



# ZOFNASS PROGRAM for SUSTAINABLE INFRASTRUCTURE at HARVARD UNIVERSITY

March 19- 20, 2018

## ZOFNASS PROGRAM WORKSHOP

# Making the Business Case for Planning Sustainable Infrastructure

**The Puzzle of Sustainable Infrastructure.**

### Speakers from:

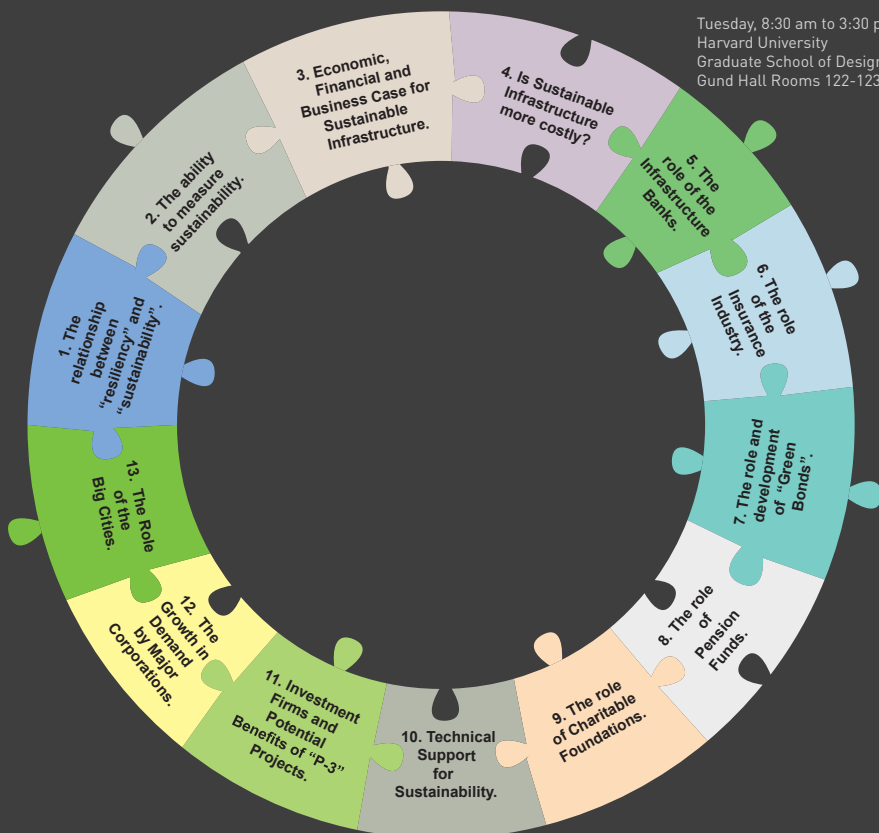
100 Resilient Cities / Rockefeller Foundation, Barclays Bank, Bentley Systems, Blackstone, Bouygues Group, CDM Smith, CH2M (now Jacobs), Climate Institute, Colas Group USA, Columbia University, Ecology & Environment, Harvard Business School, HNTB, Institute for Sustainable Infrastructure, Kiewit Infrastructure Group, Los Angeles Metro, Louis Berger, Massachusetts Bay Transportation Authority (MBTA), NYC Department of Design and Construction, Skanska, Stantec, The Nature Conservancy, NV5, QStone Capital, Power Engineers, Social Finance, Stantec, Zofnass Program Harvard University

### Sustainable Infrastructure Advisory Board (SIAB):

Autodesk, Bentley Systems, CDM Smith, CH2M (now Jacobs), Ecology & Environment, Golder Associates, HNTB, Los Angeles Metro, Louis Berger, NV5, Power Engineers, Stantec, The Nature Conservancy, TRC

Monday, 12:00 pm to 6:30 pm  
Harvard Business School  
Cummock Hall Room 102

Tuesday, 8:30 am to 3:30 pm  
Harvard University  
Graduate School of Design  
Gund Hall Rooms 122-123





*Workshop Coordination:  
Judith Rodríguez,  
jirodrig@gsd.harvard.edu*



ZOFNASS PROGRAM for SUSTAINABLE INFRASTRUCTURE  
at HARVARD UNIVERSITY

ZOFNASS PROGRAM WORKSHOP

# Making the Business Case for Planning Sustainable Infrastructure

**The Puzzle of Sustainable Infrastructure.**

Monday, March 19  
12:00 pm to 6:30 pm  
Harvard Business School  
Cumnock Hall Room 102  
33 Harvard Way  
Boston, MA 02163

Tuesday, March 20  
8:30 am to 3:30 pm  
Harvard Graduate School of Design  
Gund Hall Rooms 122-123  
48 Quincy St  
Cambridge, MA 02138

The Workshop is dedicated to the ongoing research on the Business Case for Sustainability. Sustainable infrastructure is recognized as an investment and business driver. This two-day workshop will present perspectives on the key parts that need to come together to make sustainable infrastructure possible, as listed in the Puzzle of Sustainable Infrastructure.

Under the theme of planning sustainable infrastructure, this workshop aims to:

1. Explore the main issues in making the business case for planning sustainable infrastructure, and identify emerging themes and novel concepts as presented by different stakeholders and case studies;
2. Discuss the different approaches for making the business case for planning sustainable infrastructure:
  - expand on the key arguments on decision-making process towards sustainable infrastructure;
  - creating value with sustainability, beyond a corporate social responsibility agenda;
  - sustainability as key business driver;
  - challenges and barriers

The Workshop will be attended by leaders in infrastructure development, financiers, investors, policy makers, regulators, engineers, designers, planners, infrastructure operators, and academics to share perspectives and discuss findings on the Business Case for Sustainable Infrastructure.

# Agenda

DAY 1 at HBS

## WELCOME to the ZPH WORKSHOP

<12:00 pm>

**Spiro Pollalis**

Professor and Director of the Zofnass Program  
Harvard University

**Paul Zofnass**

President and Zofnass Program Initial Sponsor  
Environmental Financial Consulting Group

## PROGRESS REPORT

<12:15 pm>

### The Business Case for Planning Sustainable Infrastructure

**Spiro Pollalis**

Professor and Director of the Zofnass Program  
Harvard University

## PANEL 1

<12:55 pm>

### Sustainability as Key Business Driver

Moderated by Marty Janowitz, Vice President  
Sustainable Development, Stantec / SIAB

**Jack Hand**

Chairman  
Power Engineers / SIAB

**Thomas Lewis**

President  
Louis Berger US / SIAB

**Jen Molnar**

Managing Director, Center for Sustainability Science  
The Nature Conservancy / SIAB

**Chris Barron**

Chief Communications Officer  
Bentley Systems / SIAB

<coffee break>

## PANEL 2

<2:30 pm>

### Construction Firms: Perspectives on Sustainability

Moderated by Spiro Pollalis, Director  
Zofnass Program Harvard University

**Ryan Prime**

Sustainability Director  
Skanska

**Joe Wingerter, and  
Connie A. Determan**

Vice President, Kiewit Infrastructure Group  
Vice President, Environmental  
Kiewit Infrastructure Group

**Jean Vidal**

President and CEO Colas USA  
Bouygues Group

## HBS CASE STUDY SESSION

<3:40 pm>

### Cross-Boundary Energy Case Study

**John Macomber**

Senior Lecturer, Zofnass Program Advisor,  
Faculty Chair of the HBS Africa Research Office  
Harvard Business School

<coffee break>

## PANEL 3

<4:40 pm>

### Financing Sustainable Infrastructure

Moderated by Feniosky Peña-Mora,  
Armstrong Professor, Columbia University

**Jeffrey Mathews**

Director  
Barclays Investment Bank

**Andreas  
Georgoulas**

Researcher  
QStone Capital / Zofnass Program for Sustainable  
Infrastructure

**Paul Brandley, and  
John Markowitz**

Chief Financial Officer and Treasurer,  
Massachusetts Bay Transportation Authority  
Director of Treasury Services, Massachusetts  
Bay Transportation Authority (MBTA)

