

2024 ENERGY EFFICIENCY FORUM

Federal Funding Updates

Home Energy Rebates (HER)

Training Residential Energy
Contractors/ Energy Auditor
Training (TREC/EAT)

Energy Efficiency Conservation
Block Grants (EECBG)



2024 ENERGY EFFICIENCY FORUM

Stakeholder Engagement

OSS Survey

VAEEC, in collaboration with the State Energy Office, is conducting a survey to gather stakeholder feedback for the Virginia Energy One Stop Shop.

Live Poll:

<https://www.menti.com/al5tdti/effab>





Up Next
BREAKOUT SESSIONS

*Data Center Demand: How Do We Respond?
Best Practices for Workforce Success*



BREAKOUT SESSIONS

Data Center Demand: How Do We Respond?

Data Center Demand

Speakers

Keith Dennis, Beneficial Electrification League

Richard Anderson, Siemens

Haneepha Degarmo, Voltus

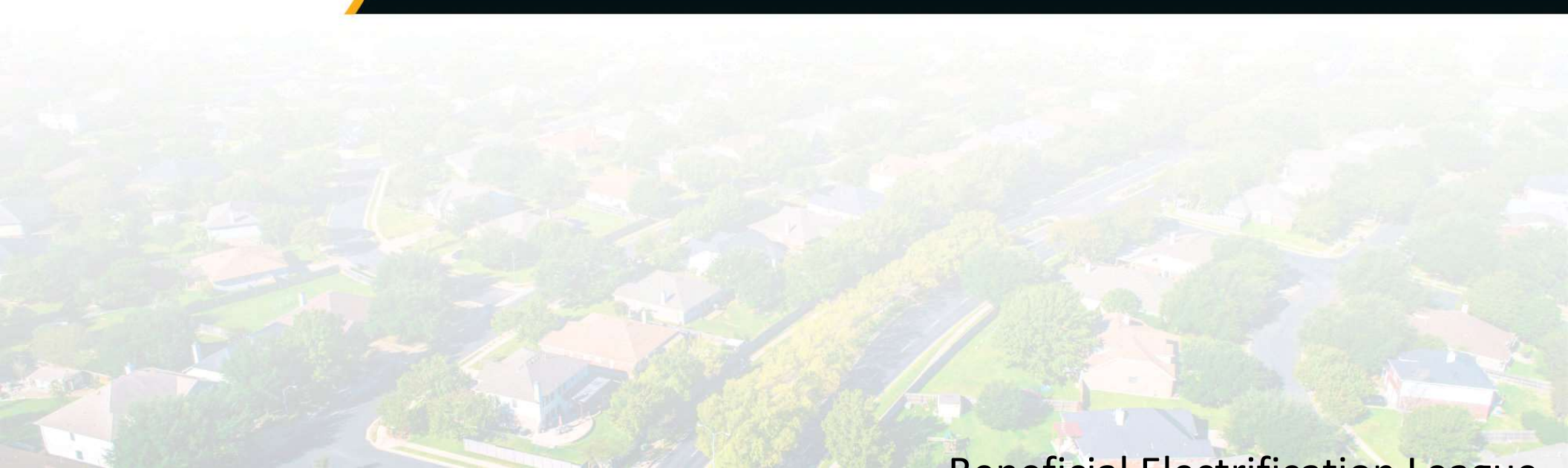
Robert Lazaro, Northern VA Regional Commission

John Morrill, Fairfax County (moderator)





Electrification, Load Growth, Data Centers, and EE



Beneficial Electrification – Then and Now



What's your favorite thing powered (or charged) by electricity?

Maybe soon it will be your AI!



