November 4 - 5, 2019

ZOFNASS PROGRAM WORKSHOP

Sustainable Infrastructure for Preventing Climate Change

Energy | Landscape | Solid Waste | Food | Transportation | Information | Water

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

DAY 1

WELCOME <12:00 pm>

PANEL 1 <12:30 pm>
Safeguarding Resources through Water Infrastructure

CASE STUDY SESSION
<2:30 pm>
Thames Water Utility Ltd. Water Resources Management Plan 2019

PANEL 2 <3:45 pm>
Sustainable and Resilient Practices in Urban Mobility and Public Spaces

End of DAY 1 <6:00 pm>

DAY 2

WELCOME <8:30 am>

PANEL 3 <8:35 am>
Global Approaches to Sustainable Development

PANEL 4
Climate Change

- Part A. Investment Towards Adaptation & Resilience <10:35
- Part B. Frameworks Towards A Sustainable Transition <12:50 pm>
- Part C. Building Coalition For Climate Action <2:00 pm>

End of DAY 2 <3:15 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).

SUSTAINABLE INFRASTRUCTURE ADVISORY BOARD "SIAB"

ARUP · Bentley · CDM Smith · En3 · HNTB · Kiewit · LA Metro · Otak · The Nature Conservancy · NV5 · POWER ENGINEERS · Stantec · Thames Water · TRC · WHI WREN HOUSE INFRASTRUCTURE · wsp

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ZOFNASS PROGRAM WORKSHOP

Sustainable Infrastructure for Preventing Climate Change

November 4-5, 2019
Harvard Graduate School of Design
Gund Hall Room 112 (Stubbins)
48 Quincy St, Cambridge, MA 02138

The world is facing a climate crisis that requires a response of planetary scale to limit global emissions and global warming below 1.5º C. Sustainable infrastructure is a pathway to prevent climate change. The November 2019 Zofnass Workshop is dedicated to discussing the potential of sustainable infrastructure for preventing climate change and making the case for the necessary investments to roll out, at the needed pace.

The Zofnass Program at Harvard (ZPH) ongoing research on "the Business Case for Planning Sustainable infrastructure" will help frame the discussions throughout the workshop, introducing tools and initiatives to the attendees towards sustainable infrastructure. The panels will feature field case studies that range from water infrastructure, airports, to beach clean ups, and how these sustainable infrastructure projects are aligned to the attainment of the United Nations Sustainable Development Goals (SDGs).

ZOFNASS PROGRAM FOR SUSTAINABLE INFRASTRUCTURE

Harvard University Graduate School of Design

Agenda

Day 1

WELCOME

<12:00 pm>

Zofnass Program Workshop

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

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

Anthony Kane — President and CEO, Institute for Sustainable Infrastructure

PANEL 1

<12:30 pm>

Safeguarding Resources through Water Infrastructure

Moderated by Prof. Pollalis, Zofnass Program Harvard University

Selim Eren — Supervising Civil Engineer, City of Santa Monica

Zach Pollard — Principal Civil Engineer, City of Santa Monica

Michael Walsh — Vice President, CDM Smith

<Break>

CASE STUDY SESSION

<2:30 pm>

Thames Water Utility Limited Water Resources Management Plan 2019

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

Giovanni Cialdino — Associate, Wren House Infrastructure

<Break>

PANEL 2

<3:45 pm>

Sustainable and Resilient Practices in Urban Mobility and Public Spaces

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

Petrina Butler — SC Transportation Design Manager, TRC

Karen Lutz — Sustainability Director, TRC / SIAB

Samantha Veide — Associate Director, United States, Forum for the Future

Matthew T. Potter — Project Architect, Northeast Division Architecture, HNTB Corporation

Vincent Guimont-Hébert — Corporate Sustainability Manager, Jacques Cartier Champlain Bridges Incorporated

<End of Day 1>

<7:00 pm Sustainable Infrastructure Advisory Board Dinner, by invitation only>

Energy | Landscape | Solid Waste | Food | Transportation | Information | Water

Agenda

WELCOME to Day 2 <8:30 am>

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

PANEL 3 <8:40 am>

Global Approaches to Sustainable Development

Moderated by Spiro Pollalis, Zofnass Program Harvard

Cristina Contreras — Research Associate, Zofnass Program Harvard University

Deepa Sathiaram — Executive Director, En3 Sustainability Solutions / SIAB

Mauricio Gomez — Director, IDOM - Madrid

Tural Aliyev — Senior Doctoral Researcher, University of Geneva

Alexandre Hedjazi — Director Global Environment Policy Program, University of Geneva

Huseyn Huseynov — Executive Secretary, National Coordination Council on Sustainable Development, Republic of Azerbaijan

<Break>

PANEL 4

Climate Change <10:35 am>

Part A. Investment Towards Adaptation & Resilience

Moderated by Spiro Pollalis, Zofnass Program Harvard

Daniel P. Schrag — Professor and Director, Harvard University Center for the Environment

Serena Y. Shi — Program Coordinator / Senior Associate, Global Adaptation and Resilience Investment (GARI) / The Lightsmith Group

Feriel Feghoul — Asset Manager, Wren House Infrastructure / SIAB

Phil Bownes — General Counsel, Wren House Infrastructure / SIAB

Roberto Mezzalana — Principal, Golder Associates / SIAB

<Lunch break at 12:10 pm>

Day 2

Climate Change <12:50 pm>

Part B. Frameworks Towards A Sustainable Transition

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

Thomas P. Gloria — Director of Sustainability Programs, FAS Division of Continuing Education, Harvard Univesity

Keith Clarke — CBE, Active Building Centre, UK

Chris Shelton — Chief Technology Innovation Officer and President, AES Next, AES Corporation

Part C. Building Coalition For Climate Action <2:00 pm>

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

Diane Doucette — President and Co-Founder, Chambers for Innovation and Clean Energy

Judith Rodriguez — Research Associate and Program Administrator, Zofnass Program Harvard University

Mark Bamford — President, Sustainability Partners Investment Advisors

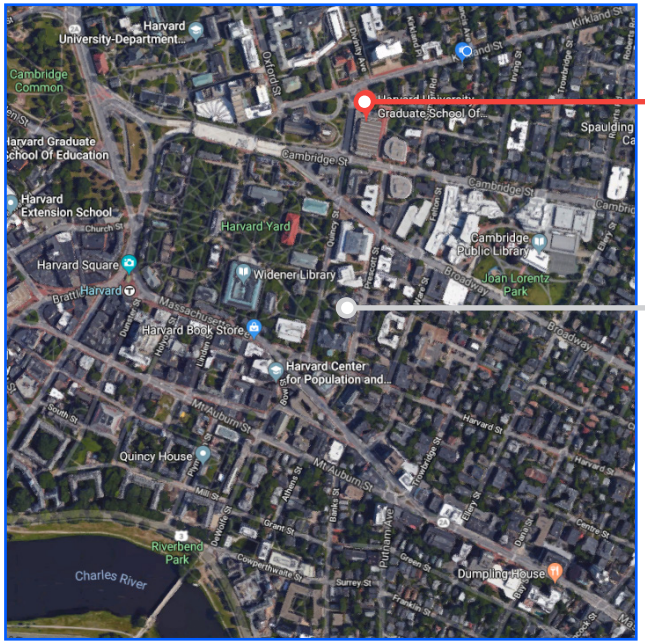
Robert Nemeth — Director of Investments, Sustainability Partners Investment Advisors

