

DC – The Power to Change Buildings

A Non-profit Alliance Driving Open Standards to Direct Current Power Distribution in Buildings



DC-The Power to Change Buildings

What is the EMerge Alliance?

- Not-for-profit 501c -Part 6
- Open application standards - DC platform
- Eco-system development and promotion
- 100+ Member organizations and growing!

Who is the EMerge Alliance?

- Architects, Engineers
- Contractors/Builders/ Integrators
- Manufacturers - Service Providers
- Building Owners – Facility Managers
- National & Independent Labs
- Academic Institutions
- Codes & Standards Groups

What is an EMerge Standard?

- Commercial Applications Standards
- Subordinate to safety, equipment standards
- Physical, electrical, operational interfaces
- Application definition - listing requirements of other standards (incl. IEC)

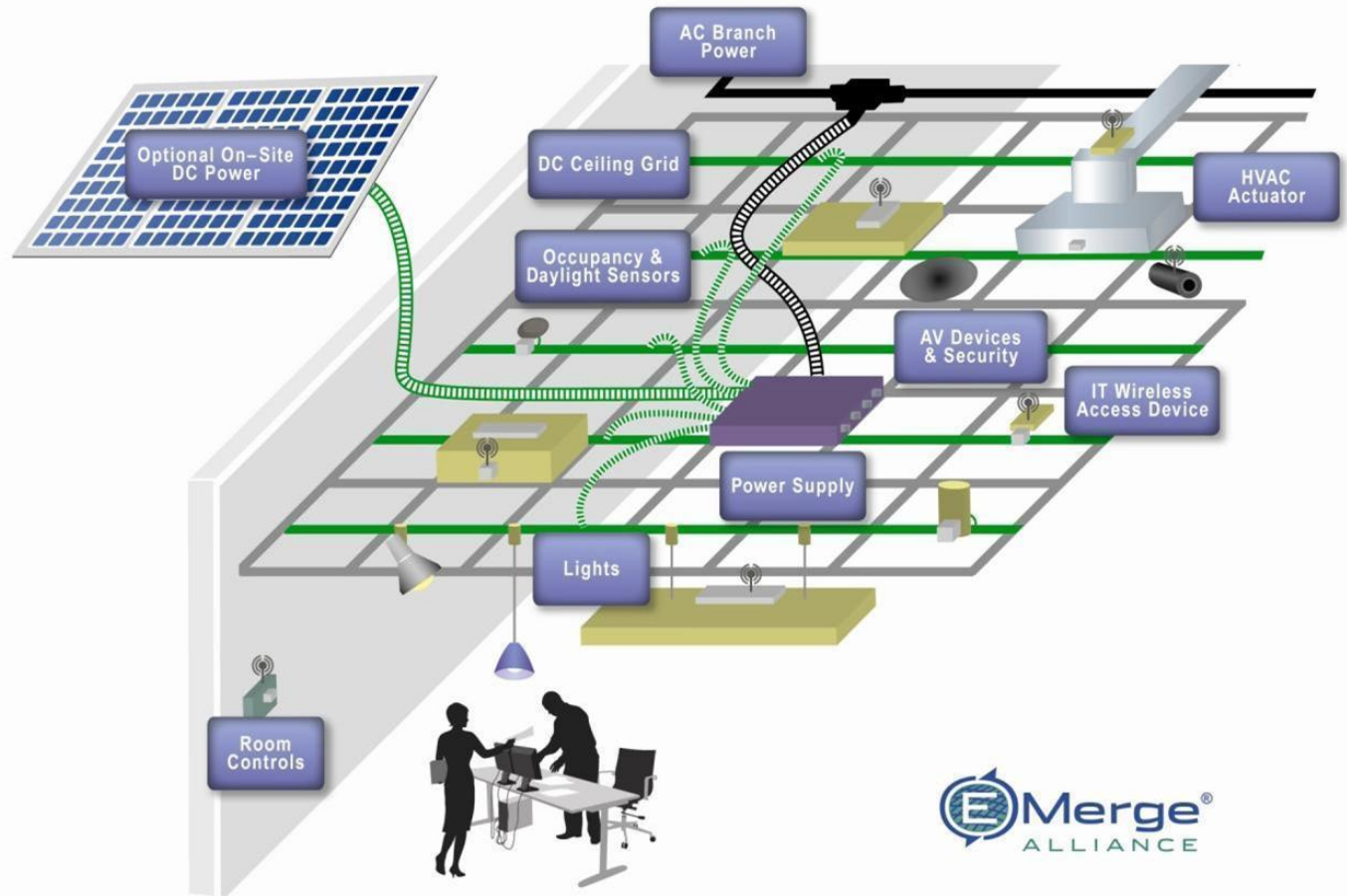
Vision: DC Microgrids in Buildings





1st Standard: EMerge Alliance Occupied Space Standard

24Vdc developed for commercial interiors



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Direct-Current Microgrid @ 380Vdc

