

Zofnass Program Symposium

Energy Infrastructure Next Generation Planning Perspectives

OCT 27-28, 2014



LEADERSHIP



QUALITY OF LIFE



RESOURCE ALLOCATION



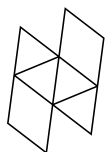
NATURAL WORLD



CLIMATE AND RISK



(www.zofnass.org)



Harvard University
Graduate School of Design

Zofnass Program Symposium

Energy Infrastructure

Next Generation Planning Perspectives

Oct 27, Mon -Oct 28, Tue

Location: Room 112 (Stubbins) Harvard Graduate School of Design,
Gund Hall, 48 Quincy St. Cambridge, MA 02138

Zofnass Program for Sustainable Infrastructure aims to influence the practice of sustainable city planning through an infrastructure-based approach, the most impactful path towards sustainable and resilient development of our communities. Infrastructure is re-examined through a systemic and synergistic approach of the Zofnass Planning Tool, as well as through an assessment-based approach of the Envision™ Rating System, the result of a joint collaboration with the Institute for Sustainable Infrastructure (www.sustainableinfrastructure.org).

This symposium is a collaborative platform that will bring together public officials, infrastructure engineers, planners, design professionals and academia to share “next generation” perspectives on sustainable energy infrastructure. The Zofnass methodology and application examples on energy infrastructure planning will present a prospective framework for integrative planning and collaboration.

The Zofnass Planning Tool attempts to redefine traditional practices for planning urban infrastructure systems through analytical processes and information-driven approaches with the purpose to optimize the contribution and interaction of various experts. The conventional definition of infrastructure mainly addresses energy, transportation, water, and waste systems. This approach extends our understanding of infrastructure to include landscape, food and information systems, eventually compiling seven infrastructure types. This planning approach complements the Envision™ Rating System through “reverse engineering” of infrastructure components or projects. Envision™ is a well-recognized and holistic framework with its own toolbox for evaluating all types and sizes of infrastructure projects that use transformational, collaborative approaches to assess the sustainability indicators over the course of the project’s life cycle.

This symposium will cover perspectives on energy infrastructure planning through three themes

Broad Perspectives on Energy Infrastructure
Transformative Approaches at the System Scale
Incremental Approaches at the Project Scale

BRIEF AGENDA

Monday, October 27, 2014 - 1pm to 6:15 pm

PANEL 1 (1:10pm-3:25pm)

Systems Level Approach to Energy Infrastructure

Spiro Pollalis, Director, Zofnass Program & Professor of Design, Technology and Management at Harvard GSD **Anthony Fiore**, Director—Office of Energy, NYCDEP, **George Kendrick**, Senior Principal, Energy and Environment, Stantec, **Rick Phillips**, Director of Urban Design, Northern California, HNTB.

PANEL 2 (3:45pm-6:15 pm)

Sustainability Frameworks and Approaches for Planning of Energy Projects

Bill Bertera, President & CEO, Institute for Sustainable Infrastructure, **James Mueller**, Assistant Commissioner, Planning & Capital Projects, NYCDEP Bureau of Wastewater Treatment, **Roberto Mezzalama**, Principal and Senior Project Director, Global Sustainability Advisor, Golder Associates, **Tom Phelps**, Principal, Stantec, **Alida Saleh**, Head of Environment & Sustainability, Exp Services.

Tuesday, October 28, 2014 - 9:00 am to 3:45 pm

PANEL 3 (9:00 am-12:00 pm)

International and Industry Trends

Andreas Georgoulas, Research Director, Zofnass Program & Lecturer, Harvard GSD, **Ulrika Francke**, CEO and President, Tyrens AB, Sweden, **Hans-Peter Egler**, CEO, Global Infrastructure Basel (GIB) Foundation, **James Grant**, Energy & Fueling Director, HNTB.

PANEL 4 (1:00pm-3:15pm)

Next Generation Practices

Jeffrey S. Katz, CTO, IBM Energy and Utilities Industry, **Roger Bason**, President Eccosolution, LLC, **Dick Corolewski**, Federal Business Unit Director, POWER Engineers.

3:15pm: Closing remarks, Spiro Pollalis

Format: Within every session each speaker will give a 20-30 mins presentation, followed by 30-45 mins of panel discussion in the end.

SCHEDULE OCT 27, MON

Room 112, Stubbins

1:00 pm-1:10 pm

Welcome and introductions (Light snacks and coffee setup in stubbins from 12:30 pm)

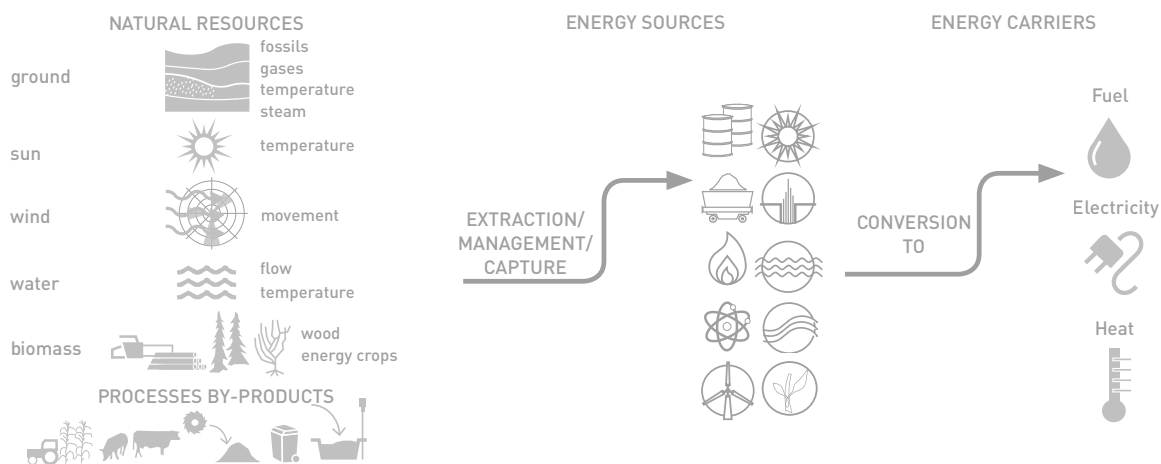
Systems Level Approach to Energy Infrastructure

