



SI DC Vertical Market

SFS Targeted Presentation

Mike Zapata

Head of Data Center Vertical, Americas



Data Center Vertical

Why it's important & Growth Drivers

What is Driving this significant growth in our Vertical?

- Demand from Hyperscalers continues to grow
- Increase in Enterprise Customers, demand resurgence
- Supply Side and Timing of Capacity
- Maturation of Developing Markets
- Data Privacy
- Consumer demands (IoT, AI, ML, VR, AR)
- Edge Compute

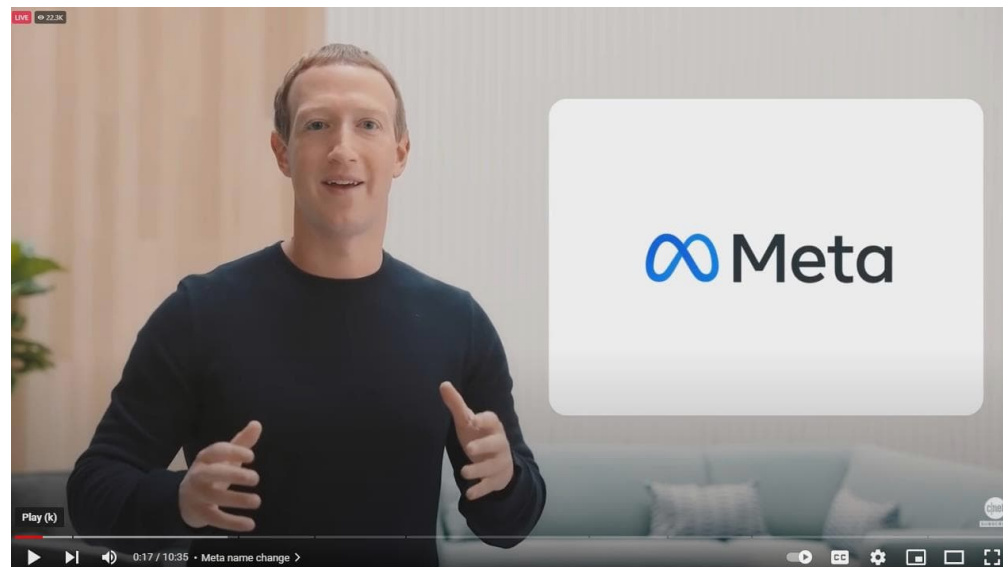
Why Data Centers in the US?

- Host to largest CapEx/OpEx companies in the world
- Established technology leaders compared to ROW
- 6.8% CAGR projection, we outpace this
- Core technology & Portfolio alignment
- It starts here....market adoption/innovation

*In 2022, global data center market is anticipated to be worth ~\$77B; for the US market is expected to reach \$14B by 2026 registering a CAGR of 8.63% -
-Businesswire 2021*



A message from Mark Zuckerberg.....



<https://www.youtube.com/watch?v=gElflo6uw4a>





| 4 Pillar Strategy

F22 4 Pillar Strategy Execution – Programs, Portfolio and Initiatives



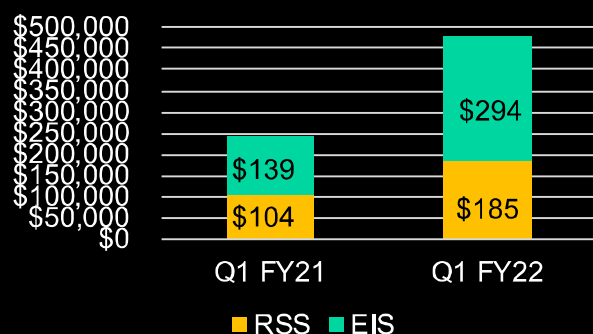
Programs, Portfolio and Initiatives	Business Units	Digitalization	Sustainability	Services	Electrification
Integrated Data Center Mgmt Suite (IDCMS)	AUT, FIS, SES				
Digital Twin (Shift Left)	DG				
Micro Grids/Digital Grid	DG, EP, EA				
White Space Cooling Optimization - AI + SLA	AUT				
Powermanager	AUT, EP				
Energy Storage (BESS) - Partnership w/ EPS, Fluence	AUT, EPS, EP, EA				
On-site generation (Renewables/Hydrogen)	SE				
Electrical/Mechanical Services (Proven Outcomes)	Service, EP, EA				
Digital Service Center (secure remote access), IT+OT, FDD	AUT, FIS, DI				
Blue GIS	EA				
Prefab/Modular Solutions (AUT Panels, Gear, etc...)	AUT, EP, EA, DG				

Data Center VM | Americas

FY22 – Q2 Review

Q2 Review

DC VM OI (\$M USD) – P6



FY22 Q2 \$OI & (YoY):

- SI Total = \$479M (197%)
- EIS = \$294M (212%)
- RSS* = \$185M (178%)

Prior YoY Growth Rates were at 17%

Trends and Drivers

1. Supply Chain constraints continue to impact customers and the drive for more capacity – early orders/securing capacity
2. Price realization accepted by most hyperscales
3. Continued challenges with skilled labor, PM's, staffing for projects on RSS side but improving
4. Post pandemic cloud adoption, AI, ML, Metaverse, Bitcoin, NFT's, Autonomous vehicles, growth in e-mobility (more data)
5. Focus on Opex – more robust and competitive service offerings (resource demands and impact of driving higher margins)

Key Wins/Successes/Accomplishments

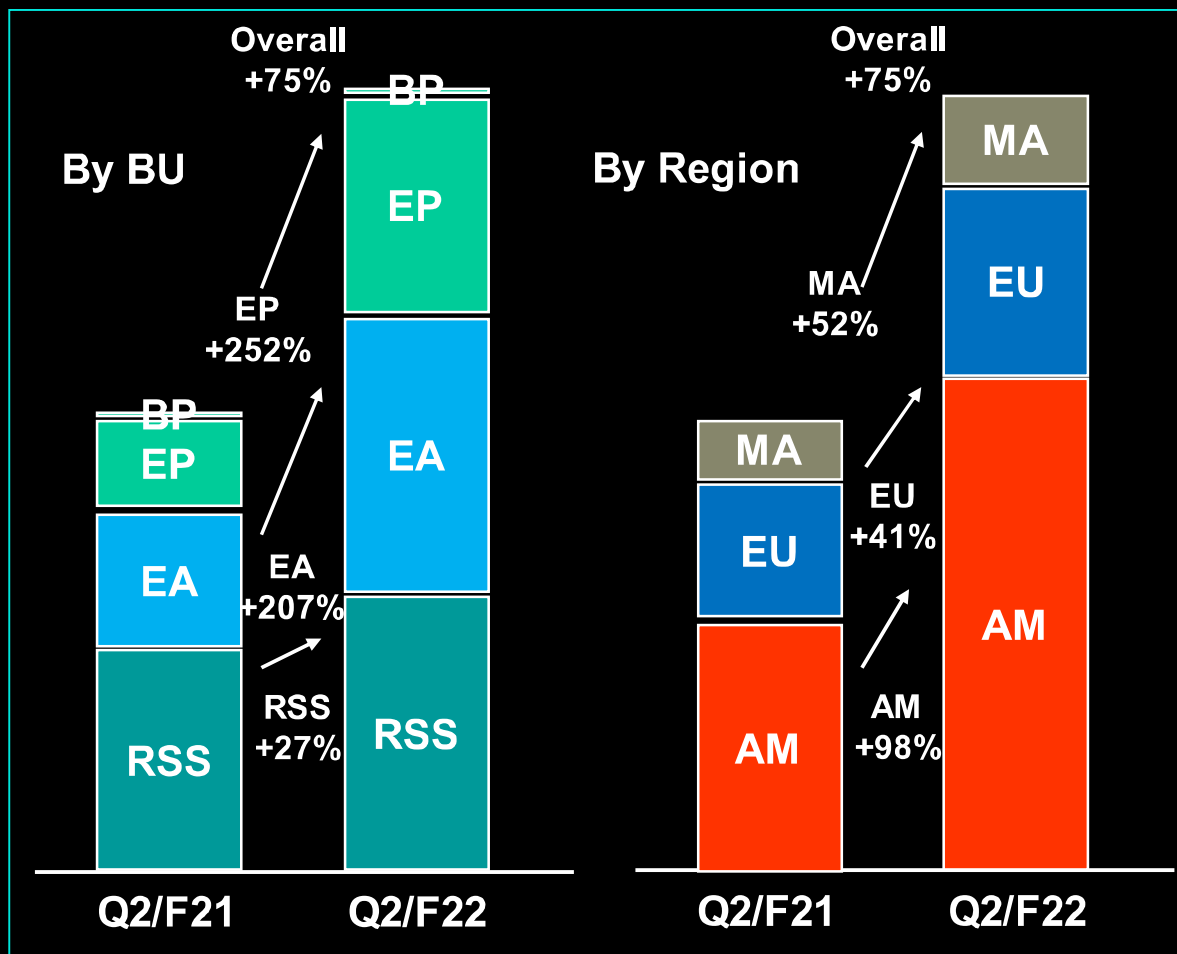
Key Wins Q2

	Customer/Project	BU	OI
Top Accounts	Apple Morgan	EA, TR, EP	\$29
	Apple Maiden	EP/Russ	\$5
	Google Foxbat LCT1A Z2	EA, EP, TR	\$13
	Google PERUN LCT1A	SE, EA	\$10
	Meta/FB MCA, KCM, PCI, NA17, TTX, GTN, MAZ	SE, EA	\$68
	Meta/FB DKL 3,5,6	RSS/Fire	\$3.4
	Microsoft SAT, DSM, ATL, CCO, FTY, BN	EP, EA, TR	\$27
	Microsoft DSM, BN49, BN81	RSS/AUT	\$7
	Amazon PDX082 Awarded and IAD	RSS/AUT	\$15
	Digital Realty, ATL, TX, OR	EP	\$5
Regional Accounts	QTS ASH, Lockridge, Freedom Design	EP, EA	\$33
	Digital Premier – WF Lewisville	EP	\$6
	JPMC Columbus & Philly	RSS/Auto	\$.2
	Cyrus One	RSS/Fire	\$.7
	CITI Bank, Columbus	RSS/Auto	\$.3
	Canada – Compass TOR2, Stack TOR1,	RSS/Fire/Sec	2
	SSC One Congress	RSS/Auto	\$.7
	IRS Andover	RSS/Auto	\$.13

AWS BR Performance Scorecards improved for compliance, Cost & Invoicing, Delivery, Quality and Relationship
 Initiated Meta Sustainability & NetZero Program (ongoing F22)
 Launch of Meta Global Fire Program development

Data Center VM | GLOBAL FY22 – Q2 Review

Q2 Global Review



Key Take Aways

- Main performance driver is the supply chain fears from the top players, building up supplies for the upcoming months:
 - Hyperscalers (>40% of our business, +220% growth in Q2/F22 vs. F21)
 - AM great performance as the main base for the hyperscalers
 - EA and EP, with supplies for 2023 and 2024 projects

Challenges

- Factory Capacity and Execution Resources
- Will the appetite for building inventories from the accounts slow down?

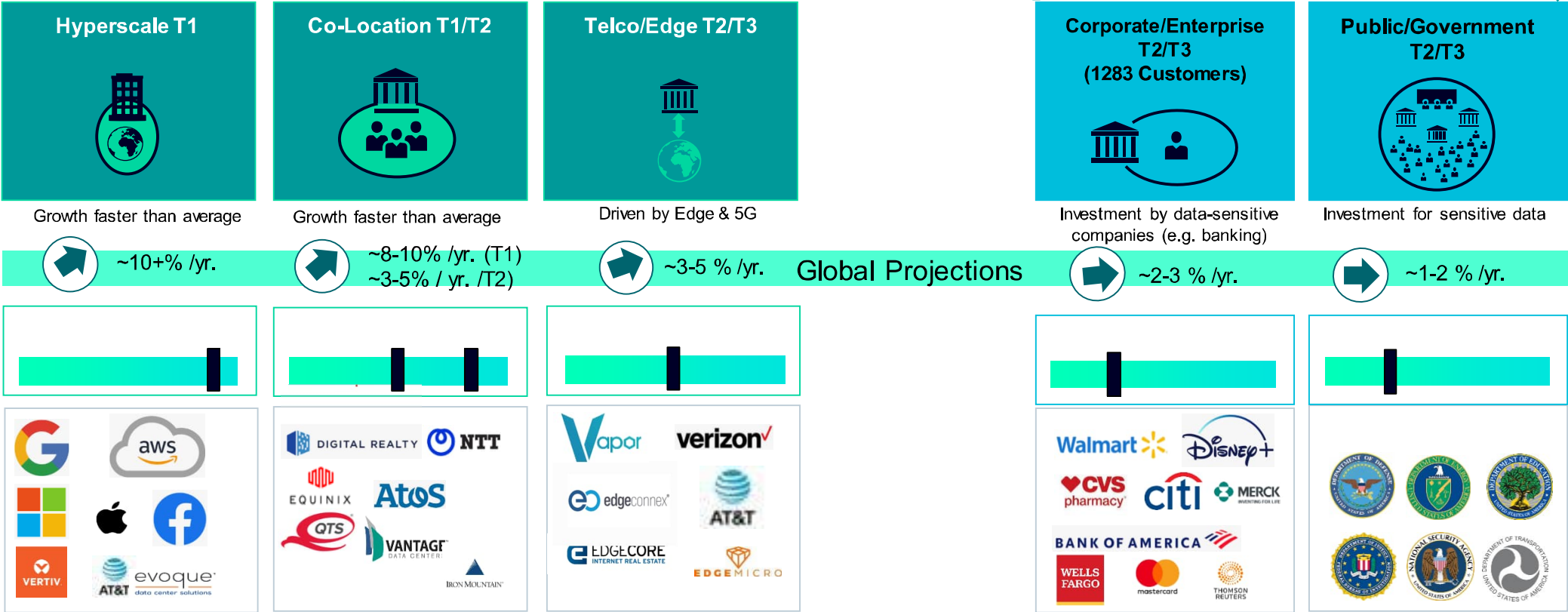
Data Centers Market Segmentation (USA)

