



An Update From...

EMerge Alliance

Reinventing Building Campus and Community Power

A Non-profit Alliance Creating Standards for use of Hybrid AC/DC Microgrid Power





The EMerge Alliance is the world's largest professional organization dedicated to advancing standards for hybrid alternating & direct current technology. It is an open industry association of collaborating commercial, government and academic organizations developing standards covering hybrid AC/DC microgrids used in commercial and residential buildings and campuses. EMerge standards facilitate the achievement of greater energy efficiency, safety, resiliency, and sustainability while maximizing the potential to use of clean, renewable on-site energy.

<http://www.emergealliance.org>

Update on the EMerge Alliance

Today's Speaker...



Brian T. Patterson
President
EMerge Alliance



100th Anniversary of the DC Microgrid

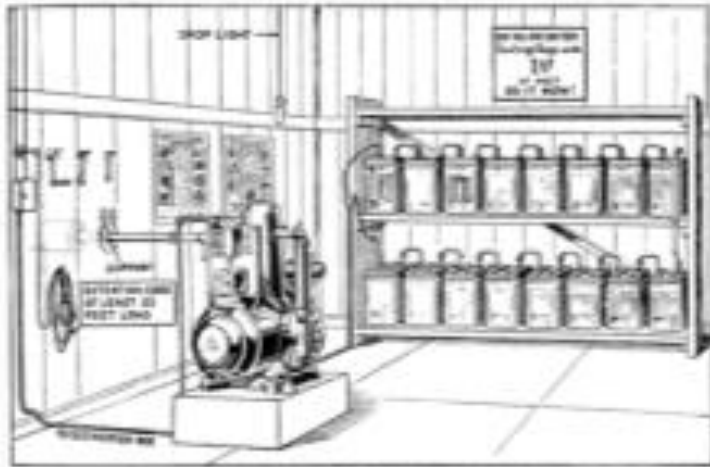


Fig. 250. Installation of a Delco-Light Plant, Showing Two-Two Shelf Rack for Battery

Completely Installed for \$248.00 *East of Mississippi River ~ Slightly Higher West ~*

Complete Installation Consists of

1. One Model 625 Delco-Light 32 Volt Generating Unit, equipped with Delco Starter.
2. Standard 6 Volt Exide Starting Battery.
3. Set-up of Plant, [concrete base to be furnished by Purchaser].
4. Wiring house for 5 outlets, to be located wherever specified by purchaser.
5. All supplies necessary, including wire, insulators, etc.
6. Standard Set of 5 Fixtures, complete with bulbs.
7. Price includes freight paid to all points east of the Mississippi.
8. Easy terms to suit convenience of purchaser.

This Model 625 Delco-Light Can Be Completely Installed in the Home Ready to Turn on the Lights, For Only \$248. (East of the Mississippi River)

DELCO-LIGHT
The Dependable Electric Plant
\$250

\$295

25 Styles and Sizes
1920 to 1975 fab Dayton, O.

Over 135,000 Satisfied Users

DELCO-LIGHT on the Farm

Completely Installed for \$248.00 *East of Mississippi River ~ Slightly Higher West ~*

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DELCO-LIGHT

DELCO-LIGHT USED HERE

Provided by **Emerge Alliance**



CONSIDER JOINING THE INDUSTRY'S LEADING BUILDING POWER STANDARDS AND TRADE ORGANIZATION...

If your company is focused on the commercial and/or residential building industry, consider joining the EMerge Alliance today as a new era in power sourcing, distribution and management in buildings is underway. The EMerge Alliance promotes better and more practical ways of getting the most out of both AC and DC power systems.

The Alliance is a nonprofit open industry association established to promote the adoption of safe, low-voltage hybrid ac/dc microgrids and other evolving power collection and distribution systems used in buildings. The Alliance develops and maintains open standards that integrate power sources, wiring infrastructures, controls and a wide variety of load devices, such as lighting, HVAC, appliances, IT gear and the connected Internet of Things in a common platform that adds flexibility, resiliency, economy, safety and sustainability for new and existing buildings. EMerge is focused on the building side of the utility meter. With a keen eye on renewable and site based distributed energy sources, the Alliance is helping prepare buildings for new energy platforms as part of an evolving new energy network, or Enernet.

WHO IS PART OF THE EMERGE ALLIANCE?

The EMerge Alliance has over 100 members representing a wide variety of industry stakeholders, including:

Equipment Manufacturers • Architecture/Design Firms • Electrical and Mechanical Engineering Firms
Sustainability & Energy Consultants • Energy Providers/Utilities • Building Owners/Developers/Contractors
Related Trade Organizations • Code & Regulatory Officials • Government • Academics

EMerge Membership Benefits

The EMerge Alliance has created a variety of membership opportunities to create a robust ecosystem of organizations that influence the residential & commercial building arena.

<p>Governing Member: Founding and/or Board Members who provide significant resources to establish and grow the Alliance</p> <p>Rights: Full voting and membership rights, budget oversight, strategic planning, committee creation and chair appointments, final standards approval. Priority member promotion and media participation.</p>	<p>Annual Membership Dues: \$25,000 Regional; \$50,000 Global <small>Requires approval by EMerge Board of Directors</small></p>
<p>Participating Member: Key suppliers of product and services in the domains covered by EMerge Standards</p> <p>Rights: Technical committee voting & full participation in committee proceedings, with a direct role in development of standards. Total access to all draft & final standards; Registered product listings and events/promotional activity participation in website, tradeshow and conferences; Committee Chair eligibility. Member promotion.</p>	<p>Annual Membership Dues: \$1,000 - \$10,000 *</p>
<p>General Member: Organizations wanting to use existing Standards</p> <p>Rights: Access to completed standards provided prior to public availability; attend general meetings; registration and web listing of products. Member promotion.</p>	<p>Annual Membership Dues: \$750 - \$5,000 *</p>
<p>Corresponding Member: Non-product manufacturers (including consultants/design and construction firms)</p> <p>Rights: voice in development of Standards and access to all draft and completed Standards; proposal and comment but no voting rights; Member promotion.</p>	<p>Annual Membership Dues: \$500 - \$2,000 *</p>
<p>Supporting Member: All others wishing to support and promote the EMerge platform</p> <p>Rights: No voting rights, may attend general meetings as determined by Board; marketing recognition for your support of the Alliance mission. Organization Logo display.</p>	<p>Annual Membership Dues: \$350</p>
<p>Liaison Member: Designed for other standards organizations, government, academic, and not-for-profit organizations to facilitate mutual development, cooperation and integration of the EMerge Alliance standards.</p> <p>Rights: No voting rights; may attend meetings/serve on selected panels, officially listed as part of the Alliance.</p>	<p>Annual Membership Dues: No Charge</p>

*Note: Fees are based on Gross Revenue. Consult the EMerge website or call for details for your organization.



EMerge “Vanguard” Standards?

- Leads instead of follows market adoption
- Creates market leadership opportunities
- Captures the leading edge of technologies and new use cases
- Proceeds traditional SDO standards (1-2 yr. vs 3-6 yr. cycle)
- Subordinate to existing regulations and listing (code) requirements
- Used to trigger regulatory and other standards updates
- Recognizes existing technologies & products to highest degree possible
- Does not depend upon new science or future inventions
- Has a bias toward minimization of requirements
- Allows for the maximum opportunity for future innovation



EMerge's Focus on Standards?

Timing:

- **Anticipatory**
- **Enabling**
- Responsive

Category:

- Terminology
- Health & Safety
- **Compatibility/Interoperability**
- Performance
- Procedural
- Etc.

