

April 3-4, 2017

ZOFNASS PROGRAM WORKSHOP: THE BUSINESS CASE FOR SUSTAINABLE INFRASTRUCTURE

DAY 1

Harvard Business School
Cumnock Hall Room 102
Soldiers Field, Boston, MA

Welcome
<12:30 pm>

The Business Case for Sustainability
<12:45 pm>

The 50 Infrastructure Priority Projects
<1:00 pm>

PANEL 1 <1:15 pm>
**PERSPECTIVES FROM
COMMERCIAL AND
DEVELOPMENT BANKS**

PANEL 2 <3:40 pm>
**PERSPECTIVES FROM INSURERS
AND INVESTORS (Part 1)**

PANEL 2 <4:55 pm>
**PERSPECTIVES FROM INSURERS
AND INVESTORS (Part 2)**

CLOSING REMARKS
<6:10 pm>

DAY 2

Harvard Graduate School of Design
Gund Hall, Room 112 (Stubbins)
48 Quincy Street, Cambridge, MA

Welcome
<8:50 am>

PANEL 3 <9:00 am>
**PERSPECTIVES FROM
SUSTAINABLE INFRASTRUCTURE
PLANNING**

PANEL 4 <11:10 am>
**PERSPECTIVES FROM POLICY
MAKERS AND REGULATORS**

PANEL 5 <1:55 pm>
**PERSPECTIVES FROM
OPERATORS AND CONTRACTORS**

WORKING SESSION <3:45 pm>
**NEXT STEPS FOR THE BUSINESS
CASE FOR SUSTAINABILITY**

CLOSING REMARKS
<4:55 pm>

ZOFNASS WORKSHOP: THE BUSINESS CASE FOR SUSTAINABLE INFRASTRUCTURE

Monday, April 3, 12:30 pm - 6:45 pm
Harvard Business School, Cumnock Hall Room 102,
Soldiers Field, Boston, MA

Tuesday, April 4, 8:50 am - 4:35 pm
Harvard Graduate School of Design, Gund Hall, Room 112 (Stubbins)
48 Quincy St. Cambridge, MA 02138

The Zofnass Program for Sustainable Infrastructure considers critical to focus on the economic benefits of sustainable infrastructure. This workshop is geared as a platform to discuss the perspective of all relevant stakeholders involved in infrastructure about the Business Case for Sustainability and better understand opportunities for collaborative action when developing and operating new projects.

Decision-makers need to identify and understand the economic benefits of sustainability. The returns on sustainable investments represent an opportunity to contribute with applied research to this knowledge area, which is currently vague to stakeholders. It is widely known that sustainable projects avoid impacts, risks, costs and negative externalities, but these are rarely measured and shared with public officials and taxpayers. Understanding the types of costs, risks, and probability of risks allows stakeholders to deliver informed project designs that anticipate and withstand or adapt to these risks, minimizing their overall vulnerability. Through the Business Case for Sustainable Infrastructure, the Zofnass Program intends to articulate, in terms of productivity gains, how sustainable infrastructure contributes to social, business, and safety resilience. Illustrating the costs and vulnerabilities to hazards avoided through sustainable projects is the necessary first step for decision-makers to identify and understand the economic benefits of sustainability.

The Zofnass Program considers crucial to follow a multidisciplinary approach that considers the perspective of all stakeholders involved in infrastructure projects on the economic benefits of sustainable infrastructure. More often than not infrastructure projects are implemented through a heavily siloed approach, wherein there is no communication among different sectors. In addition, engineering is divided from finance and investment. Disparate training and research programs exist for each sector, which do not communicate with each other. Uncoordinated efforts in turn hamper collaboration and the implementation of best practices.

The main goal of this workshop is to provide a forum for all stakeholders to give perspectives on what is the value of sustainable infrastructure for them, what are the critical changes needed, and what would be the role of academia in the development of the Business Case for Sustainable Infrastructure. Each stakeholder group brings a unique perspective on how sustainability adds financial value and facilitates competitive returns. By combining each group's unique decision-making processes and understanding of sustainability challenges, the workshop will shed light on how sustainable projects enhance competitiveness, resilience, and facilitate long-term economic growth.

Special thanks to all SIAB Members and speakers.

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

DAY 1 Agenda

Cumnock Hall, Room 102
Harvard Business School

MONDAY, APRIL 3

Welcome

<12:30 pm>

BUSINESS CASE FOR SUSTAINABLE INFRASTRUCTURE

- Prof. Spiro Pollalis** Professor and Director of the Zofnass Program
Harvard Graduate School of Design
- Dr. Andreas Georgoulas** Lecturer & Zofnass Program Research Director
Harvard Graduate School of Design
- Cristina Contreras** Research Associate
Harvard Graduate School of Design

Panel 1

<1:15 pm>

PERSPECTIVES FROM COMMERCIAL AND DEVELOPMENT BANKS

- Amar Bhattacharya** Senior Fellow - Global Economy and Development, Brookings Institute
- Tomás Sebastian Serebrisky** Principal Economic Advisor of the Infrastructure and Environment Department, Inter-American Development Bank
- Janine Ferretti** Chief, Environment and Social Safeguards Unit, Inter-American Development Bank
- Giridhar Srinivasan** Senior Operations Officer, Global Partnerships (Infrastructure Investment Lead), International Finance Corporation (IFC)
- Mariana Silva** Associate Infrastructure Planning & Finance
Nathan Associates Inc.
- Dr. Andreas Georgoulas** Lecturer & Zofnass Program Research Director
Harvard Graduate School of Design

Panel 2 (Part 1)

<3:40 pm>

PERSPECTIVES FROM INSURERS AND INVESTORS

- John Markowitz** VP Institutional & Governmental Finance
Mass Development
- Tom McKay** Senior Vice President & Chief Development Officer, North America Sekisui House, LLC (NASH)
- Luis Corzo** Client Advocate
Willis Tower Watson

Panel 2 (Part 2)

<4:55 pm>

PERSPECTIVES FROM INSURERS AND INVESTORS

- John Macomber** Senior Lecturer & Zofnass Program Faculty Advisor
Harvard Business School
- Jen Molnar** Managing Director & Lead Scientist, Center for Sustainability Science, The Nature Conservancy - NatureVest
- Benjamin J. Harper** AVP, Technical Underwriting, Head of Environmental, Zurich Insurance

Closing Remarks

<6:10 pm>

Prof. Spiro Pollalis

Professor and Director of the Zofnass Program
Harvard Graduate School of Design

Overview

<7:30 pm> At HFC SIAB Dinner, by invitation only.

Prof. Rebecca Henderson

John and Natty McArthur University Professor
Harvard Business School

DAY 2 Agenda

Gund Hall, Room 112 (Stubbins)
Harvard Graduate School of Design

TUESDAY, APRIL 4

Welcome

<8:50 am>

Prof. Spiro Pollalis Professor and Director of the Zofnass Program
Harvard Graduate School of Design

Panel 3

<9:00 am>

PERSPECTIVES FROM SUSTAINABLE INFRASTRUCTURE PLANNING

Prof. Spiro Pollalis Professor and Director of the Zofnass Program
Harvard Graduate School of Design

Prof. Robert Ayres Emeritus Professor of Economics and Political
Science and Technology Management
Novartis Chair Emeritus, INSEAD

John Williams CEO & Co-Founder
Impact Infrastructure

Christopher Mangieri Research Associate
Constellation Research Technology

Mackenzie Clark MTA New York City Transit Capital Program
Management

Mauricio Gómez Villarino Managing Director
IDOM- Madrid

Panel 4

<11:10 am>

PERSPECTIVES FROM POLICY MAKERS & REGULATORS

Brad Rawson Director of Transportation & Infrastructure
City of Somerville

Oliver Sellers-Garcia Director of Sustainability
City of Somerville

Dr. Cris Liban Executive Officer, Environmental Compliance and
Sustainability, Los Angeles County Metropolitan
Transportation Authority

(cont. Panel 4)

John Stanton President and CEO
Institute for Sustainable Infrastructure (ISI)

Joyce Coffee President
Climate Resilience Consulting

Marty Janowitz Vice President, Discipline Leader Sustainable
Development, Stantec

Panel 5

<1:55 pm>

PERSPECTIVES FROM OPERATORS AND CONTRACTORS

Manuel Wu General Manager Lima Metro Line 1
GYM Ferrovías S.A.