# Agenda

DAY 2 at GSD

## WELCOME to the ZPH WORKSHOP DAY 2

<8:30 am>

**Spiro Pollalis**

Professor and Director of the Zofnass Program  
Harvard University

## ENVISION® RATING SYSTEM

<8:35 am>

### New Features in Envision® v3

**John Stanton**

President  
Institute of Sustainable Infrastructure

<coffee break>

## PANEL 4

<9:15 am>

### Game Changers in Sustainable Infrastructure

Moderated by Jim Grant, Associate VP, Energy  
& Fueling Systems Director, HNTB / SIAB

**Jim Barbaresso**

Fellow & Senior Vice President  
HNTB Corporation

**Laura Bonich**

Vice President  
NV5 / SIAB

**Maria Lehman**

Director Strategic Initiatives  
Ecology & Environment / SIAB

**KC Sahl**

Principal  
Ecology & Environment

**Dick Corolewski**

Federal Business Unit Director  
Power Engineers / SIAB

**Rachel Levine**

Chief Engineer  
Climate Institute

**Lunch Break** (lunch available for all attendees)

## PANEL 5

<12:25 pm>

### Major Cities: Approach to Sustainability

Moderated by Spiro Pollalis, Director  
Zofnass Program Harvard University

**Sofia Zuberbuhler-  
Yafar, and  
Shani White**

Project Executive for Sustainable Infrastructure  
NYC Department of Design & Construction  
Landscape Architect  
NYC Department of Design & Construction

**Cris B. Liban**

Executive Officer, Environmental Compliance and  
Sustainability Program Management,  
Los Angeles Metro / SIAB

**Elizabeth Bradford**

Global Technology Leader  
CH2M (now Jacobs) / SIAB

**Rebecca Laberenne**

Associate Director  
100 Resilient Cities / Rockefeller Foundation

**Jane Madden**

Senior Vice President  
CDM Smith / SIAB

**Heather Unger**

Corporate Sustainability Manager  
Louis Berger / SIAB

**Navjeet Bal, and  
Casey Littlefield**

Managing Director and General Counsel  
Social Finance, Inc.  
Vice President  
Social Finance, Inc.

<coffee break>

## CONCLUDING REMARKS

<3:15 pm>

**Spiro Pollalis**

Professor and Director of the Zofnass Program  
Harvard University

<end of workshop 3:30 pm>

# Detailed Agenda Day 1

## Welcome

## The Business Case for Planning Sustainable Infrastructure

<Lunch available for all attendees 11:30 am>

<12:00 pm>

### Welcome to the Zofnass Program Harvard Workshop

Spiro Pollalis, Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard University

Paul Zofnass, President and Zofnass Program Initial Sponsor  
Environmental Financial Consulting Group

<12:15 pm>

### The Business Case for Planning Sustainable Infrastructure: Progress Report

Spiro Pollalis, Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard University

In this session we present the work in progress of the Zofnass Program research on “the business case of planning sustainable infrastructure.” Our objective is to assist public agencies and financiers, as well as developers if the project is PPP, to properly consider sustainable infrastructure projects. Since it is at the early stages of deciding to proceed or not, there is no thorough evaluation of sustainability. As a result, we also focus on the definition of sustainable projects at the time of a project’s consideration.

So far, literature review and interviews reveal that the objective is to maximize the risk-adjusted return on investment (ROI). Externalities matter to the extent that (a) change the risk of the project, thus they adjust the ROI and (b) affect the public image/profile of the entities and the acceptance of the project. Externalities are defined as the **positive or negative consequences of economic activities on unrelated third parties**.

The literature review is ongoing and the research continues with field research, interviews and case studies.

## Q & A

Led by Spiro Pollalis.



# Sustainability as Key Business Driver

## Detailed Agenda

<12:55 pm>

### Panel 1: Sustainability as Key Business Driver

#### **Moderator**

Marty Janowitz, Vice President Sustainable Development, Stantec / SIAB

#### **Progress in Utility Scale Sustainability Programs**

Jack Hand, Chairman, Power Engineers / SIAB

Sustainability isn't something new to the engineering / construction community. We've been actively practicing it for years. Over the last decade or two we've had a new awareness with respect to development and how it affects our environment and population. Today we are actively integrating smart design with economic and environmental awareness built into all aspects of a project's complete life cycle. This helps us better understand the effects of our actions today and into the future.

#### **Disaster Risk, Recovery and Rebuilding as a Business Driver and Opportunity for Sustainability**

Thomas Lewis, President, Louis Berger US / SIAB

Across the globe, the frequency of billion-dollar extreme weather disasters is increasing. In the US alone, there were 17 such disasters in 2017, including the unprecedented hurricane season, which devastated Puerto Rico, the Virgin Islands, parts of Florida, and City of Houston, and nearly 9,000 wildfires across California—including the largest fire in California's history. The severity of these events requires rebuilding at a massive scale. We can no longer afford to build back the same. Rather, we need to seize opportunities to rethink infrastructure and build back more sustainable and resilient following disasters. This presentation will discuss global perspectives on disaster risk reduction and recovery, opportunities to rebuild sustainable and resilient, and how to best leverage the Envision Rating System to help guide the way.

#### **Building the Case: Investing in Natural Infrastructure**

Jennifer Molnar, Managing Director, Center for Sustainability Science, The Nature Conservancy / SIAB

To meet the world's infrastructure needs sustainably requires finding ways to meet those goals while sustaining community, environmental, safety, and other widely held values. One significant tool to consider is natural infrastructure – investments in restoration and conservation of nature, and nature-based (bioengineered) systems as a means to achieve infrastructure needs. Investments in natural infrastructure often occur combined with investments in more traditional "grey" or "hard" infrastructure. Natural or hybrid infrastructure solutions can also offer more resilient solutions for addressing exposure to climate change risks. With interest in these solutions growing

# PANEL 1

## Sustainability as Key Business Driver

### Detailed Agenda

among companies, cities, investors, and insurers, this presentation will explore the growing engineering and economic evidence base for the effectiveness of these natural infrastructure solutions, as well as opportunities for financing and policy solutions and incentives.

#### **Sustainability, Technology, and TOTEX: The Business Case**

Chris Barron, Chief Communications Officer, Bentley Systems / SIAB

Delivering and operating sustainable infrastructure is not only environmentally responsible, it is a sound business practice. To realize the full value of sustainable infrastructure, we must define sustainability broadly to include the notions of resilience and adaptability, and consider not just environmental sustainability, but economic and operational sustainability, as well. New advances in engineering software and cloud computing enable engineers, contractors, and owner-operators to leverage information-rich, digital engineering models throughout the infrastructure asset lifecycle for better project delivery and asset performance, increasing the sustainable value for all stakeholders.

#### **Q & A**

Led by Marty Janowitz.

<2:20 pm > Coffee break.

# Construction Firms: Perspectives on Sustainability

<2:20 pm>

## Panel 2: Construction Firms: Perspectives on Sustainability

### Moderator

Spiro Pollalis, Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard University

### Sustainable Airport Redevelopment: A P3 Case Study

Ryan Prime, Sustainability Director, Skanska

Using the LaGuardia Central Terminal Building Redevelopment Project as the backdrop, Ryan will provide insight into the design-build process for mega projects and explain how sustainability can facilitate collaboration at the design, construction and operations interface. It is at this convergence of three critical elements of a project that sustainability thinking can have the most impact and therefore teams must organize themselves in such a way that the whole life cycle of a project is taken into account in the decision making process. Ryan will present an overview of the project, describe the organizational structure and explain the various aspects of the sustainability program of the LGA Central Terminal Building project. Lastly, Ryan will conclude with a summary of the lessons learned from the LGA project as well as lay out challenges going forward to leveraging sustainability thinking into the design-build process.

### Sustainability – A Contractor's Perspective

Joe Wingerter, Vice President, Kiewit Infrastructure Group

Connie A. Determan, Vice President, Environmental, Kiewit Infrastructure Group

Advancing the discussion and practice of sustainability within the construction industry is the right thing to do. At Kiewit, we have committed to engaging with industry, agency and academia partners to constantly review our proactive processes around sustainability to consider the project life cycle of designing, building (including renovation and demolition) and post construction maintenance/service life. Consistent with our Core Values, we promote and manage our internal sustainability processes as a responsible way to conduct business. From an economic case, these commitments can lead to market opportunities associated with waste/sediment diversion, wildlife protection, renewable energies and a range of project elements that can be optimized when best practices associated with sustainability become institutionalized.

