Zofnass Program for Sustainable Infrastructure

April 17 - 18, 2019

ZOFNASS PROGRAM WORKSHOP

Towards Establishing 'The Business Case for Planning Sustainable Infrastructure: Insights from Case Studies'

SPEAKERS FROM:

Arup
Bentley Systems
Cadmus Group
EFCG
Golder Associates
Harvard Business School
HNTB
Inter-American Development Bank
Institute for Sustainable Infrastructure
Jacksonville Transit Authority
Kiewit Infrastructure Group
Louis Berger
Shimizu Corporation
Sound Transit
Sustainable Infrastructure Advisory Board
United Nations Environment
University of Geneva
WestGen
World Bank
World Wildlife Fund
Wren House Infrastructure Management
WSP
Zofnass Program Harvard University

DAY 1

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

WELCOME <12:00 pm>

PANEL 1 <12:40 pm>
Contributing towards a Global Sustainability Agenda. Integration towards the Sustainable Development Goals (SDGs): The UN Effort

PANEL 2 <2:40 pm>
Valuing Sustainability in Infrastructure Investments: The WWF Report

PANEL 3 <4:20 pm>
Insights from Sustainable Energy Infrastructure

WRAP-UP DAY 1 <5:05 pm>

DAY 2

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

WELCOME <8:30 am>

PANEL 4 <8:40 am>
Insights from Sustainable Projects in Developing Countries: Financing and Engineering

HBS CASE STUDY SESSION <10:40 am>
Los Olmos Irrigation infrastructure in Peru

PANEL 5
Transportation Infrastructure

<12:35 pm> **Ensuring Sustainability at the Concept Stage**

<1:35 pm> **Insights on Autonomous Vehicles**

<2:35 pm> **Insights from Mass Transit**

PANEL 6 <3:50 pm>
Insights from Water Infrastructure

CLOSING REMARKS **<4:45 pm>**

ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

Harvard University
Graduate School of Design

Special thanks to all speakers, moderators, and the Zofnass Program Sustainable Infrastructure Advisory Board (SIAB).

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

ZOFNASS PROGRAM WORKSHOP

Towards Establishing 'The Business Case for Planning Sustainable Infrastructure: Insights from Case Studies'

Wednesday, April 17
12:00 pm to 5:15 pm
Harvard Graduate School of Design
Gund Hall Room 112 (Stubbins),
and Room 109
48 Quincy St, Cambridge, MA 02138

Thursday, April 18
8:30 am to 5:05 pm
Harvard Business School
Cumnock Hall Room 102
33 Harvard Way
Boston, MA 02163

At the Zofnass Program at Harvard, ongoing research on "the Business Case for Planning Sustainable infrastructure" indicates that sustainability pays off. Sustainability contributes to savings and to avoiding costs and reducing the risks. The April 2019 Zofnass Workshop is dedicated to discussing insights through case studies, where sustainability is a central part of the project's strategy.

The April ZPH Workshop will serve as a platform to further understand trends, fundamental partnerships, innovative schemes, and the value that sustainable projects bring for people, profitability and the environment. Panelists and attendees will further explore how sustainable infrastructure contributes to the global Sustainable Development Goals (SDGs) of the Paris accord.

The panels are structured according to either (1) case studies, which we have already studied or (2) projects that have the potential to develop into case studies to fill gaps in our research spectrum. The panels focus on sustainable project portfolio management, sustainability-linked financing, sustainability in developing countries, zero emissions vehicles, autonomous vehicles improving efficiencies, solar hybrid microgrids in emergency power operations, natural capital approach to water infrastructure, digital models improving project delivery and asset performance, among others. The ZPH Sustainable Infrastructure Advisory Board members, key partners in case study development, will have an active role in the presentation and moderation of the panels.

ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

Agenda

WELCOME In Room 112 <12:00 pm>

Zofnass Program Workshop

Spiro Pollalis	Professor and Director of the Zofnass Program Harvard University
Paul Zofnass	President and Zofnass Program Initial Sponsor Environmental Financial Consulting Group
Anthony Kane	President and CEO Institute for Sustainable Infrastructure

PANEL 1 In Room 112 <12:40 pm>

Contributing towards a Global Sustainability Agenda. Integration towards the Sustainable Development Goals (SDGs): The UN Effort

Moderated by Spiro Pollalis, Zofnass Program
Harvard University

Rowan Palmer	Programme Specialist, Sustainable Infrastructure United Nations Environment
Graham Watkins	Principal Environmental Specialist Inter-American Development Bank
Matteo Tarantino	Research Associate University of Geneva
Spiro Pollalis	Professor and Director of the Zofnass Program Harvard University

<coffee break>

Day 1 at GSD

PANEL 2 In Room 112 <2:40 pm>

Valuing Sustainability in Infrastructure Investments: The WWF Report

Moderated by Spiro Pollalis, Zofnass Program
Harvard University

Kathryn Wright	Senior Associate Cadmus Group
Will Sloan	Analyst Cadmus Group
Kate Newman	VP Public Sector Initiatives, Forests World Wildlife Fund
Judith Rodríguez	Research Associate and Program Administrator Zofnass Program Harvard University

<short break, change to room 109>

PANEL 3 In Room 109 <4:20 pm>

Insights from Sustainable Energy Infrastructure

Moderated by Spiro Pollalis, Zofnass Program
Harvard University

Thomas Lewis	President Louis Berger / SIAB
Greg Bilson	CEO WestGen Power Solutions
Spiro Pollalis	Professor and Director of the Zofnass Program Harvard University
Jun Hashimoto	Senior Landscape Architect Shimizu Corporation

<end Day 1>

Energy Landscape Solid Waste Food Transportation Information Water

<6:00 pm Sustainable Infrastructure Advisory Board Dinner, by invitation only>

Agenda

WELCOME to Day 2 <8:30 am>

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

PANEL 4 <8:40 am>

Insights from Sustainable Projects in Developing Countries: Financing and Engineering

Moderated by Andreas Georgoulias, Director, Environmental Financial Consulting Group

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

Roberto Mezzalama — Global ESIA Network Leader, Golder Associates / SIAB

Philippe Neves — Senior Infrastructure Specialist, World Bank

Lori Kerr — Senior Infrastructure Finance Specialist at the Global Infrastructure Facility, World Bank

Cristina Contreras — Research Associate, Zofnass Program Harvard University

<coffee break>

HBS CASE STUDY SESSION <10:40 pm>

The Olmos Project: Value Creation and Value Capture

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

<Lunch break at 11:40 am>

PANEL 5 [TRANSPORTATION] <12:35 pm>

Day 2 at HBS

Ensuring Sustainability at the Concept Stage <12:35 pm>

Moderated by Spiro Pollalis, Zofnass Program Harvard

Denis Martynowych — Senior Sustainability Planner and Designer, Sound Transit

Joe Wingerter — Vice President, Kiewit Infrastructure Group / SIAB

Brawn Lausen — Project Manager, Kiewit Infrastructure Group

Insights on Autonomous Vehicles <1:35 pm>

Moderated by John Macomber, HBS, and James Grant, Associate VP, Sustainable Energy and Utilities Director, HNTB Corporation / SIAB

Matthew Chang — Program Administrator / Principal, Jacksonville Transit Authority / Chang Industrial, LLC

