



The Green Grid Technical Forum 2011

March 1-2, 2011 ~ Santa Clara, CA

Call to Action: Help Us Make the Technical Forum More Sustainable

The Green Grid is excited to expand its mission to include sustainability in data centers, but it is important that the focus on sustainability does not end there. With attendees' help, we are committed to making strides to improve the sustainability of The Green Grid's events.

At this year's Technical Forum, we implemented a number of strategies to minimize the environmental impact of this conference including:

- ❖ Reducing food packaging by using bulk items whenever possible
- ❖ Composting food and other biodegradable products
- ❖ Increasing the number of recycling stations
- ❖ Participating in the Feeding America program to donate leftover food to a local charity
- ❖ Replacing water bottles with water coolers
- ❖ Using glassware and silverware instead of plastic materials
- ❖ Reducing the amount of printed materials
- ❖ Encouraging attendees to return their name badge holders and lanyards for reuse at future events

These are just some of the small steps that we have taken to improve the sustainability of our Technical Forum. We recognize that there are many other ways that we can reduce the environmental impact of The Green Grid's events and look forward to making additional improvements at future conferences.

We appreciate your assistance with minimizing waste, recycling, and returning your name badge and lanyard. We welcome your feedback on additional steps we can take to be more sustainable so please let us know if you have any suggestions. Thank you for your support as we look to improve the sustainability of our events!

Participate in the Discussion on Twitter!
 Be sure to join the conversation about The Green Grid Technical Forum on Twitter! As you are tweeting, use **#TGG11**.

Tuesday, March 1, 2011 (members-only)		
7:30-8:30	Registration	
	Track 1	Track 2
8:30-9:15	Keynote by John A. "Skip" Laitner - A Target on Their Backs: ICT and the Economic Imperative of Energy Efficiency	
9:25-10:15	Plotting a Path to Sustainability with The Green Grid's Data Center Maturity Model	ANSI/ASHRAE 90.1-2010 "Economization and You"
10:15-10:30	Networking Break	
10:30-11:20	An Analysis of Server Virtualization Utility Incentives	Considerations in the Deployment of Containerized or Modular Data Center Facilities
11:30-12:20	Why Aren't We Using Server Power Management?	Sweat the Small Stuff – Incremental Energy Efficiency Improvements Provide Big Results
12:20-1:15	Lunch and Roundtable Discussions	
1:15-2:05	Server Power Management 101	EPA ENERGY STAR for Data Center Equipment
2:15-3:05	Coming Soon to a Data Center Near You: EU Code of Conduct, Version 2	Qualitative Analysis of Cooling Architectures
3:05-3:20	Networking Break	
3:20-4:10	Making the Business Case for Energy Efficient Data Centers	ASHRAE2008 Deployment Japan Survey and Japanese Case Studies on Data Center Efficiency
4:20-5:05	State of The Green Grid and Members Meeting	
5:05-5:20	Key Contributor Award Ceremony	
5:20	Members Networking Reception	

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Wednesday, March 2, 2011			
8:00-9:00	Registration		
	Track 1	Track 2	Track 3
9:00-9:30	State of The Green Grid		
9:30-10:30	Keynote by Robert D. Atkinson - Policy Makers are Focused on You, Not the Real Problem		
10:30-10:45	Networking Break		
10:45-11:35	Plotting a Path to Sustainability with The Green Grid's Data Center Maturity Model	Using the Data Center Design Guide to Improve the Efficiency of Your Data Centers	Corporate Social Responsibility and the Energy Efficient Data Center – Gimélec
11:45-12:35	Using CUE™ and WUE™ to Improve Operations in Your Data Center	Beyond Energy: The Sustainable Data Center	DC Pro IT Tool / DOE Data Center Energy Practitioner (DCEP) Program: February 2011 Progress Report
12:35-1:30	Lunch		
1:30-2:20	Data Center Efficiency Metrics: PUE™, Partial PUE, ERE, DCcE	Understanding and Engaging Utility Incentive Programs	The Collision Course of Data Center Site Selection and Sustainability
2:30-3:20	EPA ENERGY STAR Rating Systems for Data Centers – Experience from the First Six Months	Global Harmonization of Data Center Efficiency Metrics	Utilizing the SDK Energy Checker
3:20-3:35	Networking Break		
3:35-4:25	The Data Center Pulse Top Ten	Determining the Implications of Unused Servers and How They Can Be Addressed	The Latest on The Green Grid's Productivity Research
4:25-5:00	Closing Ceremonies		

Keynote Speakers



John A. "Skip" Laitner

Economic and Social Analysis Program Director, ACEEE

Skip Laitner is the Director of Economic and Social Analysis for ACEEE. He previously served 10 years as a Senior Economist for Technology Policy for the U.S. EPA, but chose to leave the federal service in June 2006 to focus his research on developing a more robust technology and behavioral characterization of energy

efficiency resources for use in energy and climate economic policy models. In 1998 Skip was awarded EPA's Gold Medal for his work with a team of EPA economists to evaluate the impact of different strategies that might assist in the implementation of greenhouse gas emissions reduction policies.

In 2003 the U.S. Combined Heat and Power Association gave him an award to acknowledge his contributions to the policy development of that industry. In 2004 his paper, "How Far Energy Efficiency?" catalyzed new research into the proper characterization of efficiency as a long-term resource. Author of more than 250 reports, journal articles, and book chapters, Skip has 40 years of involvement in the environmental and energy policy arenas. His expertise includes benefit-cost assessments, behavioral assessments, and the macroeconomic impacts of climate and energy policy scenarios. He's been invited to provide technical seminars in diverse places such as Australia, Canada, China, France, Germany, Iceland, Ireland, Italy, Korea, South Africa, and Spain. Skip has a master's degree in Resource Economics from Antioch University.



Robert D. Atkinson, Ph.D.

President, Information Technology and Innovation Foundation

Robert Atkinson is the Founder and President of the Information Technology and Innovation Foundation (ITIF), a Washington, D.C.-based technology policy think tank. He is also author of the forthcoming book, *The Global Race for Innovation Advantage*, and *Why the U.S. is Falling Behind* (Yale, 2011), the book, *The Past And Future Of*

America's Economy: Long Waves Of Innovation That Power Cycles Of Growth (Edward Elgar, 2005), and the *State New Economy Index* series. He has an extensive background in technology policy, has conducted ground-breaking research projects on technology and innovation, is a valued adviser to state and national policy makers, and a popular speaker on innovation policy nationally and internationally.

Before coming to ITIF, Dr. Atkinson was Vice President of the Progressive Policy Institute (PPI) and Director of PPI's Technology and New Economy Project. While at PPI he wrote numerous research reports on technology and innovation policy, including on issues such as broadband telecommunications, e-commerce and e-government, privacy, copyright, the R&D tax credit, off shoring, and innovation economics.

Speakers



Dan Azevedo

IT Director of Data Center Architecture, Strategy, and Innovation, Symantec
Board Member and Metrics and Measurement Work Group Chair, The Green Grid

Dan Azevedo is responsible for the data center program at Symantec including architecture, engineering, implementation, and operations globally. He currently supports 20 locations comprised of Colocation, Managed

Service Provider, and in-house data centers. Dan is also responsible for the Green IT Program. Dan joined Symantec in February 2002 and managed the Network Operations Center. In 2004, his responsibilities grew to manage the Data Center Operations team. In addition, in 2006 Dan managed the Data Center Engineering and Global Backup Operations teams. Prior to Symantec, Dan was with Terraspring supporting the IT Operations Control Center.



John Bean

Director of Innovation for Racks and Cooling, APC by Schneider Electric
Technology and Strategy Work Group Vice Chair, The Green Grid

John Bean is the Director of Innovation for Racks and Cooling at APC by Schneider Electric. Previously, Mr. Bean was the Director for R&D Cooling Solutions at APC by Schneider Electric, developing several new product platforms and establishing engineering and laboratory

facilities in both the U.S. and Denmark. Before joining APC by Schneider Electric, Mr. Bean was the Engineering Manager for other companies involved in the development, and manufacture of mission critical cooling solutions. His career has spanned over 29 years dedicated to the design, support, manufacture, and research of thermal solutions for demanding applications and environments. Design activities have included thermal solutions for: commercial data center, military mission critical mobile platforms, and aerospace.