Closing Remarks <3:10 pm>

Spiro Pollalis, Zofnass Program Harvard

<End of Workshop, 3:15 pm>

Location at Harvard GSD



Workshop location
GSD Gund Hall
Room 112 (Stubbins)
48 Quincy St

SIAB Dinner location
(by invitation only)
Harvard Faculty Club
20 Quincy 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.

Detailed Agenda

<Light lunch available for all attendees from 11:45 am>

<12:00 pm>

Welcome to the Zofnass Program Workshop

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

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

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

PANEL 1

<12:30 pm>

Safeguarding Resources through Water Infrastructure

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

The City of Santa Monica, CA: Striving to Reach Water Self Sufficiency
Zach Pollard, Principal Civil Engineer, City of Santa Monica

The City of Santa Monica is committed to reaching water self-sufficiency by the year 2023. The City currently provides most of the drinking water to its residents and businesses from City owned wells treated at a City owned water treatment plant. However, the City purchases about a third of its water supply from the Metropolitan Water District which sources its water supply from remote locations in California and outside of California by way of aqueducts. This source of water is subject to limitations due to droughts and cost fluctuations. A series of conservation methods and capital improvement infrastructure projects create a pathway for the City to reach water self-sufficiency by 2023.

In 2014, the City Council adopted the Sustainable Water Master Plan (SWMP) which outlines a strategy to achieve water self-sufficiency. The plan to reach water self-sufficiency by 2023 includes:

1. Continuing and increasing water conservation efforts to reduce water demand
2. Developing sustainable and drought resilient alternative water supplies, and
3. Expanding local groundwater production with sustainable yield limits.

The alternate water supplies and increased groundwater production will be achieved mainly by the following four projects:

1. Santa Monica Urban Runoff Recycling Facility (SMURRF) Expansion
   a. This existing facility will be upgraded to be able to treat brackish groundwater supplied by the Clean Beaches Project.
2. Clean Beaches Project
   a. This Envision Gold winning project was completed in 2018 and harvests stormwater runoff and brackish groundwater to be treated at SMURRF for non-potable reuse and future aquifer recharge.
3. Sustainable Water Infrastructure Project (SWIP)
   a. This Envision project will treat stormwater and municipal wastewater to create treated urban runoff for non-potable uses and to recharge the local aquifers.
4. Arcadia Water Treatment Plant Expansion
   a. This project will expand the capacity and processes of the plant to treat additional groundwater created by SWIP.

Protecting the Santa Monica Bay & Beneficial Use of Stormwater: Santa Monica Clean Beaches Project
Selim Eren, Supervising Civil Engineer, City of Santa Monica

The City of Santa Monica's Clean Beaches Project is the City's first Envision rated project which achieved the Gold Award. The project was developed with an innovative approach to build a large stormwater diversion and harvesting system benefiting from the Envision framework focusing on climate and resilience. The project harvests urban runoff, stormwater runoff, and brackish water to be treated at the City's existing Santa Monica Urban Runoff Recycling Facility (SMURRF) for non-potable use and future groundwater injection.

The beautiful habitat and water quality of the Santa Monica Bay are impacted by the urban pollution of Santa Monica. In order to preserve and restore the water quality in

the Bay, the City, developed an Enhanced Watershed Management Plan (EWMP) per the requirements driven by the Municipal Separate Storm Sewer System (MS4) Discharge Permit. The development and implementation of regional Best Management Practices (BMPs) are a critical component for addressing the water quality goals and reducing the pollutants and the runoff from the built-out urban environment at the Santa Monica Bay.

The objective of the project was to develop a diversion and holding system for up to the 85th percentile 24-hour storm at the ocean outfall from the 106 acre downtown drainage area. The project built a diversion structure to divert dry and wet-weather runoff into a subsurface modular stormwater harvesting tank to store approximately 1.6 million gallons (6.1 million liters) per storm event. The total project was completed in August 2018 and the total cost was approximately $15M.

To increase the usage and effectiveness, the storage facility is equipped with underdrains to collect and pump brackish groundwater into the tank when stormwater is scarce for drought resiliency. The system was designed based on gravity flow to reduce the long-term energy usage and carbon footprint of the project while reducing the climate change impacts.

For resiliency to the sea level rise and flooding, the underground tank was designed as a submerged structure against the buoyancy forces. This project incorporated a real-time Supervisory Control and Data Acquisition (SCADA) controls to further increase system performance.

Co-Digestion with Food Waste Organics – Using Innovation to Drive Net Zero Operation at the GLSD
Michael Walsh, Vice President, CDM Smith
Cheri Cousens, Executive Director, Greater Lawrence Sanitary District (co-author)

The GLSD operates one of the few anaerobic digestion facilities in New England, with digester gas used as the primary fuel for thermal biosolids drying operation as well as for building and process heat. Like many states, the Commonwealth of Massachusetts has implemented a ban on the disposal of Source Separated Organic (SSO) food waste by incineration or landfill disposal. The District hopes to eventually achieve a Net Zero energy goal for their wastewater treatment facility and recognized that these new restrictions placed on SSO material disposal provides an opportunity to further that goal. Specifically, the District recognized that these food waste organics can be used, along with biosolids, as a fuel to increase generation of biogas at their anaerobic digestion facility, thereby increasing the generation of clean energy.

The Organics to Energy Project being undertaken by the District represents a major step from a traditional mission of wastewater treatment and disposal to one of recycle and reuse, resulting in more sustainable wastewater treatment operations. This innovative project will convert biosolids and food waste products to an important clean energy source that will, to a large degree, meet the energy needs of the GLSD facility. Additional benefits of the project include reduced stress on the already overburdened electrical grid in the northeast, greater protection against the possibility of future increases in energy costs, greater facility resiliency and operational flexibility, and the ability to provide a sustainable regional outlet for diverted SSO materials in the Commonwealth.

Construction of the project commenced in April 2016 and all aspects of the upgraded facility are scheduled to be operational by the end of 2019. This presentation will discuss the development and benefits of this innovative project.

Q & A Led by Prof. Pollalis.

