Study Guide: Eco-Entrepreneurship & Green Innovation

Comprehensive Overview of Sustainable Business Practices

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1. I'm an Eco Entrepreneur (Founders for Schools)

This panel discussion features multiple eco-entrepreneurs during Global Entrepreneur Week, showcasing the thriving green economy and diverse paths to environmental entrepreneurship.

> ### Featured Entrepreneurs & Their Ventures:
>
> - **Albie Baker Smith - Route Zero:** Software tools to help organizations cut travel emissions (80% of business emissions come from travel)
> - **Maddy Booth - What's Scrubby:** Products from coffee grounds waste; developed after working in Australian coffee shop disposing 50kg daily
> - **Duncan - ResetConnect:** Platform connecting large corporations with green startups and impact investors
> - **Nad - Are You Mad:** Recycling studio in Carnaby Street; collected 1.2 tonnes of plastic in 45 days, created furniture and products
> - **Katrina - Batteryser:** Battery technology that produces hydrogen from excess solar energy

Key Lessons for Aspiring Eco-Entrepreneurs:

Embrace Failure: Nearly every successful startup founder has a history of failed projects. Albie's previous tree-planting app didn't succeed, but taught valuable lessons. Failure is a learning opportunity, not a negative outcome.

Talk to People Early: Don't build in isolation. Engage with potential customers and like-minded communities. Programs like Carbon 13 and Young Innovators Award provide mentorship, grants, and living allowances.

Love Learning: Early-stage startups require doing all jobs—tech development, customer conversations, product design, pitch decks. Resources include Slidebean YouTube channel, The Mum Test book, and The Lean Startup.

Circular Economy Example: Colgate produces 10 million of 20 million toothbrushes made annually globally—all still exist somewhere on earth. This demonstrates the massive scale of plastic waste and why circular solutions are critical.

Creativity as Foundation:

Current systems are at breaking point. Innovation requires creativity to develop new models. The recycling studio demonstrated hyperlocal solutions to global problems, achieving 99% recycling rate versus standard 16% at recycling centers.

2. What is Eco Innovation? (Dr. Jo North)

Eco innovation encompasses business innovation with the purpose of reducing environmental harm, helping restore ecological balance, and addressing resource sustainability challenges.

> **Definition & Core Concepts:**
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> - **Eco Innovation:** Business innovation that reduces environmental harm or helps restore ecological systems
> - **Alternative Terms:** Sustainable innovation, environmental innovation, green innovation

(all related to broader sustainability practices)

- **Holistic Approach:** Not just about the product/service—includes entire life cycle, business processes, and organizational DNA
- **Circular Economy Focus:** Thinking about full lifecycle and how materials can be reused in the economy

Two Cycles of Circular Economy:

Technical Cycle: Materials that don't biodegrade (metals, plastics). Value is in the material itself. Goals: maximize lifespan, share/reuse, refurbish, repair, remanufacture, recycle. Example: recovering 80% of material through recycling rather than creating new resources.

Biological Cycle: Materials that biodegrade (food, cotton, wood). Must maximize use to benefit environment and planet. Problem occurs when technical and biological materials are mixed—makes separation and reuse difficult (e.g., poly-cotton blends).

Innovation Examples:

- **Tynall:** Creating alternative proteins from precision fermentation (20% of greenhouse gas emissions come from agriculture)
- **Turtle Tree:** Creating dairy-free milk and proteins for humans and pets using technology
- **Repsol:** Spanish petroleum company creating first circular polyurethane foam for mattresses/sofas (normally very difficult to recycle)
- **NotPla:** Plastic alternative made from seaweed—biodegrades in weeks, doesn't compete with crops, requires no fresh water or fertilizer

Why Eco Innovation Matters Now:

- Climate change demands all innovation be eco-innovation
- Companies play crucial role in solutions, not just problems
- Growing consumer demand—millennials and Gen Z expect sustainability

- Studies show 30%+ would consider changing jobs for more sustainable employers
- 70% of people consider environmental practices important when job searching

Implementing Eco Innovation:

Look at external opportunities (technology advances, new materials, renewable energy), examine internal operations (production, delivery, supply chains, energy sources), and identify your value proposition around sustainability. Solve real problems customers understand and will pay for, even at potentially higher cost. Embed environmental responsibility into decision-making frameworks.