“380VDC is the highest efficiency, cost effective solution”



■ **ETSI 300132-3-1 v2.1.13 (1) (2011)**
EMerge Alliance → NEC 2014

- 28% more efficient than 208VAC¹
- 7% more efficient than 415VAC²
- 15% less up-front capital cost in volume²
- 33% less floor space²
- 36% lower lifetime cost³
- 200%-1000% more reliable²
- No Harmonics, Safer⁴



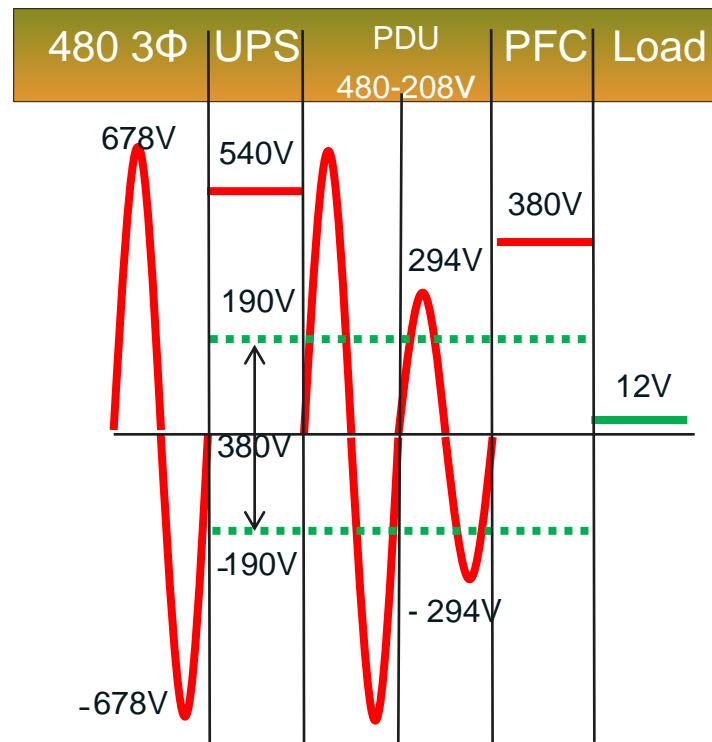
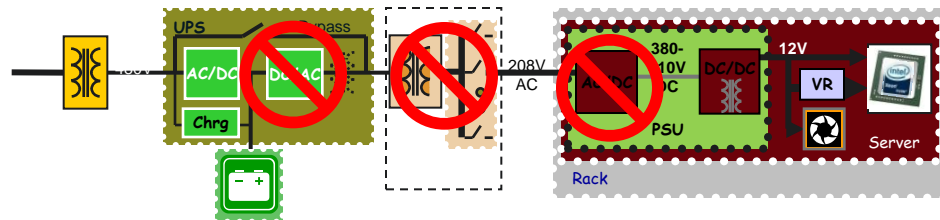
Efficiency↑ Voltage↑ Conversions↓

- Volume Priced Parts (< 420Vdc)

UCSD, Duke Energy, Intel IT (2011)