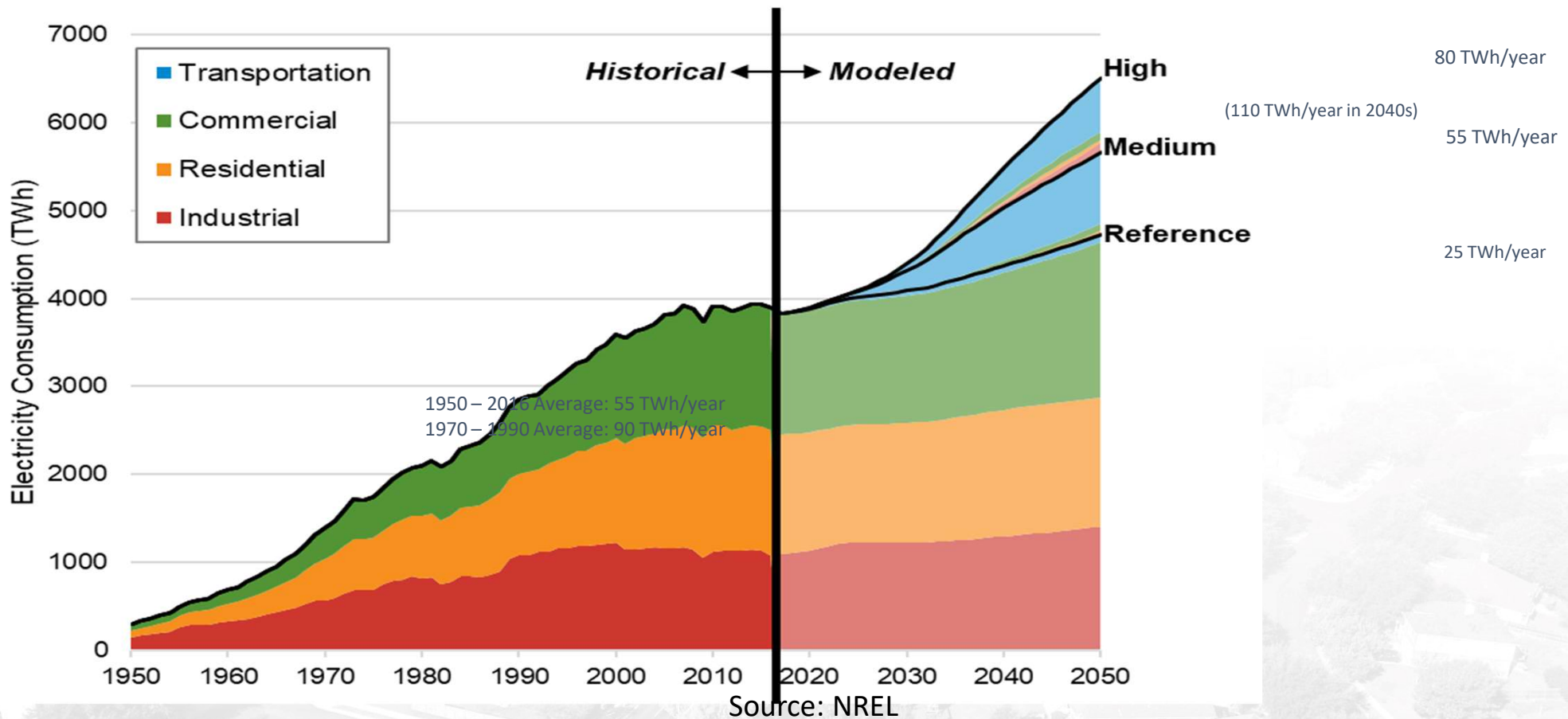
Technology Well Beyond EVs



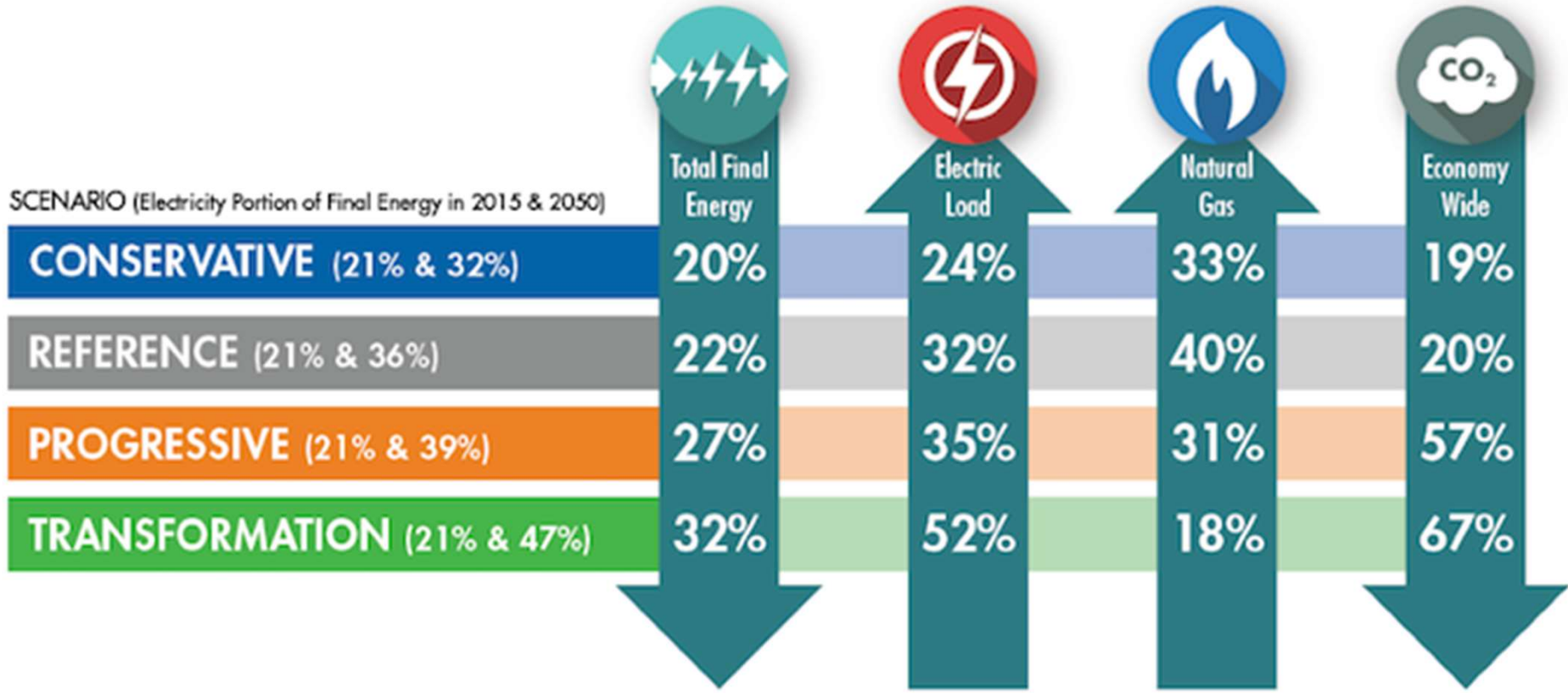
What Services is this Electrifying?



Electric Load Growth Significant, but Not Unheard of

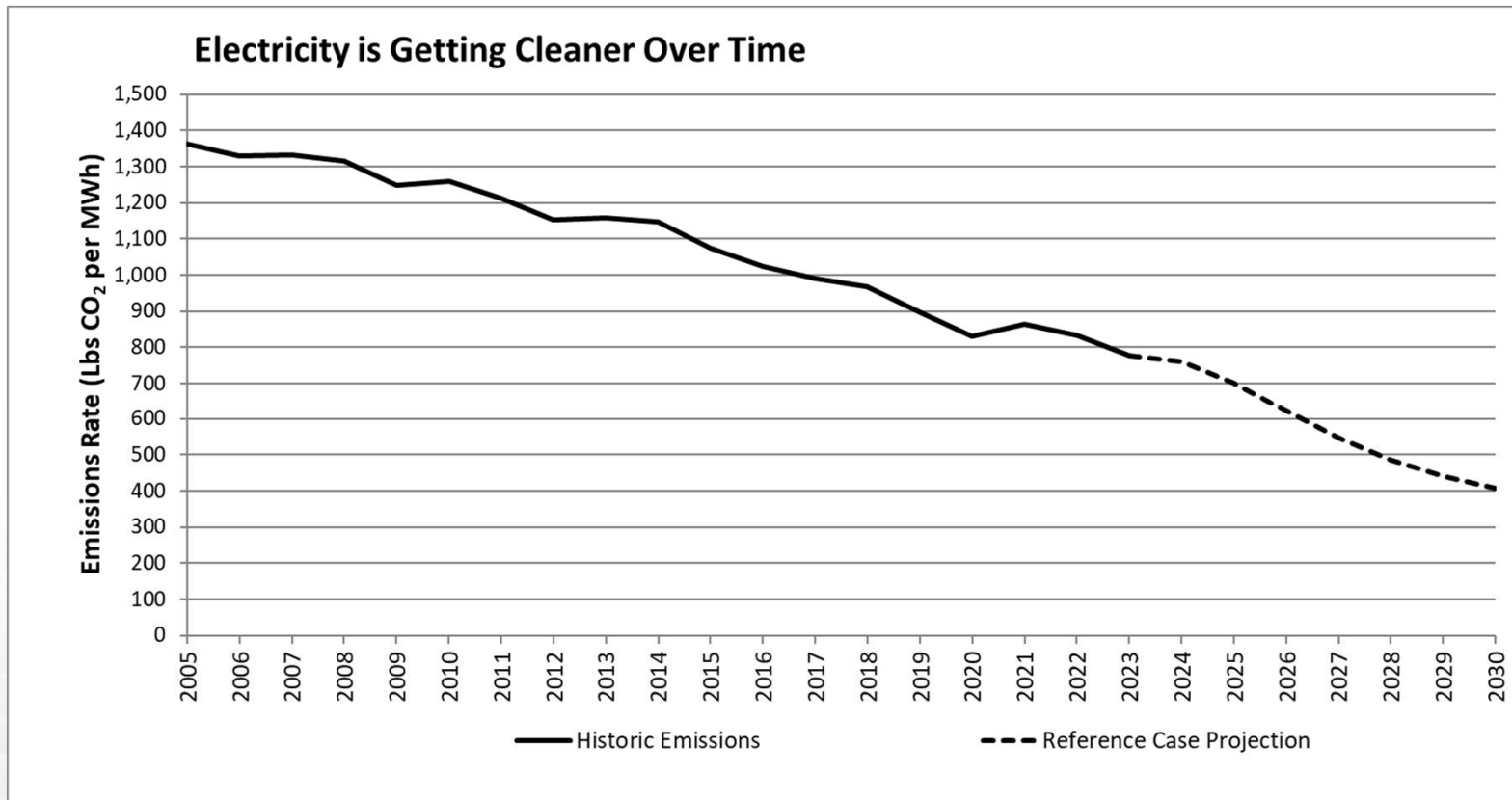


EPRI Study 2018 – And Others – EE and BE



- NREL forecasts an 81% increase in load
- Eversource projects a 150% demand increase by 2050
- National Grid expects peak demand to double

Opportunity to Improve “Emissions Efficiency”



By virtue of being plugged into the grid, the environmental performance of electric devices improves over time. (Source EIA)

What is “Beneficial Electrification?”



Beneficial Electrification (BE) includes the application of electricity to end-uses where doing so satisfies at least one of the following conditions, without adversely affecting the others:

- Saves consumers money over time;
- Benefits the environment and reduces greenhouse gas emissions;
- Improves product quality or consumer quality of life;
- Fosters a more robust and resilient grid

Beneficial Electrification programs are a valuable opportunity to engage both electric utilities and environmental groups in the effort to identify solutions that work well for the end-use consumer, local communities and the environment.

NOT an “Electrify Everything” Concept

Follow The Beneficial Electrification League on LinkedIn

Harbinger of Things to Come?