3. Intersection of Innovation and Green Entrepreneurship (Maya Karkour TEDx)

Innovation and technology act as catalysts for green entrepreneurship. The global green technology market was valued at $16.5 billion with estimated 20% growth rate through 2032.

> **Key Principle:**
>
> - Sustainable innovation isn't just about high technology or new inventions
> - Can be innovative ways of delivering products/services (circular business models)
> - Low-tech solutions redesigning consumption and production
> - Focus on less environmental and social impact

No-Tech Green Innovations:

- Vintage/secondhand goods becoming the new trend
- Natural materials grown in regenerative practices (linen, wool, bamboo, hemp) with natural dyes

- Refill systems eliminating packaging (30-40% of product cost)
- Upcycling non-recyclable plastic waste (nylon, plastic bags, umbrellas, kite surfing equipment) into fashion accessories
- **3D Ocean Farming:** Seaweed and shellfish farmed at sea—seaweed captures CO2, creates algae farms attracting fish, requires zero fertilizer or chemicals, provides highly nutritious food

Low-Tech Green Innovation:

- Oyster shell waste → construction materials, bricks, tiles, lime-based reflective paint
- **Chittazan (Egypt):** Shrimp shells → organic biofertilizer and biopesticide, potential for biomedical/cosmetic use, empowers rural women
- Fallen autumn leaves → paper products without felling trees
- Sustainable chemistry: natural, biodegradable cleaning products and cosmetics
- Reverse engineering: discarded tires → synthetic rubber for new products
- Agricultural waste (wheat straw, banana waste) → packaging
- Mycelium (mushroom roots) → sound insulation, packaging
- Product redesign: shoes that can be disassembled for material recycling

Tech-Enabled Green Enterprises:

QR codes, AI, online databases, and GPS tracking enable new circular business models:

- Apps for buying/selling secondhand clothes and products
- Consignment platforms for luxury vintage goods
- Gamification for proper waste sorting (rewards/discounts for correct recycling)
- AI-enabled smart bins recognizing recyclable types
- E-bike subscription models (suppliers maintain ownership, incentivized for

durability, apps show CO2 savings)

- QR-tracked reusable containers for food delivery
- 3D fabrication producing exact sizes with minimal waste using sustainable materials
- 3D printed customized clothing (higher incentive to wear longer)

High-Tech Green Innovation:

- Ocean plastic waste → highly durable waterproof coats
- Fish waste and algae → bioplastic replacing cling film and aluminum foil
- Shellfish and crab waste → leather-like fabric
- Reishi mushroom mycelium → vegan leather through biotechnology
- Boats integrating wind, solar power, and hydrogen storage
- Floating hydrogen ports for sustainable aquaculture
- Cellular agriculture: precision fermentation growing protein from microbes
- Cultivated meat: lab-growing animal cells in bioreactors

Powerful Quote: "Waste is a lack of imagination." Every type of waste can be revalorized into precious new material through complete redesign of how we create products.

4. Introduction to Green Entrepreneurship (Module 1)

Green entrepreneurship blends business principles with commitment to ecological conservation, representing a departure from traditional profit-centric models to holistic environmental sustainability.

> **Core Concepts:**
>
> - **Definition:** Also called eco-entrepreneurship; develops businesses addressing environmental problems while pursuing economic prosperity
> - **Triple Bottom Line:** Emphasizes economic gains, social impacts, AND environmental impacts
> - **Two Dimensions:** (1) Develop businesses addressing environmental problems (2) Reinvent existing products/processes from exploitative to regenerative

Importance of Green Entrepreneurship:

- **Positive Change Catalyst:** Drives transformation in business practices
- **Resource Efficiency:** Follows circular economy principles (reuse, recycle, reduce waste)
- **Consumer Demand Response:** Meets growing awareness and demand for eco-friendly products
- **Solution-Oriented:** Provides solutions rather than contributing to problems
- **Global Policy Impact:** Influences policy frameworks and international collaborations