Antonio Burgueño Muñoz Director of Quality and Corporate Social
Responsibility, FCC Construction

Ryan Prime Sustainability Director
Skanska USA Civil

Boone Davis Principal
The Renewables Consulting Group

Prof. Spiro Pollalis Professor and Director of the Zofnass Program
Harvard Graduate School of Design

Working Session <3:45 pm>

NEXT STEPS FOR THE BUSINESS CASE FOR SUSTAINABILITY

Prof. Spiro Pollalis Professor and Director of the Zofnass Program
Harvard Graduate School of Design

Dr. Andreas Georgoulis Lecturer & Zofnass Program Research Director
Harvard Graduate School of Design

Closing Remarks <4:55 pm> Prof. Pollalis

Location Harvard Business School



Cumnock Hall, Room 102
Harvard Business School
33 Harvard Way
Boston, MA

Location Harvard Graduate School of Design



Gund Hall, Room 112 [Stubbins]
Harvard Graduate School of Design
48 Quincy St.
Cambridge, MA

Public transportation is recommended, as well as other mobility options such as Uber, Lyft, or Fasten. However, if you wish to obtain a parking permit you may do so by going to the following website: <https://www2.uos.harvard.edu/cgi-bin/permit/purchase.pl>(Instructions: Click visitor. Click to register. Create an account. For department list the Graduate School of Design. For the code list 1001

PERSPECTIVES FROM COMMERCIAL AND DEVELOPMENT BANKS

Detailed Agenda

<12:00 pm > Light lunch available for all attendees.

<12:30 pm>

Welcome

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program, Harvard GSD*

The Business Case for Sustainable Infrastructure

Dr. Andreas Georgoulas, *Lecturer & Zofnass Program Research Director, Harvard GSD*

Infrastructure in the US suffers from chronic underinvestment in maintenance, which introduces vulnerabilities to hazards and hampers economic growth. The ASCE has reported the need to urgently increase infrastructure investments, citing the conditions of the nation's infrastructure system as "poor".

Despite the benefits of sustainable infrastructure provided through avoided impacts, costs and negative externalities, sustainability is not a prominent topic of national debates on infrastructure. The value of sustainable infrastructure to stakeholders remains vague, while many focus prominently on costs. This leads to lost opportunities when designing projects, as infrastructures are designed to last for decades.

Overall, it is currently unclear how sustainable infrastructure contributes to social, business, and safety resilience as sustainability benefits are rarely measured and shared with public officials and taxpayers. By illustrating the costs avoided through sustainability we can demonstrate that in terms of "all costs" to society, sustainable design is the least expensive methodology to create infrastructure.

The 50 Infrastructure Priority Projects

Cristina Contreras, *Research Associate, Zofnass Program, Harvard GSD*

The new administration has published the "Priority list for Emergency and National Security Projects". This list identifies 50 projects of highest priority for the country that is estimated to invest \$137.5 billion in reducing that infrastructure investment gaps while creating around 200,000 direct jobs. This presentation will explore what are the type of projects currently on the agenda, what is the overall investment by sector and what is the stage of the selected projects.

<1:15 pm>

Panel 1: PERSPECTIVES FROM COMMERCIAL AND DEVELOPMENT BANKS

Moderator

Dr. Andreas Georgoulas, *Lecturer & Zofnass Program Research Director, Harvard GSD*

Sustainable Infrastructure in the New Global Agenda

Amar Bhattacharya, *Senior Fellow - Global Economy and Development, Brookings Institute*

This presentation will provide the broader context of the role of sustainable infrastructure, of the key constraints that impede both the quantity and quality of infrastructure investments, and the role of development banks (domestic and multilateral) in unlocking both these constraints and financing.

Financing Sustainable Infrastructure in Latin America and the Caribbean

Tomás Sebastian Serebrisky, *Principal Economic Advisor of the Infrastructure and Environment Department, Inter-American Development Bank*

Latin America and the Caribbean (LAC) face the challenge to substantially increase investments in infrastructure. Up to five percent of Latin America's GDP (USD 250 billion) will be required to close the gap between future needs and existing infrastructure. Yet, only two to three percent of GDP are invested annually in developing and expanding infrastructure. LAC is not the only region that requires substantial investments in infrastructure. According to the Global Commission on the Economy and Climate global demand for new infrastructure from 2015 to 2030 is estimated at USD 90 trillion. That is twice the current stock of infrastructure worldwide. On top of that, the two ambitious international agreements of 2015 – the U.N.'s Sustainable Development Goals and the Paris climate accord – made it perfectly clear that new infrastructure has to be sustainable and business as usual is no longer an option.

The litmus test for achieving growth and competitiveness as well as to meet the challenges of the climate change is to increase financing for sustainable infrastructure.

Sharing the experience from Latin American countries the presentation will highlight the challenges of developing countries in gaining access to financing for infrastructure projects. The presentation will further discuss how financing can be scaled up by developing infrastructure to an assess class. It will also shed light on the impact of sustainability on financial risk and return.

PERSPECTIVES FROM COMMERCIAL AND DEVELOPMENT BANKS

Contribution of Safeguards to Making Infrastructure Projects More Sustainable

Janine Ferretti, *Chief, Environment and Social Safeguards Unit, Inter-American Development Bank*

Global infrastructure investment is acknowledged as critical to meet growing needs and the financial requirements are significant. At the same time, governments have considerable commitments to global sustainability objectives, including those related to climate change, biodiversity, among others. Furthermore, infrastructure developments often can encounter opposition in communities where they are to be constructed. Incorporating sustainability considerations into infrastructure projects are critical not only to achieving sustainability objectives but often to ensuring community acceptance. Environmental and social safeguards play a central role in integrating sustainability considerations in infrastructure development.

How Sustainability is Linked to Better Financial Performance in Emerging Markets

Giridhar Srinivasan, *Senior Operations Officer, Global Partnerships (Infrastructure Investment Lead), International Finance Corporation (IFC)*

IFC is a leading investor in infrastructure in emerging markets. It has been a pioneer in incorporating Environmental, Social and Governance (ESG) standards into its overall strategy and investment decision making process. Its Performance Standards have been adopted by several financial institutions. Surveys of clients show that its expertise on ESG standards is a key driver of why they work with IFC.

IFC's assessments of its own investment portfolio show that portfolio companies that lead on ESG issues outperform those that don't. And these ESG leaders also outperform external financial benchmarks.

The presentation will review this, and also explain some of the products that IFC uses to go upstream to develop sustainable infrastructure projects, how it works with clients to address ESG issues on projects, and how it is working to attract institutional investors to invest in sustainable projects.

Making Sustainable Infrastructure Bankable

Mariana Silva, *Associate Infrastructure Planning & Finance, Nathan Associates Inc.*

The present session will explore the standardized investment parameters used by Commercial and Development banks at present and will aim to answer the following questions: What are the current barriers faced by commercial banks? How can the most pressing barriers be overcome to accelerate investments into this field? How could MDBs influence compliance with good practices in sustainability in project cycle? How can we move towards customized solutions for sustainable infrastructure projects (i.e. project selection criteria, financing models, financial instruments, sustainable public private partnerships , Asset Life cycle costing, among others). This session will present practical solutions for growing a bankable pipeline of infrastructure projects globally.

