financing energy projects in developing countries

#energy project finance #developing countries energy investment #sustainable energy funding #emerging markets renewable energy #climate finance initiatives

Explore the critical strategies and challenges in securing financing for energy projects across developing countries. This covers innovative investment models, sustainable energy funding, and infrastructure development crucial for economic growth and improving energy access in emerging markets.

Financing Energy Projects in Developing Countries

An update to his comprehensive 1996 text on project finance in emerging economies, Razavi's authoritative new book provides first-hand information and analysis of how multilateral, bilateral, and commercial financiers decide to support an energy project. It presents the major changes in the attitudes and orientations of these financiers as they have entered a competitive environment seeking opportunities to do more business in the energy sector of developing countries. For every good energy project, there is a financier somewhere. However, creating an attractive project package requires an explicit understanding of the following: availability of soft loans, credits, grants, tied and untied loans; objectives, tendencies, and requirements of various financiers; possibilities of combining various financial instruments; methods of economic, financial, and risk analysis and mitigation. The reader is guided through the process of understanding the fundamentals of project financing, getting to know the financiers, and developing an acceptable project package. Finally, some real-world case studies demonstrate the intricacies of mobilizing funds for projects in various segments of the energy sector.

Introduction to Project Finance in Renewable Energy Infrastructure

What is project finance? What makes project or structured finance so relevant for large renewable energy infrastructure? Which vocabulary do I need to know in order to speak the same language during meetings with lawyers, investors, bankers and engineers? These questions and many more are answered throughout this book, offering real world examples to bridge the gap between theory and practice. The book details the role of each stakeholder in the development of renewable energy projects, the interconnection between all the agreements, the financial process from fundraising to financial close, the processes of due diligence, risk analysis, project investment valuation and much more. It also provides with an introduction to Portfolio Management using renewable energy assets and an explanation of the role of Climate Finance in green energy investments. The commented glossary enables readers to unpick the jargon used in project finance for renewable energy, and the numerous

creative figures and comprehensive tables aid with understanding. Offering a complete picture of the discipline, Introduction to Project Finance in Renewable Energy Infrastructure will be of value to professionals, engineers and academics alike interested in understanding the process and components of project finance in renewable energy infrastructures, in both private and public-private contexts.

Financing Energy Efficiency

While energy efficiency projects could partly meet new energy demand more cheaply than new supplies, weak economic institutions in developing and transitional economies impede developing and financing energy efficiency retrofits. This book analyzes these difficulties, suggests a 3-part model for projectizing and financing energy efficiency retrofits, and presents thirteen case studies to illustrate the issues and principles involved.

Investment and Finance in the Energy Sectors of Developing Countries

The World Bank's projection of world economic growth indicates that while industrial countries are expected to experience a growth rate of 2.4 percent per annum for the next 15 to 20 years, developing countries are likely to see a growth rate of 5.4 percent per annum. The substantial difference between the two growth paths has some significant impacts on energy consumption, energy investments and financial requirements for energy projects. For example, the investment needs of the power sector in developing countries is expected to be around US $130 billion per year, more than twice the projected power investments in industrial countries. Also, the biggest increases in demand for oil and gas are occurring in the developing world, which is where most of the world's proven oil and gas reserves are located. Thus, international energy companies, investors, equipment suppliers, contractors and consulting firms are shifting their attention from Europe and North America to developing countries, which are likely to offer more business opportunities in the energy sector in the future. Although numerous energy projects are initiated, many of these projects do not reach the implementation stage because of difficulties in mobilizing financial resources. The difficulties are due to the presence of various types of political and commercial risks in developing countries. As a result, structuring finance packages for energy projects in developing countries has become a complex discipline that involves innovative combinations of multilateral, bilateral and commercial funds. This paper provides a global projection of energy investments in the developing countries, and then describes emerging methods of financing oil, power and natural gas projects.

Green Infrastructure Finance

The report estimated that ...

Financial Risk Management Instruments for Renewable Energy Projects

Appropriate risk management tools can help remove some of the barriers to financing Renewable Energy Technology (RET) projects, particularly in developing countries where risk and risk perceptions are highest. That is why UNEP is working on a comprehensive overview of currently available and potential financial risk management instruments for Renewable Energy Technology (RET) projects. This study will pave the way for an upcoming GEF project that will promote the use of financial risk management instruments that favor the development of RETs.