1:10 pm-1:40 pm

Zofnass Planning Guidelines and Energy Infrastructure

Prof. Spiro Pollalis, *Director of Zofnass Program, Professor of Design, Technology and Management, Harvard GSD*

The Zofnass Planning Guidelines aim to provide an analytical framework for achieving urban sustainability, focusing on the services and performance of infrastructure systems. Urban planning determines the end-users and thus the demand for services and resources that infrastructure should respond to. On the other hand, the space requirements and distribution of infrastructure facilities and networks affect the configuration of urban areas and the morphology of the urban fabric. Planning and infrastructure development should therefore be performed in parallel to ensure efficiency, high living standards, and resiliency. Urban infrastructure and the Planning Guidelines are organized into seven basic systems: Transportation, Landscape, Water, Energy, Solid Waste, Information, and Food. Classification does not mean separation as the systems are considered to function in synergy. Energy infrastructure manages and converts available natural resources into energy carriers like electricity, heat, and fuel, delivering them to end-users. Energy security is fundamental for quality of life, economic development, and by extension, political stability. The Planning Guidelines for the Energy system call for secure and equal access to energy carriers for all individuals and businesses, while promoting rational use and efficient practices. They focus on exploiting natural resources within the environment's regenerative capacity, providing renewable and low-emission alternatives, while at the same time avoiding, minimizing and compensating for negative impacts on communities and ecosystems.



1:40 pm-2:05 pm

Initiatives toward energy neutrality, opportunities and a case study on waste to energy initiatives

Anthony Fiore, *Director - Office of Energy, New York City Department of Environmental Protection*

Significant energy is required to deliver sufficient quantities of potable water and to collect and treat wastewater. Between three and four percent of total US electricity demand is used for these purposes.¹ For municipalities, the water and wastewater sector may make up as much as 35 percent of their energy consumption.² Water and wastewater utility operators are responsible for achieving water quality standards and, therefore, protecting the public health and the environment all in the face of aging infrastructure. In fact, the American Society of Civil Engineer's 2013 report card gave the sector a D.³ In light of this, energy efficiency, conservation, generation, and supply initiatives may be superseded for more immediate needs. However, many assets have long life expectancies so it is important to evaluate investments considering the impact of new treatment requirements, air quality standards, and energy prices. In addition to integration of energy and GHG management into state of good repair programs there are other challenges that confront water and wastewater utilities in controlling both energy use and their associated greenhouse gas emissions including, scarcity of capital dollars, regulatory and legal frameworks that promote a culture of risk aversion, and long payback periods. Fortunately, this sector also has a lot of opportunities to reduce energy needs and greenhouse gas emissions. This presentation will focus on New York City Department of Environmental Protection's energy use and GHG management efforts. An overview of the department's energy use and GHG emissions will be reviewed along with the various management strategies being employed. Finally, it will showcase some of the specific initiatives the department is taking today along with future opportunities.

¹Electric Power Research Institute (EPRI). *Water & Sustainability (Volume 4): U.S. Electricity Consumption for the Water Supply & Treatment - The Next Half Century. Topical Report 1006787.* Palo Alto, CA: EPRI, March 2002

²New York State Energy Research and Development Authority (NYSERDA). *Statewide Assessment of Energy Use by the Municipal Water and Wastewater Sector. Final Report 08-17.* November 2008.

³American Society of Civil Engineers (ASCE). *Infrastructure Report Card.* <http://www.infrastructurereportcard.org/> Last accessed on October 20, 2014.

2:05 pm-2:15 pm Break

2:15 pm-2:40 pm

Renewable Energy Planning at the Community Level: Lessons Learned from Net Zero Projects

George Kendrick, *Senior Principal, Energy and Environment, Stantec.*

Renewable energy planning at the community level requires consideration of myriad environmental, social, and economic factors to meet sustainability objectives. For a given location, evaluating the full spectrum of possible renewable options such as wind, solar, biomass, geothermal, or hydropower, and developing the best path forward in terms of project selection and execution, often requires balancing the pros and cons of each renewable technology as well as challenging any preconceived notions held by stakeholders. Technical feasibility and economics play key roles in siting and project selection, but so do community norms, overarching energy and sustainability objectives, and consideration of long-range master plans for community development. This presentation will illustrate an approach to community-scale sustainable renewable energy planning using examples from recent work on the U.S. Army's Net Zero Energy program at multiple garrisons. Large military installations possess the same features as any community, including housing, recreational facilities, commercial zones, schools, green space, transportation infrastructure, industrial buildings, and mixed-use development areas. They can also present unique siting challenges involving air operations, live-fire training areas, radar and communications constraints, and installation security. Successful selection, ranking, and siting of renewable projects in these communities requires not just an analysis of feasible technologies, but also engaging stakeholders and leaders in the planning process to help validate the best path forward, as well as developing a clear understanding of the extant military mission, operational nuances, and community behaviors.

2:40 pm-2:55pm

Urban Design's Contribution to Energy Efficiency – Strategic and Tactical

Rick Phillips, *AVP/ Director of Urban Design, Northern California, HNTB Corporation*

This presentation will examine the balance of strategy and tactics underlying sustainability and how this balance applies to energy conservation and urban design, demonstrating a smart growth vision for optimizing energy efficiency through the strategy of expanded walkability and the tactic of multimodal transportation. A case study of Light Rail in Phoenix, Arizona will illustrate the speaker's key points. Presented by Rick Phillips, HNTB's director for urban design for Northern California.