Q & A

Led by Dr. Andreas Georgoulas, *GSD.*

<3:20 pm > Coffee break & networking.

NOTES

PERSPECTIVES FROM INSURERS AND INVESTORS

<4:55 pm>

Panel 2: PERSPECTIVES FROM INSURERS AND INVESTORS (Part 2)

Moderator

John Macomber, *Senior Lecturer & Zofnass Program Faculty Advisor, HBS*

Creating a Decision Platform for Investing in Resilient Infrastructure

John Macomber, *Senior Lecturer & Zofnass Program Faculty Advisor, HBS*

This session will explore financial and engineering interventions where the benefit/cost impact is well matched to the resilience payback. Using a case study of improvements in public infrastructure in Miami in the face of potential sea level rise, a number of probability relationships are explored. These include: probability and time frame of potential sea level rise; probability of incidence (in this example, incidence of flooding); probability of loss (in this situation, partial or total loss); and projected willingness of the US Federal government to fund a high percentage of recovery costs on an unlimited basis for an indefinite number of years and events. By assessing who pays for prevention, who pays for recovery, what are the probabilities of occurrences, and which characteristics of physical choices “move the curve,” engineers and financiers can be proactive in shifting shift the loss curve favorably. This could demonstrate an objective return on investment for resilient design.

The Business Case for Natural Infrastructure: Lessons from TNC-Dow Collaboration

Jen Molnar, *Managing Director & Lead Scientist, Center for Sustainability Science, The Nature Conservancy - NatureVest*

Natural infrastructure – where nature can provide benefits alongside or in place of built infrastructure – can offer communities and industry cost-effective, resilient solutions, but can be challenging to implement. There can be institutional and cultural barriers, as well as the need to bridge of ecology and economics with engineering. The collaboration between The Nature Conservancy and The Dow Chemical Company will be presented as a case study. This collaboration sought to test and demonstrate how businesses could better understand the risks and opportunities related to their reliance and impacts on nature, leading both to smarter business decisions, and greater investment in conservation because it makes good business sense.

Initial pilot analyses demonstrated how the value of nature and natural infrastructure could be considered and implemented in corporate decisions at Dow sites. For example, we assessed the role of ecosystems in sustaining water supply and protecting facilities on the coast at a Dow site in Freeport, TX. We found reforestation could be a cost-competitive solution for addressing NOx emissions and ozone pollution at that same site.

To scale integration of natural infrastructure across the business required a

two-pronged enabling strategy. To enable “bottom-up” decision-making by engineers across the company, the collaboration team developed the ESII Tool (Ecosystem Service Identification and Inventory Tool, publicly available at: www.esiitool.com), a rapid assessment tool to estimate natural capital in the landscape. Providing “top-down” incentive, in April 2015, Dow announced its 2025 Nature Goal, committing to integrate nature into its evaluation of all capital, real estate, and R&D projects, creating \$1B in business value by 2025.

This presentation will share results and lessons from the work in the TNC-Dow Collaboration to show how companies can integrate nature in their business. We will also share a vision for continuing to move toward mainstreaming valuing nature and natural infrastructure.

Climate Change Risk – An Insurer’s Perspective

Benjamin J. Harper, *AVP, Technical Underwriting, Head of Environmental, Zurich Insurance*

The impact of Climate Change on the financial sector is expected to increase in frequency and severity. Many of these impacts – such as increased flooding – are obvious, but there are additional effects that are of equal concern which are not always considered. We will discuss these impacts and the role insurance can play.

Q & A

Led by John Macomber, *HBS*.

<6:10 pm>

Closing Remarks

Prof. Spiro Pollalis, *GSD*

<7:30 pm >

Overview

By Prof. Rebecca Henderson, *John and Natty McArthur University Professor, HBS*.

Zofnass SIAB Dinner at Harvard Faculty Club, by invitation only.

<9:00 pm > End of day 1

PERSPECTIVES FROM SUSTAINABLE INFRASTRUCTURE PLANNING

<7:00 am > SIAB Breakfast Meeting, by invitation.

<8:50 am >

Welcome to Day 2

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program, Harvard GSD*

<9:00 am >

Panel 3: PERSPECTIVES FROM SUSTAINABLE INFRASTRUCTURE PLANNING

Moderator

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard GSD*

A Framework for Investing in Sustainable Planning

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard GSD*

Since conception, there had been a strong commitment by all parties involved for planning sustainably the Lahore Knowledge Park, an 800 acres greenfield development in Lahore, Pakistan. As expected, the question of cost was of utmost concern. The client indicated that a small additional cost would be acceptable, justified by the nature of the project: a high tech development for education, research and industry to attract tenants worldwide and acting as a magnet for Pakistani expats.

The planners, Osmani Ltd with Prof. Pollalis as chief planner, approached the cost issue in a bold way. Following the Planning Guidelines for Sustainable Cities, developed by the Zofnass Program, they created an integrated sustainable project at all 3 levels: land planning, urban design and bylaws. Their sustainable approach focuses on (a) buildings, (b) planning with emphasis to proximities and (c) infrastructure systems. Sustainable design minimizes the demand of infrastructure and thus the project requires less installed capacity of infrastructure systems such as roads, energy and water. Fewer and narrower roads are needed, there is less consumption of energy, and water savings and recycling require less water and sewage treatment. As a result, the entire system tends to be less costly than a conventional system, not per unit price but per total cost, since the sizes are smaller and more efficient. The true savings will result from operations, at the lifecycle of the project and its increased marketability.

Does Sustainable Infrastructure Mean Better Roads and Bridges?

Prof. Robert Ayres, *Emeritus Professor of Economics and Political Science and Technology Management Novartis Chair Emeritus, INSEAD*

Most investors are interpreting President Trump's proposed trillion dollar infrastructure investment in terms of repairs and renovation of roads and bridges. This is supposed to be very good news for firms in the construction industry, as well as

automobile manufacturers. But history suggests that better roads attract more traffic, which is not consistent with long-term economic or environmental goals consistent with climate change. I define "infrastructure" as passive capital that increases the productivity of active capital, while remaining unchanged (except for wear and tear). With that definition in mind, and also bearing in mind that the state of the infrastructure of a country has a powerful influence on the direction of technological progress and economic growth, I suggest that the long-term energy future must be electric. Then the highest infrastructure priorities might be (1) hydro-electric dam repair and upgrade, (2) storage facilities to balance supply and demand for renewable electricity and (3) recharging facilities for electric vehicles.

What's the Value of Green? Solving the Due Diligence Challenge

John Williams, *CEO & Co-Founder, Impact Infrastructure*

This presentation entitled, "What's the Value of Green?" will focus on the evolution of thinking in the banking industry as to their involvement in infrastructure and building finance. Banks and their customers including Environmental, Social and Governance; Impact; and Green Bond investors are becoming more and more interested in underwriting portions of projects however, they struggle with the assessment of value to be derived from triple bottom line performance associated with their targets. Their stakeholders are increasing their demands for hard data that supports claims of "green." Until recently, those demands were dismissed due to a lack of assessment standards, analytical capacity, the cost of project assessment, and the absence of affordable reporting tools. New emphasis on federal funding, P3s and possible changes in tax policy are coming together to catalyze even greater bank interest in project participation. This presentation will describe how architects and engineers are helping to address the barriers that have stymied bank participation. A short case study involving Prologis, the world's largest logistics building REIT and its efforts to reveal the value of green distribution centers is paving the way for the real estate industry. If time permits, additional examples for San Francisco International Airport will be highlighted.