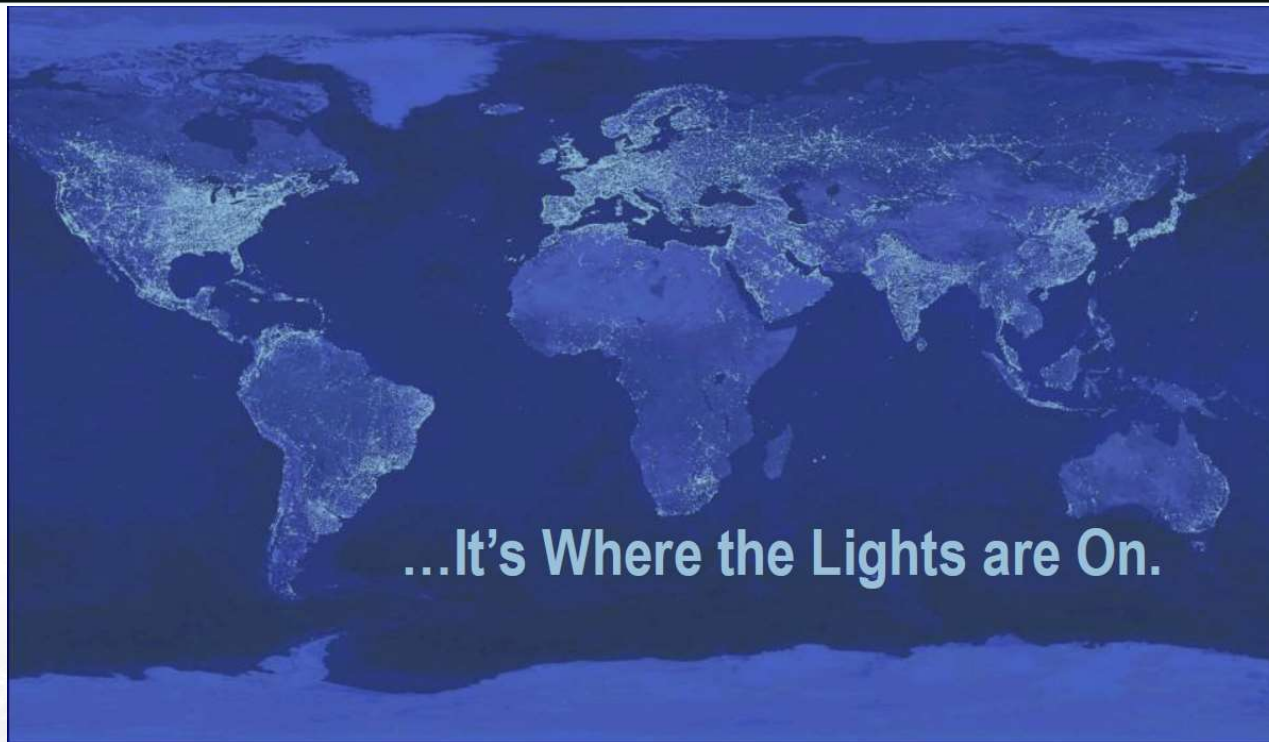


- These loads cause cost recovery issue and concern about stranded assets
- These customers are easier to criticize than loads universally considered more “beneficial”
- How we handle these loads could set the tone on new challenges and opportunities

How do we Quantify the Benefits and Costs?



You Can See Prosperity

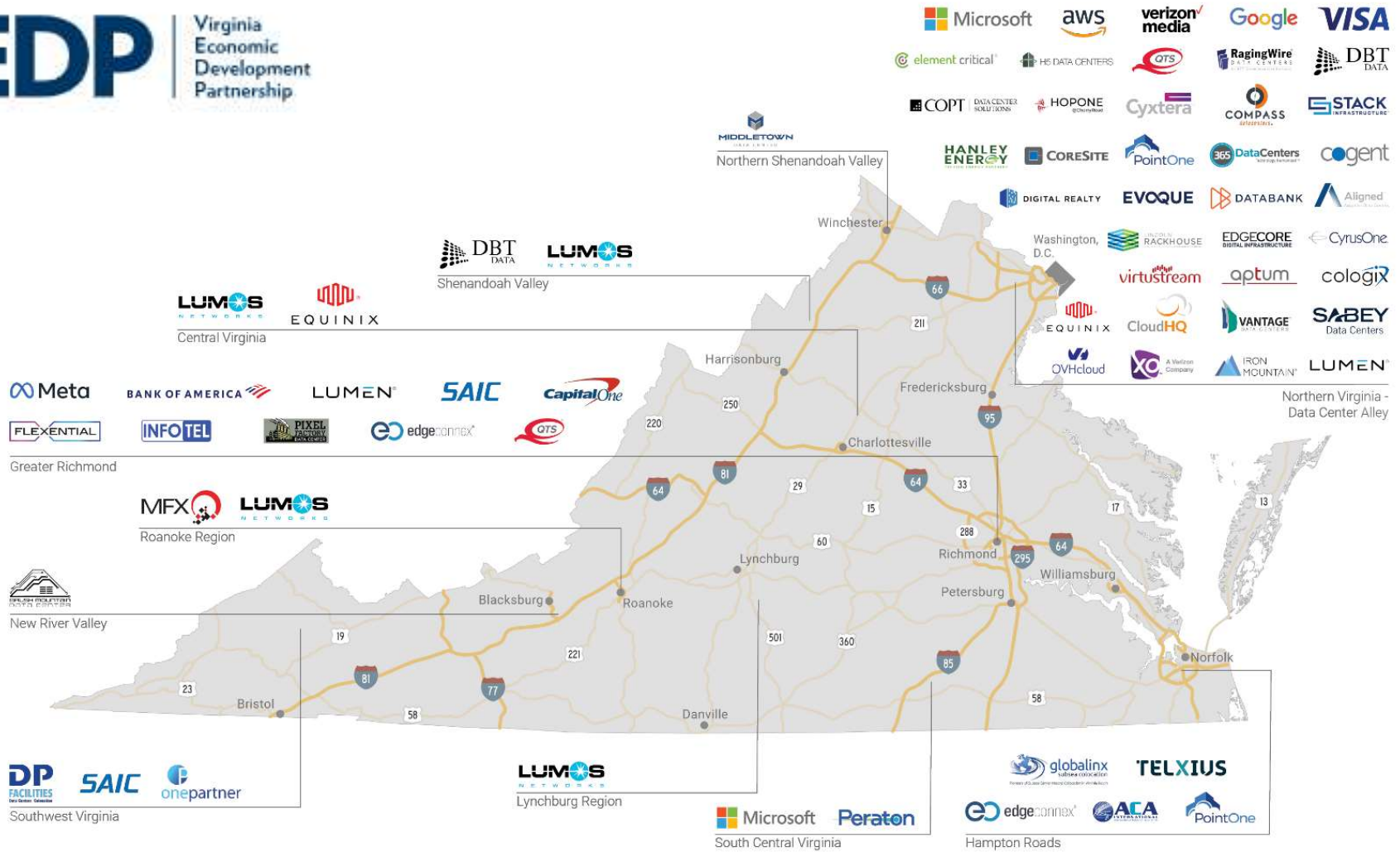


www.be-league.org – Follow BEL on LinkedIn
kdennis@be-league.org

Energy Efficiency for Data Centers



Richard Anderson
VAEEC Energy Efficiency Forum
October 2, 2024



Key Demand Drivers for Energy Efficiency in Data Centers



European Energy Efficiency Directive (EED)



