

# Welcome to SEAS!

## Admitted Student Visit Day

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### Specialization

### Coordinator

Michael Craig

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### Address

Dana Building

440 Church Street

Ann Arbor, MI 48109

### Website

[seas.umich.edu](http://seas.umich.edu)

**01** **Specialization Overview**  
program mission, goals, dual degrees

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**02** **Our Challenges**  
climate crisis, decarbonizing, food systems, water

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**03** **Our Approach**  
systems thinking, program elements, and themes

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**04** **Solutions and Impact**  
Work by alumni and students, career outcomes,

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**05** **Resources**  
Opportunities,

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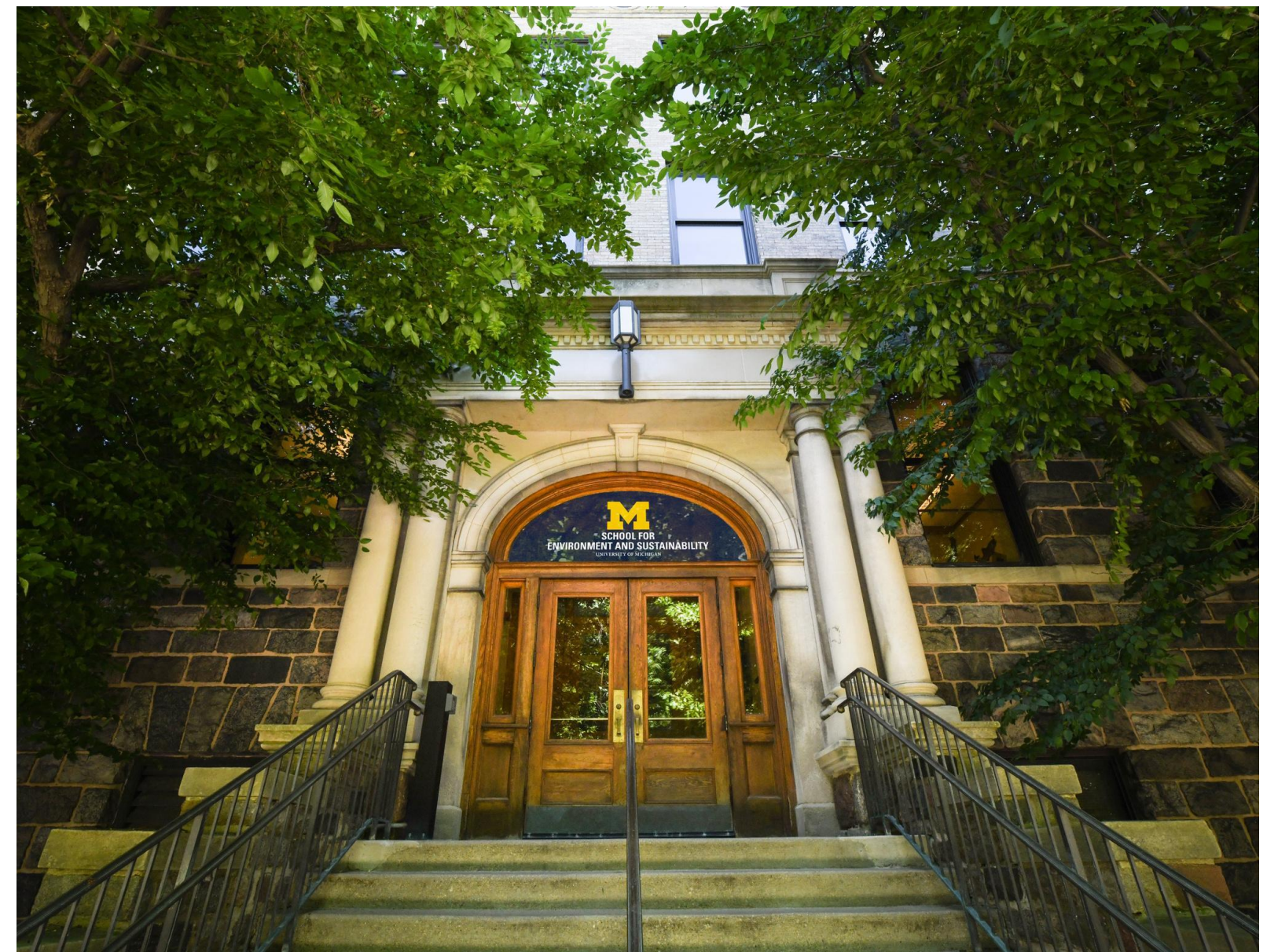
**06** **Questions**

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Alumni outcomes, data

**Careers and  
Employment**

# Agenda





# SEAS

Innovative, Integrated, Justice-Oriented, Entrepreneurial,  
Global

## Mission

At the University of Michigan School for Environment and Sustainability (SEAS), we are at the forefront of building a more sustainable and just world for all by transforming the impact of higher education and reimagining the future. We are advancing action through innovation, research, education and engagement in society, and developing leaders who are empowered to halt the climate crisis and create an environmentally sound future for generations to come.

## Why Enroll?

- Skills, knowledge, tools, methods to solve complex sustainability challenges
- Interdisciplinary training
- Excellence of programs in SEAS and across UM
- SEAS community
- Alumni network
- Success of our students and alumni



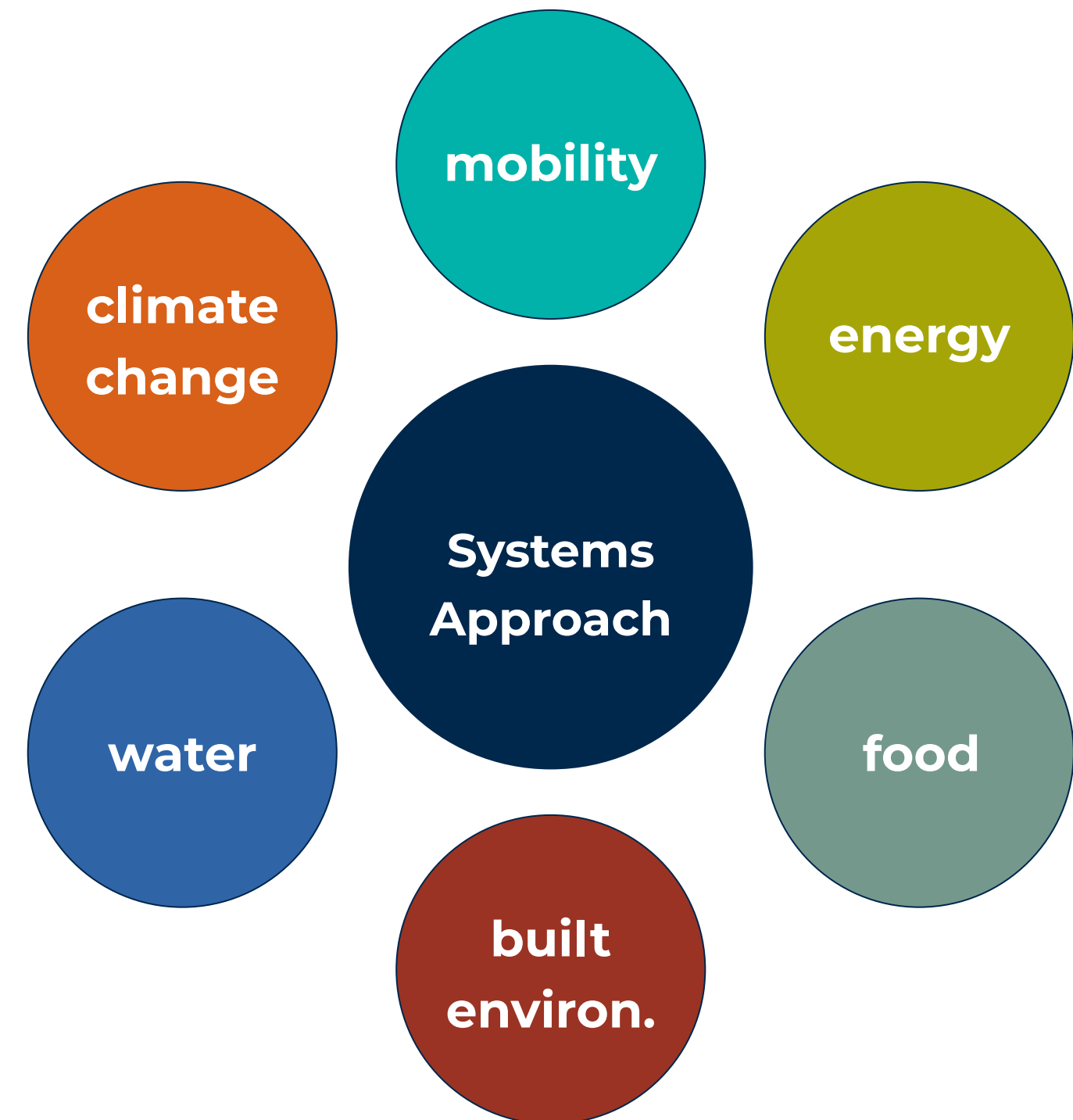
# Sustainable Systems Mission

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- Sustainable Systems graduates are equipped to become leaders through an interdisciplinary curriculum that focuses on systems thinking, as well as a sound understanding of ecological principles, the capabilities of technology, and the mechanisms that reshape economic and social progress.
- **To guide and accelerate the development and transformation of technologies, enterprise, and systems** for meeting basic human needs in a sustainable manner.
- This curriculum is designed to provide interdisciplinary education and professional development for students in SEAS and those in dual degree programs.