Quantifying a Sustainable Return on Investment

Christopher Mangieri, *Research Associate, Constellation Research Technology*
Mackenzie Clark, *MTA New York City Transit Capital Program Management*

In order to effectively combat climate change, the social and environmental externalities of investments must be quantified. Without financial justification, there is little incentive for capital markets to invest in projects that mitigating global warming, promote sustainability, and increase resiliency. Our objective is to develop a sustainable return on investment (SROI) model to be used by investors to quantify these externalities, justifying environmental conscious and socially just investments to mitigate global warming and reshape the way the world invests. The SROI model will be applicable for both the public and private sectors and will encompass projects across a diverse set of sectors: energy efficiency, renewable energy, public transportation, green infrastructure, water reclamation and reuse, waste generation and recycling, etc.

PERSPECTIVES FROM POLICY MAKERS AND REGULATORS

<11:10 am>

Panel 4: PERSPECTIVES FROM POLICY MAKERS AND REGULATORS

Moderator

Marty Janowitz, VP, Discipline Leader Sustainable Development, Stantec

The Evolution of Sustainable Infrastructure Rating

John Stanton, President and CEO, Institute for Sustainable Infrastructure (ISI)

In response to requests from New York and Los Angeles, and other cities, we will innovate upon our existing individual-project platform (<http://sustainableinfrastructure.org/envision/project-awards/26th-ward-wastewater-treatment-plant/>) (<http://sustainableinfrastructure.org/envision/project-awards/south-la-wetland-park/>) to expand infrastructure planning and rating to a citywide portfolio-level. We will show that sustainable infrastructure approaches can efficiently scale to an entire suite of city infrastructure investments. Best practices learned will create a prototype system for adoption by any city to track, measure and rate sustainability and resilience performance across all infrastructure systems. Our goal is a new streamlined, holistic planning and rating tool that empowers city sustainability officers to coordinate, integrate and compare citywide infrastructure efforts and collectively benchmark them.

Building Climate Resilience: Challenges and Collaborations

Joyce Coffee, President, Climate Resilience Consulting

While some claim that resilience projects that mitigate the physical impacts of climate change are unbankable, investors and project developers are creating market-based financial solutions. Public-Private Partnership climate adaptation project investment opportunities continue to grow. Based on experiences in other policy non-US policy environments, and considering federal, state and local opportunities in the US, there are policy options that would strengthen the PPP market for climate resilience. This presentation will consider the next generation of corporate tax codes, benefit cost analysis requirements and project definitions while profiling innovative existing US-based public private partnerships, especially in financial services.

Municipal Perspectives on Infrastructure Policy

Brad Rawson, Director of Transportation & Infrastructure, City of Somerville

Oliver Sellers-Garcia, Director of Sustainability, City of Somerville

Somerville, Massachusetts is a dense, historic urban community of only four square miles and 80,000 residents. To implement its legally-adopted, community-driven Comprehensive Plan, which calls for 15 million square feet of transit-oriented smart growth, and to meet Mayor Joe Curtatone's visionary commitment to carbon neutrality, the City must modernize and expand numerous types of infrastructure, including water, wastewater, energy distribution and public transit. The MBTA Green Line light-rail extension currently underway in Somerville offers a compelling case study through which to view the challenges and opportunities associated with interdisciplinary infrastructure policy and sustainability planning at the municipal level.

Building the Right Transformative Projects: Best Practices and Challenges

Dr.Cris Liban, Executive Officer, Environmental Compliance and Sustainability, Los Angeles County Metropolitan Transportation Authority

The Los Angeles County Metropolitan Transportation Authority (LA Metro) has been entrusted with a \$120B dollar voter initiative funding stream (called Measure M) for the next 40 years. These initial funds are designed to transform the transportation and transit system in Los Angeles. LA Metro is in a very unique position to ensure the relevance, optimization, and value of the infrastructure it will be building and operating. Being in California has its unique challenges. With evolving environmental and climatic conditions, increasing regulatory pressures, and changing needs of the consumer's traditional transit and transportation needs, it is very critical that the projects are built right; but more importantly that right projects are built. At the forefront of this aspiration and goal are design criteria, specifications, tools, and professional skills essential to building the right projects. This presentation will go through the best practices that LA Metro has pioneered for over a decade; as well as the challenges to implement the same during construction or operate and maintain said infrastructure.

Q & A

Led by Marty Janowitz, Stantec.

<1:00 pm > Lunch break, food and refreshments available for all attendees.

NOTES

PERSPECTIVES FROM OPERATORS AND CONTRACTORS

<1:55 pm>

Panel 5: PERSPECTIVES FROM OPERATORS AND CONTRACTORS

Moderator

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard GSD*

Social Shielding as a Strategy to Generate a Sustainable Business and City

Manuel Wu, *General Manager, Lima Metro Line 1, GYM Ferrovías S.A.*

LINEA 1 develops a social shielding strategy that allows us to evaluate and measure external risks that could affect the operation, as well as to identify the solutions that focus on our two objectives: Transform our stations and trains into spaces for citizenship education; and grow and share with our neighbors.

For the implementation of this strategy, we annually make a direct investment that is close to 1% of our income. We strengthen this investment through partnerships with state entities, non-profit organizations and private companies, with the purpose of capitalizing common interests, which has allowed us to expand the social investment of our programs. This economic injection of our allies will contribute to the increase of return on investment.

Our articulating role has generated a greater benefit of the population, with a sustainable investment, contributing to improve the quality of life of thousands peruvians people, through the changes of the environment, with a huge impact for the city.

By joining efforts we have secured sustainable initiatives, thanks to the participation of the community and its local authorities in the whole process of decision making and design of social programs, promoting the appropriation of each action.

Loads and Benefits of Rising Sustainability for Interested Parties.

Antonio Burgueño Muñoz, *Director of Quality and Corporate Social Responsibility, FCC Construction*

There is an increasing demand, in both the private and public sectors to understand sustainable construction practices, since economic profitability and the social relationships with the different stakeholders involved in the process.

Infrastructure developers need more and more to express sustainability on civil works through coherent assessment indicators and criteria, by means of Administrations, justifying their proposals to citizens or working on decision-making through mutual dialogue and collaboration, and private developers, submitting their projects to authorized entities.

From the contractor's perspective, this assessment may be required by the client, the financial entities (e.g. Equator Principles) or the company itself to ensure the

sustainability of its own activity. This very often increases the resources needed (budget), but it is worth for at least one of the interested parties involved. The distribution of efforts and possible compensations is an issue that is not always elucidated with enough clarity.

Assessments of the sustainable performance of infrastructures can be the basis for the decision-making of public Administrations or private developers, with the purpose of proving and communicating the extent of their proactive commitment towards achieving higher levels of sustainable performance as well as aiming to make easier the relation between the various stakeholders that participate or are involved in the decision-making process.

To achieve the goal of a higher contribution to sustainability from the construction sector, it is necessary all actors be involved in the process, and there is a need to be clear about the willingness to act in a sustainable manner and them to obtain a benefit in the process. This is not always possible for all parties, and when you find a weaker link in the chain, the objective is just breaking through.

As many interested parties are involved in the process, sometimes we find that multiple approaches to this assessment are applied. And those assessment methods are not always the same, not even similar, depending on where does it come from. In this sense, there is a clear need for standardization in this field, and some bigger efforts must be done.

Is Sustainability Sustainable?