Climate Water Restrictions



Hyperscale: Public Perception CSR / ESG Initiatives



Colocation: Customer Emission Reporting & Reduction Goals



Corporate / Enterprise: OPEX Savings



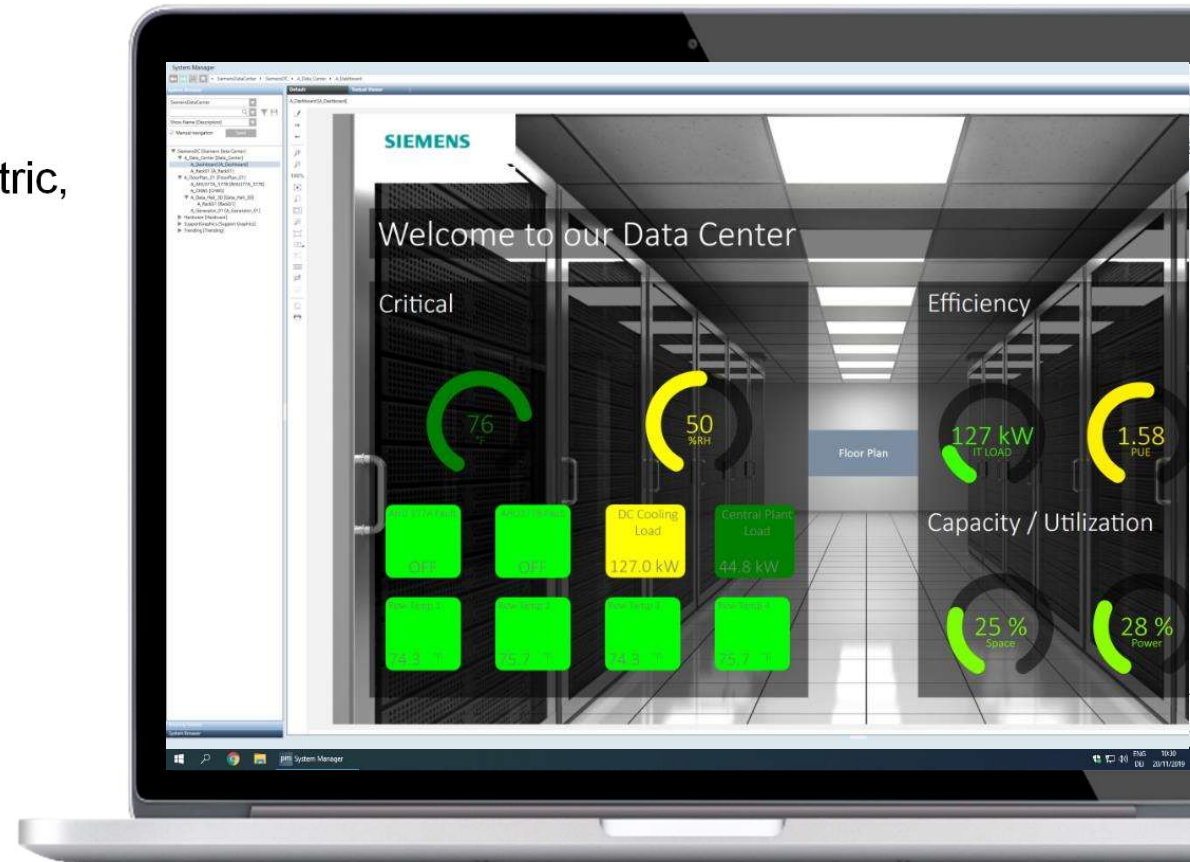
Power Allocation



You cannot **change**
what you do not
measure

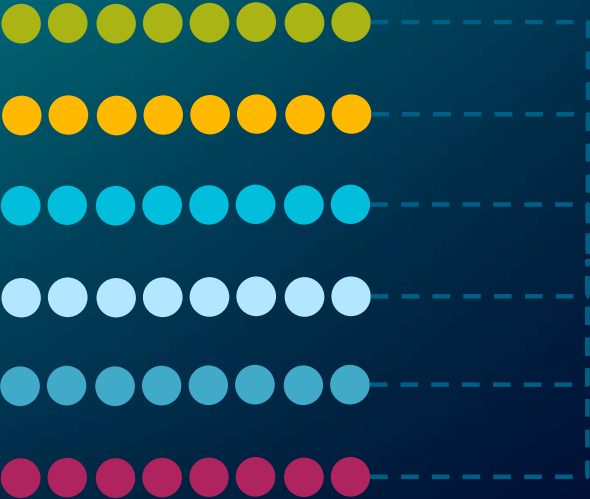
Uncovering Efficiencies in the Data Center

- **WAGES Metering:** Water, Air, Gas, Electric, Steam
- **Temperature & Humidity**
- **Power Usage Effectiveness (PUE)**
- **Water Usage Effectiveness (WUE)**
- **Cooling Capacity Factor**
- **Demand Forecasting**
- **Peak Shaving**

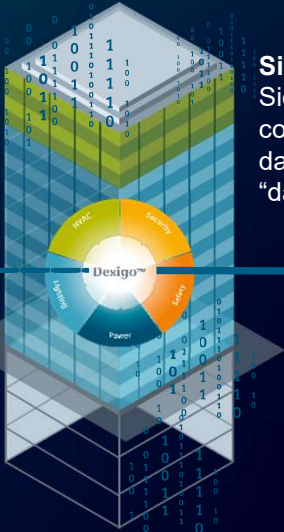


Operational Technology Partnership

OT & IT Integrations | Equipment, Applications and Data Exchange Layer

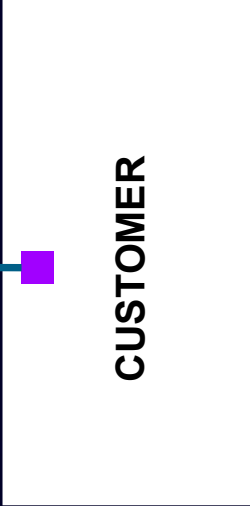


Integrations Protocols | Each Color Represents a Unique Communication Protocol



Siemens to Customer Integration | Siemens Connect Ecosystem connectors harmonize data and make data available to customer as a single "data pipe"

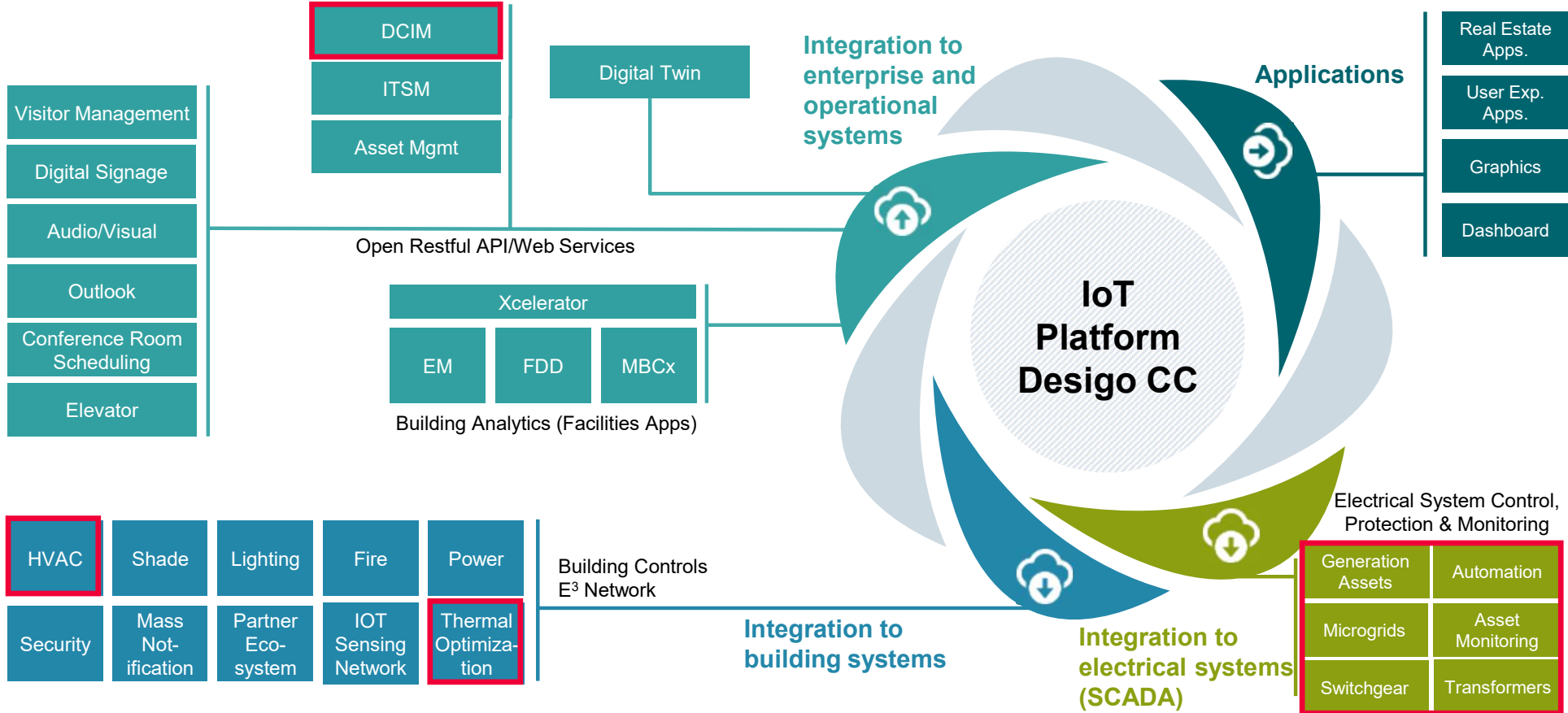
Integration Connector | Data Connectivity Layer