Public Finance Mechanisms to Catalyze Sustainable Energy Sector Growth

This work provides information and analysis regarding how multilateral, bilateral and commercial financiers make decisions about oil, gas and electric power projects.

Financing Energy Projects in Emerging Economies

This handbook deals with various financial instruments, policies, and strategies in a policy-oriented approach for financing green energy projects. Recently, global investment in renewables and energy efficiency has declined, and there is a risk that it will slow further, Clearly, fossil fuels still dominate energy investments. This trend could threaten the expansion of green energy needed to meet energy security, climate, and clean-air goals. Several developed and developing economies are still following pro-coal energy policies. The extra CO2 generated from new coal-fired power plants could more than eliminate any reductions in emissions made by other nations. Finance is the engine of development of infrastructural projects, including energy projects. By providing several thematic and country chapters,

this handbook explains that if we plan to achieve sustainable development goals, we need to create opportunities for new green projects and scale up the financing of investments that furnish environmental benefits. New financial instruments and policies such as green bonds, green banks, carbon market instruments, fiscal policy, green central banking, fintech, and community-based green funds are among the chief components that make up green finance. Naoyuki Yoshino is Dean, Asian Development Bank Institute and Professor Emeritus, Keio University. Jeffery Sachs is Director, Center for Sustainable Development at Columbia University. Wing Thye Woo is Professor of Economics, U.C. Davis. Farhad Taghizadeh-Hesary is Assistant Professor, Waseda University.

Financing of Energy Sector in Developing Countries

This handbook deals with various financial instruments, policies, and strategies in a policy-oriented approach for financing green energy projects. Recently, global investment in renewables and energy efficiency has declined, and there is a risk that it will slow further, Clearly, fossil fuels still dominate energy investments. This trend could threaten the expansion of green energy needed to meet energy security, climate, and clean-air goals. Several developed and developing economies are still following pro-coal energy policies. The extra CO2 generated from new coal-fired power plants could more than eliminate any reductions in emissions made by other nations. Finance is the engine of development of infrastructural projects, including energy projects. By providing several thematic and country chapters, this handbook explains that if we plan to achieve sustainable development goals, we need to create opportunities for new green projects and scale up the financing of investments that furnish environmental benefits. New financial instruments and policies such as green bonds, green banks, carbon market instruments, fiscal policy, green central banking, fintech, and community-based green funds are among the chief components that make up green finance. Naoyuki Yoshino is Dean, Asian Development Bank Institute and Professor Emeritus, Keio University. Jeffery Sachs is Director, Center for Sustainable Development at Columbia University. Wing Thye Woo is Professor of Economics, U.C. Davis. Farhad Taghizadeh-Hesary is Assistant Professor, Waseda University.

Handbook of Green Finance

This book is an essential primer in the core principles of sustainable energy project development through concept, design, feasibility and reality and takes a holistic approach to the development and financing of such projects, setting out the technical, commercial and financial aspects in a straightforward and practical manner. It sets out a first principles-based approach to developing sustainable projects in markets which are not extensively covered by project finance handbooks and which offer a particular set of challenges to the would-be developer. Drawing from over twenty years of experience in the sustainable energy sector, this practical guide will be a valuable resource to both those considering and already involved in projects in developing and emerging countries. Readers can expect to come away with a strong foundation in a core set of guiding principles that can be applied to a wide range of sustainable energy projects in any geographical location.

Handbook of Green Finance

Environmental finance, particularly energy efficiency and renewable energy (EERE) finance, can and should serve as an interface to other sub-sectors of financial sector promotion such as microfinance, housing finance or agricultural finance. For example, existing clients of financial institutions include small and medium-sized enterprises and households, and these are often suffering from high energy prices or have no access to sustainable energy supply. At the same time, these clients are vulnerable to extreme weather events, and often hit hardest by the impact of climate change. There are many other examples which show that the financial sector has an enormous potential to support “green” investments. In order to tap this potential on a sustainable basis, it is important to have a sound understanding which role financial institutions can and should play. This book provides a blend of well-founded professional and scientific perspectives on the potential of Environmental finance in developing and transition countries.