Level:

- Component
- Device
- **System**
- **Infrastructure**



Affiliated Organizations



Gensler

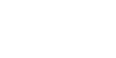
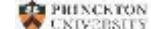
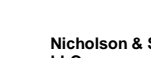
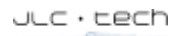
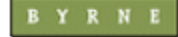
ciee



Turner



Paladino

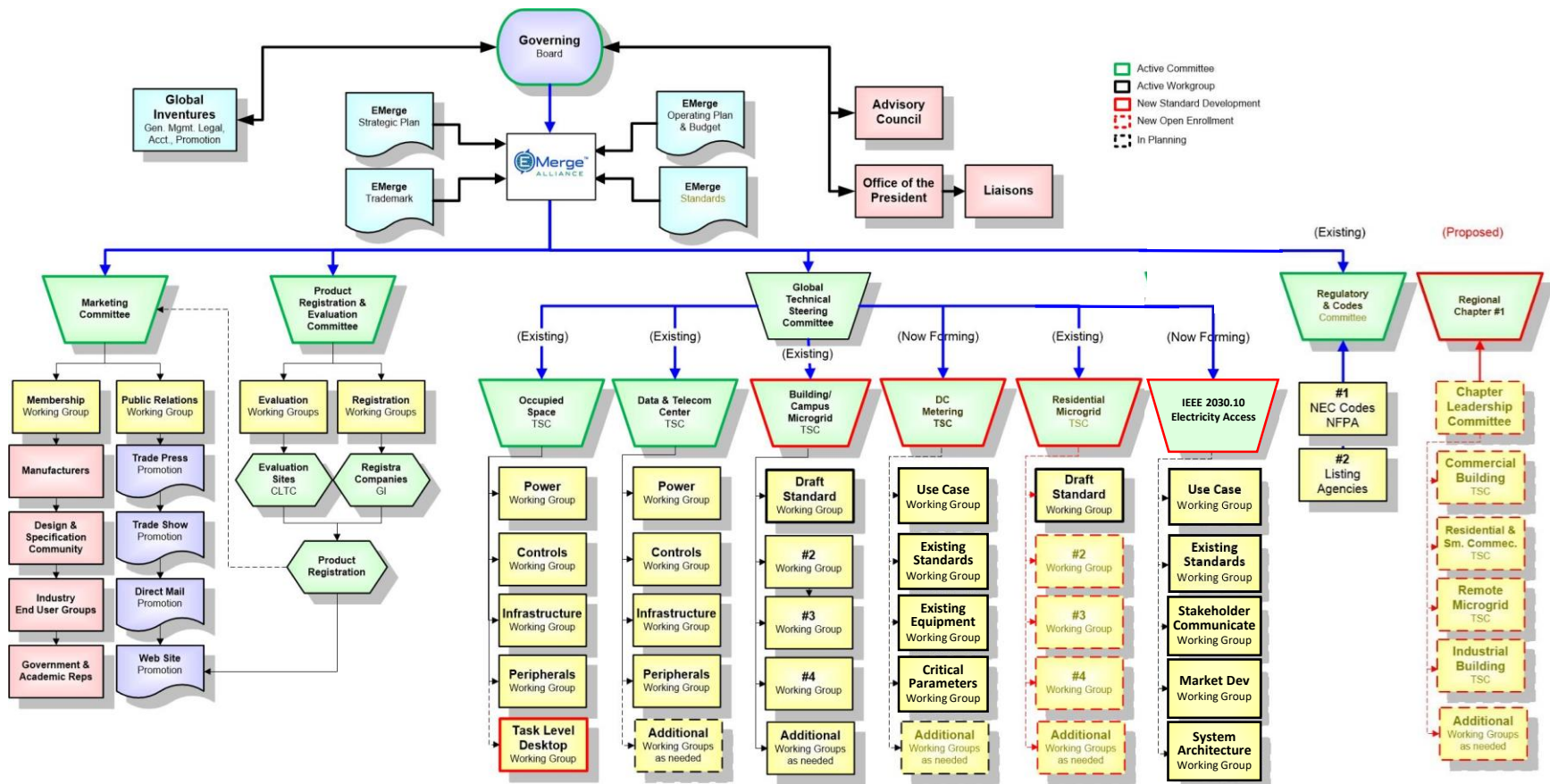


Networked Standards & NGO Organizations





Organization Chart



Membership Categories: Governing, Participating, General, Corresponding, Supporting, Liaison

EMerge Committees

- Leadership & Administration
 - Board of Directors
 - Administration
 - Finance
 - Legal
 - Advisory Council
- Technical Standards
 - Campus & Building Systems
 - Residential Building Systems
 - Occupied Space (building interiors)
 - Data Centers & Central Office Systems
 - DC Metering
 - Remote Access DC Microgrids (IEEE Joint Committee)
- Public Relations & Marketing
- Registration & Evaluation
- Codes & Regulatory

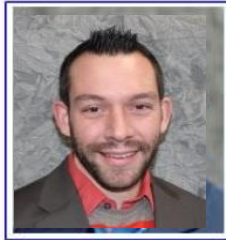
The Faces of EMerge

Chairman



Paul Savage
Nextek Power Systems

Treasurer



Dustin Hostetter
Armstrong/WAVE

Board Member



Terence Hill
PHIUS

Board Member



Gregory Reed
Univ. of Pittsburg

President



Brian Patterson
B. L. Coliker Assoc.

Support Manager



Beth Murphy
BAM Consulting

Co-Chairs
Marketing



Mia Antonia
JLC Tech

Chair
Occupied Space



Tim Martinson
dcFUSION



Ben Hartman
Nextek

Co-Chairs
Data/Telecom



Dave Geary
dcFUSION

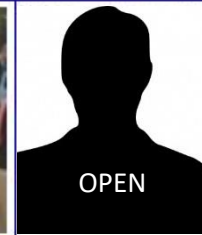


Sara Lisy
Emerson

Co-Chairs
Residential



Doug Hamborsky
Nextek



OPEN

Chair
Building/Campus Product Regis.



Guy Allee
Intel



Leigh Marolf
TE Connectivity

Remote Access
DC Microgrids



Wayne Gutschow
Nextek

DC
Metering



David Lawrence
Duke Energy



System Application Standards



Issued	• <i>Occupied Space</i>
Issued	• <i>Data Center & Central Office</i>
Active	• <i>Task Level (desktop & plug loads)</i>
Active	• <i>Whole Building Microgrids</i>
Pending Draft	• <i>Outdoor DC / Electric Vehicle Charging</i>
Pending Draft	• <i>Building Services (HVAC)</i>
New in 2017	• <i>Residential & Light Commercial</i>
New in 2017	• <i>DC Metering</i>
	• <i>Remote Access DC Microgrid</i>



Technical Standards Committees Updates



Occupied Space Standard

Status: Issued/Active

CHAIRMAN: Ben Hartman – Nextek Power Systems

PURPOSE:

The Occupied Space Standard is intended to define requirements for commercial building interiors including ceiling, wall, floor, and desk top power service for low voltage dc or hybrid ac/dc outlets using various types of hybrid ac/dc and pure dc distribution configurations.

OVERVIEW:

- Completed version includes ceiling and desktop service using ac/dc sources and LVDC final distribution.
- Current version defines 24Vdc final distribution with 120-277Vac and 380Vdc backhaul.
- Updates in work include 48 and 380Vdc final distribution alternatives
- Intended to either interconnect with hybrid ac/dc building microgrid or traditional building power systems

ENROLLMENT: Open



Data Center/Central Office Standard

Status: Issued/Active

CHAIRMAN: Dave Geary – Power Analytics/dcFUSION, Sara Lisy - Emerson

PURPOSE:

The DC/CO standard is intended to define requirements for commercial data centers and central offices. It includes the power system for data racks, and auxiliary data room equipment power service for low voltage dc or hybrid ac/dc outlets, plug strips and other fixed terminations including both 24Vdc and 380Vdc lighting using various hybrid ac/dc and pure dc distribution configurations.