2:55 pm- 3:25 pm **Panel Discussion moderated by Prof. Spiro Pollalis**

3:25 pm-3:45 pm Break

SCHEDULE OCT 27, MON

Room 112, Stubbins

Sustainability Frameworks and Approaches for Planning of Energy Projects

3:45 pm-4:10 pm

The Envision Rating System for Sustainable Infrastructure

Bill Bertera, *President & CEO, Institute for Sustainable Infrastructure*

Launched in 2012, Envision is a sustainable infrastructure planning framework and rating system applicable to all categories of civil infrastructure. With over 2400 credentialed Envision Sustainability Professionals Envision is being used by designers, owners and builders as a planning, design, construction, and management tool to examine levels of sustainability across the triple bottom line. Envision provides the framework and incentives needed to foster a dramatic and necessary improvement in the performance and resiliency of our physical infrastructure. Envision was created by the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design and the Institute for Sustainable Infrastructure (ISI). The ISI is a not-for-profit education and research organization founded by the American Public Works Association, the American Council of Engineering Companies, and the American Society of Civil Engineers.

4:10 pm-4:35 pm

Rockaway Waste Water Treatment Plant: A NYCDEP Case Study in Economics and Sustainability

James Mueller, *Assistant Commissioner, Planning & Capital Projects*

NYC Department of Environmental Protection, Bureau of Wastewater Treatment

The Rockaway WWTP is NYCDEP's smallest and least efficient wastewater treatment plants from both an energy and staffing perspective. The plant has not received a significant investment in "state of good repair" since the 1970s, and its location on the Rockaway peninsula makes it highly susceptible to extreme weather events. The high operating unit costs are driven by a significant gap between the plant's 45 mgd design capacity and its existing annual average flow of 18 mgd. Population and employment projections for the service area are flat, and spare capacity for flow collected at the Rockaway sewershed exists at the 26th Ward WWTP, five miles away across Jamaica Bay. In 2014 DEP's Bureau of Wastewater Treatment engaged in facility planning to evaluate the long term economics, risks, and benefits of consolidating treatment at the 26th Ward WWTP versus maintaining wastewater treatment on site long term.

This presentation will focus on the classification of potential treatment alternatives, the vetting of these alternatives to a shortlist for detailed consideration, the development of capital and O&M cost projections to estimate the net present value of alternatives, identification of synergies with potential future regulations and water quality goals and the evaluation of nonmonetary attributes for sustainability through the Envision framework as a holistic basis for NYCDEP's decision making.

4:35 pm-4:45 pm Break

4:45 pm-5:10 pm

Use of sustainability criteria in siting and routing of energy infrastructures

Roberto Mezzalama, *Principal and Senior Project Director, Global Sustainability Advisor, Golder Associates*

Project proponents worldwide, both private and public, are facing unprecedented scrutiny and demands from their stakeholders – investors, regulator, civil society, consumers, supply chain etc. In this context, the ability to understand and assess the environmental, social, economic and technical risks as well as opportunities during project planning and design – in a transparent fashion – is fast becoming essential to the success of energy projects given their visibility. Various tools and approaches have been developed to provide a systematic and transparent evaluation process to support informed decision-making and communication with key stakeholders while accounting for technical and non technical considerations. Within the energy sector, the GoldSET-Spatial application has provided an integrated approach to support routing and siting option identification and analysis by combining spatial data within the GoldSET multi-criteria decision analysis framework. In so doing GoldSET-Spatial aids in the assessment of alternatives and in communicating the impact of various options with stakeholders. The presentation will provide an overview of the process and how it has recently been applied in the planning of power lines at a smaller scale in a Canadian municipality and at a larger scale across Italy. A siting example will also be discussed, where Golder conducted a site selection study to identify preferred locations for a propane dehydrogenization, ammonia/urea fertilizer and methanol plants within a city's Energy and Technology Park. The process used an approach which accounted for, balanced and evaluated various environmental and social priorities as well as technical plant-related requirements.

5:10 pm-5:30 pm

'Levelized Cost of Energy': a Useful Metric in Choosing Among Campus Energy Options

Tom Phelps, *Principal, Stantec*

The goal of carbon neutrality is widely embraced, especially by many higher education institutions. However, choosing from among energy options is inevitably influenced by market-driven economics at least as much as it is influenced by the desire to do what is right for future generations. Levelized Cost of Energy (LCOE) is a life-cycle costing financial metric widely used in the utility industry. Adding a carbon emissions valuation into the formula, coupled with more subjective metrics, can help clarify the financial, environmental, and risk trade-offs when making these energy choices.

5:30 pm-5:50 pm

Sustainability as a Performance Indicator

Alida Saleh, *Head of Environment and Sustainability, exp Services Inc.*

Over the past twenty years, noteworthy improvements have been made in executing infrastructure projects globally. However, the overall rate of improvement is inadequate. This can be attributed to the fact that delivering sustainable infrastructure projects requires innovative engineering applications at all project scales. This innovation can be achieved if the industry and its clients establish design objectives that focus on sustainable solutions as a performance indicator.

The steady development of sustainability elements from a concept into a driver of client behavior is now beginning to affect the design and execution of projects. There is a trend of businesses affirming their commitment to sustainability but failing to translate the concept into operational plans at the project level. This could be attributed to the fact that sustainability crosscuts an extensive range of issues requiring a wide range of expertise involving skill sets beyond those of traditional engineering. This presentation will explore how **exp** has incorporated sustainability into the wide range of its project activities.

5:50 pm- 6:15 pm: Panel Discussion moderated by Bill Bertera

6:15pm-7 pm: Reception in Porticos, room 121

7 pm-9 pm: Dinner for guests in Stubbins, room 112

SCHEDULE OCT 28, TUE

Room 112, Stubbins

Continental breakfast in Stubbins from 8:45 am

International and Industry Trends

9:00 am-9:40 am

Assessing Environmental, Social, and Economic Impacts of Privately-Owned Energy Infrastructure in Latin America

Prof. Andreas Georgoulas, *Research Director, Zofnass Program & Lecturer in Architecture, Harvard GSD*

The IDB Infrastructure 360 Awards is the first voluntary submissions, evaluation, and recognition program for privately-owned infrastructure projects in Latin America. A joint effort from the Inter-American Development Bank and the Zofnass Program for Sustainable Infrastructure, the 360 Awards have received applications from more than \$90 billion worth of infrastructure assets in the last two years. This presentation will address the process of evaluating infrastructure projects through the Envision rating system, with a particular emphasis on energy projects submitted at the Infrastructure 360 Awards and their relative performance in Envision. The presentation will conclude with initial results from a pilot application of the Zofnass Economic Tool on an energy project, outlining the process of quantification of the external sustainability benefits of energy infrastructure.