T1 = Tier 1
T2 = Tier 2
T3 = Tier 3

GAFAM's

SI Top Accounts

Still Untapped Potential for SI USA



Global Projections

Growth potential Low —————> High

SIEMENS

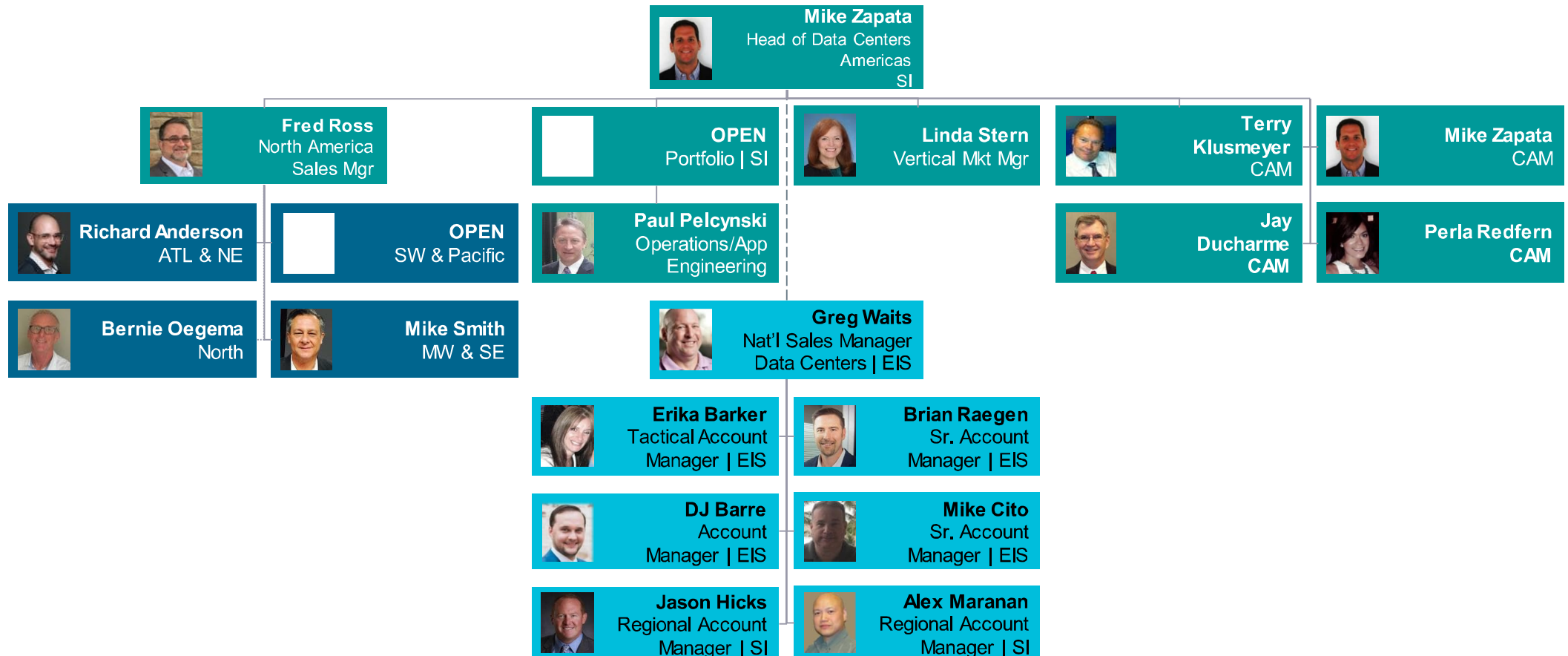
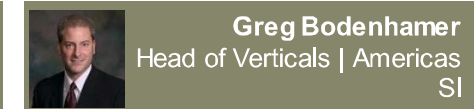


Solutions & Services Alignment with SI Sales Ecosystem

CAM's, GAM's, RAM's, SI Sales, Enterprise

Vertical Market Team

Head of Data Centers – Region Americas



SI Data Centers

Global Top Account Management



Mike Zapata
Corporate Account Manager
michael.zapata@siemens.com
Tel: 714-585-5837

Key Focus Areas:

- SI Business Results, Development and Growth and for North America
- Strategic Portfolio Development, Support and Implementation
- Top 15 Data Center Focused Account Support and Management
- Global Data Center CoC Interface and Support
- Responsible for Top Account SI Customer Relationships with Apple and Google



Jay Ducharme
Corporate Account Manager
jay.ducharme@siemens.com
Tel: 678-642-6587

Key Focus Areas:

- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Strategic planning and development to improve client results
- Building strong account teams Globally, Regionally and locally across all business units serving the client
- Responsible for Top Account SI Customer Relationships with Meta (Facebook), Equinix, Cloud HQ and, Vertiv (Emerson \ Liebert)



Terry Klusmeyer
Corporate Account Manager
terry.klusmeyer@siemens.com
Tel: 702-682-7387

Key Focus Areas:

- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Strategic planning and development to improve client results
- Building strong account teams Globally, Regionally and locally across all business units serving the client
- Responsible for Top Account SI Customer Relationships with Microsoft, Oracle and Netflix



Perla Redfern
Corporate Account Manager
perla.Redfern@siemens.com
Tel: 781-929-1069

Key Focus Areas:

- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Strategic planning and development to improve client results
- Building strong account teams Globally, Regionally and locally across all business units serving the client
- Responsible for Top Account SI Customer Relationships with Amazon and Digital Realty Trust



Scott Kornetzke
Corporate Account Manager
scott.kornetzke@siemens.com
Tel: 678-906-90836

Key Focus Areas:

- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Strategic planning and development to improve client results
- Building strong account teams Globally, Regionally and locally across all business units serving the client
- Responsible for Top Account SI Customer Relationships with ATT, Verizon, QTS, Holder Construction, JE Dunn, and DPR



Jason Hicks
Regional Account Manager
jason.hicks@siemens.com
Tel: 678-231-7916

Key Focus Areas:

- Identify and develop Tier 2 & 3 Data Center Customers
- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Building strong account teams Regionally and locally across all business lines serving the client
- Responsible for Account Development Relationships with NTT Global \ Ragingwire, Iron Mountain, T5 Data Centers, Coresite, and Evoque



Alex Maranan
Regional Account Manager
alex.maranan@siemens.com
Tel: 919-345-3672

Key Focus Areas:

- Identify and develop Tier 2 & 3 Data Center Customers
- Grow top and bottom line with multiple programs across a multitude of offerings and businesses
- Developing a solid and trusting relationship between client and Siemens
- Building strong account teams Regionally and locally across all business lines serving the client
- Responsible for Account Development Relationships with GIGA, Vantage, Yondr and Nautilus

Structured to Ensure Accountability & Advocacy for the Client



**Account Mgmt /
Sales**



**Operations /
Program Mgmt**



**Back Office
Functions**

ACCOUNT MANAGEMENT

- Client Advocate
- Dedicated Point of Contact
- Strategic / Advisory Consultant

OPERATIONS

- Standardized and Consistent Implementation
- Program Management
- Total Operationally Responsibility

BACK-OFFICE FUNCTIONS

- Finance (e.g., invoicing)
- Legal Advisement
- Performance Measurement

SI EIS Account Managers Data Centers US Regional Account team for HV, MV and LV Equipment



Greg Waits

National Sales Team Lead –
Data Centers

greg.waits@siemens.com

Tel: +1 (303) 521-3313

Key Focus Areas:

- IES Business Results, Development and Growth for North America for HV, MV and LV equipment
- Strategic Portfolio Development, Support and Implementation for EIS.
- Top 30 Data Center Focused Account Support and Management
- EIS Data Center CoC Interface and Support for the US market
- Responsible for Top EIS Data Center Accounts for Customer Relationships with Meta, (Facebook), DLR, NTT, Microsoft, Google, Databank, Tishman, Rosendin & Goldman Sachs.



Erika Barker

Tactical Account Manager

erika.barker@siemens.com

Tel: +1 (253) 219-3478

Key Focus Areas:

- National support for North America on HV, MV and LV equipment
- Provide portfolio execution for EIS.
- Deliver focused account implementation, assistance, and administration
- Manage EIS Data Center power distribution systems, & application proposals.
- Align EIS Data Center customers with technical resources.
- Identify & deploy growth trends of Electrification and Digitalization.



Brian Raegen

Sr. Account Manager

brian.raegen@siemens.com

Tel: +1 (206) 747-9382

Key Focus Areas:

- Commercial \ Technical lead for hyperscale business in UL markets, with a main focus, but not dedicated, on Data Centers.
- Interface with Data Center CoC globally to cultivate, develop, and grow strategic partners and customers for Siemens.
- Resp. for relationships with Microsoft, Amazon, NTT, Sabey, Adobe and others.
- Siemens expert on UL electrical distribution solutions.
- Int. & ext. consultant for large customer's business needs in UL markets for electrical distribution solutions.



Mike Cito

Sr. Account Manager

michael.cito@siemens.com

Tel: +1 (732) 604-5675

Key Focus Areas:

- Strategic Portfolio Development, Support and Implementation for EIS.
- Interface with data center CoC to cultivate, develop, and grow strategic partners and customers for Siemens.
- Siemens expert on UL electrical distribution solutions for US Market.
- Responsible for relationships with QTS, JDC, Microsoft, Iron Mountain and other key accounts.



DJ Barre

Account Manager

David.barre@siemens.com

Tel: +1 (267) 436-2064

Key Focus Areas:

- Strategic Portfolio Development, Support and Implementation for EIS
- Responsible for key accounts, including, OVH, CloudHQ, Google busway, TAS, Integra Mission Critical.
- Experienced in Siemens Sentron busway systems in Data Centers.
- Focusing on growth with data center integrators.

SI RSS AM Data Centers

Regional Zone Support and Portfolio Development



Fred Ross
SI North America Data Center
CoC Sales Manager
fred.ross@siemens.com
Tel: 513-490-9993

Key Focus Areas:

- Zone and Sales Management Support, Business Development and Regional Business results for the SI Data Center Market across the US and Canada for non-Top Account growth across Solutions, Service and BPS
- Field Engagement Strategic and Business Planning
- Initiate actions with Field Management
- Primary contact for centralized support of the Enterprise Zone

OPEN

OPEN
Regional Business Manager

Key Focus Areas:

- Provide Business Development and Sales Support across all SI business and product lines as they relate to the Data Center Vertical Market
- Provide Zone and Sales Management Support in developing their strategic plan for growing the data center business
- Assist Field Sales with identification and qualification of new and existing data center customers
- Primary contact for centralized support of the Pacific Zone and Southwest Zones



Michael Smith
SI Regional Business Manager
mismith@siemens.com
Tel: 614-726-2649

Key Focus Areas:

- Provide Business Development and Sales Support across all SI business and product lines as they relate to the Data Center Vertical Market
- Provide Zone and Sales Management Support in developing their strategic plan for growing the data center business
- Assist Field Sales with identification and qualification of new and existing data center customers
- Primary contact for centralized support of the Midwest and Southeast Zones



Richard Anderson II
SI Regional Business Manager
anderson.Richard@siemens.com
Tel: 773-449-7654

Key Focus Areas:

- Provide Business Development and Sales Support across all SI business and product lines as they relate to the Data Center Vertical Market
- Provide Zone and Sales Management Support in developing their strategic plan for growing the data center business
- Assist Field Sales with identification and qualification of new and existing data center customers
- Primary contact for centralized support of the Northeast and Atlantic Zones



Bernie Oegema
SI Regional Business Manager
Bernie.oegema@siemens.com
Tel: 365-996-2438

Key Focus Areas:

- Provide Business Development and Sales Support across all SI business and product lines as they relate to the Data Center Vertical Market
- Provide Zone and Sales Management Support in developing their strategic plan for growing the data center business
- Assist Field Sales with identification and qualification of new and existing data center customers
- Primary contact for centralized support for all of Canada (Zone North)

OPEN

Open
Portfolio Manager
Email:
Tel:

Key Focus Areas:

- SI Data Center portfolio strategy
- New solutions and service product mix, investment decisions, strategic alignment