### Colas, a Leader Providing Sustainable and Innovative Mobility & Infrastructure Solutions (Wattway and Flowell)

Jean Vidal, President and CEO Colas USA, Bouygues Group

Focus on two innovative projects for sustainable infrastructure (Wattway & Flowell).

# HBS CASE STUDY SESSION

## Cross-Boundary Energy

<3:40 pm>

### HBS Case Study Session: Sustainable Infrastructure in Africa

#### Moderator

John Macomber, Senior Lecturer, Zofnass Program Advisor,  
Faculty Chair of the HBS Africa Research Office, Harvard Business School

#### Guest

Jake Cusack, CEO, Cross-Boundary Energy  
[www.crossboundaryenergy.com](http://www.crossboundaryenergy.com)

#### A Business Model for Distributed Renewables in Africa: Cross-Boundary Energy HBS Case Study

The business case for sustainable infrastructure needs to include comparative analysis of competing options for engineering, operations, finance, economic benefit, and durability. All of these criteria are magnified in sub-Saharan Africa. Cross-Boundary Energy finances, develops, installs, and operates off-grid and grid-supplementing wind and solar arrays in several African nations. The business case must be made every day to the corporates who are the main offtakers; and the business model is tested every day as finance, delivery, and durability in design and execution are put under pressure. This interactive Harvard Business School case study will lead to engaged discussion not only about how to proceed in Africa...but to what lessons can be extended to making the business argument for sustainable infrastructure in the United States and other developed economies.

#### Q & A

Led by John Macomber.

<4:30 pm > Coffee break.

# Financing Sustainable Infrastructure

## Detailed Agenda

<4:40 pm>

### **Panel 3: Financing Sustainable Infrastructure.**

#### **Moderator**

Feniosoy Peña Mora, Armstrong Professor, Columbia University

#### **Financial Solutions to Achieve Sustainability Targets**

Jeffrey Mathews, Director, Barclays Investment Bank

Recent infrastructure transactions have involved long-term contracts (up to 50 years) in which governments, utilities or large corporate institutions outsource major elements of their power, water or transportation systems. Given market demand for infrastructure investments, these long-term, contract-based solutions are accretive to the "granting authority" on both an economic and sustainability basis. Mr. Mathews will cover three recent transactions where granting authorities were able to effect a transaction or long-term partnership in which a third party developer (and their lenders) both funded an upfront payment to the owner and also underwrote the long-term sustainability of the asset base (including fixed-cost solutions for long-term energy reductions; guaranteed clean water supply services; and carbon reductions from transportation congestion relief).

#### **The Investment Case for Water**

Andreas Georgoulis, Researcher, QStone Capital / Zofnass Program for Sustainable Infrastructure

This presentation discusses the business case for addressing and mitigating water risks proactively. It briefly reviews the state of the water sector, and focuses on the business risks arising from the current unsustainable pathway, the opportunities from addressing such risks proactively through sustainable investments, and the long and short-term costs of inaction.

#### **MBTA: Moving Forward with Sustainability**

Paul Brandley, Chief Financial Officer and Treasurer, Massachusetts Bay Transportation Authority (MBTA)

John Markowitz, Director of Treasury Services, Massachusetts Bay Transportation Authority (MBTA)

The Massachusetts Bay Transportation Authority is the oldest and fifth largest transit agency in the country. Last year the MBTA issued the first ever tax-exempt Sustainability Bond in the United States funding exclusively infrastructure projects with environmental and social impacts. This presentation will give an overview of the Sustainability Bond process and its economic benefits, and also other exciting resiliency efforts occurring at the MBTA.

# Detailed Agenda Day 2

## Welcome

### New Features in Envision® Rating System v3

<7:00 am> Sustainable Infrastructure Advisory Board (SIAB) Breakfast Meeting by invitation.

<8:30 am>

#### Welcome to the Zofnass Program Harvard Workshop Day 2

Spiro Pollalis, Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard University

<8:35 am>

#### New Features in Envision® Rating System

##### Envision® v3 Changes

John Stanton, President, Institute of Sustainable Infrastructure

Summary discussion on the changes for Envision v2 to v3 with an explanation of their importance and genesis.

##### Q & A

Led by John Stanton.

<9:05 am > Coffee break.

# Game Changers in Sustainable Infrastructure

<9:15 am>

## Panel 4: Game Changers in Sustainable Infrastructure

### Moderator

Jim Grant, Associate VP, Energy & Fueling Systems Director, HNTB / SIAB

### Part A: Transportation and Water Infrastructure

#### Driverless Cars, How Soon? What impact?

Jim Barbaresso, Fellow & Senior Vice President, HNTB Corporation

Over the next 30 years, more than 1 million people will perish on America's highways unless we take proactive steps to solve this national health crisis. Add to this the huge costs associated with traffic congestion, especially in terms of wasted time, wasted energy, and air quality. However, we are on the cusp of a transformation in transportation driven by advances in vehicle automation, connectivity, electrification and sharing. These advances will be disruptive to the way we currently design and operate transportation systems and could have a positive impact on traffic crashes, mobility, urban form and the environment, but only if we plan for disruption. This presentation will explore the challenges faced in light of rapid technological changes in transportation and how technological disruption presents opportunities, from crash reduction to congestion relief. The presentation will provide a glimpse of the current status of these transformative technologies and how they will evolve over the next 2 decades. Different case studies where these technologies have been tested and deployed will be examined during the presentation to provide examples of their use and benefits.

#### Water Conservation is a Game Changer

Laura Bonich, Vice President, NV5 / SIAB

Potable water availability and use, water capture and treatment, water reuse, and wastewater management are often taken for granted, as is the cumulative cost spent on capital investment and operations. In 2014 the US spent more than \$30 billion on capital costs for potable water and more than \$70 billion on operations. According to the American Water Works Association, an estimated \$1 trillion is necessary to maintain and expand service to meet drinking water demands over the next 25 years. ASCE estimates that more than 56 million new users will be connected to centralized wastewater treatment systems over the next two decades, requiring at least \$271 billion to meet current and future demands. Water Conservation can significantly reduce the required investment in water and wastewater infrastructure. California has enacted 3 pieces of water conservation legislation that truly are game changers. With so many competing demands for infrastructure dollars we should be investing in conservation first.

## PANEL 4

# Game Changers in Sustainable Infrastructure

### The Tappan Zee Bridge Replacement

Maria Lehman, Director Strategic Initiatives, Ecology & Environment / SIAB

The replacement of the Tappan Zee Bridge had been discussed for over 20 years. During that time, the useful life of the bridge had been reached and after a decade-long EIS process, \$88 million in studies was spent, the project costs ranged from \$16 to \$20 billion, 150 concepts were identified and there was no consensus on a path forward. During that same decade, over \$1 billion was invested into bridge repairs and maintenance, just to keep the bridge open. As soon as Andrew Cuomo was elected Governor of New York, he made the replacement of the Tappan Zee his keystone project not only to replace the aging bridge, but also to show New Yorkers, "Yes we can!"

The project is a 3.1 mile long bridge with a final budget of \$4 billion. The Joint NEPA/SEQR process proceeded from the Notice of Intent to the Record of Decision in 13 months. The overall project was 5 years to the first span opening, and 6 years to the full completion. Environmental sensitivity and stakeholder concerns were major challenges that were overcome by a pro-active and transparent process. The collaborative approach required a comprehensive understanding of the natural, socioeconomic and regulatory environments.

Advancing the project on a fast track, required experience that built trust and anticipated problems, and resulted in informed permit preparation with positive outcomes.

Schedule acceleration in a complex and competing regulatory environment requires a process that streamlines permitting and incorporates appropriate and necessary environmental mitigation as well as social and political license to meet community needs in an environmentally and economically responsible manner.

### Q & A

Led by Jim Grant.



# Game Changers in Sustainable Infrastructure

## Part B: Energy Infrastructure

### New York State Offshore Wind Master Plan

KC Sahl, Principal, Ecology & Environment

To support New York State's commitment under the Clean Energy Standard, which requires that 50 percent of the State's electricity come from renewable energy sources, E & E worked closely with our client—the New York State Energy and Research Development Authority (NYSDERDA)—to contribute to the first-of-its-kind New York State Offshore Wind Master Plan. The plan lays out a path for responsible and cost-effective development of 2.4 gigawatts (GWs) of offshore wind - enough to power 1.2 million homes.