# Themes

- Examples of Research Areas
- Autonomous and electrified vehicles
- Carbon neutrality modeling and strategy
- Circular economy
- Corporate environmental strategy
- Energy efficient technologies
- Energy insecurity and justice
- Environmental impacts of international trade
- Environmental information disclosure and greenwashing
- Food, water, energy nexus and sustainable diets
- Net-zero buildings
- Renewable energy siting and grid integration
- Resource management in developing countries
- Sustainable supply chains
- Transportation climate policy
- Urban agriculture and sustainable food systems
- Urban infrastructure systems





# SEAS is Different

- Our **customizable** learning experience
- Our **interdisciplinary** emphasis
- We turn knowledge into **impact**
- **Solutions** to **complex** environmental problems
- The **first** environmental school to offer master's projects
- With **X alumni (update stat)**, SEAS has the **largest** alumni network of any environmental degree program.
- Our **global engagement** equips graduates to **change the world**

# Pillars of Sus Sys



## Sample Courses

- Industrial Ecology
- Electric Propulsion
- Sustainable Cities
- Climate Physics
- Traffic Engineering
- Urban Agriculture
- Wetland Ecology



## Master's Project or Thesis

- 16-month group project
- Real client
- Real problem
- Professional learning
- Giveback to society



## Core

- SEAS + SusSys Core
- Electives, Analytics
- Project, practicum, extra courses
- Sustainable Design & Technology
- Sustainable Enterprise



## Dual Degrees

- Other U-M schools
  - Law
  - Public Policy
  - Business
  - Engineering
  - Economics
  - Urban Planning
- Over 30% pursue a dual degree

# Dual Degree: Erb Institute

## Overview

- 2.5 or 3 year degree (MBA and MS)
- Curriculum includes client-based field projects with companies, government, and nonprofits.
- Two summer internships
- Resources include specialized projects, access to rich network of sustainability leaders, career support and additional funding

## Impact Projects

- Short term, hands-on, field experiences
- Over 100 student projects to date
- About 1/3 have been international
- Locations include: Ecuador, Galapagos Islands, Costa Rica, Nicaragua, Cuba, China, Gabon, Switzerland, Spain, and more!

## Partnership Projects

- Through Partnership Projects, Erb students work collaboratively with companies, associations and nonprofits to tackle pressing business challenges and broader strategy questions. These are paid opportunities separate from internships and curricular coursework

## Internships

- Students take on 2 internships
- Opportunities for out-of-the-box experiences
- Funding support for students pursuing internships with nonprofits

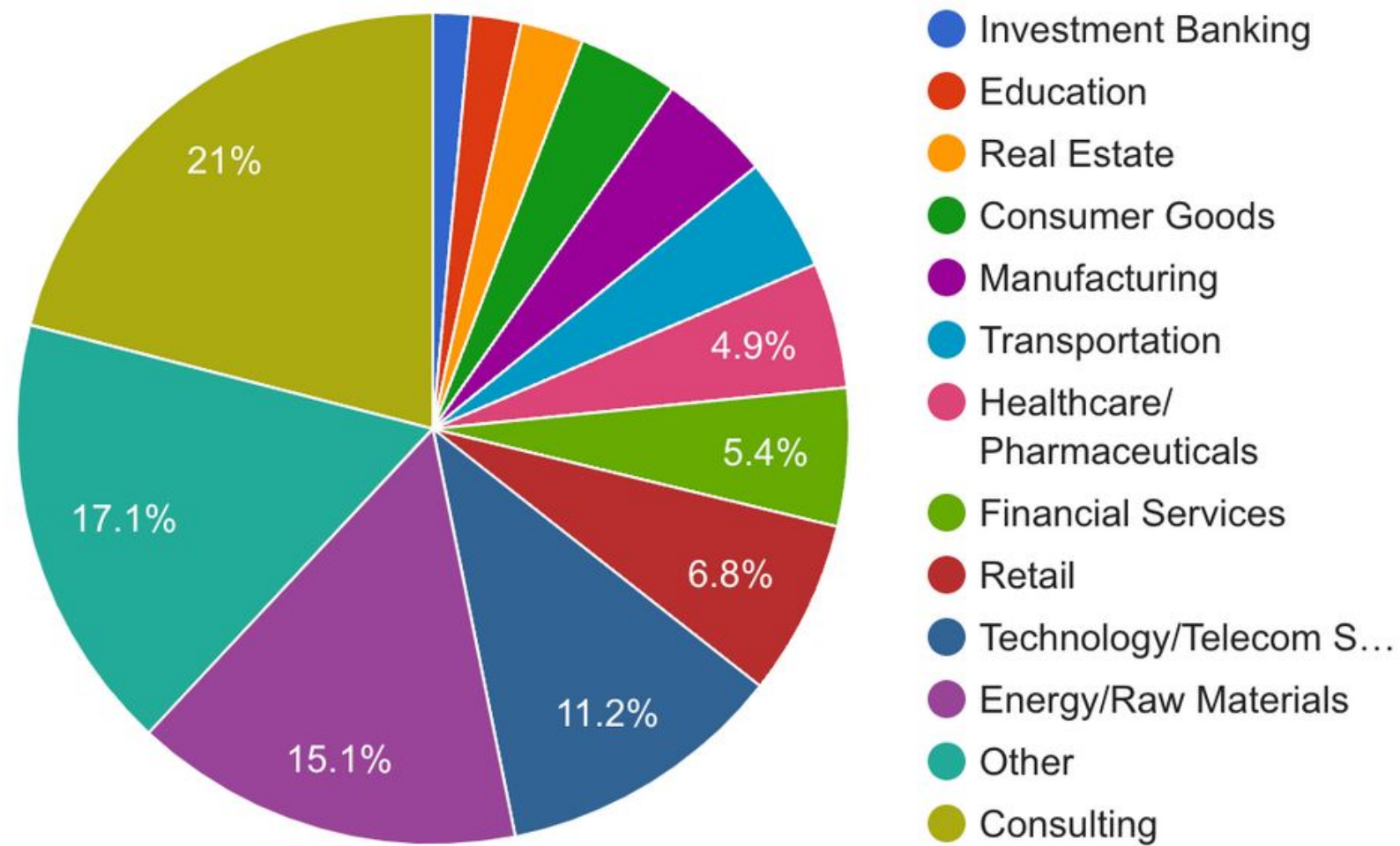
## Practitioner Engagement

- U-M workshops, career chats, and guest lectures with sustainability leaders, access to multiple boards
- 500 alumni