Integration Connectors | Each Square Represents a Unique Software Development Effort

Desigo CC: An Enterprise Data Center IoT Platform

Open Architecture – Scalable – Future Enabled

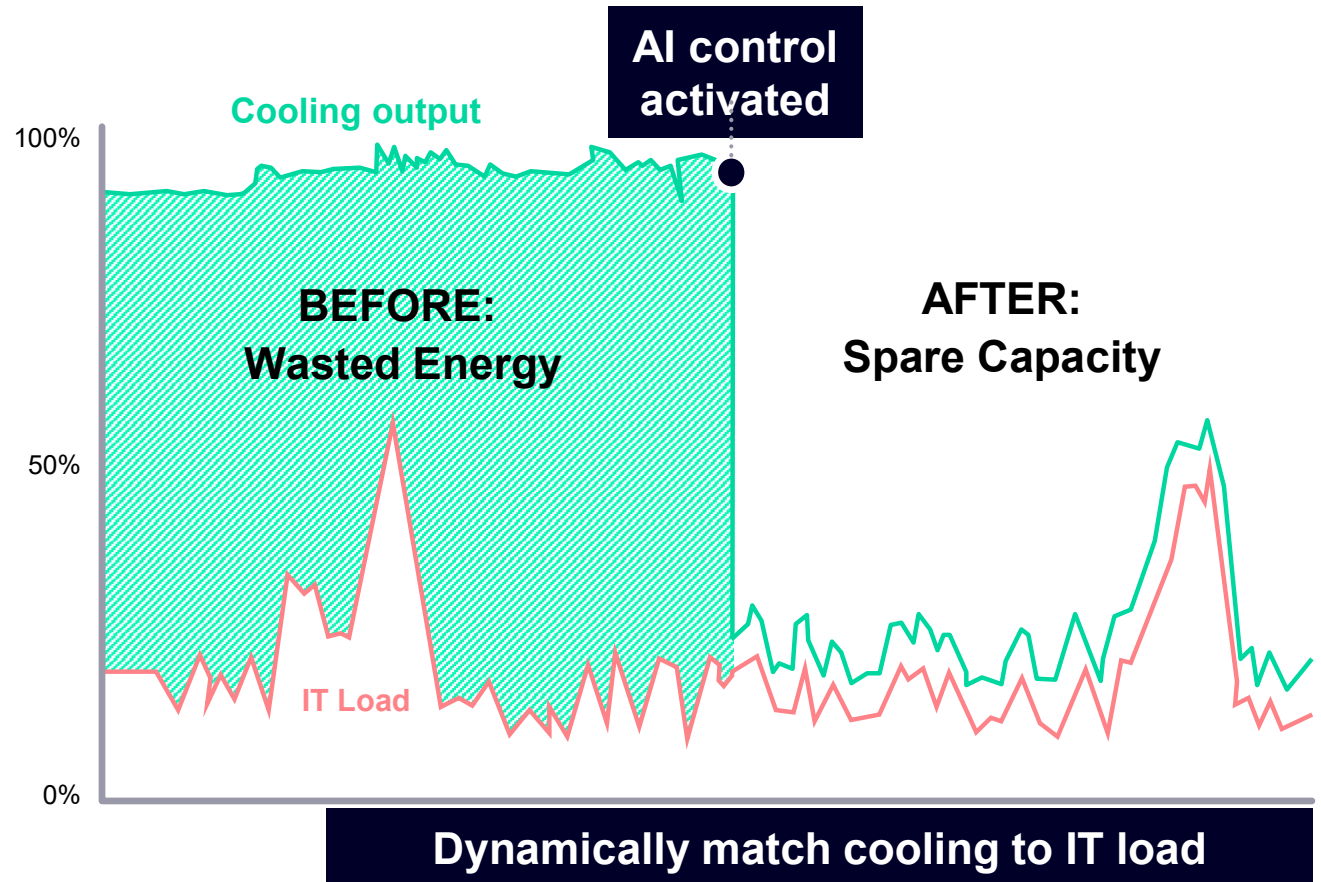


AI Optimization of Data Center Cooling

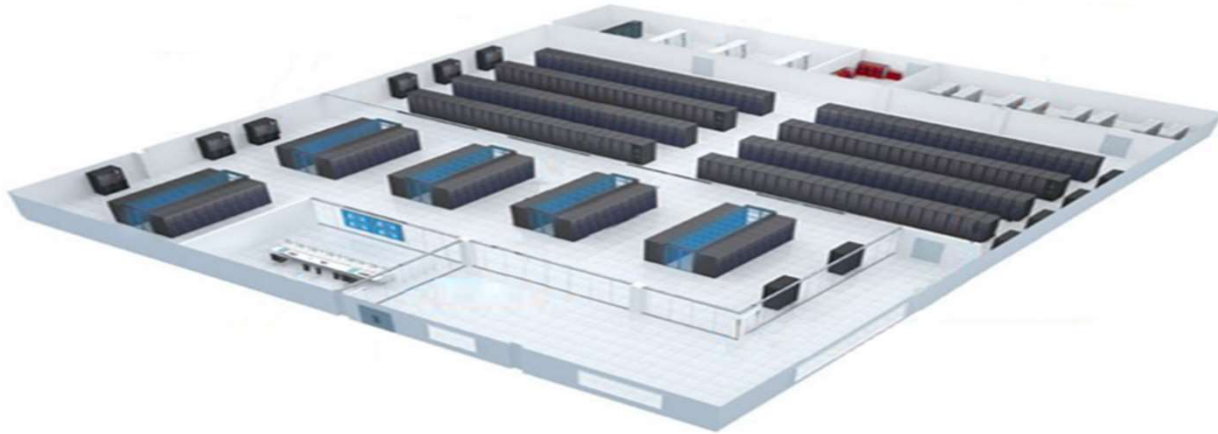
Design standards provide **more cooling than needed**

Airflow complexity and IT variability make it **impossible to optimize manually or with simple cooling unit controls**

The result is **wasted energy, lost capacity and hidden thermal risk by hot spots**



Proven Results with Artificial Intelligence Optimization Large Financial End User



Challenges: Inefficient cooling control in white space areas; a lack of adequate sensing capability required overcooling of the data halls. Running all 72 CRAC units to accommodate the cooling load causing them to lose their Tier rating.

Solutions: Demand Flow was implemented to the cooling plant. Supply water temp was increased to 50 deg F which allowed them to utilize the existing plate and frame heat exchanger longer. The branch provided WSCO leveraging wireless technologies to monitor rack inlet temps, coupled with the Artificial Intelligence Engine's "Area of Influence" algorithms, enabled an increase to the ASHRAE-recommended inlet temp of 80.6F resulting in over 50% of the CRAH's shutting down completely and increased CHW return temperature to the central plant. Now they are only running 24 CRAC units which restored their Tier level back to Tier III.