OVERVIEW:

- Completed version includes rack, aux. and lighting service using ac/dc sources and LVDC and LVAC final distribution.
- Current version defines 380Vdc primary distribution with 120-277Vac and 380Vdc backhaul.
- Next Updates will include general building interconnect to building microgrids
- Intended to either interconnect with hybrid ac/dc building microgrid or traditional building power systems

Enrollment: Open



DC Metering Standard

Status: New/Active

CHAIRMAN: David Lawrence – Duke Energy

PURPOSE:

The Direct Current Smart Meter Standard is intended to define requirements for revenue grade metering of medium and/or low voltage dc in various types of hybrid ac/dc and pure dc microgrids and other power systems for either grid tied or off-grid applications where no grid is available.

Market applications driving the use of direct current in microgrids and other power systems include:

- solar, wind and other native dc renewable energy use in buildings, campuses & communities
- energy storage and net metering
- dc fast charging of electric vehicles
- increasing use of electronic devices, brushless dc motors in appliances and professional & consumer equipment
- servicing remote microgrids with limited or no access to utility grids.

INITIAL TASKS AND WORKGROUPS:

1. Use Cases
 - a. Identify & Engage Stakeholders
 - b. Stakeholder survey of uses & requirements
 - c. Define use cases
2. Collect & review existing standards
3. Collect Relevant Equipment Literature
4. Identify critical parameters and capabilities

LATER TASKS AND WORKGROUPS:

1. Draft Standard WG
 - a. Types of Meters
 - b. Design & Construction
 - c. Testing
 - d. Performance Requirements
 - e. Accuracy Requirements
2. Testing & Certification Agency Identification
3. Final Document Preparation



DC Metering Standard

Status: New/Active

CALENDAR & MEETING DATES:

- Time of Day: 2 PM EDT, 11 PDT
- Day of Week: Tuesday
- Week of Month: Third
- Frequency: Once per month
- Notices: Via email
- Attendance: Roll-call at meetings
- Meeting Format: Online

ENROLLMENT: Open

Note: To be coordinated with NEMA lead workgroup for ANSI C12 Metering Standards



Building/Campus Microgrid Standard

Status: In Draft / Active

CHAIRMAN: Guy AlLee— Intel

PURPOSE:

The Building/Campus Microgrid Standard is intended to define requirements for commercial buildings and campuses including basic building utilities, outdoor, occupied spaces and data centers, and other sub-system power service for low voltage dc or hybrid ac/dc utilization circuits and building to building interconnection using various types of hybrid ac/dc and pure dc distribution configurations. Interconnection of on-site, community renewable and utility power sources, and storage in both connected and islanded modes is included.

OVERVIEW:

- Completed use case. existing standards, existing equipment and configuration evaluation.
- Draft standard is being prepared.
- Initial vetting of draft expected first half 2017
- Issue of version 1.0 expected in 2nd half 2017

ENROLLMENT: Open



Residential Building Microgrid Standard

Status: In Draft / Active

CHAIRMAN: Doug Hamborsky

PURPOSE:

The Residential Building Microgrid Standard is intended to define requirements for residential buildings including basic home utilities, outdoor, interior spaces, vehicle charging, ITC and home entertainment centers, and other sub-system power service for low voltage dc or hybrid ac/dc utilization circuits and building to building interconnection using various types of hybrid ac/dc and pure dc distribution configurations. Interconnection of on-site, community renewable and utility power sources, and storage in both connected and islanded modes is included.

OVERVIEW:

- Completed use case. existing standards, existing equipment and configuration evaluation.
- Draft standard is being prepared.
- Initial vetting of draft expected first half 2017
- Issue of version 1.0 expected in 2nd half 2017

ENROLLMENT: Open

Electricity Access Standard



IEEE P2030.10 / IEC SyC WG 3
Standard for
DC Microgrids for Rural and Remote
Electricity Access Applications



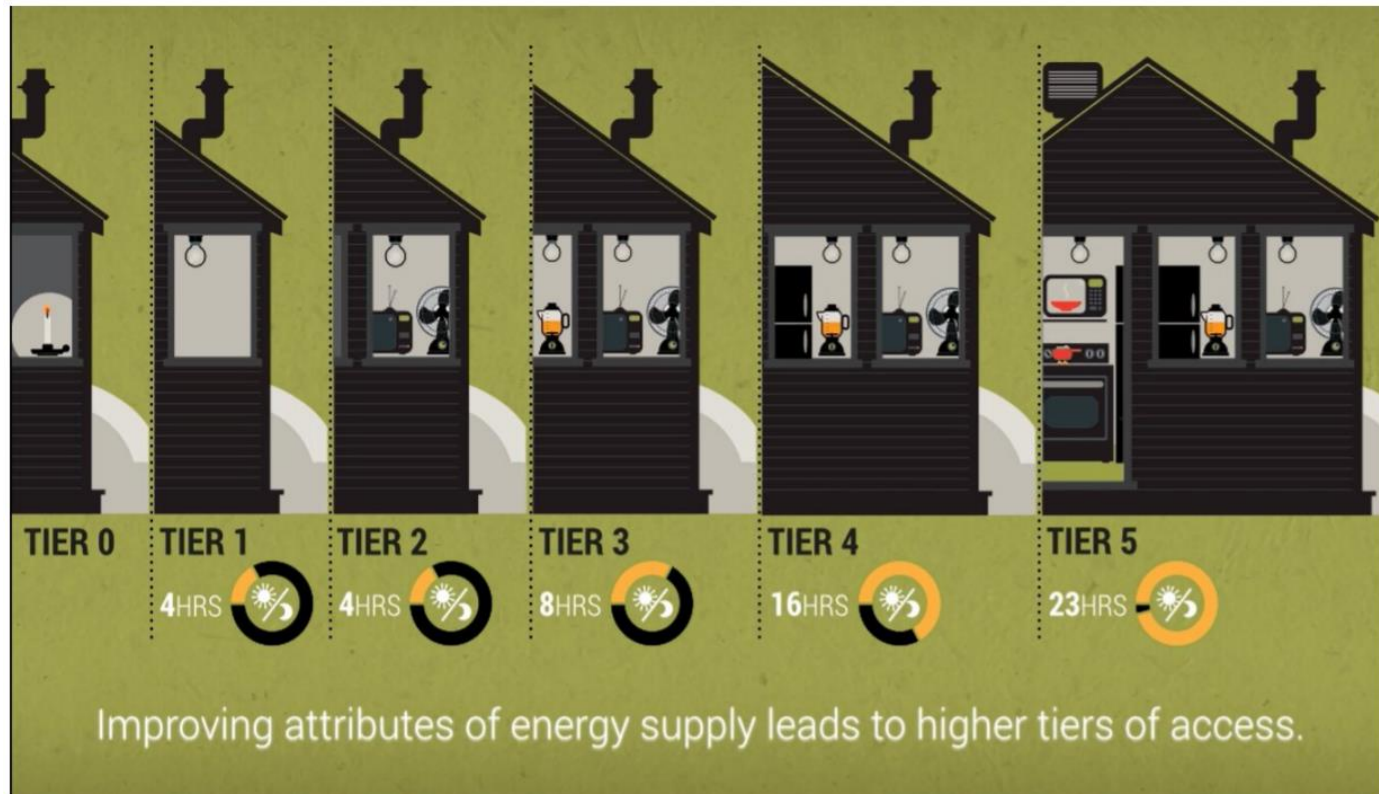
The Goal

To create a technically enabling interoperability Global standard for electricity systems that can provide safe and economic access to electricity in areas of developed and developing countries where centralized electric power generation, transmission and distribution infrastructure does not yet exist.