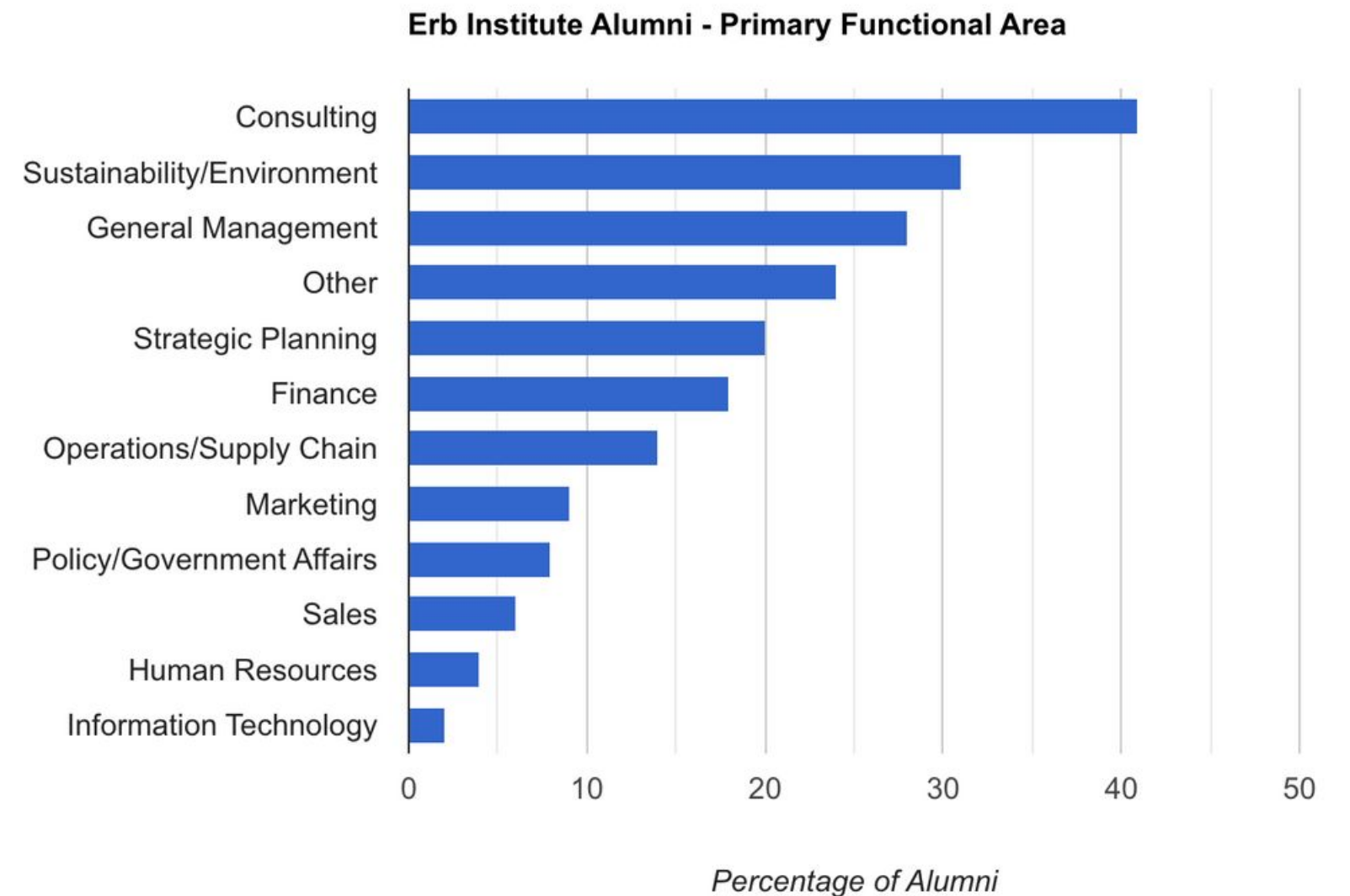


# Dual Degree: Erb Institute

## Alumni Employers by Industry



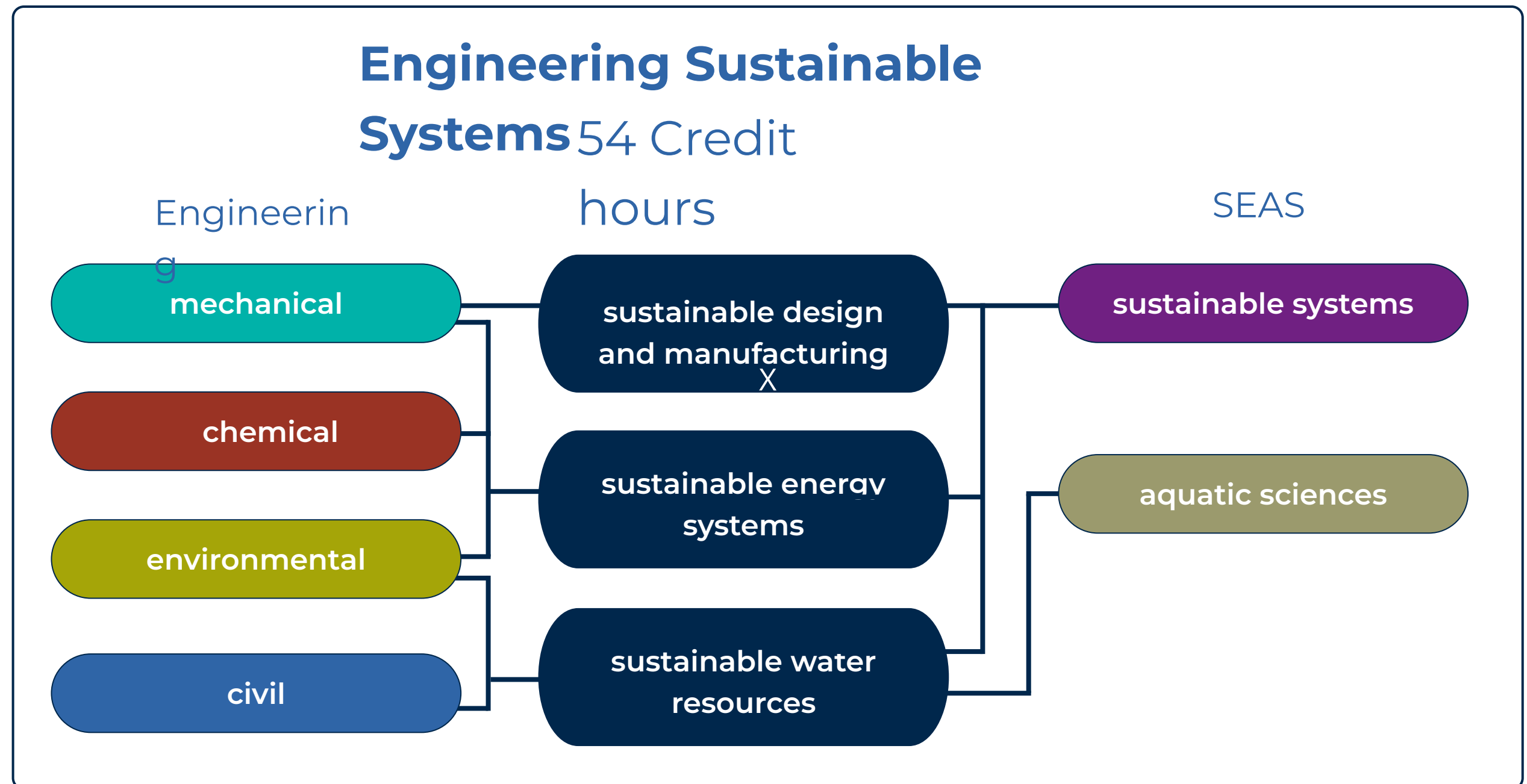
## Alumni Primary Functional Area



# Dual Degree: Engineering

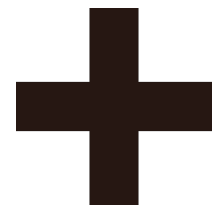
## MS/MSE Program

- MS/MSE Dual Degree Program
- 2- 2.5 years to complete
- First in the nation
- Launched Fall 2007



# More Dual Degrees

Environment &  
Sustainability  
MS



Master of urban and regional planning (MURP)

Master of science in public policy (MPP)

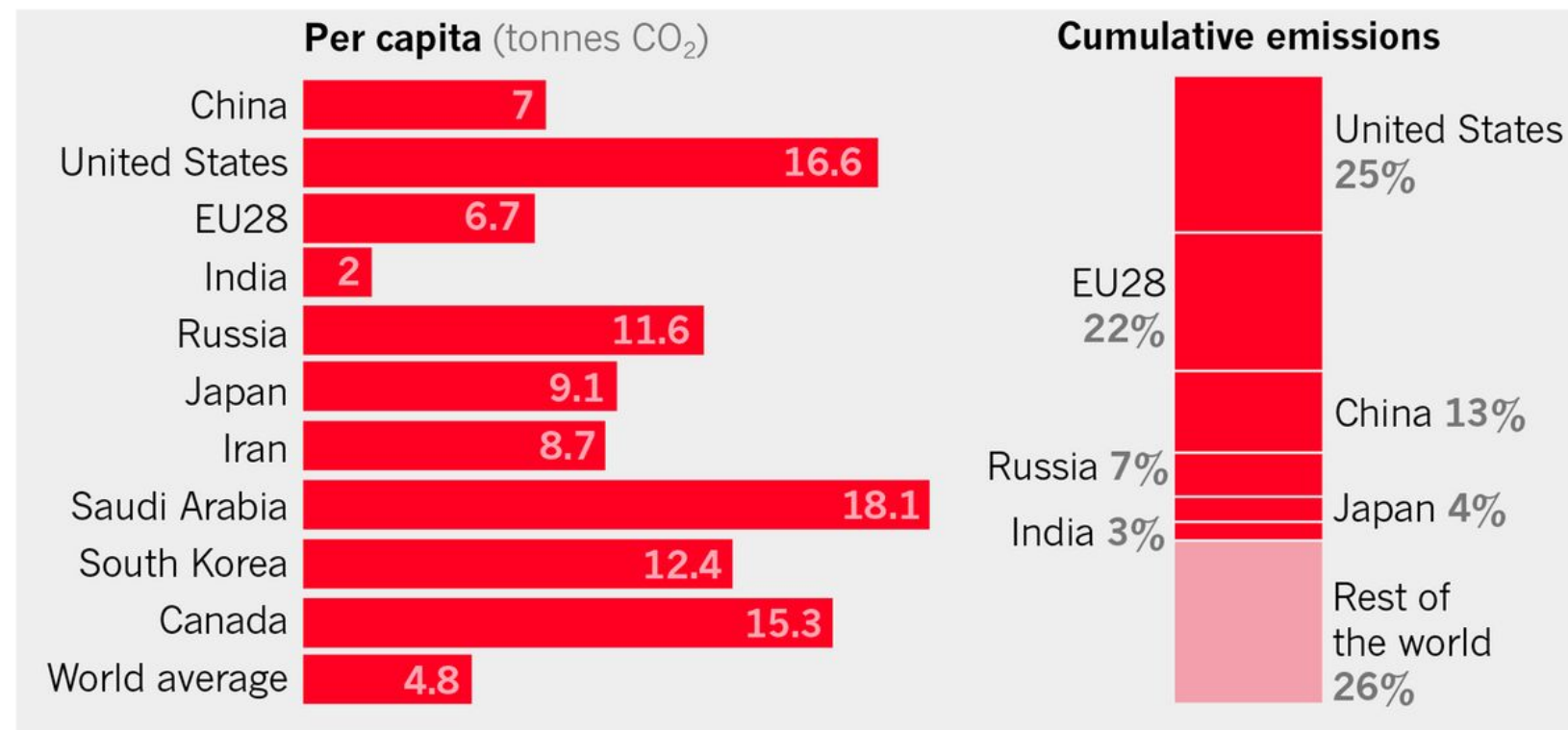
Juris doctor (JD)

