



**NYU**

**ROBERT F. WAGNER GRADUATE  
SCHOOL OF PUBLIC SERVICE**

# **PADM-GP 4314**

## **Environmental Finance and Social Impact**

### **Spring 2021**

#### **Instructor Information**

- Instructor: Stephen R. Freedman
- Email: sf147@nyu.edu
- Office Address: n.a.
- Office Hours: by appointment.

#### **Course Information**

- Class Meeting Times: Saturdays 24 April and 1 May, 2021, 9:30am-12pm and 2pm-4:30pm ET.
- Class Location: conducted via Zoom, details to be provided during week before first class

#### **Course Prerequisites**

- CORE-GP 1021 and CORE-GP 1022

Or

- URPL-GP 2660
- PADM-GP 2311 recommended

#### **Course Description**

How can financial capital be deployed to help solve the most pressing environmental problems of our time? This course will provide students a thorough understanding of how key environmental challenges can be addressed through innovative financing techniques and investment strategies. Students will be introduced to key thematic areas of environmental finance such as water, energy, waste management and sustainable agriculture. They will learn about financial instruments, structures, investment approaches and asset classes that can be relied upon to achieve positive environmental outcomes and impact including, but not limited to,

private market investments, green bonds, pay-for-success agreements, shareholder engagement, trading in environmental certificates, and conservation finance.

## Course and Learning Objectives

By the end of the course, students should be able to

1. recognize key environmental challenges and the potential for investment capital to help address them
2. understand the main instruments of environmental finance across asset classes with their strengths and limitations
3. understand the specificities of environmental finance in the main thematic areas of water, food, energy/climate change and waste.
4. identify and evaluate specific investment opportunities by applying concepts of environmental finance

## Learning Assessment Table

<b>Graded Assignment</b>	<b>Course Objective Covered</b>
Participation (live)	All
Participation (preparation assignments)	#1
Assignment 1	#2, #3
Final Exam	#2, #3, #4

## Reading Materials

There is no assigned textbook for this course. Reading material is based on publicly available reports and articles.

For students who would like to brush up on introductory finance and investments, the following resources may be consulted:

Zvie Bodie, Alex Kane and Alan Marcus (2013), Investments, 10<sup>th</sup> edition, McGraw Hill. It's available at NYU libraries. Part I is a good introduction.

Great online investment resource: [www.investopedia.com](http://www.investopedia.com)

Useful education site at the SEC: <https://www.investor.gov/introduction-investing>

## Academic Integrity

Academic integrity is a vital component of Wagner and NYU. All students enrolled in this class are required to read and abide by [Wagner's Academic Code](#). All Wagner students have already read and signed the [Wagner Academic Oath](#). Plagiarism of any form will not be tolerated and students in this class are expected to report violations to me. If any student in this class is unsure about what is expected of you and how to abide by the academic code, you should consult with me.

## Henry and Lucy Moses Center for Students with Disabilities at NYU

Academic accommodations are available for students with disabilities. Please visit the [Moses Center for Students with Disabilities \(CSD\) website](#) and click on the Reasonable Accommodations and How to Register tab or call or email CSD at (212-998-4980 or [mosescsd@nyu.edu](mailto:mosescsd@nyu.edu)) for information. Students who are requesting academic accommodations are strongly advised to reach out to the Moses Center as early as possible in the semester for assistance.