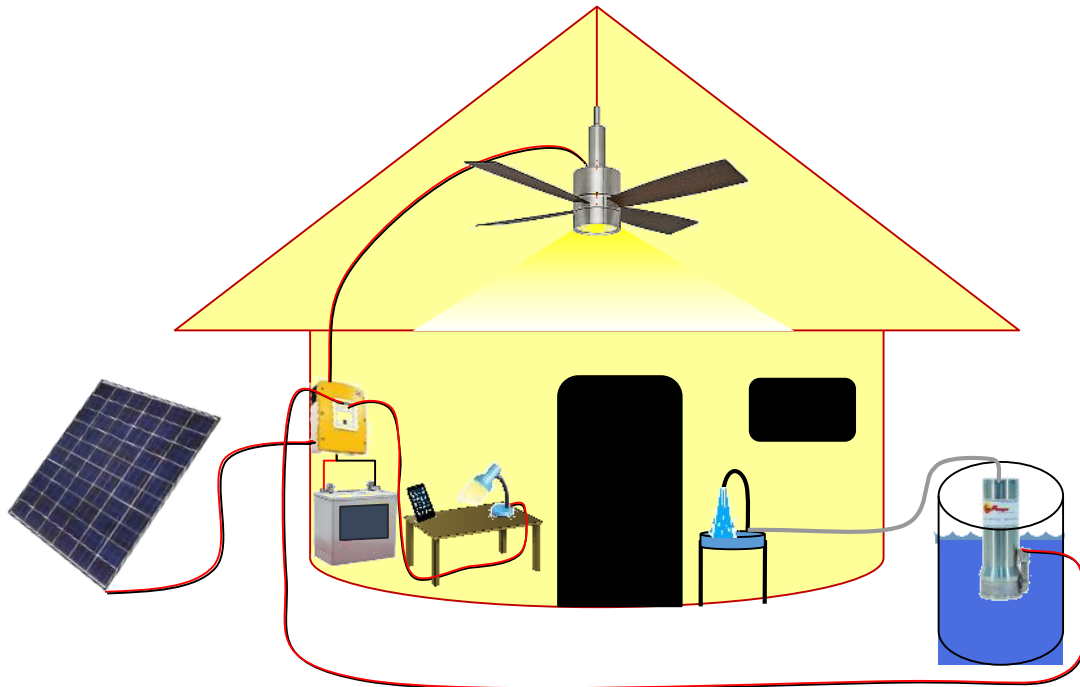
Note: To be coordinated with the IEC LVDC SyC WG on Electricity Access.

Defining the Initial Scope of the Work

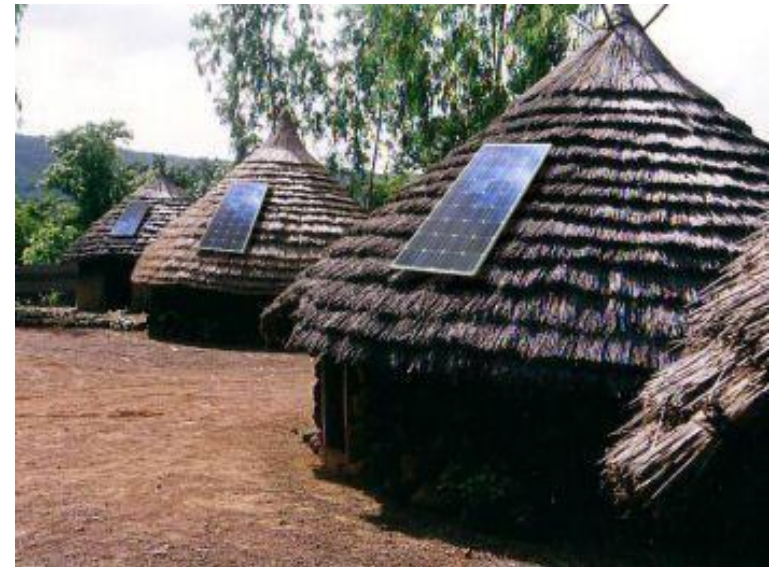
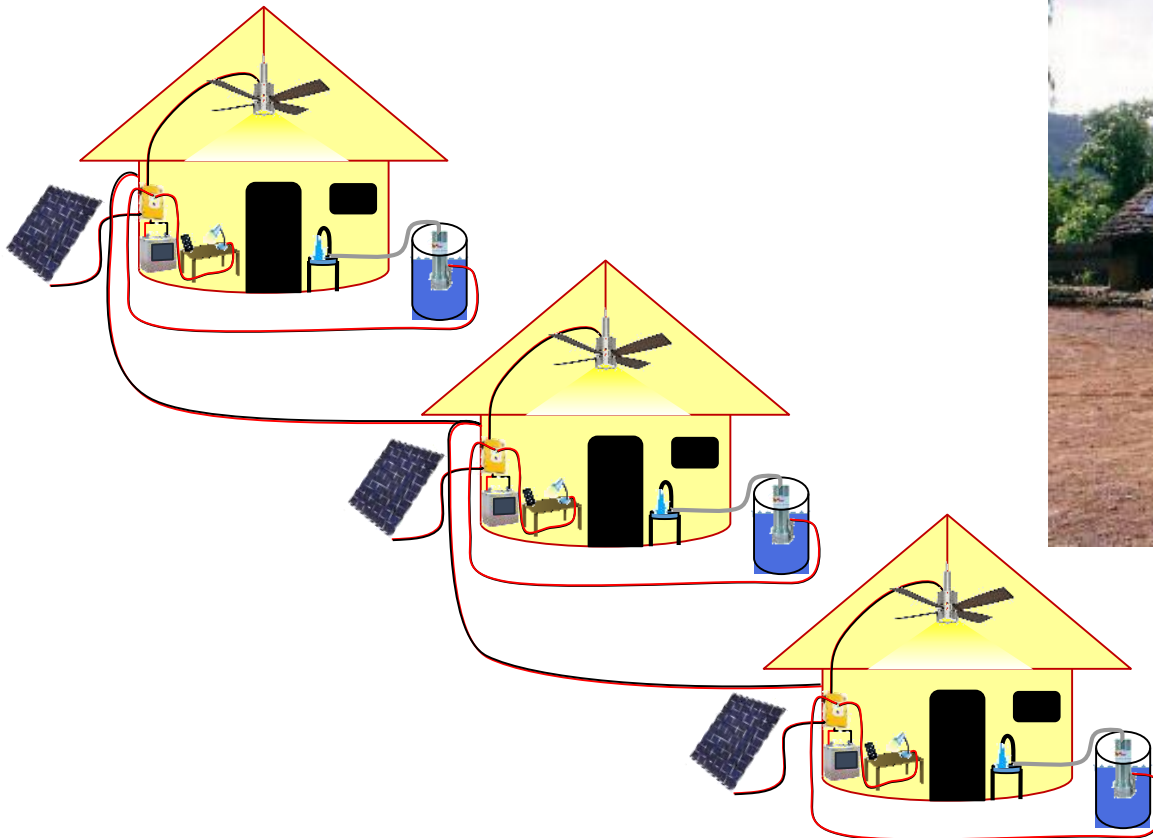