John has also served on the ASHRAE Standard Committee for Method of Testing for Rating Computer and Data Processing Room Air-Conditioners and has contributed to the Technical Committee for Mission Critical Facilities, Technology Spaces, and Electronic Equipment. His contributions have included work on the TC9.9 series of books.



Christian Belady

General Manager – Data Center Research, Microsoft Research
Alternate Board Member and Treasurer, The Green Grid

Christian Belady is the general manager for Data Center Research in Microsoft's Global Foundation Services (GFS) where he is responsible for driving research and advanced development of technologies for broad scale adoption in Microsoft's data centers. GFS supports over 200 Microsoft

online services for consumers and businesses worldwide.

Prior to his current role, he was the Director of Hardware Architecture in the Extreme Computing Group at Microsoft Research where he led a team that

explored hardware opportunities related to the future of client plus cloud computing. He started his career at Microsoft in 2007 as Microsoft's Principal Infrastructure Architect for Global Foundation Services to improve both efficiency and cost in their online services infrastructure. His responsibilities have included driving initiatives for sustainability in the data center and infrastructure space, and he was one of the key architects for the company's next generation modular data centers. Prior to joining Microsoft, Christian was a Distinguished Technologist for HP where his responsibilities included driving the technology direction in HP's server products and their environments, as well as driving industry data center initiatives. In addition, his earlier employers include Convex Computers (acquired by HP), TI, and IBM.

In 2010, SearchDataCenter named Christian as one of "5 People Who Changed the Data Center" industry and helped drive innovative thinking and quantitative benchmarking in the field. With over 84 U.S. patents and many international patents, Christian is an ASME and IMAPS Fellow and a founding member of ASHRAE's TC9.9, which is responsible for developing data center guidelines. He was one of the early architects of The Green Grid and currently serves as the Treasurer for the organization, and is an originator of the Power Usage Effectiveness (PUE™) metric used to determine the energy efficiency of a data center which is now broadly used by the industry. He also works closely with government agencies globally to define efficiency metrics for data centers and servers.

Christian has published several dozen papers, is frequently quoted in the press, and is a featured speaker on power and cooling trends in the industry. Since the late 1990s, the focus of his publications has been on data centers and the industry's need for engineering efficient computing environments. Christian holds engineering degrees from Cornell University (BS) and Rensselaer Polytechnic Institute (MS) and a business degree from the University of Texas at Dallas (MA) where he was honored with the 2010 Distinguished Alumni Award.



Paolo Bertoldi

Principal Administrator, European Commission Joint Research Centre
Paolo Bertoldi earned his Doctor's Degree in Electrical Engineering in 1985 at the University of Padova (Italy). He has been working with the European Commission since 1986. From 1986 to 1993 he was working in the EU nuclear fusion project, Joint Undertaking Torus (JET) in the UK. From 1993 until April 2001, he was Administrator with

the European Commission, DG Energy and Transport (DG TREN, Brussels Belgium), in charge of EU regulatory and voluntary programs for the rational use of energy in end-use equipment, buildings, and industry.

He was also in charge of negotiated and long term agreements with industry and tertiary sectors and the GreenLight program. Since May 2001, he has been the Principal Administrator at the European Commission Joint Research Centre (Ispra, Italy), in charge of research activities on energy efficiency policy, the efficient use of electricity (ICT, data centers, digital TV), and innovative policy instruments (e.g. white certificates, financing mechanisms, emission trading). He continues to manage the GreenLight, Motor Challenge, and Standby Initiative program.

**Mark Blackburn**

Co-Founder and Chief Technologist, 1E
 Metrics and Measurement Work Group Vice Chair, The Green Grid
 Mark Blackburn is Chief Technologist at 1E and one of the co-founders of the company for the past 13 years. Mark leads the innovations team and is responsible for the development of new innovative software products that enable organizations to reduce costs through increased IT

efficiency. Most recently, Mark oversaw the release of NightWatchman v6, a desktop PC power and efficiency management tool. He has also been instrumental in shaping NightWatchman Server Edition v20. Prior to 1E Mark held various roles within Microsoft, EDS, and Credit Suisse. Mark is the current Vice Chair of the Metrics and Measurements Work Group within The Green Grid and has been active in a number of The Green Grid's work groups and task forces over the last 4 years.

**Jud Cooley**

Senior Director of Engineering, Oracle
 Alternate Board Member and Container Task Force Lead, The Green Grid
 Jud Cooley is the Senior Director of Engineering for the Design for the Data Center group at Oracle, which includes coordinating roles for energy efficiency and sustainability capabilities among the hardware platform development teams at Oracle. He is Oracle's alternate representative to

The Green Grid Board and participates in several technical task forces. Prior assignments at Sun/Oracle include Director of Project BlackBox (a containerized data center), Director of Central Engineering, Director of the Physical Sciences Lab in the CTO organization, and various roles in developing Sun's Enterprise class server products. Prior to Sun, Jud worked at Cray Research, Floating Point Systems, Celerity Computing, and NCR Corporation in various capacities developing hardware, firmware, and IO protocols.

**Pierre Delforge**

Energy Efficiency Standards, Natural Resources Defense Council
 The National Resources Defense Council (NRDC) is a global environmental advocacy organization headquartered in the U.S. NRDC engages with industry, U.S. federal, state, and other country governments to advance environmentally sustainable practices in energy and climate, pollution, water, oceans, and health. Pierre's

focus at NRDC is on initiatives and policies to reduce energy consumption by information technology and consumer electronics in spite of their rapid growth. Prior to joining NRDC in 2010, Pierre spent 20 years in the IT industry where he worked in software, hardware, and most recently in corporate environmental sustainability at HP where he led energy and climate programs.

**Yoshihiro Fujie**

Manager, Systems Lab Services, IBM Japan, Ltd.
 Japan Technical Work Group Vice Chair, The Green Grid
 Mr. Fujie has been involved with industry's leading server and storage development and technical support for more

than 20 years and has held various senior management positions in IBM. Since 2008, he has led data center energy efficiency projects as an expert of green IT. Mr. Fujie is an active member of The Green Grid and has been the Vice Chair of the Japan Technical Work Group since August 2008. Most recently, he has been involved in the promotion of Smarter Planet as an IT infrastructure expert.

**Jon Haas**

Director in Intel's Eco-Technologies Programs Office, Intel
 Board Member, Technical Committee Chair, and Data Center Design Guide Work Group Chair, The Green Grid

Jon Haas is a Director in Intel's Eco-Technologies Programs Office, part of the Digital Enterprise Group at Intel Corporation. The Digital Enterprise Group creates Intel architecture server products and server industry technologies while driving new server, workstation and

desktop platform capabilities. In support of that mission, Jon manages technical and marketing teams that work with the industry's key energy efficiency technology forums and vendors, in developing and bringing to market, complimentary products based upon new capabilities and technologies for server platforms, enterprise computing, and data centers. Jon is a 22-year Intel veteran spending most of his career working on server and I/O technologies. Jon participates in The Green Grid as a Board member, Technical Committee Chair, and Data Center Design Guide Work Group Chair. Jon has authored and co-authored many papers for The Green Grid and also participates in the organization's Liaison Committee.

**Chris Hankin**

Senior Director, Environment and Sustainability, Information Technology Industry Council

Chris joined the Information Technology Industry Council (ITI) in May 2010, after spending over 10 years as the head of the Washington D.C. office of Sun Microsystems. Chris is primarily responsible for ITI's policy efforts to promote government policies and practices that encourage

ICT-enabled sustainable economic growth and clean energy innovation. This includes staffing of both ITI's Energy and Environment Committee, and the Digital Energy Solutions Campaign. During the Reagan Administration, Chris was Director of Legislative Affairs and an Associate Deputy Under Secretary for Trade at the Labor Department. He moved to the State Department in 1987, serving as the Deputy Assistant Secretary for International Trade Controls, and he remained at State through the Bush Administration and for the first years of the Clinton Presidency. Chris then spent two years on the staff of the House International Relations Committee, and three years as a lobbyist for NCR Corporation before joining Sun Microsystems in December 1999.

