DEFENSE ENVIM THESIS TOPICS

POST-MASTER ®
INTERNATIONAL ENVIRONMENTAL MANAGEMENT ENVIM
ACADEMIC YEAR 2023-2024

NOVEMBER 6TH, 7TH AND 26TH
DECEMBER 3RD, 4TH

MINES PARIS | PSL | ISIGE



INTRODUCTION

The Post-Master EnvIM is designed for young graduates holding a master's degree or young professionals who wish to complete their curriculum with a specialization for ecological transition, to be part of the management of environment and energy issues and solutions, in an international context. Participants in this training program, which is based on an innovative and practical pedagogy, will have the rare opportunity to study from local and international players in Europe and Asia, thanks to the wealth of many case studies, and to the industrial partners and experts involved in its lectures, workshops and projects.

EnvIM is the result of a 16 years of experience with international and european partners, leading to the International Post-Master's Degree from MINES Paris PSL, Mastère Spécialisé certified by Conférence des Grandes Ecoles CGE.

EnvIM program is proposed through options organized with a common core program in France, the program is offered in english language. Participants can benefit from the variety of backgrounds of students coming from various countries and various initial academic pathways, creating a multi cultural context for studying together and sharing experiences. The common core program deals with all the challenges for ecological transition, using systemic approaches and tools for decision makings.

- "option EnvIM Asia" is a 14-month program designed in cooperation with Tsinghua University, offering students the chance to develop new skills through France and China, through a rich generalist pathway on environmental management.
- "option EnvIM World" 12-month in France, a program designed for students having a professional project in relation with international challenges of environmental issue.

These programs offer students various opportunities to clarify and nourish their professional projects in an international context, acquire new competencies and experiences for environmental and energy transition, with the help of many case studies. They will learn and apply new knowledge's, unfolding new abilities, depending on their aspiration during 6 month internship in a company. Small groups and high rate of Professors per students eases a close guidance for each student during the academic period and the period in the company as well.

This document presents the 18 professional thesis topics for the 2023 - 2024 Promotion of the post-master. The defense thesis will take place at the École des Mines de Paris, 60 boulevard Saint Michel, from 6 to 26 November 2024, then on 3rd and 4th December according to the schedule.

DEFENSE ENVIM THESIS TOPICS
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INTERNATIONAL ENVIRONMENTAL MANAGEMENT ENVIM
ACADEMIC YEAR 2023-2024

November 6th 2024

L312

10h — **Zhao LIU** - *Crédit Agricole Assurance - Pacifica*
Pathway to Net Zero for Insurance Companies : a Study on Insurance-Associated Emissions of Home Insurance in France.

11h15 — **François BORDET** - *CARBON FARMERS*
Valuing the positive impacts of low-carbon agriculture on nature, society and the economy of the sector?

14h30 — **Clémentine PELISSIER** - *EGIS*
The integration of AI in the Environment Service Line of Egis

15h15 — **Éva TAVARES** - *SETEC International - Lima*
Highways of progress and paths of conflict: between development, controversy and unequal environmental and social impacts

November 7th 2024

L120

9h — **Nour EL KOREK** - *Danone*
Applying Scientific Methods to Enhance Sustainability Outcomes for Water and Biodiversity within the Private Sector: The Case of Danone.

11h30 — **Tanguy LARCHER** - *EDF LAB Saclay*
What business model would make investing in rooftop PV and battery storage profitable for residential clients ?

14h30 — **Alexandre SCHAMBERGER** - *SETEC*
To what extent can project managers respond to the current challenges of the circular economy, particularly regarding reuse and demountable/adaptable design, and what strategies and tools should they adopt to anticipate future regulatory requirements and align their projects with the ambitions of the extended circular economy on the territorial scale ?

DEFENSE ENVIM THESIS TOPICS
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INTERNATIONAL ENVIRONMENTAL MANAGEMENT ENVIM
ACADEMIC YEAR 2023-2024

November 26th 2024

L120

11h15 **Haocheng YANG** – *REXEL*
Raw material assessment of Rexel France : quantification, risks ans opportunities with wood and copper.

December 3rd 2024

L312

9h **Xingci CHEN** - *Céline*
Sustainable Architecture Procurement in Luxury Brands: Bridging International Suppliers and Internal Stakeholders for Future Growth.

10h15 **Elie MATAR** - *SUEZ SA*
Key Factors Influencing the Success of Waste Management in the Middle East: Regulatory, Cultural, and Environmental Perspectives with Lessons from Global Practices

11h15 **Victoire DUMONT**- *RE(SET)*
Deploying Industrial and Commercial Packaging Reuse.

14h30 **Martin BERNARD** - *DECATHLON Water Sport center*
Recycling of soft PVC-based products : stakes, technologies and applications.

15h45 **Dylan GORDON** - *FracTracker Alliance*
Remote Sensing and GIS-Based Characterization of Hydrocarbon and Hazardous Gas Emissions in the Marcellus Shale: Insights for Mitigation and Prevention.

17h **Mateo DELAVEAU** - *URBANOMY*
The voluntary sector and the challenge of decarbonization.

THÈSES PROFESSIONNELLES
MASTÈRE SPÉCIALISÉ EEDD PARCOURS EXECUTIVE MANAGEMENT GLOBAL DE LA RSE ET DU DÉVELOPPEMENT DURABLE (RSEDD)
2023-2024

December 4th 2024

L312

9h — **Lucie LAMBRETH** - *BL Evolution*
How to build a biodiversity strategy for a financial institution ?