9:40 am-10:10 am

Energy Infrastructure in Sweden: Production, Distribution, Synergies

Ulrika Francke, *CEO and President, Tyréns AB, Sweden*

A presentation about Tyréns AB and the company's role in building sustainable communities, with a focus on energy. Tyréns is one of Sweden's leading urban planning consultancies. They specialize in planning and infrastructure solutions that promote sustainable development. Founded in 1942, Tyréns has more than 1,300 employees, thirty offices nationwide and a London-based partner, AKT II and the subsidiaries HaCaFrø in Denmark and Tari in Estonia. Owned by a private foundation, Tyréns is a leader in research and development and works closely with universities and research institutes. The energy issue has been on Sweden's agenda for a long time due to the cold climate and industrial demand. The presentation will address energy production and distribution systems in Sweden, its challenges and possibilities, progress and setbacks, and delineate the reasons for the country's energy systems transformation. It will also describe how demand for energy, together with different economical and administrative instruments, has affected our attitude toward waste. Viewing waste as a resource and a fuel, rather than something to dispose, changes the conditions for all players when it comes to building sustainable communities. Tyréns is part of this process with interesting projects in various parts of the energy production and consumption systems.

10:10 am-10:30 am Break

10:30 am-11:00 am

Risk Mitigation through Sustainability

Hans-Peter Egler, *CEO, Global Infrastructure Basel (GIB) Foundation*

Sustainable infrastructure contributes to the reduction of human and industrial footprints. With this in mind, GIB Foundation has developed a general sustainability grading for the development of infrastructure projects, which is currently under revision. GIB Foundation is further developing the grading into an international private voluntary standard. To complement these efforts, and facilitate the link to the financial sector, GIB Foundation's work aims also at stimulating and enabling the financial sector - particularly institutional investors and strategic asset allocators - to scale up financing of sustainable infrastructure. Moving from conventional infrastructure to sustainable infrastructure has the potential to improve the livelihoods of billions of people all over the globe, by promoting and mainstreaming the systematic financing of eco-efficient technologies and socially inclusive development, e.g. in urban planning. Such structures will also contribute significantly to the preservation of natural resources, climate change mitigation and reducing social imbalances.

Sustainability criteria have the potential to mitigate risk. Infrastructure projects that are planned sustainably have, among other benefits, stronger backing from the public, lower energy and repair costs, better governance and pro-active risk management. These factors reduce implementation risks, lower running costs, and lead to outstanding residual value as well as stronger resilience. To channel more funds towards sustainable infrastructure, the added value of sustainability has to be demonstrated and made accessible to capital markets, and in particular to the aforementioned institutional investors. This value comes, on the one hand, from the potential risk mitigation feature of sustainable infrastructure, which reduces implementation, resource and credit default risks. Furthermore, sustainable infrastructure may offer competitive returns by potentially reducing costs. In addition, GIB Foundation is working to establish a Sustainable Infrastructure Standard, Credit Rating and develop a distinct sustainable infrastructure asset class, including a registry. The presentation will describe GIB's approach and the international trends concerning these developments. It will also draw conclusions concerning the performance of energy projects in comparison with other types of infrastructure.

11:00 am-11:20 am

Industry Perspective on Energy Planning in Aviation

Jim Grant, *Energy and Fueling Director, HNTB Corporation*

This presentation will examine application of the general hierarchical strategy for sustainable energy to the aviation market. Topics include: NextGen air traffic management, energy efficiency, renewable energy and lower impact energy production. Real-world examples from Alaska Airlines, Denver International Airport, Dallas-Fort Worth International Airport and Los Angeles International Airport will illustrate energy planning in aviation. Presented by Jim Grant, HNTB's energy and fueling director. draw conclusions concerning the performance of energy projects in comparison with other types of infrastructure.

11:20 am-12:00 pm: **Panel Discussion moderated by Prof. Andreas Georgoulas**

12:00 pm-12:45 pm Lunch in room 124

SCHEDULE OCT 28, TUE

Room 112, Stubbins

Next Generation Practices

1:00 pm-1:30 pm

Information Infrastructure for Energy

Jeffrey S. Katz, *Chief Technology Officer, Energy and Utilities industry, IBM*

The electrical power system is adopting an intelligent overlay, known as advanced distribution management, or smart grid. The advent of solar and photovoltaic generation, and distributed power systems, bring an additional dimension to power system coordination. The always-on presumption of electric power becomes a more complex challenge with these new elements. Real-time precision 4D weather forecasting, micro-grids, intermittent generation optimized with storage make for interesting developments in the fusion of electrical and computational sciences. Interdependencies are developing. Water is essential to most thermal power plant cycles and electricity is used to desalinate water. Electric vehicles, pure or hybrid, are common and charging stations abound. The digital economy depends on electric power and smarter transmission and distribution systems are digitized.

Meanwhile, computerization of anything now admits to sophisticated cyber-security threats. Security is the bond between digital and reality, and is critical to the advance of complex, dynamic infrastructure elements. Yet the less obvious the computer is in an architectural component of the physical world, the more likely that security is an afterthought. If security wasn't enough of an issue, uncoordinated intelligent systems can lead to "emergent behavior", a great science fiction sounding term from the growing field of systems science. As a nod toward the increasing human dependence on electric power, consumer awareness of power consumption on a more controllable basis, versus just paying a bill each month, is motivating utilities to make their infrastructure a little more participatory with the stakeholders. Smart meters than can run in reverse is just one aspect; social networking for outage management is another.