**Tony Harvey**

UCS Power and Cooling, Cisco
 Technical Committee Member, The Green Grid

Tony Harvey has been working in the computer industry for more than 20 years. During that time he has worked in numerous areas providing product and program

management for a variety of software and hardware products. Most recently, Tony was responsible for working on power and cooling solutions for high density blade servers, working with data center vendors and product groups on how to manage increased data center density to improve energy efficiency and extend the life of the data center infrastructure. He has presented at industry conferences and to customers on the issues related to high-density power and cooling solutions. Tony is currently working at Cisco on the Unified Computing System to bring radical new energy and efficiency and power control capabilities to the broad server market.



Andy Hawkins

Product Manager, 1E

Data Collection and Analysis Work Group Member, The Green Grid

Andy Hawkins is a Product Manager at 1E, a global role he has held for three years. Reporting to the Head of Software, Andy is an integral part of the innovations team and is responsible for the development of new innovations which enable end user organizations to reduce IT costs. Most

recently, Andy spearheaded the development of the NightWatchman Server Edition, a power and efficiency management tool.

During his eleven year tenure at the company, Andy has held a number of roles at 1E, including principal consultant, where he led a team of people tasked with designing some of the UK's largest IT infrastructures. He was seconded to EMC in 2000 as a storage architect, working with large organizations in the UK such as Orange and Norwich Union. Andy holds a BSC in Physics and Acoustics from the University of Surrey and has a passion for music production in his spare time.

Kerry Hazelrigg

Senior Data Center IT Resource Planner, The Walt Disney Company
Operations Work Group Member, The Green Grid

Kerry is responsible for ICT resource planning associated with all ICT hardware moving in and out of The Walt Disney Company (TWDC) Orlando data center. In this role, she serves as the main point of contact for internal clients and a bridge to the service and resource providers of the

data center. She is also responsible for the Data Center Infrastructure Data Base, a tool that tracks ICT equipment and facilities resources within TWDC's three main data centers. She started her tenure at TWDC in 1993, with responsibilities ranging from managing maintenance and monitoring of data center facilities equipment as a facilities administrator, to liaising between IT and Disney Sports Attractions as a business technology partner.

Kerry holds a Bachelor's of Science in Mechanical Engineering / Minor in Mathematics from the University of Central Florida, and an MBA with a Management Concentration from Crummer Graduate School of Business at Rollins College.



Magnus Herrlin, Ph.D.

President, ANCIS Incorporated

Dr. Magnus K. Herrlin is President of ANCIS Incorporated, a consultancy providing advanced thermal and energy solutions for data and telecom centers. The company's

roots can be traced to the legendary Bell Communications Research (Bellcore). Besides technical consulting, ANCIS provides technical training as well as program management.

Prior to establishing ANCIS, Magnus served ten years as Principal Scientist with Bellcore where he led efforts in optimizing the cooling efficiency of equipment rooms. Magnus is currently the lead for the DOE Data Center Energy Practitioner (DCEP) program. He also develops key components of the DOE "DC Pro" energy assessment software suite.

Magnus is widely published with over 70 publications. He is co-recipient of the ASHRAE Technical Paper Award for "Evolution of Data Center Environmental Guidelines." He has introduced several thermal and energy metrics for data and telecom centers.

Magnus is a founding Member of ASHRAE TC 9.9 Mission Critical Facilities, Technology Spaces, and Electronic Equipment, and he is a member of the BICSI Data Center Standards Committee. Magnus holds a Ph.D. in Mechanical Engineering and is a Certified Energy Manager (CEM) by the Association of Energy Engineers.



Catherine Jagu

Sustainable Development Director, Gimélec
Director, P.E.P. Association

Catherine Jagu is the Director for Sustainable Development in Gimélec, the French association for electrical manufacturers, and director of P.E.P. association, a French program for product environmental profiles.

She was previously Vice President of Quality and Environment at Mersen and has been involved in the electrical industry more than 20 years with a variety of responsibilities including finance and sales. Catherine graduated from the HEC School of Management in 1984 and became six sigma black belt by General Electric in 1998. She was also certified as an Environmental Manager by CESI in 2005.

Cecily Joseph

Director of Corporate Responsibility, Symantec



Cecily Joseph is Director of Corporate Responsibility at Symantec Corporation, the fourth-largest independent software company in the world. Cecily oversees Symantec's global corporate social responsibility program, which includes environmental, social, and governance program development, integration, and alignment. As the

company spokesperson on matters related to corporate responsibility, Cecily responds to stakeholder questions and concerns and oversees the company's reporting and communication efforts. Cecily represents Symantec as a focal point for the U.N. Global Compact U.S. Network and helps to organize and facilitate meetings with multinational corporations, universities, and NGOs on human rights, labor, environment, and anticorruption.

Cecily's responsibilities also include coordination and design of Symantec's corporate-wide global climate change program. This program addresses a new go-to-market strategy around green IT, includes internal and external communication, work with non-profit organizations, and initiatives to reduce

Symantec's environmental footprint. She manages an internal environmental stewardship council which sets goals and targets and reports to the Symantec CEO and chairman quarterly on conservation, transportation, and responsive software packaging practices related progress. Cecily joined Symantec after 12 years with VERITAS Software where she managed the company's legal affairs and served as Executive Director of the VERITAS Foundation. She received a Bachelor's Degree from the University of Miami and a law degree from Tulane University. Cecily serves on the boards of The Housing Trust of Santa Clara County, Abode Services and The Emergency Shelter Program. A frequent public speaker on the areas of corporate social responsibility, and sustainability, Cecily is also a regular panellist at women's leadership events. Cecily lives in Hayward, California with her husband and two children.



Christopher Kelley

Program Manager, Cisco

Christopher Kelley is the Program Manager for Cisco Containerized Data Center services. With over 15 years of IT and data center facilities design and operations experience, he recently joined Cisco from Oracle/Sun Microsystems, where he was focused on development, sales, and delivery of modular facilities as well as fixed

facility strategy, design, automation, implementation, and operations services. Christopher is also focused on facility automation and converged business service management (BSM). He also works with customers and industry partners to develop strategic and tactical roadmaps for the deployment of high-performance IT, Cloud, and Facility (such as "cloud in a box") solutions. Christopher holds a MBA in Global Business from the F.W. Olin Graduate School of Business at Babson College, and a joint B.S. B.A. in Marketing and Management from Northeastern University. He is also a Certified Project Management Professional (PMP) and holds other industry certifications.



Mukesh Khattar

Energy Director, Oracle

Board Member, The Green Grid

Mukesh Khattar leads Oracle's commitment to reducing energy use in facilities and data centers. His responsibilities include strategic planning and driving energy efficiency initiatives for cost savings and carbon footprint reduction in existing and new buildings as well as

data centers globally. His innovative application of variable airflow management in conjunction with heat containment in an enterprise data center in Texas won him the 2010 ASHRAE Technology Award. Under his leadership, Oracle continues to yield over \$2 million annually in direct energy cost savings from operating efficiency enhancements. Oracle is also exceeding energy reduction goals set as an EPA Climate Leaders partner. Khattar has a unique set of skills: an end user at Oracle; research management at the Electric Power Research Institute; research at Florida Solar Energy Center; teaching at Florida Institute of Technology; and design, sales, construction, and project management of HVAC&R systems. His integrated refrigeration and HVAC system for the Wal-Mart Environment Demonstration store in Moore, OK, won him the 1998

ASHRAE Technology award. Several technologies developed by him - heat pipes for dehumidification, dual path HVAC systems for humidity control, and smart demand defrost controls among others—are increasingly used in the industry. His previous works earned him the 2003 ASHRAE Technology Award and the 1989 ASHRAE Energy Award. His innovative work on using NASA derived heat pipe technology for increasing dehumidification performance of air conditioning equipment inducted him into Space Technology Hall of Fame. He actively participates in ASHARE, Co-Chairs the Energy Committee of the Silicon Valley Leadership Group, and serves on the Board of Directors of The Green Grid.