10h15 — **Cordélia PELLETIER DE CHAMBURE** - *QUANTIS*
How is sustainability integrated into the innovation process within the private sector for consumer goods (food & beverage, fashion & cosmetics)?

11h30 — **Aurélie BRUNSTEIN** - *Réseau Action Climat*
Prospective Study on the Decarbonisation of the French Primary Steel Industry.

14h30 — **Valentin RACT** - *AFD*
ABC-Map and Biodiversity Assessment : A Geospatial Approach to Enhancing Risk and Impact Evaluation in AFD AFOLU Projects.

Zhao LIU

PENN Multi-Master's Degree in International Environmental Management (IEM)

Master of environmental studies

University of Pennsylvania

USA

Pathway to Net Zero for Insurance Companies : a Study on Insurance-Associated Emissions of Home Insurance in France

The insurance industry faces significant challenges in aligning with global net-zero targets, particularly due to the complexities associated with insurance underwriting, notably Scope 3 emissions—those indirect emissions that occur throughout a company's value chain (PwC, 2024).

This study seeks to address the pivotal question: How can insurance companies accurately measure and reduce insurance-associated emissions to align with net-zero goals? The context of this research is rooted in the increasing regulatory pressures and societal demands for the insurance sector to play a more effective role in climate change mitigation.

Previous studies have highlighted the difficulties in quantifying Scope 3 emissions, particularly for insurance companies, where indirect emissions often overshadow direct operational emissions (Accounting for Sustainability, 2024). The complexity is further exacerbated by the lack of standardized methodologies tailored to the insurance industry. Recent developments, such as the introduction of the Partnership for Carbon Accounting Financials (PCAF) standards and the Corporate Sustainability Reporting Directive (CSRD), underscore the need for industry-specific approaches to emissions accounting. (SBTi, 2023)

The objective of this study is to clarify the definitions of Scope 3 emissions and discuss what should be covered in Scope 3 reporting for insurance companies. Additionally, the study aims to demonstrate a Scope 3 emission calculation methodology using the case of home insurance in France, covering emissions linked to both the management of insurance claims and insurance portfolios. What distinguishes this study from prior research is its focus on home insurance—a sector for which no previous standards or guidelines exist, unlike the more established guidelines for commercial and personal car insurance lines (PCAF, 2022b).

The study will be conducted within a defined perimeter, focusing on the French home insurance market, with a specific emphasis on data sourced from regulatory bodies such as ADEME (Agence de l'Environnement et de la Maîtrise de l'Énergie) and other industry-specific databases. The expected outcomes include a preliminary framework for Scope 3 emission calculation in home insurance and practical recommendations for emission reduction strategies tailored to the French market.

However, challenges such as data availability and accuracy, particularly in estimating emissions related to insurance claims management, may arise. This work is unprecedented in France. At the author's institution, Crédit Agricole Assurance, where the team is also exploring methods to calculate and estimate the underwriting emissions of home insurance portfolios in collaboration with several partners. To mitigate these risks, the study will utilize proxies and draw upon existing standards and guidelines from other industries, such as commercial and personal car lines, to develop a method for calculating emissions for home insurance.

By grounding the study in relevant bibliographic references, including recent advancements in (greenhouse gases) GHG accounting standards, the latest regulatory developments, and ongoing efforts related to net-zero goals within the insurance industry, this research aims to contribute significantly to the fields of carbon accounting and net-zero targets within the insurance sector

Crédit Agricole Assurances – Pacifica - Paris

Clémentine PELISSIER

Engineer in Biology

INSA Toulouse

France

The integration of AI in the Environment Service Line of Egis

In the frame of the increase of environmental concerns, governments worldwide, as well as international institutions, are implementing more stringent environmental regulations requiring businesses to comply with higher standards to measure, manage and report their environmental performance. Technological advancements appear as great assets to assist in the sustainability reporting, as well for impact assessment as for environmental monitoring.

The use of remote sensing technologies and Geographic Information Systems (GIS) for instance is already quite common and allows more comprehensive environmental assessments. Combined with IoT (Internet of Things), they are also used for environmental monitoring, data collection, and real-time reporting.

Even though Artificial Intelligence (AI) and machine learning are expected to play a crucial role in the future of this field, these technologies are not yet well integrated in environmental consultancy practices and can even face reluctance.

In the Environment Service Line of Egis, a considerable amount of data is being used, processed and produced every year. It is becoming sometimes complex to give a sense to all the environmental data combined.

Data and regulations are also evolving and changing rapidly. The use of AI and machine learning could be of real help in the automation of data analysis, the development of predictive models for forecasts and risks identification, the optimisation of environmental systems, or even in assisting in reporting tasks.

The question raised by this observation is how can AI be efficiently integrated in the Environment Service Line at Egis and how is it going to impact the production process ?

Through readings on the topic of AI in IA and environmental consultancy, user tests with AI tools, and exchanges with various potential users, this study presents an initial overview of promising use cases for the SL and how to best prepare for AI integration.

For each use case, we suggest a standard procedure to best use the tool, and to assess both the improvements made and the remaining limits. We then proposed a non-exhaustive analysis of the potential impacts and changes it could involve in terms of methods of production.