## Class Policies

This course will abide by the Wagner School's general policy guidelines on incomplete grades, academic honesty, and plagiarism. It is the student's responsibility to become familiar with these policies. All students are expected to pursue and meet the highest standards of academic excellence and integrity. Please familiarize yourself with the following guidelines:

[Incomplete policy](#), [Course withdrawal policy](#), [Grading policy](#)

## Assignments and Evaluation

**Class Participation (including case study):** 30% of total grade

Participation is awarded based on two aspects, which will receive equal weight: 1) On-time submission and passing grade for two preliminary assignments due prior to the first live class. The assignments will be evaluated on a pass or fail basis, 2) attendance, punctuality and engagement in class discussions. Giving the concentrated format of the course over two consecutive Saturdays, missing more than 1 hour will negatively impact your participation grade. Extraordinary circumstances include religious observances and illness but you must give notice via email as soon as possible. All students benefit from high levels of participation, so you are expected to do readings prior to class, attend class, and contribute to the discussion. Attendance is taken via Zoom. I will be making note of those who routinely participate in the discussion. Active participation during the case study in week 2 will receive particular weight.

**Written Assignment** (due on week 2, 1 May 2020): 25% of total grade

**Final Take-Home Exam** (due on 7 May 2020): 45% of total grade

## NYU Classes

All announcements, resources, and assignments will be delivered through the NYU Classes site. I may modify assignments, due dates, and other aspects of the course as we go through the term with advance notice provided as soon as possible through the course website.

## Overview of Semester

Week	Date	Topic	Deliverable
Week 1, morning, lecture 1	24 April	Introduction: key environmental challenges and concepts	
Week 1, morning, lecture 2	24 April	Investment instruments available to finance environmental goals	
Week 1, afternoon lecture 3	24 April	Waste management and the circular economy	
Week 1, afternoon, lecture 4	24 April	Sustainable agriculture	
Week 2, morning, lecture 1	1 May	Climate change investing	
Week 2, morning, lecture 2	1 May	Case study on renewable energy	Case study
Week 2, afternoon, lecture 3	1 May	Water	Written assignment
Week 2, afternoon, lecture 4	1 May	Miscellaneous concluding topics	
	7 May	Final take-home exam due	Written assignment

## Detailed Course Overview

### Week 1, Lecture 1: Introduction

- Scale of environmental challenges (global footprint network, planetary boundaries)
- The Environment within the UN's Sustainable Development Goals
- Critical need for private capital given scope of funding gap

- Interdependencies abound: The water – energy – food nexus
- Overview of course

## Reading Materials

### **Overview of Environmental Challenges:**

- WWF (2020), "[Living Planet Report 2020. Beyond the Curve of Biodiversity Loss](#)", WWF International, Gland, Switzerland. Chapters 1, 2 and 3.
- Stockholm Resilience Center (2009, 2015), "[Planetary Boundaries](#)".

### **Business case Environmental Sustainability:**

- T. Whelan and C. Fink (2016), "[The Comprehensive Business Case for Sustainability](#)", Harvard Business Review, October 21, 2016

### **The role of private capital:**

- UBS (2017), "[Mobilizing private wealth for public good](#)", UBS White Paper for the World Economic Forum Annual Meeting 2017.

### **Acknowledging interdependencies:**

- FAO (2014), "[Walking the Nexus Talk: Assessing the Water-Energy-Food Nexus in the Context of the Sustainable Energy for All Initiative](#)", Environment and Natural Resources Management Working Paper #58, Rome. Read pages 1-34.

## Week 1, Lecture 2: Investment instruments available to finance environmental goals

- Overview of asset classes and instruments
- Listed market instruments
- Private markets investments (Equity, debt, real assets)
- Thematic equity investments
- Shareholder engagement
- Green bonds
- Pay-for-success contracts
- Other innovative social finance instruments
- Conservation finance

## Reading Materials

### **Overview of Investment Instruments:**

- Koester, A., Schoettler, Ph. (2017), "[The Investor's Perspective: An illustration of how we can build portfolios that match impact and financial goals with intentions and constraints](#)", Impact Management Project.

#### **Thematic equity investments:**

- Pictet Asset Management (2018), Global Environmental Opportunities: Transforming Sustainable Investment, Geneva  
<https://www.am.pictet/en/uk/global-articles/2018/insights/equities/thematics/global-environmental-opportunities-introduction>

#### **Green bonds:**

- Climate Bonds Initiative (2020), "[Sustainable Debt: Global State of the Market H1 2020](#)".
- ICMA (2018), "[The Green Bond Principles. Voluntary Process Guidelines for Issuing Green Bonds, June 2018](#)".
- ICMA (2018), "[The Sustainability Bond Guidelines 2018](#)".