Self-initiated dual degrees

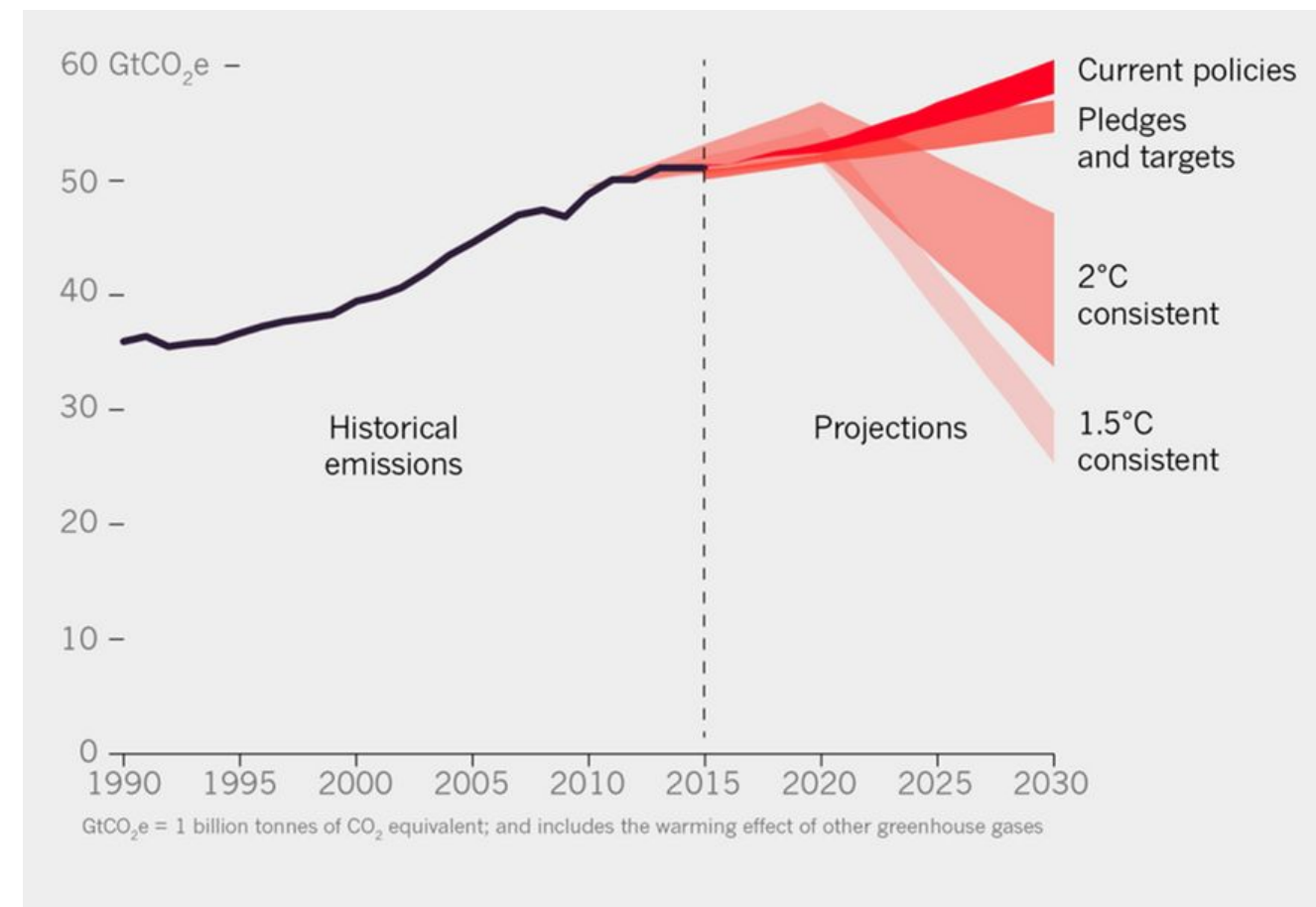
# Our Challenges

# Our Challenge:

## Climate Crisis



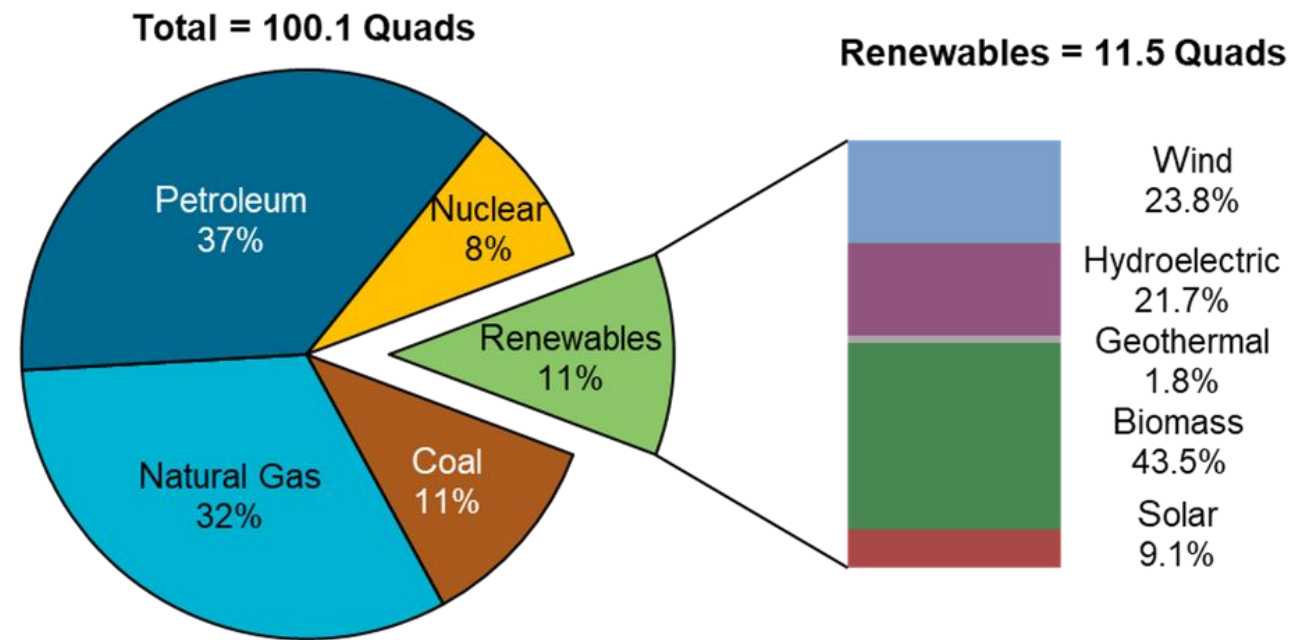
global average greenhouse emissions  
1.5 C target in 2030: 2.8 t CO<sub>2</sub>e/capita



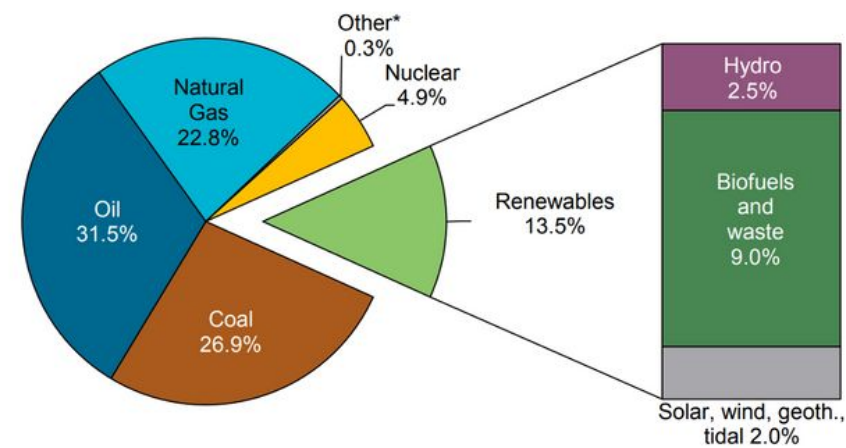
IPCC goals for 1.5°C, global CO<sub>2</sub> emissions: ~45% reduction from 2010 levels by 2030, net zero around 2050

# Our Challenge:

## Decarbonizing Energy Systems



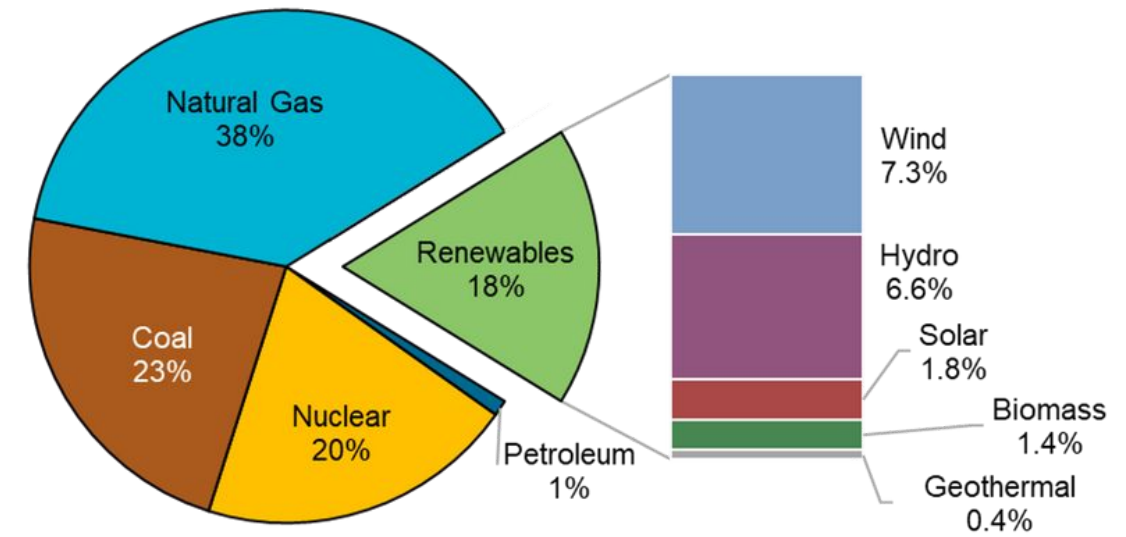
2018 fuel shares in world total energy supply



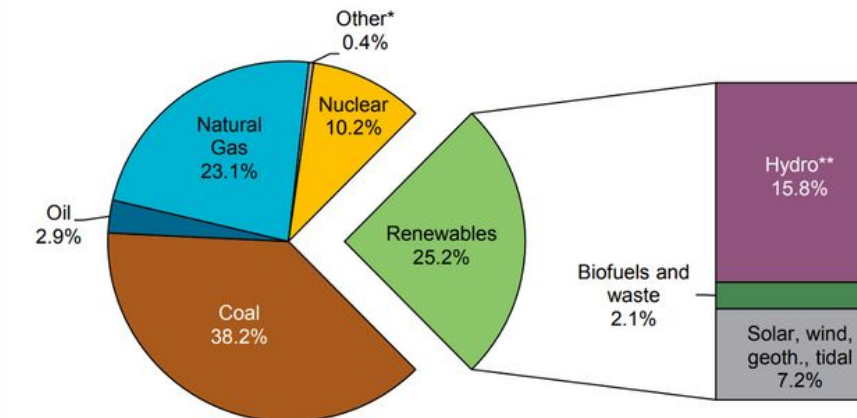
IEA. All rights reserved.

\* Other includes non-renewable wastes and other sources not included elsewhere such as fuel cells.  
 Note: Totals in graphs might not add up due to rounding.  
 Source: IEA/OECD World Energy Balances.

**Total = 4.12 trillion kilowatthours**



2018 fuel shares of world electricity production



IEA. All rights reserved.

\* Other includes electricity from non-renewable wastes and other sources not included elsewhere such as fuel cells and chemical heat, etc.  
 \*\* Excludes pump storage generation.  
 Note: Totals in graphs might not add up due to rounding.  
 Source: IEA/OECD World Energy Balances.