Developing Sustainable Energy Projects in Emerging Markets

The aim of this book is to act as a guide for development workers for financing small renewable systems and a source of reference for further in-depth investigation. The book examines the issues which affect the success of a renewable energy financing programme on both a financial and a technical level.

Greening the Financial Sector

This report outlines the general characteristics of financing a nuclear power project and presents innovative approaches for power generation financing. It discusses the special conditions and requirements of nuclear power projects and their financing complexities. The availability of adequate and secure financial resources is one of the most crucial constraints in the implementation of nuclear power projects in developing countries. Possible ways and means of dealing with these constraints are presented.

Financing Renewable Energy Projects

Foreword by Lord Browne of MadingleyReviews of the First Edition:'The entire text is quite readable and can be moved through with relative ease. This reviewer heartily recommends that, regardless of your background, you read this book to really get a grasp of the cutting-edge of climate finance.'LSE Review of BooksRenewable Energy Finance (Second Edition) describes in rich detail current best practices and evolving trends in clean energy investing. With contributions by some of the world's leading experts in energy finance, the book documents how investors are spending over $300 billion each year on financing renewable energy and positioning themselves in a growing global investment market. This second edition documents, with practical examples, the ways in which investors have funded over $2.6 trillion in solar, wind, and other renewable energy projects over the past decade. The book will be a go-to reference manual for understanding the factors that shape risk and return in renewable energy, the world's fastest growing industrial sector. The book is suitable for executives new to the field, as well as advanced business students.Edited by Dr Charles Donovan, Principal Teaching Fellow at Imperial College Business School and formerly Head of Structuring and Valuation for Global Power at BP, the book will give readers a unique insiders' perspective on how renewable energy deals actually get done.

Renewable Energy Projects for Sustainable Development

This text highlights the role that renewable energy can play in achieving sustainable development. It focuses on rural areas of developing countries, looking in particular at stand-alone solar home systems and grid-connected biomass cogeneration plants. It analyzes the main barriers to the successful transfer of renewable energy technology, with case studies from a range of South-East Asian, South Asian, Pacific and African countries, and explains the ways in which these obstacles can be overcome. The roles of the key players involved and how the Kyoto Protocol can facilitate the transfer in order to mitigate climate change are also discussed.

Financing Arrangements for Nuclear Power Projects in Developing Countries

This book is the first of two volumes that review various approaches and instruments that have been tried, tested, and utilized to scale up clean energy development in Asia and the Pacific. This volume examines clean energy investment needs and financing gaps in the region and reviews existing financing options and approaches, including examples of how these have been applied. Innovative solutions for mobilizing private finance and managing risks associated with clean energy investments are also discussed.

Sources of Financing Energy Efficiency Projects in Central and Eastern Europe

This report draws lessons to date from recent international experience in applying public financing instruments to unlock commercial financing to scale-up clean energy in East Asia. It addresses the following issues: when to use public financing instruments; which instrument to select; and how to design and implement them most effectively.

Investment and Finance in the Energy Sectors of Developing Countries

The Nationally Appropriate Mitigation Action (NAMA) is the new kid on the block in the battle against climate change. The NAMA is the most decisive instrument devised to address the fact that today the only source of growing emissions are the world’s developing countries. But as it is based purely on voluntarism it crucially depends on financing models that can lift the concept off the ground. This book provides the first insights as to how this concept can deliver on its promise – and challenges some of the fundamental mantras in international climate change collaboration.