Tiers 1 thru 3 - Level 1

Individual Dwelling Microgrids



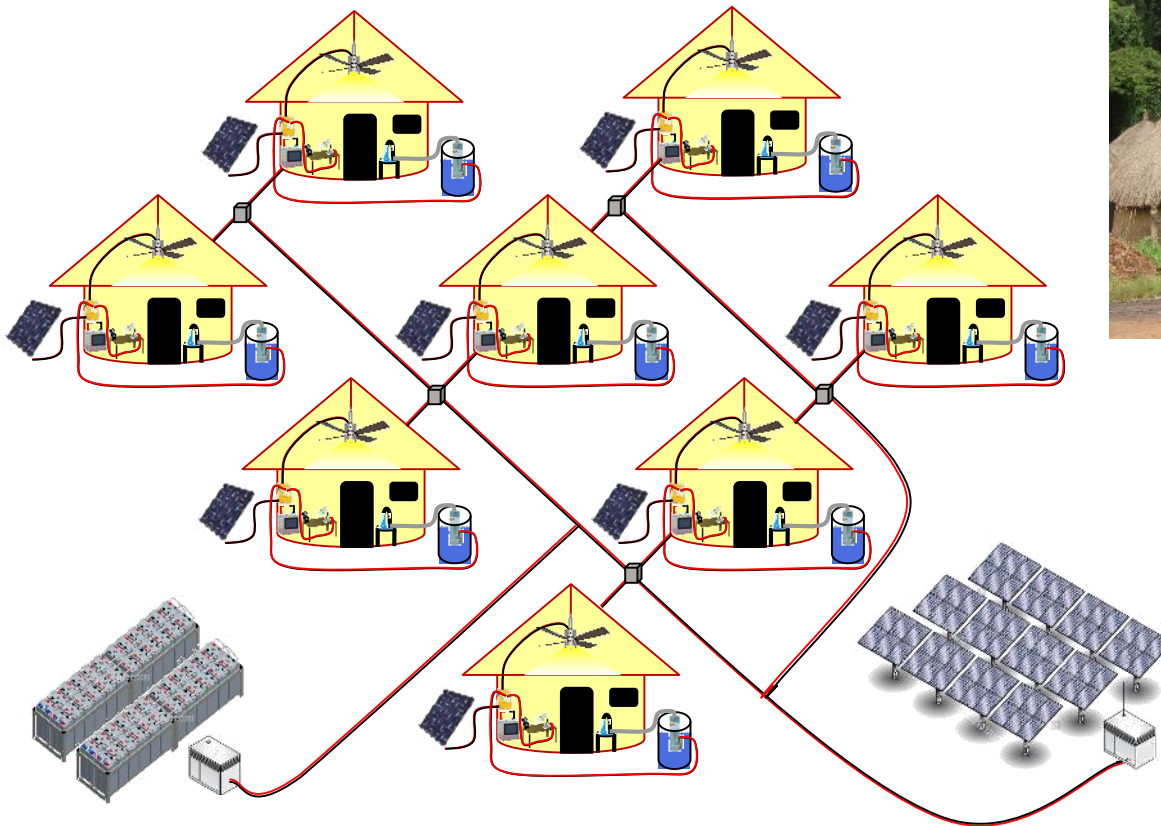
Neighborhood Microgrids





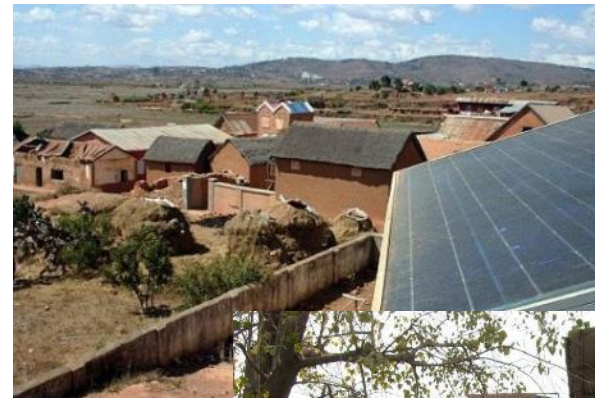
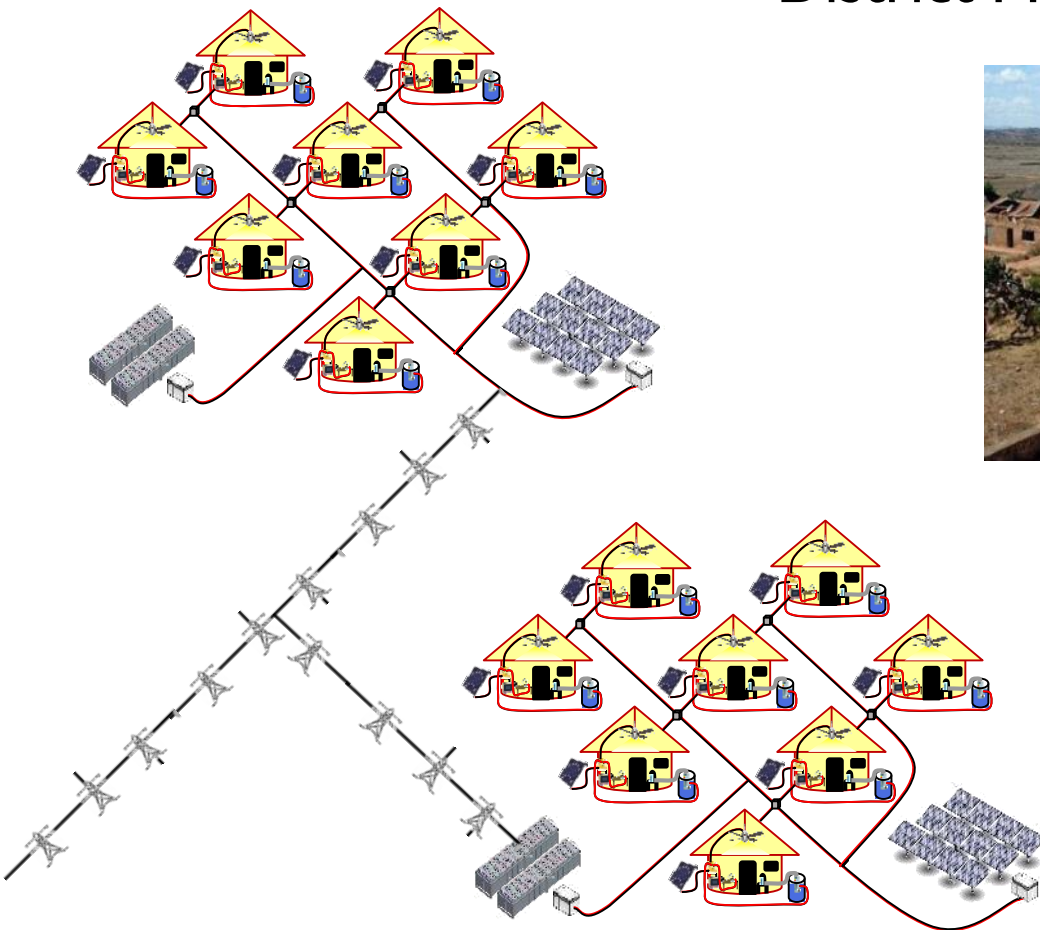
Tiers 1 thru 4 - Level III

Community (Village) Microgrids

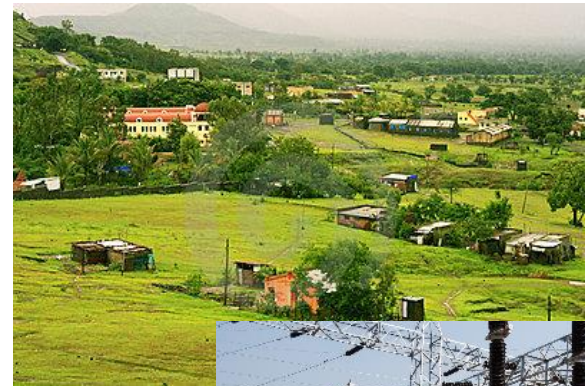
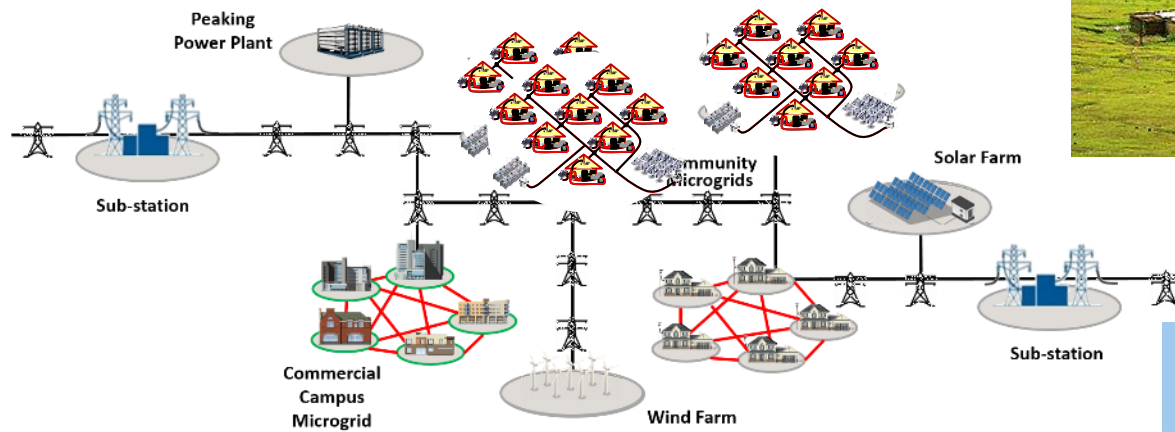