Ryan Prime, *Sustainability Director, Skanska USA Civil*

What does Sustainability mean to Skanska? Ryan will briefly explain how Sustainability has been defined and implemented at Skanska, one of the nation's largest development and construction firms. Ryan will explain the benefits behind sustainable thinking that have driven the concept forward as well as the current and future challenges that threaten industry scale adoption. The common perception is that adding any form of sustainability to a project simply adds cost. Mr. Prime will provide some examples of how sustainability may add cost to a project; however if the mentality were to shift from a source of cost to a source of opportunity, much like the focus on quality in the manufacturing industry, sustainability thinking could add value far outlasting the initial cost of implementation. In order to encourage sustainability projects must be procured in such a way that the control is offered up to the entity with the most knowledge and influence to make the best value decisions. Therefore the project delivery method directly relates to how sustainable a project can be without excessive burden on the project cost. Lastly, Ryan will discuss opportunities in the industry going forward to showcase sustainability and promote the concept's long-term implementation while building tomorrow's infrastructure.

NEXT STEPS FOR THE BUSINESS CASE FOR SUSTAINABLE INFRASTRUCTURE

<3:45 pm>

Working Session: NEXT STEPS FOR THE BUSINESS CASE FOR SUSTAINABLE INFRASTRUCTURE

Summary Day 1 & 2

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard GSD*

Discussion and Next Steps

Prof. Spiro Pollalis, *Professor and Director of the Zofnass Program for Sustainable Infrastructure, Harvard GSD*

Dr. Andreas Georgoulas, *Lecturer & Zofnass Program Research Director, Harvard GSD*

Respondents

Panelists and Resources
Sustainable Infrastructure Advisory Board
Zofnass Program for Sustainable Infrastructure

<4:55 pm>

Closing Remarks

Prof. Spiro Pollalis, *GSD*

DISCUSS

Prof. Spiro Pollalis

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

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) 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.

Dr. Andreas Georgoulis

Lecturer & Zofnass Program Research Director, Harvard University GSD

Dr. Andreas Georgoulis is an expert on sustainable infrastructure and large scale developments. He is the research director of the Zofnass Program for Sustainable Infrastructure at Harvard, where he teaches since 2007. He has published three books and numerous case studies on his area of work. His current projects include the Infrastructure 360 Awards with the Inter-American Development Bank, a wide interdisciplinary effort to assess health impacts of cities in Asia, and research on 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 infrastructure. In the past, he has

led the development of the first rating system to assess sustainable infrastructure, now deployed in the US and globally as Envision, collaborated with Obermeyer, Hochtief, UniCredit Markets and Investment Banking, and the US General Service Administration. He has consulted for the Economist Intelligence Unit and the United Nations Development Program, and led urban development plans in Cameroon, Saudi Arabia and Pakistan. Prof. Georgoulis holds degrees in Architecture Engineering from the University of Athens, a Master's and a Doctorate from Harvard.

Cristina Contreras

Research Associate, Harvard University GSD

Cristina Contreras is currently a Research Associate in the Zofnass Program for Sustainable Infrastructure at Harvard University. Her work focuses on promoting sustainable practices in infrastructure projects on a global scale, examining and exploring the challenges and opportunities that sustainability can provide to countries and companies. She has presented her work on assessing sustainable infrastructure at several international conferences, and was a lecturer in the School of Civil Engineers at Polytechnic University of Madrid and a Teaching Fellow at Harvard University Graduate School of Design. Before coming to Harvard, Ms. Contreras worked for six years in the private industry, in collaboration with some of the largest construction companies in the country. Ms. Contreras is an accredited Envision Sustainability Professional (ENV SP), and a certified Envision trainer. She holds Bachelor's in Technical Architecture and Building Engineering, both from the Polytechnic University of Madrid (UPM), as well as Master's Degree in Sustainability and Environmental Management and a Professional Graduate Certificate in Corporate Sustainability and Innovation both from Harvard University.

Amar Bhattacharya

Senior Fellow - Global Economy and Development, Brookings Institute

Amar Bhattacharya is senior fellow at the Global Economy and Development Program at Brookings Institution. His focus areas are the global economy, development finance, global governance, and the links between climate and development. From April 2007 until September 2014 he was Director of the Group of 24, an intergovernmental group of developing country Finance Ministers and Central Bank Governors. In that capacity he led the work program of the Group, supported the deliberations of the Ministers, and was the principal point of interface with other organizations including the G20. He has therefore been an active participant in the global economic discussions and a key representative of the views of developing countries.

Prior to taking up his position with the G24, Mr. Bhattacharya had a long-standing career in the World Bank. His last position was as Senior Advisor and Head of the International Policy and Partnership Group. In this capacity, he was the focal point for the Bank's engagement with key international groupings and institutions such as the G7/G8, G20, IMF, OECD and the Commonwealth Secretariat. Through these different positions Mr. Bhattacharya has had a long-standing engagement in research and policy discussions on the global economy and spillovers, international financial architecture, development financing and the global governance agenda including on the role and reform of the international financial institutions. He completed his undergraduate studies at the University of Delhi and Brandeis University and his graduate education at Princeton University.

Tomás Sebastian Serebrisky

Principal Economic Advisor of the Infrastructure and Environment Department, Inter-American Development Bank

Tomás Serebrisky is the Principal Economic Advisor of the Infrastructure and Environment Department of the Inter-American Development Bank (IDB) in Washington, D.C. Prior to joining the IDB, Tomás was Chief Economist of the Antitrust Commission in Argentina, Visiting Professor at Universidad Torcuato Di Tella (2000-2002) and a Senior Economist in the World Bank (2002 to 2012) where he led the preparation and supervision of investment projects in several infrastructure sectors. His areas of expertise are the economics of infrastructure investment, Public Private Partnerships, logistics, economic regulation and antitrust. Tomás published extensively in refereed journals, is the author of the book "Airport Economics in Latin America: Benchmarking, Regulation and Pricing" (World Bank, 2012) and is the co-editor of the books "Saving for Development: how Latin America and the Caribbean can save more and better" (Palgrave, 2016). Tomás holds a Ph.D. in Economics from the University of Chicago and a B.A. in Economics (summa cum laude) from Universidad de San Andres in Buenos Aires, Argentina.

Janine Ferretti

Chief, Environment and Social Safeguards Unit, Inter-American Development Bank

Ms. Ferretti joined the Inter-American Development Bank in 2003 after she completed her term as executive director of the North American Commission for Environmental Cooperation (CEC). During the 10 years she worked at the CEC, she carried out initiatives related to trade and environment, biodiversity conservation, health and environment, enforcement of environmental law, public access to environmental information and

capacity building. She also oversaw independent fact-findings in response to public complaints related to non-enforcement of environmental laws. Before joining the CEC, Ms. Ferretti was executive director of Pollution Probe, a Canadian NGO, where she worked with the Environmental Liaison Centre International in Nairobi, Kenya and the International Union for the Conservation of Nature in Bonn, Germany.

Ms. Ferretti holds a Master of Environmental Studies in Environmental Policy from York University, Toronto, and a Bachelor in Environmental Studies from the University of California, Santa Cruz.

Giridhar Srinivasan

Senior Operations Officer, Global Partnerships (Infrastructure Investment Lead), International Finance Corporation (IFC)

Giridhar Srinivasan is a Senior Operations Officer in the Global Partnerships team at the International Finance Corporation (IFC). Over the course of his career, he has worked on over \$9 billion of infrastructure transactions, across both developed and emerging markets. He is currently involved in managing client relationships, structuring transactions and mobilizing capital, with a focus on the infrastructure sector. He works on issues how to make project development more efficient, how to make infrastructure projects more resilient, and how development partners can work with investors to unlock the potential of the infrastructure sector.