Corban Lester

Energy Conservation Incentive Developer, Lockheed Martin

Utility Task Force Lead, The Green Grid

Corban Lester develops energy conservation incentives for Lockheed Martin Energy and Environmental Services and currently leads the Efficient Data Centers initiative for the Energy Trust of Oregon. Corban is the Lead of The Green Grid's Utility Task Force, which is working to help utilities

address the needs of IT organizations through energy efficiency programs.



Mark Monroe

Executive Director, The Green Grid

Mark is the Executive Director of The Green Grid, an IT industry and end user consortium focused on resource efficient data centers and business computing environments. An expert in corporate sustainability, data center efficiency, and many aspects of Information Technology (IT), Mark has more than 28 years experience

in the IT industry. His duties have included responsibility for internal, customer, and industry thought leadership on sustainability and energy efficiency topics. His IT background includes experience in data center design and operations, application and system design, service level management, process design and analysis, professional services, sales, government and commercial program management, and outsourcing management.

Mark is also on the Board of Directors for the Center for ReSource Conservation in Boulder, CO. He works on sustainability advisory boards with the University of Colorado and local Colorado governments, and is a Six Sigma Master Black Belt. As a founding sponsor of the University of Colorado's Renewable and Sustainable Energy Institute (RASEI), Mr. Monroe helped lead the university and industry partners into detailed programs around the New Energy economy in Colorado.



Nancy Mui

Electrical Engineer, Equinix

Utility Task Force Member, The Green Grid

Nancy Mui is an electrical engineer at Equinix. She provides technical support to operations and other cross-functional teams including sales, marketing, and finance. At her current role, she is responsible for load management and capacity planning, including monitoring,

trending, and analysis of engineering metrics and statistical data used for strategic planning at Equinix data centers within the U.S. She is also responsible for monitoring utility contracts/suppliers, electricity procurement in deregulated markets and coordination with electric utilities for efficiency incentives, and demand response programs. She has provided design and consulting expertise on a variety of facilities ranging from data centers and office buildings to water and wastewater facilities.



Dean Nelson

Sr. Director of Global Data Strategy, Architecture and Operations, eBay
Advisory Council Member, The Green Grid

Dean is the Sr. Director of Global Data Center Services for eBay Inc, the world's largest online marketplace. He is responsible for Strategy, Architecture and Operational functions of eBay's Inc. mission critical data center infrastructure. Dean is also a core member of the eBay

Green Team.

Previously, Dean spent 17 years with Sun Microsystems manufacturing, engineering, and real estate. Through 2009, he was the Sr. Director of Global Lab and Data Center Design Services responsible for managing Sun's multi-billion dollar global technical infrastructure portfolio. He also spent 3 years at Allegro Networks where he built a world-class networking QA team and state of the art, fully integrated automation system and lab environment.

Dean is a member of The Green Grid End User Advisory Council, Technical Advisory Board for Mission Critical Magazine, founder of Data Center Pulse - an exclusive datacenter owner community, author of the Sun Microsystems Blueprint series, Energy Efficient Datacenters, featured as a Sun Microsystems Contrarian Mind, and was identified by SearchDatacenter.com as one of the top five people who changed the data center. Dean is also the recipient of Sun's prestigious Innovation Award in 2008.

Zeydy Ortiz, Ph.D.

Senior Performance Engineer, IBM
Proxies Task Force Lead, The Green Grid

Zeydy Ortiz is a Senior Performance Engineer in the IBM System x Performance Group at Research Triangle Park, NC. She is responsible for optimizing future system designs for performance, energy efficiency and virtualization. Dr. Ortiz joined IBM in 1998 after completing

her doctoral degree in Computer Science from North Carolina State University. She has a Master's in Computer Science from Texas A&M University and a Bachelor's degree in Computer Engineering from the University of Puerto Rico.



Michael Patterson, Ph.D.

Senior Thermal Architect, Intel
Technology and Strategy Work Group Chair, The Green Grid

Michael Patterson is a Senior Thermal Architect working in the Eco-Technology Program Office in the Digital Enterprise Group at Intel Corporation, Dupont, Wa, where he works in the power, thermal, and energy-efficient performance areas. The work covers silicon level activity,

through platform and rack level solutions, and on up to interface with data center power and cooling technologies. He did his undergraduate work at Purdue University, received his MS degree in Management from Rensselaer Polytechnic Institute, and was awarded his MS and Ph.D. in Mechanical Engineering from the University of Vermont. His current technical interests include server power and thermal management technologies, server/datacenter interaction, and high density data center concepts. He has been with Intel for 17 years. He is a registered Professional Engineer. He is also a member of ASME and ASHRAE and represents Intel in a number of The Green Grid activities.



John Pflueger, Ph.D.

Technology Strategist, Dell
Board Member, The Green Grid

John Pflueger, Ph.D., is a technology strategist in Dell's Data Center Infrastructure organization, driving strategy and implementation efforts aimed at improving data center efficiency. In this role, he is responsible for a number of data center issues including defining and leveraging the

relationship between facility and IT resources. John has 16 years of experience working in the computer and semiconductor equipment industries, including product development, product marketing, and product management roles. John attended the Massachusetts Institute of Technology, receiving Mechanical Engineering degrees in 1985 (B.S.), 1988 (M.S.), and 1991 (Ph.D.).

Jack Pouchet

Director Energy Initiatives, Emerson Network Power
Board Member, The Green Grid

Jack Pouchet, BA, MBA Business Administration, Director Energy Initiatives for Emerson Network Power / Liebert is based in Southern California and works closely with major OEMs in the server market, large data center users, and leading mission critical engineering firms to help define,

architect, and create opportunities for advanced power and cooling technologies that improve day-to-day operational efficiencies. Jack brings over twenty years of related OEM power supply, power generation, distribution, and power product sales and marketing experience to Emerson Network Power giving him a unique end-to-end perspective of the entire AC and DC power path.

An active member of several industry and sustainability associations including The Green Grid and the Union of Concerned Scientists, Jack is frequently engaged with federal and state agencies in research and legislation centered on alternative / renewable energy as well as energy efficiency including support of the EPA in their report to Congress on data center operations under H.R. 5646.

Jack serves as Emerson's representative on the Board of Directors of The Green Grid. As a scientist/inventor Jack has corporate IP for alternative/renewable energy components, systems, and architectures specifically addressing the IT, networking, data center, and electric utility markets.

**Winston Saunders**

Director of Data Center Power Initiatives, Intel
Alternate Board Member, The Green Grid

Winston Saunders is the Director of Data Center Power Initiatives in the Data Center Group at Intel. He also serves as an alternate on The Green Grid Board of Directors. Winston has worked at Intel for over 15 years and is a graduate of the University of Washington and UC Berkeley.

**Eddie Schutter**

Senior Technical Director, AT&T
Advisory Council Member and Data Center Design Guide Work Group
Vice Chair, The Green Grid

Mr. Schutter has over 15 years experience in the information technology industry. He has a wide range of experience in the Leadership of Advanced Information and Internet Technology Organizations; e-Business, Strategy, Organizational Leadership and Operations Management;

Advanced Information Services, Data, Voice, and Video Telecommunications Technologies and business process re-engineering.

In his current role, he leads AT&T's Enterprise Data Center Architecture and Planning organization, a division of Information Technologies, which is responsible for strategic, tactical, and optimization planning of more than 30 enterprise IT data centers and over 600 smaller data centers and server farms; a raised floor portfolio that exceeds 3 million sqft and 70MW of UPS power. Additionally, Mr. Schutter is a member of the AT&T CTO Technology Council, is a recognized subject matter expert in Sustainable IT and Data Center Technologies, and is a member of the AT&T public speakers bureau.