1:30 pm-2:10 pm

Ocean Energy and Living Reefs: Infrastructure Design with Natural Systems

Roger Bason, *President, Ecosolution, LLC*

Shoreline Energy Infrastructure integrates power generation from near shore tidal currents and wave action with constructed living reefs that provide shoreline protection and improve biodiversity. With many coastal communities strained by diminished financial resources while simultaneously facing threats from environmental degradation and climate change, this synergistic approach makes sense on many levels. Power generation provides annual recurring revenue. Constructed Living Reefs provide multiple benefits from rebuilding beaches to shoreline protection, ecotourism and biodiversity enhancements. The presentation seeks to improve understanding of the commercial status of these ocean technologies as well as where and how they can be best applied. By summarizing the strengths and limitations of this energy infrastructure approach, a discussion can move forward to enable the integration of the key parameters with the design process. Evaluating requirements for effective system installation will clarify the sustainable Envision™ design and planning process, making it available to islands as well as urban and shoreline communities worldwide.

2:10 pm-2:40 pm

Roadmap to Integrating Renewable Energy into Existing Power Delivery Systems

Richard Corolewski, *Electrical Engineer/Federal Division Director*

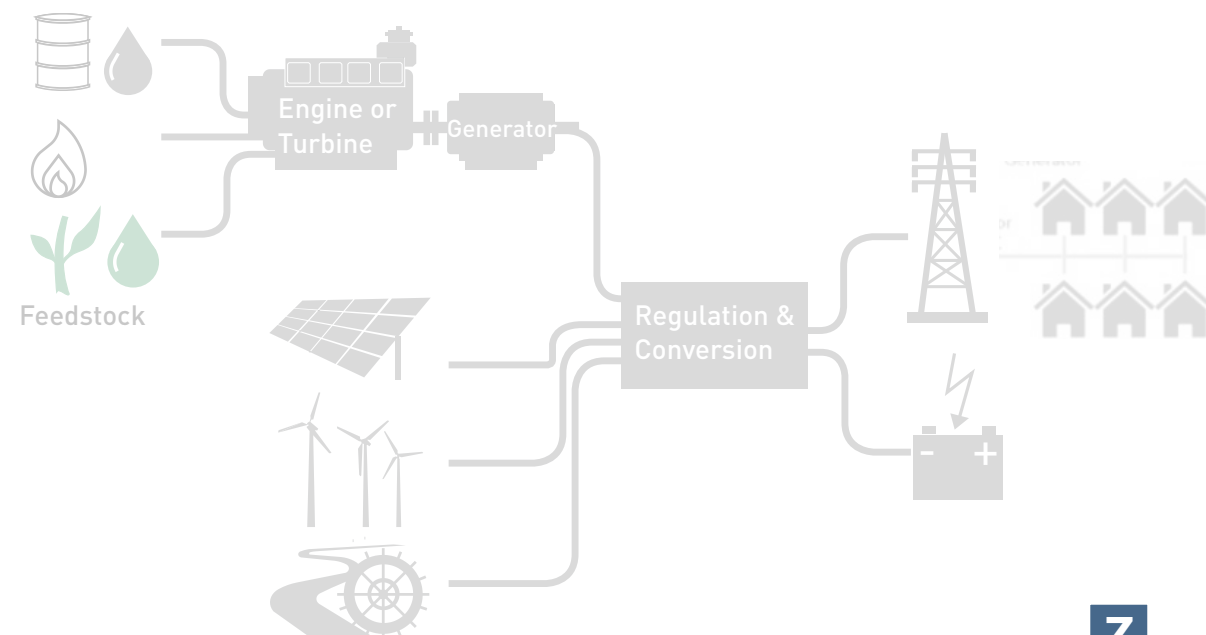
The U. S. Government is the world's largest energy consumer. Because of global energy security concerns, the government and its agencies are tasked with reducing energy demand, increasing alternative energy sources, and ensuring that energy is delivered reliably and efficiently. Commercial electricity retailers are also aiming towards meeting renewable energy targets by sourcing more of their electricity from renewable resources. Renewable energy, such as wind and solar, offers valuable solutions to global sustainability provided they can be safely and reliably integrated into the existing electrical energy supply and distribution system. There is a perception that integrating renewable energy into electrical grids is a simple "plug-and-play" proposition. In reality, it is a very complex and iterative process that requires early planning and engineering to ensure successful compliance with utilities' interconnection requirements. Proper interconnection with the utility must be well planned and coordinated to support the demands of the project schedule and drive the project forward. Overlooking critical components of the coordination process can halt projects or jeopardize schedules from delays, or it can result in additional development costs to safeguard system stability.

Understanding and considering the critical components of coordinating with utilities provides a roadmap for interconnection success. These components include interfacing with the local power provider to understand the utility's concerns and requirements; developing interconnection criteria; performing an interconnection study; identifying system protection and control measures; and conducting power flow studies.

2:40pm-3:15 pm: Panel Discussion moderated by Prof. Spiro Pollalis

3:15 pm: Closing Remarks, Prof. Spiro Pollalis

HYBRID GENERATION



SPEAKER BIOS

Roger Bason

Eccosolution, LLC

Renewable Energy Technologies, Focus on Ocean Energy and Living Reefs

A thought leader in the field of ocean energy innovation; Bason has pioneered tidal energy technology development over the past 14 years. This includes contributing to the first US tidal energy project at Roosevelt Island in the East River, NYC; serving as Adjunct Professor at Columbia University School of International Public Affairs (SIPA) Center for Energy, Marine Transportation and Public Policy, and Consultant to the UN Partnership for Small Island Developing States. He currently lectures widely and directs tidal, wave and living reef projects in the US, UK and Bermuda. He teaches Ocean Energy training programs with a focus on the Common Core Science, Technology, Engineering and Math (STEM) Next Generation Science Standards.

William J. Bertera

President & CEO, Institute for Sustainable Infrastructure

President and CEO of the Institute for Sustainable Infrastructure. He is the former Executive Director of the Water Environment Federation, the Rebuild America Coalition and the American Public Works Association. He has also held senior management positions with the International City Management Association, the National Association of Counties and the National Solid Wastes Management Association.

Richard Corolewski, P.E.

