

# Feasibility Analysis for Sustainable Technologies: Empowering Green Innovation

In an era marked by environmental challenges, the adoption of sustainable technologies has emerged as a crucial imperative. 'Feasibility Analysis for Sustainable Technologies' presents a comprehensive guide to navigating the complexities of evaluating and implementing green innovations. This book arms decision-makers with the knowledge and tools to make informed choices, ensuring that sustainable technologies become a cornerstone of our future.



## Feasibility Analysis for Sustainable Technologies: An Engineering-Economic Perspective

★★★★★ 5 out of 5

Language : English  
File size : 9577 KB  
Text-to-Speech : Enabled  
Screen Reader : Supported  
Enhanced typesetting : Enabled  
Word Wise : Enabled  
Print length : 180 pages



## Delving into Feasibility Analysis

The heart of this book lies in the concept of feasibility analysis. It presents a step-by-step framework for assessing the viability of sustainable technologies, considering key aspects such as:

- Technical feasibility: Assessing technological readiness, infrastructure availability, and compatibility with existing systems.
- Economic feasibility: Evaluating investment costs, operating expenses, and potential revenue streams.
- Environmental feasibility: Identifying environmental benefits, quantifying greenhouse gas reductions, and assessing life cycle impacts.
- Social feasibility: Examining stakeholder acceptance, ethical considerations, and community impact.

# BENEFITS OF A FEASIBILITY STUDY

- 1 Point out the valid reasons to go ahead with the idea
- 2 Saves time money and resources.
- 3 Enhances the team's focus
- 4 Helps in identification of new oppurtunities
- 5 Helps to take an informed "go/no-go" decision
- 6 Narrow down the business alternatives
- 7 Enhances the probability of success in a short span of time
- 8 Helps to make clear future growth plans
- 9 Adds value to funding pitches
- 10 Helps make realistic assumptions

By conducting thorough feasibility analyses, decision-makers can identify the most promising sustainable technologies, allocate resources effectively, and mitigate potential risks.

## Case Studies and Real-World Applications

To illustrate the practical applications of feasibility analysis, the book presents a wealth of case studies. These real-world examples delve into the implementation of sustainable technologies across diverse industries, including:

- Renewable energy projects (solar, wind, hydro)
- Green building construction and retrofits
- Electric vehicle adoption and charging infrastructure
- Sustainable waste management systems (recycling, composting)
- Carbon capture and storage technologies

# Feasibility Study of Solar Photovoltaic Systems for Energy In Residential Homes:

A Case Study of Metropolitan Lagos, Nigeria



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Editor: Dr Henry Adams

## RESEARCH QUESTIONS

1. What is the technical feasibility for the use of solar PV systems in meeting the energy demand (in a standalone or hybrid) of grid energy of residential buildings in Lagos?
2. What is the economic benefit for the integration of PV to buildings in Lagos compared to the use of building stand generators?
3. To what extent will energy use from solar PV in buildings reduce greenhouse gas emissions in Lagos?

## COUNTRIES AND REGIONS

**Nigeria**  
Region: Five local Governments (Ajayi (Ajegunfe, Alimosho, Mushin, Oshodi and Kosofe)) in Lagos State, South West Nigeria

## METHODS

- Multi-method approach including:
- Extensive literature review
  - Survey of 2M households for the collection of energy data – Survey OUs across 5 LGAs in Lagos and the five most building types in Nigeria ("Flat, Semi-detached, Duplex, Quaker, Single family Bungalow and Traditional Court Yard")
  - Household survey data in Microsoft Excel to generate electricity load profile of buildings
  - The load profiles of the buildings (10 buildings in various sensitivity levels) was used to model a stand-alone system using HOMER Pro software
  - GHG emission savings associated to the use of PV in residential buildings was calculated using Microsoft Excel



## FINDINGS

- Solar generation is a prominent source of electrical energy for households as they were used in all the building types in the study location.
- Overall, PV systems possess potential for generating electricity to meet the entire electricity demand (100%) of residential buildings.
- A duplex building in our study had a rooftop area that was not large enough to accommodate the required solar PV array, implying that small buildings with very high energy demands may not be able to take full of their load supplied by PV systems.
- The levelized cost of electricity (LCOE) generated by the PV systems is higher than electricity from the grid but cheaper than the LCOE of diesel generators (Figure 5)
- The use of PV reduced electricity in the buildings but potential for reducing and related GHG emissions by 53.2% (Chinisa et al., 2015 revealed a GHG emission reduction of 85% for Cameroon)



Contribution of the LCOE of three energy systems for use in residential buildings in five LGAs

## KEY MESSAGES FOR PLANNERS OR POLICYMAKERS

- The government should create an enabling environment for the adoption and use of solar PV in residential buildings through legislation for supporting the attainment of Nigeria's ambition target under the NDC.
- A list of policy options should be used – to increase uptake of PV in the new build and the adoption of low-consumption household appliances on the other hand.
- Climate finance contributes a window of opportunity for investment in the solar sector – for instance Green Climate Fund (GCF).



By showcasing successful implementation strategies, the book provides valuable lessons for organizations seeking to embrace sustainability.

## Benefits for Decision-Makers

This comprehensive guide offers a multitude of benefits for decision-makers, including:

- Enhanced understanding of sustainable technology options
- Ability to assess the viability of green innovations
- Informed decision-making based on rigorous analysis
- Effective allocation of resources for sustainable investments
- Reduced risk of technology failures or negative environmental impacts

## : Embracing a Sustainable Future

, 'Feasibility Analysis for Sustainable Technologies' empowers decision-makers to confidently navigate the path towards a greener future. By providing a comprehensive framework for evaluating and implementing sustainable technologies, this book becomes an invaluable resource for organizations, policymakers, and individuals committed to sustainability. As we face the urgent challenges of climate change and environmental degradation, the adoption of feasible and effective sustainable technologies is imperative. This book serves as a roadmap for innovation, helping us transition to a more sustainable and prosperous future.

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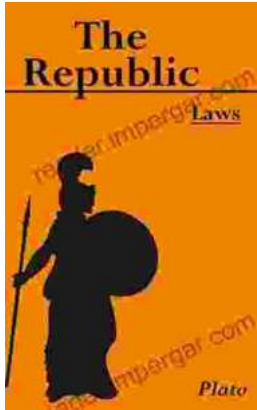
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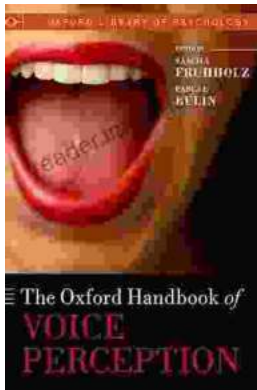
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