Gregory Krueger — Program Director, Emerging Technologies Program, HNTB

Leo Argiris — COO (Americas Division), Arup / SIAB

Insights from Mass Transit <2:35 pm>

Moderated by Spiro Pollalis, Zofnass Program Harvard

Chris Barron — Chief Communications Officer, Bentley Systems / SIAB

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

Margaret Cederoth — Sustainability Director, WSP

<coffee break>

PANEL 6 <3:50 pm>

Insights from Water Infrastructure

Moderated by Spiro Pollalis, Zofnass Program Harvard

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

Giovanni Cialdino — Associate, Wren House Infrastructure London

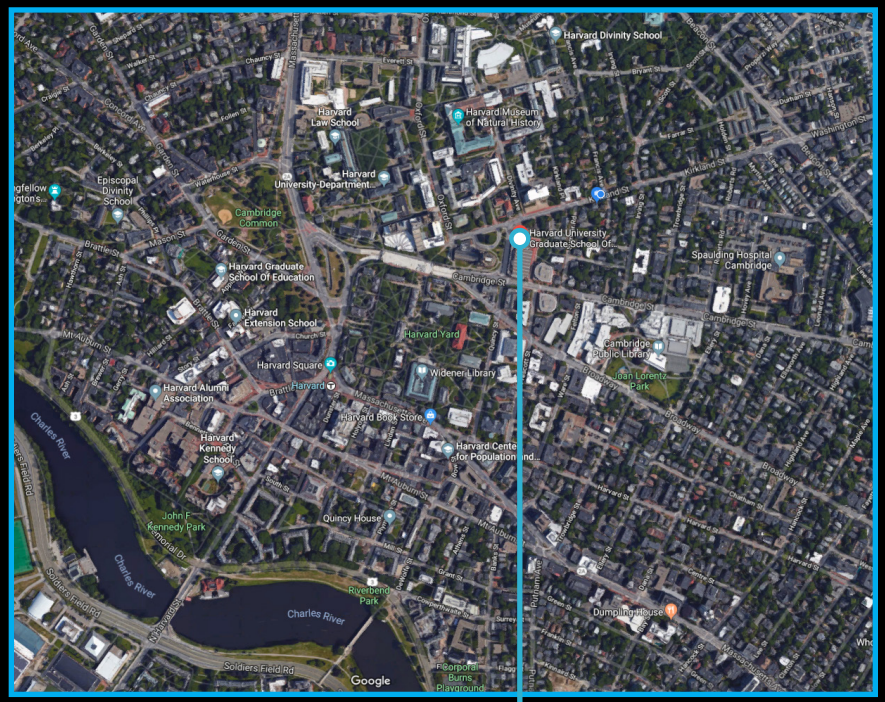
Tural Aliyev — Senior Ph.D. Researcher, University of Geneva

Alexandre B. Hedjazi — Director GEPP program / Senior Lecturer, University of Geneva

<end of Workshop>

Day 1 Location
Harvard Graduate School of Design

Gund Hall Room 112 (Stubbins) **and Room 109**



Gund Hall, GSD
Harvard GSD, Rooms 112 (Stubbins)
and Room 109
48 Quincy St
Cambridge, MA 02138

SIAB Dinner location
(April 17, by invitation only)
Henrietta's Table (Charles Hotel)
1 Bennett Street, Cambridge, MA
02138

Public transportation is recommended, as well as other mobility options such as taxi, Uber, or Lyft. Parking permit available for purchase.

Day 2 Location
Harvard Business School

Cumnock Hall Room 102 (downstairs)

Cumnock Hall, HBS
Room 102 (downstairs)
33 Harvard Way
Boston, MA 02163

<Lunch available for all attendees from 11:30 am>

<12:00 pm>

Welcome to the Zofnass Program Workshop

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

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

A message from ISI
Anthony Kane, President and CEO, Institute for Sustainable Infrastructure

On the collaboration of ISI and the ZPH
Paul Zofnass /Anthony Kane / Prof. Pollalis

ISI has a new Board and a new CEO: Anthony Kane, MDesS'09. ISI and the ZPH will address their cooperation in research and in promoting Envision.

<12:40 pm>

PANEL 1: Contributing towards a Global Sustainability Agenda. Integration towards the Sustainable Development Goals (SDGs): The UN Effort

The 17 SDGs have had a great impact in planning and design. The Zofnass Program, is taking an active lead in exploring how the SDGs impact the development of infrastructure, focusing on their active and effective implementation. The relation of Envision to SDGs is a topic of immediate interest.

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Integration in Sustainable Infrastructure
Rowan Palmer, Programme Specialist, Sustainable Infrastructure, United Nations Environment

Sustainable infrastructure is central to achieving the Sustainable Development Goals (SDGs). While sustainable infrastructure is included explicitly in SDG 9, it also underlies the other socio-economic SDGs; various estimates point to the need for trillions of dollars in investment in water and sanitation systems (SDG 6), energy infrastructure (SDG7), food systems (SDG2), transportation infrastructure to support trade and economic growth (SDG 8), among other types of infrastructure if we are to achieve the 2030 Agenda for Sustainable Development.

However, at the same time, the choices that we make about the types of infrastructure we build, where we build it, and how it is designed, constructed, and operated will have impacts on the climate (SDG 13) and terrestrial and marine ecosystems (SDGs 15 and 14, respectively).

For infrastructure to contribute to holistically to the SDGs, it is essential to adopt integrated approaches to its planning and implementation. Such approaches consider the interconnections between different infrastructure systems, sectors, levels of governance (local, regional, national), and elements of sustainability (environmental, social, and economic), and do so early enough in the decision-making process that alternatives are still economically and politically viable.

Despite the need for more integration, most countries tend to follow a siloed approach, addressing sustainability only at the project or sectoral level. In doing so they miss the opportunity to deliver on multiple SDGs by maximizing synergies and minimizing trade-offs among the economic, social and environmental aspects of sustainability.

UN Environment's Sustainable Infrastructure Partnership has been established to promote integrated systems-based approaches to sustainable infrastructure. UN Environment is working with a wide range of partners, including UNIDO, UNDP, World Bank, OECD, UNECE, UNOPS, IUCN, WWF, UNECE, and others, combine expertise into impactful programmes that promote sustainable infrastructure in support of the SDGs, both at the international and country levels.

IDB Approach to delivering Sustainable Infrastructure
Graham Watkins, Principal Environmental Specialist, Inter-American Development Bank

This presentation will focus on advances in the implementation of the IDB Group sustainable infrastructure framework. The presentation will begin with an overview of the framework and its links to existing approaches to delivering sustainable infrastructure including ENVISION. This will be followed by a discussion of advances in (1) analysis and advances with countries in the implementation of the framework; (2) analysis and advances in the implementation of the framework with bank operations; and (3) advances with establishing financing instruments aligned with the framework including the IDBG NDC Accelerator, IDBG UK Sustainable Infrastructure Program, and sovereign bonds. The presentation will also discuss the urgent need to align global processes clarifying the nature of and, approach to, delivering sustainable infrastructure within G20, OECD, UN, and the MDBs.

Transitioning cities, Transitioning data: Challenges in Localizing SDG indicators for Housing Infrastructures in Post-Soviet Republics
Matteo Tarantino, Research Associate, University of Geneva

This presentation discusses the early results of a project undergoing with UN-ECE to map and understand the challenges in data-driven urbanism in Albania, Ukraine, Georgia and Kirghizstan. Post-soviet countries represent a particularly interesting cases within the current scenario of housing infrastructure in Europe. This scenario appears currently characterized by aging infrastructure, reduction of public spending, and a general tension towards data-driven, evidence-based urbanism as a mediator between the two. Tension between these factors is further framed by the shared framework of SDG-11, its monitoring requirements and its connected indicators. In post-soviet republics, pursuit of SDG-11 is challenged by the combination of aging infrastructure inherited by the Soviet times, economic vulnerability, capacity and governance constraints, and a problematic data culture. Their transition towards evidence-based house infrastructuring requires therefore careful localization of indicators and practices, in order to avoid not only issues in the implementation of the transition itself, but also critical negative externalities entailed by the transition process itself.

Q & A
Led by Prof. Pollalis.

<2:20 pm > Coffee break.