Renewable Energy Finance: Funding The Future Of Energy (Second Edition)

Given the chronic power shortages faced by numerous developing countries, and the need everywhere to keep pace with demand, understanding the drivers of public private partnerships (PPPs) in energy is critical. While many private electricity projects have been delayed and financing costs have increased, the impact of the global financial crisis was less severe than that of previous crises that originated in developing countries. This resilience stems from developing countries' need to expand generation capacity, electricity sector reforms and better regulatory frameworks, and short-term solutions (such as rental power plants). The study reports the evidence from statistical analysis and a sample of case studies selected based. It proposes a novel analytical approach to model PPPs, using a two-stage procedure based on Heckman's sample selection distinguishing between those factors that determine whether private investment in energy takes place, and those that influence the volume of investment. The results of the analysis provide the following conclusions: • Both general governance and regulatory instrument primarily affect investors' decisions to enter the various power sector markets, not the subsequent level of investment – indicating that investors seem to be adequately protected against risks. • Support mechanisms, like feed-in tariffs, are crucial for attracting investors in renewable generation, but they do not succeed in displacing fossil fuel investment and they could play a bigger role in affecting the level of investment in renewables. • There is a significant trade-off between effectiveness and efficiency of alternative instruments for deploying renewables. Feed-in tariffs tended to be quite effective but to be set on the high side, reducing incentives to cut costs and posing significant strains on already stripped national budgets. Competitive auctions, on the other hand have tended to be efficient but initially low and not always the most effective instrument. • Countries can scale up renewables following different paths. For Brazil, the move from feed-in tariffs to auctions enabled it to both reduce costs and deploy additional capacity. Peru followed in Brazil's path, opting for auctions instead of introducing feed-in tariffs. On the other hand, China's move from competitive tenders to feed-in tariffs allowed for discovery effects to determine the right level of prices to attract private investment in renewables.

Technology Transfer for Renewable Energy

Renewable Energy Finance: Theory and Practice integrates the special characteristics of renewable energy with key elements of project finance. Through a mixture of fundamental analysis and real-life examples, readers learn how renewable energy project finance works in actual deals that mix finance, public policy, legal, engineering and environmental issues. The skills developed in analyzing non-recourse cash flow-based finance are applicable not only to green energy, but also apply more widely in project finance and infrastructure investing. The book's comparisons of developed and developing countries make it valuable to readers worldwide. Presents real world cases in each chapter Includes a companion website that contains renewable energy project finance models and other resources Supports efforts to achieve environmental sustainability through renewable financing projects and cleaner production techniques

Financing Clean Energy in Developing Asia—Volume 1

Tackle infrastructure development projects in emerging markets with confidence In Project Finance: Applications and Insights to Emerging Markets Infrastructure, distinguished professor and author Paul Clifford insightfully applies the fundamental principles of project finance structuring to infrastructure investments in emerging markets. Using leading emerging market case studies to illuminate the underlying themes of the book, the author provides a practitioner's perspective and incisive analysis of concepts crucial to a complete understanding of project finance in emerging markets, including: · Risk management · ESG and impact investing · The emergence of new global multilateral development banks · China's Belt and Road Initiative Project Finance bridges the gap between theoretical infrastructure development, investment, and finance and the implementation of that theory with instructive and applicable case studies. Throughout, the author relies on a grounded and quantitative approach, combining the principles of corporate finance with straightforward explanations of underlying technologies, frameworks, and national policies. This book is an invaluable resource for undergraduate and graduate students in finance, as well as professionals who are expected to deal with project and infrastructure finance in emerging markets.

Unlocking Commercial Financing for Clean Energy in East Asia

The world is currently undergoing an historic energy transition, driven by increasingly stringent decarbonisation policies and rapid advances in low-carbon technologies. The large-scale shift to low-carbon

energy is disrupting the global energy system, impacting whole economies, and changing the political dynamics within and between countries. This open access book, written by leading energy scholars, examines the economic and geopolitical implications of the global energy transition, from both regional and thematic perspectives. The first part of the book addresses the geopolitical implications in the world's main energy-producing and energy-consuming regions, while the second presents in-depth case studies on selected issues, ranging from the geopolitics of renewable energy, to the mineral foundations of the global energy transformation, to governance issues in connection with the changing global energy order. Given its scope, the book will appeal to researchers in energy, climate change and international relations, as well as to professionals working in the energy industry.

