

# **Environmental Justice (EJ) + Health + Decarbonization**

**Prof. Nea Maloo**, AIA NOMA ICC NCARB LEED AP

The course will be a new inter-disciplinary course in the College of Engineering and Architecture for architects, engineers, and environmental studies major students. This course is intended to bring principles of environmental justice to empower students with the knowledge, and expertise to be leaders in sustainability. The course aims to put sustainable building practice at the center of environmental health, justice, and social equity. The great Nelson Mandela said "Education is the most powerful weapon which you can use to change the world." This course will create the Environmental justice by having students of color be leaders in the field of sustainability. There is a vital need for such a course at Howard University, to shape their careers in community as leaders of sustainability. The multi-disciplinary students will address social, economic, and practical methods for building and community design specifically for people of color.

Globally, the building industry is responsible for 40% of the world's greenhouse gas emissions and the embodied carbon emissions from the building sector alone produce 11% of global emissions. Attention to embodied carbon emitted during the manufacture, transport, and construction of buildings has for too long been a blind spot for sustainable design. Countries and communities of color worldwide are mostly impacted by our lack of action on these issues. Climate change can have different social, economic, public health, and other adverse impacts on underprivileged populations. Communities of color also endure the impacts of unhealthy, energy-inefficient, and disaster-vulnerable buildings, and the energy and petrochemical infrastructure that supplies them.

Architects can design beautiful buildings, create healthier built environments for all, and can also advance health equity and environmental justice broadly. We must engage and prepare a new generation of architects, engineers with the knowledge of these connections, and learn to identify, specify, and design with healthier products, and strategies for decarbonization. To achieve true global sustainability in the built environment, we must acknowledge and address structural racism and its impact on communities worldwide in how we teach and practice architecture, design, and construction. The course will equip the students with the knowledge of healthy building materials in the context of the political and social realities of building. Additionally, the students will learn theory and practice of building decarbonization as foundational approach to environmental justice and health.

## **Course Description**

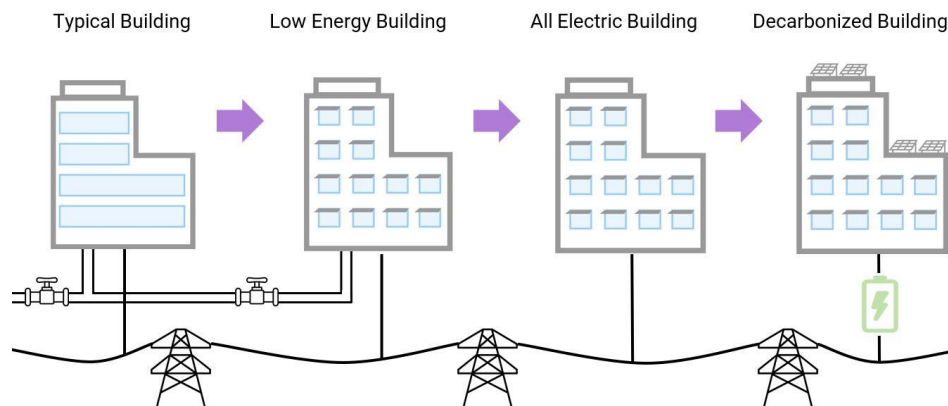
The course taught at Howard is envisioned as inter-disciplinary in collaboration with industry leaders (HBN) and Stanford University. The course will be 15 weeks course, three credit, offered in Fall semester. Fundamentally, the course will address the lack of attention to embodied carbon as part of a sustainable design and its impact to climate change, particularly as it affects countries and communities of color resulting in a disastrous collapse of its ecosystems. The course intends to equip future design professions with new strategies for decarbonization leading to the intended goal of justice for all. The thrust of this course to empower future leaders in the field, brings together experts from academia and the industry in intense and impactful discussions about decarbonization and climate justice. The objective of this course is to build strategies for Decarbonization and climate justice within the architecture profession and the broader local and global community. Under the broad umbrella of climate justice, the inter-disciplinary education will offer an overview of the use of technology tools, including the energy simulation modeling tool Sefira, collected data and design approaches in architectural design.