<2:10 pm > Coffee break.

<2:30 pm>

CASE STUDY
Thames Water Utility Limited Water Resources Management Plan 2019

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

Resilient planning, integrated regional considerations, trust and legitimacy with customers, as well as the engagement of stakeholders constitute the main commitments of Thames Water Utilities Ltd (TW) to respond to its users while protecting the environment. This case study presents TW's plans to meet its public commitments and its regulatory requirements, with the planning alternatives for meeting the increased demand and the expected reduced supply while ensuring resilience and sustainability. Part I focuses on the draft Water Resources Management Plan 2019 and its planning options; Part II presents the demand management schemes; Part III describes two strategic long-term water supply options.

<3:30 pm > Break

PANEL 2

<3:45 pm>

Sustainable and Resilient Practices in Urban Mobility and Public Spaces

Moderator
James Grant, Associate VP, Sustainable Energy and Utilities Director, HNTB / SIAB

Constructive Collaboration for Advancing Sustainable Urban Mobility
Samantha Veide, Associate Director, US, Forum for the Future

The sustainability challenges we face are broad-reaching, systemic and beyond the bounds of neat geographic or organizational boundaries—and we don't stand a chance of tackling them without collaboration. Current levels of action to reduce greenhouse gas emissions are woefully insufficient to stem the climate crisis and create a more sustainable future. MOVING US is a program convened by Forum for the Future with NYC's TransitCenter to advance sustainable urban mobility. Core to this program is unlocking more productive pathways for private and public actors to work together to realize change at the pace and scale commensurate with the challenges facing the US mobility system. The MOVING US project is a three-year program starting in NYC, but with plans to expand to other cities. The ultimate deliverable will be a 'collaboration playbook' for stakeholders in transportation and mobility.

During this session, Forum will share its learnings thus far on the following critical questions:

- What is and isn't working about the traditional ways we collaborate in cities to drive change? How do we collaborate smarter and more effectively?
- How can we encourage mobility actors to think in systems given the nature of their industry (its interconnections and interdependencies) to realize deeper and longer-term change?
- How do we balance the need for turn-key and replicable solutions with the need for bespoke approaches to address unique urban communities?

Panel 2

Going Green in Greenville, GA: Building Healthier Places and People
Petrina Butler, SC Transportation Design Manager, TRC
Karen Lutz, Corporate Sustainability Director, TRC / SIAB

A greenway can provide many positive impacts to communities, including an increase in public health, economic and transportation benefits, wetland preservation, climate mitigation and resiliency, and the improvement of air and water quality. In addition, they can allow humans to experience nature with minimal environmental impact. Running along the scenic Reedy River on a historic rail bed, the Prisma Health Swamp Rabbit Trail Network is a 22 mile multi-use greenway system. Opened in 2009, this trail has experienced continual growth and offers fun, non-motorized recreation and transportation opportunities. This case study will explore the many benefits realized by the existing greenway and showcase how a sustainable outlook on a major expansion of the trail will enhance the positive impact to the community and environment.

East Side Coastal Resiliency Project (Big U) on Manhattan Island, NYC: Infrastructure Readiness Planning for Climate Change
Matthew T. Potter, Project Architect, Northeast Division Architecture, HNTB

HNTB is the Program Manager/Construction Manager for the East Side Coastal Resiliency (ESCR) Project of the Lower Manhattan Coastal Resiliency Project in New York City. The ESCR project involves the construction of a coastal flood protection system along a portion of the east side of Manhattan and related improvements to city infrastructure. The project aims to benefit the community by flood risk reduction, improved park access, and enhanced public spaces. The project spans 2.4 miles of urban coastline from East 25th Street to Montgomery Street.

Integrating Sustainability in Major Infrastructure Management – The Case of JCCBI Canadian Crown Corporation
Vincent Guimont-Hébert, Corporate Sustainability Manager,
Jacques Cartier Champlain Bridges Incorporated

For a few years now, the Jacques Cartier and Champlain Bridges Incorporated (JCCBI) Canadian Crown Corporation has integrated the concept of sustainable development into its corporate vision and mission statements. As a result, JCCBI has put in place the necessary foundations to operationalize the concept of sustainable development in its core activities, in particular by adopting a policy, a strategy and a multi-year sustainability action plan including multicriteria decision-support tools in conjunction with the Federal Sustainable Development Strategy.

Q & A. Led by James Grant.

<6:00 pm > End of Day 1.

<7:00 pm > Zofnass Program Sustainable Infrastructure Advisory Board Dinner at the Harvard Faculty Club, by invitation only.

DAY 2

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

Welcome to Day 2

<8:30 am>

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

PANEL 3

<8:40 am>

Global Approaches to Sustainable Development

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

Decoding the SDGs for Infrastructure practitioners. The implementation challenge.
Cristina Contreras, Research Associate, Zofnass Program for Sustainable Infrastructure, Harvard University GSD

The notion that sustainable infrastructure is a key driver to achieve the Sustainable development agenda is a widely spread idea and a commonly repeated mantra. However, answering the question "to what extent?" and how much of this work is already been addressed by the currently existing sustainable infrastructure approaches? It is still not fully understood. This presentation aims to introduce a cross comparative analysis between commonly used sustainable infrastructure criteria and the Sustainable Development Goals. This will help decode what it means to say that our project is aligned with the SDGs, and how it differs from the work that has already been done in the field, aiming to shed some light on the implementation challenges that infrastructure practitioners around the world are facing.

To illustrate the analysis conducted, several real examples will be presented looking not just at the similarities and differences in the content addressed, but also the level of detail of the different frameworks and the different scales to which they apply.

Infrastructure Development and Sustainability in India
Deepa Sathiaram, Executive Director, En3 Sustainability Solutions / SIAB

70% of the India of 2030 is yet to be built and sustainable development is imperative. With the Indian infrastructure having a requirement of investment and work of at least US $770 billion by 2022, it is critical that this infrastructure is not just sustainable but also enhances the quality of life of all the people and the communities. While the building sector has built reasonable awareness and voluntary adoption over the last 15 years by embracing sustainable practices and green building certification, the Indian infrastructure sector is still struggling to establish a consistent and solid framework for sustainable development. This is where Envision and ZPH become very relevant and can contribute to sustainable infrastructure development. It can not only help create this framework in the Indian context but also foster a green ecosystem by raising awareness with project owners, designers, contractors and other stakeholders while fostering collaboration to achieve long-term sustainability.

To widen its adoption and applicability, Envision needs a certain degree of regionalization and references to equivalent standards without diluting the rigor of the program. To become widely acceptable for local projects it is important to keep in mind regional

environmental priorities and limitations while providing stretch goals for projects to move quickly in meaningfully addressing sustainability in infrastructure projects. A dynamic model that will keep increasing industry benchmarks from time to time is important to successfully evolve and elevate industry practices over the short to medium term. The session will quickly look at some of the regional challenges that need consideration to make Envision achievable by Indian infrastructure projects. Finally, we will look at an outline of the operational structure of some major green building certification programs in India.