As the first Offshore Wind Master Plan in the U.S., this high-profile, two-year effort attracted significant interest and involvement from stakeholders across the board—from government and developers to commercial fishing interests and coastal land owners. E & E's resource area experts developed 11 of 20 studies on environmental, social, economic, regulatory, and infrastructure considerations to help the State identify—and justify—the most favorable areas for offshore wind energy development.

Our work supported the State's decision-making process for selecting potential sites for future offshore wind energy development. To set a precedent for collaborative engagement and interagency coordination, the team developed a Strategic Outreach and Engagement Plan to guide outreach during the master plan process. Through public meeting coordination and outreach, we captured and included feedback from indigenous nations, agencies, and stakeholder groups to serve as an appendix to the Master Plan, making input consistently available for all future planning efforts.

The New York offshore environment presents significant opportunity for offshore wind energy development, given the strong market for electricity demand and the lower East Coast water depths. With a plan in place that identifies potential areas for offshore wind energy development, considers benefits and cost-reduction pathways, and promotes stakeholder engagement, New York has called for the procurement of at least 800 MW of offshore wind over the next two years. The Master Plan greatly reduces the risks for developers and expedites the process to move on critical green energy generation.

### Trends in Power Delivery: Seattle's Denny Substation

Dick Corolewski, Federal Business Unit Director, Power Engineers / SIAB

Substations play a vital role in distributing electric power from the point of generation to the point of use. Traditionally, the prime considerations in substation design are safety and reliability. However, there are significant opportunities to incorporate sustainable practices during the planning, designing and construction phases. While most substation project owners do not see sustainability as a requirement, that mindset is beginning to change. A great example is Seattle City Light's (SCL) new \$210M Denny Substation. The City of Seattle requires elements of sustainability on capital improvement projects.

## PANEL 4

# Game Changers in Sustainable Infrastructure

For the urban substation, opportunities were identified in site sustainability, building sustainability and public education. POWER Engineers served as the consultant team project manager (over 24 disciplines) and also performed the electrical design. A Seattle architecture firm designed the Denny Substation as an urban neighborhood focus point. Unlike almost every other substation, Denny is designed to invite people to the site and offer them amenities. That's a game changer.

### **North American Supergrid**

Rachel Levine, Chief Engineer, Climate Institute

The North American Supergrid is a proposal for the development a largely underground, high voltage direct current electricity overlay system, as a means for the efficient delivery of electricity on a level playing field for consumption. This would allow electricity to be profitably sold instantaneously anywhere in the contiguous United States, something not currently possible. The projected cost of the NAS is \$300 billion over a 30 year build out period. The NAS could be funded by rate payer fees and built by private investment without relying on federal funds; a recent publication by MacDonald et al (2016) confirmed that a rate payer return on investment would not significantly raise electricity prices for the consumer. The North American Supergrid would be the modern equivalent of the United States Interstate Highway System. Like that landmark initiative, the NAS promises to have a transformative impact on America's economy. Once completed, the NAS would provide a trifecta of economic, security, and environmental benefits for decades to come.

### **Q & A**

Led by Jim Grant.

<11:35 am > Lunch Break (50 minutes), food available for all attendees.

# PANEL 5

## Major Cities: Approach to Sustainability

<12:25 pm>

### Panel 5: How Major Cities Approach Sustainability?

#### Moderator

Spiro Pollalis, Professor and Director of the Zofnass Program, Harvard University

#### Part A: NYC and Los Angeles

#### NYC Department of Design & Construction: Advancing the Framework for Integrating Sustainability

Sofia Zuberbühler-Yafar, Project Executive for Sustainable Infrastructure, NYC Department of Design and Construction

Shani White, Landscape Architect, NYC Department of Design & Construction

Building on the presentation shared at the Fall 2017 Zofnass Workshop “*Putting Together the Puzzle of Sustainable Infrastructure*” this presentation will share further developments to NYC DDC’s current approach on integrating the Envision Rating System into forthcoming NYC capital infrastructure projects. Further typology baselines have been established helping highlight current levels of achievement [LOA]. Opportunities for improvement as well as further analysis into obtaining higher levels of achievement in sustainability have been explored. Discussion will also include plans for how to take this research to the next step of implementation.

#### The Business of Sustainability: Lessons Learned and Trends

Cris B. Liban, Executive Officer, Environmental Compliance and Sustainability Program Management, Los Angeles Metro / SIAB

The bigger challenge faced by organizations regarding the adoption of sustainable infrastructure is not the lack of ideas, but in the ability of the entity or agency to make a business case of the project. Certainly not a straightforward task especially if the operating entity is a government entity. What are the challenges observed by one infrastructure owner in the implementation of their program? What are the best practices implemented to overcome those challenges? What are the emerging trends that can accelerate implementation? A paradigm shift was key to effect change. How could others capitalize?

#### Public Agency Use of Envision®

Elizabeth Bradford, Global Technology Leader: Resilient and Sustainable Infrastructure Planning & Envision Sustainable Infrastructure Rating System, CH2M (now Jacobs) / SIAB

Since its launch in 2012, many public agencies have begun using Institute for Sustainable Infrastructure’s Envision® rating system (Envision) to plan and design their civil infrastructure projects more sustainably and resiliently. Typically, organizations interested in Envision started by supporting staff credentialing followed by reviewing a

## PANEL 5

# Major Cities: Approach to Sustainability

previously designed and highly sustainable project for an Envision certification award. As organizational capacity increased, these public agencies began issuing requests for proposals (RFPs) and requests for qualifications (RFQs) that include specifications for Envision. And, beginning in 2016, cities and counties across the United States—particularly progressive public agencies that were early adopters of policies requiring LEED—began to formally adopt policies for the use of Envision as the infrastructure complement to LEED for buildings. This presentation will include an overview of public sector adoption of Envision, and provide an update on the City of Los Angeles pilot study of organization-scale adoption of Envision within the Environmental Engineering Division.

### Part B: Multiple Cities Initiatives

#### **100 Resilient Cities: Infrastructure for Urban Resilience**

Rebecca Laberenne, Associate Director, 100 Resilient Cities / Rockefeller Foundation

100 Resilient Cities – pioneered by the Rockefeller Foundation – works with 100 cities around the world to increase their resilience to the challenges of the 21st century. These include acute shocks, such as earthquakes and hurricanes, and everyday chronic stresses, such as aging infrastructure, and inadequate housing, that erode the fabric of a city and exacerbate the shocks when those occur. As more cities in the global network complete their Resilience Strategies, the organization is pivoting from planning to implementing resilience initiatives with a strong focus on resilient and resilience-building infrastructure. This presentation will describe the 100 Resilient Cities program, share a working definition of “resilience” as it relates to infrastructure, review several examples of infrastructure projects emerging from our network cities, and describe some of the new ways we are working to support greater investment in infrastructure as a fundamental building block of urban resilience.

#### **The Water Resource Recovery Facility: A Critical Link in the Chain of the Water-Energy-Food Nexus**

Jane Madden, Senior Vice President, CDM Smith / SIAB

As the global population continues to grow at a pace to reach 10 billion people by 2050, we all need to consciously change our mindset to ensure the survival of the planet and the human race. Access to clean water, energy and food remains a challenge in many parts of the world – we are lucky in this country, for the most part, to have these basic human needs readily available – but we can do better. Using innovative engineering and science we can advance the clean water advocacy agenda to help connect the dots on a broader agenda. Utilities, consultants, and most importantly the regulatory agencies need to work towards outcome based solutions that achieve multiple desirable results and work towards a circular economy. Water Resource Recovery Facilities (WRRFs) have become an integral part of a sustainable economy as the resources that come to each facility in the form of wastewater, carbon, nutrients, organic waste and FOG (fats oils and greases) – become the resources needed to survive (clean water, soil amendments,

## Major Cities: Approach to Sustainability

energy and fuel). This presentation will challenge the minds of participants to find new partners and work with the regulatory agencies to holistically achieve an appropriate level of environmental benefit with management solutions that reduce costs and cross the divide of water, energy and food.