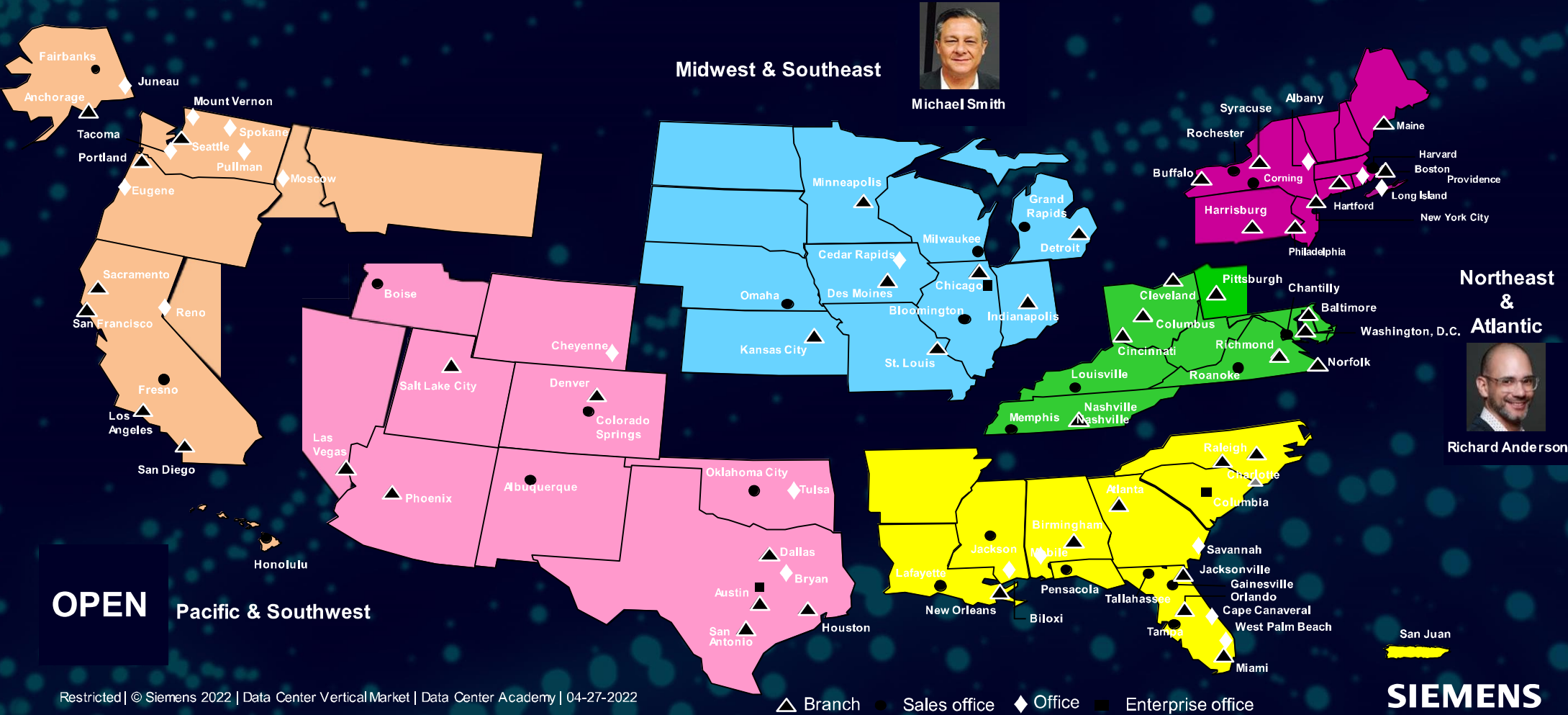
Paul Pelczynski
Application Engineer
paul.pelczynski@siemens.com
Tel: 847-243-3034

Key Focus Areas:

- SI Data Center application and technical support
- New product development

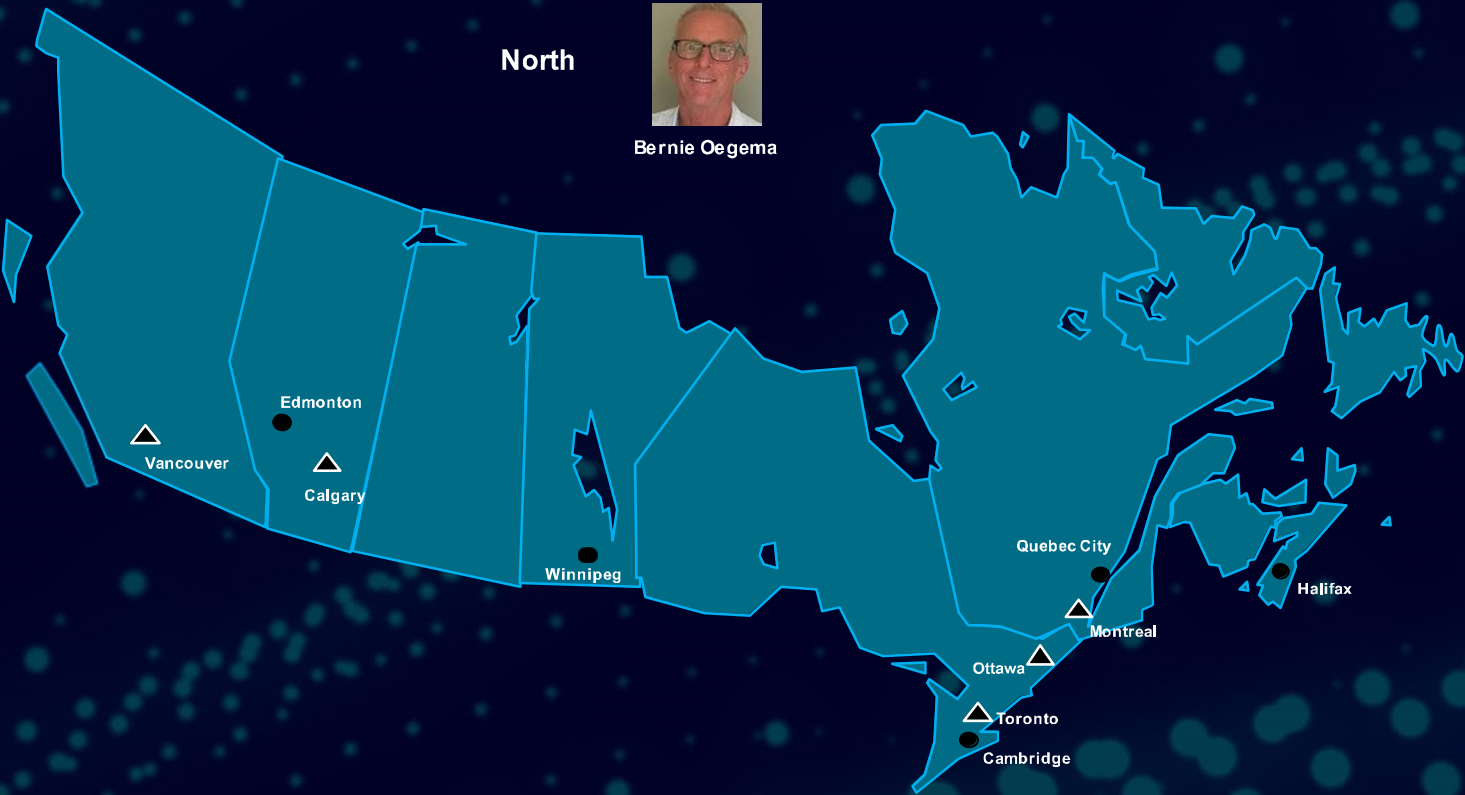
SI Vertical Market Data Centers US Regional Zone Support

Ingenuity for life



SI Vertical Market Data Centers Canada Zone North Support

Ingenuity for life



Bernie Oegema

Considering Normal Market Conditions



SI RSS AM Data Center Business Plan

Classifications by Branch (Supported by the NSM's)

- Alaska
- Sacramento
- Los Angeles
- Las Vegas
- Denver
- Austin
- Houston
- Nebraska
- Oklahoma
- Des Moines
- Kansas City
- St. Louis
- Minneapolis
- Detroit
- Indianapolis
- Cleveland
- Cincinnati
- Nashville
- Pittsburgh
- Baltimore
- Syracuse
- Boston
- Tallahassee
- Jackson
- New Orleans
- Orlando
- Jacksonville
- Tampa
- Miami
- Vancouver
- Edmonton
- Calgary
- Ottawa

BASE

- Seattle
- Portland
- San Francisco
- San Diego
- Dallas
- San Antonio
- Salt Lake City
- Phoenix
- Chicago
- Columbus
- Richmond
- Atlanta
- Charlotte
- Raleigh
- Maine
- Philadelphia
- Hartford
- Toronto
- Montreal

EXPANDED

- NY Metro (NY / NJ)
- Northern Virginia (Beltsville)
- Enterprise (ECS)

PREMIER

SI RSS AM Data Center Business Plan

Data Center Branch Classification Requirements

Base

< \$2.5m OI

Every Branch
Existing Customers
Focus on Service All Bus Lines

- < \$2.5m Data Center OI (excluding Top Account Business)
- 1 PM, 3 Specialists and 1 Engineer Trained in Data Center path
- Opportunistic pursuit of identified projects
- Identified Champions for Sales and Operations
- Reporting on capacity to execute by VM

Expanded

> \$2.5m < \$7.5m OI

Targeted Branches
Greenfield and Brownfield
Focus on SOL\SVC\BPS All Bus Lines

- > \$2.5m and < \$7.5m Data Center OI (excluding Top Account Business)
- 2 PM, 8 Specialists and 2 Engineer Trained in Data Center path
- Targeted Horizontal Data Center Market Growth Strategy in Horizon Plan
- Identified Champions for each Business Line in Sales and Operations with Specific Financial Targets

Premier

> \$7.5m OI

Top Key Branches
Local Data Center Market Leader
Dedicated Personnel All Bus Lines

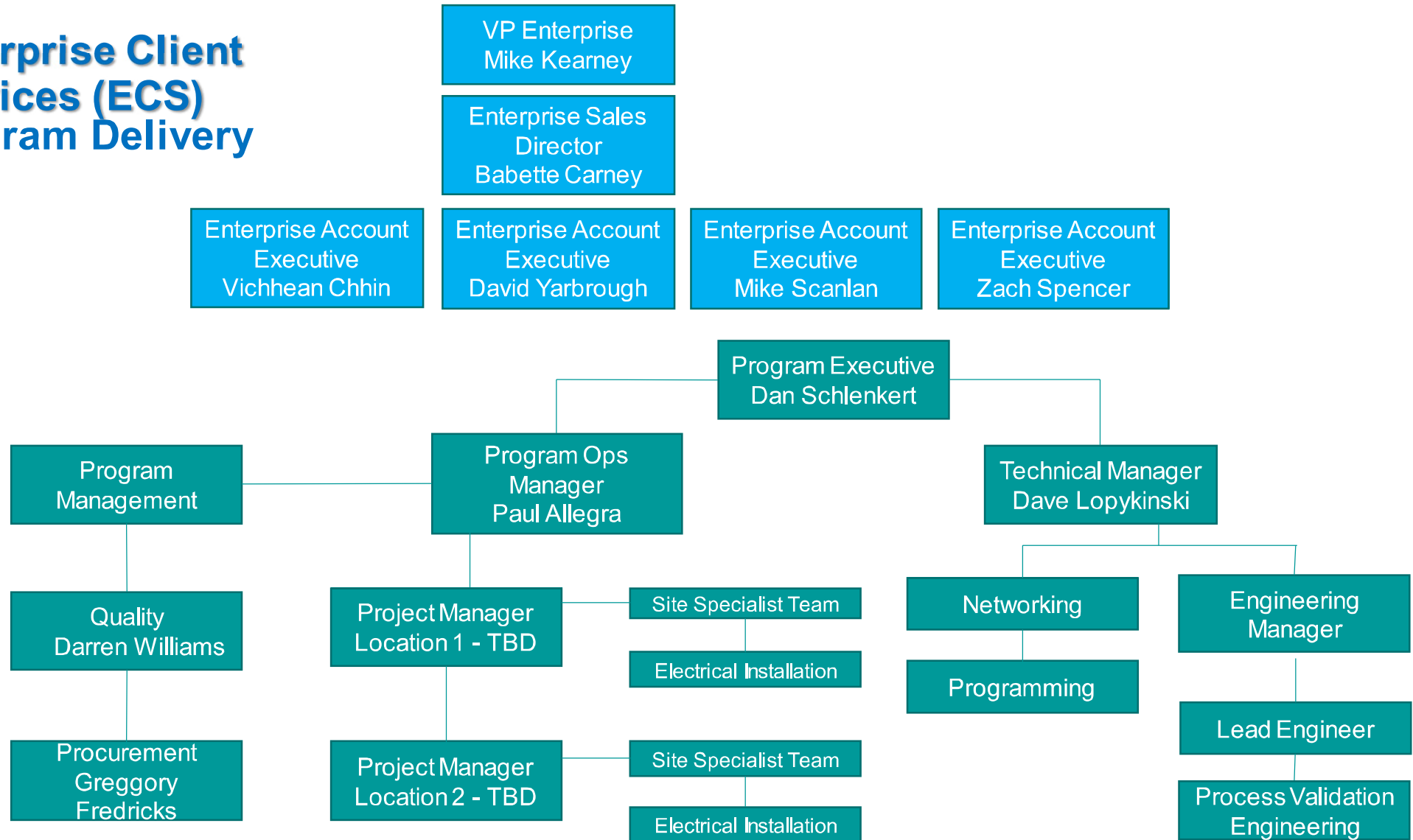
- > \$7.5m Data Center OI (excluding Top Account Business)
- 4 PM, 16 Specialists and 3 Engineer Certified in Data Center path
- Data Center Growth Plan in All Business Lines
- VM GM% above Branch GM%
- Specific capacity identified for sales and operations to meet demand from market opportunity



RSS ENTERPRISE

How we bring consistency/continuity

Enterprise Client Services (ECS) Program Delivery



Enterprise Trends – The Evolving Expectations of an Enterprise Client



Reduction of Total Vendors



Primary Point of Contact



Global Reach & Experience



Uniform Pricing

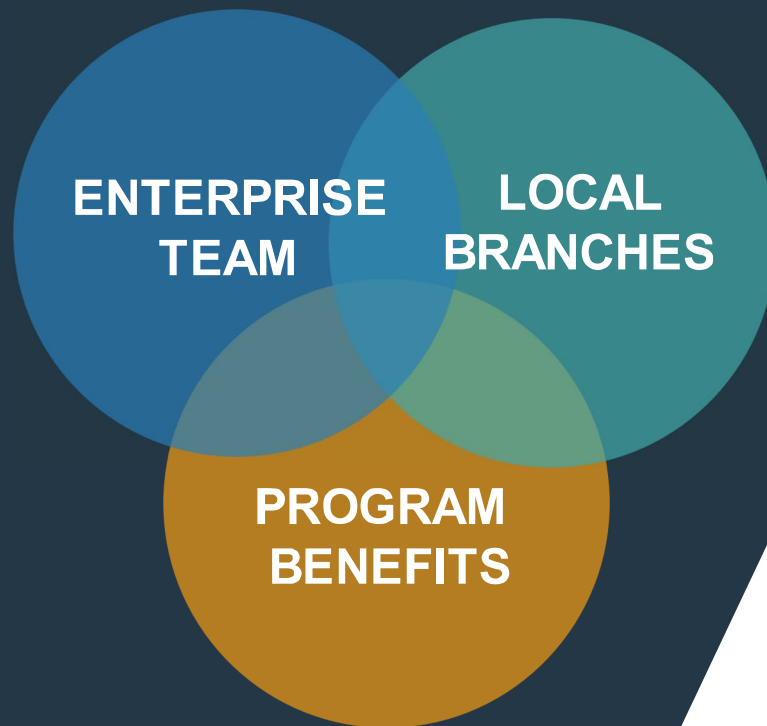


Standardized Execution



Trusted Partnership

RSS Execution and Coordination



ENTERPRISE TEAM

- Dedicated Account Management and Project Oversight
- Standard Eng'g, Design, Programming and Graphics
- Consistent Project Execution and Quality
- Program Management
- Commissioning Management