#### **Environmental impact bonds:**

- Goldman Sachs, DC Water, and Calvert Foundation (2016), "[FACT SHEET: DC Water Environmental Impact Bond](#)" and [press release](#), September.

#### **Shareholder engagement (examples):**

- [Trillium Asset Management shareholder proposal for Whole Foods Market](#).

#### **Optional reading:**

- Dear A. et al (2016), "[Social Impact Bonds: the early Years](#)", Social Finance, July.
- The Global Impact Investment Network (2020), "[Annual Impact Investor Survey 2020](#)".

### Week 1, Lecture 3: Waste management and the circular economy

- Limits of linear economy
- Introducing the circular economy
- Rethinking business and production processes
- Merging of impact investing and ESG

#### Reading Materials

#### **Waste Management:**

- Hoornweg, D. and Bhada-Tata, P. (2012), "[What a Waste: a Global Review of Solid Waste Management](#)", World Bank, Urban Development Series Knowledge Papers, No. 15. Read up to page 33.

### **Circular Economy:**

- Ellen MacArthur Foundation (2015), "[Towards a Circular Economy: Business Rationale for an Accelerated Transition](#)", November.
- Burckart, W. and Butterworth, J. (2017), "[Investing in the New Industrial \(R\)evolution: Insights for asset owners and managers financing the circular economy](#)", The Investment Integration Project.
- Closed Loop Partners (2017), "[Capital Landscape for Investment in Circular Supply Chains](#)", September

### **Optional reading:**

- World Economic Forum (2014), "[Towards the Circular Economy: Accelerating the scale-up across global supply chains](#)", Prepared in collaboration with the Ellen MacArthur Foundation and McKinsey & Company.

## Week 1, Lecture 4: Sustainable agriculture

- Challenge of feeding 9 billion people
- Limits arising from food - water - energy nexus
- Harnessing natural processes: holistic approaches
- Role of technology
- Sustainable agriculture as climate change adaptation

### Reading Materials

#### **Agricultural sector:**

- Iston, J.M., Pardey, P.G. (2014), "[Agriculture in the global economy](#)", Journal of Economic Perspectives 28(1), 121-146.

#### **Investing in agriculture:**

- Lang, K., Humphreys, J. and Rodinciuc, A. (2017), "[Impact Investing in Sustainable Food and Agriculture Across Asset Classes: Financing Resilient Value Chains through Total Portfolio Activation](#)", May.
- McMahon, P. (2016), "[The investment case for ecological farming](#)", SLM Partners White Paper, January.
- Dutia, S. G. (2014), "[AgTech: Challenges and Opportunities for Sustainable Growth](#)", Ewing Marion Kauffman Foundation, April.

### **Optional reading**

- Murray, L. and McGrath, M. (2016), "[Sustainable Farmland Investment Strategies: An Introduction to Current Conditions](#)", Yale School of Management & Yale School of Forestry and Environmental Studies, November.

## Week 2, Lecture 1: Climate change investing

- Mitigation vs adaptation
- Pathways to 2 degrees warming scenario: all hands on deck
- Renewable energy
- Energy efficiency
- Going carbon negative? Carbon capture and storage

### Reading Materials

#### **Overview of investment options for climate change investing:**

- Boston College Center for Corporate Citizenship (2009), "[Handbook on Climate-Related Investing across Asset Classes](#)", Boston College Carroll School of Management, Institute for Responsible Investment.

#### **Investing in Mitigation:**

- World Economic Forum (2016), "[Renewable Infrastructure Investment Handbook: A Guide for Institutional Investors](#)", December.
- IEA (2015), "[Carbon Capture and Storage: The solution for deep emissions reductions](#)".