<2:40 pm>

PANEL 2: Valuing Sustainability in Infrastructure Investments: The WWF Report

In a long and systematic study, WWF has addressed the value of investing in sustainable infrastructure. The ZPH participated in the report.

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Valuing Sustainability in Infrastructure Investments
Kathryn Wright, Senior Associate, Cadmus Group
Will Sloan, Analyst, Cadmus Group

As governments increasingly look to the private sector to help address infrastructure investment gaps, these investors face growing pressure from clients and regulators to understand how sustainability considerations impact the financial performance of infrastructure assets. Within this relatively new asset class, environmental, social, and governance (ESG) criteria have emerged through industry-recognized frameworks for assessing sustainability risks and benefits. Infrastructure investors often evaluate these ESG criteria during due diligence to satisfy internal sustainability policies or investment criteria. However, these ESG criteria are less frequently factored into financial analyses to determine the net present value or internal rate of return of infrastructure investments. Given the long-term investment horizons and illiquid nature of infrastructure assets, sustainability considerations can have material impacts on the asset's financial performance. As such, improved methodologies are needed to support investors in integrating ESG criteria into infrastructure valuation methodologies. These methodologies can not only improve the financial performance of infrastructure assets for investors but can also encourage investment in assets that lead to better social, environmental, and economic outcomes. In their recent report, Cadmus and WWF-Switzerland explored current practices for integrating ESG into infrastructure investment decisions and analysed the market for third-party tools that support investors in integrating ESG criteria into investment decisions. During this presentation, Cadmus will present the findings of their research and discuss the challenges and opportunities for growing the practice of integrating ESG into infrastructure investment decisions and valuations.

Integration for Optimal Investments
Kate Newman, VP Public Sector Initiatives, Forests, World Wildlife Fund

Investors are actively looking for long-term assets like infrastructure, yet as crucial as infrastructure is for development, the risk of significant unintended negative economic, environmental and social consequences can deter investment. Poorly planned infrastructure can have devastating social impacts if it results in inequitable access to expected benefits. Some projects generate significant greenhouse gas emissions over the lifespan of the asset. Others can lead to deforestation and land degradation and cause decline in biodiversity through habitat loss and fragmentation, interruption of wildlife migratory routes, and pollution.

One antidote to social and environmental risk is early and holistic integrated planning that anticipates impacts, promotes comprehensive risk management, supports informed decision-making, increases transparency and predictability, and improves net benefits. This presentation will describe WWF's experience in promoting sound investment in sustainable infrastructure by helping improve the enabling environment for good decision making. In countries such as Myanmar, Mozambique and Colombia, government and civil society are working to strengthen national and local capacity to develop strategic infrastructure plans that are not just lists of projects but offer a comprehensive vision for a sustainable future and a guide to investment and development. They are improving access to data, creating policies that promote good planning, considering natural as well as engineered solutions, and are beginning to bring environmental authorities to the same table as planners, financiers, investors and local communities to assess trade-offs and find options that deliver the greatest benefits for all as they develop the infrastructure of the future.

Peralta Wind Power Project (Palmatir) Envision assessment
Judith Rodríguez, Research Associate and Zofnass Program Administrator, Harvard University

The Peralta Wind Power Project is one of the largest wind farms in Uruguay with an installed capacity of 50 MW. The grid-connected project consists of 25 turbines of 2 MW, a transmission line of 34 km above ground, and 20 km below ground, a substation, and the construction and maintenance of 17 km of roads. It is a Clean Development Mechanism that generates 100,00 Certified Emissions Reductions (CERs) per year, which is equivalent to an annual reduction of 100,000 CO2 tons. The Peralta Wind Power Project is a privately funded project financed by the Inter-American Development Bank and the US Exim Bank. The presentation will highlight the strategy behind the project through the lens of its Envision sustainability evaluation.

Q & A
Led by Prof. Pollalis.

<4:10 pm > Short break, change to room 109 for Panel 3.

<4:20 pm>

PANEL 3: Insights from Sustainable Energy Infrastructure

Investing in Renewable Energy makes financial sense. This session will present two cases where thinking out of the box proves that "sustainability pays".

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Solar Hybrid Microgrids in Emergency Power Management
Thomas Lewis, President, Louis Berger US / SIAB Representative
Greg Bilson, CEO, WestGen Power Solutions
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

In September 2017, Puerto Rico was devastated by two hurricanes in a row, Irma and Maria, which destroyed the power grid of the island. Louis Berger was commissioned by the Federal Emergency Management Agency (FEMA) to install and maintain hundreds of fossil fuel generators in an attempt to restore power for critical facilities. During that mission Louis Berger sponsored a pro bono demonstration project to provide solar hybrid microgrid solutions under their social responsibility program "Give Back." In emergency response situations, the solar hybrid microgrids provide an environmentally friendly, reliable, and affordable alternative to fossil fuel generators. Apart from emergency response, solar hybrid microgrids can be used on a more permanent basis, especially in storm-prone areas, as an additional layer of resilience in the event of a future natural disaster. The first phase of Louis Berger's charitable program restored power for up to six months at a remote location in the mountains at the children's shelter Hogar Pequeño Joshua and at the adjacent Perla de Gran Precio Resident Treatment Center. Equally important to the environmental and social issues, the life cycle costing of solar hybrid microgrids can be as low as one-half of the life cycle cost of diesel generators, with operational costs being approximately a third that of diesel generators of the same uninterrupted power. Following the grid power restoration on the aforementioned facilities, the second phase of the program aimed at the long-term cost-effectiveness, flexibility, and resilience of the solar hybrid microgrids, whether they operate independently or connected to the power grid.

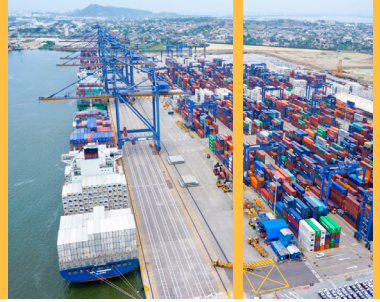
Okayama's Solar Power Plant with Ecological Landscape Design Method
Jun Hashimoto, Senior Landscape Architect, Design Department, Civil Engineering Division Shimizu Corporation

Ecological Landscape Design Method (ELDM) is a site-specific planning and design method. Setouchi Kirei Mega Solar Power Plant is 500ha development in Okayama which utilized previously used salt farm. Within the site, 16ha of Kinkai Habitat was designed to help create the base for the environment to thrive and to host endangered bird and other species.

Q & A
Led by Prof. Pollalis.

<5:05 pm > Wrap-up Day 1.

<6:00 pm > Zofnass Program SIAB Dinner at Henrietta's Table, Charles Hotel (by invitation only)



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

<8:30 am>

WELCOME Day 2

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

<8:40 am>

PANEL 3: Insights from Sustainable Projects in Developing Countries: Financing and Engineering

The multilateral banks and consultants promote sustainability in the developing world. This session will address the issues they face on the front lines.

Moderator

Andreas Georgoulias, Director, The Environmental Financial Consulting Group

Sustainability in the developing world: the DHA City Karachi

Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

In 2010, I was invited to plan the new city of DHA for 600,000 people, at a distance of 50 km away from Karachi, Pakistan. It was the time that we were developing the Envision® rating system for infrastructure projects at the Zofnass Program at Harvard. When I presented the concept of a sustainable city, both to our joint venture for planning as well as to the client (DHA), it was received very positively. Today, the city is under construction.

We followed a strategy of reverse engineering of Envision®, both at the infrastructure projects but also for the entire city (the system of systems), with the objective to get the most credits. We presented the client a business plan showing that a sustainable planning could maximize profits. On the cost side we proposed "sustainability within reason" to keep costs low, paying attention to the capabilities of the local market, the local climate and culture. On the revenues side, sustainability helped to sustain high prices on the land.