LOCAL BRANCHES

- Local Project Management
- Local Field Technicians
- Subcontractor Management
- Commissioning Support as needed
- Post Project Service and Support
- Proximity to Client sites

PROGRAM BENEFITS

- Streamlined Proposal Process, Engineering and Execution
- Enforce Standards & Minimize Changes
- Improved Transparency, Collaboration and Coordination
- Consistent Proposals and Pricing
- Speed to Market and Ability to Scale
- Reduced Risk and Cost to Client



Vertical Marketing for Data Centers

Linda Stern, DC Vertical Marketing Manager

Data Center Industry 2022 – Resources & Campaigns

CAMPAIGNS

- **White Space Cooling**
- **Blue GIS and AIS**
- **Smart Data Center (Integrated Solutions)**
- **PowerManager within Desigo CC**
- **Data Center Cybersecurity**
- **Data Center Security**
- **Sustainability – embed across all verticals, drive understanding that all have data centers**
- **Cross Collaboration w/ other Verticals – pilot Higher Ed campaign via APPA, focus accounts leveraging current customers**

Data Center Industry 2022 – Resources & Campaigns

RESOURCES

- White papers – Physical Security, Secure IT/OT, GIS
- Smart Data Center eBook
- Webinar on IT/OT integration – revamp for verticals, new solutions
- Events – 7x24 Exchange conferences
- Social Media & Email Campaigns to complement new collateral releases
- LeadGen & Opportunities – Data Center Hawk, Construct Connect, 451 Research
- Market research – DC Hawk, DC Dynamics, DC Frontier, Mission Critical, Uptime Institute, others
- LinkedIn for market and account intelligence and discovery; group posts/sharing
- Industry resources – DC Knowledge, DC Frontier, DC Dynamics, Uptime Institute, Mission Critical

Data Center Industry Trends 2022 – Insights from OMDIA - cooling & power

➤

①

Sustainability is at the top of the agenda.

Sustainability initiatives are growing, and more money is being poured into R&D. New technologies can be a game-changer for sustainability goals. They include higher efficiency, smaller-footprint equipment, liquid cooling, smart grid-ready UPS, improved battery energy storage systems (ESS), enhanced monitoring, and AI-enabled analytics.

②

Liquid cooling is gaining more interest for high performance computing and sustainability.

Liquid cooling systems enable thermal management for higher density of electronics since air cooling systems are no longer effective. Liquid cooling solutions are currently being adopted in many data centers, addressing new workload needs but also helping to achieve sustainability goals linked with GHG emissions and water consumption.

③

New technologies in UPS and batteries are enabling interaction with renewable energy and the smart electric grid.

Smart grid-ready UPS and battery ESS enable more efficient and sustainable energy use as well as system flexibility. Many large manufacturers are already offering products capable of interacting with the grid.

④

Lithium-ion battery adoption is growing.

Batteries with lithium-based chemistries are currently the fastest-growing ESS technology. Omdia anticipates more investments in R&D for new ESS. More innovative companies like cloud service provider and colocation provider data centers are adopting lithium-ion for higher-power UPS.

Data Center Industry Trends 2022 - Innovations

①

AI-enabled analytics and intelligent monitoring for data-driven decision-making.

Companies are looking into new ways to increase productivity and efficiency to deal with labour shortages while reducing risk. Automation and intelligent monitoring capabilities are enabling the next generation of smart and connected equipment.

②

Automation and robotics.

Robotics help with process automation and productivity while reducing human error. Non-physical robots, software robots, or digital robots, can analyze large datasets to create better user interactions and experiences.

③

Prefabricated modular data centers are a fast-growing market.

More efficient and sustainable construction of data centers is the need of the future. Omdia forecasts that for 2021–24, the installed base of prefabricated modular data centers (PMDCs) will grow at a 24% CAGR.

④

Edge data centers are growing in number and demanding more equipment.

Latency and bandwidth are becoming key performance determinants resulting in the need for more computing power to be placed closer to end users and machines. Omdia forecasts that 5.6 million or 29% of all servers shipped in 2025 will be located at the edge.

⑤

Infrastructure as a service is next.

Vendors increase their efforts to provide their infrastructure as a service. The innovation in automation, remote monitoring, and proactive recommendation capabilities are helping to bring these services to the market.

Data Center Industry Trends 2022 – IT roles changing

①

IT operations will transform ways of working in 2022.

The operational activities (defined as activities needed to ensure business users can be productive) span multiple disciplines, yet most organizations still have a very team-centric, or domain-centric, approach to managing and orchestrating these.

②

Cloud-native technologies are becoming more mainstream.

We are seeing the rise of the developer control plane as part of a new DevOps process and how to manage cost of cloud-native development.

③

Managing the edge adds complications to an already complex process.

Omdia forecasts that 5 million, or 26.3%, of all servers shipped in 2024 will be located at the edge, up from 2.4 million, or 20%, in 2019.

④

Environmental sustainability demands on organizations will likely increase in 2022.

Respondents ranked renewable energy availability eighth out of 12 options in a 2021 survey. This is not particularly high, especially given that in a 2020 Omdia survey, it ranked 11th.

⑤

Skills and the need to engage a wider audience in the use of technology and data will drive long-term IT strategy.

Low code and no code must be better understood in terms of their use and capabilities—currently, they are all things to all people.

Data Center Industry Trends 2022 – Hybrid Deployments becoming most popular

Key Messages – In 2022, cloud computing and cloud-native will become the dominant architectures of choice

①

2022 will see ARM becoming the chipset of choice for certain workloads in the public cloud.

ARM server deployments in hyperscale data centers are increasingly driven by workloads like video streaming, which operates more efficiently in ARM cores.

②

Hybrid and multicloud—a collection of cloud suppliers and not an integrated cloud ecosystem.

Unfortunately, the truth in 2022 is multicloud will remain just a collection of isolated cloud suppliers where organizations run their workloads. Hybrid cloud will become more widely adopted but remains a one-to-one relationship.

③

Dealing with legacy workloads requires more than just x86-based clouds.

Migrating those applications classified as legacy applications is a much more difficult operation than it sounds. Firstly, legacy as a term covers a multitude of different platforms and programming languages, from mainframe and UNIX to IBM i and other non-VM-based x86 applications.

④

The edge remains a massive potential new market and could see the re-emergence of the telco as a key partner in the ecosystem.

Edge computing represents a high-growth opportunity for cloud SPs (CSPs) and telecommunication providers, with many new cloud services launched in the last 12 months and the ongoing deployment of 5G by telecommunication providers.

⑤

The cloud as an environmentally sustainable option in companies' emission calculation.

The importance of environment sustainability is evident in the marketing collateral of the leading cloud providers, as they are all making claims and counterclaims.

Data Center Industry Trends 2022 – High Performance Computing and Quantum Computing transforming business operations

①

Quantum middleware is emerging as the most influential segment of the market.

The development of quantum computing hardware is well advanced, and the algorithms needed for solving business problems are becoming better understood. However, connecting developers, data scientists, and classical computers requires a middleware layer to evolve.

②

Quantum computing hardware design is evolving along different trajectories.

The many different approaches to quantum computing hardware show no signs of being concentrated into a small number of the most popular approaches.

③

Quantum computing software remains a potential big market.

The reframing of business problems to the quantum world remains mainly an academic-led exercise. But some industries are producing industry quantum experts that can perform this function.

④

Quantum security remains a top concern for CIOs.

The ability of a quantum computer to break the current AES 256 encryption remains the biggest challenge for organizations.

| Contact

Linda Stern
Vertical Marketing Manager, Data Centers, Americas
Mobile +1 650-5426833
E-mail linda.stern@siemens.com

Highspot: <https://see-siemens.highspot.com/spots/6144de57b30341fd2bee1623>

Web: <https://new.siemens.com/us/en/markets/data-centers.html>

SIEMENS

SI PRODUCT Portfolio for Data Centers

Products, systems and solutions for Data Centers from Siemens Smart Infrastructure

Products & Solutions	Grid Protection & Automation	Power Distribution	Cooling & Automation	Fire Safety	Security & Access
					
	Benefits				
	• Security & quality of power supply • Flexibility of systems	• Supply reliability • Power availability • System resilience	• Uptime • OPEX • Business performance	• Safety • Asset protection • Business continuity	• Staff productivity • White space protection • Business resilience
	Portfolio examples				
	• Grid protection • Substation Automation • Power Quality & Measurement Microgrid • Distributed Energy & renewable integration • Battery storage	• MV/LV switchgear • PDU • Busbar/ busway • Circuit breakers • Control cabinets • Modular substations • UPS integration • Electrical power management system (EPMS)	• Controllers • Actuators • Valves • Lighting • Sensors • Desigo CC-open platform • WSCO • Demand Flow	• Very Early Warning Detection • Suppression • Notification • Evacuation	• Access management incl. perimeter protection • Video surveillance • Intrusion detection • Evacuation

■ Power ■ Building

SI SERVICE Portfolio for Data Centers

Holistic Operational Management for Data Centers from Siemens Smart Infrastructure

Services & Solutions	Mechanical Services	Electrical Services	Energy Services	Fire Safety Services	Security & Access Services
					
	Benefits				
	• Extend Life Cycle Investment • Optimize performance	• Safety • Extend Life Cycle Investment • System resilience	• Extend Life Cycle Investment • Optimized Performance	• Safety • Asset protection • Code Compliance	• Staff productivity • Asset protection • Business resilience
Portfolio examples					
	• Preventive Maintenance • Predictive Maintenance • Emergency Services • System Retrofit & Replacement • Vibration Analysis • Fan Array Solutions	• Preventive Maintenance • NETA Trained • Arc Flash Studies • Coordination Studies • Emergency Services • System Retrofit & Replacement	• White Space Cooling Optimization • Chiller Plant Optimization • Facility Improvement Measures • Fault Detections and Diagnostics • Dynamic VAV Optimization	• <i>Inspection Testing & Maintenance on the following:</i> • Fire Alarm & Detection • Air Sampling (VESDA) • Portable Fire Extinguishers • Sprinkler System • Clean Agent Suppression Systems	• Security Assessment & Planning • Test and Inspection • Data back up • System retrofits, extensions & upgrades • Managed and Hosting Services



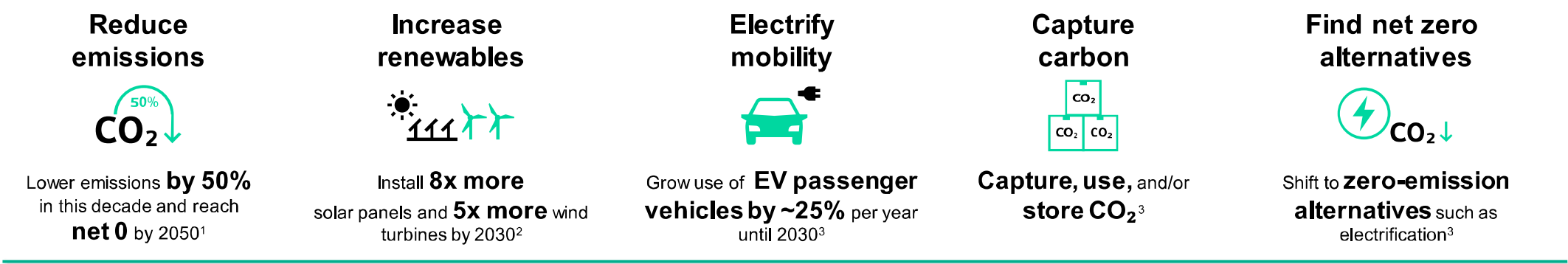
Sustainability & Decarbonization

Pathway to achieving net zero

Ari Kobb, Director Energy & Sustainability Solutions

Stacey Mahler, VM's | Sustainability/Decarbonization Commercial Strategy

Transformative Change is Needed (and Happening)



Market Frameworks and Initiatives



Reporting and Transparency

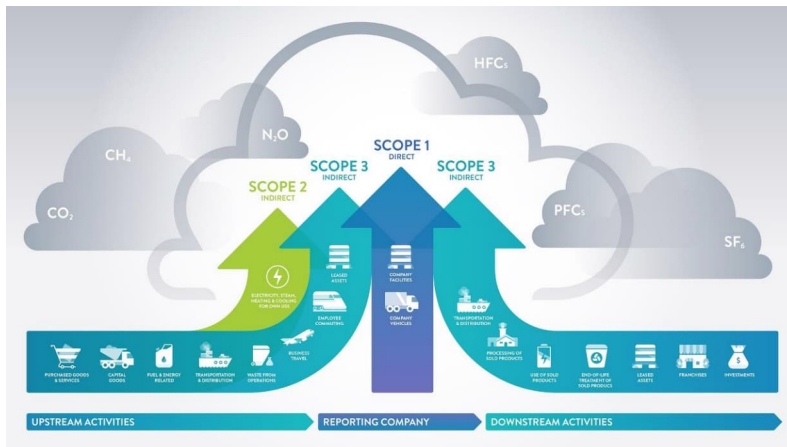


Organizational Alignment, Systems and Processes



Understanding your Carbon Footprint

Emissions Scopes and Sources



GHG Emissions Scopes

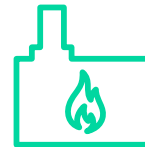
Scope 1: Owned/controlled direct emissions sources

Scope 2: Indirect emissions from owned/controlled sources

Scope 3: Emissions from sources not owned/controlled

Quantifying Emissions

Scope 1 Emissions



- Natural gas and other fuels (process, heating, backup generation)
- Gasoline and diesel use (own fleet)

Scope 2 Emissions



- Purchased electricity from the Grid
- District steam
- Electricity generated from on-site sources (co-gen)

Scope 3 Emissions



- Upstream leased assets
- Processing of sold products
- Downstream leased assets
- Business travel and transportation

Reductions to Emissions



On-Site Renewables



Clean Energy Sourcing



Supply Chain Reductions

What our Customers Expect from it's Supply Chain



Allocate GHG Emissions to Microsoft by Revenue

Allocate based on the proportion of total revenue represented by Microsoft.