■ **Other Industries likely adopters**

- PV, Wind, Lighting, EV Charging, VFD Motors



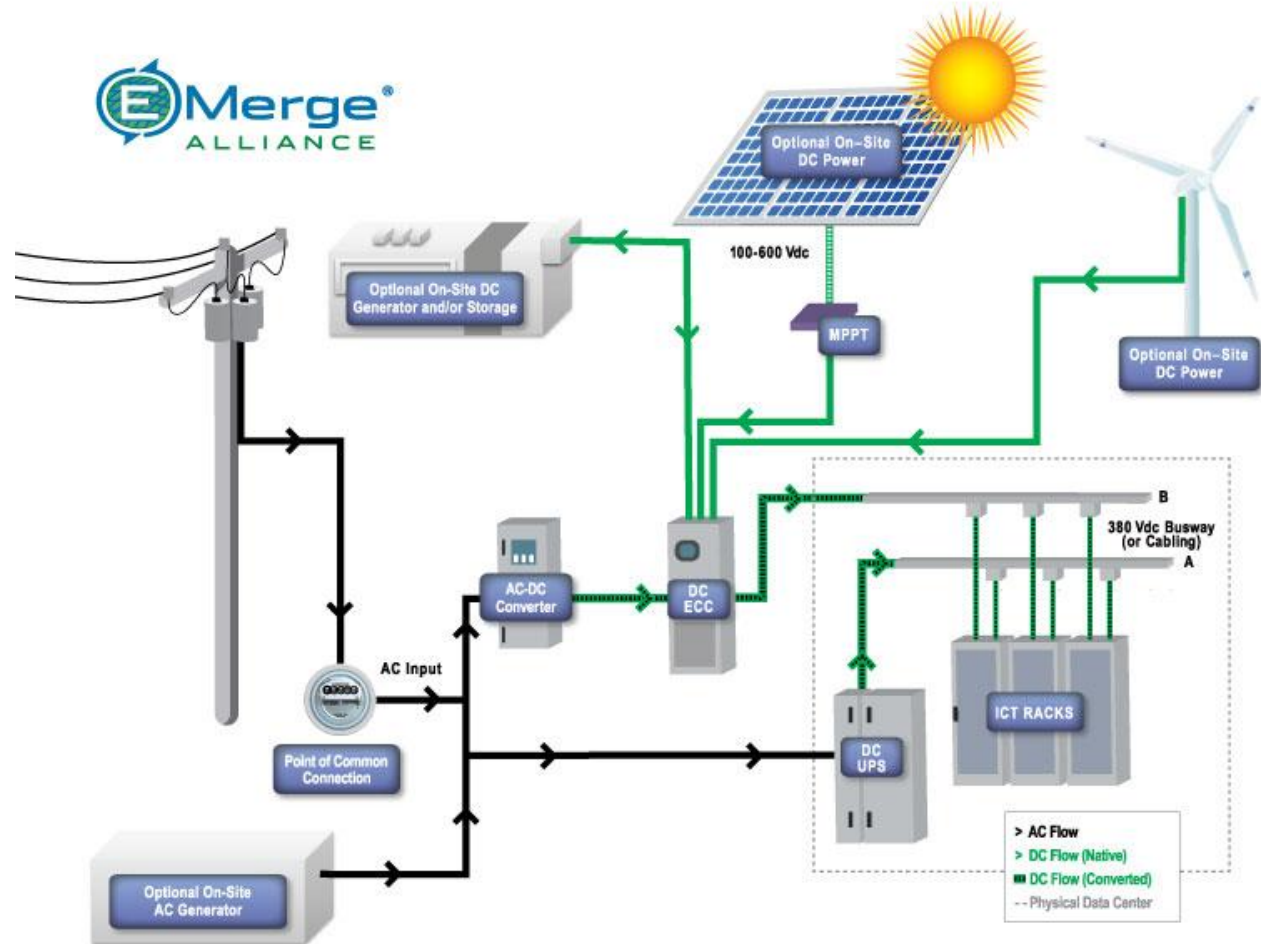
380VDC: Highest voltage with volume components, fewest conversions

¹ Intel, Intelc Paper, 2007 ² Intel, HP/EYP, Emerson, Whitepaper, 2009 ³ Validus/GE Study, 2010 ⁴ IEC 23E/WG2

2nd Standard: EMerge Alliance Data/Telecom Center Standard

380 Vdc - Developed for Telecommunications and Data Centers

Soon to be publicly announced



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Our Panel Today - David Holub / Hook Communications

David Holub, President of Hooked Communications, which builds Internet infrastructure. In his career he has had the opportunity to work on a wide variety of projects in Europe and Asia as well as throughout the U.S. and Canada, from start-up environments to being an officer in a NASDAQ listed company.

Clients and employers have ranged from various telecommunications carriers to Craigslist, Broadcom and Intel. David has been consulting at Bloom Energy for approximately 1 year, assisting them with the adoption of their Fuel Cell technology within Mission Critical environments.

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Our Panel Today - Dennis Symanski - EPRI

Dennis Symanski currently serves as a senior project manager in EPRI's Energy Efficiency Program within the Power Delivery and Utilization Sector. Specific research areas include coordinating demonstrations of emerging technologies such as the use of high voltage direct current (380VDC) to run the data center hardware, as well as evangelizing the adoption of best practices for the design and operation of data centers such as hot aisle containment and virtualization.

Before joining EPRI, Dennis worked on power quality standards and data center operations at Sun Microsystems and Data General; relay coordination, electric vehicles and windmills at New England Electric System; and electric power generation, transmission, and distribution at Exxon Research and Engineering.

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Our Panel Today - Lutz Boettger / ABB

Lutz Boettger is Vice President and Global Product Group Manager, Data Centers & Infrastructure at ABB. He is also North America Region Manager for ABB's Low Voltage Systems business. He has been with the company for over 15 years and has held global responsibilities in a variety of power systems related functions, working in Germany, Switzerland and the USA. Lutz holds a Masters degree in electrical engineering from the Rheinisch-Westfaelische Technische Hochschule (RWTH) Aachen, one of the premier German engineering schools.

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Our Panel Today – Mike Miller - HP

Mike Miller's on its way.

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