Tiers 1 thru 5 - Level IV

District Microgrids

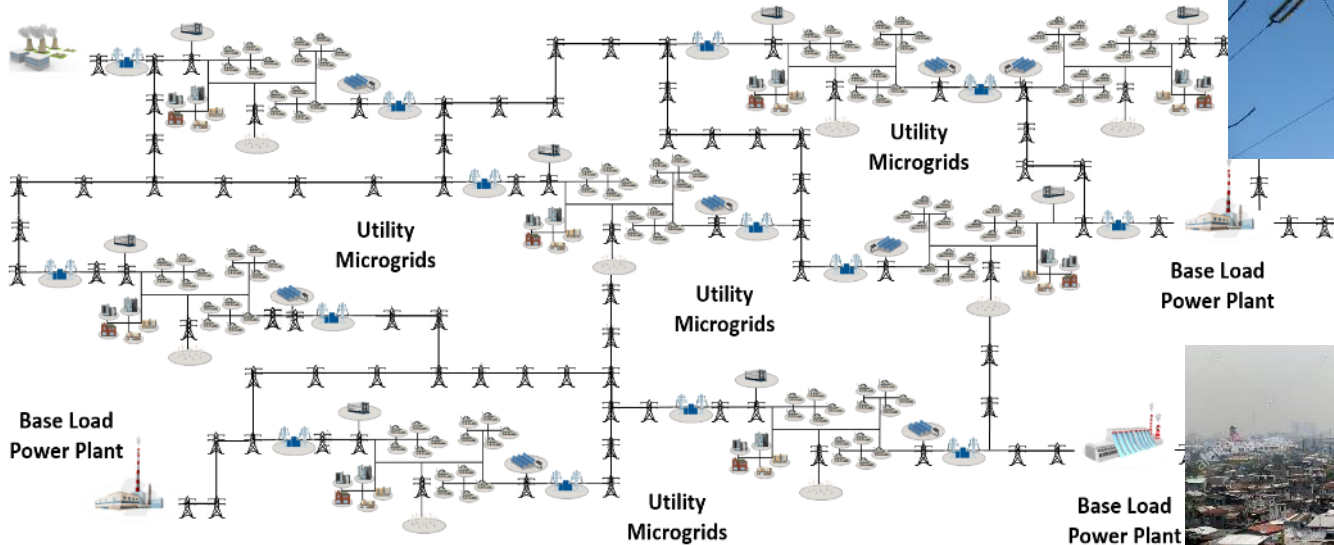


Regional Grids



National Grids – Multinational – Continental – Intercontinental - Global

Base Load
Power Plant





The Enernet

World-Wide Grid

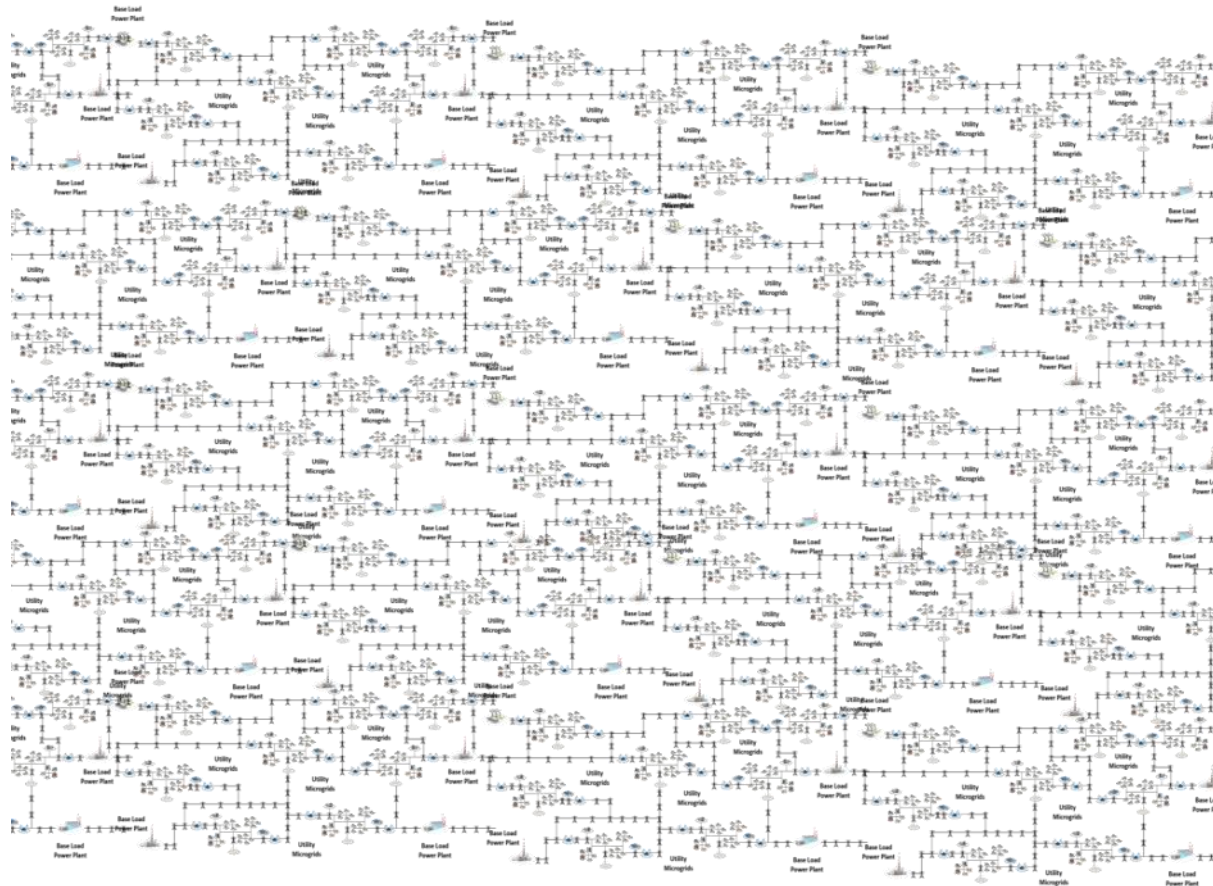
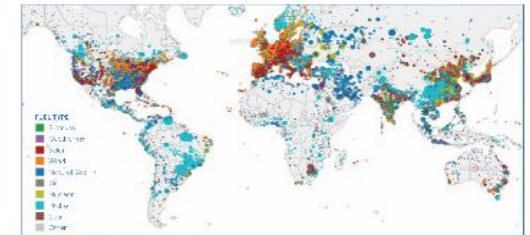


Figure 7: Globe: Power Plant Fleet by Technology





Interested in Joining IEEE 2030.10

Mike Kipness

m.kipness@ieee.org

For Additional Information about the 2030.10 Committee

Beth Murphy

Membership and Programs Manager

bmurphy@emergealliance.org



**Interested in Joining the Webinar @
1PM Today**

IEEE 2030.10

smartgrid.ieee.org



EMerge Event Participation

Emerge 2016 Event History

March 3, 2016

Pittsburgh, PA

Grand Opening – Energy Innovation Center

University of Pittsburgh

March 17, 2016

Carlisle, PA

USGBC GreenCon 2016

Dickinson College

April 5, 2016

Denver, CO

ASC - DC Project Roundtable

Alliance for a Sustainable Colorado

April 13, 2016

Washington, DC

UCLA (SMERC) – Innovation Thought Leadership Forum

Univ. of California, Wash. Center (UCDC)

April 21, 2016

Pittsburgh, PA

AIA Pittsburgh – Build Pittsburgh

David L Lawrence Convention Center

April 26-28, 2016

San Diego, CA

Lightfair International

San Diego Convention Center

April 26-28, 2016

San Diego, CA

CABA Intelligent Buildings and Digital Home Forum

Handlery Hotel San Diego

May 3-5, 2016

Dallas, TX

IEEE/PES T&D Conference & Expo

Dallas Convention Center

May 11-12, 2016

Washington DC

2016 Energy Efficiency Global Forum

Walter E. Washington Convention Ctr.

