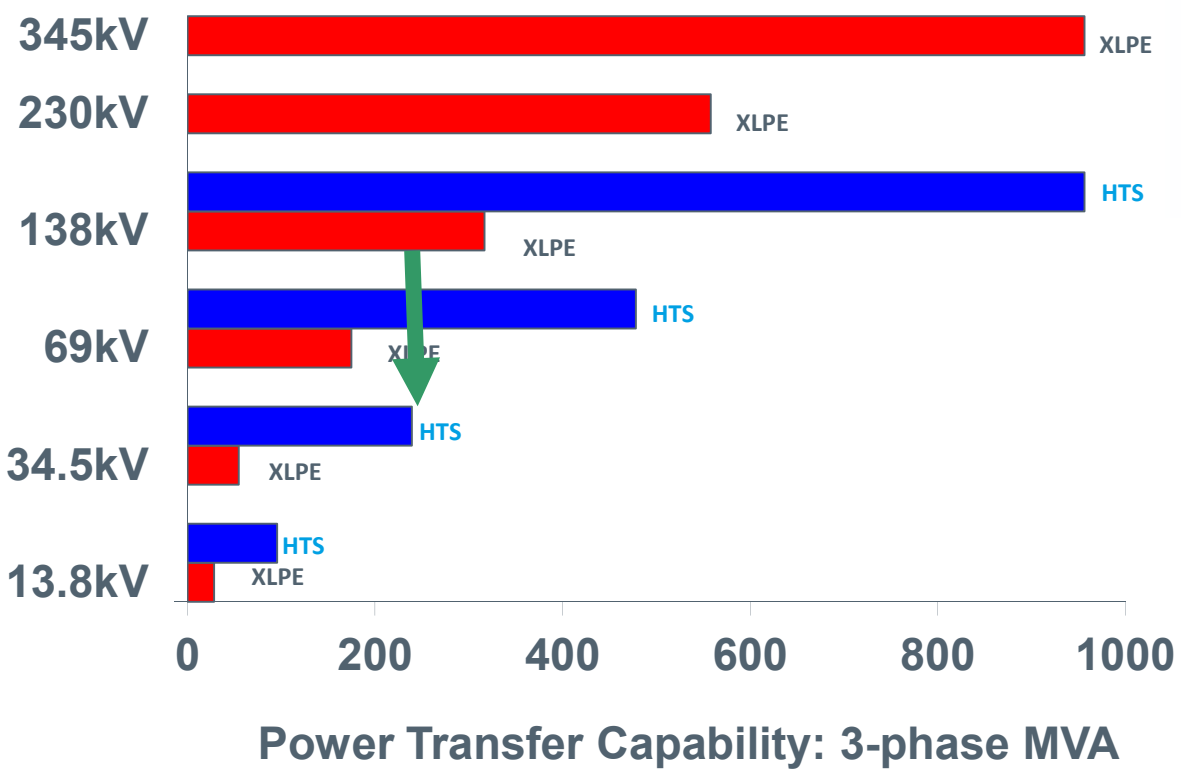
- Very high power transfer capability compared to conventional cables solves many siting problems
- Thermal isolation eliminates de-rating, simplifies placement concerns, and minimizes right-of-way
- Optional fault current management capabilities eliminate need to upgrade existing equipment
- Minimal magnetic field