Global Trends:

- Consumer-led demand for sustainable practices worldwide
- Sustainable agriculture becoming focal point
- Technological innovations in renewable energy
- Circular economy models gaining popularity

Key Sectors in Green Entrepreneurship:

Renewable Energy:

- Solar power: Harnessing sun energy for electricity
- Wind energy: Converting wind kinetic energy to electricity
- Hydropower: Generating electricity from flowing water

Energy Efficiency:

- Energy-efficient technologies reducing consumption in buildings and transportation
- Smart grid solutions optimizing energy use

Green Building & Construction:

- Sustainable architecture prioritizing environmental impact, energy efficiency, resource conservation
- Eco-friendly construction materials with lower environmental impact

Waste Management & Recycling:

- Upcycling: Transforming waste into higher quality/value products
- Waste-to-energy: Converting waste through incineration or anaerobic digestion

Water Conservation:

- Water purification technologies ensuring clean drinking water access
- Smart irrigation systems reducing consumption, increasing crop yields

Sustainable Agriculture:

- Organic farming without synthetic pesticides, fertilizers, or GMOs
- Agroforestry: Integrating trees and shrubs into agricultural landscapes

Clean Transport:

- Electric vehicles (cars, bikes, public transportation)
- Sustainable logistics with eco-friendly transportation solutions
- Green freight: Electric/hybrid delivery vehicles
- Smart logistics: Route optimization and real-time tracking

Eco-Tourism:

- Conservation-focused experiences emphasizing environmental education
- Community engagement ensuring tourism contributes to development
- Cultural preservation showcasing local traditions
- Low-impact accommodations prioritizing sustainability

Eco-Friendly Products:

- Green technology products (solar-powered devices, energy-efficient electronics)
- Recycled and sustainable materials in manufacturing
- Sustainable fashion using organic cotton, hemp, ethical practices
- Upcycling and recycling programs reducing textile waste

Role in Africa's Sustainable Development:

Green entrepreneurship addresses environmental challenges (deforestation, soil degradation, water scarcity, climate impacts) while creating employment, fostering innovation, building economic resilience, and influencing policy through:

- Environmental conservation through afforestation, sustainable agriculture, renewable energy
- Community engagement and knowledge exchange

- Innovation and technology transfer
- Diversification of industries creating adaptable economic foundations
- Policy advocacy through partnerships with governments, NGOs, and international organizations

5. Three Stories of Local Eco-Entrepreneurship (Majora Carter)

Local eco-entrepreneurs create "hometown security" by solving environmental and social problems simultaneously, generating wealth locally rather than destroying it elsewhere.

Story 1: Brenda Palms - Sweet Beginnings (Chicago)

- **Problem:** Ex-convict reentry; 2/3 return to prison; costs $60,000/year per person vs. $17 saved per $1 spent on early education
- **Solution:** Business producing honey-based skincare products
- **Impact:** Hired seemingly unemployable people to care for bees, harvest honey, make products sold at Whole Foods; combined employment training with life skills (anger management, teamwork); <4% return to prison rate

Story 2: Andy Lipkus - Green Infrastructure (Los Angeles)

- **Problem:** 20% of California energy pumps water to Southern California; expensive rainwater channeling; urban heat island effect
- **Solution:** Linked trees, people, and technology
- **Impact:** Convinced LA to replace $200M of planned asphalt around schools with trees/greenery; 20M sq ft asphalt avoided; reduced AC consumption; increased maintenance employment; net savings plus healthier students

Story 3: Judy Bonds - Wind Energy (West Virginia)

- **Problem:** Mountaintop removal coal mining destroys landscapes, poisons water, creates unemployment, health hazards; 2 dozen men can tear down mountain in months for few years of coal
- **Solution:** Coal River Mountain Wind project
- **Impact:** Calculated upfront costs vs. long-term payback; centuries of clean energy with local expertise development; longer payback than mountaintop removal but wind energy pays back forever; left business plan as legacy

Common Characteristics of These Entrepreneurs:

- Practical visionaries solving real problems
- Examine market demands and money flows
- Recognize that "cheap" solutions creating unemployment produce "expensive citizens"
- Channel dollars through local economies productively
- Meet existing market demands while reducing social problems

Additional Problem/Solution Examples:

Waste Handling & Unemployment: Create eco-industrial parks where one company's waste is another's raw material, or use recycled materials for manufacturing. Creates local jobs and markets.