Previously Mr. Schutter was the managing director of SBC's IT Disaster Recovery Operations, Enterprise Data Center Operations, and Principal Technical Architect of the SBC Internet Data Centers. Mr. Schutter is a volunteer leader in The Green Grid as an Advisory Council Member and Vice Chair of the Data Center Design Guide Work Group. He is also a Board Member of Data Center Pulse, and serves as a technical team member and advisor in many industry organizations. In his personal time, Mr. Schutter enjoys time with his wife and family of nine children. Mr. Schutter resides in Dallas, TX. Associations and Certifications: Certified Data Center Design Professional, The Green Grid, Data Center Pulse, BICSI, 7x24, AFCOM, Uptime Institute, ASHRAE, ANSI, ASME

Harkeeret Singh

Global Head of Energy and Sustainable Technology, Thomson Reuters
Advisory Council Member and EMEA Technical Work Group Chair, The Green Grid

Harkeeret (Harqs) Singh is Global Head of Energy and Sustainable Technology at Thomson Reuters. He is seen as the Energy 'Czar' and one of the main enablers of a greener and more sustainable future for the company. In his role Harqs is responsible for energy efficiency and

sustainability across the Markets division, including Data Centers, Servers, Storage, Network and Desktop.



Harqs has been working within the industry specifically looking at data centers and IT in both Europe and the U.S. for some time, particularly in the pursuit of advancing energy efficiency principles and working across traditional boundaries to achieve 'holistic' efficiency. Prior to joining Thomson Reuters in August 2009 he held a variety of roles at BT, including Head of Data Center Strategy.

At Thomson Reuters Harqs is responsible for industry engagement around energy efficiency, liaising with The Green Grid (serving as the Chair for the EMEA Technical Work Group alongside sitting on the Advisory Council), ASHRAE, the EU Code of Conduct for Data Centers and the U.S. EPA/DOE energy efficiency initiatives and many other for a across the industry. He is also a lead representative for Global Climate Change Policies - UK CRC Energy Efficiency Scheme, ACES (American Clean Energy and Security Act), and others across the world. Harqs holds a BSc in Computer Science and Business Management from the University of Birmingham and awards which include a Strategy Award from Accenture.

**Eiji Taguchi**

Enterprise Specialist, Intel
Japan Technical Work Group Chair, The Green Grid

Eiji Taguchi has been working more than a quarter of a century in the IT industry. He joined Intel in 1982 and took a wide range of IT responsibilities to enable Intel's rapid growth, such as Design Engineering Computing Services Manager, Japan Site IT Manager, Greater Asia Region IT Engineering Manager, Asia Internet Data Center Manager, and IT Consulting Manager. Currently, he is in charge of strategic marketing programs, such as data center marketing, to enable Intel to design new generation enterprise products and platforms and accelerating market transformation to new generation IT infrastructure.

**Jamel Tayeb, Ph.D.**

Sr. Applications Engineer, Intel

Jamel Tayeb is a software engineer in Intel's Software and Services Group. He has held a variety of engineering, marketing and PR roles over his 10 years at Intel. Jamel has been working with enterprise and telecommunications hardware and software companies in optimizing and porting applications for/to Intel platforms, including Itanium and Xeon processors. Most recently, Jamel has been involved with several energy-efficiency projects at Intel. Prior to reaching Intel, Jamel was a professional journalist.

Jamel earned a Ph.D. in Computer Science from Université de Valenciennes, a Post-graduate diploma in Artificial Intelligence from Université Paris 8, and a Professional Journalist Diploma from CFPJ (Centre de formation et de perfectionnement des journalistes – Paris Ecole du Louvre).

**Jay Taylor**

Director of Global Standards, Codes and Environment, APC by Schneider Electric

Alternate Board Member and Liaison Committee Chair, The Green Grid

Jay L. Taylor has a long career in technology management, computer power conversion, Li-Ion battery, and data center design and development strategies. A graduate of Texas A&M, Jay holds a BS in Engineering. His newest assignment is Director of Global Standards, Codes and

Environment. A pragmatist, he is a strong advocate of government and private industry cooperation that result in real economic benefits and energy savings. He has been active in advocating new, tougher, and consistent standards for ENERGY STAR in both the U.S. and the European Union. As an energy efficiency subject matter expert and strategist, he has driven notable projects such as server administered power management, which will decrease the overnight energy use of tens of thousands of computers, and upgrading a data center for fresh air cooling in Austin, Texas, saving millions in energy costs.

**John Tuccillo**

Vice President of Global Industry and Government Alliances, APC by Schneider Electric

President and Chairman of the Board, The Green Grid

John Tuccillo serves as the Vice President of Global Industry and Government Alliances at APC by Schneider Electric in West Kingston, RI. John is responsible for building collaborative technology and business alliances with key industry leaders as well as policy and standards

bodies in the variety of markets served by APC by Schneider Electric. Previously, John served as Global Director of Data Center Systems where he led a team of systems engineers, application engineers, product management and marketing professionals focused on delivering interoperable infrastructure and management systems. Mr. Tuccillo has 25 years experience within the IT and manufacturing industries working within the hardware, software, components and services categories.

**Kathrin Winkler**

Vice President of Corporate Sustainability, EMC Corporation
Board Member and Secretary, The Green Grid

As Vice President and Chief Sustainability Officer, Kathrin is charged with providing vision and leadership in the development and implementation of EMC's strategy for environmental and social sustainability. Kathrin teams with functional leaders in EMC's Green Business Leadership, a

cross-functional virtual team that champions company-wide environmental initiatives and works to ensure integration of sustainability principles both in strategy and in day-to-day operations. In her previous role as Sr. Director for EMC's hardware engineering group, Kathrin founded the company's Engineering Green Team and its Design for Environment program, which are driving leadership designs in environmental stewardship and energy efficiency throughout EMC's product portfolio.

Kathrin joined EMC in 2003 as Director, NAS Product Management. Her past positions included Principal Consultant/Analyst specializing in enterprise management systems and service level architectures at Renaissance Worldwide, Vice President Technical Marketing in a Web services security startup, and Consultant Software Engineer in Network Systems Engineering at Digital Equipment Corporation. In addition to her work at EMC, Kathrin serves as a Director of EcoLogic Development Fund, a non-profit organization dedicated to community-based conservation in Central America.

**Henry Wong**

Senior Staff Platform Technologist, Intel

EPA ENERGY STAR for Servers Task Force Lead, The Green Grid

Henry ML Wong is a senior staff platform technologist at Intel Corporation, enabling and evangelizing energy efficient power and thermal technologies. Mr. Wong is a 23+ year Intel veteran, with over 16 years of industry experience in digital and mixed signal processor

development, including the first Intel® Mobile Chipset (360SL), the first mobile Intel Pentium® Processor (P54LM/P55C), and advanced mobile package technologies. Mr. Wong then spent 5+ years leading technology development and enablement of high-efficiency and high-reliability power-conversion techniques, component thermal solutions, and system clocking networks for the Intel Itanium®, Itanium 2, and Intel Xeon® processor platforms. Mr. Wong authored and enabled key technologies such as Adaptive Voltage Positioning, Modular Direct Power Connect, Server Component High Impingement Mode Cooling, and Programmable Geared Differential Clocking for Multi-Time Domain Architectures. He is currently leading Intel's support of the enterprise industry energy-efficiency initiatives and technologies, with organizations such as the U.S. EPA, U.S. DOE, Lawrence Berkley National Labs, and The Green Grid. Mr. Wong is a 1984 graduate of Yale University with a degree in semiconductor physics and econometric modeling.

**Jim Woodbury**

STG Architecture and Design, IBM

Management Infrastructure Sub Work Group Chair, The Green Grid

Jim is a graduate of Iowa State University where he obtained his BSEE in 1982. He joined IBM that same year where he has since held a variety of technical and managerial positions. His primary focus has been in the area of system and server architecture, design, and

development. As a manager, he co-founded, organized, and helped lead an organization which rewrote the IBM AS/400 base operating system for a new processor architecture -- one of the largest object-oriented development efforts in the industry at the time. As a technical leader, he has led initiatives for emerging technologies such as storage networking, served as the chief architect for the IBM Electronic Customer Care initiative and contributed to IBM's cloud computing architecture. Most recently, he has served as a lead strategist -- assembling the overall technical strategy for Systems Software in IBM's Server and Technology Group.