June 1-3, 2016

Washington, DC

Distributed Energy Development & Deployment

Washington Plaza

June 19-24, 2016

Aspen, CO

American Renewable Energy Forum

Viceroy Snowmass

September 1-2, 2016

Tokyo, Japan

IEC SEG4

Japan Electric Association Hdqtrs.

September 12-15, 2016

Las Vegas, NV

Solar Power International 2016

Las Vegas Convention Center

Smart Energy Microgrid Pavilion

September 21-25, 2016

Philadelphia, PA

11th Annual North American Passive House Conference

DoubleTree by Hilton Phila. Center

October 5-6, 2016

Los Angeles, CA

Greenbuild 2016

Los Angeles Convention Center

Net Zero Zone Pavilion

October 23-26, 2016

Austin, Texas

Intelec 2016

Renaissance Austin

November 11, 2016

Pittsburgh, PA

11th Ann. Pitt Electrical Ind. Conference

Pittsburgh Energy Innovation Center

November 28-30, 2016

Cleveland, OH

EnergyTech 2016

Securing Our Energy Future

Emerge 2017 Planned Events

January 5-8, 2017

Las Vegas, NV

CES Conference and Exhibition

Smart Energy Marketplace
Las Vegas Convention Center

January 19-20, 2017

Paris, FR

IEC-SEG4

F.I.E.E.C

Centre d'affaires Espace Hamelin

February 15, 2017

Denver, CO

ASC – DC Project Update

Alliance for a Sustainable Colorado

March 26-30, 2017

Tampa, FL

IEEE - Advanced Power

Electronics Conference & Expo

Tampa Convention Center

April 5-7, 2017

Boston, MA

ACI Microgrid Conference

Hyatt Regency Boston

May 8-12, 2017

Philadelphia, PA

LIGHTFAIR International

Philadelphia Convention Center

May 22-24, 2017

Nairobi, Kenya

IEC LVDC SyC - 1st IEC International

Conf. on LVDC for Electricity Access

Intercontinental Hotel

September 10-13, 2017

Las Vegas, NV

Solar Power International 2017

Mandalay Bay Convention Center

Smart Energy Microgrid Hall

November 8-10, 2017

Boston, MA

Greenbuild 2017

Boston Convention & Exhibition
Center

Net Zero Zone Pavilion

January 9-12, 2018

Las Vegas, NV

Consumer Electronics Show

Las Vegas Convention Center

Smart Energy Marketplace

In the next five years, Microgrids will grow into a \$40+ billion market. And, the forecast of Solar powered systems in buildings is expected to grow into a \$10+ billion market by 2020.

Smart Energy Microgrid Tradeshows



To ensure your company is leading the way, EMerge facilitated tradeshows will provide unique opportunities to showcase your products and systems that serve these growing markets.



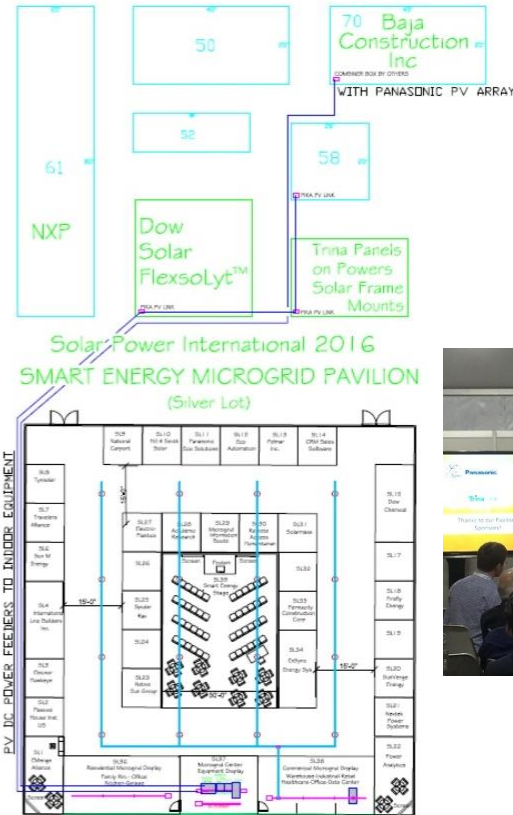
Largest Solar Trade Show in North America

Solar Power International is the fastest growing and largest solar show in North America as recognized by *Trade Show Executive* and *Trade Show News Network*.



Participating Suppliers

-  **Armstrong** • Armstrong World Industries
-  **baja** CONSTRUCTION INC. • Baja Construction Co.
-  **CE+T** • CE+T
-  **Dow** • Dow
-  **ELTEK** • Eltek
-  **EnSync** • EnSync Energy Systems
-  **EVERLAST LIGHTING** • Everlast Lighting
-  **JLC Tech** • JLC Tech
-  **NEXTEK** • Nextek Power Systems
-  **Panasonic** • Panasonic
-  **Pika ENERGY** • Pika Energy
-  **POWER ANALYTICS** • Power Analytics Corp.
-  **POWERS SOLAR FRAMES** • Powers Solar Frames
-  **simpliPhi** • SimpliPhi
-  **Solar Mass** • Solar Mass Energy
-  **Trina Solar** • Trina Solar
-  **UNIVERSAL ELECTRIC CORPORATION** • Universal Electric



Sponsored by



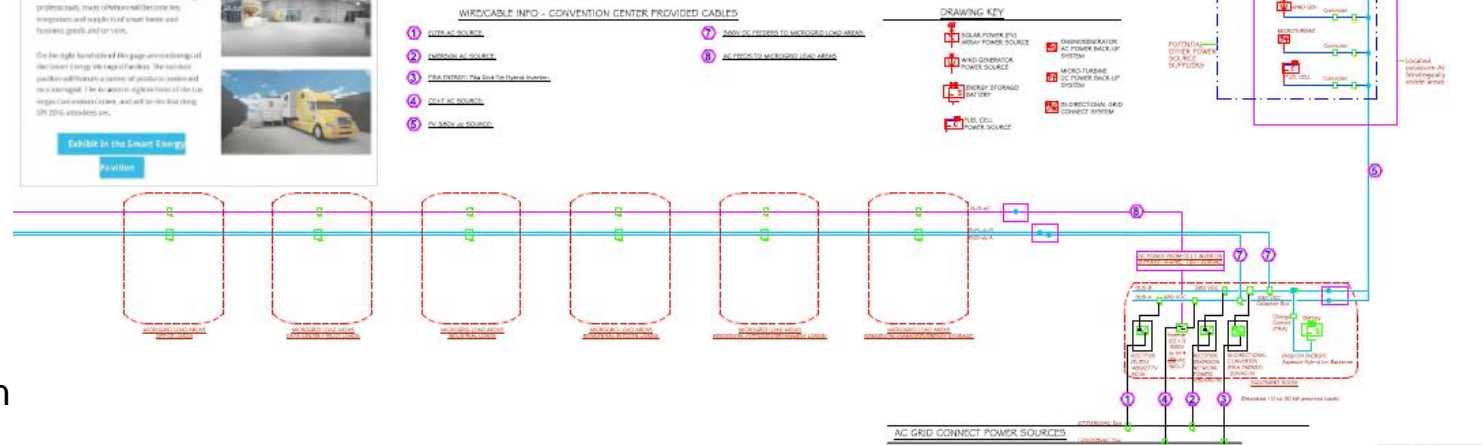
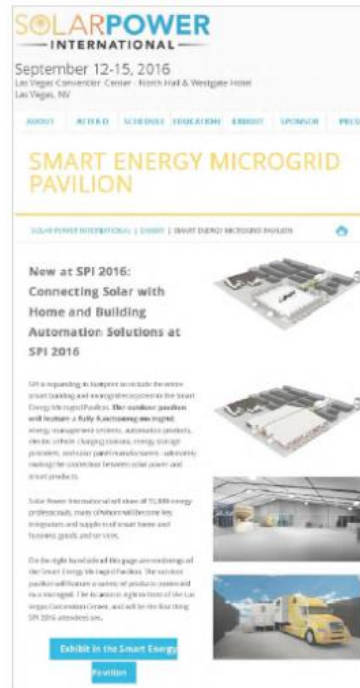
Facilitated by



How It Worked

Description:

- Exhibitor could choose:
 - 120 Vac
 - 24Vdc
 - 48Vdc
 - 380Vdc
- Power sources and batteries sat on the bus behind a disconnect
- Power management converted ac source and managed dc bus
- MEP team coordinated interconnect design & specs.