Photo courtesy Long Island Power Authority



Superconductor cables offer unique capabilities

Power Transfer Equivalency of Superconductor Cables



Same Voltage, More Power

Greatly increased power transfer capacity at any voltage level

Same Power, Lower Voltage

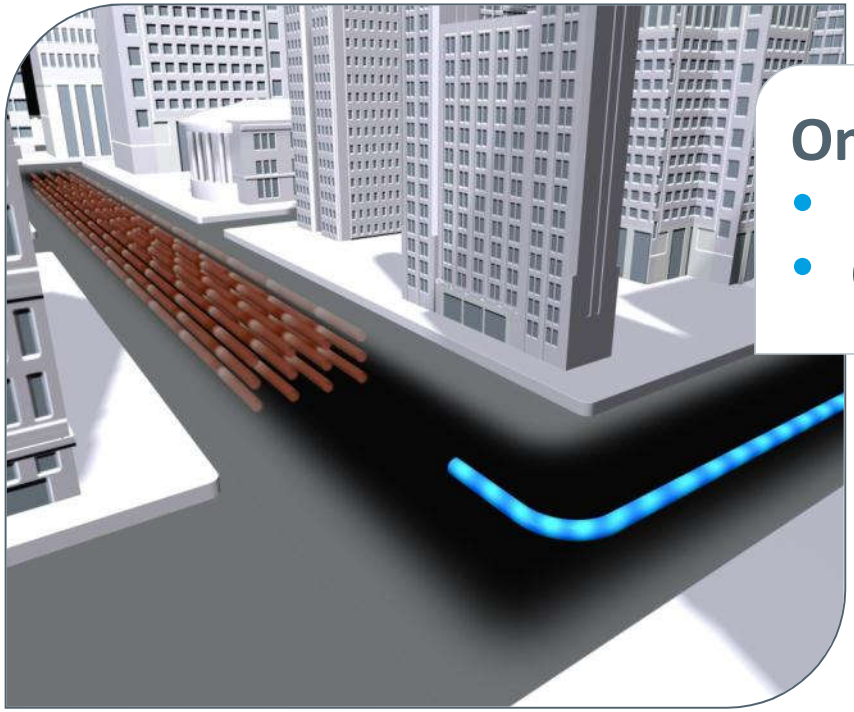
New MV versus HV Siting Opportunity

- "MV Transmission"
