

Fundamentals of Environmental Finance

1 - 5 December 2008.
Reims Management School

Lecturer

Jako Volschenk
University of Stellenbosch Business School, South Africa
Tel: +27 21 918 4234;
Email: jakov@sun.ac.za
Skype: jackvol

Introduction

“There's no doubt about the science. [...] The debate is over. [...] We see the threat posed by changes in our climate. And we know the time for action is now.”

- Arnold Schwarzenegger, Governor of California, The Independent, 3 July 2005

The capitalist model of using natural resources with disregard for efficiency and waste is increasingly questioned by economists. Yet it is encouraging to see that multinational companies are experiencing a paradigm shift. This paradigm shift is largely due to a realisation that it is good business to be environmentally responsible. Companies are increasingly being scrutinised by stakeholders and there is a clear advantage to companies to move past mere compliance.

During this course, we will explore the link between finance and the environment from a number of angles. To do so we will also explore the underlying environmental issues and the economic theory that underpins market based initiatives such as the Kyoto Protocol.

This course on the fundamentals of Environmental Finance is extremely wide in focus and we will cover a huge amount of ground. Try to prepare for each session well in advance and you will find the content much easier to grasp.

The course has the potential to open up a new world for you. May you find the journey of discovery both exciting and rewarding.

Prerequisites

It is assumed that you have already completed a course in finance before attending this course. Students taking this course must be familiar with terms and techniques such as the IRR, NPV, and its related variables. Students should also, at least, have a very basic understanding of environmental issues such as climate change.

Objectives

This course aims to empower professionals to incorporate the impact of environmental finance into their decision-making. This includes

- Understanding the background and drivers of environmental finance.
- Understanding the environmental drivers that may have an effect on business.
- Understand the nature of typical environmental projects with specific focus on energy-related projects.
- Understand the various financial instruments used in environmental projects and how these may impact on the feasibility of projects.
- Understand the choices and strategic options available to companies when it comes to environmental issues.

It is important to note that this course does not focus on financial metrics such as IRR, NPV or DSCR. It is mainly aimed at sensitising participants to qualitative issues in environmental projects, but often touches on quantitative measures.

Relevance

The course will be most relevant to professionals at managerial or technical level in the electricity, oil, mining, investment, agricultural, insurance, environmental and public sectors. Although much of the focus in the course surrounds energy, some focus will also be given to wider environmental issues. However, this is not a course on biodiversity or impact assessments.

Teaching methods

The material for this course is extremely wide and it is virtually impossible to gain an in-depth knowledge of the material overnight. The course is best seen as an overview of environmental finance. However, students are encouraged to explore specific topics that they may find interesting.

A mixture of teaching methods will be used. Most sessions will consist of lectures, but case studies, exercises and simulations are but a few ways in which students will explore the concepts explained and covered in the course.

Evaluation

Marks will be allocated and weighted as shown below.

Category	Weight	Deadline
Learning diary	10%	6/12/2008
Energyville	10%	4/12/2008
Class contribution	15%	5/12/2008
Group project	25%	5/12/2008
Final test	40%	5/12/2008

Learning diary

The purpose of a learning diary is to comment, evaluate and problematise themes that arose during the lectures. The learning diary is an independent whole, which cannot consist of only describing lecture contents. Your comments can be critical or complementary. Insights, observations and reactions towards information should be included. This means that you reflect on your own learning difficulties, the techniques you learnt, the contextualisation in your own frame of reference, and your attitudes.

It is recommended that the learning diary follow the structure of the lecture series. Observations can relate to a lecture area or some specific sub-theme. You can also base your diary on comparison of content themes or viewpoints of the lectures.

The diary doesn't have to cover all lectures, but should include comments on at least five lectures. The diary is should be between 5-8 pages in length.

(Edited from http://www.gamesandstorytelling.net/Registration_Learning_diary_guidelines.html)

Class contribution

During lectures we will often have discussions and debates. Try to take part in these. There are no silly questions. You may also be expected to complete small exercises. These may be collected and marked towards your class contribution mark.