Previously, he was on the investment team at IFC InfraVentures, an internal venture capital fund for infrastructure projects. His responsibilities included making new investments, developing greenfield projects and developing the fund's overall strategy. Before joining IFC, he was a founding member of Lehman Brothers Infrastructure Fund, and was an investment banker in Rothschild's Global Infrastructure M&A team. Earlier in his career, he worked at Katzenbach Partners, a management consulting firm based in New York.

Giridhar received a BA with Honors from Swarthmore College, and an MBA from The Wharton School at the University of Pennsylvania.

Mariana Silva

Associate Infrastructure Planning & Finance, Nathan Associates Inc.

Mariana H. Silva is a sustainable infrastructure project finance specialist at Nathan Associates. Ms. Silva has ample experience in the capitalization of resilient low carbon infrastructure, with emphasis in project finance, credit due diligence and Public Private Partnerships (PPPs) in the clean energy, water and sanitation, and transportation sectors.

She has advised several governments on policies in a manner that provides for economic growth, social justice and stewardship of the natural environment. Mariana was retained by the Swiss Ministry of Finance to design targeted financial policies and fiscal interventions aimed at positioning Switzerland as the Global Green Financial Hub. Also, she led the UNEP Inquiry project aimed at redesigning Bangladesh's financial system for higher capital flows into green infrastructure projects.

Her expertise in capital markets include fixed income securities and structured products. While working for the international Institute for Sustainable Development, she managed a five year project in collaboration with NDRC and the People's Bank of China aimed at developing a secondary market for green bonds. Four years after project inception, China is currently the biggest green bond issuer globally.

Mariana is an expert member at the United Nations Economic Commission team developing Public Private Partnerships financing guidelines for the capitalization of sustainable Water and Sanitation projects in emerging economies.

Mariana H. Silva has pursued her studies and working experiences in different regions to gain an international markets perspective: born in Mexico, she has since lived in Switzerland, Germany, the United Kingdom, Hong Kong and The United States. She is fluent in Spanish, German, French and English.

John Markowitz

Vice President - Infrastructure and Governmental Finance, Mass Development

John Markowitz is Vice President - Infrastructure and Governmental finance at MassDevelopment. He manages infrastructure bond programs working closely with state and local government officials, real estate developers and banks to leverage public and private funds to support economic growth. He formerly worked in public finance investment banking financing infrastructure for real estate development projects across

the country. John has a Bachelor of Arts from the University of Virginia. He currently serves as Board member and Secretary of the US Green Building Council's Massachusetts chapter and is also a member of Urban Land Institute's Boston/New England Infrastructure Council.

Tom McKay

Senior Vice President & Chief Development Officer, North America Sekisui House, LLC (NASH)

As Senior Vice President & Chief Development Officer, Mr. McKay manages the scheduled execution of real estate development and business operations for NASH's property portfolio across the United States, including multifamily, mixed-use, and master planned communities. He also leads NASH's efforts on new property acquisition and sustainability integration.

North America Sekisui House (NASH) (www.nashcommunities.com) is a wholly-owned subsidiary of SEKISUI HOUSE, LTD., Japan's largest homebuilder. NASH invests in land opportunities and develops environmentally sound projects based on long-held traditions of maintaining ecological balance and sustaining asset appreciation.

Mr. McKay brings over twenty five years of experience in all aspects of the real estate development business. Prior to joining NASH he worked for local and regional developers based in the Mid-Atlantic region.

Mr. McKay earned a Bachelor of Business Administration in Accounting from James Madison University.

Luis Corzo

Client Advocate, Willis Tower Watson

As a Client Advocate at Willis Towers Watson, Luis focuses on assisting existing and prospective clients make better decisions about risks. Luis works with public and private entities developing some of the most complex infrastructure projects globally. Prior to joining Willis Towers Watson, Luis was the Managing Director at CG/LA Infrastructure, a DC-based strategy firm where he led administration responsibilities for the Infrastructure 360 awards program. Prior to CG/LA, Luis spent three years providing reinsurance to the most complex infrastructure assets throughout Latin America. Luis began his career in the US Maritime industry, 11 years, ranging from ship design, construction, operations and maintenance. Luis is a graduate from the US Merchant Marine Academy and is originally from Venezuela and Nicaragua.

John Macomber

Senior Lecturer & Zofnass Program Faculty Advisor, Harvard Business School

John Macomber is a Senior Lecturer in the Finance unit at Harvard Business School. His professional background includes leadership of real estate, construction, and information technology businesses. At HBS, Mr. Macomber is engaged in the Business and Environment Initiative and Social Enterprise Initiative. He teaches Finance, Real Estate, Urbanization, and Entrepreneurship courses in the elective curriculum and in Executive Education. He is the former Chairman and CEO of the George B H Macomber Company, a large regional general contractor; and remains a principal in several real estate partnerships. John serves or has served on the boards of Young Presidents Organization International (YPO), Boston Private Bank, and Mount Auburn Hospital.

Jen Molnar

Managing Director & Lead Scientist, Center for Sustainability Science, The Nature Conservancy - NatureVest

Jen Molnar is lead scientist at The Nature Conservancy and managing director of TNC's Center for Sustainability Science. The Center 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 almost 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.

Benjamin J. Harper

AVP, Technical Underwriting, Head of Environmental, Zurich Insurance

Ben is the Environmental leader in Zurich's Technical Underwriting division, and is based in Atlanta, Georgia. He is responsible for providing technical, policy, and underwriting guidance in support of Zurich's global environmental and pollution coverages. Prior to his current role, Ben was the Product Officer in Zurich's Climate Office, where he was responsible for developing new risk transfer products to address climate change and sustainability risk. Ben and his team have developed

products to address concerns ranging from renewable energy sources and carbon emissions to geologic sequestration. Ben began his Zurich career in ZNA's Environmental business unit where he managed a group of engineers and geologists responsible for all aspects of environmental risk management in support of Zurich's environmental business.

Ben has served on multiple stakeholder committees including the U.S. Department of Energy's National Risk Assessment Partnership (NRAP), the European Zero-Emissions Platform (ZEP), and the National Science Foundation (NSF) Hydraulic Fracturing Focus Group. He has been a guest speaker and panelist at the United Nations, and contributing expert to the International Energy Agency.

Before joining Zurich, Ben worked in engineering consulting with a focus on large-scale environmental remediation projects, impairment assessments, remedial design, regulatory compliance and civil/environmental construction. Ben holds a Bachelor of Science in Civil Engineering and is a Certified Cost Engineer (CCE).

Prof. Rebecca Henderson

John and Natty McArthur University Professor, Harvard Business School

Rebecca Henderson is the John and Natty McArthur University Professor at Harvard University, where she has a joint appointment at the Harvard Business School in the General Management and Strategy units. Professor Henderson is also a research fellow at the National Bureau of Economic Research. Her work explores how organizations respond to large-scale technological shifts, most recently in regard to energy and the environment. She teaches Reimagining Capitalism in the MBA Program.

Prof. Robert Ayres

Emeritus Professor of Economics and Political Science and Technology Management Novartis Chair Emeritus, INSEAD

Robert U. Ayres is a physicist and economist, currently Novartis professor emeritus of economics, political science and technology management at the international business school INSEAD, in France. He has previously taught at Carnegie-Mellon University, and as a visiting Professor at Chalmers Institute, Gothenburg Sweden. He is also Institute Scholar at the International Institute for Applied Systems Analysis (IIASA) in Austria, and a King's Professor in Sweden. He is noted for his work on technological forecasting, life cycle assessment, mass-balance accounting, energy efficiency and the role of thermodynamics in economic growth. He

originated the concept of “industrial metabolism”, known today as “industrial ecology” with its own journal. He has conducted pioneering studies of materials/energy flows in the global economy. He is author or co-author of 21 books and more than 200 journal articles and book chapters. The most recent books are *The Bubble Economy* (MIT Press, 2014), and *Energy, Complexity and Wealth Maximization* (Springer, 2016).