The range of potential applications of AI appears very promising to enhance the efficiency of environmental consultants work. The main limit, beyond the costs of developing such technologies, might remain in the end the acceptance of the collaborators. It is also important to consider the environmental impacts of such tools, by avoiding unnecessary applications of AI that would lead to counterproductive usage.

Overall, a certain distance and open mindedness is required for an ethical and rational use of these new technologies, and appreciate the full potential of AI in environmental consultancy

EGIS – Paris

Eva TAVARES

Master in International Affairs and Sustainable Development

Paris Dauphine University

France

Highways of progress and paths of conflict : between development, controversy and unequal environmental and social impacts.

The development of highway infrastructure has been considered as a symbol of progress by contributing to economic growth, connectivity and development. However, these projects often spark controversy due to their environmental and social impacts, particularly in the last decades.

This study, titled Highways of progress and paths of conflict: between development, controversy and unequal environmental and social impacts, aims to critically examine the different perceptions and realities surrounding highway projects in both developed and developing countries.

The first part of the study focuses on societal perceptions and controversies through two key case studies : the A69 project in France, representing current trends toward low-carbon development and anti-urbanization movements, and another similar highway project in a developing country (to be defined).

These cases illustrate the contrasting arguments and discourse surrounding the debate on highway infrastructure, particularly in light of growing environmental concerns. Moreover, structural differences between highway networks in developed and developing countries will be analyzed, highlighting disparities in road density, integration with public transportation systems, to give a better understanding/ context of the difference of perception.

The study also explores the long-term economic benefits of such projects, including increased foreign investment, improved local business competitiveness, and enhanced access to essential services such as education and healthcare.

The second part of the research investigates the environmental and social impacts of highway projects, focusing on the case of the Nueva Carretera Central (NCC) in Peru. As a national priority for developing transport infrastructure, the NCC presents a unique case to study both its benefits and its environmental and social costs. The project's environmental and social impacts will be analyzed against the planned innovative approaches aimed at mitigating them. By comparing the NCC to similar international projects, the study will evaluate the effectiveness of planned mitigation measures versus the actual outcomes, acknowledging the massive scale and unavoidable destruction of the NCC despite these efforts.

Finally, the research delves into the financial dynamics underpinning highway projects, investigating who ultimately benefits from these large-scale investments. Financial stakeholders, including investors and governments, profits from tolls and taxes, while local communities often bear the burden of environmental degradation, loss of agricultural land, and disrupted livelihoods... This section will analyze the unequal distribution of economic benefits and environmental and social costs, critically assessing the role of policymakers, investors, and corporations in managing these imbalances.

Expected findings from this study include a nuanced understanding of the controversial role highway projects play in fostering development while simultaneously exacerbating environmental and social inequalities. Recommendations will focus on more equitable strategies for future infrastructure projects, balancing progress with sustainable development goals

SETEC international - Lima

Tanguy LARCHER

Engineer

INSA Bourges

France

What business model would make investing in rooftop PV and battery storage profitable for residential clients ?

As the global community faces the big challenge of climate change, the necessity for a sustainable and resilient energy production mix has never been more pressing. Increasing the share of renewable energy sources (RES) in the energy mix has significant implications for energy systems, particularly regarding the need for energy storage and flexibility.

Indeed, the increased share of RES in the electricity mix introduces intermittency, which must be balanced with flexibility for the grid or "grid flexibility". Supporting grid flexibility can involve notably demand response programs, smart grids, and grid modernization.

However, the economic and regulatory framework structures the implementation of this grid flexibility, as well as the pace of RES deployment.

The current European regulations and policies encourage the development of distributed renewable energy sources, such as rooftop PV. In this context, distributed flexibility solutions such as stationary batteries (BESS) and/or electric vehicles, could become relevant investments.

This situation raises multiple questions. Specifically, our team was asked to focus on residential consumers : what business model would make investing in rooftop PV + BESS profitable for residential clients? (i.e. How will EDF create and capture value in this scenario)

Hence, we performed a techno-economic analysis in order to compare business models and identify the economic and technical parameters affecting their profitability. To support our analysis, we compared our results within different markets: France, Belgium, Italy and the UK.

In this study the first step was to collect information to paint a picture of the technical, regulatory and economic framework. This allowed us to identify the theoretically relevant business models, as well as the key parameters which shape them. The next step consisted in looking for the value of the identified parameters in the different countries.

One structuring parameter was the households' electricity consumption. Therefore, we looked for representative for residential households' consumption among 5,000 simulated load curves.

At the heart of this work, we built several Excel tools (one per country), which computes financial KPIs for an investment in PV + BESS by a residential consumer, such as the NPV, IRR, savings on the electricity bill, etc.

Per my suggestion, we also coded programs in python to compute results from the simulated load curves. Finally, we compared the KPIs' results between the business models and between the countries, together with several sensitivity analysis. This brought out profitability thresholds, according to which we were able to rank the proposed business models.

EDF LAB Saclay

Alexandre SCHAMBERGER

Engineer
in Energy
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INSA LYON

France

To what extent can project managers respond to the current challenges of the circular economy, particularly regarding reuse and demountable/adaptable design, and what strategies and tools should they adopt to anticipate future regulatory requirements and align their projects with the ambitions of the extended circular economy on the territorial scale ?