March 1, 2011



Craig Yorty

Supervisor LAN/WAN Engineering, Philadelphia Gas Works

Craig Yorty is the Supervisor of LAN/WAN Engineering for the Information Services Department of the Philadelphia Gas Works (PGW). During his three decades at PGW, Craig has worked as a Network Analyst II, Instrumentation Specialist/Electronics Technician and Senior Gas Controller. On May 4, 2010, he became one of the

country's first Department of Energy's Level-1 Data Center Energy Practitioners (DC-CEP). Craig believes that his skills as a Level-1 DC-CEP give him unique insight into how PGW can reduce energy consumption. Craig earned an Associate of Arts in Computer Science Networking from Bucks County Community College. He holds Cisco CCNA and Cisco CCNA-Voice certifications. A native of Langhorne, Pennsylvania, Craig is the proud father of a son and daughter. He believes that good environmental practices can be good for business.



Michael Zatz

Manager, ENERGY STAR Commercial Buildings Program Climate Protection Partnerships Division, U.S. Environmental Protection Agency

Michael Zatz is the manager of the U.S. EPA's ENERGY STAR Commercial Buildings Program. In this role, Mr. Zatz oversees the development and implementation of activities aimed at improving the energy efficiency of a wide variety of building types, including offices, K-12 schools, higher

education institutions, healthcare facilities, retail space, hotels, congregations, and others. Mr. Zatz also is responsible for oversight of the ongoing development and modification of ENERGY STAR's Portfolio Manager energy benchmarking tool, which has been used by over 60,000 buildings across the country to assess and track their energy use.

Mr. Zatz joined ENERGY STAR in February 2006, and prior to that he spent nearly 14 years with ICF Consulting, a private environmental and energy consulting firm. He has specific expertise in the development and implementation of voluntary public-private partnerships. Mike has an M.S. in Environmental Science and Policy from Johns Hopkins University, and a B.S. in Engineering and Public Policy from Washington University in St. Louis.

8:30am-9:15am

Keynote - A Target on Their Backs: ICT and the Economic Imperative of Energy Efficiency

John A. "Skip" Laitner, ACEEE

[Track 1]

Observers of U.S. energy policy might think of energy efficiency as a useful tool to manage the growth of our nation's energy consumption. They might also see it as a cost-effective means to ease our transition into a post-carbon world. And yes, the evidence does support both of these notions. But the U.S. economy now wastes 87 percent of the energy it uses, and regulators tend to focus their efforts on waste management, rather than on avoiding waste in the first place. There is an emerging body of evidence which compels a significantly greater attention to the critical role of energy efficiency in maintaining a productive and a more prosperous economy. The Green Grid, and semiconductor and information and communication technologies (ICT) more broadly, will be among the surprising opportunities that can enable higher levels of productivity – should we choose to invest in those resources.

9:25am-10:15am

Plotting a Path to Sustainability with The Green Grid's Data Center Maturity Model

Harkeeret Singh, Thomson Reuters, EMEA Technical Work Group

[Track 1]

This session will introduce The Green Grid's new Data Center Maturity Model (DCMM) which touches upon every aspect of the data center including power, cooling, compute, storage, and network. The levels of the model outline current best practice and a five year roadmap for the industry. The DCMM provides capability descriptions by data center area so that operators can benchmark their current performance, determine their levels of maturity, and identify the ongoing steps and innovations necessary to achieve greater energy efficiency and sustainability, both today and into the future.

ANSI/ASHRAE 90.1-2010 "Economization and You"

John Bean, APC by Schneider Electric, Technology and Strategy Work Group [Track 2]

Historically data centers, considered process cooling, have been exempt from previous editions of the 90.1 Standard. However, with increasing data center energy consumption and focus on building efficiency this exempt status has been removed as of the 2010 edition. Economizers are among the more significant implications from loss of exempt status. Depending upon geographic location and size an economizer system may now be required for data center cooling solution. The standard recognizes two distinct methods of economization: air economizers and water economizers.

This work provides a high level summary of compliance paths for Section 6 "Heating, Ventilating and Air-Conditioning," along with various economizer

requirements as they relate specifically to the data centers. Items to be covered include: exemptions, air economizer performance and water economizer performance. These mandates warrant careful consideration during: planning, design, building, and commissioning of new data centers or significant expansion of existing data centers.

10:30am-11:20am

An Analysis of Server Virtualization Utility Incentives

Corban Lester, Lockheed Martin, Utility Task Force

[Track 1]

Are utilities wasting ratepayer money on incentives for server virtualization? The ultimate answer will impact the level of support utilities give IT and data center efficiency in the near future, just as the hard work of reaching the SMB reaches a crucial phase. This session explores server virtualization through a utility lens, offering a case study The Green Grid can use to better understand the pitfalls, challenges, and opportunities that come with helping utilities encourage end users to invest in efficiency.

Considerations in the Deployment of Containerized or Modular Data Center Facilities

Jud Cooley, Oracle, Container Task Force

[Track 2]

Christopher Kelley, Cisco, Container Task Force

Containerized or Modular Data Center Facilities can save time and money and increase business flexibility, but there are common issues that need to be thought about in new ways. This session will be an overview of the topics to be covered in an upcoming white paper including site selection, service access, lifecycle and refresh, insurability and certification, local code issues, and many more. This is an opportunity to hear from and ask questions of the presenters who have direct experience delivering these types of facilities. An interactive question and answer period will be highly encouraged.

11:30am-12:20pm

Why Aren't We Using Server Power Management?

John Pflueger, Ph.D., Dell, Server Power Features Task Force

[Track 1]

Over the past several years, server vendors added a number of features to their products aimed at understanding and reducing server power consumption. These range from relatively simple measuring and monitoring features to more complex functions regulating situational power use. Anecdotal evidence from the field, however, suggests that, despite the potential for these features to reduce power consumption, operating expenses, and heat loads, end-users have been slow to adopt and leverage. This session will report on the findings of the Server Power Features Task Force: the obstacles inhibiting adoption, a potential roadmap for TGG, and the industry at-large to remove these inhibitors.

Sweat the Small Stuff – Incremental Energy Efficiency Improvements Provide Big Results

Kerry Hazelrigg, The Walt Disney Company, Operations Work Group

[Track 2]

Tom Brey, IBM, Operations Work Group

In September of 2009, The Green Grid and its Operations Work Group accepted the opportunity to study the impact of energy efficiency improvements in a member's data center. The purpose of the study is to provide operators a set of The Green Grid endorsed improvement metrics and ROI models intended to assist data center operators with building credible business cases for performing energy efficiency improvements. This session reveals the findings of this specific case study, insight into the journey and analysis, and lessons learned.

1:15pm-2:05pm

Server Power Management 101

Tony Harvey, Cisco, Server Power Features Task Force

[Track 1]

Winston Saunders, Intel, Server Power Features Task Force

Henry Wong, Intel, Server Power Features Task Force

In the industry today, there is an increasing need for education around the management of power utilization and consumption. Today's servers, at the core of the data center, foster new and advanced opportunities for efficient application and use within today's IT environment. With a better understanding of these opportunities, the concept of Server Power Management has the potential to become the ideal process for regulating power use. For data center personnel, building the knowledge base of the technology and the impact Server Power Management has on operating and capital expenses, lends itself to a more efficient and effective application of power management policy, within the organization and the industry. This session will focus on the basics of Server Power Management: the benefits of power management, the hierarchy of power management, the opportunities the learner has to manage power, and the learner's ability to do so.

EPA ENERGY STAR for Data Center Equipment

Jay Taylor, APC by Schneider Electric, Liaison Committee

[Track 2]

This session will provide an update on the state of the different ENERGY STAR programs for data center equipment. It will also bring participants up to date on the structural changes that were introduced to ENERGY STAR product-based programs during 2010.