John Williams

CEO & Co-Founder, Impact Infrastructure

John has over 37 years of experience as an advisor to infrastructure and building development programs, 16 years as a principal owner of an international architecture and engineering company, and 13 years as an adjunct faculty member at Columbia University. He developed a series of awarding winning business practices including a framework for determining the value of GREEN. He was an original member of the SAIB and is currently a Member of CERES Presidents Council, is Chair-Elect for the Institute for Sustainable Infrastructure, is a Subject Matter Expert for Sustainability Accounting Standards Board (SASB), served as Co-Chair of the West Coast Infrastructure Exchange Business Standards Committee, and serves as a Trustee for the New York Foundation for the Arts.

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Christopher Mangieri

Research Associate, Constellation Research Technology

Christopher Mangieri is a Research Associate at Constellation Research Technology, a FinTech startup in the sustainable investing space.

Chris recently finished his M.S. in Sustainability Management at Columbia University where he focused on sustainable investing. While at Columbia, Chris was the project manager for a team of 16 graduate students that were tasked with developing a sustainable return on investment model that monetized the social and environmental benefits of projects for the Los Angeles Metropolitan Transportation Authority.

During his time at Columbia Chris interned at NewWorld Capital Group, a private equity firm focused on environmental opportunities, and at Mission Markets, an impact investing platform designed to connect investors with mission-focused organizations.

Prior to the above, Chris was an environmental engineering consultant at Langan Engineering and Environmental Services. Chris also holds a B.S. in Environmental Engineering from the University of Vermont.

Mackenzie Clark

MTA New York City Transit Capital Program Management

Mackenzie is a recent graduate of Columbia University where she received her Masters of Science in Sustainability Management. Prior to this, she obtained her Bachelor’s of Science in Environmental Science from Queen’s University in Canada. While at Columbia, she complemented her studies with internships at various organizations including Silver Leaf Partners, the Interfaith Center on Corporate Responsibility, the Principles for Responsible Investment and the United Nations Global Compact. In addition, at Columbia Mackenzie was the deputy project manager for a team of 16 graduate students tasked with developing a sustainable return on investment model that monetizes the social and environmental benefits of projects for the Los Angeles Metropolitan Transportation Authority.

Mauricio Gómez Villarino

Managing Director, IDOM- Madrid

Mauricio started his professional career in the late 90’s in the energy sector at Gas Natural - Unión Fenosa Group (www.gasnaturalfenosa.com) working consecutively as project engineer, on-site engineer, project manager and consultant. In 2003 he joined IDOM as Manager of the Environmental-Water Consulting Department; subsequently he took charge of establishing the “Canary Islands IDOM’s Office”, which he ran until 2008, developing projects in the sectors of energy, infrastructure, water, environment, architecture and consultancy. In 2008 he moved to the United Kingdom as Business Development Director, been responsible of managing the integration in IDOM of a company acquired in the UK (Merebrook Consulting Ltd.). In January 2011 he was appointed Managing Director of IDOM-Madrid Headquarters.

Together with his career in the private sector, Mauricio has developed a full career in university teaching and postgraduate teaching, including the publication of some technical and professional books, been an occasional speaker at various professional fields.

John Stanton

CEO, Institute for Sustainable Infrastructure (ISI)

John has spent his career working on sustainability issues. Prior to joining ISI as President and CEO at the beginning of 2017, he served as Executive Vice President & Regulatory Counsel for Policy & Markets at Tesla / SolarCity, Executive VP and General Counsel at the Solar Energy Industries Association (SEIA), Vice President for Energy Programs at the PEW National Environmental Trust, Legislative Counsel at the US EPA, New

Jersey Deputy Attorney General and Director of the Energy & Environment Committee at the National Conference of State Legislatures. He earned his law degree at Georgetown University Law School.

Joyce Coffee

President, Climate Resilience Consulting

Joyce Coffee, LEED AP, founder Climate Resilience Consulting, has 20 years of domestic and international experience in the corporate, government and non-profit sectors implementing resilience and sustainability strategies. Current projects: World Bank Global Adaptation and Resilience Fund; Rockefeller Foundation Financing Urban Resilience; Regional Plan Authority Resilience Trust Fund; 100 Resilient Cities Federal Policy Platform; Kresge Foundation Adaptation Portfolio Review; National Science Foundation Urban Resilience to Extremes. Experience: USAID’s US-Asia Environmental Partnership, World Bank, MWH, Farr Associates Architecture and Urban Design, City of Chicago, Edelman, Notre Dame Global Adaptation Initiative. Advising: Senior Sustainability Fellow, Global Institute of Sustainability; Global Adaptation and Resilience Investment work group, American Society of Adaptation Professionals, National Center for Atmospheric Research Engineering for Climate Extremes Partnership, National Science Foundation’s Urban Resilience to Extremes Sustainability Research Network.

Education: Masters City Planning, Massachusetts Institute of Technology; BS Biology, Asian Studies, Environmental Studies Tufts University.

Brad Rawson

Director of Transportation & Infrastructure, City of Somerville

Brad Rawson serves as Director of Transportation & Infrastructure within the Mayor’s Office of Strategic Planning & Community Development. He leads a team of five staff responsible for transportation planning, public space projects and urban forestry. He serves as Mayor Curtatone’s point person on the MBTA Green Line Extension, while also managing bicycle and pedestrian infrastructure projects, park design and construction, and many other areas of public policy related to infrastructure and the public realm. He is a Somerville resident and has served the City since 2007.

Oliver Sellers-Garcia

Director of Sustainability, City of Somerville

As Director of the Mayor’s Office of Sustainability and Environment, Oliver Sellers-Garcia leads initiatives on climate change mitigation and adaptation, resource conservation, and environmental innovation in Somerville. Recent and ongoing

initiatives include municipal and residential energy efficiency, greenhouse gas accounting, solid waste reduction and diversion, green procurement, clean technology piloting and implementation, and regional resilience planning. Prior to joining the City of Somerville in 2014, he worked for eight years as an environmental consultant, helping clients around the country and the world integrate sustainability and climate change into physical and organizational planning. Sellers-Garcia holds a Bachelor’s degree in Urban Studies from Columbia University and a Master’s in City Planning from MIT. He is a resident of the Union Square neighborhood of Somerville.

Dr. Cris B. Liban

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

Dr. Liban is an internationally recognized expert in the field of resource management, clean technologies, transportation, environment, and sustainability. In December 2016, he received from President Rodrigo Duterte the Philippines’ Highest Prize for Filipinos living overseas, the Pamana ng Pilipino Award. His influence reaches across the globe through the introduction of technology advancements, creative financing, and leveraging non-traditional partnerships to effect social change in the communities he serves. He is currently the Executive Officer for Environment and Sustainability at the LA County Metropolitan Transportation Authority. LA Metro is the 3rd largest transportation agency in the United States in the 20th largest economy in the world.

Among his numerous professional and civic responsibilities, Dr. Liban is a member of the USEPA National Advisory Council for Environmental Policy and Technology; and holds concurrent Commissioner positions in Transportation and Beach Commissions for the City and County of Los Angeles, respectively. He leads numerous initiatives notably through the National Academies of Sciences’ Transportation Research Board, American Society of Civil Engineers, American Public Transportation Association, California Transportation Association. Dr. Liban had also been a technical adviser in numerous infrastructure projects and plans most recently with the California High Speed Rail Authority and the City of Santa Monica, CA Climate Action Plan.