This study focuses on the role of the Engineers (MOE in French) and Owner's Representative (AMO in French) in implementing the Circular Economy in the building construction and deconstruction sector and will be structured in two main parts: an analysis of operational challenges and an exploration of methodological tools for an extended circular economy.

The first part will focus on the operational challenges faced by MOEs and AMOs in implementing circular ecolomy. For SETEC, it is important to have a clear vision of these obstacles in order to effectively integrate circular ecolomy concepts into their projects. This section will begin with an analysis of the current legislative and regulatory framework impacting the activities of MOE/AMO. The question of how future legislation and regulations will evolve will also be addressed, based on the notions of "weak circularity" and "strong circularity" (Aggeri, 2023). We will explore how extended circularity could transform current practices by adopting more innovative methods such as "design for deconstruction", requiring greater investment in terms of financial resources, time and training.

The second part will focus on the methodologies and tools can be developed to anticipate regulatory changes and scale up their projects to the extended circular economy. An analysis of the current tools used by SETEC will be carried out, which we will describe as surface performance (Ntsondé and Aggeri, 2022).

The new regulatory framework introduced by the European Commission, the EU Taxonomy, will be analyzed. This framework pushes towards a more ambitious and integrated circular economy, encouraging deeper performativity. We will examine the activities recognized as eligible by the EU Taxonomy, and the new methodologies and tools it introduces. The work of CAP2030 will also be analyzed.

This work currently focuses on defining a framework of indicators for the circulare economy, focusing on eco-conception in the construction sector. An interim version was provided to SETEC as part of an initial testing phase, aimed at gathering feedback from experts to improve and refine the indicator framework. The aim in this work is to identify what construction methods and indicators are going to be used in the future, in order for SETEC to be prepared. This analysis will be illustrated by a number of case studies to provide a better understanding of the challenges and opportunities facing players in the sector.

Contractualization during the project design phase will also be discussed. Contractualization is an important lever for the effective implementation of circular ecolomy in projects. Information from the scientific literature on innovative best practices will be incorporated to suggest improvements to SETEC.

This thesis aims to provide a clear vision of the challenges and opportunities of the circular economy, as well as practical tools to overcome them. By acculturating teams to the principles of the circular ecolomy and proposing concrete, adaptable solutions, SETEC will not only be able to meet current regulatory requirements but will also have a clear vision of future regulatory and technical innovations in the sustainable construction sector.

SETEC - Paris

Nour
EL KOREK

Master of Science
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Lebanon

Adopting SAI framework to enhance Sustainability Outcomes for water and biodiversity within the private sector : the case of Danone

The critical limits of several planetary boundaries, including freshwater use and biodiversity integrity, have been exceeded. This indicates that vital resources essential to our ecosystem urgently require protection and restoration. Simultaneously, global, and EU-level actions are being implemented to address these issues by strengthening mandatory regulations and promoting the adoption of voluntary reporting frameworks.

In this context, and from a double materiality perspective, rigorous efforts need to be put in place to accelerate sustainable interventions and mitigate negative impacts on water and biodiversity, especially within the scope of the private sector. With more rigid reporting requirements looming in the nearby future, it is important for private actors to anticipate these changes by countering rapidly their environmental impacts.

Danone, a leading global food, and beverage company is committed to enhancing its sustainability efforts through its comprehensive sustainability roadmap, “Danone Impact Journey,” which focuses on three pillars: health, nature, people, and communities, driving sustainable impact by 2030. Danone has taken several key approaches to improve its sustainability performance in the areas of water and biodiversity.

This is evident in the Danone Impact Journey Report on Water, which outlines the company’s 2030 strategy for water preservation at both global and local scales. The implementation of water stewardship projects is central to this strategy, aiming to generate positive water impacts within the landscapes where Danone operates.

However, water stewardship projects face numerous challenges, ranging from a lack of relevant data to financial and technological barriers that limit their implementation in certain contexts. Given their complexity and importance, adopting the right methodology to drive the implementation of these projects is key to achieving their nature related ambitions.

Integrating scientific principles and methods can be an effective approach for businesses to drive water stewardship projects. The Sustainable Agriculture Initiative Platform for agriculture regeneration, also known as SAI, is a coalition of member companies in the food & Beverage sector aiming to accelerate the spread of sustainable agriculture practices, focusing mainly on regenerative agriculture.

They developed a framework process flow to facilitate the development of local regenerative agriculture transition plans for suppliers and farmers. Given the above, this thesis proposal suggests assessing the role of SAI in potentially facilitating the implementation of water stewardship projects at the level of Danone’s agriculture supply chain.

The secondary aim of this thesis is to evaluate its effectiveness in driving measurable outcomes for nature and, potentially understanding the limitations and drivers that influence its implementation.

DANONE - Paris

Haocheng YANG

PENN Multi-Master's Degree in International Environmental Management (IEM)

Master of environmental studies

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USA

Raw Material assessment of Rexel France : quantification risks and opportunities with wood and copper

As a prominent French electronic distributor, Rexel occupies a unique position as a bridge between customers and manufacturers, allowing the company to play a crucial and advantageous role in reducing environmental impact across its value chain. Simultaneously, the environmental impact of its products could also affect the profitability of the group from both directions, making a sufficient management of it especially demanding.