Electrical Engineer/Federal Division Director, POWER Engineers

Mr. Corolewski is the director of the POWER Engineers' Federal Division and has 30 years' experience in the A/E industry supporting projects in the U.S. and overseas. He is currently responsible for all business development, strategic planning and operations of POWER's Federal Division, which specializes in energy engineering and design. Mr. Corolewski is a member of POWER's Sustainability Committee and is integral to shaping POWER's sustainable engineering solutions. Together with POWER's CEO, he serves on the Sustainable Infrastructure Advisory Board (SAIB) for the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design. With other industry leaders, he promotes topics of sustainability within today's global infrastructure. Mr. Corolewski offers a thorough understanding of all aspects of project management and execution, including programming, planning, design, bidding and construction administration. He has managed federal, industrial, and commercial projects, ranging in size from \$3 to \$100 million, and he specializes in Department of Defense and Department of State programs.

Hans-Peter Egler

CEO, Global Infrastructure Basel (GIB),

Global Infrastructure Basel (GIB) is a leading global non-profit foundation dedicated to promoting sustainable infrastructure financing practices and fostering market-based sustainable development around the world. Hans-Peter has long standing expertise in international cooperation, management and project innovation. Before joining GIB, he led the Trade Promotion Division of the Swiss State Secretariat for Economic Affairs (SECO). Prior to that, he was responsible for investment promotion activities and infrastructure financing for Latin America and Africa. From 1992 to 1994, Hans-Peter was Deputy Country Director of the Swiss Development Cooperation in Bolivia. He started his professional career in 1988 as the project manager responsible for introducing the first office automation system within the Swiss Federal Administration. From 1990 to 1992, he was Deputy Head of Division for Latin America in charge of bilateral trade and investment issues. Hans-Peter holds degrees in Economic Sciences, Modern History and Environmental Management and has over 26 years of work experience.

Anthony J. Fiore

Director - Office of Energy, New York City Department of Environmental Protection

Anthony has spent the last 15 years with the NYC Department of Environmental Protection (DEP) with experience ranging from water quality, environmental health and safety, operations and engineering, and customer service. Anthony has led development efforts for hydroelectric projects; the investigation of wind and solar opportunities; and beneficial use of anaerobic digester gas. As a result of this experience Anthony has been given the responsibility to lead a new office of Energy for the DEP. As Director of DEP's Energy Program, Anthony has overall responsibility for setting the strategic energy goals for the agency, the development of metrics and quality assurance programs for tracking consumption and energy costs, and the management of the capital priorities for energy projects. Anthony holds a Master's in Public Health from the Mailman School of Public Health at Columbia University and a Bachelor's of Science degree from Binghamton University.

Ulrika Francke

CEO, Tyréns AB

Tyréns is one of Sweden's leading urban planning consultancies. We specialize in planning and infrastructure solutions that promote sustainable development. Founded in 1942, Tyréns has more than 1,300 employees, thirty offices nationwide and a London-based partner, AKT II and the subsidiaries HaCaFrø in Denmark and Tari in Estonia. Owned by a private foundation, Tyréns is a leader in research and development and works closely with universities and research institutes. Ms Francke has an extensive background in the real estate industry and in society planning and experience from the private, public and political sector. During the 80's she was Member of the Stockholm city council, Stockholm municipal executive board and the vice Mayor of Stockholm. After that she has had leading positions both in the private and public sector. Among others she has been the CEO of Fastighets AB Brommastaden, Executive director for the department of city planning and building permits at City of Stockholm, Executive director for the department for traffic and real estate at City of Stockholm and CEO of SBC AB. She has also held a number of directorships in companies in the energy, waste and water sectors and in various research organizations.

SPEAKER BIOS

Prof. Andreas Georgoulas

Research Director, Zofnass Program & Lecturer in Architecture, Harvard GSD

Prof. Andreas Georgoulas is the research director of the Zofnass Program for Sustainable Infrastructure at Harvard University Graduate School of Design, where he also teaches since 2007. His work focuses on infrastructure and large-scale developments, where he has published two books and continues to develop methods and tools to evaluate their environmental, social and economic impacts. His current projects include the Infrastructure 360 Awards, the first sustainability assessment and recognition program in Latin America in collaboration with the IDB, a wide interdisciplinary effort to assess health impacts of cities in Asia, and research on hybrid models of waste-to-energy facilities. He is the lead developer of the Zofnass Economic Tool, a comprehensive analytic model that quantifies the external costs and benefits of sustainable infrastructure. He has collaborated with Obermeyer, Hochtief and the US General Service Administration, and in infrastructure financing with UniCredit Markets and Investment Banking. He has consulted for the Economist Intelligence Unit and the United Nations Development Program, and led feasibility studies for new city developments in Cameroon, Saudi Arabia and Pakistan. Prof. Georgoulas holds degrees in Architecture Engineering from the University of Athens, a Master's and a Doctorate from Harvard.

James Grant

PE, MBA, BSME ME, ENV SP

Associate Vice President; Energy and Fueling Director HNTB Corporation

Mr. Grant has over 30 years' experience and currently serves as Director for the Energy & Fueling Services Group in HNTB's Bellevue, Washington, office. He is a contributing member of the Harvard Sustainable Infrastructure Advisory Board focused on the development of a rating system for horizontal infrastructure. Mr. Grant authored the Aviation Chapter in the book, "Infrastructure Sustainability and Design" for the Harvard GSD. He met with Federal Agencies at the White House and Pentagon to strengthen project sustainability in government programs. Mr. Grant prepared a Webinar course training session on Measurement & Verification for the United States Army Corps of Engineers to improve the accuracy of energy conservation estimates. Mr. Grant is currently providing energy planning and design services to the Chicago Department of Aviation, the Houston Airport System, Los Angeles World Airports and the Port of Seattle. His projects range from central utility plant improvements to major upgrades involving entire central terminal areas.