Financial Engineering of Climate Investment in Developing Countries

The volume presents innovative approaches to improving energy access in underprivileged communities. A core theme is the use of previously underutilized or unrecognized resources that can be found through synergies in supply and value innovation, novel financing methods, and the use of leapfrog technologies. The contributors illustrate how decentralized approaches and small-scale localized solutions can promote climate change mitigation and adaptation and increase the resiliency of vulnerable communities. This book gathers selected articles from the 2014 Micro energy Systems Conference at UC Berkeley that focus on technical, financial, human, institutional, and natural resource capital. The contributions reflect the latest concepts, theories, methods and techniques, offering a valuable resource for researchers, practitioners and governmental institutions engaged in the field of energy access for developing countries.

Revisiting Public-Private Partnerships in the Power Sector

Despite the urgent need for action, there is a widespread lack of understanding of the benefits of using green energy sources for not only reducing carbon emissions and climate change, but also for growing a sustainable economy and society. Future citizens of the world face increasing sustainability issues and need to be better prepared for energy transformation and sustainable future economic development. Cases on Green Energy and Sustainable Development is a critical research book that focuses on the important role renewable energy and energy efficiency play in energy transition and sustainable development and covers economic and promotion policies of major renewable energy and energy-efficiency technologies. Highlighting a wide range of topics such as economics, energy storage, and transportation technologies, this book is ideal for environmentalists, academicians, researchers, engineers, policymakers, and students.

Renewable Energy Finance

This book explores the role of governments and international financial institutions (IFIs) in mitigating the perceived risks in green infrastructure markets of emerging and developing countries. Although green infrastructure is designed to enhance a country's wealth, the author sheds light on the way that the market is failing to link up institutional investors' needs for a stable yield with the demands of potentially financially-viable investments in green infrastructure markets. Providing a detailed analysis of the root cause of this market failure, this innovative book offers powerful solutions for developing countries. An essential read for academics of development economics and international finance, as well as practitioners and policy-makers, this book covers topics such as industrial policy, climate governance, carbon markets and capital markets.

Project Finance

Renewable energy plays an important role in contributing to the transition toward low-carbon development growth, in enhancing technology diversification and hedging against fuel price volatility, in strengthening economic growth, and in facilitating access to electricity. The global trends indicate a growing commitment to renewable energy development from developed and developing countries in both the introduction of specific policy levers and investment flows. Developing countries have now a long history of designing and implementing specific policy and regulatory instruments to promote renewable energy. Today, feed-in tariff policies are being implemented in about 25 developing countries and quantity based instruments, most notably auction mechanisms, are increasingly being adopted by upper middle income countries. This paper summarizes the results of a recent review of the emerging experience with the design and implementation of price and quota based instruments to promote renewable energy in a sample of six representative developing countries and transition economies.

The paper discusses the importance of a tailor-made approach to policy design and identifies the basic elements that have proven instrumental to policy effectiveness, including adequate tariff levels, long term policy or contractual commitments, mandatory access to the grid and incremental cost pass-through. Ultimately, a low carbon development growth in the developing world depends on the availability of resources to finance the solutions that exhibit incremental costs. Policies introduced to support renewable energy development should be designed and introduced in combination with strategies that clearly identify sources of finance and establish a sustainable incremental cost recovery mechanism (for example, using concessional financial flows from developed countries to leverage private financing, strengthening the performance of utilities and distribution companies, or allowing the partial pass-through of incremental costs to consumer tariffs with a differentiated burden sharing that protects the poor). Without question, policy makers will have to ensure that the design of different policy mechanisms and the policy mix per se deliver renewable energy targets with the lowest possible incremental costs and volume of subsidies.

The Geopolitics of the Global Energy Transition

It is in the interest of the United States and the other industrialized nations that the economic well-being of the developing countries be enhanced. Adequate supply and effective use of energy at reasonable cost are a necessary underpinning for economic development. The developing countries need assistance in assessing, planning, financing, and implementing energy supply programs. This volume examines the issues and options related to energy supply, use and financing in developing countries. Co-published with the Atlantic Council of the United States.