Central Plant – Demand Flow

- 37% Reduction in Annual Energy Usage
- Utility Rebate \$200K
- \$206,169 Annual Savings (\$0.11/kWh)
- 2.75 Year Simple Payback

Server Rooms – WSCO

- 72 CRAH units
- 71% kWh Savings
- \$241,817 Annual Savings
- Utility Rebate \$150K
- <2 year payback

Thank You



Richard Anderson
National Sales Manager, Data Centers
(Northeast & Atlantic)

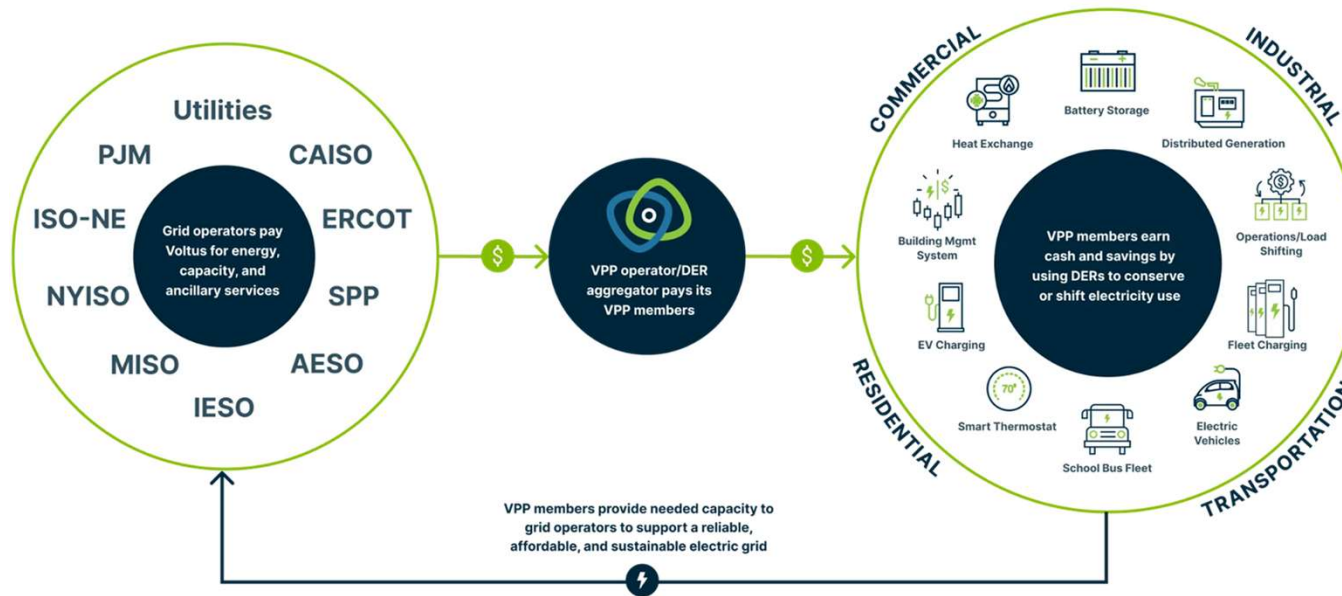
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Demand Response: Data Centers

Haneepha DeGarmo, CEM, CMVP
Director, Field Operations at Voltus



Virtual power plants (VPPs)



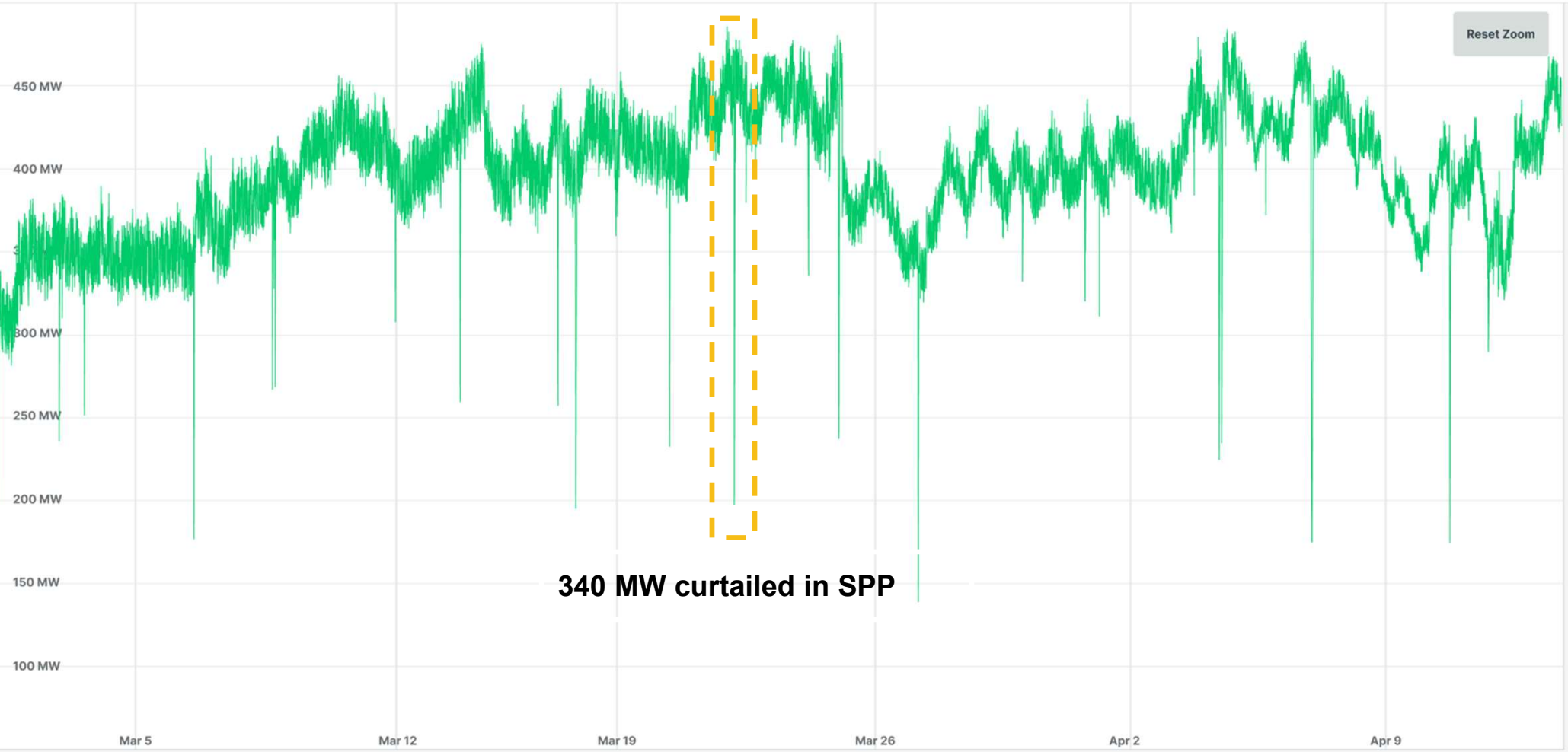
VPP / Grid Connector

- Grid Resilience
- Capacity
- Emission Reduction
- Cleaner Energy (Renewables)
- Affordability (reduces electricity bills)

Distributed Energy Resources (DERs)