The Challenge of Achieving Energy Self-Sufficiency in Islands: The Case of El Hierro Hydro-wind Power Plant in Canary Islands, Spain

Mauricio Gómez Villarino, Director, IDOM

Adding renewable energies to the energy mix is essential to ensure the sustainability of electrical power systems. However, energy sources -such as wind or photovoltaic- are limited by the fluctuations in the power generated, not being able in many occasions to satisfy demand when it is required. Energy storage methods, such as hydraulic reservoirs, can help to mitigate these problems and improve the integration of these systems. Renewable energies are an important step towards a cleaner and more sustainable planet, reducing considerably the emission of greenhouse gases.

El Hierro has taken up the challenge of ensuring that the electric power supplied to the island comes from renewable energy sources. To this end, a hydrowind power plant has been built and commissioned. This plant combines 11.5 MW of wind generators with a reversible hydroelectric plant of 11 MW (turbine) and 6 MW (pumping). Considering that the demand peak of the island is 7.5 MW, this configuration means that, in certain conditions, demand on the island can be fully met with clean and renewable energy.

IDOM has participated in the project from the concept phase to its implementation, providing engineering services, procurement management and technical assistance for the design, construction and commissioning. The El Hierro Hydrowind Power Plant began operations in July 2015 and its operation has been refined over time until, in February 2018, it reached the milestone of supplying the island's consumption for 18 days in a row with 100 % renewable energy. It is expected that, in the coming years, the plant will supply over 65% of the total demand of the island, potentially reaching a 100% by adding more power generation in the future.

SDGs and Value Creation: Equating Economic Valuation with Sustainable Urban Development. The case of Waterfront Industrial Districts in Baku, Azerbaijan

Tural Aliyev, Senior Ph.D. Researcher, University of Geneva
Alexandre B. Hedjazi, Director Director Global Environmental Policy Program / Senior Lecturer, Institute for Environmental Sciences, University of Geneva

The city of Baku, one of the first oil centers in the world, is pursuing the Urban Development along its Waterfront. The ongoing significant Urban Development along the industrial waterfront based on Oil Revenues and aims to create a new brand of the city that projects itself as a Global City.

Throughout the presentation, the aim is to present ongoing remediation projects on the industrial waterfronts of Baku and highlight their specificity. The current remediation projects of Baku are unidimensional, which focuses primarily on economic valuation and beautification. This obsolete and unidimensional process of Urban Remediation is not responding to the multi-challenges of Baku, which is faced by the Environmental and Climate Change. In addition to the risks associated with 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 interdisciplinary targets of Sustainable Development Goals can help to develop a multidimensional approach which includes Disaster Risk Reduction for Waterfront of Baku and Sustainability strategies for natural and industrial risks and identify the opportunities and historical knowledge. The vulnerable places – the industrial waterfront areas – of Baku should be remediated beyond the economic values in a sustainable and resilient manner for responding to the multiple challenges, create new values (ecosystemic, environmental, social and economic) and tradeoffs / co-benefits (for the population, for the stakeholders, and for urban planners).

Implementation of the Sustainable Development Goals in Azerbaijan

Tural Aliyev, Senior Ph.D. Researcher, University of Geneva
Huseyn Huseynov, Executive Secretary, National Coordination Council on Sustainable Development, Republic of Azerbaijan

The development priorities of the Republic of Azerbaijan integrated into the national plans with joining the Millennium Development Goals from 2000 year, with implementation of State Programs of Poverty Reduction and Sustainable Development. Thanks to its continuous efforts at establishing a sustainable development model, the Government of Azerbaijan approved a strategic roadmap for the social and economic development of the key sectors with short-term (by 2020), medium-term (by 2025) and long-term target outlooks (beyond 2025).

After joining to Sustainable Development Agenda of the United Nations Azerbaijan takes serious actions to implement all 17 SDGs and the principles that underpin the 2030 Agenda. Building opportunities for inclusive and sustainable economic growth for all and 'leaving no one behind' is a priority for the Government of Azerbaijan and we have demonstrated firm commitment to transitioning to sustainable development and aligning our national development strategy to the Sustainable Development Goals.

Azerbaijan will continue its efforts to implement 2030 Agenda with a view to achieve the SDGs. The country will strive to preserve macroeconomic stability by allocating resources in such a manner as to increase the share of the private sector in the overall economy, reducing economic dependency on oil and gas production thus promoting diversification of the economy, accelerating resource mobilization, and integrating sustainability practices into overall national development strategy.

Q & A. Led by Prof. Pollalis.

<10:25 am > Break

PANEL 4

<10:35 am>

Climate Change

Commentary
Prof. Daniel P. Schrag, Harvard University Center for the Environment

Climate Change Part A.
Investment Towards Adaptation & Resilience

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

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.

The Global Adaptation & Resilience Investment Working Group (GARI): Catalyzing Private Investment in Adaptation & Resilience
Serena Y. Shi, Program Coordinator, GARI / Senior Associate, The Lightsmith Group

The Global Adaptation & Resilience Investment (GARI) working group is a 501(c)(3) non-profit organization that brings together private and public stakeholders to discuss critical issues at the intersection of climate adaptation/resilience and investment, with the objective of helping to assess, mobilize, and catalyze action and investment. The Lightsmith Group, a sustainable investment firm with a focus on adaptation and resilience, has been chairing GARI since 2015, after launching it in partnership with the UN Secretary General's A2R Climate Resilience Initiative at COP21. Since then, GARI has convened more than 20 in-person and remotely-accessible meetings in New York, Washington DC, San Francisco, and London, bringing together over 200 private investors and other stakeholders from pension funds, endowments and foundations, insurance companies, banks and investment managers, to large corporations, engineering firms, start-ups, think tanks, advisory firms and development finance institutions. This presentation will walk through (i) the history of the organization and its theory of change, (ii) the nature and composition of GARI participants and their respective roles in catalyzing adaptation investment, (iii) the state of climate adaptation and resilience investment, along with key milestones and ongoing initiatives in the space, (iv) a summary of the GARI group's activities to date, and (v) the path forward for the GARI working group and its vision for the future of the adaptation investment ecosystem that it seeks to support.