Much was possible within reason and with local means. The terrain was preserved with minimal earth works, keep seasonal water streams, study and protect the fauna and sauna, have at least 30% renewable energy sources, require photovoltaics on the buildings, provide mass transit and bicycle paths, reuse gray water, use storm water collection ponds and allowing infiltration; install conduits for a fiber network and provide land for farming. We also developed a detailed system for solid waste collection and reuse/recycle facilities. Furthermore, we kept all infrastructure within the development limits; with the exception of the watershed and the food supply.

In 2014, the project was submitted to ISI with a documentation of more than 1,000 pages and received an award of a "Certificate of Accomplishment", as the first sustainable planned green city of Pakistan.

Implementing sustainability frameworks in developing countries' infrastructures financing: case studies and lessons learnt

Roberto Mezzalama, Global ESIA Leader, Golder Associates / SIAB Representative

Infrastructures are one of the key elements that support economic and social development in all countries, and in the last decades we have seen an enormous amount of infrastructure projects being realized in developing countries in Asia, Africa and South America. Most countries in these regions have some form of environmental permitting for infrastructures, sometimes modeled on the legislation of former colonial powers. In many cases, however, host countries lack the capacity and the political will to really implement the legislation in a way that is capable to protect the natural environment and the local communities. Several sustainability frameworks have been developed by international financial institutions and export credit banks to ensure that the projects they finance in developing countries achieve a high level of protection for the natural environment and the local communities. This corpus of sustainability standards, adopted also by the majority of large commercial banks as part of the Equator Principle, is generally modeled around the safeguard policies of the World Bank and the Performance Standards of the International Finance Corporation. The standards, although generally more stringent than the local legislation of the host countries, are mainly designed to prevent, mitigate and compensate for negative impacts potentially linked to the infrastructure under development, rather than to achieve specific sustainability goals. Their practical implementation is also impacted by the lack of local capacity and by discrepancies with the local legislation. To complicate the situation, the current market is a "developer market" and there is competition for projects among banks and financial institutions, as well as among donor countries for access to viable projects.

Encouraging private sector investment in sustainable infrastructure in emerging markets

Philippe Neves, Senior Infrastructure Specialist, World Bank
Lori Kerr, Senior Infrastructure Finance Specialist at the Global Infrastructure Facility, World Bank

Multilateral development banks have long integrated environmental and social (E&S) guidelines as a necessary component of investment project financing. Within the World Bank Group, this is known as Environmental and Social Performance Standards (for IFC, the International Finance Corporation) and Environmental and Social Framework (ESF, for the World Bank). IFC's Performance Standards served as a foundation for the establishment of the Equator Principles, an E&S risk management framework adopted

PANEL 4

HBS CASE STUDY SESSION

by financial institutions as a minimum standard for project financing. Complementing MDBs' E&S frameworks and traditional credit guidelines, are development impact frameworks that provide an integrated estimate of financial sustainability and development benefits of investment projects, as well as public disclosure policies that enhance transparency of projects being financed. This is the business environment in which MDBs have been evolving for some decades now.

In today's context, where the mobilization of private capital is critical to help address the enormous infrastructure investment gap especially in emerging markets and developing economies (EMDEs), there is a need to scale up sustainable infrastructure both in quantity and quality. Since momentum among private investors and financiers is gathering towards alignment with the Sustainable Development Goals, ensuring that investment opportunities that are brought to market by EMDE governments are prepared in a sustainable way is becoming ever more important. Heretofore, few infrastructure projects arrive to market in a way that investors can identify as "sustainable".

The Aligned set of Indicators (ASI) initiative supported by PPIAF and GIF aims to be one solution to address this issue.

Insights from the ZPH-IDB Infrastructure 360 Project

Cristina Contreras, Research Associate, Zofnass Program Harvard University

Infrastructure is considered as the backbone of growth and development especially in Low-Income Developed Countries (LIDCs) and Emerging Markets. However sustainability most often than not is not a priority, and the information required to identify the sustainability performance of the project is limited. This presentation will focus on sharing the lessons learned of the Infrastructure 360 Awards, a three years research project conducted by the Zofnass Program for Sustainable Infrastructures in collaboration with the Inter-American Development Bank. This initiative aimed to identify and rewards good sustainability practices in Latin America and the Caribbean incentivizing developers and project teams to integrate sustainability within their projects. The analysis conducted includes 38 infrastructure projects in 12 countries in the region. This is the larger body of knowledge that still exists on the application of the Envision Rating System outside the US and Canada borders. The projects analyzed include hydropower, wind farm, solar plants, biogas, airports, ports, roads, mass transit, water treatments, and waste-to-energy facilities among others.

Q & A

Led by Andreas Georgoulias.

<10:20 pm > Coffee break.

<10:40 pm>

HBS Case Study on Sustainability

The Olmos Project: Value Creation and Value Capture – Harvard Business School Discussion

Moderator

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

As society grapples with finding ways to pay for sustainable infrastructure, the concept of "value capture" is frequently raised. This is particularly vivid when the investment side of an infrastructure project is easy to identify – largely specific spending on concrete and steel - but the return on investment is hard to identify since the benefits are diffused among all of the population. Value creation, value capture, and value realization is one technique to draw in more of the value created in order to deploy it into the capital cost of a project.

Investing in irrigation infrastructure is a way to create jobs and businesses and economic activity in a region. Can the land value created by the fact of an infrastructure investment be partially captured by the government and turned back into financing that infrastructure? The Olmos project is an ambitious attempt to irrigate 43,000 hectares (more than 160 square miles) on the arid Pacific coast of Peru. The potential infrastructure developer is proposed to be compensated largely by the increase in land values post irrigation. The federal and local governments don't want to invest at all, but they do want their citizens to realize the benefits.

We will discuss this situation in an interactive participant-centered Harvard Business School format. When can this method work and when will it not? Have ZPH attendees seen this technique in any other settings? How might one translate from a single use case, two-dimensional setting (irrigation for farming) to a multiple uses, three-dimensional setting (for example mid-rise real estate development to fund transit or utility infrastructure)? Is there a business case for land value capture in planning and paying for sustainable infrastructure?

Q & A

Led by John Macomber.

<11:40 am > Lunch Break, food available for all attendees. (55 minutes)

PANEL 5

Abstracts

<12:35 pm>

PANEL5: Transportation Infrastructure Ensuring Sustainability at the Concept Stage

How sustainability defined at the concept stage is effectively implemented in a design-build scheme? Is there a parallel with the financing of projects by multilateral banks?

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Using Envision to build a Culture of Sustainability, Innovation, and Efficiency at Sound Transit

Denis Martynowych, Senior Sustainability Planner and Designer, Sound Transit

Sound Transit (ST) will spend more than $50B over the next 20 years to expand the transit system in the Puget Sound Region. The agency has committed to getting all of its light rail expansion projects Envision certified.

This presentation will offer real life examples of how the ST's Sustainability Team is developing an integrated plan that uses Envision to drive collaboration and innovation between agency staff, consultants, and design/build contractors to achieve higher levels of sustainability than would otherwise be possible.

In our business case we argued that Envision will drive the kind of collaboration that will benefit all of the project's goals in addition to sustainability.

Key elements of the plan include

- *Envision Education*– Broader understanding is the foundation of broader engagement. The program that provides an overall understanding of Envision to all staff involved on light rail expansion teams. It will support anyone who wants to become an ENV SP.
- *Clarifying Roles and Responsibilities*– For collaboration to generate cost-effective results everyone needs to know what is expected of them. ST's Sustainability team is building an Envision Guidance Manual that is continually updated to clarify roles and responsibilities. This effort is especially important in Design-Build (DB) projects. The presentation will include examples of which Envision credits and accompanying submittal documents the agency will provide to DB teams. It will show which credits the DB team is required to pursue and which are optional.
- *Incentivizing Innovation* – Because the agency is expecting Envision certification on multiple projects over time, the opportunity to identify and achieve stretch goals will grow from project to project. Additionally, performance oriented language will be included in DB contracts to incentivize and reward innovation.