# Our Challenge:

## Decarbonizing Mobility and Accessibility

### Reduce travel

- Live closer to work, bundle trips, telework, teleconference

### Shift modes

- Public transit, bike, walk

### Vehicle electrification

- Inform design, vehicle adoption decisions
- Charging infrastructure, equity, access
- Deploy with renewable energy sources
- Develop circular economy for EV batteries

### Other technologies

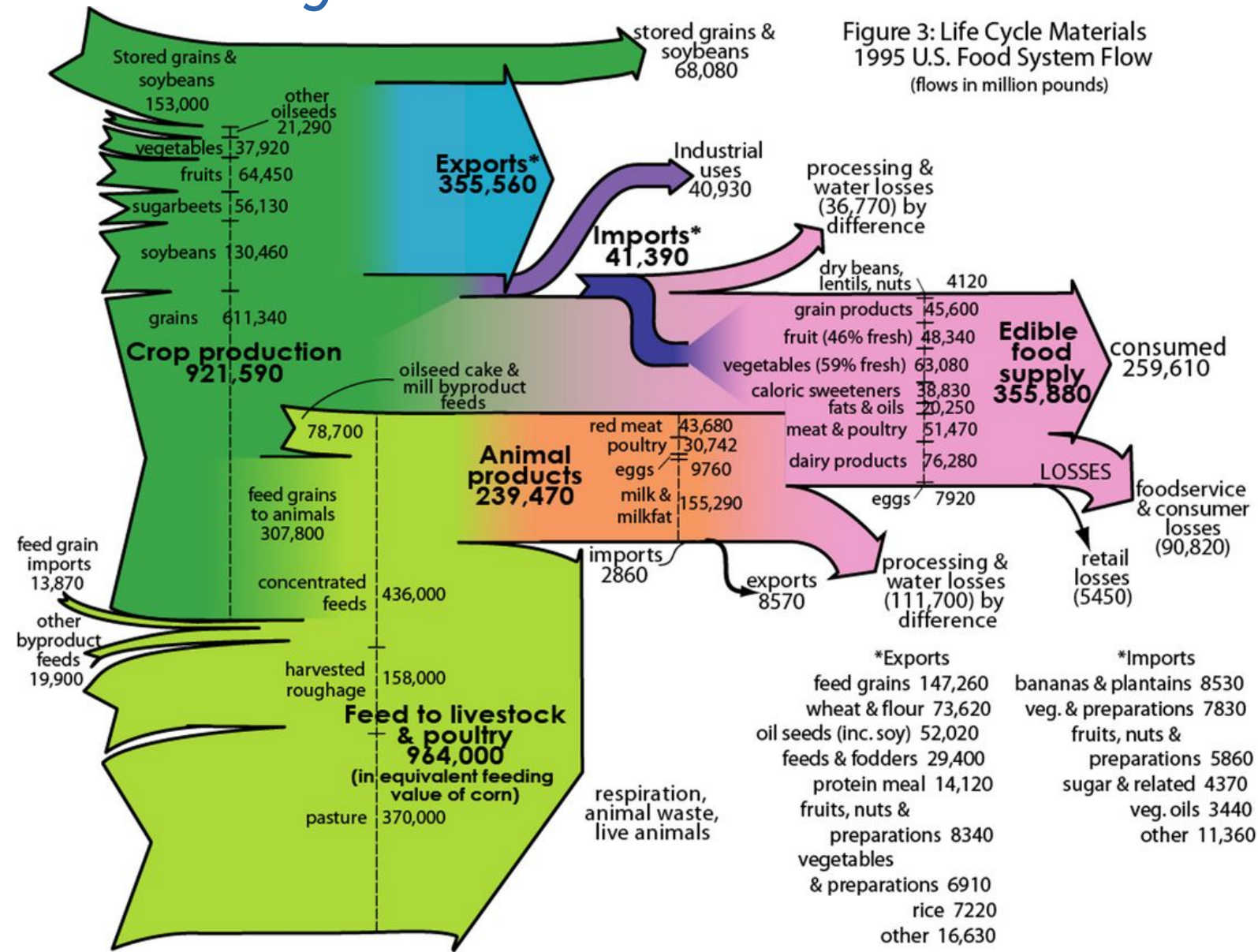
- Vehicle lightweighting, powertrain efficiency, automation

### Policy

- incentives for EV deployment
- more stringent vehicle GHG standards
- tax to address externalities of climate change

# Our Challenge:

## Food Systems



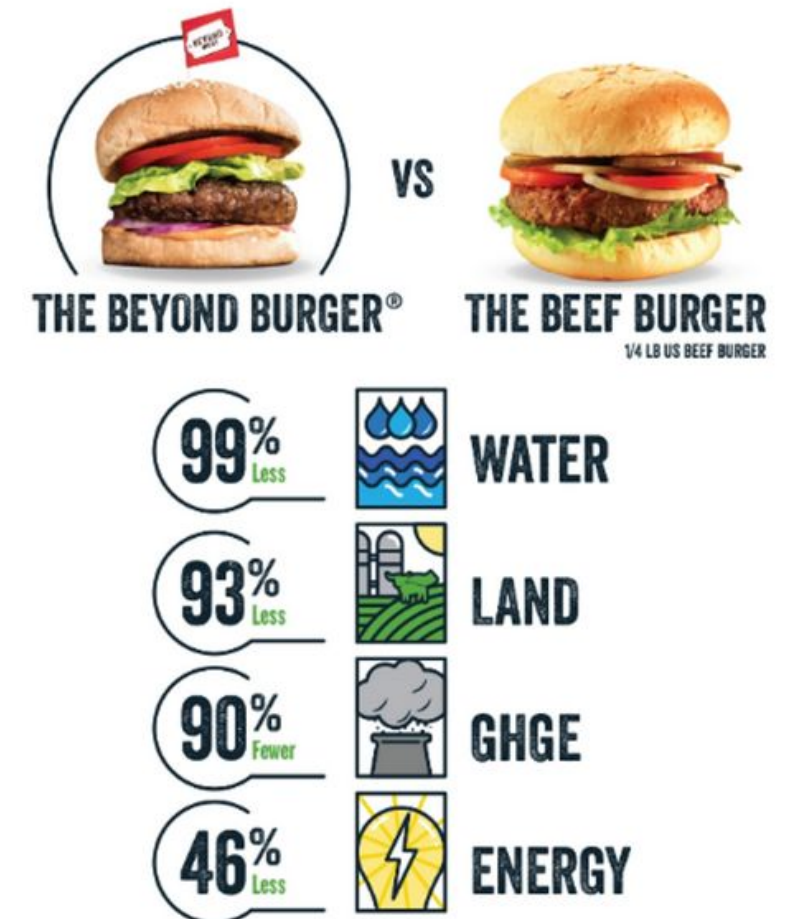
Report No. CSS18-10  
September 14, 2018