- Ideal for NIMBY & ROW sparse environments

* **No XLPE cable de-rating factors applied**.
Superconductor rating based on conventional 4000A breaker rating

HTS Cables provide transmission-level power at distribution voltages

Simplifying Transmission Siting



One MV HTS Cable can replace:

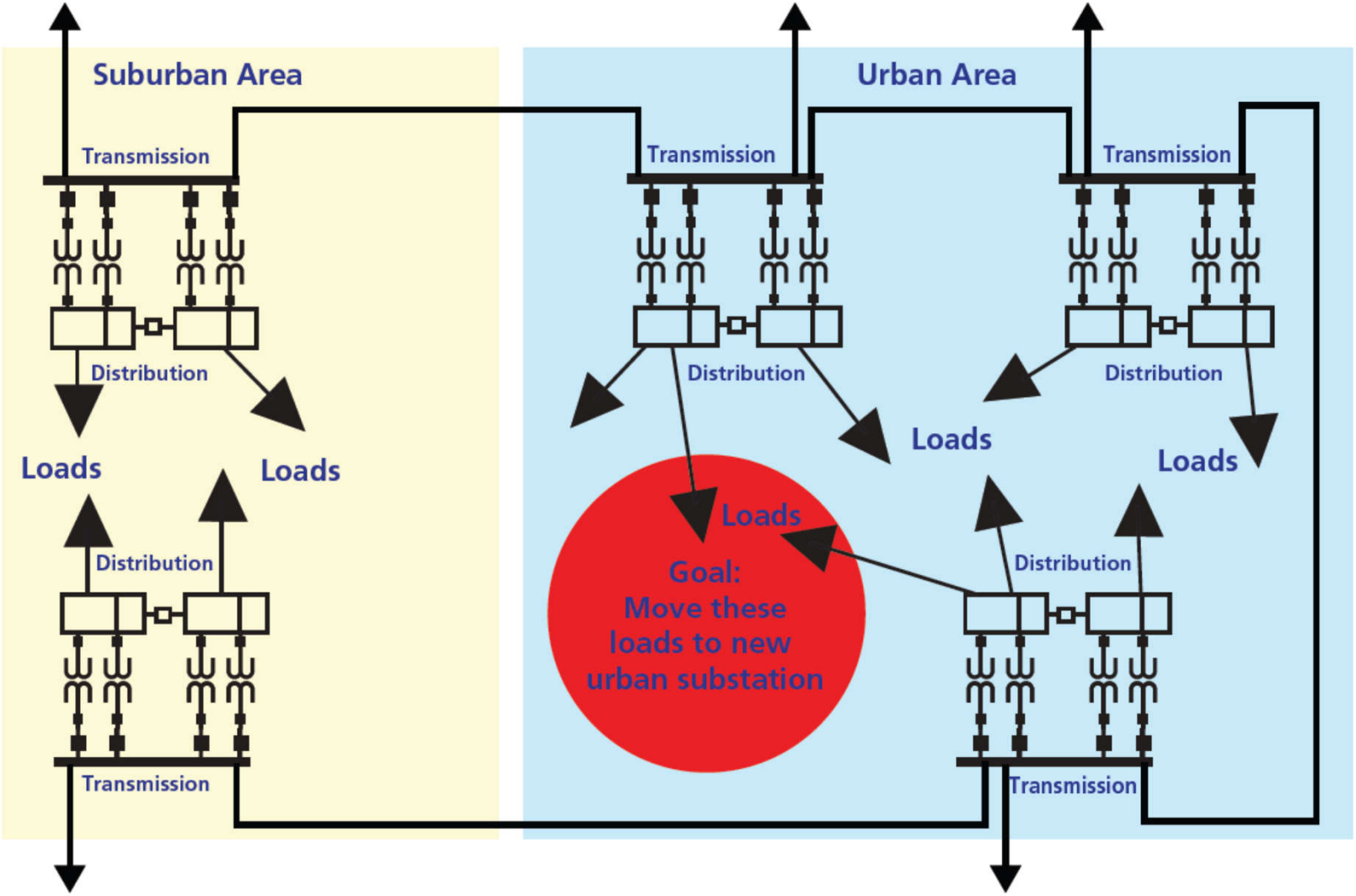
- Many conventional underground circuits
- Overhead transmission line