Sustainable and Successful – Infrastructure Project Level Practices that Pay Off

Joe Wingerter, Vice President, Kiewit Infrastructure Group / SIAB Representative
Brawn Lausen, Project Manager, Kiewit Infrastructure Group

Project level sustainability practices yield significant economic and environmental benefit. This is best realized by broadening the scope of sustainability beyond design and Operation & Maintenance, and implementing sustainable practices at the project level during planning, procurement, and construction. This presentation provides an overview of Kiewit's commitment to this idea by highlighting Kiewit's company culture and sustainability approach, as well as practices from a number of our infrastructure projects.

Kiewit is committed to Sustainability as we believe it strengthens our competitive advantage, drives down costs, and reduces our impact on the natural environment. This commitment to sustainability is highlighted through a number of programmatic elements, including aggressive equipment idling and fleet optimization policies. Additionally, Kiewit takes a holistic approach to sustainability with a core value commitment to a robust Quality Management System (QMS) and an active engagement in the design process that typically results in better constructability and a more sustainable ultimate asset. Kiewit also prides itself on the successful implementation of innovation, both in the projects we build, and the techniques and technology we use to do it. These sustainability tenets further drive our project level practices, including preconstruction planning, recycling, and beneficial re-use. For this presentation, these practices were analyzed to determine the associated environmental benefit and financial benefits. Examples were drawn from a range of Kiewit infrastructure projects including pontoon (floating) bridges, light-rail projects, highway construction, and demolition. Sustainable practices considered include:

- Recycling and diverting over 60,000 tons of construction waste between projects
- Planning for fixed operation facilities to reduce operational costs and resources
- Beneficial material reuse resulting in reduced Greenhouse Gas emissions of more than 300 metric tons CO2e
- Proactive phasing to minimize impact to the natural environment.

The financial benefits associated with these practices are significant; in quantum and with respect to a growing cultural awareness. Estimates of beneficial reuse practices on one project yielded a cost reduction of nearly $1M. The success of these project level practices as well as our company wide efforts further reinforce the idea that sustainability should be approached through a comprehensive lens which considers all aspects of project development, design and construction.

PANEL 5

Abstracts

<1:35 pm>

Insights on Autonomous Vehicles

There is much hype but also reality about Autonomous Vehicles. This session presents a case study and engineering experts.

Moderators
John Macomber, Senior Lecturer, Zofnass Program Advisor, Faculty Chair of the HBS Africa Research Office, Harvard Business School
Jim Grant, Associate Vice President, Sustainable Energy and Utilities Director, HNTB Corporation / SIAB Representative

Jacksonville Transit Authority Project: the agency's and the consultant's perspectives.

Matthew Chang, Program Administrator, Jacksonville Transit Authority / Principal, Chang Industrial, LLC
Gregory Krueger, Program Director, Emerging Technologies Program Manager, HNTB Corporation

Jacksonville Florida is an emerging smart city and has been selected as a finalist by the National Smart Cities Council for 2019. Smart Cities projects lie at the confluence of public sector investment and private sector innovation. Join Matthew Chang and Gregory Krueger as they explain the deployment of Internet of Things, Data Exchanges, and Smart Infrastructure throughout the city and the region. A deep dive case study will be offered into Jacksonville's signature smart project, the award-winning Ultimate Urban Circulator, known as U2C. This project is the nations first "at-scale" autonomous vehicle mass transit system. Matthew and Gregory will take questions on the new paradigms of mobility, innovative public private partnerships, and communications infrastructure.

Autonomous Vehicles and The Future of Cities

Leo Argiris, COO (Americas Division), Arup / SIAB Representative

Rapidly emerging mobility innovations are transforming transportation and the built environment. Ubiquitous shared autonomous vehicles and rapid advances in the technology of transport could radically change how we travel and by extension how we plan, design and regulate development projects. This talk will look at the changing landscape of autonomous vehicles and other technology advances to describe the ways that the planning and design of cities is being impacted today and changes we can anticipate in the near-term future. Topics considered will be the impact on road capacity, safety, the impact of electrification, roadway accoutrement, digital implementations and the possibility of further sprawl. Case studies will be used to demonstrate how these future trends are impacting our projects today.

Q & A
Led by John Macomber and Jim Grant.

<2:35 pm>

Insights from Mass Transit

Large mass transit projects are by definition sustainable. What else makes them sustainable? Insights from the $20billion UK Crossrail and the CA high-speed rail projects.

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Use of the twin digital in the Crossrail case study (London)

Chris Barron, Chief Communications Officer, Bentley Systems / SIAB Representative

Lessons learnt from Crossrail

Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Crossrail, the new Elizabeth Line railway project, is currently the largest infrastructure project under construction in Europe. Due it its size, cost, and complexity it can be categorized as a megaproject. The £16 billion ($21 billion) new railway line will increase the rail capacity of London by 10%, significantly improving the environmental performance of the whole city. Regarding sustainability, this is the "right project." Nevertheless, in terms of sustainability in a megaproject it is also challenging to "do the project right," since managers and stakeholders of megaprojects are traditionally reluctant to adopt new approaches. They prefer tried and tested methods in order to avoid risk. Contrary to that perspective, the Crossrail management team pursued innovation and set a precedent in sustainability for a project of this size. Although the project currently (December 2018) faces delays due to the integration of rail signaling systems, Crossrail's construction process and its innovation and sustainability strategy have established a legacy of good practices and lessons learnt.

Building Social Equity and Investor Interest through Sustainability: California High-Speed Rail Program

Margaret Cederoth, Sustainability Director, WSP

The California High-Speed Rail program has integrated sustainability into its approach to delivering the first high-speed rail system in the US through a comprehensive sustainability policy. Sustainability has been implemented throughout the delivery of the program. The HSR sustainability program has built a complete and consistent set of environmental, social and governance indicators reported out annually through a GRI report, as well as to the GRESB infrastructure benchmark.

Funding for the HSR program comes in part from proceeds from California's Cap-and-Trade program, which places significance on climate investments that positively affect social equity issues while reducing greenhouse gas emissions.

The presentation will be an overview of the HSR program and provide detail on results and success in construction requirements, social and economic development results, the ways that external benchmarks serve as management tools, and outline approaches for reducing carbon through contractor innovation. The presentation will also detail insights from the Authority's recently repeated materiality assessment and findings on the relationship with UN SDGs.

Q & A
Led by Prof. Pollalis.

<3:30 pm > Coffee break.

<3:50 pm>

PANEL5: Insights from Water Infrastructure

A private public utility that serves metropolitan London, and urban planning issues in Switzerland and Azerbaijan, give a wide spectrum of challenges of water as infrastructure.

Moderator
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

An Introduction to Thames Water

Giovanni Cialdino, Associate, Wren House Infrastructure Management
Prof. Pollalis, Zofnass Program for Sustainable Infrastructure, Harvard University

Thames Water is a privately held utility serving a large part of the greater London, UK. It is subject to financial and environmental regulation, based on 5-year plans. Sustainability and resilience are parts of the utility's strategy, partly on its own initiative, partly responding to the regulators. However, while sustainability pays in the long term, resilience is like a (costly) insurance policy that may never be needed. Both require upfront investments that need to be funded, with impact on the customer water bills. This session will present the operating regulated framework of the privately held utility, to set the stage for a discussion in the next Zofnass workshop on how to plan and finance for both sustainability and resilience. This case study provides an ideal vehicle to examine the finances of sustainability and resilience.