Embedding Sustainability into London City Airport
Phil Bownes, General Counsel, Wren House Infrastructure / SIAB
Feriel Feghoul, Vice President, Wren House Infrastructure / SIAB

London City Airport ("LCY") opened in 1987 with a plan to connect businesses in the City of London and newly established Canary Wharf with domestic and European markets. In recent years, the route network has diversified and the airport currently serves a total of 45 destinations across the UK, Europe and the United States. As London's most central airport, demand has increased rapidly. In 2006, LCY handled 2.4 million passengers. In 2018, those passenger numbers had doubled. And in 2019 LCY expects to exceed five million passengers for the very first time. That represents 42% growth in passengers in the space of five years. As LCY anticipates much greater demand to use the airport, Management and Shareholders cannot stand still. With demand for the airport set to increase dramatically, long-term thinking is needed to ensure the airport is able to serve London to 2035 and beyond.

The City Airport Development Programme (CADP) is a transformative project. The project will see eight new aircraft stands, equivalent to the size of 11 football pitches, being built, and the creation of the UK's first Digital Air Traffic Control Tower, a full length parallel taxiway and the easterly and westerly extensions of the terminal, quadrupling its size.Today we will present how Sustainability is integrated into the project design and beyond.

Use of ZPH Planning Guidelines as a Diagnostic Tool - the Torino Water Infrastructure Case Study
Roberto Mezzalana, Principal, Golder Associates / SIAB

The ZPH Planning guidelines have been conceived to support infrastructure planning mainly in the development on new cities or greenfield urban developments. In most of the developed world however, the main focus is on urban regeneration, and plans for urban infrastructure development or improvement need to deal with choices that have been made sometimes centuries ago with no consideration for environmental sustainability. In our search for support tools to guide urban regeneration projects towards sustainability, we have decided to use the Planning guidelines as a diagnostic tool, in order to highlight the current performance of infrastructure systems against the objectives and guidelines for the relevant infrastructure. With funding from the Italian Ministry of Environment and Compagnia di San Paolo and in partnership with Nomisma and IUR we have developed an approach called "go-IN sustainable cities" which expands the Planning guidelines to consider also social infrastructures and buildings. We then ran two case studies on water and social infrastructures in the City of Torino. The water infrastructure case study will be the subject of the presentation.

Q & A. Led by Prof. Pollalis.

<12:10 pm > Lunch break.
(Food available for all attendees.)

Climate Change Part B. <12:50 pm>
Frameworks Towards A Sustainable Transition

Moderator
Marty Janowitz, Vice President Sustainable Development, Stantec / SIAB

Green New Deal: Implications for Sustainable Infrastructure
Thomas P. Gloria, Program Director, Sustainability, Harvard University, Faculty of Arts and Sciences, Division of Continuing Education

The US 2018 mid-term election cycle ushered in new leadership with a more widely recognized urgency towards climate change and socio-economic decline. This resulted in the submission of a joint resolution to the 116th Congress by the House and Senate (H.Res. 109 and S.Res. 59) recognizing the duty of the Federal Government to address both these issues (Ocasio-Cortez, 2019) (Markey, 2019). The first version of the GND was drafted by the European Greens nearly a decade ago (European Greens, 2010). In this incarnation, the goal is to comprehensively address climate change and, at the same time, consider the ramifications towards "social, economic, racial, regional and gender-based justice and equality" issues.

The joint resolutions call for the creation of a Green New Deal with the goals of:
- achieving net-zero greenhouse gas emissions;
- establishing millions of high-wage jobs and ensuring economic security for all;
- investing in infrastructure and industry;
- securing clean air and water, climate and community resiliency, healthy food, access to nature, and a sustainable environment for all; and
- promoting justice and equality.

The resolution calls for the accomplishment of these goals through a 10-year national mobilization effort.

The resolution also enumerates the goals and projects of the mobilization effort, including
- building smart power grids (i.e., power grids that enable customers to reduce their power use during peak demand periods);
- upgrading all existing buildings and constructing new buildings to achieve maximum energy and water efficiency;
- removing pollution and greenhouse gas emissions from the transportation and agricultural sectors;
- cleaning up existing hazardous waste and abandoned sites;
- ensuring businesspersons are free from unfair competition; and
- providing higher education, high-quality health care, and affordable, safe, and adequate housing to all.

The unified effort to "kill two birds with one stone" by addressing the existential threat of accelerating climate related risks and the growing inequities of accessibility to basic needs of "clean air, clean water, healthy food, adequate health care, housing, transportation, and education" is at the heart of this movement. In this talk, a brief introduction is given to the GND, "what is it?"; "where is it now?"; "how much is it going to cost?"; and the implications to sustainable infrastructure.

CSR to Sustainability to 1.5°C. When Transition Became Transformational for Business
Keith Clarke, CBE, Active Building Centre UK

All pathways to 1.5ºC require the construction and built environment to incorporate urgently a new design parameter as fundamental driver. This is transformational for the industry rather than transitional. The question for the existing building models in the US and globally is, if they can adapt or be then superseded and supplanted by different models. The urgency of reducing our impact requires immediate action given that major infrastructure projects have a gestation period of at least a decade and we have to achieve a net zero economy by two decades' time.

AES Climate Scenario Report
Chris Shelton, Chief Technology Innovation Officer and President, AES Next, AES

Q & A. Led by Marty Janowitz.

Climate Change Part C. <2:00 pm>
Building Coalition For Climate Action

Moderator
Marty Janowitz, Vice President Sustainable Development, Stantec / SIAB

Chambers for Innovation and Clean Energy (CICE)
Diane Doucette, President and Co-Founder, CICE

This session will describe how and why CICE is building conservative business and political support for climate action. With no forward movement expected at the federal level, it is imperative that local communities and states take action to address climate change, advance clean energy and build resilient communities. We are working with the most credible economic messengers at the local and state level to build support for action.

We will share information about how businesses in red states, blue states and purple states are engaging in climate and clean energy efforts across the country. We will also discuss some of the partnerships we are building around the country with organizations to advance climate resilience and clean energy.

Climate Action on the Ground: Insights from the UN Solutions Summit
Judith Rodríguez, Research Associate and Program Administrator, Zofnass Program for Sustainable Infrastructure, Harvard University

Innovative solutions for climate action helping advance the Sustainable Development Goals (SDGs) are being implemented on the ground, around the world. This presentation focuses on insights obtained as part of the selection committee from the United Nations Solutions Summit. It will provide an overview of the 10 selected innovative solutions, looking at project types, different locations, SDGs achieved. The UN Solutions Summit starts with an open global call for submissions of projects that are being implemented locally to contribute to the attainment of the 17 SDGs; followed by a global participatory selection process to agree on a shortlist; culminating in the selection of 10 innovative ideas, which are showcased at the Solutions Summit sessions during the United Nations General Assembly in NYC. More info at www.solutions-summit.org.