Energyville

Energyville is the name of a simulation that was built by Chevron in collaboration with The Economist. The game can be found at <http://www.willyoujoinus.com/energyville/> and you are welcome to explore the game before the course (I would actually like to encourage you to do so). During the course you will be expected to play the Energyville simulation. Your score is calculated from the best position you are able to reach in the rankings.

You may play the game as many times as you like, but for your mark you need to print me a "screen-grab" of your best score. In order to make it easier for me, please use your surname for the name of your town...for instance Youngville or Youngtown if your surname is Young. You may submit the page with your ranking on the Thursday morning or any time before then.

Group project: Corporates and climate change

During the last session of the course you must do a presentation to the class. Please email me your presentation before the session as I would like to have record of it.

You will be expected to work in groups of four. For one of the following companies, explain how the company is adjusting to and for climate change. Groups may select any company on a basis of elimination, and you may also nominate a business (but clear it with me first).

- Airbus
- Chrysler
- Tata
- Deutsche Bank
- Carrefour
- E.ON
- GE (General Electric)
- Swiss Re or Munich Re

You should rely greatly on the reports published by these companies and other entities.

The 10 minute presentation may include answering questions such as:

- How is the particular industry connected to climate change?
- How sensitive is the company's revenue to the impacts of climate change, direct or indirect?
- Are they doing anything to take advantage of the opportunities related to climate change?
- What should the company do to reduce the impact of a carbon constrained future on company value?
- Explain what methods are best suited for the above calculation of company value.

Some of the readings that you may find of value for this project include the Lash and Wellington article that is prescribed as reading for session 2 and an article by the Innovest group called *Climate change and shareholder value* that was published in 2003. You may also need to read the article by Don Reed (session 9) in advance in order to gain maximum insight into the effect of climate change on company value.

Final test

During the last session you will also be expected to write a test covering all the work that we covered during the week. The test will be open book, but note that the test might contain little theory with a bigger focus on application. If you paid attention during the week and took part, you should not experience too many problems.

Program and Content

Broad outline

Below is a rough outline of the course, although we may run across sessions depending on the debates that happen in class.

	Monday	Tuesday	Wednesday	Thursday	Friday
	<i>Background</i>	<i>Underlying theory</i>			<i>Integration</i>
9:00 - 12:00	Student introduction and ground-rules Intro to climate change and environmental finance	Key economic theory issues Economic instruments for the environment	Biofuels Energyville	TRECs, CDM, JI and ETS CASE STUDY: <i>Darling Wind Farm</i> or <i>Kuyasa</i>	Incorporating environmental finance into corporate finance Group project preparation at RMS
	Lunch	Lunch	Lunch	Lunch	Lunch
		<i>Understanding the nature of projects</i>	<i>New sources of finance</i>		
13:00 - 16:00	Business and sustainable development Climate change strategies	Energy efficiency & Renewable energy	TRECs, CDM, JI and ETS		Group presentations and test

Session outline

Session 1: Monday 1 December 2008, 9:00 – 12:00

Topics	Student introduction and ground-rules Intro to climate change and environmental finance
Outcomes	At the end of the session you should be able to: • Define environmental finance • Debate the relative strengths of different drivers of Environmental Finance. • Define climate change. • Describe the factors causing climate change. • Describe the consequences of climate change, specifically in the context of developing countries. • Explain the link between economic growth, energy consumption, carbon emissions and climate change. • Explain and apply the impact of environmental issues on the basics variables used in financial valuation (Risk, discount rate, free cash flow, diversification).
Readings	• Hawken, P., Lovins, A. and Lovins, H. 1999. <i>Natural Capitalism: The Next Industrial Revolution</i>. London: Earthscan. 1-21. • UNFCCC. 2005. <i>Caring for Climate: A guide to the Climate Change Convention and the Kyoto Protocol</i>. Bonn: Climate Change Secretariat (UNFCCC). 23 – 38 • PointCarbon. 2008. <i>Carbon 2008: Post-2012 is now</i>. Available at: http://carbonfinance.org/docs/State___Trends--formatted_06_May_10pm.pdf