Waterfront Urban Areas as an Urban Infrastructure: Challenges, Retrofitting and its Methods. The case of Baku, Azerbaijan

Tural Aliyev, Senior Ph.D. Researcher, University of Geneva
Alexandre B. Hedjazi, Director GEPP program / Senior Lecturer, University of Geneva

The effects of climate change are impacting the cities and their infrastructure. The concerns about the cities infrastructure in terms of resilience are increasing. The

increasing complexity of disasters also impacts the urban infrastructure of the coastal zones, which are predominantly characterized by high density of land use and population. In addition to the risks associated to coastal cities (irregularities of precipitation, cyclic changing of water level, etc.), the Baku's coastal zone urban infrastructure is also dealing with the particular risks related to the patterns of urban and industrial development on the Caspian Sea.

In the present context of challenges, the different methods of urban retrofitting have their role to play in reducing and managing the range of hazards and uncertainties by using the Natural Capital Approach. The inquiries highlight the importance of natural and physical protective interventions which should be integrated into the built environment.

Based on Disaster Risk Reduction and Adaptation models such as Nature-based and Engineering-based solutions, the aim of the presentation is to expose the different methods of intervention as a sustainable solution for the possible vulnerabilities scenarios for waterfront urban infrastructure of the city of Baku. Throughout the presentation, the objective is also to highlight the importance of the continuous process of resilience in a city, which should methodically integrate into the design, construction and operation processes.

Water infrastructures retrofitting in Geneva

Alexandre B. Hedjazi, Director GEPP program / Senior Lecturer, University of Geneva

Cities are increasing confronted to the complexity and unpredictability of Environmental Change dynamics added to the needs of their population in terms of delivery of services and their wellbeing.

Through the living Lab concept the study draws from the experience of Switzerland and Geneva in retrofitting and greening watersheds to scale-up and enhance sustainability agendas of Cities while ensuring the secure delivery of public services. The Green infrastructure concept and Nature Based Solutions inform us on the importance of Natural Capital towards greater sustainability of Water infrastructure while mitigating risks associate to Climate Change in urban areas.

Q & A
Led by Prof. Pollalis.

<4:45 pm > **Closing remarks by Prof. Pollalis.**

<4:55 pm > End of Workshop

SPEAKERS BIOS

Bios (in speaking order)

Welcome

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

Prof. Spiro Pollalis is Professor of Design, Technology and Management at the Harvard Design School. Prof. Pollalis is an expert in sustainability and in planning large sustainable projects. At Harvard University, he is the Director of the "Zofnass Program for the Sustainability of Infrastructure" and the Principal Investigator of the project "Sustainable Urbanism on the Arab Gulf." He is also the co-chair of the Scientific Advisory Committee of the Singapore-ETH Switzerland Centre for Global Environmental Sustainability. He has taught as a visiting professor at the ETH-Zurich, TU-Delft and the University of Stuttgart.

The Zofnass Program at Harvard, under the direction of Prof. Pollalis has created the Envision® sustainability rating system for infrastructure, now administered by the Institute for Sustainable Infrastructure, in Washington DC.

In his private practice, Prof. Pollalis has been the chief planner of the new DHA City Karachi for 600,000 people, which is under construction, the LDA City in Lahore and the redevelopment of the former Athens airport.

Prof. Pollalis received his Master's and PhD from MIT (1979, 1982) and his MBA in high technology from Northeastern University (1985). He has an honorary Master's degree in Architecture from Harvard (1994).

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.

Anthony Kane
Acting President and CEO, Institute for Sustainable Infrastructure

Anthony Kane is Acting President & CEO of the Institute for Sustainable Infrastructure in Washington, DC where he oversees the organization's overall operations and leads the development of the Envision framework for sustainable infrastructure. He is also a commissioner on the Washington DC Commission on Climate Change and Resiliency. Anthony was formerly a research director at the Zofnass Program for Sustainable Infrastructure at Harvard University's Graduate School of Design, a research associate with the Materials, Processes, and Systems Group at Harvard University, and an instructor at the Boston Architectural College. He holds a Bachelor of Architecture summa cum laude from Virginia Tech and a Master in Design Studies from Harvard University. Anthony is a co-author of Ceramic Material Systems in Architecture and Interior Design and a contributing author of Infrastructure Sustainability and Design.

PANEL 1

Rowan Palmer
Programme Specialist, Sustainable Infrastructure
United Nations Environment

Rowan Palmer is a Programme Specialist at UN Environment's Resources and Markets Branch in Geneva. He works primarily on sustainable infrastructure in the context of inclusive green economy transitions and the 2030 Agenda for Sustainable Development, innovation for the environment, and South-South cooperation. Prior to joining UN Environment in 2014, Rowan was an environmental manager for large-scale transportation infrastructure projects in his home province of British Columbia, Canada. Rowan holds a Bachelor's degree in International Development and Environment Studies from McGill University in Montreal and a Master's degree in International Relations from Instituto de Empresa in Madrid.

Graham Watkins
Principal Environmental Specialist, Inter-American Development Bank

Graham Watkins is Principal Environmental Specialist leading the knowledge and strategy agenda for the Climate Change Division of the Inter-American Development Bank and co-leads the Sustainable Infrastructure initiative within the IDBG. Graham previously worked in the safeguards unit of the Bank specializing in sustainable infrastructure and improving the management of biodiversity and natural resources in Bank operations. He was the Executive Director of the Charles Darwin Foundation in Galapagos from 2005 to 2009 and prior to this he was the Director General of the Iwokrama International Centre for Rain Forest Conservation and Development in Guyana. Graham's professional life includes more than 30 years of experience in sustainable infrastructure, biodiversity, collaborative wildlife and fisheries management, and working with indigenous peoples. Graham has a PhD from the University of Pennsylvania and a Masters from the University of Oxford.

Matteo Tarantino
Research Associate, University of Geneva

Matteo Tarantino, Ph.D. is Assistant professor at the Catholic University of Milan, Italy and a Research Associate at the University of Geneva, Switzerland, where is the co-director of the Global Environmental Policy Program. His research focuses on the technology/governance nexus from the sociological point of view, with foci on environmental data, urban conflict, and data-driven social processes. Among his latest publications, "Database Green: Software, Environmentalism and Data Flows in China", "Navigating the Green Datascape: Some Challenges In Automating Environmental Data Procurement for Disclosure Efforts in China" (2019, forthcoming), "The Multiple Airs: Pollution, Competing Digital Information Flows and Mobile App Design in China" (2019, forthcoming)

PANEL 2

Kathryn Wright
Senior Associate, Cadmus Group

Kathryn Wright is a Senior Associate at Cadmus, where she works with clients on climate and energy projects across North America and internationally. She is currently the Project Manager for a 5-year engagement with Washington D.C. focused on supporting implementation planning and financing strategies for resilience as part of the Climate Ready D.C. initiative. Nationally, Ms. Wright has worked closely with the Environmental Defense Fund and the Union of Concerned analysis on analyzing pathways to support clean energy and infrastructure finance. She recently concluded a project with World Wildlife Fund-Switzerland examining pathways to integrate environmental, social and governance criteria into the valuation of sustainable infrastructure projects.

Will Sloan
Analyst, Cadmus Group

Will Sloan is an Analyst at Cadmus, where he supports clients in analyzing barriers and opportunities in renewable energy and infrastructure finance in the United States and internationally. Mr. Sloan has supported the Environmental Defense Fund in assessing pathways to drive private investment in sustainable infrastructure and led a gap analysis on sustainable energy financing in the Caribbean Community (CARICOM) on behalf of the World Bank and Caribbean Development Bank (CDB). He recently co-authored a World Wildlife Fund-Switzerland report examining pathways to integrate environmental, social and governance criteria into the valuation of sustainable infrastructure projects.