Along with the development and application of the tools such as the Carbon Tracker, Rexel, a prominent French electronic distributor, has established a leading position in comprehensively understanding the carbon footprint of the products it sells while actively pursuing its ambitious goal of sustainability. However, there remains a notable gap regarding the raw material consumption and natural resource depletion within the company's product portfolio.

Considering the impact of the life cycles of certain materials, such as copper and aluminium, that the company lives upon, and the growing tension in supply as a result of energy transition, raw material poses great environmental as well as business threat no less than carbon footprints.

Considering the backgound of a dynamic legal framework as a result, this study seeks to bridge that gap by developing a methodology that combines sales data, logistics information, as well as Product Environmental Profile (PEP) to provide an estimation of the quantity of raw material consumed, in order to offer Rexel a clearer picture of its resource use and potential areas for improvement.

With a risk mapping, the study reveals that two specific materials--copper and wood-- stand out in terms of both quantity and highly concentrated usage in certain products. Copper, being a key component in electrical products especially in cables, and wood, commonly used in packaging and infrastructure, are critical to the group's operations, but the over-dependency on these materials makes the company vulnerable to price volatility, foreseen inefficient supply, regulatory shifts, and unnecessary costs.

In light of these findings, this study recommends that Rexel consider strategic measures to mitigate its over-dependence on the two materials. These measures could include diversifying supply sources, exploring alternative materials, and promoting reverse logistics. By addressing these vulnerabilities, Rexel can enhance its resilience against material shortage and price spikes ensuring more stable and sustainable operations.

REXEL - Paris

Xingci CHEN

PENN Multi-Master's Degree in International Environmental Management (IEM) Master environnemental studies

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Sustainable Architecture Procurement in Luxury Brands : Bridging International Suppliers and Internal Stakeholders for Future Growth.

The luxury industry has often been criticized for greenwashing and perceived as lacking true sustainability initiatives. However, as one of the most forward-thinking brands within the largest luxury group, LVMH, CELINE is taking concrete steps to address these concerns. By conducting detailed carbon footprint analyses of its past store architecture, CELINE identifies gaps where improvements can be made.

This effort allows the brand to make informed changes, particularly in the procurement phase, where material choices and supplier practices are adjusted to align with genuine sustainability goals. CELINE's proactive approach sets it apart, demonstrating a commitment to reducing its environmental impact and leading by example in the luxury sector.

The architecture procurement department plays a pivotal role in bridging innovations from upstream suppliers with evolving downstream customer dynamics. It translates the group's sustainability goals into tangible changes in materials, designs, and supplier practices. These actions not only fulfill the company's CSR commitments but also align with consumers' increasing preference for sustainable choices, reflecting their values and lifestyles.

This thesis examines the integration of sustainability within the architecture and procurement processes of luxury brands, with a focus on Maison CELINE's alignment with the LVMH LIFE 360 strategy. It explores how sustainability requirements influence the architecture of luxury retail spaces, from supplier relationships to customer perception.

The study identifies gaps in communication and processes between architecture departments and international suppliers, specifically regarding the use of sustainable materials and carbon reduction efforts. From LVMH's commitment to sustainability and supplier production upgrades to shifting consumer habits, the architecture procurement department at CELINE serves as the crucial bridge connecting these elements. It has made significant strides in harmonizing these factors, ensuring that sustainability goals are met in a balanced and impactful manner. By aligning the group's environmental objectives with supplier innovation and consumer expectations, CELINE's procurement team plays a pivotal role in driving meaningful and sustainable change across the brand.

Through case studies of luxury brands that have successfully implemented sustainability, this paper highlights both the challenges and opportunities in driving eco-friendly initiatives. It also investigates the evolving role of customer consumption behavior in response to sustainability, alongside the influence of architectural design on brand perception.

Additionally, the thesis presents sustainable solutions for supplier relationship improvements, carbon calculation methods, and innovative tools to advance sustainability efforts within the architecture procurement department. Finally, it discusses the potential for rebranding luxury brands by leveraging sustainability as a key tool to attract and retain customers, while delivering long-term business benefits.

The conclusion offers strategic recommendations for further sustainability integration, with scalable potential across the luxury industry.

LVMH, Céline

Elie MATAR

Bachelor in civil engineering

Notre Dame University

Lebanon

Key Factors Influencing the Success of Waste Management in the Middle East: Regulatory, Cultural, and Environmental Perspectives with Lessons from Global Practices

Waste management is one of the most critical environmental challenges of our time. As the global population continues to grow and urbanize, the amount of waste generated increases, leading to significant environmental degradation, pollution, and public health risks. The need for sustainable and effective waste management systems has never been more urgent.

Waste management issues are not limited to a single region but are a growing concern across many nations, as evidenced by reports from global organizations like the United Nations (UN) and the World Bank. Every year, an estimated 11.2 billion tons of solid waste are collected worldwide (Nations, 2024). By 2050, global waste is expected to grow by 70%, with significant increases in regions such as South Asia, Sub-Saharan Africa, and the Middle East (Schrader-King & Liu, 2018).

Around the world, governments are implementing waste management regulations tailored to their unique economic, social, and geographical contexts. However, these strategies and regulations are evolving at varying rates, influenced by each country's distinct pace and perspectives.

Developed nations, like those in the European Union, struggle with managing large quantities of industrial and electronic waste, while developing countries face challenges with organic waste and inadequate infrastructure.