### India's 100 Smart Cities Mission

Heather Unger, Corporate Sustainability Manager, Louis Berger / SIAB

In 2015, Indian Prime Minister Narendra Modi launched the 100 Smart Cities Mission, which is a bold initiative to improve the quality of life in rapidly expanding urban areas. The program covers city improvement (retrofitting), city renewal (redevelopment), and city expansion (greenfield development). Cities are selected for the program through a competitive application process. What defines a 'smart city' in a country that lacks basic infrastructure? India's objective is to develop cities that provide core infrastructure and a decent quality of life to its citizens, a clean and sustainable environment, and application of 'smart' solutions. This presentation will provide an overview of the 100 Smart Cities program, discuss the features of India's 'smart cities', and highlight program progress and challenges. Today, and especially in the future, can a city be sustainable without being 'smart' as well?

### Social Impact Bonds

Navjeet Bal, Managing Director and General Counsel, Social Finance, Inc.  
Casey Littlefield, Vice President, Social Finance, Inc.

Social Finance develops innovative public-private partnerships and mobilizes impact capital to support evidence-based interventions, addressing a wide range of pressing social needs. We are experts in identifying and valuing outcomes and we are now using that performance lens to deliver resilient and sustainable solutions for people in need. Bringing an outcomes lens to infrastructure investments (i.e. man-made and natural systems) can attract additional private capital to advance outcomes, by linking and quantifying social and environmental impact, while helping governments pay only for projects that work. Areas with great potential for this kind of outcomes-based financing include but are not limited to:

- Energy efficiency
- Stormwater management
- Coastal restoration

In our presentation, we will (i) provide an introduction to and overview of Social Impact Bonds; (ii) review a recent example of a SIB; (iii) describe the prevalence of SIBs both in the United States and globally, and (iv) describe our approach to quantifying social and environmental impacts.

### Q & A

Led by Spiro Pollalis.

## Bios (in speaking order)

### Welcome

#### Spiro Pollalis

Director of the Zofnass Program for Sustainable Infrastructure, Harvard University

After 30 years as full Professor at Harvard, Spiro N. Pollalis has moved to the Research Professor position to spend more time on research and consulting. Since 2008, he is the Director of the Zofnass Program for the Sustainability of Infrastructure that has led to the Envision Rating System and the development of Planning Guidelines for Sustainable Cities. 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; and Uni-Stuttgart, Germany. He serves as the co-chair of the Advisory Committee for the Future Cities Lab of the Singapore-ETH Center (SEC) and chairs the Sustainability Workgroup for the Future of Construction at the World Economic Forum.

Prof. Pollalis is the chief planner for the DHA City Karachi for 600,000 people, currently under construction, for the Lahore Development Authority City, for the Lahore Knowledge Park and for the master plan of Faisalabad. 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](http://www.pollalis-hellinikon.com)) and as a member of the Planning Committee of Athens. Prof. Pollalis serves as Board member in large engineering firms and consults governments on sustainability.

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.

#### Paul Zofnass

President, Environmental Financial Consulting Group, and Zofnass Program Founder

Paul is President of the Environmental Financial Consulting Group (EFCG), a firm he founded in 1990 to provide strategic and financial advice to the environmental and infrastructure engineering/consulting ("e/c") industry. EFCG currently serves as a retained advisor to over 50 major e/c firms, and has served as an advisor to over 300 firms over the past 27 years, and completed over 140

M&A assignments. Prior to that he spent 17 years in finance at Citibank and at Oppenheimer, where he was Managing Director in Investment Banking. He is an alumnus of Harvard College, Harvard Law School and Harvard Business School.

He is a long-term environmentalist, having assisted Harvard to establish its Environmental Studies Program in the 1990's and providing its first Environmental Scholarship; initiating and contributing the Zofnass Tree Identification Program to NYC's Central Park; creating the Zofnass Family Preserve/Westchester Wilderness Walk, a 250 acre nature preserve with a 10-mile long hiking trail in Pound Ridge, NY, 45 miles from NYC; donating a permanent New England Forest Exhibition at the Harvard Museum of Natural History, and creating the Zofnass Infrastructure Sustainability Program at Harvard to develop a rating system to evaluate Sustainability as it applies to major civil infrastructure projects. He serves as a Faculty Member for Harvard's Department of Organismic and Evolutionary Biology; served on the Visiting Committee to Harvard's Arnold Arboretum; a Board member of Riverkeeper; a Board member of the Mount Auburn Cemetery in Cambridge, and served for 20 years on the board of the Westchester Land Trust.

### PANEL 1

#### Marty Janowitz

Vice President Sustainable Development, Stantec / SIAB

As Stantec's Vice President, Sustainable Development Marty has been responsible for guiding Stantec's efforts to become an exemplary model of sustainability in its operations and to advance integrated services addressing important evolving trends. He has played a prominent role in the emergence of sustainable infrastructure within integrated urban systems, to optimize lifecycle triple bottom line (economic, environmental, and social) benefits and efficiencies.

Marty is a member of the Sustainable Infrastructure Advisory Board of the Zofnass Program at Harvard GSD and the Institute for Sustainable Infrastructure Envision Review Board. A hands-on practitioner, he was senior advisor on the world's first waste water treatment and transportation projects to achieve Envision Award and for more than 10 other completed and ongoing Envision-related designs and verifications including as lead Verifier on the largest Envision awarded project. Marty was selected a member of Canada's Clean 50 - outstanding contributors to sustainable development and clean capitalism.

## Jack Hand

Chairman, Power Engineers / SIAB

Mr. Hand is the Chairman of the Board of POWER Engineers, a global consulting engineering and services firm specializing in delivery of integrated solutions for energy, facilities, environmental, and federal markets. Founded in 1976, POWER Engineers is an employee-owned company with 47 offices in 4 countries and is ranked one of the top engineering firms in the United States.

Jack earned a B.S. in Electrical Engineering from Kansas State University. He joined POWER in 1992, and was appointed President and CEO in 1998, holding that position until May of 2016. As Chairman, Mr. Hand is responsible for providing the strategic vision for POWER Engineers, concentrating on creating a sustainable company focused on its employees and clients. A top priority is developing new energy markets and opportunities for POWER Engineers. His focus continues to be in smart and efficient power delivery and generation systems.

## Thomas Lewis

President, Louis Berger US / SIAB

Thomas (Tom) Lewis is the president for Louis Berger's U.S.-based operating company. Lewis previously served as the company lead for its environmental practice and founded and led the disaster management and recovery practice, personally taking part in many disaster recovery and resilience programs over the past 25 years. Prior to joining Louis Berger, Lewis spent 5 years at the Connecticut Department of Transportation as an engineer and project manager. He has expertise and has presented frequently on the topics of sustainability, renewables, waste management and resource efficiency, resilience, and disaster planning and recovery. He earned a bachelor's in civil engineering and a master's in geoenvironmental engineering from the University of Connecticut, and a Juris Doctorate in environmental law from Rutgers University. He is a licensed PE in multiple states, is active in multiple professional organizations, and serves on multiple company boards as well as for the Transportation Research Board.

## Jennifer Molnar

Managing Director, Center for Sustainability Science, The Nature Conservancy / SIAB

Jen Molnar is lead scientist at The Nature Conservancy and managing director of TNC's Center for Sustainability Science, which seeks to scale up outcomes for both the environment

and the economy by developing actionable, science-based solutions with the private and public sectors.

Jen has 20 years of experience using science to improve decision-making. She is science lead for the TNC-Dow Chemical Company collaboration, which led to Dow's ground-breaking Valuing Nature Goal – a commitment to assess nature in all of their projects, aiming to generate \$1B in economic value by 2025. She has led interdisciplinary global research teams, most recently as TNC's Director of Science. Jen received a master's degree from Yale's School of Forestry and Environmental Studies, and is an Executive Fellow with the Center for Business and the Environment at Yale. She has an S.B. in environmental engineering from Harvard, and previous private sector experience in remediation.

## Chris Barron

Chief Communications Officer, Bentley Systems / SIAB

Chris Barron is Chief Communications Officer for Bentley Systems. He joined Bentley as VP of Corporate Marketing in 2008 and was named CCO in 2015. A registered architect, Mr. Barron left architectural practice in 1983 to pursue a career in marketing of computer-aided-design software to the AEC industry.