General Formula for Allocating GHG Emissions Based on Revenue:

$$\frac{\text{Total GHG Emissions for Scope 1 or Scope 2}}{\text{Total revenue of products/services produced}} \times \frac{\text{Revenue of products/services purchased by Microsoft}}{\text{Total revenue of products/services produced}} = \text{Allocated GHG Emissions}$$

Company-wide Allocation:

$$\frac{1,000,000 \text{ metric tons CO}_2\text{e (Company-wide Scope 2 GHG Emissions)}}{\text{US\$500,000 revenue}} \times \frac{\text{US\$200,000,000 revenue}}{\text{US\$200,000,000 revenue}} = \text{Allocated GHG Emissions}$$

SIEMENS Client Carbon Emissions Allocation

Allocation Parameters

Client Name	Microsoft
Organizational Boundary	Siemens Smart Infrastructure (SI)
Emissions Boundary	Scope 1 and 2
Geographic Boundary	Global
Allocation Model	Revenue
Time Frame	Fiscal Year 2019
Revenue from Purchases: Direct	\$16,100,000
Revenue from Purchases: Indirect	\$48,500,000
Total Siemens Revenue	\$18,270,000,000

Carbon Emissions Allocation (Mt CO2e)

Emissions Scope	Siemens Emissions (Mt CO2e)	Direct Allocation	Indirect Allocation (IDC)
Scope 1	80.441	247.0	213.5
Scope 2 (Market-Based)	31.623	97.1	83.9
Total Emissions	112.064	344.1	297.5

Net Zero Supplier Engagement Program

Requesting your **participation** in this program



Supplier Expectations

Set 5yr and 10yr GHG reduction target for Facebook business



Supplier Onboarding & Contracting

Integrate Net Zero requirements into key suppliers contracts and RFPs through Responsible Supply Chain (RSC) program.



Supplier Collaboration



Supplier Performance

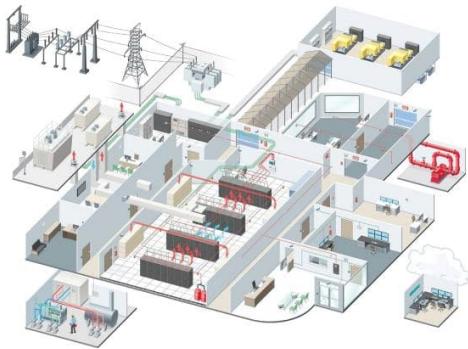
Activity tracker/ Scorecard

Supplier name	Siemens	Task Need by date
Does the company report on sustainability externally?	●	
Preliminary Net zero supplier engagement with facebook	●	
CDP and climate report	●	
Human right and environmental corrective plan	N/A	
Conflict mineral report	●	
EDP/LCA- Product level	●	24-Oct
Adhere to Responsible Business Alliance code of conduct	●	25-Oct
Provided FB's portion of SI,S2,S3 & material issues	●	11-Nov
Tracking against target for H2 2021	●	31-Dec

The Interconnection and Intersection of Decarbonization



Owned & Managed Data Center



Scope 1 Emissions Scope 2 Emissions Scope 3 Emissions



Impact Strategies



Energy Efficiency



On-Site Renewables



Clean Energy Sourcing



Supply Chain Engagement

DIGITAL REALTY

Manage Operations for MSFT



Scope 1 Emissions



Scope 2 Emissions



Microsoft



Scope 3 Emissions

Impact Strategies



Energy Efficiency



On-Site Renewables



Clean Energy Sourcing

SIEMENS

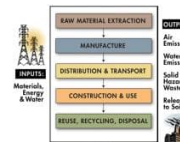
Manufacture Products that go into MSFT Data Centers



Embodied Carbon of our Products



Impact Strategies



- Lower carbon manufacturing (net zero)
- Low carbon materials that go into our products
- Reduce transportations emissions
- Greater efficiency through the use phase

Microsoft



Scope 3 Emissions



Case Study

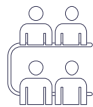
Vantage Data Centers ESG Strategy

Materiality: Typical Topics Considered



Environmental

- Energy use and efficiency
- Carbon / GHG emissions
- Renewable energy
- Climate risk and resilience
- Water use, conservation and risk
- Waste and recycling
- Circularity, embodied carbon
- Green buildings (design and construction, materials)
- Supply chain environmental impact
- Environmental disclosure and transparency
- Construction & site selection
- Wastewater



Social

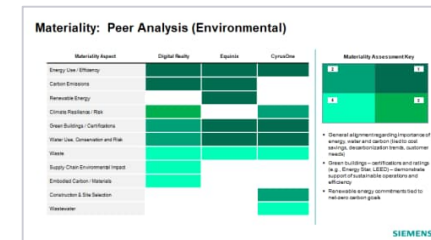
- Diversity, equity and inclusion
- Human capital
- Human rights
- Philanthropy / giving
- Global citizenship
- Community engagement and leadership
- Talent acquisition, development and training
- Health and safety
- Supply chain (social impact)



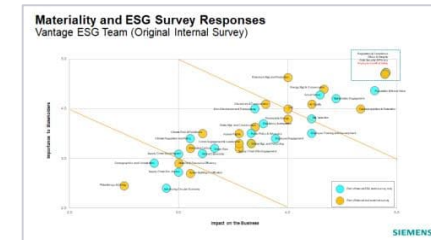
Governance

- Ethics and integrity
- Compliance
- Data security and privacy
- Public policy and advocacy
- ESG engagement (supply chain)
- Anti corruption
- Disclosure and transparency
- Business performance

Approach and Process



Peer Materiality Evaluation



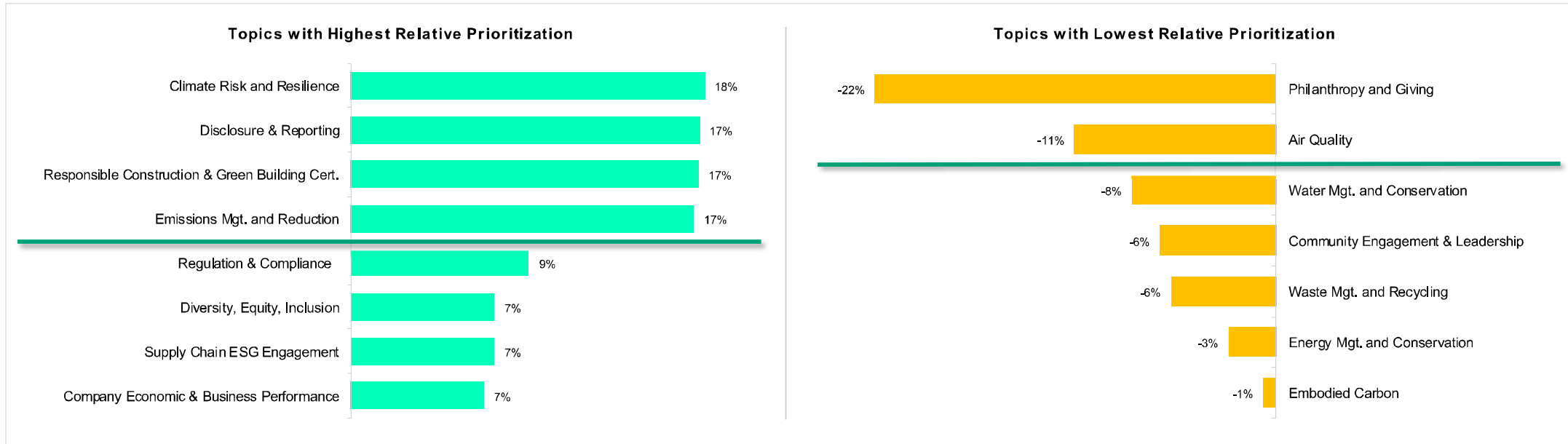
Internal ESG Team Evaluation

Q#	Materiality Topic	Area Impact	Dev vs. Med	Dev vs. Avg	Score Avg	Dev vs. Med
1	Climate Change and Energy	High	High	High	2.1	1.1
2	Carbon Emissions	High	High	High	2.1	1.1
3	Renewable Energy	High	High	High	2.1	1.1
4	Climate Resilience / Risk	High	High	High	2.1	1.1
5	Green Buildings / Certifications	High	High	High	2.1	1.1
6	Water Use, Conservation and Risk	High	High	High	2.1	1.1
7	Waste	High	High	High	2.1	1.1
8	Supply Chain Environmental Impact	High	High	High	2.1	1.1
9	Embodied Carbon / Materials	High	High	High	2.1	1.1
10	Construction & Site Selection	High	High	High	2.1	1.1
11	Wastewater	High	High	High	2.1	1.1
12	Energy Use / Efficiency	High	High	High	2.1	1.1
13	Human Capital	Medium	Medium	Medium	1.5	0.5
14	Human Rights	Medium	Medium	Medium	1.5	0.5
15	Philanthropy / Giving	Medium	Medium	Medium	1.5	0.5
16	Global Citizenship	Medium	Medium	Medium	1.5	0.5
17	Community Engagement and Leadership	Medium	Medium	Medium	1.5	0.5
18	Talent Acquisition, Development and Training	Medium	Medium	Medium	1.5	0.5
19	Health and Safety	Medium	Medium	Medium	1.5	0.5
20	Supply Chain (Social Impact)	Medium	Medium	Medium	1.5	0.5
21	Ethics and Integrity	Low	Low	Low	0.5	-0.5
22	Compliance	Low	Low	Low	0.5	-0.5
23	Data Security and Privacy	Low	Low	Low	0.5	-0.5
24	Public Policy and Advocacy	Low	Low	Low	0.5	-0.5
25	ESG Engagement (Supply Chain)	Low	Low	Low	0.5	-0.5
26	Anti Corruption	Low	Low	Low	0.5	-0.5
27	Disclosure and Transparency	Low	Low	Low	0.5	-0.5
28	Business Performance	Low	Low	Low	0.5	-0.5
Average Rating			1.1	1.1		
Median Rating			1.1	1.1		

ESG Stakeholder Survey

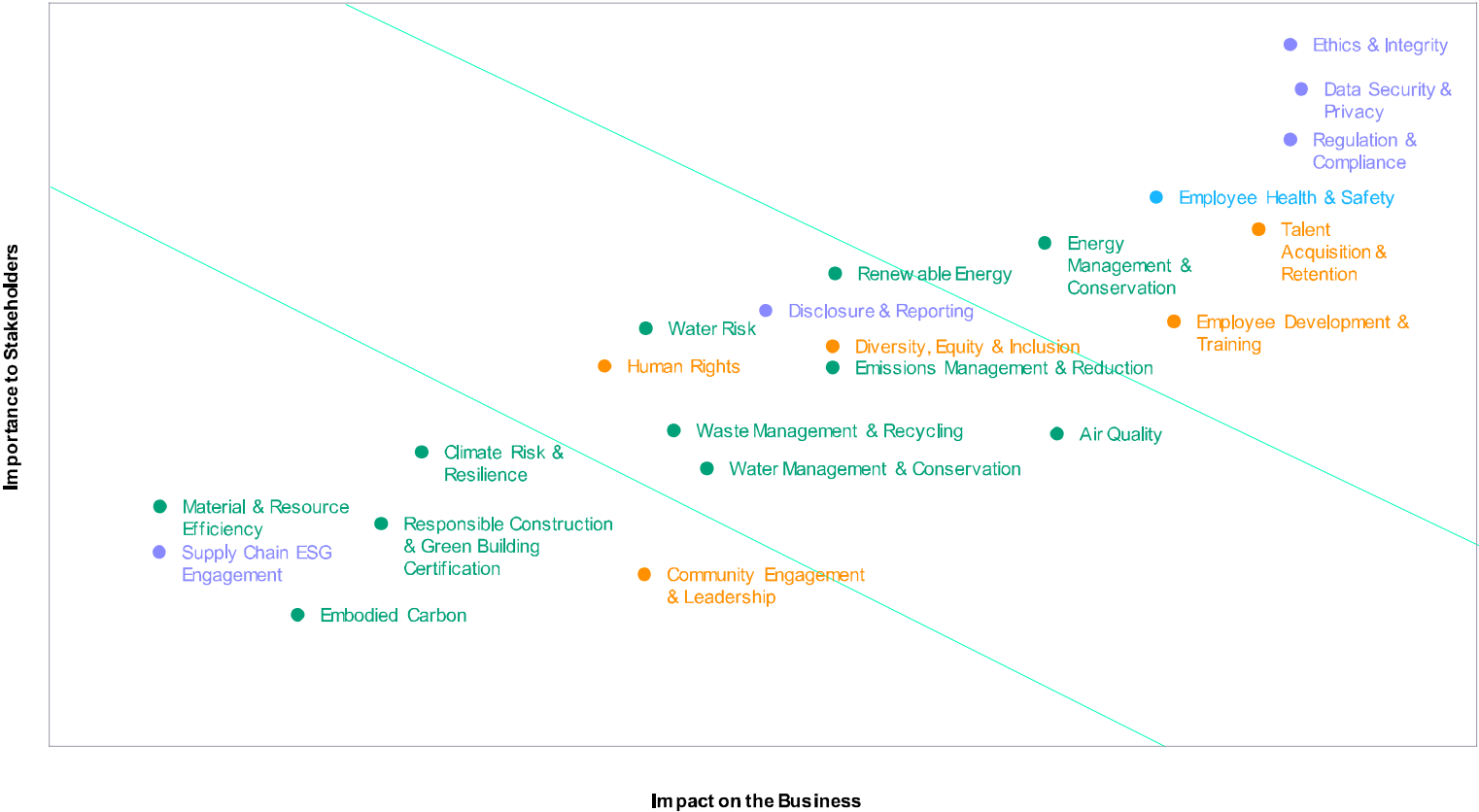
Variation by Respondent Type

Investor Prioritization Relative to the Overall Survey



- Compared with the overall survey responses, investors demonstrated higher levels of relative prioritization in areas associated with risk mitigation, transparency, and strategies to gain competitive advantage
- Investors are in line with the broader survey in areas related to governance and company performance
- Investors are generally aligned with the broader survey responses regarding the least prioritized materiality topics
- They demonstrate a larger de-prioritization specifically for philanthropy and giving, and air quality