- Demand Response
- Price Response
- Carbon Reduction

Reset Zoom



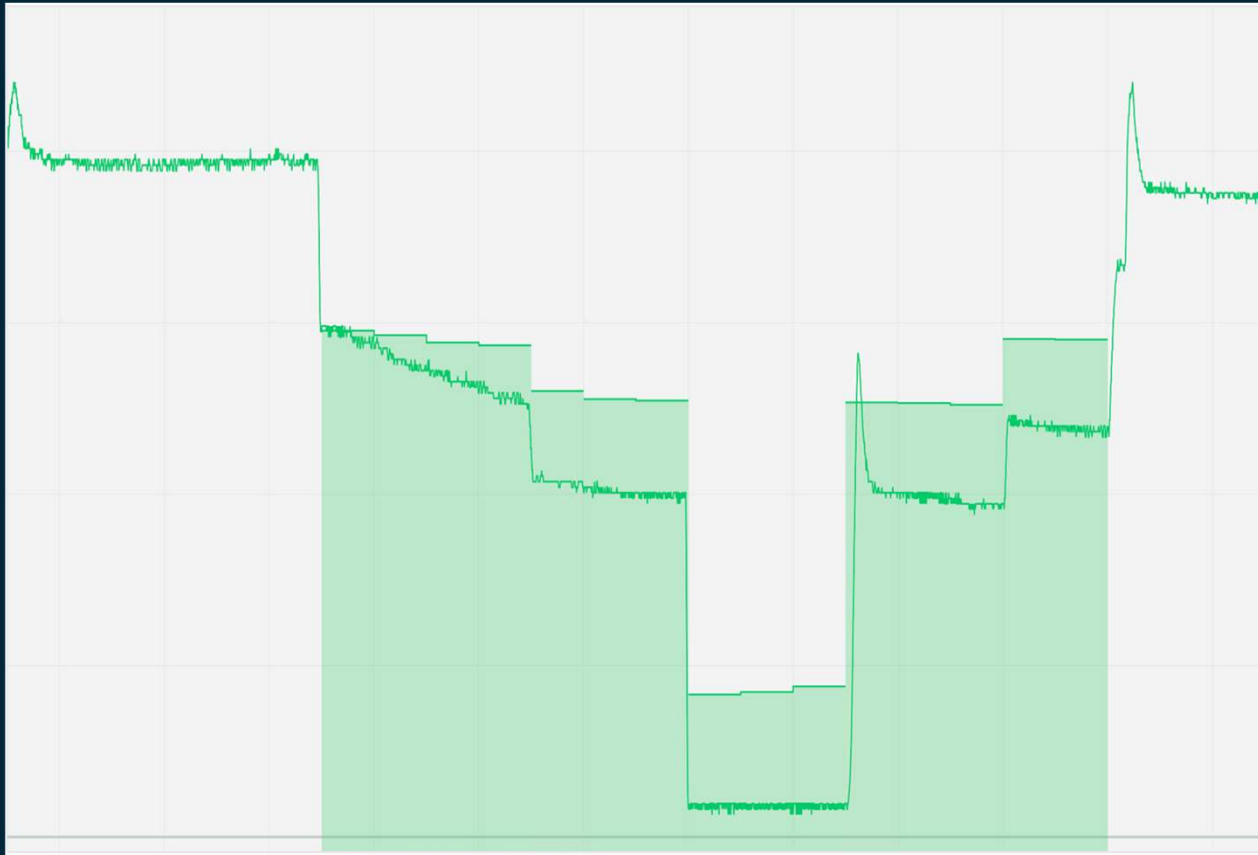
340 MW curtailed in SPP

Voltus's DR customer base



Walmart



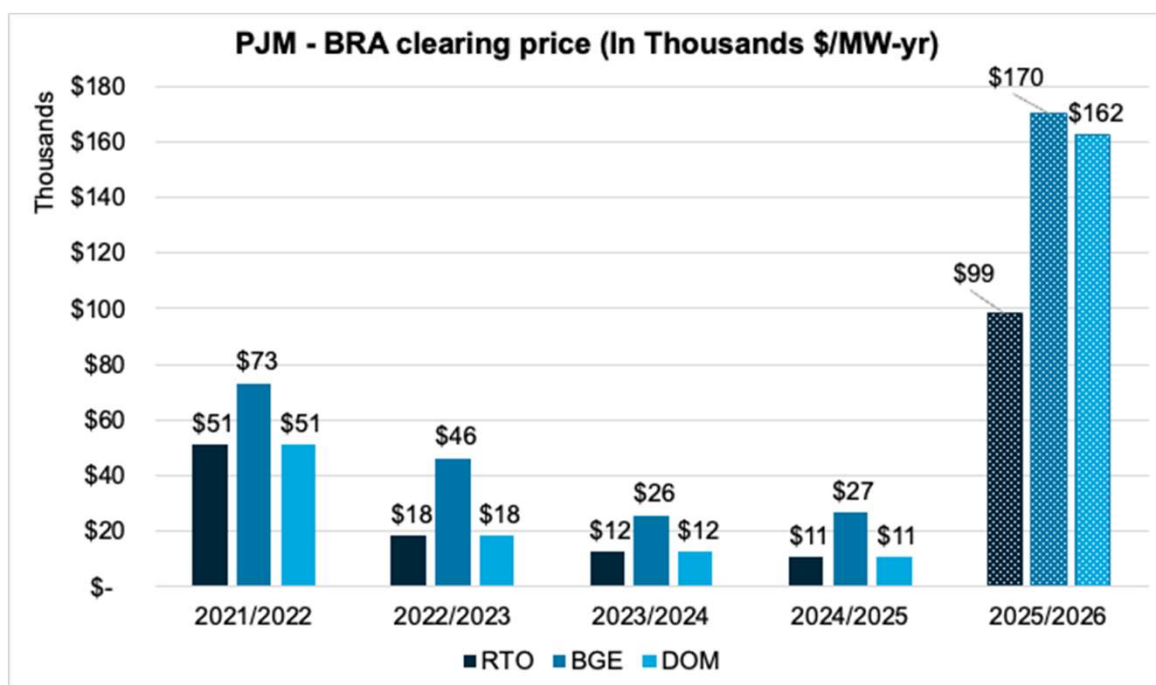


Data center customers

- Curtailment type: Backup gen, automation
- Load Reduction: Potential 100MW
- Program: Price Response, ELRP, Sync-Reserves, Carbon Response

Grid resilience and pricing: Data centers

PJM's BRA Pricing



Data Center participation in DR:

- Supports grid emergencies with needed capacity
- Reduce electricity pricing by adding more resources

BRA pricing could help fund needed updates to connect data centers to the grid

Increasing data centers participation in DR



**Infrastructure upgrades
(generators,
automation)**



**Onsite load
flexibility**

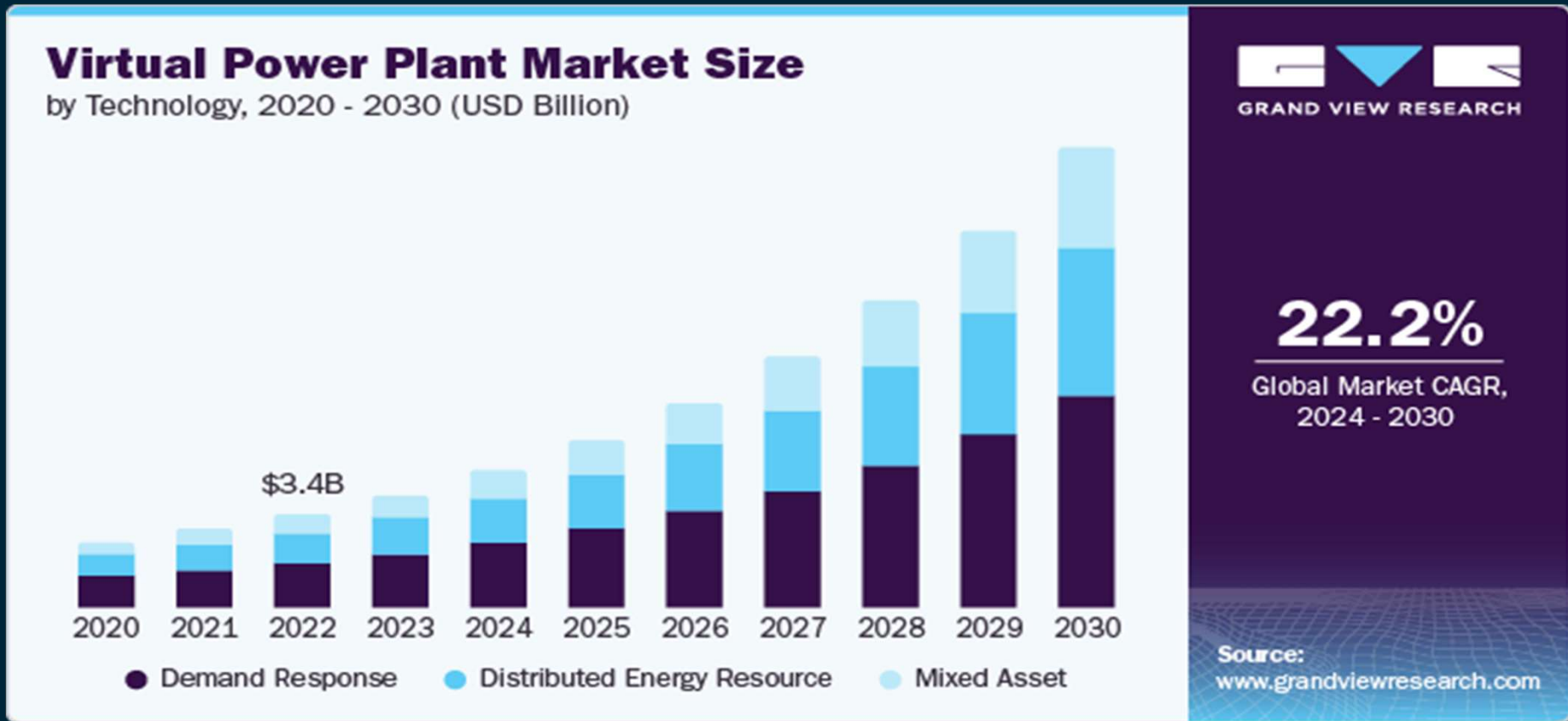


**Purchase of a
corporate VPP**



Carbon Response

Growth of virtual power plants is inevitable...