The composition of waste also varies considerably between countries, influenced by factors such as economic development, consumption patterns, and local customs. For example, high-income countries tend to generate more electronic and plastic waste, while lower-income countries produce larger quantities of organic waste.

This variability in waste types requires tailored strategies to address the specific needs and challenges of each region. This global push toward sustainable waste management is driven by a combination of environmental concerns, economic imperatives, and international commitments to reduce greenhouse gas (GHG) emissions and combat climate change.

We will explore the key factors influencing the success of waste management systems analyzing the regulatory, cultural, and environmental dimensions. The central question guiding this research being What are the critical success factors for implementing effective and sustainable waste management strategies in the Middle Eastern context, and how can lessons from global practices be adapted to this region ? and focus to the United Arab Emirates (UAE), the Kingdom of Saudi Arabia (KSA), and Qatar.

These countries have been selected not only for their rapid economic growth and unique cultural dynamics but also because they are at the forefront of environmental commitments and waste management initiatives in the region. Compared to other Middle Eastern countries, the UAE, KSA, and Qatar have made significant strides in implementing policies aimed at sustainability, reducing greenhouse gas (GHG) emissions, and improving waste management infrastructure.

SUEZ SA – Paris

Victoire DUMONT

Master of public laws ASAS

Entrepreunariat & marketing digital

Toulouse Business School

France

Deploying Industrial and Commercial Packaging Reuse.

As a new Extended Producer Responsibility (EPR) Scheme is set to be implemented in France starting 1st of January 2025 for industrial and commercial packaging (ICP), a new financial stream will be unlocked to support the supply chain in reducing, reusing, and recycling the deposit of 7.3 million tonnes of ICP. This study will focus on the reuse of ICP packaging.

Currently, 50 to 53% of ICP is estimated to be reused. That's more than one over two though we observe a strong heterogeneity in reuse performance among ICP types. Multiple obstacles to ICP reuse have been identified in the ADEME prefiguration study for ICP EPR scheme published in 2024, including the need for more knowledge of existing solutions and the lack of coordination between stakeholders.

This study aims to provide ICP users with an operational playbook on deploying industrial and commercial packaging reuse and aims at addressing those two challenges.

We will focus on ICP which will be covered by the new EPR scheme and will first analyze the current state of ICP reuse based on the literature review, which enables to establish the list of 50 ICPs expected to be covered by the new EPR scheme which will define precisely the perimeter of the study, this list being validated by ADEME.

Then, will be identified the different types of ICP users based on their regulatory obligations as well as economic and logistic constraints, then a focus on identifying the stakes of ICP reuse for each type of users based on regulation, market analysis and impact studies.

Then, a set of 50 targeted interviews of ICP manufacturers, service providers powering reuse and users addressing or using the ICP identified will enable the identification of the drivers, existing solutions, and restraining factors for reuse.

All the service providers and manufacturers sourced for the interview which power ICP reuse will be gathered in a digital platform. This platform will be designed for ICP users to tackle the problem of need for knowledge of existing solutions and will be delivered with a step-by-step methodology on ICP reuse rollout for each user type.

RE(SET) - Paris

Martin BERNARD

Engineer
in Materials
and Sustainable
Development

ESIREM Dijon
France

Recycling of soft PVC-based products : stakes, technologies and applications.

Polyvinyl chloride (PVC) is the third most important synthetic plastic polymer derived from petroleum, obtained in a powder or granulate form, before being transformed into soft or rigid components. The global volume of "soft" PVC components is increasing steadily in the natural world, and its toxicity is significantly higher than that of other plastic components.

Thus, the traditional disposal of non-biodegradable soft PVC wastes causes serious environmental issues. In this context, the recycling option appears as an interesting alternative.

Over the past decades, great progress has been made concerning PVC recycling regulations. In France particularly, an updated framework known as Extended Producer Responsibility (EPR), including from 2022 a new product category, specifically target soft PVC recycling. These regulations contribute to the collection of such post-consumer products through eco-organisms, but not always to an effective disposal.

For instance, while diverse technologies and innovations have already proven an effective recycling of any mono-material soft PVC product, it isn't the case of multi-material soft-PVC based products, constituting this study perimeter. Indeed, separating the PVC part from other components (metals, plastics, textiles), being technically feasible, still represents a challenge nowadays.

This is amongst others what is specific in this study and what will be brought to it. Therefore, in this paper, we propose to study how to build a semi-closed-loop recycling flow of this type of products, while considering all the challenges it implies for a distributor: a case study within Decathlon company will contribute to the answer.

The main reason for this study reflects the company needs and benefits for a specific recycling project, the associated study objectives are intrinsically linked to this project : First, the aim will be to understand the different collection flow possibilities when addressing a recycling project, particularly when an ERP is involved.

In this way, both qualitative and quantitative findings are expected, by identifying and characterizing the available feedstock of Decathlon products that will be used for the project, as well as studying stakes and opportunities to increase this feedstock.

The second objective will be to identify, validate, and consolidate the best technical solutions for soft PVC automated sorting, avoiding manual steps requirements. In order to do this, a global literature review of the current technologies available will be performed. These technologies will be compared and hierarchized, both before and after being tested on Decathlon's products. Simultaneously, an overview of the current key players in this sector is expected.