Recommended Materiality Matrix



Include: High / Medium Impact to Business

- Water Risk (Medium)
- Employee Development & Training (High)
- Employee Health & Safety (High)

Excluded from Final Materiality Assessment

- Environmental Disclosure
- Supply Chain Environmental Impact
- Advancing the Circular Economy
- Climate Regulation
- Reputation & Brand Value
- Company Economic & Business Performance
- Site Selection
- Governance
- Stakeholder Engagement
- Public Policy / Advocacy
- Philanthropy & Giving
- Supply Chain Social Impact
- Demographics & Urbanization
- Global Citizenship



Decarbonizing Data Centers with Li-Ion BESS

Bernie Oegema | National Sales Manager Siemens CAN

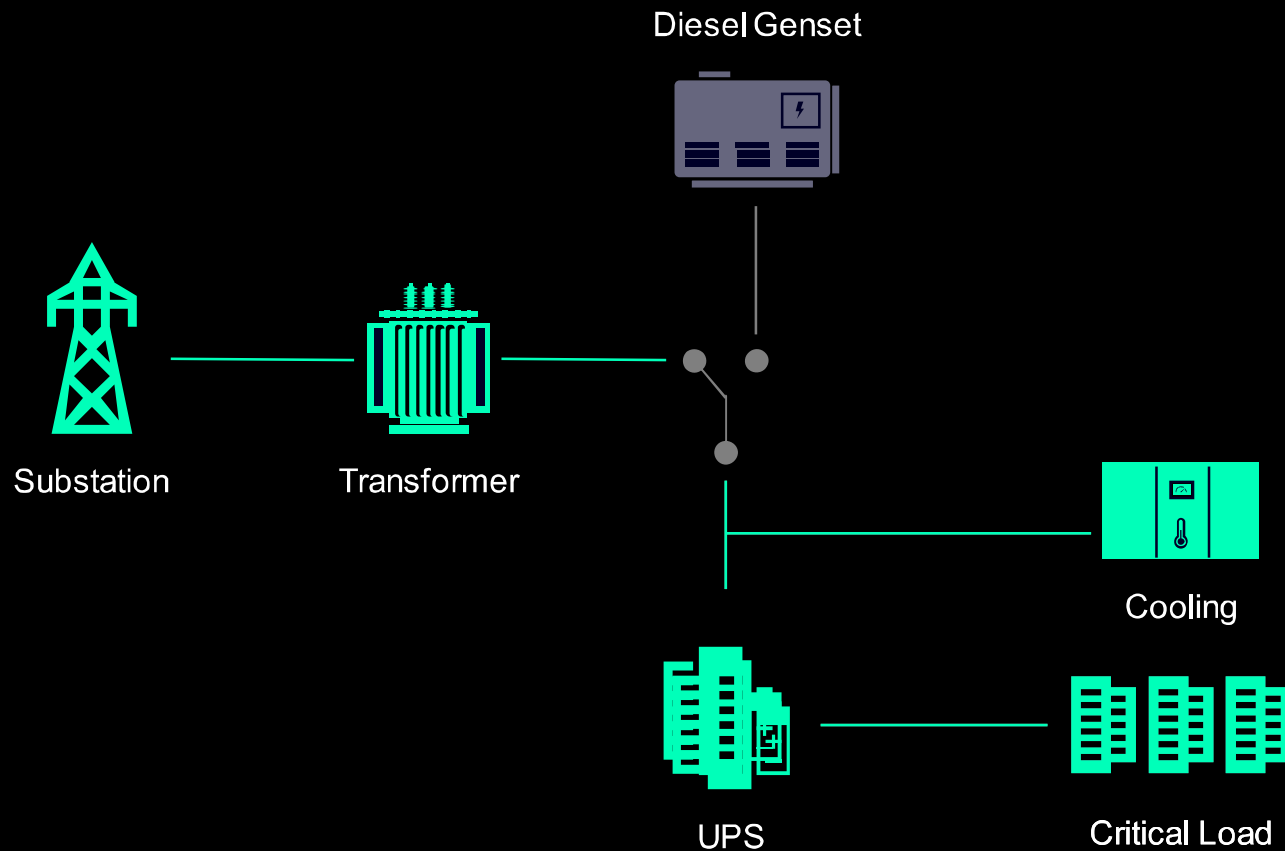
Graham Morin | Sales Director Fluence BESS