Panel 4

Sustainability as a Service
Mark Bamford, President, Sustainability Partners Investment Advisors
Robert Nemeth, Director of Investments, Sustainability Partners Investment Advisors

Sustainability as a Service® is a usage-based utility model that serves as an innovative solution to help solve the deferred maintenance and can provide new essential services in the "MUSH" (Municipalities, Universities, Schools and Hospitals) marketplace. By upgrading to the new from their old, entities can enjoy up to 40 percent reduction on their carbon footprint in year 1 instead of deferring those savings.

Q & A. Led by Marty Janowitz.

<3:10 pm > Closing remarks by Prof. Pollalis.

<3:15 pm > End of Workshop

SPEAKER 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

President and CEO, Institute for Sustainable Infrastructure

Anthony Kane is 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

Zach Pollard

Principal Civil Engineer, City of Santa Monica

Zach Pollard is a Principal Civil Engineer with the City of Santa Monica and supervises the City's construction management group. Zach has been with the City for over 9 years and has over 21 years in the engineering business. He has managed the design and construction of several of the City's high scale Capital Improvement Projects including the California Incline Bridge Replacement, Santa Monica Pier Renewal, and the Clean Beaches Project. He is currently involved with the Sustainable Water Infrastructure Project (SWIP) and the expansion of the City's water treatment plant. Both projects help the City meet its goal of water independence in 2023.

Zach has a Bachelor of Science and degrees in Civil Engineering and Environmental Engineering from North Carolina State University. He also has a Master of Public Administration degree from the University of Southern California. Zach has 11 years of experience in the private engineering consulting business and 10 years of experience working for municipalities. He is a licensed Professional Civil Engineer in California, has a LEED AP Building Design and Construction credential, and an Envision Sustainability Professional (ENV-SP) credential.

Selim Eren

Supervising Civil Engineer, City of Santa Monica

Selim Eren as the Supervising Civil Engineer at the City of Santa Monica is tasked with overseeing more than $100 million worth of infrastructure investment and directing the construction management team of the Engineering and Street Services. Selim has a broad portfolio of projects includes the Pier, water distribution, pump station, advanced water treatment, urban runoff and stormwater harvesting, bridge replacement, mobility and transit. He has championed the sustainability for citywide implementations. He has led the design management and the construction team for the Clean Beaches Project which received the first Envision award for the City of Santa Monica. He is currently managing the City's Design-Build Sustainable Water Infrastructure Project, the first all-underground wastewater and stormwater treatment facility in California with MBR-RO-UV/AOP advanced water treatment process for groundwater replenishment.

Selim's 15-year career includes the private sector experience in contracting and consulting firms. Since 2012, he has served the City with the duties included overseeing the planning, design, and construction of infrastructure projects and managing the staff and consultants.

Selim has a Master of Science degree in Engineering Management and a Bachelor of Science in Environmental Engineering. He is a Licensed Professional Civil Engineer in California and an active member of the American Public Works Association.

Michael Walsh

Vice President, CDM Smith

Mike Walsh is a Vice President with CDM Smith, an international water and environmental engineering firm based in Boston. He has over 30 years of experience in the planning and implementation of major water reclamation and biosolids projects, including application of innovative water reuse, alternative energy, nutrient removal, and energy recovery technologies at both large and small treatment facilities. Mike is a Professional Engineer in

multiple states and is an Envision Sustainability Professional (ENV SP). He is active in many professional organizations, including having recently served as President of the American Council of Engineering Companies of Massachusetts where he works to build public recognition and support for greater investment in water infrastructure. Throughout his career, Mike has been involved with multiple projects for the Greater Lawrence Sanitary District, including the Organics to Energy Project featured in this presentation.

CASE STUDY SESSION

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 the University of Palermo.

PANEL 2

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.

Samantha Veide
Associate Director, United States, Forum for the Future

Samantha Veide is the Associate Director of the U.S. for Forum for the Future. At Forum she helps lead the US team to expand the organization's reach and impact via more collaborative partnerships in the areas of Sustainable Livelihoods & Value Chains and Climate Change, including sustainable mobility.

Prior to joining Forum, Samantha spent 20+ years working for more sustainable and just value chains. Her areas of expertise include gender equity, corporate strategy, sustainability strategy and designing learning curriculum that drives change.

Committed to the concept of service, she has served in numerous volunteer leadership positions throughout her career, most notably as the past chair of the Sustainability Council for the Specialty Coffee Association of America and the current chair of the board for Coffee Quality Institute (CQI).

Samantha's educational background is in Organizational Communication, Psychology and Gender Studies. She most recently completed her post-graduate work in Sustainable Business Leadership at the University of Cambridge, U.K.

Petrina Butler
SC Transportation Design Manager, TRC

Petrina leads TRC's growing transportation practice in South Carolina. She graduated with a Bachelor of Science in Civil Engineering from Embry-Riddle Aeronautical University in 2002 and obtained her Master of Science in Civil Engineering from Florida Atlantic University in 2008. She is a licensed Professional Engineer in 8 states and is a certified Envision Sustainability Professional. Her diverse capabilities include bridge design and load rating, roadway design, and structural analysis and inspection. She is the Past-President of the American Society of Civil Engineers, SC Section, and currently serves as a Board Director for the American Council of Engineering Companies, SC, and the newly sanctioned SC Chapter of Women in Transportation Seminar. She resides in Greenville, SC with her two children, Naomi and Owen.

Karen Lutz
Corporate Sustainability Director, TRC / SIAB

Ms. Lutz has 30 years' experience in environmental and sustainability consulting in both the public and private sector. Areas of expertise include ESG/sustainability advising, facilitation of strategy development, and reporting/communications. Utilizing a variety of standards and benchmarking tools, she assists clients in developing measurable solutions that bridge economic, social and environmental goals.

As TRC's Sustainability Director, Karen also leads her company's corporate sustainability program. Her responsibilities include the integration of sustainability into TRC's business systems, internal and external communications and reporting, and advancement of market facing services, including sustainable infrastructure, clean energy, and sustainability/ESG advisory services.

Matthew T. Potter
Project Architect; Northeast Division Architecture HNTB Corporation

Mr. Potter has over 8 years' experience and currently serves as Project Architect in HNTB's New York, New York, office. He has worked on transportation, high end residential, commercial, public, and master planning projects, many of which have been published internationally. Matthew currently is an Envision Sustainability Professional on the PM/CM team of the NYC-DDC East Side Coastal Resiliency (ESCR) Project in Manhattan. Matthew graduated from New Jersey Institute of Technology, Summa Cum Laude with a Bachelor of Architecture and a Minor in Environmental Studies and Sustainability.

Vincent Guimont-Hébert
Corporate Sustainability Manager, Jacques Cartier Champlain Bridges Incorporated (JCCBI)

Vincent has devoted his entire career to helping public and private organizations set themselves apart by making decisions that generate economic, environmental and social value. Vincent's experience has led him to specialize in the integration of sustainability principles into organizations' operational and administrative functions. He has developed and implemented policies, strategies, multi-year action plans and sustainability programs for international leading organizations in the manufacturing, retail, government services, transportation and natural resource sectors. Vincent holds a civil engineering degree from Polytechnique Montreal and masters in Business Administration from Université du Québec à Montréal and Paris-Dauphine University.