Session 2: Monday 1 December 2008, 13:00 – 16:00

Topics	Business and sustainable development Climate change strategies
Outcomes	At the end of the session you should be able to: • Describe what sustainability refers to in an environmental context in your own words. • Explain the significance of the environment, both in terms of its interaction with society and with the economy. • Describe the various impacts of unsustainable human development on the environment. • Discuss the role of sustainable investment funds, pressure from stakeholders and evolving regulatory models in encouraging good environmental stewardship in companies. • Discuss and apply different frameworks of climate change strategies.
Readings	• Kolk, A. and Pinkse, J. 2005. Business Responses to Climate Change, Identifying Emergent Strategies. <i>California Management Review</i>, 47(3), 6-20. • Lash, J. and Wellington, F. 2007. <i>Competitive Advantage on a Warming Planet</i>. Harvard Business Review, March 2007

Session 3: Tuesday 2 December 2008, 9:00 – 12:00

Topics	Key economic theory issues Economic instruments for the environment
Outcomes	At the end of the session you should be able to: • State and discuss the key economic theory assumptions underpinning Environmental Finance as a discipline. • Explain the concept of economic efficiency and the typical failures that exist in the market. • Explain the rationale behind the use of market mechanisms to combat environmental issues. • Define externalities and explain the role it may play in environmental instruments. • Explain why economic models differ in its valuation of mitigation costs. • Explain and apply the mitigation cost curve. • Understand and be able to apply valuation techniques to environmental impacts. • Explain the rationale of using certain environmental instruments in different instances. • Explain the use of different policy mechanisms in controlling environmental externalities, including legislation, taxes, market mechanisms, etc. • Differentiate between Directive based, Incentive based and information based instruments to control environmental problems • Understand and elaborate on the advantages and disadvantages of specific policy instrument. • Apply and propose the best policy measures for selected case scenarios.
Readings	• Stern, N. 2006. What is the economics of climate change. <i>World Economics</i>, 7(2) 1-10, April-June. • Weyant, J. 2000. <i>An Introduction to the economics of climate change policy</i>, Pew Centre for Global Change, pp. ii-iv (Executive Summary), 44-45 (Conclusions). • Hawken, P., Lovins, A. and Lovins, H. 1999. <i>Natural Capitalism: The Next Industrial Revolution</i>. London: Earthscan. Chapter 13 "Making Markets Work" pp. 260-284. • Panayoutou, T. 1998. Economic Instruments: Typology, Advantages and Limitations. In <i>Instruments of Change: Motivating and Financing Sustainable Development</i>. UNEP/EarthScan. 15-45.

Session 4: Tuesday 2 December 2008, 13:00 – 16:00

Topics	Energy efficiency & Renewable energy
Outcomes	At the end of the session you should be able to: • Understand the basic terminology of energy efficiency and renewable energy. • Discuss risk, return and performance of renewable energy and energy efficiency projects; • Discuss the barriers to Energy efficiency and renewable energy • Discuss the role of government in encouraging the use of renewable energies. • Assess the use of various instruments in the environmental finance field in its applicability to certain types of projects • Define the terms energy efficiency and renewable energy • Understand the role played by energy efficiency and renewable energy technologies in meeting future development needs.
Readings	• Johansson, T., McCormick, K., Neij, L., and Turkenburg, W. 2002. <i>The Potentials of Renewable Energy</i>. International conference for renewable energies 2004, Bonn Available at: http://www.iiiee.lu.se/Publication.nsf/\$webAll/02DAE4E6199783A9C1256E29004E1250/\$FILE/Johansson%20et%20al.pdf

Session 5: Wednesday 3 December 2008, 9:00 – 12:00

Topics	Biofuels Energyville
Outcomes	At the end of the session you should be able to: • Define the alternative fuels to fossil fuels • Explain the drivers and barriers to biofuels. • Understand the concept of energy balance and its implications. • Explain the advantages and disadvantages of fossil fuels vs renewable energy sources. • Apply critical thinking in proposing an ideal energy mix for a city of the future.
Readings	• Ceaser, W.K., Riese, J, and Seitz, T. 2007. Betting on biofuels. <i>The McKinsey Quarterly</i>, 2, 53-63. Available at: http://www.wilsoncenter.org/news/docs/Brazil.Biofuels%202007%20Report%20-%20McKinsey%20-%202007.pdf