Prior to joining Bentley, Mr. Barron was marketing director for Autodesk's AEC Market Group, corporate marketing manager for Softdesk and senior marketing manager for Intergraph. Mr. Barron holds a bachelor's degree in Biology and Geography from Middlebury College and a Master of Architecture degree from Harvard University.

## PANEL 2

## Ryan Prime

Sustainability Director, Skanska

Ryan Prime is the national Sustainability Director for Skanska USA Civil. In addition to his corporate responsibility Ryan manages the Skanska-Walsh JV Sustainability Program for the LaGuardia Airport Central Terminal Building Replacement Project in Queens, New York. Ryan has been with Skanska USA Civil since 2008 and has worked on some of the largest and most complex infrastructure projects in the NY Metro area including the Second Avenue Subway and the Navigational Clearance Project -Bayonne Bridge. During his time with Skanska, Ryan has worked extensively in risk modeling, commercial management and

## Bios

environmental compliance. Since taking the role of Sustainability Director Ryan has served as chair of the Construction Industry Workgroup for the Institute for Sustainable Infrastructure and has provided his expertise in the development and review of the Envision Rating System 2.0 and 3.0. In addition he lectures at Columbia University on sustainable development for the Department of Civil Engineering and Engineering Mechanics. Ryan holds a B.S. degree in Environmental Geoscience from Boston College and a M.E. degree in Ocean Engineering from Stevens Institute of Technology.

### Joe Wingerter

Vice President, Kiewit Infrastructure Group

Joe Wingerter is a Vice President for Kiewit Infrastructure Group focused the development of strategic markets and targeted infrastructure projects including the origination, development, pursuit and delivery activities associated with Public Private Partnerships and other alternative contracting methods. Joe has more than 30 years of industry experience most recently concentrating on the interface of Kiewit's investment initiatives supporting the optimization of project development initiatives, design-build inputs, and long term asset management analysis. Joe has engaged with the pursuit of P3 and Design Build projects valued at more than \$35 billion across the US and Canada. He serves on numerous industry boards and committees supporting the interests of public sector partners, Kiewit, and the industry to grow North America's infrastructure investment.

### Connie A. Determan

Vice President, Environmental, Kiewit Infrastructure Group

Ms. Determan, V.P., has more than 30 years of experience with environmental strategy, CERCLA/RCRA, negotiating with regulators, risk communication, environmental management systems, compliance audits and due diligence. She has worked extensively with community work groups and panels that address technical issues and resolutions.

As the director of Kiewit's environmental program, she also facilitated the development of the sustainability program, which identifies ways the company operates in a more sustainable manner to safeguard the welfare of Kiewit employees, help preserve the environment, protect surrounding communities, and improve the company's financial performance. Implementing the company's Idling Policy is one of the key strategies of the sustainability program. The Idling Policy prevents Kiewit vehicles and equipment from idling longer than

five minutes, reduces company fuel consumption, diesel emissions, and noise, and decreases vehicle and equipment maintenance. Kiewit's vision is to continually identify other sustainable practices, such as reducing waste and water consumption at our offices and projects, in order to minimize negative impacts to the environment. Kiewit always strives to foster the economic growth of the business, as well as the prosperity of all employees and the communities in which they live and work.

Ms. Determan is active in the Omaha community, which includes the Executive Leadership of the American Heart Association Go Red, Advisory Board Member of South Dakota School of Mines and Technology, Volunteer of the Year at Notre Dame Convent.

Kiewit is a Fortune 500 company and one of the largest and most respected construction and engineering organizations in North America. The company had revenues of \$9 billion in 2017.

### Jean Vidal

President and CEO Colas USA, Bouygues Group

## HBS CASE STUDY SESSION

### John Macomber

Senior Lecturer, Zofnass Program Advisor,  
Faculty Chair of the HBS Africa Research Office, Harvard Business School

John Macomber is a member of the Finance faculty at Harvard Business School. His research focuses on urbanization and particularly the opportunity for private finance of public infrastructure in cities in the global South: Latin America, Africa, South Asia, and Asia/Pacific. His primary MBA course at HBS is "Building Sustainable Cities and Infrastructure," in the Finance unit. Mr. Macomber is the Faculty Chair of the Harvard Business School Africa Research Office and a Zofnass Program advisor. He has also taught at MIT and the Harvard Design School in both graduate programs and Executive Education. Prior to joining the HBS faculty, Mr. Macomber spent several decades in the real estate and construction industry. He is a graduate of Dartmouth College and Harvard Business School.



## PANEL 3

### Feniosky Peña-Mora

Armstrong Professor, Columbia University

Prof. Feniosky Peña-Mora is the Edwin Howard Armstrong Professor of Civil Engineering and Engineering Mechanics, Professor of Earth and Environmental Engineering, and Professor of Computer Science at Columbia University. He took a public service leave from 2014 to 2017 to serve as the New York City Commissioner of the Department of Design and Construction, the largest municipal capital construction agency in the nation with over 1200 projects valued at more than \$15 billion undertaken by more than 1400 employees and 1300 consultants. Under his leadership, more than 860 construction projects, valued at more than \$9 billion, started or completed; the agency received more than 80 design and professional awards; the agency also committed more than \$5.4 billion in new contracts by improving the capital project procurement process, each one of these accomplishments a record for DDC. Prior to his public service leave at DDC, he was the Dean of the Fu Foundation School of Engineering and Applied Sciences and Morris A. and Alma Schapiro Professor of Engineering at Columbia University. In this post, he was responsible for setting the school strategic direction and managing its operation and growth to over \$400 Million endowment, \$200 million annual operating budget, 4500 students, and 400 staff and faculty members. Previously, he was Associate Provost and the Edward William and Jane Marr Guttsell Endowed Professor at the University of Illinois at Urbana-Champaign. Before joining the faculty at Illinois, Dr. Peña-Mora was the Gilbert W. Winslow Career Development Professor at the Massachusetts Institute of Technology, where he earned his Master of Science and Doctor of Science degrees in civil engineering in 1991 and 1994, respectively. Prof. Peña-Mora is the author or co-author of more than 220 scholarly publications. He holds six patents and one provisional patent. He is a fellow of the Chartered Institute of Buildings (CIOB) as well as elected member of the Dominican Republic Academy of Sciences, and the United States National Academy of Construction.

### Jeffrey Mathews

Director, Barclays Investment Bank

Mr. Mathews is a Director with Barclays and has over 12 years of experience in financial advisory and investment banking for infrastructure projects and acquisitions. Jeff brings expertise in the structuring of public-private partnerships, with particular experience in the power, water and transportation sectors. Recently, Jeff has focused on transactions that revolve around innovative investment vehicles for public infrastructure

projects that include sustainable energy and carbon reduction objectives. Recent relevant deal experience includes advising clients on the Ohio State University Comprehensive Energy Solution transaction (\$1.2 billion; 2017); the Denver Central 70 Project (\$1.2 billion; 2017); the SH-288 Managed Lanes Project in Texas (\$1.1 billion; 2016); the \$1.3 billion North Tarrant Expressway Project in Texas (\$1.3 billion; 2016); the Rialto Water System Privatization in California (\$175 million; 2012); and the Poseidon Carlsbad Desalination Plant in California (\$900 million; 2012). Jeff is a graduate of Washington University in St. Louis and holds FINRA 79, 63 and 52 licenses.

### Andreas Georgoulis

QStone / Zofnass Program for Sustainable Infrastructure, Harvard University

Andreas Georgoulis is an expert on sustainable infrastructure and large scale developments. He is a researcher at the Zofnass Program for Sustainable Infrastructure at Harvard, and with QStone Capital, a private equity firm focusing in waste water. He has published three books and numerous papers on his area of work. He is the lead developer of the Zofnass Economic Tool, a comprehensive analytic model that quantifies the external costs and benefits of infrastructure. In the past, he was part of the team that developed the first rating system to assess sustainable infrastructure in the US, now deployed globally as Envision. He has collaborated with Obermeyer, Hochtief, UniCredit Markets and Investment Banking, and the US General Service Administration. He has consulted widely for multilateral development banks, and in specific assignments for the Economist Intelligence Unit and the United Nations Development Program. He has led urban development plans in Cameroon, Saudi Arabia and Pakistan. Georgoulis holds degrees in Engineering from the University of Athens, a Master's and a Doctorate from Harvard.