Wayne Aho | Sr. Product Manager, Siemens Fire Life Safety

Mike Zapata | Head of Data Centers, Americas

SIEMENS

Typical Data Center Configuration

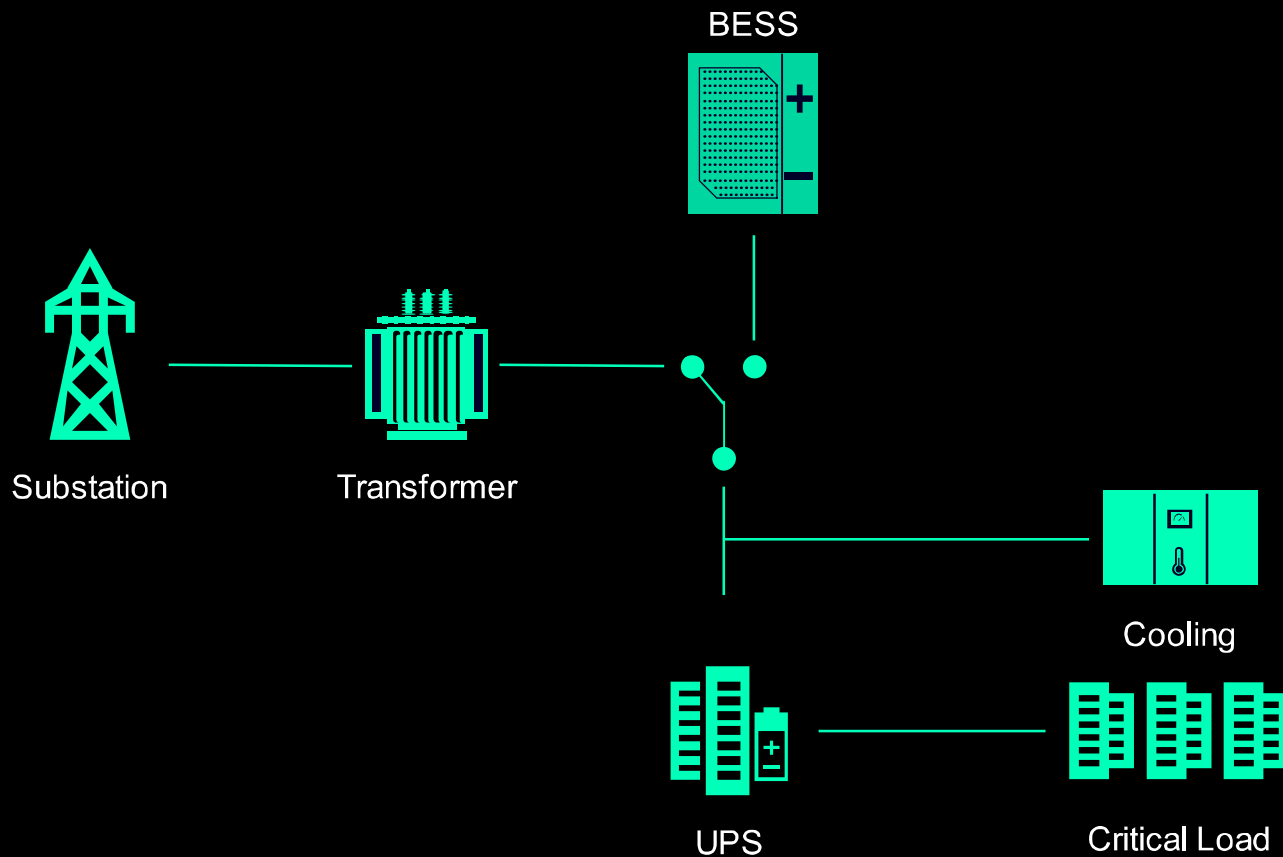


PPA with
renewable suppliers

99%
decarbonization

OPEX
driven approach

How to achieve zero carbon footprint – No Genset



Combo

PPA and BESS

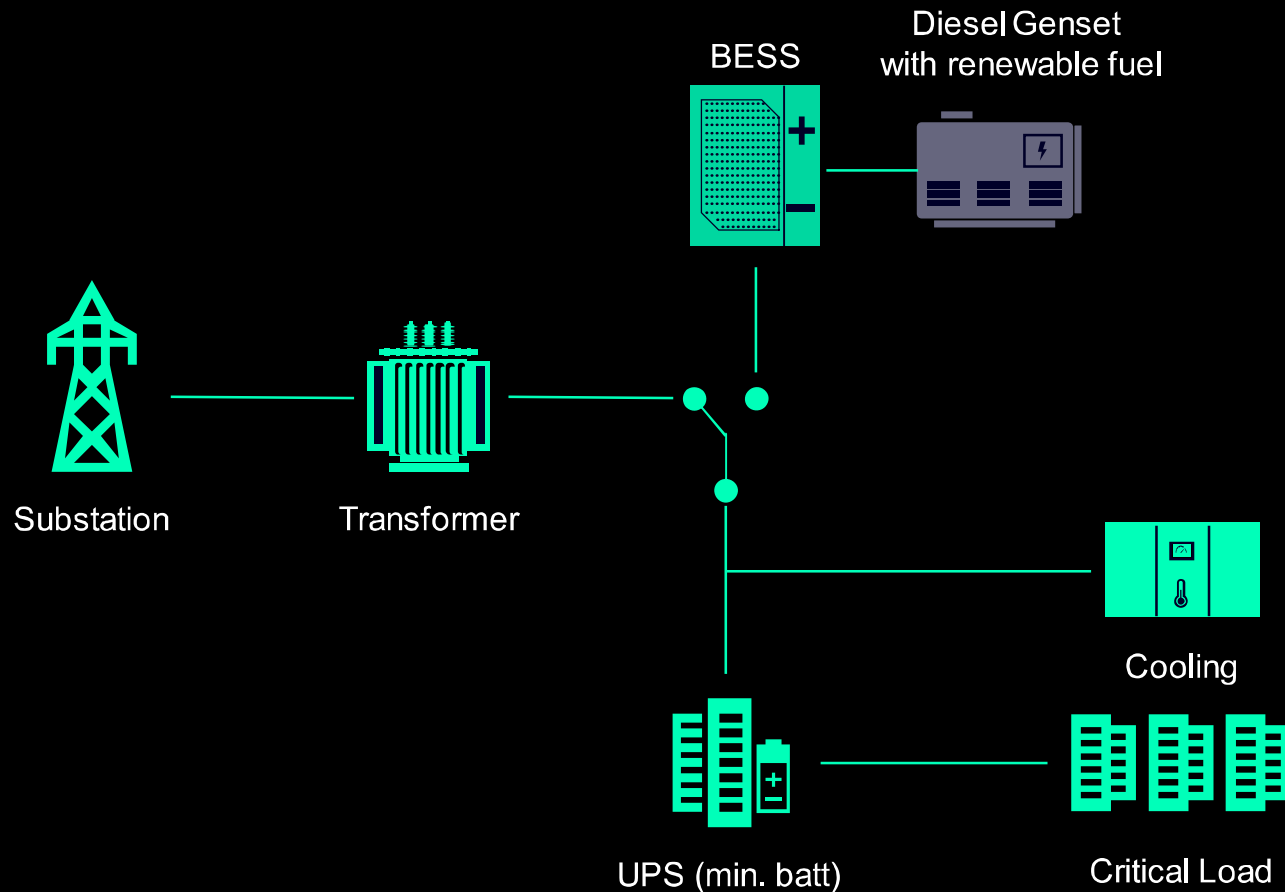
100%

decarbonization

Better

cost-effectiveness
than a diesel genset

Hybrid Diesel/BESS

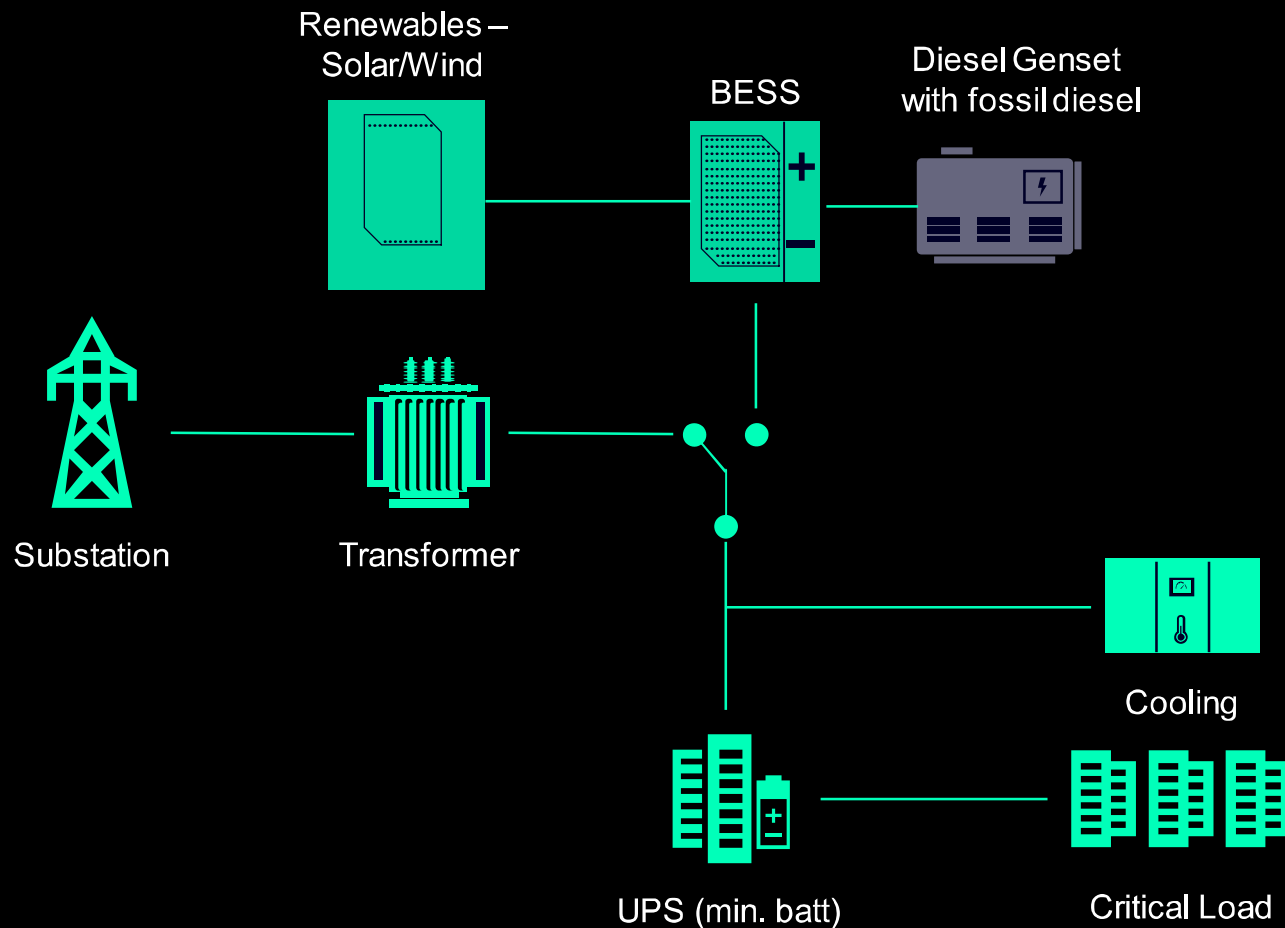


96%
Carbon free
grid

100%
Carbon free
fuel

=100%
decarbonization

How to achieve zero carbon footprint with a Genset/BESS hybrid



96%
Carbon free
grid

>4%
Renewables

=100%
decarbonization

Google 'excited' for potential of battery-based technologies at data centres

April 21, 2022 [Article](#)



2.75MW/5.5MWh, BESS Installation

Objective 1 : Provide same uptime and availability performance at the site level as with diesel generators only

Objective 2 : Provide the same back-up functionalities as with generators only, for a lower data center total cost of operations (TCO), by 2023

Objective 3 : Accelerate the deployment of energy storage for grid decarbonization by providing grid services at a lower cost, and demonstrating a minimum level of revenues from such applications

GRIDSTACK

A grid-scale, industrial-strength energy storage system designed for the most demanding market applications with industry-leading reliability, scalability, and safety.



EASILY CONFIGURABLE

- Configure key components from pre-qualified Tier 1 suppliers.
- Enhance your system for specific market applications with a range of optimized dispatch algorithms.



HIGHLY SCALABLE

- Scale-out design drives efficiencies in project permitting and delivery to reduce your implementation risk.
- Consistency across cores and project locations simplifies training, operations, and maintenance.



TOTAL SYSTEM SAFETY

- Equipped with comprehensive safety features throughout the integrated technology stack.
- Factory-built design brings consistent quality control to your storage system for the highest level of safety.



Thermal Optimization

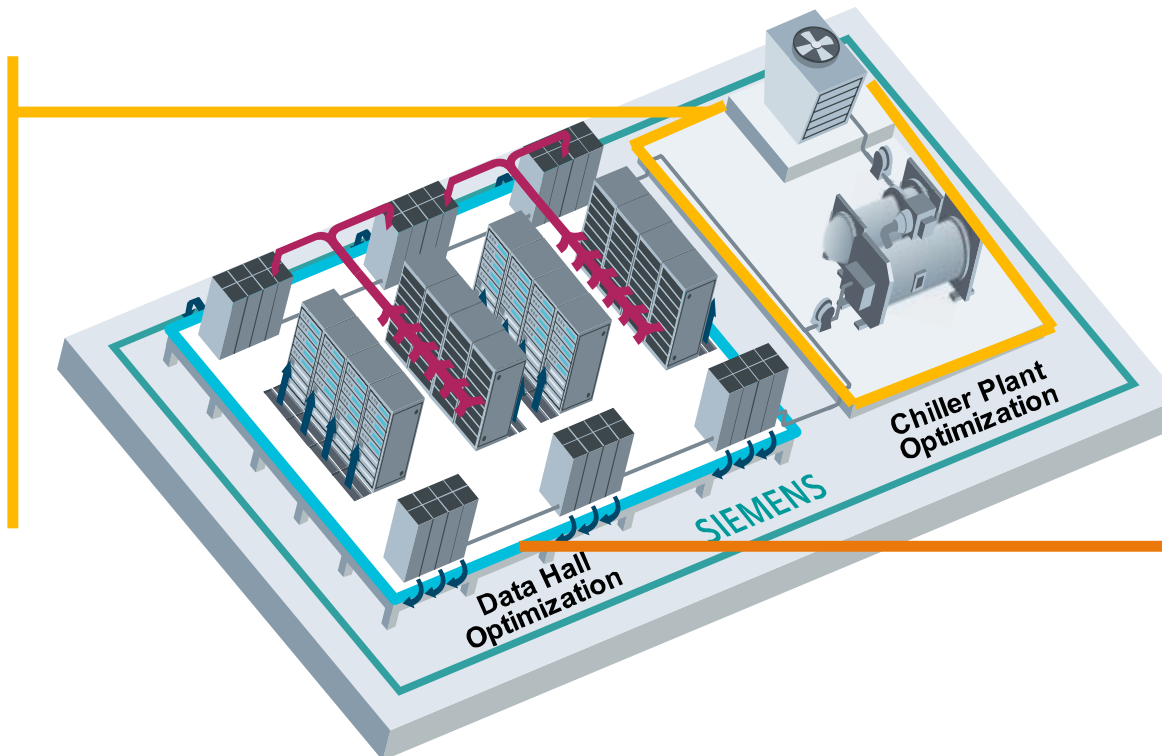
Fred Ross, National Sales Manager, DC VM
Bernie Oegema, National BD, Siemens CAN

Technology overview of Thermal Optimization offering



Primary Demand Flow

- Utilization of temperature distribution in white space
- Dynamically adjust chiller load points according to real time demand

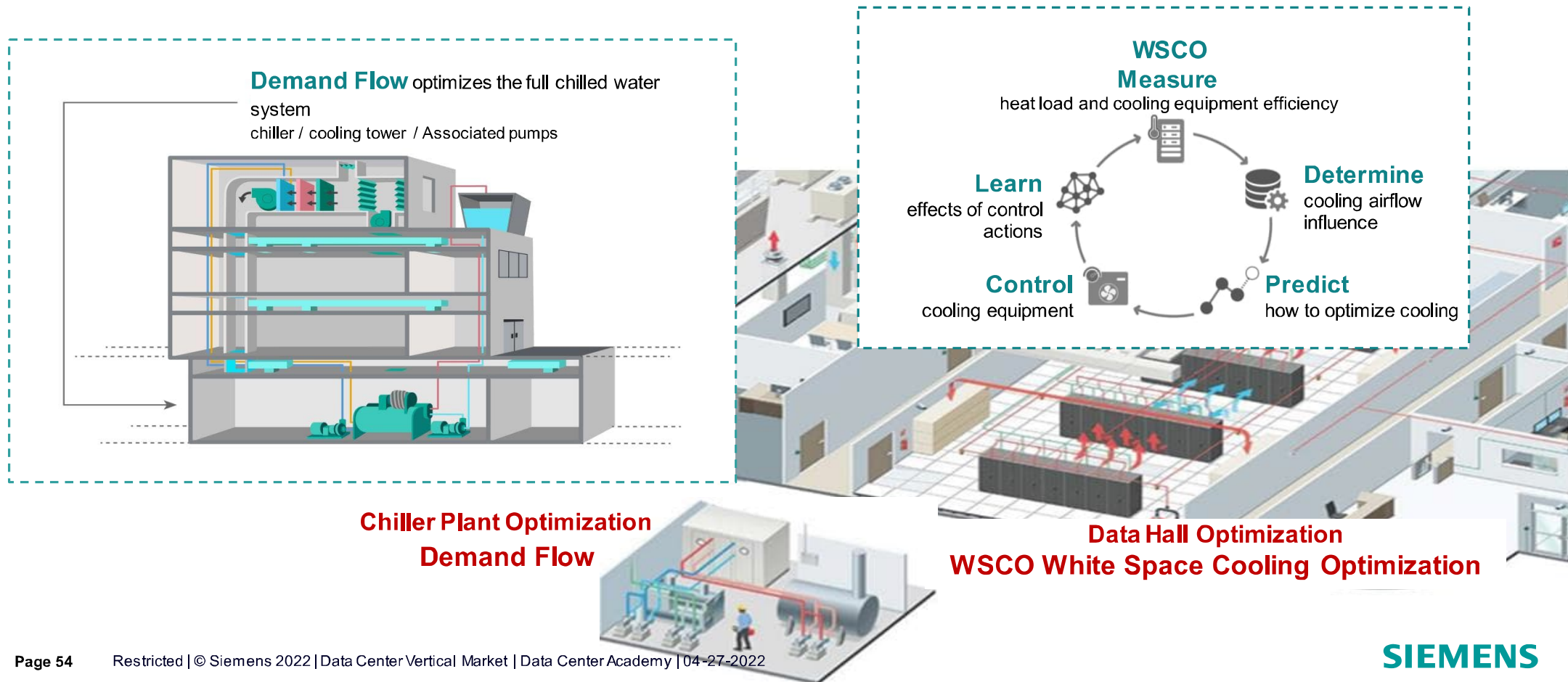


Secondary White Space Cooling Optimization

- Utilization of temperature distribution in white space
- Dynamically adjust chiller load points according to real time demand

Thermal Optimization

Generate savings, reduce risks and increase capacity



Thermal Optimization Artificial Intelligence for IT/OT Infrastructure

Automated

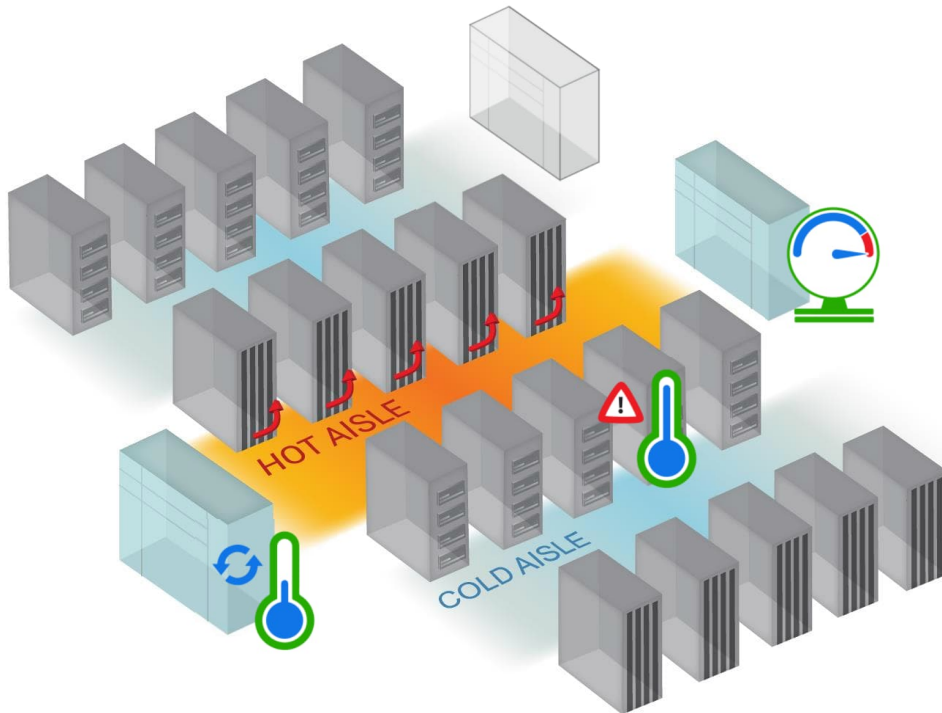
- Rule based
- Preprogrammed procedures and responses
- “if, then” conditions

Autonomous

- Machine Learning
- Adjusting on its own based on historical usage patterns
- Responds to new situations