Marty Janowitz

VP, Discipline Leader Sustainable Development, Stantec

Marty Janowitz is Vice President, Sustainable Development at Stantec. He has more than 30 years’ experience consulting internationally in environmental and sustainability planning, policy and engagement. He’s responsible for guiding

Bios

Stantec's efforts to become an exemplary model of sustainability in all its operations and leads the company's initiatives to develop an integrated sustainability consulting practice. He's played a leading role in the sphere of sustainable infrastructure serving on the Zofnass Program's Sustainable Infrastructure Advisory Board. He's an Envision Professional, Verifier and Trainer, was Chair of an ISI Technical Committee and is a member of its new Envision Review Board. He was advisor to Stantec's Envision Platinum Grand Bend Wastewater treatment project – the first such project first and first Envision project in Canada. Marty was elected a member of Canada's Clean 50 - outstanding contributors to sustainable development and clean capitalism.

Manuel Wu

General Manager Lima Metro Line 1, GYM Ferrovías S.A.

Civil Engineer, graduated from the Pontifical Catholic University of Peru; With a Master's Degree in Business Management and a degree in Management Skills from University of Piura; With Specialization in Operations and Logistics of the ESAN University.

Currently, General Manager of GYM Ferrovías S.A. company in charge of investments, Operation and Administration of the Concession of Line 1 of the Lima Metro for 30 years. Managing a private investment of about US \$ 280 MM (bond issue in NY), managing assets for more than US\$ 1000 MM, serving more than 107 Million clients per year; Promoting sustainable development and citizen culture.

Antonio Burgueño Muñoz

Director of Quality and Corporate Social Responsibility, FCC Construction

Born in Madrid in 1962, Ingeniero de Caminos - Spanish 6-year Master of Civil Engineering - EQF7 – 374 ECTS; ICE-accredited, Corporate Member of the Spanish Institution of Civil Engineers (Colegio de Ingenieros de Caminos), Specialist on Environment, Master of Geographic Information Systems (GIS) and Master of Civil Engineering Works construction science.

He is currently Quality and CSR Director at FCC Construcción, SA, the construction area of FCC, one of the largest companies in construction and services in the world, responsible for the departments of Quality, Environment, Information and documentation, Technical planning, Audits, R&D and Corporate social responsibility.

He actively works on several organizations such as: chairman of the International Committee Working Group ISO/TC59/SC17/WG5 "Building construction

/ Sustainability in building construction - Civil Engineering Works"; chairman of the European Technical Committee Working Group CEN/TC350/WG6 "Sustainability of Construction Works- Civil Engineering Works"; vice chairman of CTN 198 "Sustainability in Construction" and chairman of its "Civil engineering Work" subcommittee; the "Spanish National Committee on Large Dams", SPANCOLD.; president of the Building Committee of the Spanish Association for Quality (AEC); member of the Advisory Board for the Certification of Construction Companies; or the European Construction Technology Platform (ECTP), amongst others.

Ryan Prime

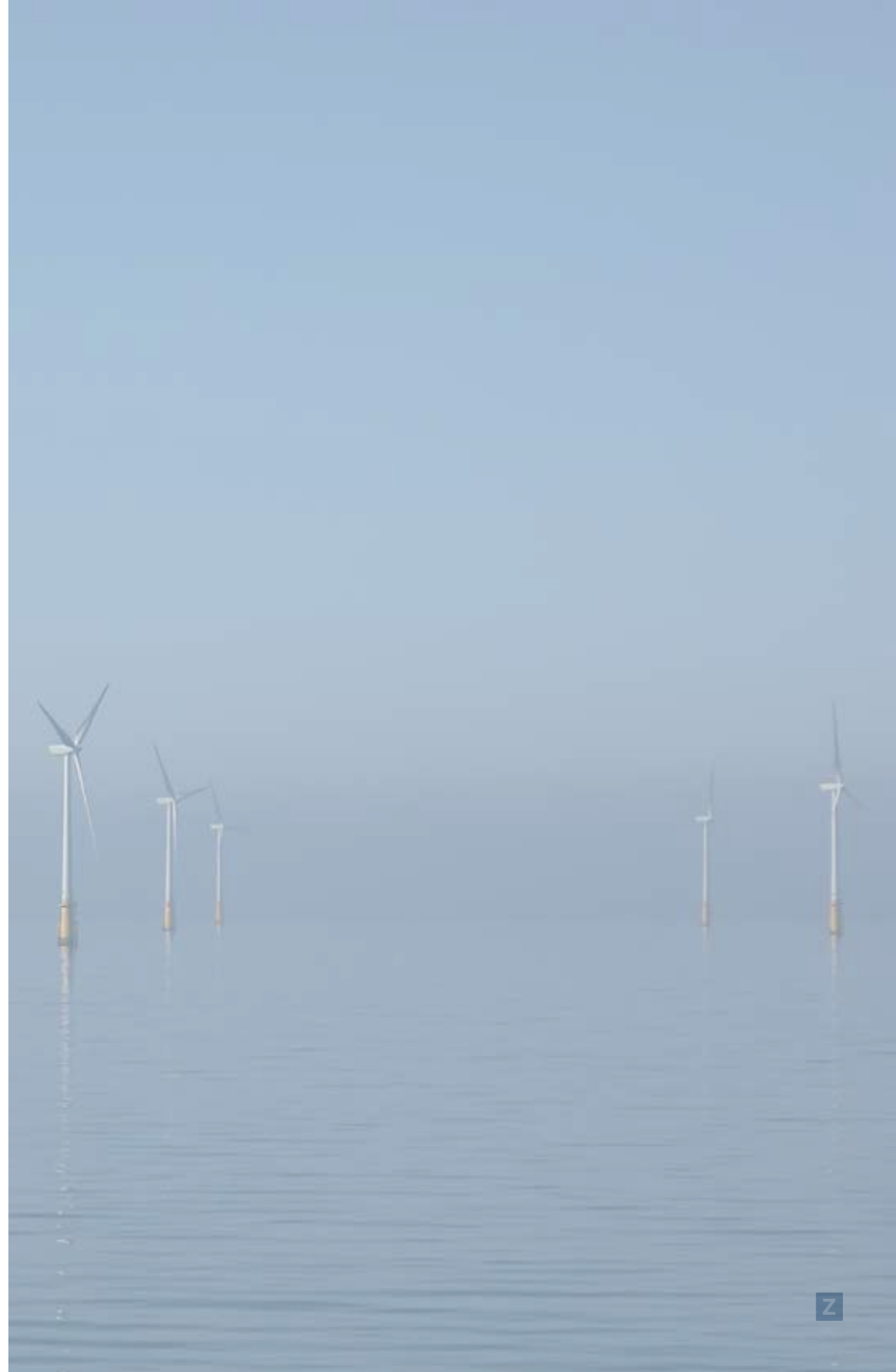
Sustainability Director, Skanska USA Civil

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. 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 management and 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. 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.

Boone Davis

Principal, The Renewables Consulting Group

Boone Davis is a Principal at the Renewables Consulting Group (RCG) and has worked in the US offshore wind industry for the past 6 years. Prior to joining RCG, Boone worked for the developer of the Cape Wind Project, Energy Management Inc. (EMI), where he was responsible for planning the project's construction, and developing and negotiating the commercial agreements that comprised it. Since joining RCG, Boone has served as the Project Manager for GE Renewable Energy (formerly Alstom Power) on the Block Island Wind Farm, the first offshore wind farm to be constructed in the US. Boone holds a Bachelor's degree in Engineering Science and Management from Vanderbilt University.





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