### Paul Brandley

Chief Financial Officer and Treasurer, Massachusetts Bay Transportation Authority (MBTA)

Paul Brandley is the Chief Financial Officer and Treasurer of the Massachusetts Bay Transportation Authority, the oldest and fifth-largest mass transit agency in the country. He manages the Authority's \$5.5b debt portfolio, invests \$1.5b in cash, and hedges the agency's energy exposure. Paul manages the Authority's annual operating budget and oversees a long-term capital reinvestment strategy to systematically reduce the State of Good Repair backlog and support economic growth in the region. Paul sits on various pension and retirement boards within the agency.

## Bios

Prior to joining the MBTA, Paul designed investment and hedging strategies for institutional clients of Bear Stearns as an Associate Director, Barclays Capital as a Manager, and Goldman Sachs as a Vice President. These strategies spanned developed and emerging markets currencies, interest rates and commodities. Paul is a board member for AGO Financial Services, a buy-side financial consulting firm. Paul earned a Master's Degree from John F. Kennedy School of Government at Harvard University (2016) and a BA in political economy from Georgetown University (2005).

### John Markowitz

Director of Treasury Services, Massachusetts Bay Transportation Authority (MBTA)

John Markowitz is Director of Treasury Services at the MBTA managing the Authority's debt portfolio, cash and investments. Previously he worked at MassDevelopment, the Commonwealth of Massachusetts' development and finance agency, managing infrastructure bond programs, and before that at Stifel Nicolaus as Vice President of Public Finance underwriting infrastructure bonds for municipalities across the country. John holds a BA in Political Science from the University of Virginia.

## NEW FEATURES in ENVISION®

### John Stanton

President, Institute of Sustainable Infrastructure

John Stanton has spent his career working on sustainability issues. Prior to joining ISI as CEO and President in 2017, he served as Executive Vice President & Regulatory Counsel at Tesla / SolarCity, Executive VP and General Counsel at the Solar Energy Industries Association (SEIA), Vice President for Energy and Climate at the PEW National Environmental Trust, Legislative Counsel at the US EPA, New Jersey Deputy Attorney General and Director of the Energy & Environment at the National Conference of State Legislatures. He earned his law degree at Georgetown University Law School.

## PANEL 4

### Jim Grant

Associate VP, Energy & Fueling Systems Director, HNTB / SIAB

Jim Grant has over 36 years' experience and currently serves as Director for the Energy & Fueling Services Group in HNTB's Bellevue,

Washington, office. He provides subject matter expertise in central utility plants, renewable energy systems, distributed resources, energy conservation and aviation fueling systems for airports. Jim is currently leading a utilities master plan at SFO involving over \$1 Billion in Capital Improvement Projects. He has prepared several white papers and studies on self-generation and shifting electrical demand to save energy costs. Jim is a certified Aboveground Storage Tank Inspector (since 1998) and he has served as a SIAB member on the Zofnass Program for Sustainable Infrastructure since 2010.

### Jim Barbaresso

Fellow & Senior Vice President, HNTB Corporation

Jim Barbaresso is a technical Fellow and Senior Vice President of HNTB Corporation, a national infrastructure planning and design consulting firm. Jim has more than 39 years of experience in transportation planning, traffic operations, and Intelligent Transportation Systems in both the public and private sectors. He leads the HNTB ITS Practice and provides subject matter expertise on highway and tolling projects across the United States, including some of the nation's most challenging emerging mobility programs like Smart Columbus and the Tampa Connected Vehicle Pilot. He has written numerous white papers and articles on public agency considerations regarding new mobility solutions in our age of connectivity and automation.

### Laura Bonich

Vice President, NV5 / SIAB

Laura Bonich, PE, LEED AP specializes in providing strategic approaches for infrastructure master planning, (power, transportation, water, wastewater, reclaimed water and drainage). Laura advocates for the sustainable optimization of infrastructure recommending innovative best practices rather than traditional code compliance design approaches with an emphasis on reducing project cost. Laura is a member of the Harvard GSD Sustainable Infrastructure Advisory Board, Chair of the Institute for Sustainable Infrastructure National Technical Committee for the Envision Infrastructure rating system, Member of the USGBC Waterbuild Advisory Board, past branch president of the American Society of Civil Engineers and holds a Master's in Business Administration.

NV5 is a provider professional consulting services in Construction Quality Assurance, Infrastructure, Energy, Program Management, and the Environment with a 60 year history; Ranked 54 out of top 500 design firms by ENR (2017 Engineering News Record) and #1 by Zweig White Hot Firms List.

## Maria Lehman

Director Strategic Initiatives, Ecology & Environment / SIAB

Maria Lehman P.E., F.ASCE, ENV SP. With more than 37 years of experience, Ms. Lehman has held leadership positions in both the public and private sectors. Currently she is the Director of Strategic Initiatives at Ecology and Environment. Her expertise is in economic development; quality assurance; highway, transportation, and facility planning, design and construction; environmental assessment; emergency management; and infrastructure operations and maintenance. She has successfully completed projects ranging from \$10,000 to \$4 billion. She served as the Chief Operating Officer and Acting Executive Director for the NYS Thruway Authority, and during that time served as the Project Executive for the replacement of the Tappan Zee bridge.

## KC Sahl

Principal, Ecology & Environment

Currently Ecology and Environment's NYC Operations Manager, KC Sahl has more than 23 years' experience serving clients in both the government, nonprofit, and private sectors. Prior to joining E & E, he served as a consultant for Deepwater Wind, New York and Northeast Project Director for NRG Energy Bluewater Wind, and had leadership roles with the City of New York Department of Parks and Recreation and Madison Square Park Conservancy. Since joining E&E, KC has been working to provide environmentally sound reasoning for offshore wind projects.

## Dick Corolewski

Federal Business Unit Director, Power Engineers / SIAB

Dick Corolewski is the director of the Federal Division of POWER Engineers and has more than 30 years of experience in the A/E industry, with more than 20 years in the federal market 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, including deep retrofits of buildings, renewable energy, generation, and energy security. Mr. Corolewski is the chairman of POWER's Sustainability Committee and is integral to shaping the direction of 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, commercial, and government projects, specializing in Department of Defense and Department of State programs. He has been responsible for managing projects from \$3 million to \$100 million.

## Rachel Levine

Chief Engineer, Climate Institute

Rachel Levine holds a Bachelor's Degree in Environmental and Ecological Engineering from Purdue University and a Master's Degree in Civil Engineering from the University of Nebraska (Lincoln). Her prior areas of research and teaching experience include the development sustainable energy pathways and biodegradation of pharmaceutical contaminants in wastewater treatment streams. She is currently Chief Engineer for the Climate Institute, and the in-house technical lead on the institute's North American Supergrid Initiative, which advocates for the creation of a resilient, largely underground high-voltage direct-current electricity transmission network.

## PANEL 5

## Sofia Zuberbühler-Yafar

Project Executive for Sustainable Infrastructure, NYC-Department of Design and Construction

Sofia Zuberbühler-Yafar is Project Executive for Sustainable Infrastructure for the New York City Department of Design and Construction [NYC DDC]. She is spearheading the implementation and planning on integrating sustainable measures into the agency's various infrastructure projects typologies. As a ISI certified trainer, she is preparing fellow colleagues to become ENV SPs - so far, NYC DDC has over 110 ENV SPs. Her unit designs and manages the on-time delivery of various multi-million-dollar city-wide green infrastructure design contracts and construction projects for the NYC Department of Environmental Protection.

Mrs. Zuberbuhler-Yafar is a Licensed Landscape Architect with a Masters in Urban Design and Bachelors of Landscape Architecture from the City College of New York. She has over 17 years of varied private realm experience as well as public sector including being an Urban Designer for the NYC Department of City Planning and as a Landscape Architect with NYC DDC.

## Bios

### Shani White

Landscape Architect, NYC Department of Design & Construction

Shani White is a Registered Landscape Architect and an Envision Sustainability Professional with over 17 years of design and planning experience spread between the grass roots, private and public sectors.

She has worked collaboratively with allied professionals and local communities delivering various creative and quality focused project types through their planning, design, and construction stages; including waterfront enhancements, urban parks and playgrounds, recreational spaces, and presently green infrastructure practices with the Department of Design & Construction, NYC.