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The invited experts will provide case study accounts of their approaches to climate justice, experiences of practicing Decarbonization, with a particular focus on their effect on learning outcomes. The discussions will form the basis for students to apply learned methods of design problem solving and converting then into (Fig 1.1) it into lower energy then all electric, to lead decarbonized building. Finally, the appropriate selection of healthy material will be resulting in an appropriately environmental healthy building and the carbon offsets will benefit the community.

## Design Path to Decarbonized Buildings



( Fig1.1, BDLA, Stanford university)

### Work plan and implementation

The 15-week, 3 credit course, multi-disciplinary course will be divided into three sections.

#### 1. Environmental Justice (EJ)( 2.5 weeks)

The students will study the broad history of environmental racism. In this first part, we will explore the interlocking concepts of anti-racism and sustainability in the built environment. We will explore examples of how architecture and design have negatively impacted both the environment and marginalized communities. We will discuss in depth examples of anti-racist architecture, design, and construction, and how we can encourage widespread adoption of practices that promote anti-racist sustainability. Anti-racism, according to the Antiracist Research and Policy Center, involves taking stock of and eradicating policies that are racist, that have racist outcomes, and making sure that, we are working towards a much more egalitarian, emancipatory society. Students will also explore the methods and background of how zoning laws and placement of infrastructure have been used intentionally against underserved the people of color. The section will be covered through case studies and speakers.

#### 2. EJ +Healthy building material ( 2 .5 weeks)

We will explore the unique way in which the materials we build contribute to these toxic conditions, and how careful materials selection can advance an environmental justice agenda. Students will learn about the red list of material, green list of materials and its current research on the impact to health and climate. The students will apply the preferred materials in the specification into their final designs.

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## 3. EJ + Building Decarbonization (10 weeks)

The third session will be divided into five parts. The students will learn how to use Sefira, and to address the question, what is decarbonization?

- I. **Introduction and Background**  
Introduction to course requirements, major themes, and Global Energy Picture. Guest Reviews the case study of American Institute of Architects national renovation Project. Introduce students to the AIA design problem statement. Students form groups to address the design. Intro to BD concepts and discusses the impact on the design process.
- II. **Architectural Considerations for Building Decarbonization**  
Discuss how building materials have a carbon impact. Show where/how to do this calculation Discuss how building materials have a carbon impact. Show where/how to do this calculation. Daylighting and Efficient Lighting strategies will be explored.
- III. **Building Systems - Low Energy, All Electric, Building Photovoltaics**  
How do mechanical systems work? Focus on HVAC and plumbing. The case study review of HVAC system at AIA Headquarters. Development and use of typical diagrams of HVAC system as a design tool.
- IV. **Beyond the Building**  
How are other countries looking at building energy efficiency and decarbonization? Expert panelists from Africa, India, China, and Europe will discuss how they approach decarbonization. Issues to be addressed include, Decarbonized electric grid strategies, utility programs, rebates, CCAs, Offsite procurement options, RECs, Offsets
- V. **Design Intensive + Building Decarbonization**  
The students will put all the course information into practice in a final capstone project in an existing building or innovative design that incorporates the course content studied throughout the semester. The final document will include the transformation of the building to low energy and the all-electric building and the decarbonization of the building. Students will utilize community offset to illustrates carbon offsets and will learn and use sefira as a tool to aid in energy modeling.

## Guest speakers and resources

- Peter Rumsey, CEO, Point Energy Innovations, Lecturer, Stanford University
- Prof. Brad Grant, Howard University
- Anthony Kinslow, Gemini Energy solutions, environmental justice advocate
- Bill Walsh, Founder, Healthy Building Material network,
- Kate Simone, Carbon leadership forum
- Nancy Clanton, Lighting and Daylighting
- Kristen Distefano, Embodied carbon Resources
- The Color of Law, Richard Rothstein
- A Wartime Plan for Electrifying America - [Energy Gang Podcast](#)
- Exelixis Case Study, AIA Headquarters, DC case-study
- Sketchup for Sefira