#### **Investing in Adaptation:**

- Investor Group on Climate Change (2017), "[From Risk to Return: Investing in Climate Change Adaptation](#)", March.

#### **Emissions Trading:**

- [California Environmental Protection Agency \(2015\), Overview of ARB Emissions Trading Program.](#)

#### **Optional reading**

- Redstone Strategy Group (2016), "[Philanthropy's full force: Mission investments to catalyze climate solutions](#)", July.
- EDF, CDC, Caisse des Depots Group and IETA (2015), "[California: an Emissions Trading Case Study](#)".
- Haszeldine et al. (2018), "[Negative emissions technologies and carbon capture and storage to achieve the Paris Agreement commitments](#)", Philosophical Transactions, Royal Society, Volume 376, Issue 2119.



## Week 2, Lecture 2: Case study renewable energy

- Renewable energy case study
- Limits of linear economy
- Introducing the circular economy
- Rethinking business and production processes
- Merging of impact investing and ESG

### Reading Materials

#### Case study

- Subramanian, R. (2014), "[SolarCity Corporation: Challenges in the Solar Energy Value Chain](#)". Ivey Publishing, W14135.
- <https://hbsp.harvard.edu/import/721782>

## Week 2, Lecture 3: Water

- Challenge of water scarcity
- Water cycle and water value chain
- Types of investment (infrastructure: green vs grey, treatment, contamination prevention, demand management etc.)
- Water investments as climate change adaptation
- Water rights and water markets

### Reading Materials

#### Water Investing:

- Impax Asset Management (2013), "[Investing in Water: Global Opportunities in a Growth Sector](#)".
- The ImPact & CREO (2017), "[Water: An Impact Investment Primer for Family Offices and Foundations](#)".
- The Kresge Foundation et al. (2017), "[Climate Resilience & Equitable Water Systems Capital Scan](#)", June

#### Water rights:

- Richter, B. (2016), "[Water Share: Using water markets and impact investment to drive sustainability](#)". The Nature Conservancy: Washington, D.C. Chapter 3 & Appendix I. Executive Summary, Chapter 3 and Appendix I.
- Lustgarten, A. (2016), "[Liquid Assets: A maverick hedge fund manager thinks Wall Street is the answer to the water crisis in the West](#)", Propublica, co-published with The Atlantic, February 9

**Optional reading:**

- EY (2013), "[The US water sector on the verge of transformation](#)", Global Cleantech Center white paper.
- Debaere, P. (2014), "[The Global Economics of Water: Is Water a Source of Comparative Advantage?](#)" American Economic Journal: Applied Economics, 6(2): 32-48.

**Week 2, Lecture 4: Miscellaneous concluding topics**

- Environmental Finance and developing countries: triple bottom line opportunities
- Outlook

**Reading Materials****Conservation Finance:**

- Hamrick, K. (2016), "[State of Private Investment in Conservation 2016: A Landscape Assessment of an Emerging Market](#)", The Nature Conservancy and J.P. Morgan, December.
- Credit Suisse (2016), "[Conservation Finance, From Niche to Mainstream: The Building of an Institutional Asset Class](#)".

**Environmental Finance in Developing Countries:**

- UNEP (2016), "[Green Finance for Developing Countries: Needs, Concerns and Innovations](#)", July
- UNDP (2012), "[International Guidebook of Environmental Finance Tools. A Sectoral Approach: Protected Areas, Sustainable Forests, Sustainable Agriculture and Pro-Poor Energy](#)", Executive Summary

**NYU's Calendar Policy on Religious Holidays**

[NYU's Calendar Policy on Religious Holidays](#) states that members of any religious group may, without penalty, absent themselves from classes when required in compliance with their religious obligations. Please notify me in advance of religious holidays that might coincide with exams to schedule mutually acceptable alternatives.