### Beyond Meat's Beyond Burger Life Cycle Assessment:

A detailed comparison between a plant-based and an animal-based protein source

Martin C. Heller and Gregory A. Keoleian

**M** CENTER FOR SUSTAINABLE SYSTEMS UNIVERSITY OF MICHIGAN

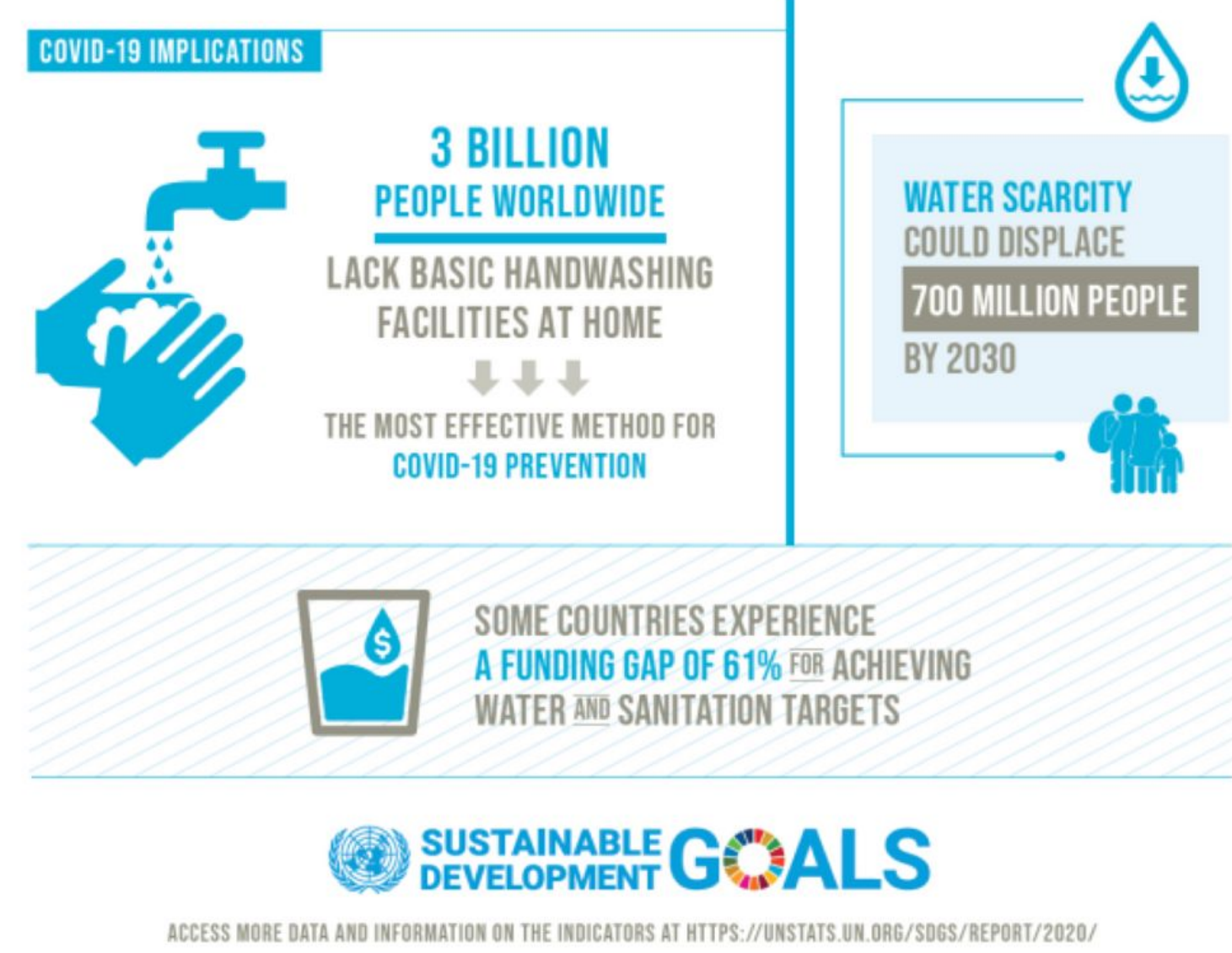


Source: Sustainability Factsheets



# Our Challenge:

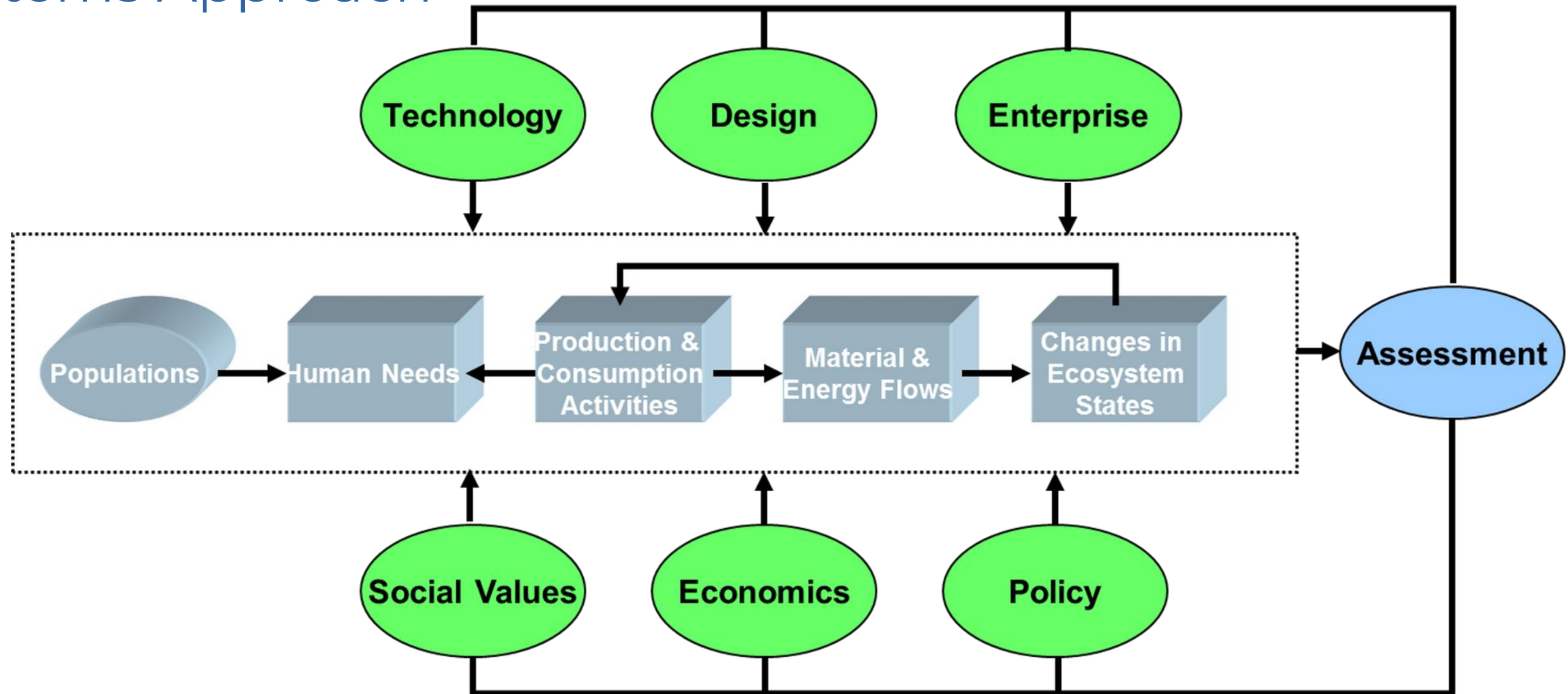
## Water Scarcity and Sanitation



# Our Approach

# Our Approach:

## Systems Approach



# Our Approach:

## Program Elements

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### Systems Analysis

- Evaluate sustainability performance

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### Sustainable Design and Technology

- Guide design of sustainable products and technology

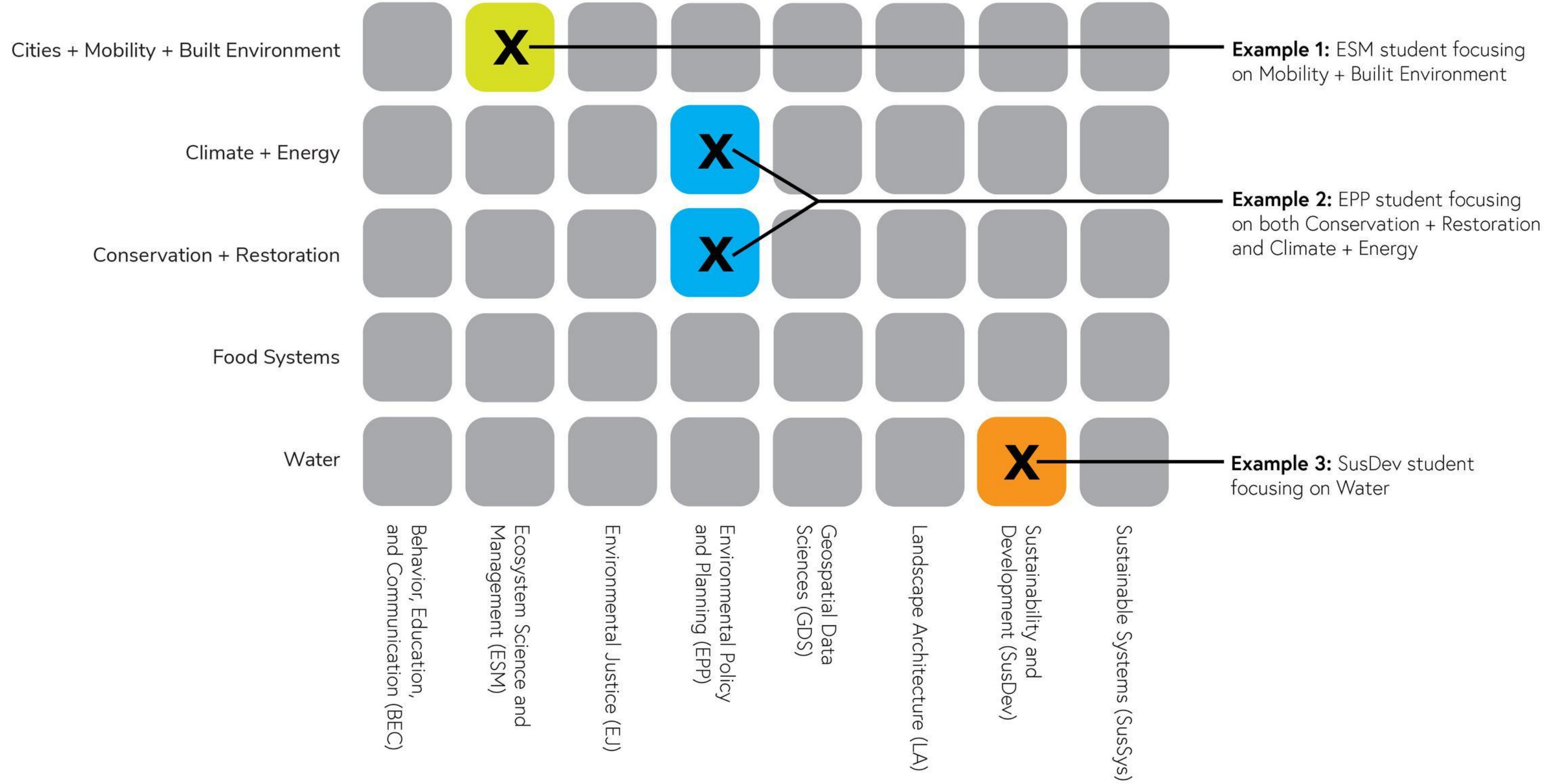
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### Sustainable Enterprise

- Lead public and private sector organizations in the innovation and implementation of sustainable systems



# Themes



# Specializations



# Tailoring your Degree Beyond your Specialization

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## Certificates

- Environmental Justice
- Industrial Ecology
- Spatial Analysis
- Sustainability
- Climate Change Solutions