Jeffrey S. Katz

Chief Technology Officer, Energy and Utilities industry, IBM

Jeff Katz is the Chief Technology Officer of the Energy and Utilities industry at IBM. He is a Senior Member of the IEEE and a member of the IBM Academy of Technology. He has presented at many industry conferences, including the Department of Energy's Grid Wise Grid Inter-Op. He was an invited speaker at the CMU Conference on the Electricity Industry and the Yale Alumni in Energy conference, and was co-chair of the IEEE 2030 Smart Grid IT Task Force. He was invited to an energy cyber security workshop convened by the GAO and NAS. He is on the External Advisory Board of the Trusted Computing Initiative in the Power Grid. He was on the "Networked Grid 100: The Movers and Shakers of the Smart Grid". He is on the IEEE Standards Association Board for 2014. He is an author on six patents.

George Kendrick

Senior Principal, Energy and Environment, Stantec

George Kendrick is a senior principal at global design firm Stantec, where he leads strategic planning and project coordination for the firm's renewable energy sector nationwide. He has coordinated energy planning, impact assessments, sustainability evaluations, engineering design, and technical support for a wide range of power projects, including work on more than 100 wind and solar power projects in North America over the past decade. Mr. Kendrick authored the chapter on Sustainable Wind Energy Development in the 2012 Harvard-Zofnass book *Infrastructure Sustainability and Design*, and has also recently conducted renewable energy evaluations and Net Zero Energy planning for multiple military communities in Europe in the past two years. He is a dual citizen of the USA and Ireland, with field experience in Europe, the Baltics, Mexico, and Central America.

Roberto Mezzalama

Principal and Senior Project Director, Global Sustainability Advisor, Golder Associates

Roberto Mezzalama is Principal and Senior Project Director of Golder Associates since 2006 and in April 2011 he has been appointed Global Sustainability Advisor for Golder Associates Corporation. Roberto holds an M.Sc. in Environmental Engineering from Polytechnic of Torino, Italy and a B.Sc in Natural Science from the University of Pavia, Italy; he speaks a fluent English and a very good French. Roberto has held various positions in local governments in Italy prior to joining Golder Associates. He joined Golder Associates in 1999 as senior Project Manager, and has managed and directed several Environmental Impact Assessment Studies in Europe and North America. In 2004 and 2005 he has been the manager of the Environmental Assessment Division of the Calgary Office. From November 2007 to April 2011 he was President and Managing Director of Golder Associates Europe coordinating the 14 European Operating Companies and managing a staff of about 800 people. In his capacity of Senior Project Director he is now leading several international projects. His role includes the management and direction of international working groups comprising experts from various nationalities, the definition of baseline studies and impact analysis methodologies for Environmental and Social Impact Assessment Studies according to various international standards and integration with the engineering team and client team.

SPEAKER BIOS

James G. Mueller, P.E.

Assistant Commissioner, Planning & Capital Projects
New York City Department of Environmental Protection, Bureau of Wastewater Treatment

Jim Mueller has over 21 years of experience at the New York City DEP in planning, design and construction of large scale water and wastewater infrastructure improvement projects. He has been extensively involved in developing and implementing \$13B of transformational infrastructure programs. In addition, Mr. Mueller has led organizational and business process changes in several Bureaus within DEP as well as the creation and advancement of a comprehensive risk assessment, prioritization and asset management program. A graduate of Manhattan College and New York University, Mr. Mueller holds a Bachelor's Degree in Civil Engineering, a Master's Degree in Environmental Engineering and an MBA in Finance and Statistics.

Tom Phelps

Principal, Stantec

Tom's 40 years' practice in professional engineering includes energy related R&D and advocacy, detailed building design, and central energy systems planning and implementation. He is a registered professional engineer internationally, in 9 states, and in 2 Canadian provinces. He also serves as an expert witness in engineering and project management related matters.

Rick Phillips, AICP, RA (AZ)

Associate Vice President; Director of Urban Design,
Northern California, HNTB Corporation

Rick Phillips is an award-winning architect and urban designer with more than 30 years of international experience in all aspects of transportation infrastructure. In addition to his broad design and planning abilities, he is accomplished at stakeholder outreach, collaborative planning and consensus building. As an architect, Mr. Phillips has developed designs and proposals for transportation facilities, bridges, major railway terminals, intermodal facilities, LRT corridors and stations, transit-oriented development (TOD), highway structures, pedestrian bridges, and commercial and residential projects. As a planner, his experience encompasses residential, community and resort concept plans, detailed recommendations on highway and transit alignments, historic preservation and adaptive re-use, aesthetic and urban design guidelines, and environmental impact mitigation.

Alida Saleh

Head of Environment and Sustainability,
exp Services Inc.

Alida Saleh is the Head of Environment and Sustainability at exp Services Inc. and is one of the firm's in-house sustainable design, construction and operations experts. Ms. Saleh has been involved in a broad range of public and private projects in North America and Internationally. She obtained her Masters in Sustainability and Environmental Management from Harvard University and specializes in 'Green' development and implementing environmental management systems. Ms. Saleh served as a Board Member of the Canadian Infrastructure Advisory Board with DFAIT for three years. Currently she is serving as a Member of the Harvard Sustainability Infrastructure Advisory Board and a Steering Committee Member for the Disaster Management Advisory Committee for Focus Humanitarian Assistance Canada.

Prof. Spiro Pollalis

Director of Zofnass Program & Professor of Design,
Technology & Management, Harvard GSD

Professor Pollalis is Professor of Design, Technology and Management at the Harvard Design School. Since 2008, he is the Director of the Zofnass Program for the Sustainability of Infrastructure that has led to the Envision Rating System. He is also the Principal Investigator of the project "Gulf Sustainable Urbanism" for 10 cities in the Arab Gulf, sponsored by the Qatar Foundation. He has taught as a visiting professor at the ETH-Zurich, Switzerland; TU-Delft, Holland; Uni-Stuttgart, Germany; U-Patras, Greece; and has offered joint courses with the Harvard Business School on planning and development. He serves as the co-chair of the Advisory Committee on Future Cities for the Singapore-ETH Center. Prof. Pollalis is the chief planner for the new DHA City Karachi for 600,000 people, currently under construction. He served as the Chairman and CEO of the public company for the redevelopment of Hellinikon, the former Athens airport, and he developed the base master plan and business plan (www.pollalis-hellinikon.com). Professor Pollalis received his first degree from the University in Athens (EMP) and his Master's and PhD from MIT. His MBA in high technology is from Northeastern University. He has an honorary Master's degree in Architecture from Harvard.