Consequences of Status Quo



Over Provisioning

Unneeded cooling expansion projects

Too Much Pressure

Complex airflow dynamics force operators to turn up fans and waste energy

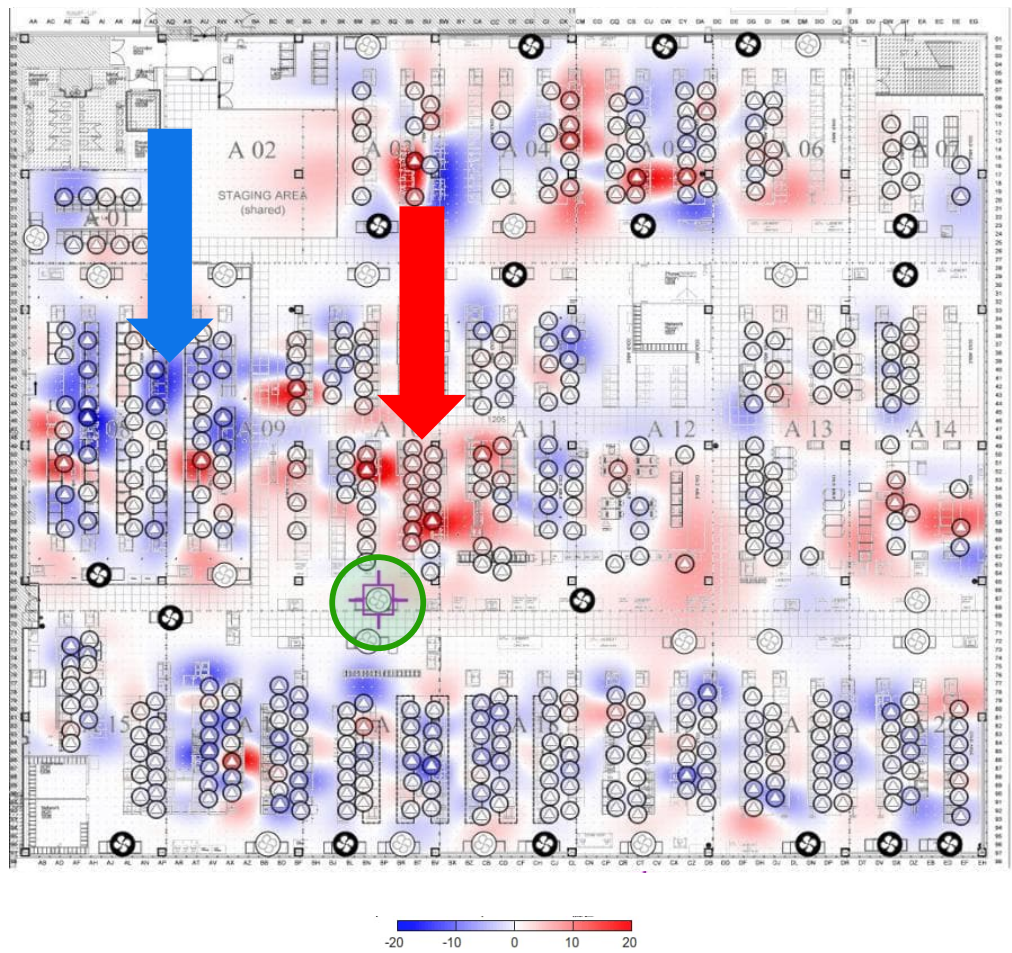
Hot Spots

Excessive airflow causes turbulence and hot spots

Reduced capacity

Low return air temperatures reduce cooling efficiency and can limit IT deployments

Unveiling the Complexity and Address the Issue

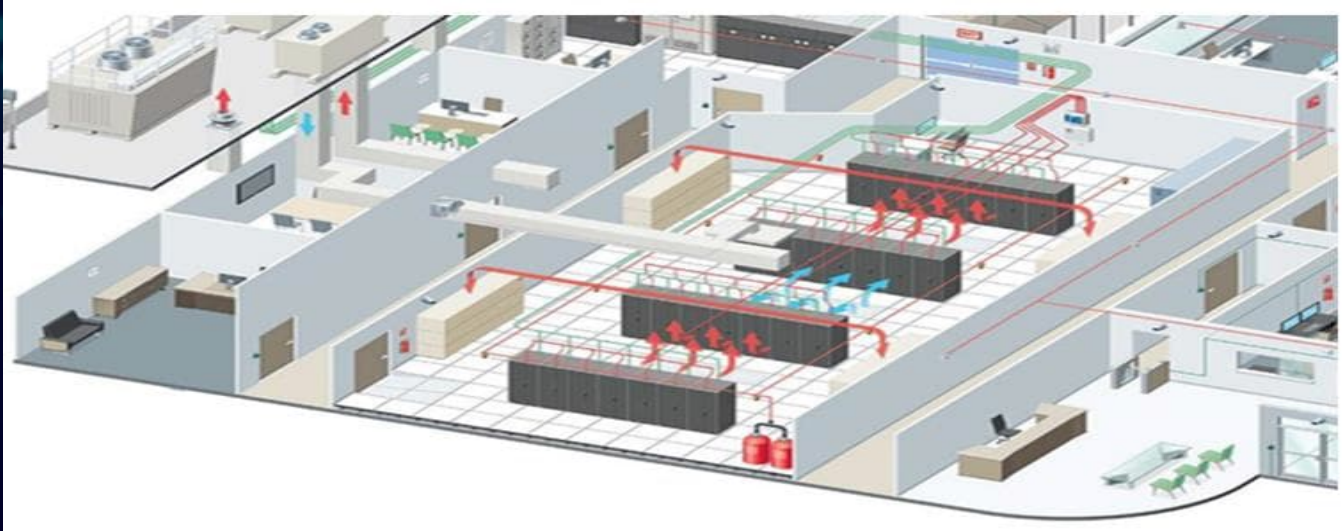


Standard **100-kW CRAHs** on a raised floor

Has a **cooling influence** on some areas
Has **no influence** on spaces / entire room

And a **heating influence** on other areas

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** 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 **Artificial Intelligence Optimization** and 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. This dropped them back to **only running 35 CRAC units** which restored their Tier level back to Tier III. Today, they are maintaining the space with only 24 CRAC's!

Central Plant – Demand Flow

- Immediate 37% Reduction in Annual Energy Usage
- ~\$200,000 Utility Rebate
- \$206,169 in Annual Savings (\$0.11/kWh)
- 2.75 Year Simple Payback

Server Rooms – WSCO AI Optimization

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

SIEMENS

Proven Results with White Space Cooling Optimization (WSCO) - BMO Data Centre



Challenges: Inefficient cooling control in white space areas; a lack of adequate sensing capability required overcooling of the data halls. Running all 32 CRAH units with return temperature set point control.

Solution: Siemens implemented WSCO, an Artificial Intelligence Optimization solution 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 27°C/81°F resulting in 2/3 of CRAH's running in standby mode and increased CHW return temperature to the central plant. Temperatures are consistent throughout the room and airflow is rebalanced with changing loads in real time

 **Led to 4 other WSCO projects, DemandFlow and Li-Ion Detection and more Opportunities!**

Server Rooms – AI Optimization

- 32 CRAH units
 - 170 kW/1500 MWh baseline
 - 76 kW/820 MWh after
 - 55% reduction at CRAHs
- 200 MWh energy reduction at Chiller Plant
- \$130,000 Annual Electrical Savings
- Utility Rebate \$100K
- <2-year payback
- Other benefits
 - Increased redundancy
 - Avoid capex – electrical & HVAC
 - Reduced wear on equipment
 - Lower maintenance costs
 - Active management of cooling eliminates hot spots = SLA compliance



Electrical Services & Solutions

Brandon Welling, National BD, Electrical Services, Siemens RAM

Murtaza Khan, National BD, Siemens EA

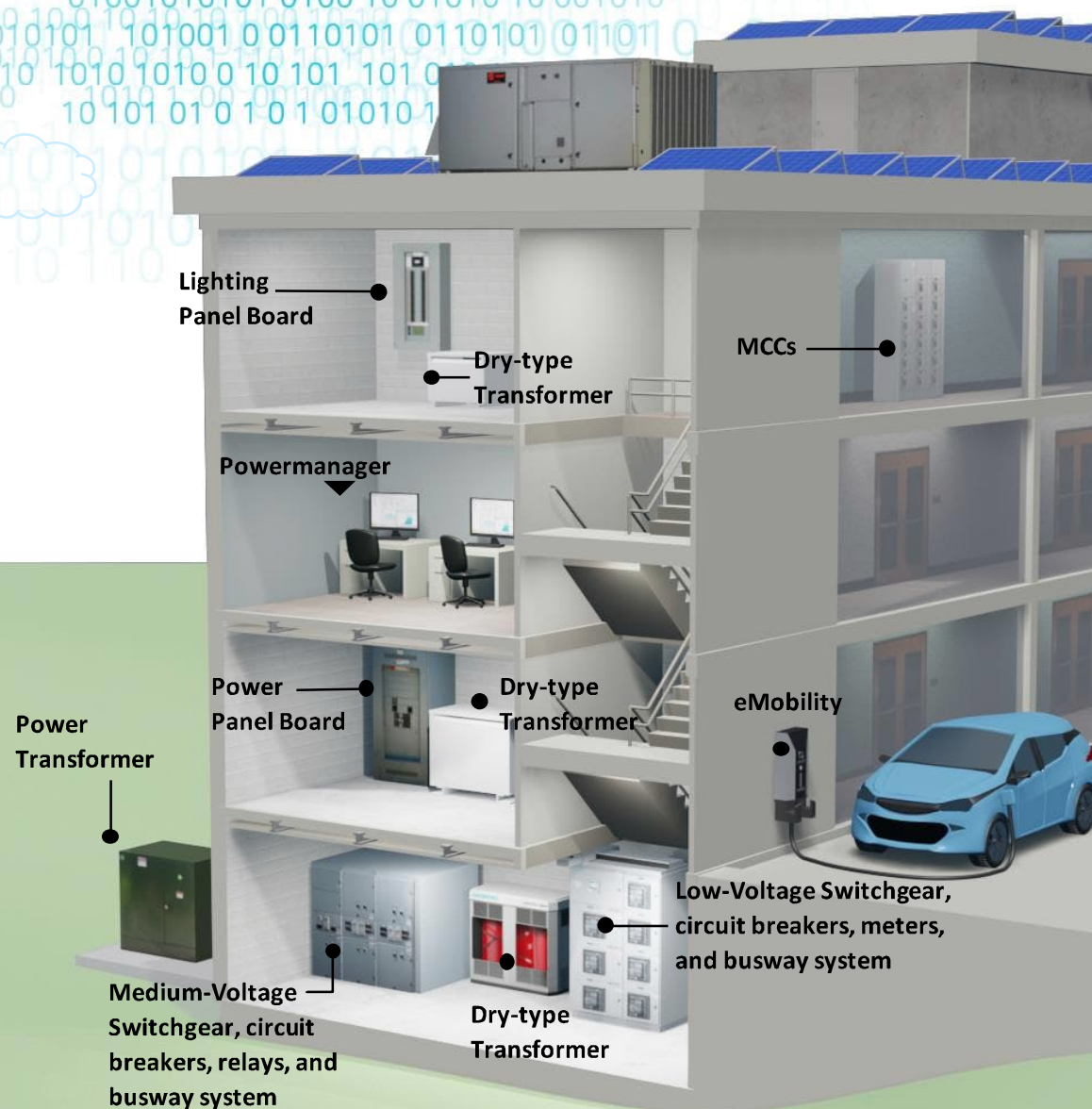
Electrical Services Capabilities

Equipment we support

Complete Coverage

- Arc Flash Mitigation studies
- Power System Studies
- Start-up & commissioning
- Custom turnkey solutions
- Circuit Breaker Retrofits
- DesigoCCPowerManager
- Metering/sub-metering
- Warranty extension services
- Technical Training
- Multi-year maintenance agreements
- Circuit breaker repair facilities
- Spare parts management
- Switchgear Modernization

- Power Circuit Breakers
- Arc & Ground Fault Circuit Interrupters
- Busway Systems
- Metering
- Molded Case Circuit Breakers
- Motor Control Centers
- Panelboards
- Protective Relays
- Transformers
- Switchgear
- Switches & Switchboards



Cybersecurity & Trust – Business impact by providing research insight and technology excellence to secure own operations and customer solutions

Driving future cybersecurity technologies for Siemens with research and standardization



Security Architecture

Support for requirements engineering, architecture definition, prototyping, and certifications.

- Security Requirements Engineering
- Design, Documentation, and Prototyping of Security Architectures
- Certification & Compliance Consulting
- Cloud-, Industrial IoT and Container-Security, IAM, PKI, Network Security, Zero Trust, Zero Touch Onboarding, Blockchain



Security for Embedded Systems

Security for Embedded Systems, considering specific characteristics of industrial environments.

- Advanced cryptography and robust implementation techniques
- Secure elements and trust anchor architectures
- Industrial communication security, authentication & integrity for products & supply chain, Industry 4.0 security & standardization
- Security testing of embedded systems



Security Services Enablement

Research for technologies and methods to constantly advance cybersecurity services.

- Services for monitoring, cyber threat hunting, attack detection, incident response, and security visualization
- Evaluate and integrate 3rd-party security solutions
- Automated Hardening



Security Analytics

Research for tools and methods to leverage analytics and machine learning techniques.

- Security data acquisition, deep package inspection, anomaly detection, security visualization, Zero trust for heterogeneous IT and OT infrastructures
- Industrial blockchain research & development
- Security Consulting & Security Testing Technology



Security Lifecycle

Enable businesses to systematically develop secure products and deliver secure solutions.

- Development of process concepts to comply with technical standards and regulations along product lifecycles
- Drive integration of security testing in CI/CD pipelines
- Pilot technical and organizational models and continuously maintain best practices



THANK YOU!

Michael Zapata

Head of Data Centers | Americas

P: 714.585.5837

Michael.Zapata@siemens.com