Questions?

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voltus™



Data Center Demand- How Do We Respond?

Virginia Energy Efficiency Council Forum
October 2, 2024



[novaregion.org](https://www.novaregion.org) / [@novaregion](https://twitter.com/novaregion)

A vertical stack of four social media icons: Facebook, Twitter, YouTube, and Instagram.

Data Center Market

Northern Virginia has the highest density of data centers in the world, and it is growing. According to datacentermap.com there are 349 data centers in Northern Virginia.

<https://www.datacentermap.com/content/nova/>





Economic/Fiscal Impact

According to a White Paper authored by Ashburn District Supervisor, Michael Turner, in FY2025, Loudoun County estimates about \$**895M in data center real and personal property tax revenue.**

Nearly half of Virginia's exports are in services sectors, a significantly higher share than the U.S. overall.

- In Northern Virginia, Digital Services Exports (2022): \$3.075 Billion
- In Northern Virginia, Digitally-Deliverable Services Exports (2022): \$8.24 Billion

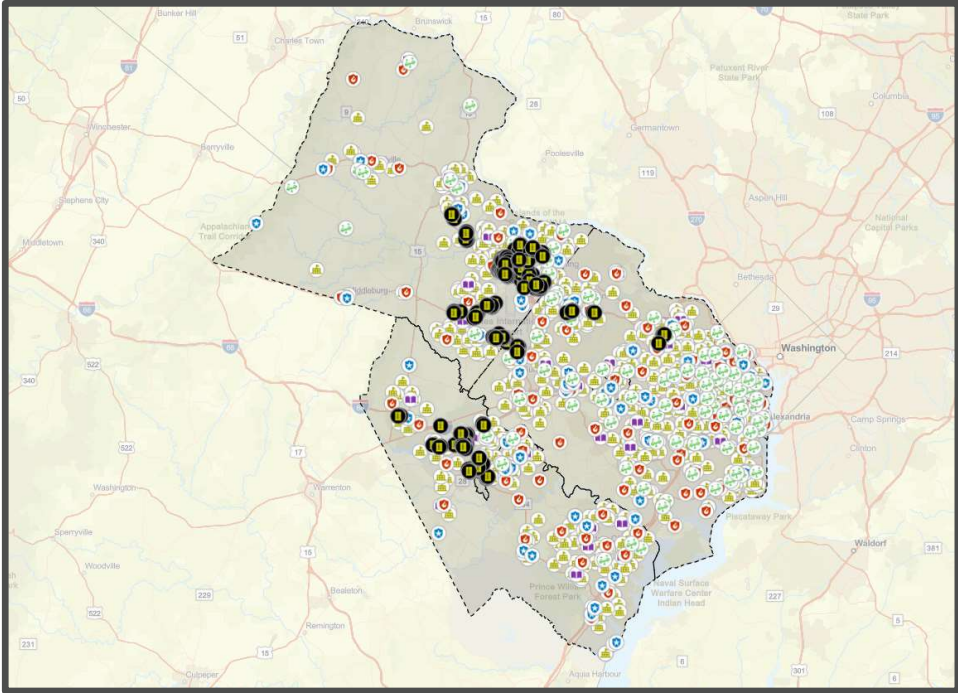




Opportunity

NVRC worked with both Arlington and Loudoun County in the development of their Community Energy Plans which were adopted in 2009. Both plans specifically called for the use of District Energy to reduce greenhouse gas emissions.

In Loudoun, the plan outlined how heat from data centers could be utilized to provide heat to facilities located near the data centers to reduce their greenhouse gas emissions.



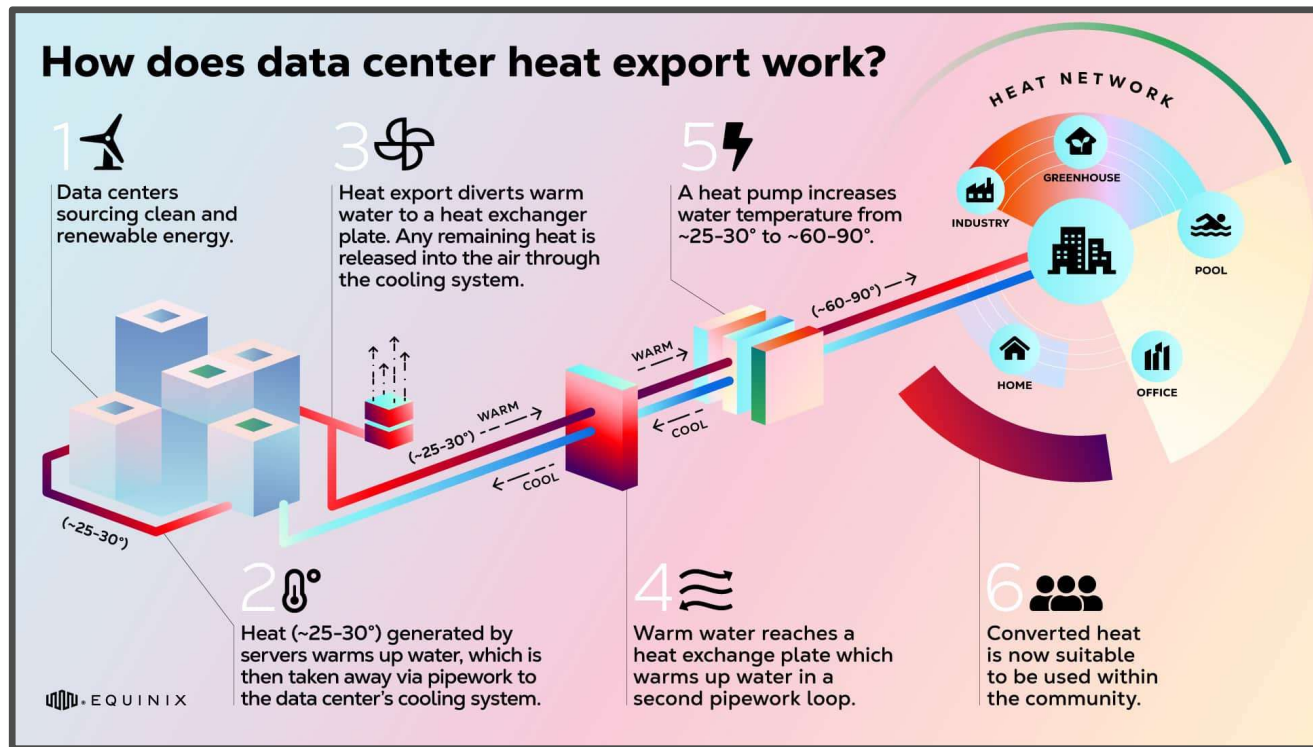
NVRC [data center map](#) with local government facilities.



How District Energy from Data Centers Works

Graphic from blog post authored by Equinix.

<https://blog.equinix.com/blog/2024/06/05/what-is-data-center-heat-export-and-how-does-it-work/>





Webinar on District Energy Opportunities in Northern Virginia – October 22

Please join us for a free webinar on the Code of Virginia related to district energy and how district energy from a data center is actually working.

Visit NVRC’s web site for details.

<https://novaregion.org/1577/Webinar-Series-2024>





Thank You

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