2:15pm-3:05pm

Coming Soon to a Data Center Near You: EU Code of Conduct, Version 2

Paolo Bertoldi, European Commission Joint Research Centre

[Track 1]

This session will discuss the recently updated EU Code of Conduct (EU CoC) for Data Centers. This document was originally created by the European Commission Joint Research Centre in 2008 in response to increasing energy

consumption in data centers and the need to reduce the related environmental, economic, and energy supply security impacts. The EU CoC aims to inform and stimulate data center operators and owners to reduce energy consumption in a cost-effective manner without hampering the mission critical function of data centers. The EU CoC aims to achieve this by improving understanding of energy demand within the data center, raising awareness, and recommending energy efficient best practice and targets. The EU CoC recently been updated for the second version of the document. The Green Grid participated in this review process with the goal to provide comments back to the Joint Research Centre.

Qualitative Analysis of Cooling Architectures

Michael Patterson, Ph.D., Intel, Thermal Management Sub Work Group [Track 2]

In this session a representative of the Thermal Management Sub Work Group will report out on their just-published white paper on the range of cooling architectures. In this comprehensive study the qualitative aspects of various cooling strategies are reviewed. This includes attributes such as current usage and availability, efficiency, reliability, equipment architectures, and standardization and acceptance. The architectural strategies are looked at in different levels from air-flow management, to equipment placement, to heat rejection. The session will also cover differences in air and water cooling and provide attendees with the latest information on the advantages and disadvantages of cooling architectures.

3:20pm-4:10pm

Making the Business Case for Energy Efficient Data Centers

Dean Nelson, eBay [Track 1]

Resource efficient business computing can be a place where feel-good, intangible returns don't stand up to the scrutiny of examination by the CFO. But companies all over the world are exposing very large, very tangible benefits of focusing on metrics like PUE in their business computing environments. eBay, a member of The Green Grid, is one of the largest on-line service providers in the world, and they share some of their secrets of converting efficiency to dollars in this conversational, informative session.

ASHRAE2008 Deployment Japan Survey and Japanese Case Studies on Data Center Efficiency

Yoshihiro Fujie, IBM, Japan Technical Work Group [Track 2]
Eiji Taguchi, Intel, Japan Technical Work Group

During this session, the results and findings of the recently completed ASHRAE2008 Deployment status survey will be presented along with a recommendation for action. In the latter half of the session, the case studies of Fujitsu's and Hitachi's data center efficiency improvements will be discussed.

4:20pm-5:05pm

State of The Green Grid and Members Meeting

John Tuccillo, APC by Schneider Electric, The Green Grid President and Board Chairman
Mark Monroe, The Green Grid Executive Director [Track 1]

As The Green Grid closes in on its fifth year, there is significant achievement, expansion, and change for the organization. This session reviews some of the accomplishments of the last year, and covers the annual user meeting requirements, but more importantly addresses the expanded mission and new directions that The Green Grid will pursue in the coming months. With input from the end user Advisory Council, the organization will unveil and examine the exciting new charter. Chairman of the Board and President John Tuccillo and new Executive Director Mark Monroe will cover the past, look to the future, and answer questions from attendees.

5:05pm-5:20pm

Key Contributor Award Ceremony

John Tuccillo, APC by Schneider Electric, The Green Grid President and Board Chairman
Mark Monroe, The Green Grid Executive Director [Track 1]

During this ceremony, recipients of The Green Grid's Key Contributor Award will be recognized for their contributions to The Green Grid.

March 2, 2011

9:00am-9:30am

State of The Green Grid

John Tuccillo, APC by Schneider Electric, The Green Grid President and Board Chairman
Mark Monroe, The Green Grid Executive Director [Track 1]

As The Green Grid closes in on its fifth year, there is significant achievement, expansion, and change for the organization. This session reviews some of the accomplishments of the last year, and covers the annual user meeting requirements, but more importantly addresses the expanded mission and new directions that The Green Grid will pursue in the coming months. With input from the Advisory Council, the organization will unveil and examine the exciting new charter. Chair of the Board and President John Tuccillo and new Executive Director Mark Monroe will cover the past, look to the future, and answer questions from attendees.

9:30am-10:30am

Keynote – Policy Makers are Focused on You, Not the Real Problem

Robert D. Atkinson, Ph.D., Information Technology and Innovation Foundation [Track 1]

Regulators around the world are taking aim at IT in general, and data centers in particular, in their efforts to regulate reduced energy use and carbon emissions. But at the end of the day, we need more IT and innovation, not less. Rob Atkinson will discuss why policy makers should be concentrating on spurring digital transformation – incentivizing conversion of energy intensive atoms to energy savings bits and why spurring fundamental clean energy R&D, rather than regulating IT efficiency, is the surer path to the needed low carbon global economy.

10:45am-11:35am

Plotting a Path to Sustainability with The Green Grid's Data Center Maturity Model

Harkeeret Singh, Thomson Reuters, EMEA Technical Work Group [Track 1]

This session will introduce The Green Grid's new Data Center Maturity Model (DCMM) which touches upon every aspect of the data center including power, cooling, compute, storage and network. The levels of the model outline current best practice and a 5 year roadmap for the industry. The DCMM provides capability descriptions by data center area so that operators can benchmark their current performance, determine their levels of maturity, and identify the ongoing steps and innovations necessary to achieve greater energy efficiency and sustainability, both today and into the future.

Using the Data Center Design Guide to Improve the Efficiency of Your Data Centers

Jon Haas, Intel, Data Center Design Guide Work Group [Track 2]
Eddie Schutter, eBay, Data Center Design Guide Work Group
Jim Woodbury, IBM, Data Center Design Guide Work Group

The Data Center Design Guide (DCDG) outlines and identifies a new architectural approach to how we build and modernize data centers focusing on energy efficiency, and how to move forward towards a coordinated holistic, single pane, policy based management for the entire data center. The DCDG has been drafted by a Work Group within the Technical Committee and is ready for wider Industry review and comment. During the next summer, comments and inputs will be incorporated to finalize the document. This session will cover the main tenants and objectives of the Design Guide, document outline, outstanding items still to be closed and how user can use the guide to define a capabilities roadmap for future data center builds and equipment purchase discussions and decisions. The session will also provide an overview of the management infrastructure initiative within The Green Grid. The overview includes objectives, strategies, key concepts, and directions relevant to the initiative. It also describes the technical specifications and similar collateral under development by The Green

Grid, implications to adopters, and future expectations. This presentation covers both power and cooling domains.

Corporate Social Responsibility and the Energy Efficient Data Center - Gimélec

Catherine Jagu, Gimélec [Track 3]

"To meet the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland 1987). This is the goal of sustainable development. France has developed several initiatives on this basis from the constitutional charter on the environment in March 2005 to the "Grenelle" laws voted in 2007 and 2010. The "Grenelle process" was totally new for French government and will strongly impact the French economy and business, beyond the strong breakthrough concerning the State organization and regulations.

11:45am-12:35pm

Using CUE™ and WUE™ to Improve Operations in Your Data Center

Dan Azevedo, Symantec, Metrics and Measurement Work Group [Track 1]
Christian Belady, Microsoft, Metrics and Measurement Work Group
Michael Patterson, Ph.D., Intel, Metrics and Measurement Work Group
Jack Pouchet, Emerson Network Power, Metrics and Measurement Work Group

Recently The Green Grid announced the creation of two new metrics designed to help improve the sustainability of data center facilities by measuring the effectiveness of carbon and water use tied specifically to the IT energy infrastructure they contain. The new metrics, Carbon Usage Effectiveness (CUE™) and the Water Usage Effectiveness (WUE™), are joining The Green Grid's widely-used Power Usage Effectiveness (PUE) metric. All are designed to help IT, facilities, and sustainability organizations across the globe optimize their data centers. This will be a facilitated discussion among a panel of contributors who co-authored CUE and WUE and the audience. The panel and audience will have an interactive session where we explore the benefits and challenges of the new metrics.