Finally, one last objective will be to identify and validate integration pathways of recycled PVC, as well as outlets applicable to Decathlon's products. Thus, a literature research followed by an experimentation plan will enable to determine the optimal integration rate of recycled PVC content, into specific components.

DECATHLON water sports - Hendaye

Dylan GORDON

PENN Multi-Master's Degree in International Environmental Management (IEM)

Master of Science in applied geosciences

University of Pennsylvania

USA

Remote Sensing and GIS-Based Characterization of Hydrocarbon and Hazardous Gas Emissions in the Marcellus Shale : insights for Mitigation and Prevention.

Pennsylvania's energy sector, long a cornerstone of the state's economy, is characterized by a complex network of oil, gas, and petrochemical operations (Ingraffea et al., 2014). While these industries have driven economic growth, they have also created significant environmental challenges, particularly regarding the monitoring and accounting of emissions.

The state's reliance on these industries has raised widespread concerns about hazardous gas emissions, which are often underreported and difficult to monitor accurately due to the dispersed and remote nature of many facilities (Environmental Defense Fund, 2018). Pennsylvania hosts a vast number of oil and gas wells, including active and abandoned storage wells, depleted reservoirs, injection wells, as well as infrastructure such as power plants, terminals, and refineries (Kang et al., 2014).

The scattered distribution of these sources complicates the monitoring of hydrocarbon emissions and associated hazardous gases such as methane, nitrogen dioxide, and formaldehyde (Environmental Protection Agency, 2021; NASA, 2024). Traditional ground-based monitoring methods are often insufficient, particularly in remote areas, prompting this study to investigate the potential of remote sensing techniques to provide more comprehensive and accurate environmental monitoring across the state's energy sector (Veefkind et al., 2012; Schneising et al., 2020).

This study aims to address the gaps in emission monitoring by integrating advanced remote sensing techniques with geospatial and statistical methods to provide a more accurate assessment of emission dynamics and sources across Pennsylvania. Using data from both the Sentinel-5 TROPOspheric Monitoring Instrument (TROPOMI) for widespread coverage and GHG Sat for high-resolution data (up to 10 meters), the research will seek to improve emission source attribution and support more effective environmental management (Veefkind et al., 2012).

TROPOMI will help understand broader emission dynamics, while GHG Sat will provide detailed monitoring of specific oil and gas wells (Duren et al., 2019). The study will begin with a cluster analysis to spatially organize and assess the distribution of emission sources, including active and abandoned wells, refineries, and storage facilities. This approach is intended to identify high-density emission zones that require focused monitoring.

Geospatial analysis and geostatistical methods will be employed, including techniques such as hot spot analysis and spatial interpolation, to better understand emission patterns and predict emission levels across unsampled areas (Schneising et al., 2020). The satellite data will be processed through Google Earth Engine to address environmental factors and analyzed using ArcGIS Pro to produce detailed visualizations of emission distributions (Redlands, 2011).

By integrating satellite data from TROPOMI and GHG Sat with point source information, the study aims to enhance the precision of emission source attribution, particularly in areas where multiple industrial activities overlap or where abandoned and depleted wells contribute to emissions (Kang et al., 2014).

This research is especially important for addressing underreporting and identifying sources of high concentration of emissions in Pennsylvania and could help inform more effective environmental management practices.

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The voluntary sector and the challenge of decarbonization.

The fight against climate change is a major issue of our time, requiring concerted action from all sectors of society, including the voluntary sector. As governments and businesses take steps to reduce their carbon emissions, non-profit associations are also faced with the need to integrate decarbonation into their strategies. This thesis examines the following problem : “Decarbonization: obstacle or opportunity for the associative world ?”

Based in particular on a practical case I had the opportunity to work on during my internship, it explores the specific challenges and opportunities faced by associations in the context of the ecological transition.

The first part of this study looks at the particular challenges that decarbonization imposes on associations. Time constraint is an essential factor to have in mind, with regulatory deadlines fast approaching, forcing associations to react swiftly.

At the same time, they have to navigate an often unclear and uncertain regulatory framework, which complicates the implementation of long-term strategies. Sector-specific constraints, such as limited financial and extra-financial resources, volunteering, and the complexity of reconciling environmental objectives with their core missions, add a further layer of difficulty.

The second chapter explores the construction of the ecological transition for non-profit organizations. This section first looks at the legitimacy of the transition, highlighting the issues at stake and the specific features of the associative sector. It then explores the levers and opportunities available to support this transformation. Finally, it looks at the feasibility of this transition, both financially and structurally, while highlighting exemplary initiatives.

This second section is partly based on the carbon accounting of the Foyer Notre-Dame des Sans Abris, a non-profit organization based in the Lyon metropole area. This case study does not replace in-depth research but adds a more concrete dimension to the subjects covered.

Finally, the third chapter analyzes the place of associations in the global decarbonization movement, examining their interactions with other sectors and their potential to become leaders in this field. Cross-sector synergies are essential to maximize the impact of decarbonization initiatives (someone’s scope 1 is someone’s else scope 2 and 3!).

Associations can play a central role in mobilizing communities and influencing public policy, thanks to their proximity to citizens and their ability to raise awareness and educate on climate issues.

In short, this thesis aims to demonstrate that, far from being a mere obstacle, decarbonization offers a unique opportunity for the associative world to reassert its key role in the ecological transition and make a significant contribution to a sustainable future.

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How to build a biodiversity strategy for a financial institution ?