Photo courtesy Consolidated Edison

HTS Cables Offer New Options to Siting Power Lines

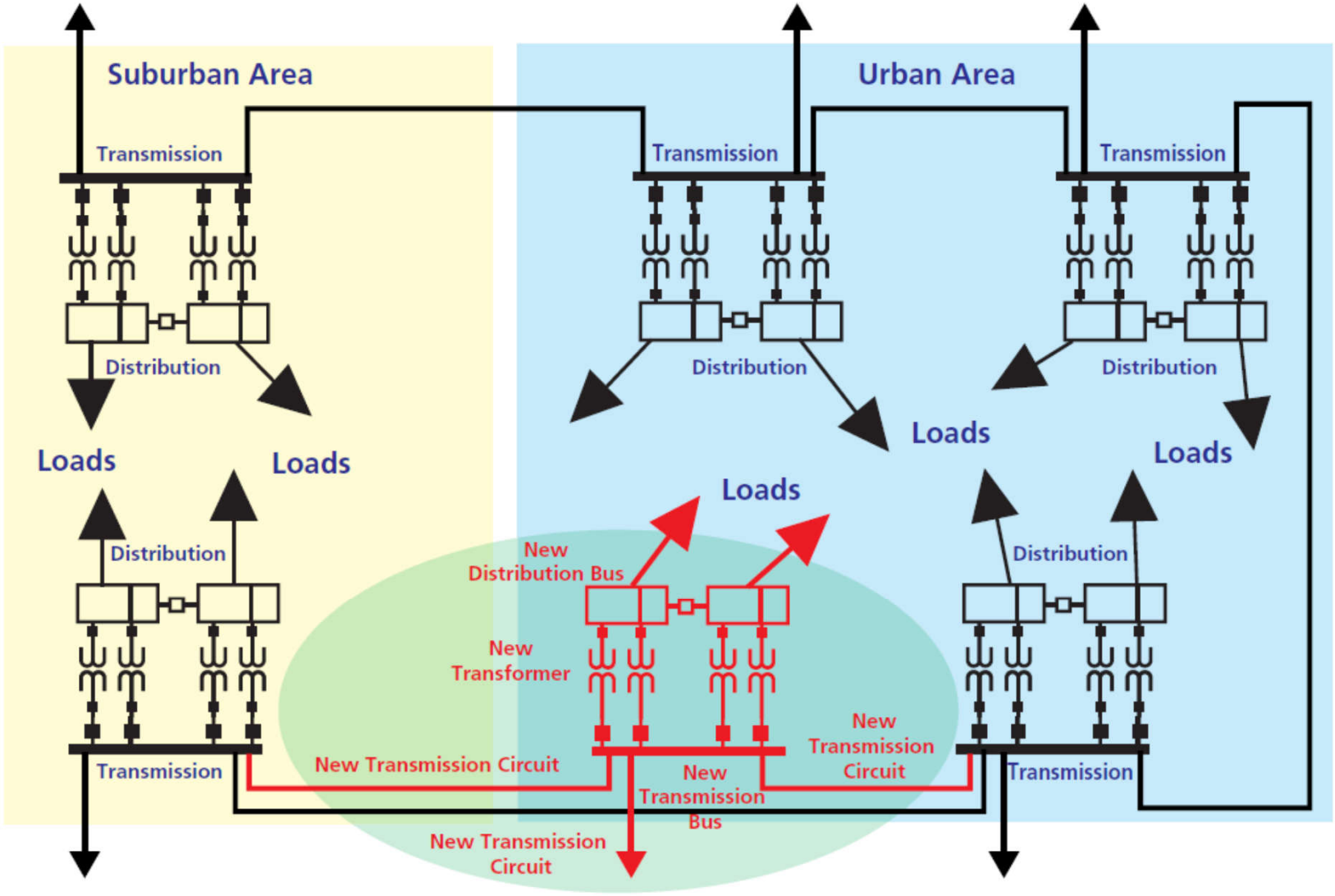
New Urban Substation Scenario

How to serve growing Urban Loads

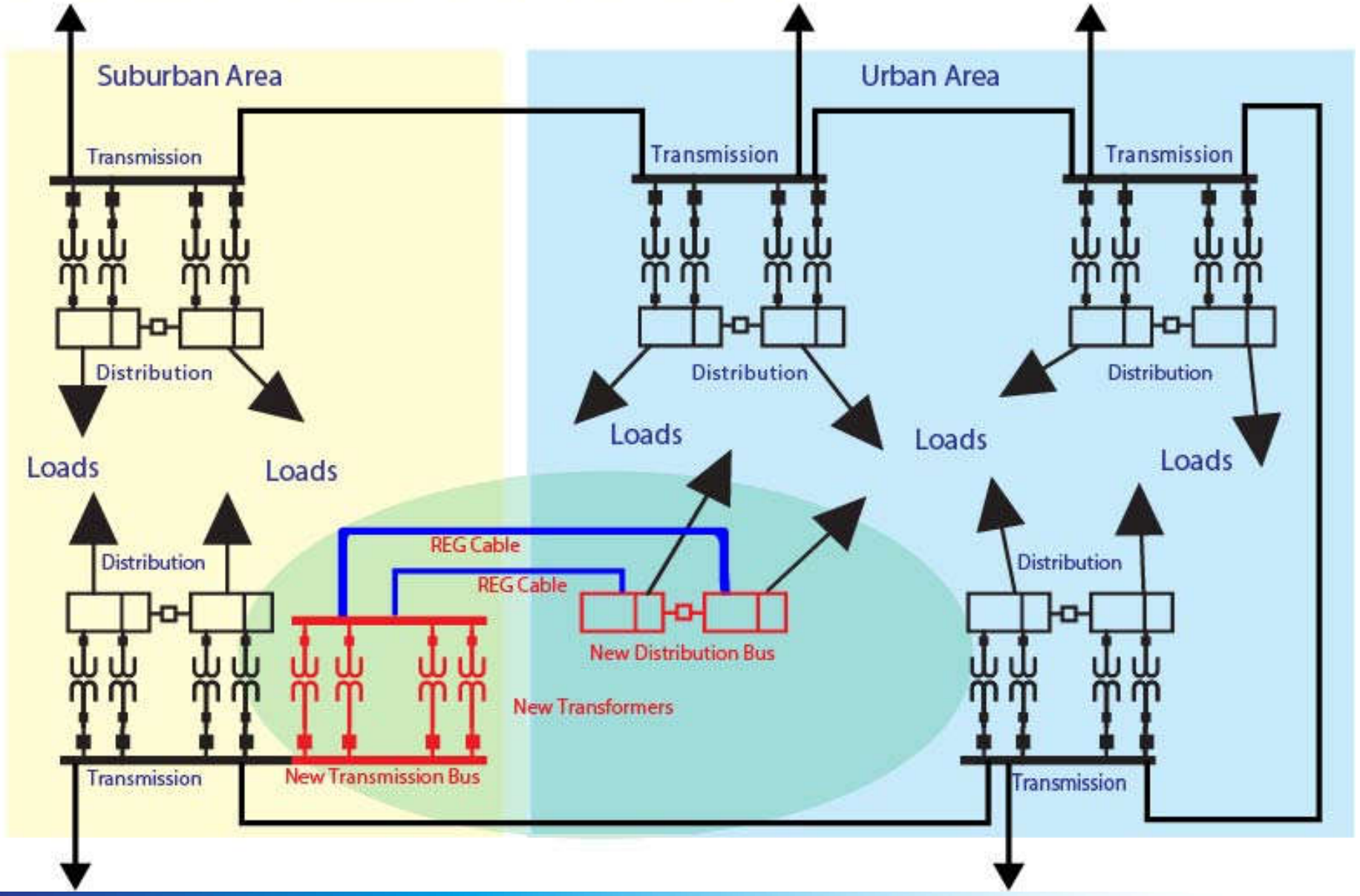


Traditional Solution:

New Full Transmission/Distribution Urban Substation with Similar Transmission Connections