Session 6: Wednesday 3 December 2008, 13:00 – 16:00

Topics	TRECs, CDM, JI and ETS (1)
Outcomes	• At the end of the session you should be able to: • Explain the basic structure of tradable renewable energy certificates (TRECs), the differences to other instruments, motivation why companies would buy TRECs • Explain the basic pricing criteria used when valuing TRECs. • Discuss the implied differences between TRECs and CDM financing and where one might be more advantageous than the other. • Illustrate with examples how various financial instruments are used and adjusted for the Environmental Finance field. • Discuss the role of uncertainty in the developing carbon market, and explain the importance of dear government policy in the functioning of a market in environmental goods • Identify the different stakeholders in a CDM project and their role • List the key elements to a CDM project • Explain basic terms used in relation to Kyoto, i.e. hot air, bubbling, leakage, additionality, banking of credits, carbon sinks, flares, etc. • Discuss the use of CDM in project finance • Describe the various transaction types (spot transactions, forward sales, use of options and its functions)• Discuss the various options In selling your CERs
Readings	• Volschenk, J. 2006. <i>Environmental certificates in project finance</i>. Notes written for the Environmental Finance elective. Bellville: University of Stellenbosch Business School.

Session 7: Thursday 4 December 2008, 9:00 – 12:00

Topics	TRECs, CDM, JI, ETS and Programmatic CDM/JI
Outcomes	• At the end of the session you should be able to: • Discuss the position of developing countries in the global debate • Discuss the link between the prices of CERs, and AAUs • List the main differences between the different Kyoto mechanisms • Describe the structure of the Kyoto Protocol, distinguishing between Annex 1 and non-Annex 1 countries. • Name the various trading schemes (emissions trading) in operation and discuss the basic characteristics of each. • Motivate the spread between CDM and ETS prices • Test the sensitivity of prices of CERs to various factors and explain the impact this may have on project finance budgets. • Identify the major determinants of carbon prices in JI. COM and ETS trading • Discuss risk in project finance, both from a generic point of view and from an instrument specific viewpoint.
Readings	• Stiles, G. 2007. A programmatic CDM project for energy efficiency in the South African industrial sector. Marbek Resource consultants Africa, in CDM Investment Newsletter 2/2007 • Frenzel, S. and Gruss, A. 2007. The programmatic approach under CDM. CDM Investment Newsletter 2/2007 Available at: http://www.climatebusiness.net/downloads/Newsletter_17.pdf

Session 8: Friday 5 December 2008, 9:00 – 12:00

Topics	Incorporating environmental finance into corporate finance
Outcomes	• At the end of the session you should be able to: • Discuss the link between competitiveness of companies and their environmental footprint • Explain the different research approaches in attempting to quantify the impact of climate change on companies, including the shortcomings of the methods. • Discuss the relation between climate change and shareholder value.
Readings	• Reed, D. 2001. <i>Stalking the elusive business case for corporate sustainability</i>. Sustainable Enterprise Perspectives, Washington: World Resources Institute.

Session 9: Friday 5 December 2008, 13:00 – 16:00

Topics	Presentation of Group projects Class Test
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About the lecturer

Jako Volschenk is a lecturer at the University of Stellenbosch Business School in Cost Accounting and Environmental Finance. He also teaches on other Masters programs in South Africa and France, as well as on executive programs throughout Africa.. He currently consults to a number of South African companies and NGOs, specifically in the areas of energy, carbon trading and environmental sustainability. Jako has also published in the area of microfinance.

Previously Jako worked with the Africa Centre for Investment Analysis and acted as organiser of the Africa SMME Awards. During this period Jako also completed a number of consulting assignments around the social impact of private equity investments in South Africa.

Jako is an Associate of the Institute for Futures Research and a member of the South African Energy Association. Jako also serves on the board of the World Hope Foundation in Nigeria.

Jako is currently reading for his PhD in the area of sustainable energy strategies in South Africa.