Kate Newman
VP Public Sector Initiatives, Forests, World Wildlife Fund

Kate Newman WWF Vice President for Forest Public Sector Initiatives and specializes in large-scale conservation planning and policy support with a current focus on sustainable infrastructure in Asia, Africa and Latin America. In her 28 years with WWF, she has worked with WWF country teams and their partners to create a more harmonious balance between conservation and economic development and enhance government and civil society collaboration. Prior to WWF, Ms. Newman worked for the United States Agency for International Development and the Peace Corps in the Democratic Republic of the

Congo. She received a BA in Anthropology from the University of Virginia and an MSc in Environmental Management from the University of London.

Judith Rodríguez

Research Associate and Zofnass Program Administrator, Harvard University

Judith Rodríguez is a Research Associate and Program Administrator at Harvard University Zofnass Program for Sustainable Infrastructure. She focuses on key questions surrounding the sustainability and resilience of infrastructure, landscape, and cities. Her experience in sustainability and resilience includes assessments of large-scale infrastructure, of flood resilience best practices for cities, and mapping vulnerabilities to climate change.

Judith holds dual Master's degrees in Landscape Architecture and Urban Design from Harvard University GSD, and a Master in Architecture from the Illinois Institute of Technology. She is an Envision Sustainability Professional, a LEED Accredited Professional, and a Municipal Vulnerability Preparedness provider certified by the MA Executive Office of Energy and Environmental Affairs.

PANEL 3

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.

Greg Bilson

CEO, WestGen Power Solutions

Gregory Bilson is an entrepreneur and executive manager with over a decade of experience in the renewable energy field, and has extensive experience in renewable energy strategy and project development. Greg is a cofounder of Western Energy Solutions, a renewable energy project development company. He held the positions of Chief Development Officer and subsequently Chief Operating Officer of Concord Blue Energy, an advanced waste conversion company, where he led business and project development, contracting, and corporate partnership efforts. He also served on its board of directors. Subsequently, Greg founded WestGen Power Solutions, a company focused on the design, manufacture, and delivery of mobile and stationary solar and hybrid microgrid systems. The company has successfully acquired exclusive rights to a mobile solar generator technology, in addition to creating original designs and configurations for a variety of microgrid platforms. WestGen successfully deployed solar generators and light towers to Puerto Rico after hurricane Maria.

Jun Hashimoto

Jun Hashimoto, Senior Landscape Architect, Design Department, Civil Engineering Division Shimizu Corporation

Jun Hashimoto is originally from Miyazaki and joined Shimizu Corporation in 2016. She works in Civil Engineering Technology Division as the only one landscape architect.

PANEL 4

Roberto Mezzalama

Global ESIA Network Leader, Golder Associates / SIAB

Roberto Mezzalama has a bachelor's degree in Natural Sciences cum laude from the University of Pavia and a M.Sc. in Environmental Engineering from the COREP Polytechnic University of Torino. In the first part of his career, Roberto has held several positions as environmental manager in local public authorities in Italy for about ten years. Roberto has joined Golder in 1999 as a specialist in Environmental and Social Impact Assessment. In 2004 and 2005 he has been the manager of the Environmental and Social Impact Assessment Division of Golder Calgary office, supervising a group of about 100 specialists in various disciplines. From 2007 to 2011 he has been the Managing Director of Golder Europe, supervising the offices of Golder in 13 countries and with over 800 employees. From 2011 to 2014 he has been Golder's Global Sustainability Advisor and has developed the policies, training and reporting on sustainable development for the global group of companies. Since 2014 he is the global leader of Golder's Environmental and Social Impact Assessment Technical Community and he is Project Director of ESIA studies for projects including oil fields, gas pipelines, petrochemical plants, railways, renewable energy plants, mines and ports. Roberto is Envision SP and has helped clients implement sustainability practices in sectors ranging from banking, construction, renewable energy and oil&gas. Roberto has conducted projects in over 15 countries in North America, Europe, Africa and Central Asia.

Philippe Neves

Senior Infrastructure Specialist, World Bank

Senior Infrastructure Specialist in the Public – Private Infrastructure Advisory Facility (PPIAF) of the World Bank Group. Philippe has more than 14 years of work experience with private sector investors and concessionaires as well as with governments, in financing and advising infrastructure and PPPs. Within PPIAF, he oversees the transport sector activities, and has led or participated in the production of knowledge products such as Policy Guidelines for Managing Unsolicited Proposals in Infrastructure Projects; or Resilient Infrastructure PPPs: Contracts and Procurement. He is currently developing an aligned Set of Indicators for Sustainable Infrastructure. He previously led the IFC transaction advisory mandate to the Government of Colombia for the Fourth Generation of Road Concessions; and advised the Government of Haiti for PPPs at both institutional and transactional levels. Philippe holds a Master of International Relations from Pantheon-Sorbonne and a Master of Science in Management from HEC, Paris.

Lori Kerr

Senior Infrastructure Finance Specialist at the Global Infrastructure Facility, World Bank

Senior Infrastructure Finance Specialist at the Global Infrastructure Facility of the World Bank Group, with more than twenty years of experience in international development and sustainable infrastructure investment in emerging markets. Prior to joining the GIF, Lori was a Senior Director at Climate Finance Advisors, BLLC where she worked with private developers, investors and financiers, as well as governments and Development Finance Institutions on low-carbon, climate-resilient investment strategies and blended finance solutions. Previously, Lori held a variety of senior positions at the IDB Group. She was private sector focal point for the Climate Investment Funds and the Global Environment Facility and served as investment committee chair of Canada's US$250 million "Canadian Climate Fund for Private Sector in the Americas". Previously, Lori was a senior investment officer focusing on infrastructure and renewables.

Lori holds an International MBA in Finance and Economics from the Schulich School of Business in Canada and a Graduate Diploma in Latin American and Caribbean Studies, both from York University.

Cristina Contreras

Research Associate, Zofnass Program for Sustainable Infrastructure, Harvard University

Cristina Contreras is currently a Research Associate at the Zofnass Program for Sustainable Infrastructure at Harvard University. Her research 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. During the last six years at Harvard, she has worked in several research projects ranging from the coordination and supervision of the Infrastructure 360º Awards to identification of the economic implications of sustainability practice in infrastructure projects. As part of the Infrastructure 360 awards team, an initiative sponsored by the Inter-American Development Bank, Cristina has worked in quantifying infrastructure sustainability in more than 40 projects (water and sanitation, transportation and energy) in 12 countries. She also works as an independent consultant for International Financial Institutions to help define a common framework for sustainable infrastructures.

Ms. Contreras' work has been presented in numerous national and international conferences and she has contributed to several published books. Ms. Contreras received her Bachelor's degree in Technical Architecture from Universidad Politecnica de Madrid and a Master's degree in Sustainability and Environmental Management from Harvard University.

Andreas Georgoulias

Director, The Environmental Financial Consulting Group

Andreas is a Director at the Environmental Financial Consulting Group, a financial advisory firm based in New York. Prior to joining EFCG he was a director at the Zofnass Program for Sustainable Infrastructure

and at the faculty of Harvard Graduate School of Design, where he still collaborates with and teaches at the executive education level. He has advised AEC firms and international finance institutions around the world, was on the project finance unit of Unicredit Markets and Investment Banking, and worked on airport construction with Hochtief AG. Andreas studied risk management processes of AE firms for his PhD at Harvard, and holds a professional diploma in Architecture Engineering from the Technical University of Athens.

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 5

Denis Martynowych

Senior Sustainability Planner and Designer
Sound Transit

Denis Martynowych is an architect and planner with over twenty-five years of experience in sustainable planning, design, and project management on large building and infrastructure projects in the Pacific Northwest. He is certified as a LEED BD+C and Envision Sustainability Professional. Recently he completed the Envision Trainer and Verifier workshops. He currently serves as Sound Transit's Senior Sustainability Planner and Designer and is a member of the agency's Equity Oversight Committee. Denis is directly involved with advancing sustainability goals on all of ST's multi-billion dollar transit expansion projects.