# Core Faculty



**Michael Craig**

Assistant Professor



**Benjamin  
Goldstein**

Assistant Professor



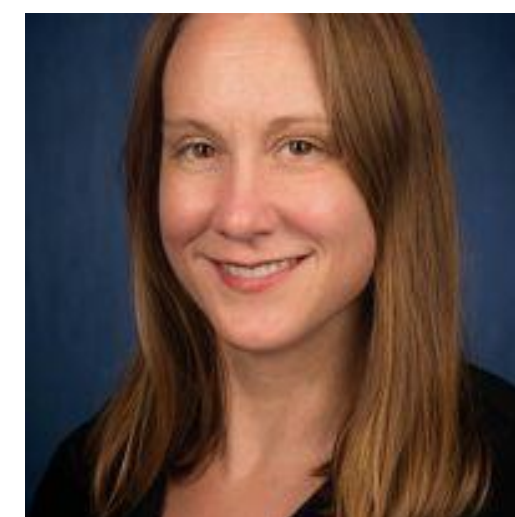
**Greg Keoleian**

Professor, CSS Director



**Thomas Lyon**

Professor



**Shelie Miller**

Professor



**Joshua Newell**

Professor



**Sara Soderstrom**

Associate Professor



**Parth Vaishnav**

Assistant Professor



**Charlene Zietsma**

Professor

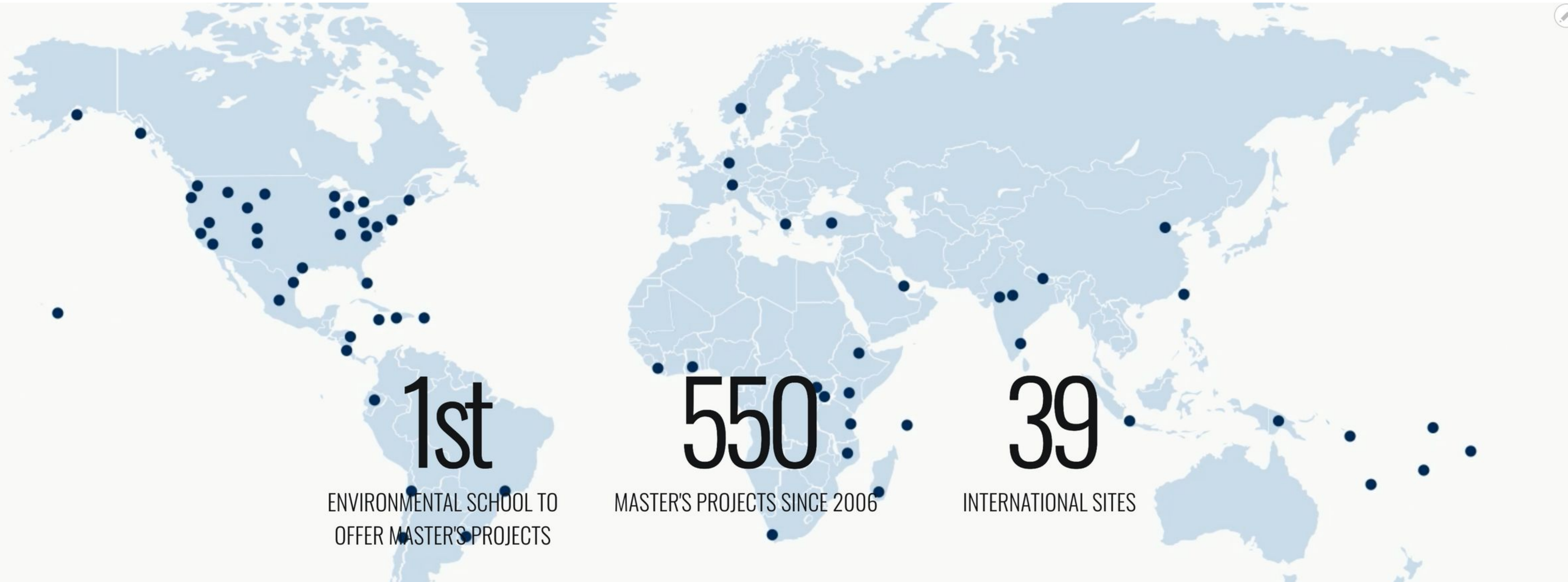
# Solutions and Impact

students and alumni



# Master's Projects

first environmental school to offer master's projects



# Scope 3 Emissions Assessment and Circular Economy Protocol Development at Ford Motor Company



Laura Aguilar Esteva



Akshat Kasliwal



Michael Kinzler



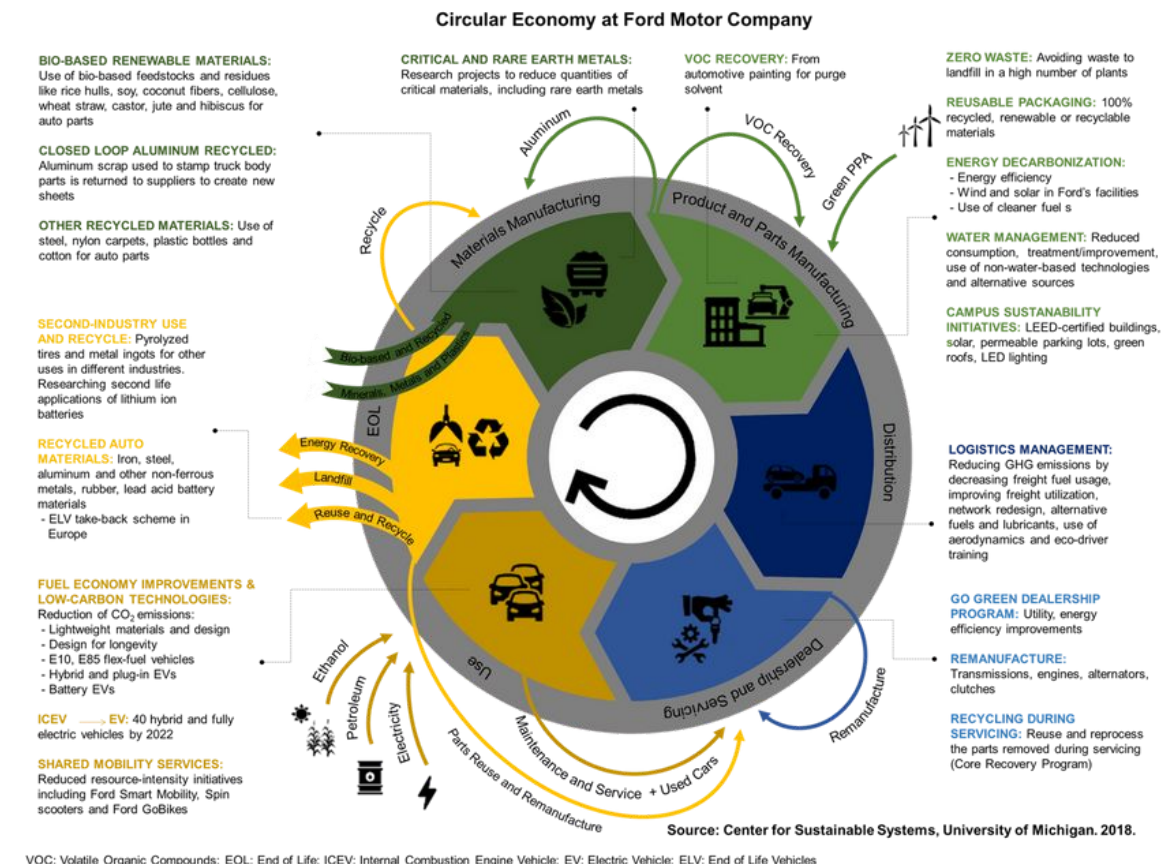
RESEARCH AND ANALYSIS

## Circular economy framework for automobiles: Closing energy and material loops

Laura C. Aguilar Esteva, Akshat Kasliwal, Michael S. Kinzler, Hyung Chul Kim, Gregory A. Keoleian ✉

First published: 20 November 2020 | <https://doi.org/10.1111/jiec.13088>

**Funding Information** This study was supported by the Ford Circular Economy Master's Project Fellowship (No. N025068). Additional funding for this research was provided by the University of Michigan's School for Environment and Sustainability and Argonne National Laboratory (ANL Grant # 7F-30052 & U.S. DOE Award # DE-AC02-06CH11357).



# Thesis: The Intersection of Energy and Justice

Dominic Bednar

- SS track '16
- Exploring Spatial, Racial and Socioeconomic Patterns of Residential Heating Affordability, Consumption & Efficiency in Wayne County, Michigan

REVIEW ARTICLE

<https://doi.org/10.1038/s41560-020-0582-0>

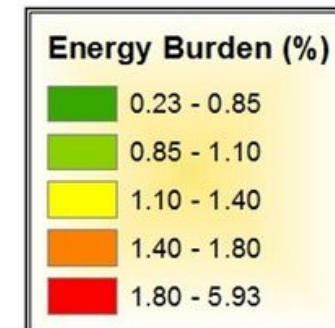
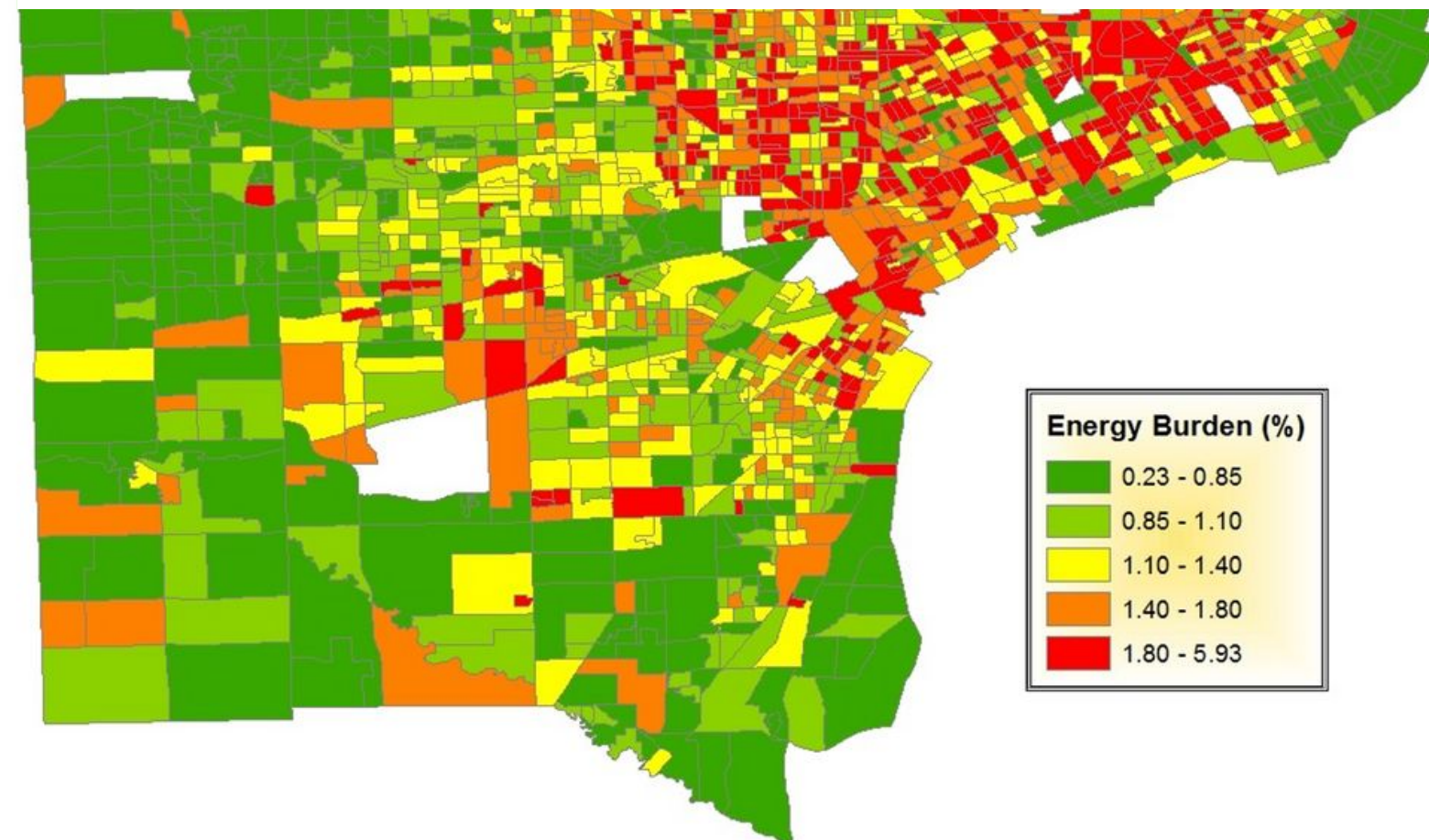
nature energy

Check for updates

## Recognition of and response to energy poverty in the United States

Dominic J. Bednar  and Tony G. Reames 

A household is energy poor when they cannot meet energy needs. Despite its prevalence, the US has not formally recognized energy poverty as a problem distinct from general poverty at the federal level, which limits effective responses. In this Review, we examine the measurement and evaluative metrics used by the two federally-funded energy programs focused on reducing high energy bills to understand how program eligibility requirements and congressional funding appropriations have shaped the national understanding and implementation of energy poverty assistance. We find that current measurement and evaluative metrics hinge on the distribution of government resources and the number of vulnerable households assisted, rather than improving household well-being and reducing overall energy poverty. We suggest that comparisons to formal food insecurity and fuel poverty recognition and national responses in the US and UK, respectively, can help inform the development of more comprehensive US responses to energy poverty going forward.



