

# EMERGING LEADERS FORUM



# Planning for Data Center Interconnections

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# Agenda

- What are data centers?
- State of the data center industry
- Who is NOVEC?
- Northern Virginia Data Centers
- Data Center Planning and Challenges



# What are data centers?

- A data center is a facility that centralizes an organization's shared IT operations and equipment for the purposes of storing, processing and disseminating data and applications.
- Data Center Types
  - Enterprise
  - Cloud Services
  - Colocation



# Data Center Design Standards

- Tier 1 – Basic infrastructure ( $N$ )
- Tier 2 – Some redundant infrastructure same distribution path ( $N-1, N+1$ )
- Tier 3 – Some redundant infrastructure geographically diverse paths ( $N-1, N+1$ )
- Tier 4 – Full redundant infrastructure ( $2N, N-2, N+2$ )

# Data Center Industry

- The global construction pipeline reached a new record in 2021, led by an 18.9% year over year growth in the United States.
- Data center demand reached a new record in 2021, with the absorption in the United States of an additional 885.7 MW, while the core markets in Europe absorbed 219.3 MW.
- Growth has been accelerated by the Covid-19 Pandemic, IT and Cybersecurity projects, the evolving esports industry.

# Data Center Industry

A large array of solar panels is shown in a field at sunset. The sun is low on the horizon, creating a warm, golden glow. The solar panels are arranged in rows and are tilted towards the sun. The background shows a grassy field and a fence line.

- Increased focus on sustainability and renewables by the data centers
- New technologies are being introduced inside the data center creating more density within the same footprint

# Who is NOVEC?

- Locally Owned Electric Distribution Cooperative
- Northern Virginia Service Territory
  - 651 Square Miles
- 175,000+ Customers
- 7600 Miles of Line
  - 5280 miles of Underground Distribution
  - 2280 miles of Overhead Distribution
  - 40 miles of Transmission





# Northern Virginia Data Centers

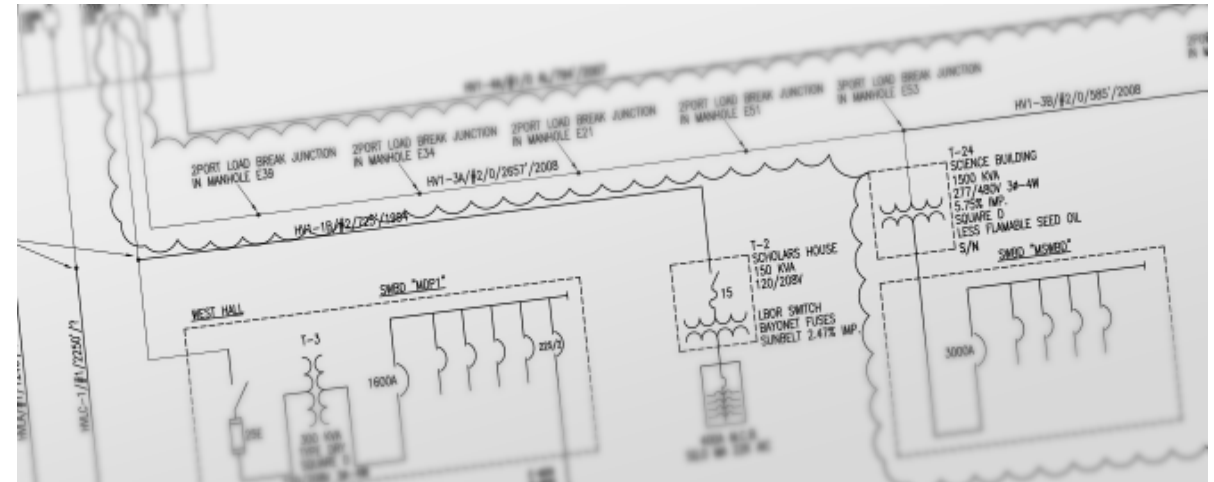
- Approximately 250 data centers located in Northern Virginia.
- Northern Virginia is the largest and fastest growing data center market in the world.
- \$126 Billion in capital investment and supported 28,000 jobs in 2021.

Figure 1. Relative Sizes of Largest Data Center Markets (megawatts of power capacity) – 2019<sup>7</sup>



# Data Center Planning

- Data Center Requirements
  - Capacity
    - 30 MW – 100 MW Buildings
    - 150 MW – 1200 MW Campuses
  - Redundancy
    - Distribution, Substation, Transmission
    - Open Transition vs. Closed Transition
  - Timing
    - Proposed need-by date for power



# Data Center Planning Process

- Customer Request
  - Load Ramp
  - Site Plan
  - Questionnaire
- Electric System Evaluation
- Solution(s) Development
  - Bridging Power
  - Permanent Power
- Proposal Process
- Contract Development
  - Engineering/Construction Scope
  - Rate Structure
- Construction & Energization

# NOVEC Planning Challenges

- NOVEC System Voltages
  - 12.47kV and 34.5kV
- Customer Capacity and Redundancy Requirements
  - Substation Design
  - Distribution Design
- Transmission Interconnections
- Regulatory Challenges

# NOVEC Planning Challenges

- Short-term vs. Long-term Planning
- Forecasting Data Center Growth and Capacity
- Integrating Renewables
- Evolving Data Center Designs and Requirements