Net Zero Energy Pavilion



Produced by



GREENBUILD

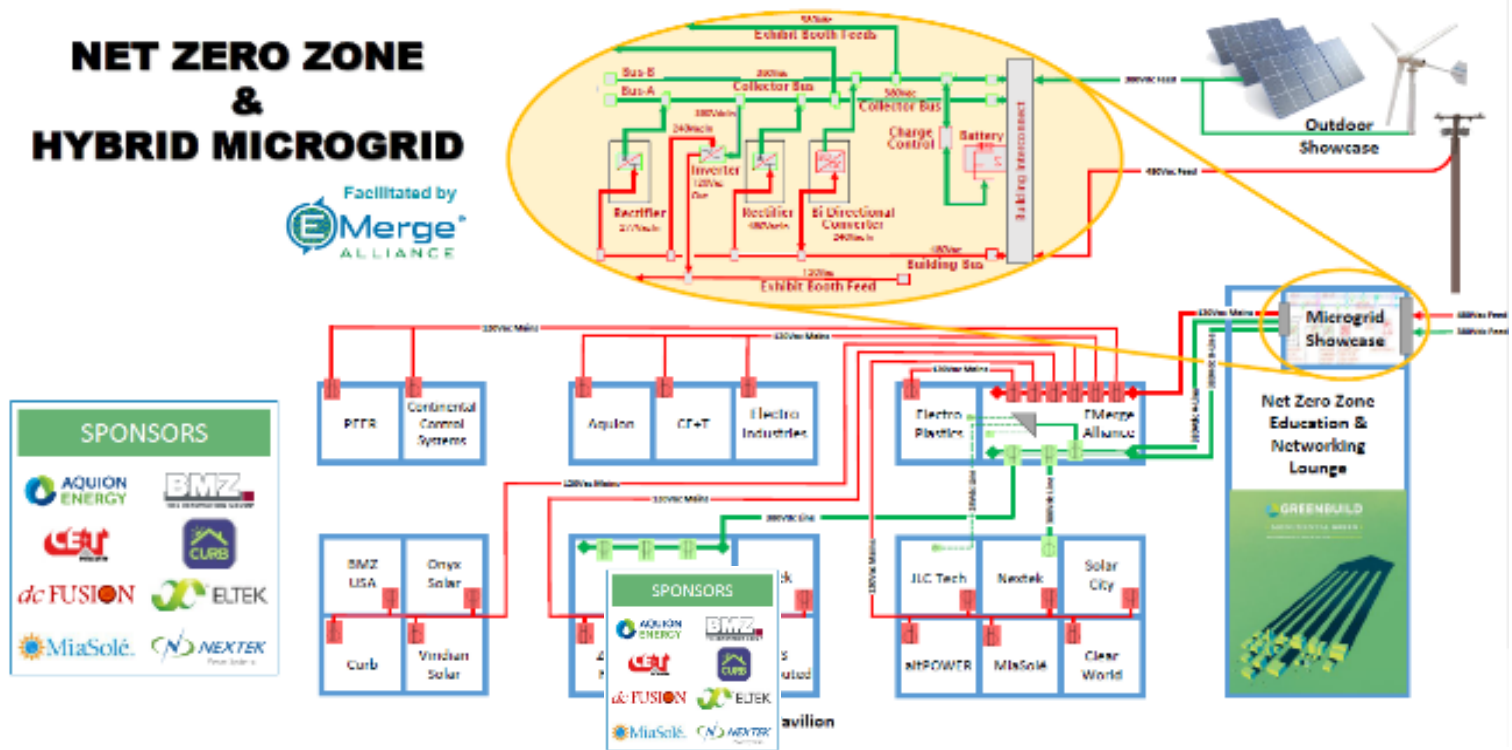
INTERNATIONAL CONFERENCE AND EXPO

ICONIC *Green*

Greenbuild International 2016

NET ZERO ZONE & HYBRID MICROGRID

Facilitated by
Emerge
ALLIANCE



The Net Zero Zone is produced with:



And Powered by:

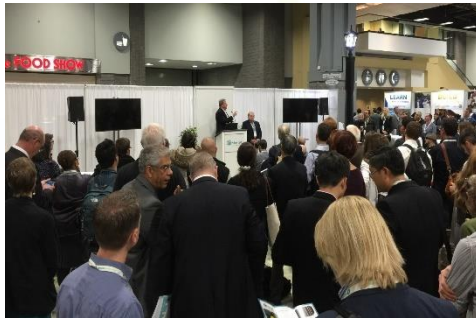


2016 Participating Exhibitors

- ACT D'MAND Systems
- ADC Energy
- Accuenergy Inc.
- altPOWER, Inc.
- Calmac Manufacturing Corporation
- Canadian Solar
- ChargePoint, Inc.
- Conserval Systems
- Eclipse Lighting, Inc.
- Electro Industries/Gauge Tech
- Electro Plastics/Step Warmfloor
- Emerge Alliance
- JLC-Tech LLC
- Kyocera Solar Solutions & Communications
- LA Solar Group
- Messana Air-Ray Conditioning
- MiaSole
- Nextek Power Systems
- Next Generation Energy
- Promise Energy
- Prudential Lighting
- Ryukyu Dengen Kaihatsu Co., LTD
- SolarCity
- Zehnder America, Inc.

The Net Zero Zone

- A special promotional area on the exhibit floor
- Focused exhibit space, presentation theatre and a live Microgrid demonstration
- Promoted as a special destination at the show.
- Special directory info, signage, destination tours educational program, opening ceremony with key notables, live on-floor industry briefings and more.



A UNIQUE DEMONSTRATION AND EXHIBITION OPPORTUNITY FOR THE BUILDING MICROGRID MARKET



THE AC/DC HYBRID MICROGRID DEMONSTRATION

- Participate directly in the live demonstration with your products
- Have your own booth to focus on all your products and services
- The “Zone” will be a destination for tours, industry focus presentations and special events to drive visitor traffic
- Become a presenter of information about your company’s offerings



A UNIQUE DEMONSTRATION AND EXHIBITION OPPORTUNITY FOR THE BUILDING MICROGRID MARKET

Come Discover the **NEXT BIG THING...**



LAS VEGAS, NV
JANUARY 5-8, 2017

Smart Energy Marketplace

Produced by



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Control The Future, Invent It



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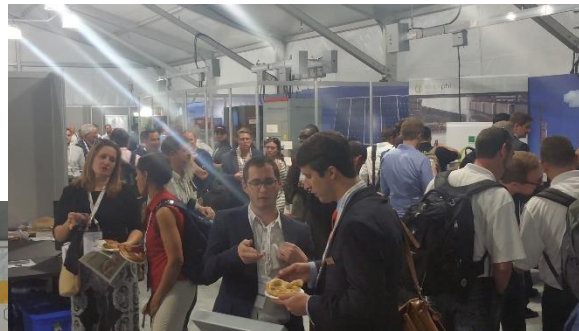


THE NEXT BIG THING:



THE BUILDING OF AN

ENERNET



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