Beyond Energy: The Sustainable Data Center

Mark Monroe, The Green Grid Executive Director [Track 2]
Pierre Delforge, NRDC
Chris Hankin, Information Technology Industry Council
Cecily Joseph, Symantec
Dean Nelson, eBay
Kathrin Winkler, EMC Corporation

Energy efficiency is a critical factor for information and communication technology (ICT), given its responsibility for an estimated 2-3% of global greenhouse gas emissions, its boundless growth in use, and the anticipated increases in electricity costs worldwide. That virtually all industry sectors rely on ICT for their own mitigation further demands that we have our own house in order. Yet energy consumption is not the only environmental or social impact from the deployment of ICT. Whether it's the acquisition of raw materials, the selection of packing material, or end-of-life-disposal, companies are starting to

hold their vendors accountable for the impacts of the entire lifecycle of their products and for the manner in which they conduct business. This panel will share their definitions of "Green IT," provide insights into the means they are using to drive improvement, and the factors that should be considered when striving to achieve the "sustainable data center."

**DC Pro IT Tool / DOE Data Center Energy Practitioner (DCEP) Program:
February 2011 Progress Report**

Henry Wong, Intel, Data Collection and Analysis Work Group [Track 3]
Magnus Herrlin, Ph.D., ANCIS Incorporated

The U.S. Department of Energy and Lawrence Berkley National Labs created a training program for Data Center Practitioners to review first level energy efficiency assessments of their data centers. The Green Grid has created an Excel based assessment tool to be used as the IT module of the program. This presentation will cover the status of the tool and several of the key features. The second half of this session provides a brief overview and progress report on the DCEP program. The data center industry and DOE have partnered to develop a certificate process leading to energy practitioners qualified to evaluate the energy status and efficiency opportunities in data centers. The key objective is to raise the standards of those involved in energy assessments to accelerate energy savings in the dynamic and energy-intensive marketplace of data centers. The practitioners are trained to provide a consistent approach through system-level energy assessments. They have documented knowledge and skills including proficiency in the use of the DC Pro Software Tool Suite. Target groups for participating in the program include data center personnel (in-house expertise) and consulting professionals (for-fee consulting). After a number of pilot training events in 2010, the program will be offered world-wide in 2011.

1:30pm-2:20pm

Data Center Efficiency Metrics: PUE™, Partial PUE, ERE, DCcE

Dan Azevedo, Symantec, Metrics and Measurement Work Group [Track 1]
Mark Blackburn, 1E, Metrics and Measurement Work Group
Jud Cooley, Oracle, Metrics and Measurement Work Group
Michael Patterson, Ph.D., Intel, Metrics and Measurement Work Group

The Green Grid has released several metrics over the past few years targeting specific areas of data center energy efficiency. This session will be a panel of co-authors for the released metrics PUE, ERE, DCcE, and the soon to be released Partial PUE. The presenters will provide an introduction and current status to each metric and will reserve time for an interactive audience discussion.

Understanding and Engaging Utility Incentive Programs

Jay Taylor, APC by Schneider Electric, Utility Task Force [Track 2]
Mukesh Khattar, Oracle, Utility Task Force
Nancy Mui, Equinix, Utility Task Force
Craig Yorty, Philadelphia Gas Works, Utility Task Force

Utility incentives can help bring Green IT within financial reach for savvy organizations who know how to leverage them, but finding and acquiring these

funds can be confusing, time consuming, and even perilous. This session brings utility energy efficiency experts together with seasoned data center architects to share experiences, tips and tricks on getting the most support possible for IT energy efficiency investments, answering questions such as:

- How do I find out what incentives are available?
- How can I influence what utilities will fund?
- What is the best way to accelerate funding / sidestep bureaucracy / cut paperwork?

The Collision Course of Data Center Site Selection and Sustainability

Eddie Schutter, AT&T, Advisory Council [Track 3]

This presentation reviews the critical element considerations of site selection criteria for new construction and collocation hosting facilities. Additionally, it demonstrates the necessity to elevate the priority of sustainability as a new and critical element in site selection; proposes how the utilization of the current and future tools and metrics of The Green Grid can aid the owner/operator, consultant, and manufacturer in successfully choosing locations that can promote efficiency and sustainability; and invites participation into the development of these best practices and tools.

2:30pm-3:20pm

EPA ENERGY STAR Rating Systems for Data Centers – Experience from the First Six Months

Michael Zatz, U.S. Environmental Protection Agency [Track 1]

For years you have heard of the impending release of the ENERGY STAR rating and label for data centers. This presentation will report on the first six months of use since the release of the rating in June 2010, and will also highlight opportunities for data center operators to leverage the value of the ENERGY STAR label and brand to benefit their operations. First, we'll recap the history of the rating development. Next will be a review of use since its release, with highlights of the more than half-dozen data centers that have already earned the ENERGY STAR label. The presentation will conclude with a discussion of the value of the ENERGY STAR label to data center operators, as well as the growing number of mandatory benchmarking laws that will impact data center operators.

Global Harmonization of Data Center Efficiency Metrics

Dan Azevedo, Symantec, Global Harmonization of Data Center Efficiency Metrics Task Force [Track 2]

This session will review the progress and current status specific to the Global Harmonization of Metrics effort. In 2009 The Green Grid in collaboration with organizations around the globe began driving toward a set of metrics and indices which can be formally adopted by all participant organizations to improve data center energy efficiency globally. Groups participating in this effort are the Department of Energy, the Environmental Protection Agency, the European

Union Code of Conduct, Japan's Green IT Promotion Council, Ministry of Economy, Trade and Industry, and various additional industry groups.

Utilizing the SDK Energy Checker

Jamel Tayeb, Ph.D., Intel

[Track 3]

This session will cover the use of Intel's Energy Checker SDK to instrument applications for productivity. Content will include an overview of the goals of the Energy Checker SDK, how to use Energy Checker SDK to measure data center productivity (productive work vs. power), and the relationship to The Green Grid's efforts of the Data Center Design Guide.

3:35pm-4:25pm

The Data Center Pulse Top Ten

Dean Nelson, eBay

[Track 1]

Eddie Schutter, AT&T

What are the latest issues, concerns, trends, and requests from data centers? Data Center Pulse, a non-profit group of thousands data center owners and operators spanning 66 countries, will be hosting their annual summit the day before The Green Grid Technical Forum in Santa Clara, CA. This working session will produce real time content to update the DCP Top Ten list. The Top 10 will be presented and discussed at The Green Grid forum as part of the collaboration agreement between Data Center Pulse and The Green Grid.

Determining the Implication of Unused Servers and How They Can Be Addressed

Andy Hawkins, 1E, Data Collection and Analysis Work Group

[Track 2]

A recent survey conducted by The Green Grid revealed four-fifths of data center operators are not looking for unused servers as part of regular operations. Those who do, find on average 10% of their servers are running without being used. This session investigates the cost of wasteful servers and why ignoring them can put the ROI of virtualization at risk. Also explained are new approaches to monitoring servers, where power and usage measurements are combined with business value to shine a spotlight on a hidden problem within the data center.

The Latest on The Green Grid's Productivity Research

Zeydy Ortiz, Ph.D., IBM, Proxies Task Force

[Track 3]

The Green Grid defined the Data Center energy Productivity (DCeP) metric to quantify the useful work that a data center produces based on the amount of energy it consumes. This metric intends to allow data center operators the ability to optimize the energy used based on the current workload and to facilitate comparisons before and after actions are taken. The Green Grid proposed eight proxies that could be used to approximate DCeP and solicited industry feedback to determine the criteria to use to evaluate the proxies. In this session, the presenter will review the proposed proxies to measure productivity and present a preliminary assessment of the top five evaluation criteria. The session will also

cover experimental validation of the proxies that The Green Grid is conducting to assess ease-of-use and accuracy.

4:25pm-5:00pm

Closing Ceremonies

Mark Monroe, The Green Grid Executive Director

[Track 1]

During the final session, Executive Director Mark Monroe will provide a summary of the Tech Forum, a view into the future activities, and will moderate questions from the audience for The Green Grid Board of Directors. The closing ceremony will also include a raffle for exciting prizes drawn from completed event surveys.

**Santa Clara Convention Center
Mission City Ballroom**



- Track 1 – B4**
- Track 2 – B5**
- Track 3 – M1&M2**
- Meal Area – B1-B3**