Unhealthy Food Systems: Current system relies on transportation, chemical fertilization, heavy water use, refrigeration—poisoning waterways, producing unhealthy food. Urban agriculture integrated with rural food systems can create year-round local supply, supporting seasonal farmers, creating regional jobs, meeting institutional demands (hospitals, schools).

Hometown Security Concept:

Rebuilding natural defenses, putting people to work, restoring natural systems. Creating wealth locally instead of destroying it overseas. Tackling social and environmental problems simultaneously yields cost savings, wealth generation, and national security. The sum of the local is the global.

> **Key Message:**
>
> - We are the key to our own recovery
> - Think local, act local
> - Smart infrastructure provides cost-saving ways for municipalities to handle both infrastructure and social needs
> - Shift systems to transform tax-burdened people into tax base contributors

6. Green Business Ideas for Teen Entrepreneurs

Young people have a superpower in entrepreneurship: willingness to speak out about problems they see. 87% of Gen Zers worry about the environment, but 88% believe their generation can change the world for the better.

Jaden Smith Example: At age 12, started Just Water—sustainably sourced water in recyclable packaging, paying communities 6x the going rate for water collection.

Five Business Ideas with Case Studies:

Idea 1: Alternative Energy

Case Study - Tom Osborne (18): Created "green char" from sugar cane farm waste as alternative to charcoal/wood (which caused his mother's lung disease). Green char is smokeless, has higher energy content, burns longer, doesn't cause deforestation.

Idea 2: Recycled Paper Products

Case Study - Fabian Overbeek (19, Netherlands): Recycled greeting card business with sustainable South African paper company. Cards contain seeds inside—after enjoying card, plant it in garden.

Idea 3: Plant-Based Snacks

Case Study - Leensa Ahmed (17, Minnesota): Started Green Garden Bakery with friends after fundraising for car accident victim. Sells plant-based desserts using vegetables from community garden. Uses local ingredients, compostable packaging decorated by kids using vegetable-based paints.

Idea 4: Community Garden

Case Study - Claire Reed (16): Developed Real Gardening method using simple, affordable materials. Research with University of Pretoria showed 80% water savings during early stages. Officially launched 2010; focused on getting next generation passionate about gardening.

Idea 5: Homemade Care Products

Case Study - Benjamin Stern (16): Released plastic-free Nobo shampoo balls, earned investment from Mark Cuban on Shark Tank. Later launched Nobo Drops—liquid pods with biodegradable casing containing conditioner, body wash, shaving cream. Four out of five people don't consistently recycle bathroom items—equivalent to 1,200 football stadiums of shampoo bottle waste annually in US.

Resources for Starting:

- Ask yourself: What problem are you experiencing? Can it be solved sustainably? Who else has this problem?
- Identify resources you have and need
- SBA environmental grants and loans
- Student expos and contests
- University support programs

- Young entrepreneur resource guides
- Ask questions freely, seek perspectives, take advantage of resources

7. Eco Volunteer to Eco Entrepreneur (Malini Parmar TEDx)

Journey from corporate banking/IT career to social entrepreneur selling zero waste homes concept, demonstrating how volunteer activism can evolve into successful social enterprise.

Journey Timeline:

2009: Joined waste segregation initiative in community. Started with operations plan, marketing, vendor management. Over 80% participation—proving behaviors can change with clear communication and visible processes.

2014: Took year off work to work full-time on waste. Set up stalls, promoted menstrual cups, mastered composting, shared learning with expanding "Garbage Sisterhood."