REG Solution: Transmission & Transformation in Suburban Area, Distribution Only Substation in Urban Area

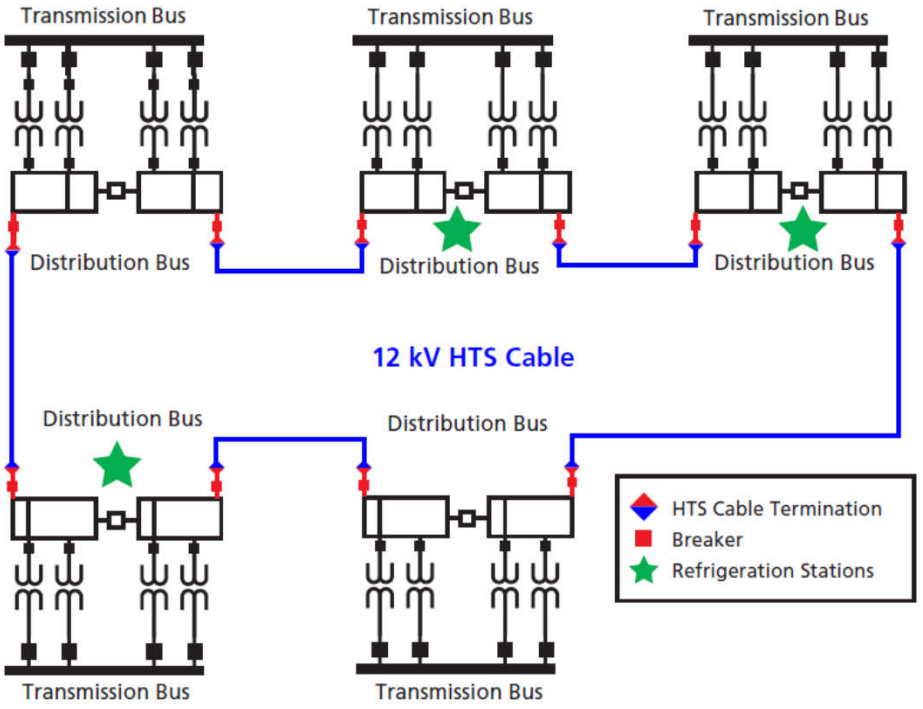


MV "**Resilient Electric Grid**" (REG) System

Interconnecting Distribution Substations

This REG system provides the utility:

- Increased load serving capacity without installing new power transformers
- Increased reliability from N-2 to N-4
- Can serve load upon loss of all power supply to any substation
- Provides Fault Current Limiting



Interconnect Distribution as a back-up to the Transmission Network

Increase Reliability

Interconnecting Distribution Substations

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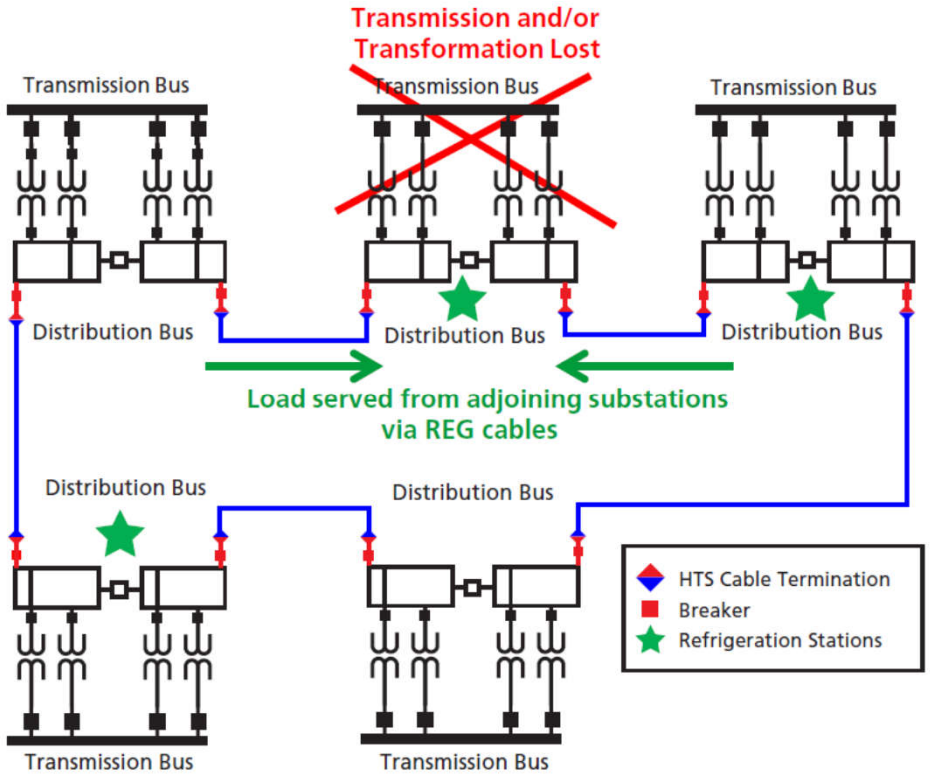

REG System provides network resilience to major events

DHS REG Commercialization Project

- **July 16th 2014**
  - ***AMSC, ComEd and DHS announce an agreement to develop a deployment plan for a Resilient Electric Grid system based on superconductor cables***
    - ***Multi-mile, Multi-phase project***
    - ***Estimated $60M in total funding from DHS***
    - ***$1.5 Million Approved for First Phase***
    - ***Indicated that two additional utilities were also investigating REG technology***

DHS REG Commercialization Project

- **April 22nd, 2015**
  - ***Eversource Energy announced their interest in REG technology following their detailed study of AMSC's Resilient Electric Grid System***

- **July 9th, 2015**
  - ***PEPCO in Washington, DC announced that they are undertaking a deployment study of AMSC's Resilient Electric Grid systems.***

DHS REG Commercialization Project

- **November 3rd, 2015**
  - ***AMSC and DHS announce that the REG program is moving forward with additional funding of up to $3.7M through May 2017***
- **February 8th, 2016**
  - ***AMSC and Nexans announce that Nexans has been selected to design and fabricate a HTS cable for qualification and performance evaluation.***
  - ***This represents an important step toward the construction phase of DHS and AMSC's REG Program***

Thank you!