She has earned a Bachelor of Landscape Architecture from SUNY, College of Environmental Science and Forestry at Syracuse and a Master of Science in Urban Affairs at CUNY, Hunter College.

Shani's career has been driven by her deep passion for people and respect for the environment, which has helped her to focus on the improvement of circumstances that affect the physical, economic, and social conditions that impact the growth and development of our neighborhoods.

### Cris B. Liban

Executive Officer, Environmental Compliance and Sustainability, Los Angeles County Metropolitan Transportation Authority / SIAB

Cris B. Liban, P.E. is the Executive Officer for Environmental Compliance and Sustainability at the Los Angeles County Metropolitan Transportation Authority. He holds concurrent political appointments as an Adviser to the US Environmental Protection Agency and California Natural Resources Agency; and as a Commissioner of the Los Angeles County Beach Commission and the Los Angeles City Board of Transportation Commissioners. Dr. Liban is a prolific writer and an international speaker. He has been leading international sustainability efforts with other organizations such as the American Public Transportation Association; and sustainability and resiliency research panels of the National Academies' Transportation Research Board. He is currently the Chair of the American Society of Civil Engineers national Committee on Sustainability and spearheading a number of initiatives including an effort to develop an international standard on sustainable infrastructure.

### Elizabeth Bradford

Global Technology Leader: Resilient & Sustainable Infrastructure Planning, and the Envision Sustainable Infrastructure Rating System, CH2M (now Jacobs) / SIAB

Elizabeth Bradford is the Global Technology Leader for CH2M's Resilient & Sustainable Infrastructure Planning practice (CH2M is now Jacobs), which includes over 100 Envision Sustainability Professionals (ENV SPs). In this role, Elizabeth provides management consulting services to address client challenges, using a balanced business case approach that considers an organization's economic resiliency and sustainability while planning environmentally and socially resilient and sustainable projects and programs.

Additionally, Ms. Bradford developed the Resiliency and Sustainability Framework for infrastructure which offers public and private sector planners a comprehensive program development and decision support system that provides for economic considerations. The framework, which received the 2017 Environmental Business Journal's Industry Leadership Award, elevates resilient and sustainable design principles to the program and organization level, ensuring consistent implementation across the portfolio of projects.

Some of her recent publications include: Integrating Envision Principles in Program Management for Decision Support (2017); Implementation of Sustainable Procurement Practices and Use of Envision (2017); Making the Case for Increasing Public and Private Investments in Wastewater Treatment: The Importance of Integrating Effects on Natural Capital (2015); and The Business Case for Natural Infrastructure ([www.NI4Biz.org](http://www.NI4Biz.org), 2015).

#### Education

Before joining CH2M, Ms. Bradford served 7 years in the US Navy Construction Force (1994-2001), where she pursued an AA from St. Leo University (2000). After leaving the armed forces, Ms. Bradford pursued a BS in Geology from the University of South Alabama (2004) and an MS in Earth Sciences (hydrogeochemistry) from Dartmouth College (2007).

### Rebecca Laberrenne

Associate Director, 100 Resilient Cities / Rockefeller Foundation

Rebecca Laberrenne is a licensed Professional Engineer (P.E.) with a background in structural and earthquake engineering. She has over 13 years of experience in the design and construction of buildings and bridges as well as in project

management and strategic consulting for building and infrastructure projects. Rebecca joined 100RC from Guy Nordenson and Associates, a structural engineering consulting firm in New York City. She has also worked with the NGO Build Change on post-earthquake housing reconstruction in both China and Haiti following the 2008 and 2010 earthquakes. Rebecca holds a Bachelor of Science in Engineering (B.S.E.) degree in Civil and Environmental Engineering and a Certificate in Architecture from Princeton University; a Master of Science (M.S.) degree in Structural Engineering, Mechanics and Materials from University of California, Berkeley; and a Master of Public Administration (M.P.A.) from New York University.

## Jane Madden

Senior Vice President, CDM Smith / SIAB

Since joining CDM Smith in 1984, Jane Madden has been involved in the planning, design, and construction of some of the firm's most challenging wastewater treatment projects. Through this experience, she has gained vast hands-on experience in wastewater planning and engineering, nutrient removal, solids handling, and sustainability. Ms. Madden brings technical excellence and thorough understanding of regulatory and business issues to her role as technical strategy leader for water reclamation. Ms. Madden is a graduate of the University of Vermont, a registered Professional Engineer, a Board Certified Environmental Engineer (BCEE) and a Board Member of the Massachusetts Coalition for Water Resources Stewardship and on the Sustainable Infrastructure Advisory Board.

## Heather Unger

Corporate Sustainability Manager, Louis Berger / SIAB

Heather Unger, LEED AP, ENV SP, is a senior planner and manager of corporate sustainability at Louis Berger. Ms. Unger chairs the Louis Berger Corporate Social Responsibility Committee, and is responsible for incorporating sustainability into Louis Berger projects and operations and managing Louis Berger's philanthropic activities. Ms. Unger has over 10 years of environmental and planning experience. Ms. Unger currently serves on the Institute for Sustainable Infrastructure (ISI) technical advisory committee and the American Public Transportation Association (APTA) sustainability committee. She holds a Bachelor's degree in Environmental Resource Management from The Pennsylvania State University and a Master in Liberal Arts in Sustainability and Environmental Management from Harvard University Extension School.

## Navjeet Bal

Managing Director and General Counsel, Social Finance, Inc.

Navjeet Bal is responsible for developing and executing innovative financings that bring together the public, private and nonprofit sectors. She brings over 25 years of experience as a public finance infrastructure attorney and a public official, having served as the Commissioner of Revenue in Governor Deval Patrick's administration from 2007 through 2011. Throughout her career as a bond attorney, Navjeet was involved in innovative financings, including serving as bond counsel to Massachusetts for the issuance of the nation's first municipal Green Bonds, which is now a multi-billion dollar sector of the municipal debt market. She also created innovative legal structures for new public authorities designed to leverage federal and state funds to pay for critical infrastructure and capital projects, in particular for water and sewer projects. Navjeet holds leadership positions in legal, community and professional organizations. She received her B.A. in Philosophy from Williams College and her J.D. from Northeastern University.

## Casey Littlefield

Vice President, Social Finance, Inc.

Casey Littlefield is a Vice President on the Social Investment team at Social Finance. Casey joined as a Harvard Business School Leadership Fellow and served as an advisor to the CEO. She also leads projects in business development and strategic planning to direct sustainable organizational growth. Committed to supporting efficient scaling and impact in the social sector, she has experience in management consulting, financial services, and the nonprofit sector. Before joining Social Finance, Casey was an Education Pioneers Fellow at Education Growth where she provided support for nonprofit organizations that offered compelling solutions to unmet needs in education. Prior to Education Growth, Casey worked at New Leaders where she was responsible for strategic planning initiatives, including: revenue forecasting; financial scenario development; brand auditing and development; governance management; and communications. Earlier in her career, Casey assisted in the launch of Teach For India in Mumbai, and worked in management consulting at Oliver Wyman Group. Casey holds an MBA from Harvard Business School, and a B.A. in history from Yale University.

## AGENDA

### **DAY 1** at HBS

- 12:00 pm **Welcome**
- 12:15 pm **The Business Case for Planning Sustainable Infrastructure**
- 12:55 pm **PANEL 1: Sustainability as Key Business Driver**
- 2:20 pm <coffee break>
- 2:30 pm **PANEL 2: Construction Firms: Perspectives on Sustainability**
- 3:40 pm **HBS Case Study Session: Sustainable Infrastructure in Africa**
- 4:30pm <coffee break>
- 4:40 pm **PANEL 3: Financing Sustainable Infrastructure**

### **DAY 2** at GSD

- 8:30 am **Welcome**
- 8:35 am **New Features in Envision® Rating System v3**
- 9:05 am <coffee break>
- 9:15 am **PANEL 4: Game Changers in Sustainable Infrastructure**
- 11:35 am LUNCH break (light lunch available)
- 12:25 pm **PANEL 5: Major Cities: Approach to Sustainability**
- 3:05 pm <coffee break>
- 3:15 pm **Concluding Remarks**
- 3:30 pm End of Workshop

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