Joe Wingerter

Vice President, Kiewit Infrastructure Group / SIAB

Joe Wingerter is a Vice President for Kiewit Infrastructure Group focused on 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 considerations, 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.

Brawn Lausen

Senior Project Manager, Kiewit Infrastructure Group

Brawn Lausen is a Senior Project Manager for Kiewit Infrastructure West Co. currently working on the E130 Sound Transit project in Bellevue, WA. Brawn has more than 20 years of construction industry experience with Kiewit which has seen him excel and progress in a number of roles including engineer, superintendent, and project manager. In his current role, Brawn is managing Sound Transit's $665 million I-90 Lake Washington Crossing where he is working closely with Sound Transit and critical third parties such as WSDOT and SDOT to deliver a successful project. This project is crucial to implementing Sound Transit's proposed $3.7 billion East Link corridor from Bellevue to Overlake. Brawn has worked on a number of other alternative delivery transportation infrastructure and technical bridge projects including the $583 million Farrington Guideway light-rail project in Honolulu, and the $629 million Tacoma Narrows Way Bridge.

Matthew Chang

Program Administrator / Principal
Jacksonville Transit Authority / Chang Industrial, LLC

Matthew delivers transformative innovation in the context of achievable engineering and business strategy - recently serving the City of Jacksonville Florida as Program Lead for autonomous vehicle initiatives for the Jacksonville Transportation Authority (JTA).

Matthew is a professional engineer with over 15+ years of experience and currently serves as Principal of Chang Industrial. He has worked to develop multiple types of expertise by working within multiple worldviews with developing a commitment to continuing education, diversity, generosity, service, research, and mentorship. Matthew has successfully led new business start-ups for engineer-procure-construct (EPC) factory construction and for integrated material handling systems. During his leadership these start-ups have delivered technology and engineering projects for major national retailers and manufacturers, such as Costco, PepsiCo, Constellation Brands, and Keurig Dr Pepper.

As a thought-leader and automation expert, Matt has organized and spoken at national industry forums on innovation, sustainability, Industry 4.0, Industrial IoT, e-commerce proliferation, and future trends.

Gregory Krueger

Program Director, Emerging Technologies Program Manager, HNTB Corporation

Greg Krueger serves as program director for emerging technologies in transportation at HNTB. He is vice president, with deep expertise on automated and connected vehicles. He is working with both private and public-sector clients to facilitate the deployment of connected and automated vehicles on the nation's roadways.

Krueger serves as chairman of the Committee on Intelligent Transportation Systems of the Transportation Research Board. Krueger was manager of the U.S. Department of Transportation Southeast Michigan Connected Vehicle Test Bed. Krueger also served as Michigan Department of Transportation's program manager for its statewide Intelligent Transportation Systems program, overseeing all development of ITS throughout the state of Michigan.

His views and expertise are regularly requested by media outlets nationwide.

Leo E. Argiris

COO (Americas Division), Arup / SIAB

A senior member of Arup's management team, Leo Argiris has over three decades of experience as a structural engineer. Leo is currently serving as the Chief Operating Officer for the Americas Region of Arup.

Since joining Arup in 1995, Leo has led multidisciplinary teams on projects including major new arts centers, mixed-use high-rise towers, transportation projects, and public art projects. Projects include the Lester B. Pearson Int'l Terminal in Mississauga, Ontario; the United States Air Force Memorial in Arlington, VA; the Halsey Street Teachers Village in Newark, NJ; and the NJ 9/11 Memorial in Jersey City, NJ.

A graduate of Cooper Union's Albert Nerken School of Engineering, he also holds an MBA from Baruch College.

Leo lectures frequently and is an Adjunct Professor at the New Jersey Institute of Technology and Columbia Graduate School of Architecture.

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.

James Grant

Associate Vice President, Sustainable Energy and Utilities Director, HNTB Corporation / SIAB

Mr. Grant has over 39 years' experience and currently serves as Director for the Energy & Utilities 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 utilities master plans at SEA and 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 has served as a Sustainable Infrastructure Advisory Board (SIAB) member on the Zofnass Program for Sustainable Infrastructure at Harvard since 2010.

Bios

Margaret Cederoth
Sustainability Director, WSP

Margaret Cederoth, AICP LEED AP ENV SP, is the Sustainability Director for WSP USA and a practice leader in sustainable infrastructure. She has 20 years of experience in the areas of transportation and sustainability. Ms Cederoth has developed sustainability strategies and managed the implementation process for major infrastructure projects in the US and Middle East. She led sustainability efforts for the Masdar Institute project in Abu Dhabi from 2007 to 2009. She has also worked on complex carbon neutral projects and high-performance facilities in the U.S. . She currently directs the sustainability program for the California High-Speed Rail Authority.

PANEL 6

Giovanni Cialdino
Associate, Wren House Infrastructure London

Giovanni is an Associate at Wren House Infrastructure, with responsibilities that cover origination, evaluation and execution of opportunities, as well as management of portfolio companies.

Giovanni is involved in situations across the whole infrastructure spectrum, with main focus on healthcare, education, specialised logistics, as well as other core plus sub-sectors. Giovanni worked on the execution of several Wren House investments such as Global Power Generation, Thames Water and Zorlu Enerji mezzanine loan.

He is actively involved in the asset management of Thames Water and was previously involved in the asset management of Global Power Generation.

Giovanni holds M.Sc. in Innovation Management from Scuola Superiore di Studi Universitari e Perfezionamento Sant'Anna and University of Trento and B.Sc. in Electronic Engineering from University of Palermo.

Tural Aliyev
Senior Ph.D. Researcher, University of Geneva

Tural Aliyev is a Ph.D. researcher at the University of Geneva (Institute for Environmental Sciences) in urban planning in the framework of "Swiss Government Scholarships for International Students". He received his Bachelor's degree from the University of Architecture and Construction in Azerbaijan (2005-2009) in Architecture and Urban Planning (with honors). After graduating, he continued his study in Higher School of Architecture in Montpellier (France) in the framework of the "State Program on the Education of Azerbaijan Youth Abroad in the Years 2007-2015". Then, he graduated his study at the University of Montpellier III (2011-2013) in Master's degree in "Urban Planning and Territorial Projects".

Research of Tural Aliyev is related to urban retrofitting of industrial areas. The particularity of this research is to analyze the territorial retrofitting on a large scale. This research is in relation of the processes of metropolization of the City of Baku as well as of the environmental strategy of Greater Baku.

Alexandre B. Hedjazi
Director GEPP program / Senior Lecturer, University of Geneva

Alexandre Hedjazi has received a doctoral degree in Urban Planning from University of Grenoble in France and a Ph.D from School of Public Affairs – University of California Los Angeles (UCLA). Dr. Hedjazi's started his research career on the financing of urban infrastructures and Public-Private Governance which contributed to the final document of OECD's Conference for Partnership in the XXI Century. Dr. Hedjazi later joined UCLA to conduct research on regional development and security where among many courses and seminars he lectured on Regionalisation and Energy Security. Since joining the University of Geneva in 2007, he has taught many courses on Urban Sustainability and transitions as well as territorial development, bringing scholars and practitioner to explore and discuss the nexus of development, security and the environment. Bridging his academic research and his experience in the Caspian Sea region, his latest work concerns the impact of emerging economic and political insecurities on regional cooperation and development in the the Caspian Region. Alexandre Hedjazi is also engaged in a research project on system integration in the greater Geneva region through air transportation, energy and environmental nexus analysis.

www.zofnass.org
#zofnassprogram #zphworkshop
Follow us: @zofnassprogram

ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

Harvard University
Graduate School of Design