0 2.5 5 10 15 20 Miles

Data Source: RECS, 2009, US Census, American Community Survey



# Life Cycle Comparison of Manual and Machine Dishwashing

Gabriela Porras

- SS track '19
- Exploring Spatial, Racial and Socioeconomic Patterns of Residential Heating Affordability, Consumption & Efficiency in Wayne County, Michigan



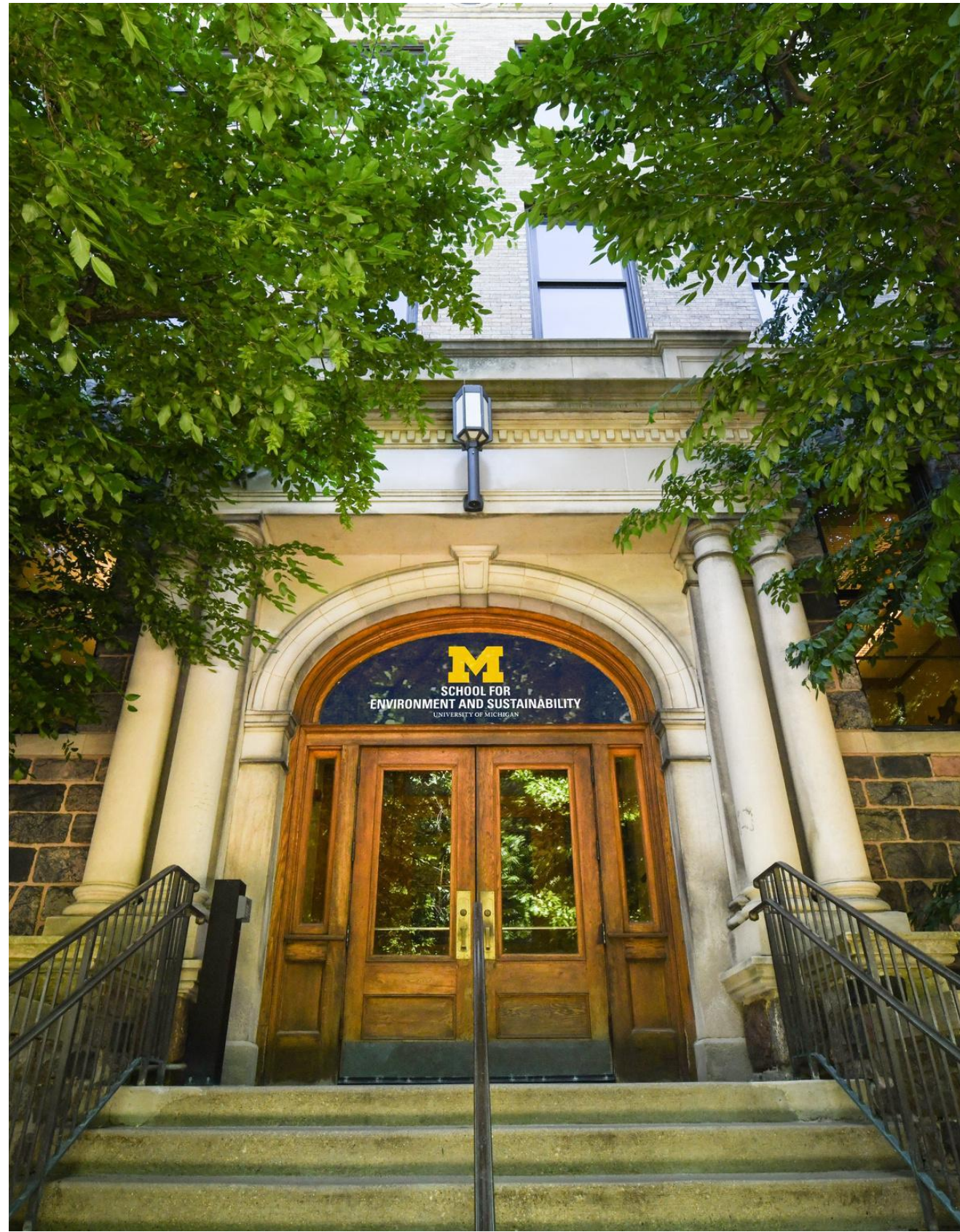
LETTER • OPEN ACCESS

## A guide to household manual and machine dishwashing through a life cycle perspective

Gabriela Y Porras<sup>1</sup>, Gregory A Keoleian<sup>1</sup> , Geoffrey M Lewis<sup>1</sup>  and Nagapooja Seeba<sup>2</sup>

Published 12 February 2020 • © 2020 The Author(s). Published by IOP Publishing Ltd

[Environmental Research Communications](#), Volume 2, Number 2



# Alumni Impact

## All Sectors

- Michelle Farhatt, '11, Arc Engineer, PJM Interconnection
- Elizabeth Terry, '03, Program Manager, National Grid
- Devon Douglas, '09, Director of Sustainability, Etsy
- Shoshanna Lenski, '11, Director of Strategy & Planning at DTE Energy
- Patti Liao, '11, Senior Manager, Recurrent Energy
- Adithya Dahagama, '16, Program Manager, Energy & Infrastructure Strategy
- Rob Frederick, '00, VP and Director, Corporate Responsibility
- Amanda Farthing, '21, Research Engineer II, National Renewable Energy Laboratory
- Michael London, '20, Product Manager, 3D Printing - Metals at HP



# Career Outcomes



SATISFIED  
WITH POST-  
GRAD  
POSITION



JOB  
SEEKERS  
FOUND  
FULL-TIME  
JOBS



FOUND  
POSITION  
WITHIN 6  
MONTHS

## 2022 Salaries

By Sector		By Specialization			
Specialization	% of reported	Count	Average	Median	Range
Dual Degree*	35.5%	27	\$131,016	\$125,000	\$75,000 - \$175,000
Behavior, Education & Communication	24.0%	18	\$98,333	\$83,500	\$40,000 - \$175,000
Environmental Policy & Planning	21.3%	16	\$111,195	\$90,000	\$57,000 - \$175,000
Ecosystem Science & Management	21.3%	16	\$65,187	\$58,500	\$35,000 - \$135,000
Environmental Justice	17.3%	14	\$62,715	\$54,000	\$40,000 - \$94,000
Sustainable Systems	17.3%	13	\$114,502	\$120,000	\$70,000 - \$175,000
Geospatial Data Sciences	9.3%	7	\$54,229	\$55,000	\$32,000 - \$82,601
Landscape Architecture	8.0%	6	\$63,900	\$62,200	\$55,000 - \$72,000
PhD	5.3%	4	\$61,250	\$57,500	\$50,000 - \$80,000
Sustainability and Development	4.0%	3	\$64,000	\$65,000	\$49,000 - \$78,000

\*Dual degree students pursued degrees in multiple schools

# Resources





# Opportunities



## Center for Sustainable Systems (CSS)

- Nearly all of the research conducted involves the participation of students
- Research Assistantships, hourly employment (including work-study) and volunteer positions
- Opportunity to publish research results



## Forums and Lectures

- Lectures are being announced weekly, but several are recurring
- Annual Wege Lecture
- Monthly Lectures
  - CSS Research Forums
  - SS Forums
  - Erb Colloquium Brown Bag



## Clubs

- SEAS Student Government
- Consortium on Agriculture, Food, and the Environment
- BLUElab
- Ross Net Impact
- Energy Club @ Ross
- Student Sustainability Initiative (SSI)
- Michigan Backpacking Club



## Conferences

- COP Conferences yearly
- Group of students attended and presented on observations from the Global Climate Conference in Paris.



# CSS Sustainability Factsheets

- Get the facts!
- 28 Factsheets
- 1763 facts and 838 citations and 135 graphics
- Updated annually

# Supportive Community

Largest living alumni body of any university

 **12,600+**

TOTAL ALUMNI, THE LARGEST  
GRADUATE POPULATION OF ANY  
ENVIRONMENTAL DEGREE  
PROGRAM

 **33%**

OF SEAS ALUMNI  
HAVE RECEIVED A  
DUAL DEGREE FROM  
ANOTHER ONE OF U-  
M'S NATIONALLY  
RANKED TOP 10  
PROGRAMS

 **Alumni**

ARE REPRESENTED IN ALL  
50 STATES AND 80+  
COUNTRIES



# Our Culture

# Funding

- [Financial Aid website](#) to gain knowledge about internal and external resources to inform you as you develop your plan to finance your graduate degree. These resources include, but are not limited to:
- [Federal and university financial aid](#): This aid takes into account financial need, and the funding sources include grants, loans, and student employment. A completed FAFSA is required.
- [SEAS funding](#): These competitive merit scholarships are awarded by the school, generally at the time of admission.
- [Graduate Student Appointments student employment](#): These limited and competitive positions—Graduate Student Instructor (GSI), Graduate Student Research Assistant (GSRA), and Graduate Student Staff Assistant (GRSA)—often include a full-tuition waiver, health and dental benefits, and a monthly stipend.
- [External funding](#): Fastweb, Pivot, and SPIN are three popular clearinghouses for student-centered grants offered by independent organizations.
- [Rackham funding \(scholarships, fellowships, travel\)](#): Similar to SEAS funding, these selective grants are offered by the Rackham Graduate School.
- [Student Hourly Employment](#): This includes 1) hourly part-time work; 2) work study, which is partially funded by the federal government. To qualify, students must have a work study allocation as part of their funding package. International students are not eligible. Check with SEAS faculty regarding hourly employment.
- [SEAS Funding Database](#): Better understand the specific funding opportunities that are available.



**Enrollment  
deadline  
April 15**

**M** | **SEAS** SCHOOL FOR ENVIRONMENT  
AND SUSTAINABILITY  
UNIVERSITY OF MICHIGAN

**Come join us!**

# Questions?

## Address

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48109

## Website

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## Specialization Coordinator

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