Mid-2015: Formed social enterprise; within 3 months only 2 founders remained.

Key Initiatives:

Borrow a Bag Program:

- Inspired by another volunteer group
- Supported by shopkeepers but initially no citizen pickup
- Connected with citizen volunteers, built campaign
- Scaled to multiple locations

Plastic Ban Campaign (December 2016):

- Choice between activism or scaling business—chose activism

- Achieved plastic ban law March 2016
- Market flooded with cloth bags and hundreds of vendors (mission accomplished)

Green the Red:

- Pan-India group promoting menstrual cups and reusable cloth pads
- When producers wouldn't make requested changes, designed stemless cups themselves

Composting Initiative:

- Saw opportunity for low-cost composters
- Asked knowledgeable competitor to help design first product
- He shared knowledge; they returned favor by bringing all competitors into composting workshops
- **Key Philosophy:** "The world needs more collaboration and less competition in this space"

Business Evolution:

- **Saathi Program:** Converted activists into eco-entrepreneurs
- Recruited and trained eco-women for operations, accounts, sales
- Created employment where women find it difficult (smaller towns)
- Sourced from women's self-help groups and NGOs
- Learned to price products sustainably
- Built trust to raise funds for nonprofit projects
- Focused portfolio on two categories: composting and sustainable personal care
- **2020:** Finally shifted into profitability

Key Lessons:

- Accepted that garbage problems are too numerous—work on a few, support all others
- Social enterprise kept together by ecosystem support
- Share ideas and time generously—community returns favor in double measure
- Build company from activist learnings with models that actually work

8. What Is Eco-Entrepreneurship? (Megan Pillsbury)

When teaching eco-entrepreneurship at University of Delaware, the concept was framed through two key dimensions:

> **Two Dimensions of Eco-Entrepreneurship:**
>
> - **Dimension 1: Problem-Solving**
> - Can you develop businesses that address environmental problems?
> - Use business structure or technology to create specific solutions
> - Direct approach to environmental challenges
> - **Dimension 2: Reinvention**
> - Can you reinvent existing products, processes, or structures?
> - Flip them from exploitative to regenerative
> - Transform what already exists to reduce harm

Student Application:

Students in the class worked on two different types of business ideas:

- Addressing a specific environmental problem
- Reversing the impact of something we already do

This framework provides a clear, actionable definition: eco-entrepreneurship is about either solving environmental problems through new business solutions OR transforming existing business practices to be regenerative rather than exploitative.

Summary: Key Themes Across All Documents

1. Multiple Pathways to Eco-Entrepreneurship

Success comes from various backgrounds: corporate careers, volunteer activism, student projects, and direct environmental passion. No single "right" path exists.

2. Innovation Spans Tech Levels

Solutions range from no-tech (vintage goods, refill systems) to low-tech (upcycling, natural materials) to high-tech (biotechnology, cellular agriculture). All are valid and valuable.

3. Failure as Learning

Every successful eco-entrepreneur has failed projects. Reframing failure as learning opportunity is essential mindset shift.

4. Collaboration Over Competition

Sharing knowledge, resources, and even helping competitors strengthens entire green economy. Community support is fundamental to success.

5. Circular Economy Foundation

Understanding technical vs. biological cycles, maximizing material lifespan, and closing loops are central to eco-innovation.

6. Local Solutions, Global Impact

"Hometown security" demonstrates how local eco-entrepreneurship addressing community-specific problems contributes to global environmental goals.

7. Triple Bottom Line

Success measured not just by profit, but by environmental restoration and social impact—creating jobs, empowering communities, improving health.

8. Young People as Change Agents

Gen Z's environmental concern combined with entrepreneurial fearlessness positions young

people as powerful drivers of green transition.

9. Business Viability Matters

Good intentions must be paired with sound business models. Learning to price sustainably, understanding markets, and achieving profitability ensures long-term impact.

10. Systems Thinking Required

Effective eco-entrepreneurship considers entire systems—product lifecycles, supply chains, community impacts, policy implications—not just individual products or services.