PANEL 3

Cristina Contreras
Research Associate, Zofnass Program for Sustainable Infrastructure, Harvard University

Cristina Contreras is currently a Research Associate in the Zofnass Program for Sustainable Infrastructure at Harvard University, where she 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 industry. During her time at Harvard, Cristina has lead several multi-year research projects aimed at introducing sustainable infrastructure practices into emerging economies, especially in the Latin America region. In her efforts to promote sustainable infrastructure, she also consults as an independent expert consultant for international organizations such as the Inter American Development Bank, Brookings Institute in Washington D.C, and GIZ in Germany, among others.

Cristina is member of several working groups in infrastructure sustainability including the "United Nations Environment Programme's Expert Working Group on integrated approaches to sustainable infrastructure" and American Society of Civil Engineers' (ASCE), "Sustainable Infrastructure Standards Committee - Leadership Writing Group" and the "Planning Committee on Global Sustainability."

Cristina holds a Bachelor degree in Technical Architecture and Building Engineering, both from the Polytechnic University of Madrid (UPM), and a Masters Degree in Sustainability and Environmental Management from Harvard University.

Deepa Sathiaram
Executive Director, En3 Sustainability Solutions / SIAB

Deepa is a leading international green building, HVAC and building systems design professional. Deepa has been named as one of "India's Top 15 Nature's Keepers" for actively spearheading India's green building movement in the last 20 years. She is a USGBC LEED Fellow Class of 2013, IGBC Fellow and an internationally recognized USGBC and WELL Faculty.

As a highly admired leader, green consultant and education advocate, Deepa founded En3 in 2003 to specialize in sustainability and energy efficiency consulting. En3 so far has consulted for over 500 million square feet of green buildings world-wide with operations in the U.S., India the Middle East and Africa. Her work includes many industry firsts including one of India's 1st Net-Zero Energy Buildings, 1st carbon-neutral organization, India's 1st carbon-neutral construction project and India's 1st WELL Building project among others.

She is an expert in health and indoor air quality in buildings and is an WELL Faculty and works very closely with the International Well Building Institute (IWBI). She is also part of the "Buildings

for Health" Program a joint initiative of the USGBC and Harvard C.T. Chan School of Public Health to design buildings that enhance the health and well-being of occupants.

Deepa is also a trained expert in conformity assessment and product evaluations. She was the technical lead in setting up ICC's green product evaluation program. Deepa is an internationally recognized assessor for accreditation of testing and calibration laboratories, inspection agencies and certifying bodies.

Deepa serves on various international technical working groups including the committees for the International Accreditation Service Inc. (IAS), U.S. Green Building Council (USGBC), Indian Green Building Council (IGBC), the EHS Department of the Ports, Customs and Free Zone Authority of Dubai, and others.

Mauricio Gómez Villarino

Director, IDOM

PhD Civil Engineer, PhD European Special Mention, CEO-Senior Management Program IESE Business School. Specialist in Sustainability and Resilience Analysis for Infrastructure Planning and Design. Managing Director at IDOM Center-South (IDOM Consulting, Engineering and Architecture), Member of IDOM´s Executive Committee. Member of the Executive Council of the Spanish Institution of Civil Engineers, Member of the Board of Directors of the Spanish Association for the Environment, Member of the Committees of Sustainable Development of the Spanish Engineering Institute. Professor at Madrid Polytechnic University; and director of several masters and courses in the fields of project management and project sustainability and resilience. Author/Co-author of five technical books and many papers in the fields of engineering consultancy and environmental management. Recipient of several awards (e.g. Best Young Engineer by the Institution of Civil Engineers; Best Project University Award by Polytechnic University of Madrid; Best advance solution for sanitation and landscape recovery by Uralita Civil Works). Professional experience in Spain, United Kingdom, Portugal, France, USA, Turkey, Algeria, Brazil, Chile, Uruguay, Peru, Colombia, Argentina, Kuwait, Oman, Malaysia and Jordan among others.

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". The esearch 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.

PANEL 4

Daniel P. Schrag

Sturgis Hooper Professor of Geology
Professor of Environmental Science and Engineering
Director, Harvard University Center for the Environment
Director, Science, Tech. and Public Policy Program, HKS
Area Chair for Environmental Science and Engineering

Daniel P. Schrag is the Sturgis Hooper Professor of Geology at Harvard University, Professor of Environmental Science and Engineering, and Director of the Harvard University Center for the Environment.

Schrag studies climate and climate change over the broadest range of Earth history. He is particularly interested in how information on climate change from the geologic past can lead to better understanding of anthropogenic climate change in the future. In addition to his work on geochemistry and climatology, Schrag studies energy technology and policy, including carbon capture and storage and low-carbon synthetic fuels.

From 2009-2017, Schrag served on President Obama's Council of Advisors on Science and Technology. Among various honors, he is the recipient of the James B. Macelwane Medal from the American Geophysical Union and a MacArthur Fellowship. Schrag earned a B.S. in geology and geophysics and political science from Yale University and his Ph.D. in geology from the University of California at Berkeley. He came to Harvard in 1997 after teaching at Princeton.

Kate Newman

VP Public Sector Initiatives, Forests, World Wildlife Fund

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.

Serena Y. Shi

Program Coordinator, Global Adaptation & Resilience Investment / Senior Associate, The Lightsmith Group

Serena Shi is the Program Coordinator for the Global Adaptation & Resilience Investment (GARI) working group and is a Senior Associate at The Lightsmith Group. Prior to joining GARI and Lightsmith, she was an Investment Analyst at the International Finance Corporation, the private sector investment arm of the World Bank, where she focused on direct equity and debt investments in the telecoms sector in emerging markets. She was previously an Associate at Goldman Sachs, where she worked on structured debt transactions across the renewable energy, telecoms, media, pharmaceutical, and consumer retail sectors. Ms. Shi holds a B.S. from the Wharton School at the University of Pennsylvania.

Feriel Feghoul

Vice President, Wren House Infrastructure / SIAB

Feriel Feghoul is a Vice President at Wren House Infrastructure and mainly focuses on portfolio value enhancement initiatives across the portfolio with a special focus on ESG. She transitioned to this role from global origination and execution.

Feriel has been involved in multiple projects in the ports, toll road and airport sectors but also core plus space globally (rail and aircraft leasing, parking meters, smart metering) over her career. She has 12 years' experience specialising in infrastructure having joined Wren House from the Public Sector Pension Investment Board in Montreal. She also worked at National Bank Financial in Montreal as an Investment Banking professional. Feriel holds a Bachelor of Commerce from McGill University and a MSc in Financial Economics from the University of Oxford (Saïd Business School).