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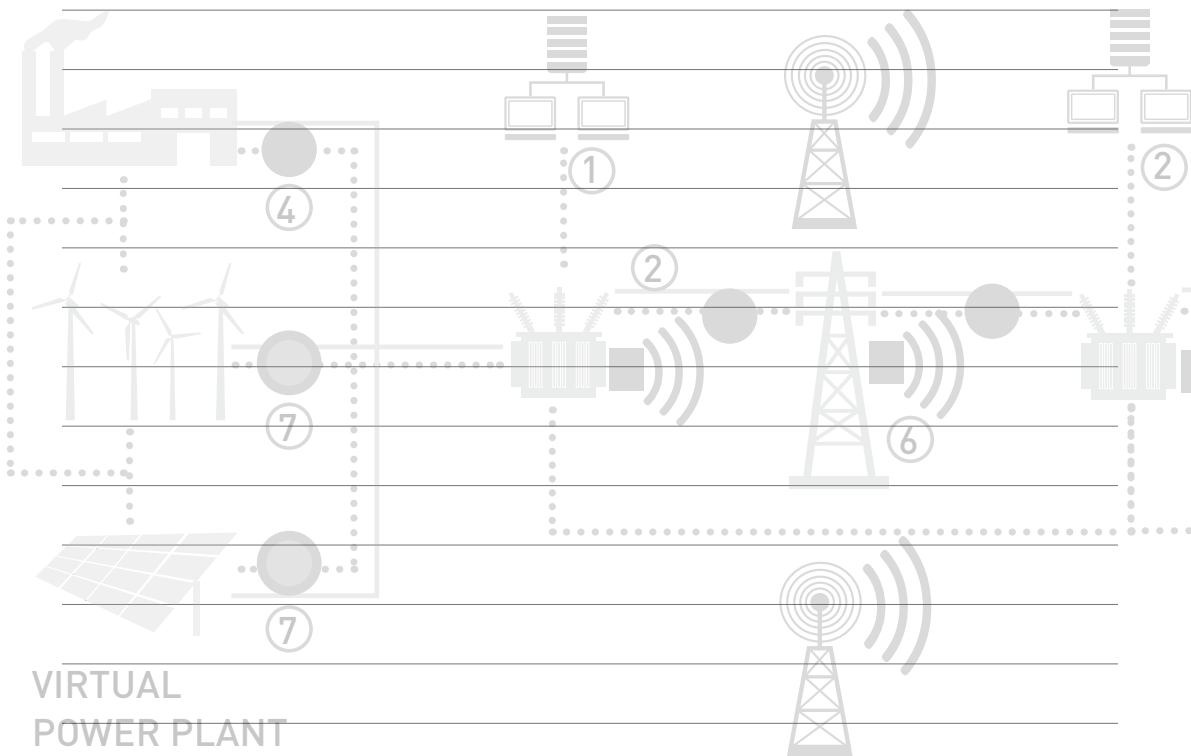


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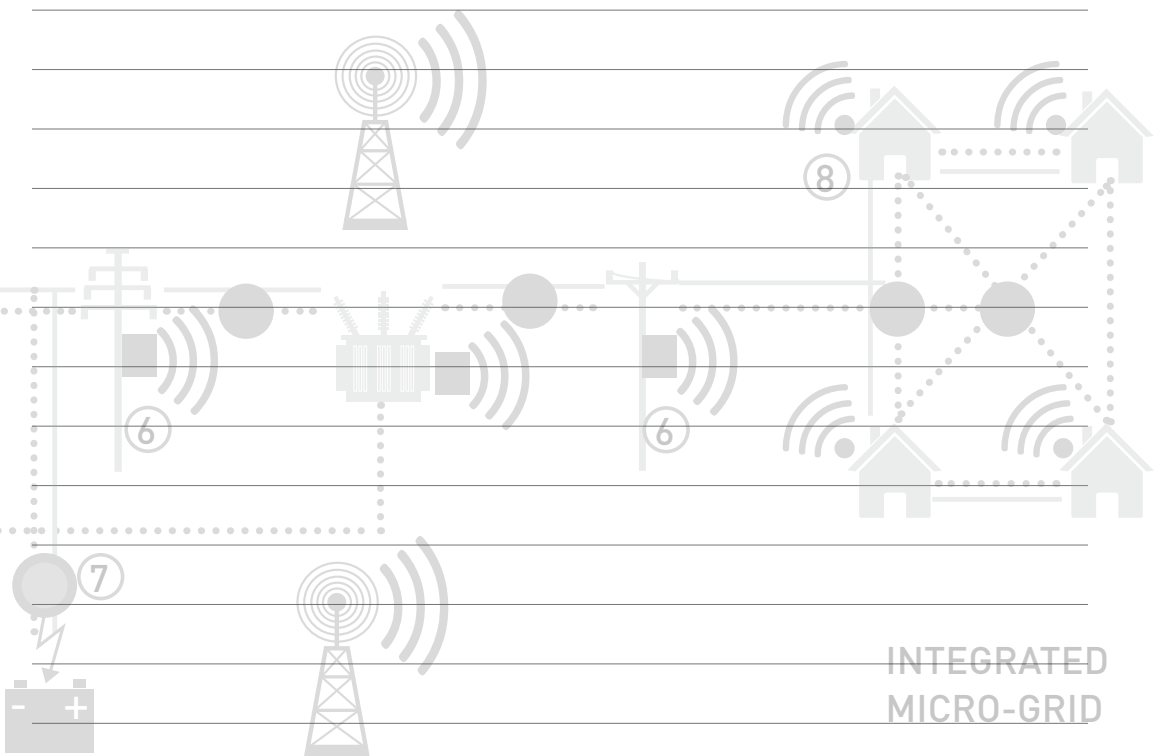
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SMART GRID



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INTEGRATED MICRO-GRID



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energy



transportation



solid waste



water



landscape



transportation



information



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