Nature is declining globally at a rate unprecedented in human history and this decline is expected to accelerate: transformative changes are needed to restore and protect nature (IPBES, 2019). To tackle this issue, recently, there has been a rapid development of regulations (Kunming-Montreal GBS, CSRD, Article 29 LEC in France), as well as an increase in awareness and a rapid development of voluntary frameworks for companies to take biodiversity into account, as they play a key role.

Companies, particularly financial institutions, need to meet these demands and define visionary biodiversity strategies, but they are not yet mature on the topic.

This study will focus on the financial sector (banks, insurance companies and investment funds) and how to build a biodiversity strategy.

The objectives are to provide an overview and a comparison of the different existing tools to establish a biodiversity diagnostic (meaning the assessment of dependencies, impacts, risks and opportunities for a financial institution), a biodiversity strategy, and to assess this approach with concrete study cases and discuss the results.

BL Evolution has already written a guide on the building of biodiversity strategy and other consulting firms have also written articles or guides on the topic, from a theoretical angle.

The aim of the study is to be more concrete, to rely on study cases and concrete applications, and to focus on operational implementation.

To achieve these goals, a review of scientific and grey literature (including BL Evolution publications) will be used for the theoretical part. The application side will rely on study cases published in the literature, previous consulting missions performed by BL Evolution, interviews of colleagues and clients and missions and studies currently ongoing in the consulting firm.

The main challenge and risk for this study is that the research question is broad which will require good time management and framing with the tutor. The obstacles encountered might be the unavailability of clients and issues related to confidentiality.

But the strong expertise of BL Evolution on biodiversity topics and the availability of colleagues will be an asset. This study will be a personal opportunity to improve skills and an opportunity for BL Evolution to get in touch with previous clients, to produce

BL Evolution

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How is sustainability integrated into the innovation process within the private sector for consumer goods (food & beverage, fashion & cosmetics) ?

In today's fast-changing business world, innovation teams aim to de-risk ideas that help the organization grow profitably. This requires using filters throughout the innovation process to screen potential projects, starting broadly and narrowing down to the best opportunities.

A key filter is sustainability, which is increasingly important due to stakeholder, regulatory, and consumer demands. Integrating sustainability is both a moral and strategic priority, driving long-term value and competitive advantage. However, it requires a clear definition of sustainability, tools to measure it, and methods to ensure it's applied consistently at every stage of innovation.

This leads us to the following research questions: How can sustainability be integrated and prioritized as a core criterion driving decision in the innovation process, ensuring it is considered equally alongside feasibility and profit? And what key performance indicators (KPIs), tools, and methods are essential at each stage to measure sustainability ?

The specific study objectives & perimeter are how sustainability can be a main criteria for innovation in the consumer goods sector (food & beverage, fashion, and cosmetics) and assess KPI, tools and methods to measure sustainability through relevant materialities for the consumer market and provide examples.

This study will highlight a potential contradiction between innovation, which traditionally aims to drive growth by creating new products and markets, and sustainability, which advocates for a more restrained approach to consumption. This presents a strategic shift for companies, where resilience should become the guiding principle instead of profit and market growth.

The goal of innovation should transition from merely introducing new products to enhancing existing ones, making them less resource-intensive while managing risks and balancing key criteria such as feasibility and cost.

Primary data will come anonymized data from a mission in the consumer goods sector, alongside a formal interview with the Global Innovation Lead and informal discussions with the innovation team and experts.

Secondary data will include internal documents and past client deliverables, all anonymized, while desk research will involve reviewing scientific articles and reports on integrating sustainability into innovation for consumer goods.

Through qualitative analysis are explored how innovation can be a core criterion in the innovation process and more broadly in an organization' strategy. An LCA tool will be developed to calculate reduction potentials on selected materialities for several fictional products providing quantitative data.

QUANTIS - Paris

Aurélie BRUNSTEIN

L'engagement solidaire comme pilier de déploiement de la RSE.

IDIX est une agence de communication corporate, institutionnelle et digitale. L'agence travaille en B to B et propose des services de conseil en communication. Elle s'appuie pour cela sur deux progiciels « Maison » : PADDIX et SNACDATA, des logiciels de génération de contenu.

Que peut faire une PME de 24 salariés pour « faire sa part » et relever les challenges de notre époque ? Dans une société de plus en plus individualiste et polarisée, la conviction de la direction de l'Agence est qu'il est nécessaire de (re)créer du lien social.

Ce questionnement est au cœur de la problématique de IDIX. De quelle manière, à son échelle, l'Agence peut avoir un impact social positif sur son écosystème et quel type de dispositif pourrait y répondre. C'est ainsi que IDIX a souhaité étudier la mise en place d'un dispositif autour de l'engagement solidaire.

Cette étude va nous permettre d'étudier le contexte de IDIX, de voir comment cette problématique a émergée et comment IDIX propose d'y répondre avec la présentation du dispositif d'engagement solidaire imaginé. Aussi, nous verrons de quelles manières, ce dispositif s'inscrit dans la stratégie RSE de l'agence.

IDIX – Paris / Nantes

Valentin
RACT

L'engagement solidaire comme pilier de déploiement de la RSE.

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IDIX – Paris / Nantes

This document presents the abstracts of the professional theses defended at École des Mines de Paris for the Post-Master International Environnement Management EnvIM.
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