Phil Bownes

General Counsel, Wren House Infrastructure / SIAB

Phil Bownes is General Counsel at Wren House Infrastructure and has 14 years of experience in large-cap international M&A. Phil has worked on the acquisition and management of all of Wren House's portfolio investments. Prior to joining Wren House, Phil worked in private practice for Slaughter and May's London and Hong Kong offices and the London office of White and Case. He has a bachelor's degree in Jurisprudence from the University of Oxford.

Roberto Mezzalama

Principal, 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.

Marty Janowitz

Vice President Sustainable Development, Stantec / SIAB

As Stantec's Vice President, Sustainable Development Marty has been responsible for guiding Stantec's efforts to become an exemplary model of sustainability in its operations and to advance integrated services addressing important evolving trends. He has played a prominent role in the emergence of sustainable infrastructure within integrated urban systems, to optimize lifecycle triple bottom line (economic, environmental, and social) benefits and efficiencies. Marty is a member of the Sustainable Infrastructure Advisory Board of the Zofnass Program at Harvard GSD and the Institute for Sustainable Infrastructure Envision Review Board. A hands-on practitioner, he was senior advisor on the world's first wastewater treatment and transportation projects to achieve Envision Award and for more than 10 other completed and ongoing Envision-related designs and verifications including as lead Verifier on the largest Envision awarded project. Marty was selected a member of Canada's Clean 50 - outstanding contributors to sustainable development and clean capitalism.

Thomas P. Gloria

Program Director, Sustainability, Harvard University, Faculty of Arts and Sciences, Division of Continuing Education

Dr. Gloria is Director of the Sustainability programs at Harvard University's Division of Continuing Education (DCE). The program offers a Master of Liberal Arts in the field of Sustainability and Development Practice to more than 300 matriculated master's students and 1,800 overall enrollments. In addition to his duties as Director, he is a trusted advisor to fortune 500 companies on strategic sustainability initiatives. Dr. Gloria is Chair of the International Society of Industrial Ecology's Life Cycle Sustainability Assessment Committee, Associate Editor of the Journal of Industrial Ecology, member of the US TAG to ISO/TC 59/SC 17 Sustainability in Building and Civil engineering works and serves on Ceres' GM Company Sustainability Stakeholder Committee. He regularly lectures for the Harvard University Extension School and Tufts University.

He holds a Ph.D. and M.S. in Civil and Environmental Engineering from Tufts University and a B.Sc. in Electrical and Computer Science Engineering from the University of Connecticut.

Keith Clarke

CBE, Active Building Centre UK

With more than forty years' experience, Keith has worked in all sectors of the UK and international construction industry and retired from WS Atkins in 2011 after leading the business to considerable growth. His current roles include Chair of Forum for the Future and the Active Building Centre and Non-Executive Director of Sirius Minerals. He is also a Member of the Advisory Board, Environmental Change Institute, Oxford, a Director of Constructionarium and a Director of Women In Property.

Chris Shelton

Chief Technology Innovation Officer and President, AES Next, AES Corporation

As AES Chief Technology Innovation Officer and President of AES Next, Chris is charged with developing high value, technology-enabled growth for the AES portfolio of businesses. These efforts are driven by innovative business models and technologies, including energy efficiency, digital customer engagement, automation, renewables, e-mobility, and other solutions. Chris has over 20 years of technology related investment, business development, and systems architecture experience and has been a leader in the origination and expansion of new business efforts at AES. These include the development of AES' industry leading energy storage business, which became Fluence Energy, the fast growing distributed solar business, and the recent investment in and expansion of Uplight, a leading customer action platform for the utility industry. His past work in AES also includes the launch of a retail electricity business where he pioneered the bundling of environmental offsets with customer electricity consumption and began the first AES wind development efforts. He holds a Bachelor of Science in Physics and is the past Chairman of the Energy Storage Association.

Diane Doucette

President and Co-Founder, Chambers for Innovation and Clean Energy

Diane is a strategic planner, policy advisor, and coalition builder. She has been working at the nexus of business and policy advocacy for 20+ years. She has created numerous business networks in support of climate policies and her model of coalition building has been replicated in many states.

In 2011, Diane co-founded Chambers for Innovation and Clean Energy (CICE), a national network of local chambers of commerce focused on advancing climate action.

Diane spent the first 10 years of her policy career working internationally – first as an advisor to the new Russian government following the collapse of the Soviet Union and then as a liaison between the Russian government and the foreign business community.

After seven years in Moscow, Diane moved to London as a strategic planner for AT&T. She then returned to the US to advocate for climate action.

Diane has a Ph.D from UC Berkeley in Political Science.

Judith Rodríguez

Research Associate and Zofnass Program Administrator, Harvard University GSD

Judith Rodríguez is a researcher and designer with experience in sustainable infrastructure, urban design and landscape architecture. At the Zofnass Program, she worked on urban water infrastructure, mapping vulnerability to climate change and flood resilience best practices in cities. Her experience in sustainability and resilience includes assessments of large-scale infrastructure in the transport, water, sanitation, and energy sectors in developing economies.

She is an advocate for climate action and the implementation of the Sustainable Development Goals (SDGs). Judith participated in the UN Solutions Summit and in SDG-learning focused sessions during the UN High Level Political Forum on Sustainable Development.

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, LEED AP, and Municipal Vulnerability Preparedness provider.

Mark Bamford

President, Sustainability Partners Investment Advisors LLC

Mark Bamford AB '85, is President of Sustainability Partners Investment Advisors (SPIA), where he began working earlier this year. Mark received his MBA from the Tuck school and spent 16 years at Goldman Sachs, where he was a Managing Director running Syndicate and Capital Markets businesses for the firm in New York and London. Mark spent 12 years at Barclays where he was a Managing Director and a member of the Market Management Committee, running Global Syndicate for the firm. Mark has worked across all of the fixed income asset classes in the US and Global markets over his career.

Robert Nemeth

Director of Investments, Sustainability Partners Investment Advisors LLC

Bob recently joined SPIA as Director of Investments. He is in charge of leading the expansion into the Americas. Robert Nemeth served as the Managing Director/Director of Research at the Perkins Fund Marketing from 2013-2017. He was responsible for marketing and sales of alternative investments in New England, the Mid-West and for specific New York, Florida and California clients. From 2005-2012, he was a Partner at Elm Ridge Capital Management. Prior to Elm Ridge, he was Head Trader for SRC at John A. Levin & Co., a 14B multi-strategy firm. Bob started his career at J.P. Morgan Investment Management where he remained for 11 years and was Vice President, Senior Equity and Convertible Trader.

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