Decentralized Solutions for Developing Economies

This open access book analyses barriers and challenges associated with the financing of clean energy access in sub-Saharan Africa. By considering various economic, financial, political, environmental and social factors, it explores the consequences of energy poverty across the region and maps the real and perceived investment risks for potential capital providers, both domestic and international. Furthermore, it analyses risk mitigation strategies and innovative financing structures available to the public and private sectors, which are aimed at leveraging capital in the clean energy sector at scale and fostering the creation of an enabling business and investment environment. More specifically, the present book analyses how to (i) enhance capital allocation in projects and organisations that foster clean energy access in the region, (ii) mobilize private capital at scale and (iii) decrease the cost of financing through risk mitigation strategies. Going beyond traditional approaches, the book also considers socioeconomic and cultural aspects associated with investment barriers across the subcontinent. Moreover, it urges the public and private spheres to become more actively involved in tackling this pressing development issue, and provides policy recommendations for the public sector, including proposals for business model evolution at multilateral agencies and development institutions. It will appeal to a wide readership of both academics and professionals working in the energy industry, the financial sector and the political sphere, as well as to general readers interested in the ongoing debate about energy, sustainable development and finance.

Cases on Green Energy and Sustainable Development

This book examines clean energy investment needs and financing gaps in Asia and the Pacific and discusses how they are being addressed. It reviews existing financing options and approaches for clean energy, and includes country examples of how these have been applied. Innovative solutions for mobilizing private finance and managing risks associated with clean energy investments are also discussed. The book is the first of two volumes that look at various approaches and instruments that have been tried, tested, and utilized to scale up clean energy development in the region.

Green Infrastructure Financing

This 2007 third edition continues to be a comprehensive and authoritative guide to the business, practice, law, and practical use of project finance. It covers the complete project finance structure, from conception to negotiation to debt closing, and from project difficulties to successful restructuring. The book continues to be accessible to those with little experience in project finance, while maintaining the insight and detail of previous editions that has made it a valuable reference for the experienced lawyer, manager, banker, contractor, and government official. This edition focuses on a real-world, practical

approach to project finance, without the overuse of case studies and economic theory. Yet the contract forms, detailed glossary, index, and project finance bibliography make it a complete text.

Design and Performance of Policy Instruments to Promote the Development of Renewable Energy

A Financing Facility for Low-Carbon Development is part of the World Bank Working Paper series. These papers are published to communicate the results of the Bank's ongoing research and to stimulate public discussion. This paper proposes an innovative financing mechanism, known as the Low Carbon Development Facility (LCDF), which would bring additional investment financing at concessional rates to low carbon development projects in non-Annex I countries. The-new-financing would help to rapidly scale up project-based emissions avoidance in these countries, up to 10 GtCO2e in 2030. LCDF also could help the post-Copenhagen Green Climate Fund implement financial pledges made by Annex I countries to support projects, programs, policies, and other activities in developing countries. The LCDF neither limits financing to incremental costs nor focuses on transformational projects. Therefore, the Facility does not substitute for the Global Environment Facility and the Clean Technology Fund, but rather helps scale up the innovative projects pioneered by these instruments.

First Regional Seminar on Financing for the Development of Energy Programs in Latin America

At present, different concentrating solar thermal technologies (CST) have reached varying degrees of commercial availability. This emerging nature of CST means that there are market and technical impediments to accelerating its acceptance, including cost competitiveness, an understanding of technology capability and limitations, intermittency, and benefits of electricity storage. Many developed and some developing countries are currently working to address these barriers in order to scale up CST-based power generation. Given the considerable growth of CST development in several World Bank Group partner countries, there is a need to assess the recent experience of developed countries in designing and implementing regulatory frameworks and draw lesson that could facilitate the deployment of CST technologies in developing countries. Merely replicating developed countries' schemes in the context of a developing country may not generate the desired outcomes. Against this background, this report (a) analyzes and draws lessons from the efforts of some developed countries and adapts them to the characteristics of developing economies; (b) assesses the cost reduction potential and economic and financial affordability of various CST technologies in emerging markets; (c) evaluates the potential for cost reduction and associated economic benefits derived from local manufacturing; and (d) suggests ways to tailor bidding models and practices, bid selection criteria, and structures for power purchase agreements (PPAs) for CST projects in developing market conditions.

Energy Supply and Use in Developing Countries

Financing Mechanisms for Renewable Energy Development in the Pacific Islands