

Rita Pandey  
Sanjay Bali  
Nandita Mongia

# The National Clean Energy Fund of India

## A Framework for Promoting Effective Utilization

SPRINGER BRIEFS IN ENERGY

Rita Pandey  
Sanjay Bali  
Nandita Mongia

# The National Clean Energy Fund of India

## A Framework for Promoting Effective Utilization



Springer

# **SpringerBriefs in Energy**

For further volumes:  
<http://www.springer.com/series/8903>

Rita Pandey · Sanjay Bali · Nandita Mongia

# The National Clean Energy Fund of India

A Framework for Promoting  
Effective Utilization

Rita Pandey  
National Institute of Public Finance  
and Policy (NIPFP)  
New Delhi  
India

Nandita Mongia  
Project Design and Monitoring, Energy  
and Climate Change  
Dwarka  
Delhi  
India

Sanjay Bali  
New Delhi  
India

ISSN 2191-5520  
ISBN 978-81-322-1963-7  
DOI 10.1007/978-81-322-1964-4  
Springer New Delhi Heidelberg New York Dordrecht London

ISSN 2191-5539 (electronic)  
ISBN 978-81-322-1964-4 (eBook)

Library of Congress Control Number: 2014942068

© The Author(s) 2014

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media ([www.springer.com](http://www.springer.com))

# Foreword

The National Clean Energy Fund (NCEF), announced in Budget 2010–2011, is seen as a major step in India's quest for energy security and reducing carbon intensity of energy. Funding research and innovative projects in clean energy technologies, and harnessing renewable energy sources to reduce dependence on fossil fuels constitute the objectives of the NCEF. It is observed that utilization of funds from NCEF has been rather low and disbursements, so far, are aligned more with ongoing programs/missions of various ministries/departments than with the stated objectives of the fund. This poses potential risk of diluting the focus of NCEF with adverse implications for research and innovation in clean energy sector in India. Especially, in the absence of any identified targets and prioritization.

This study aims to provide a detailed framework for promoting effective utilization and administration of NCEF. It is hoped that the recommendations of the study will inform the government so that appropriate corrections may be made timely. The outputs of the study will also be useful to hone the strategic thinking on a suitable energy technology policy and an assessment of technology needs besides other barriers in clean energy sector in India.



Rathin Roy

# Acknowledgments

This study has benefitted from the valuable suggestions received from experts in government, industry, and academia. In particular, we are grateful to Meena Agarwal (Joint Secretary, Ministry of Finance, Government of India), Saurabh Garg (Joint Secretary, Ministry of Finance, Government of India), P. R. Shukla (Professor, IIM Ahmedabad), Anil Gupta (Professor, IIM Ahmedabad), U. Sankar (Professor Emeritus, Madras School of Economics, Chennai), Shailly Kedia (Associate Fellow, TERI), and Bipin Shah (Professor, Entrepreneurship Development Institute of India, Ahmedabad) for insights shared on this topic.

We acknowledge the feedback and constructive ideas received from a number of stakeholders including the participants of the two workshops held in November, 2012, and April, 2013 in Delhi. We are extremely grateful to panellists—Kirit Parikh (Chairman, IRADe), Anil K. Jain (Advisor, Planning Commission), Meena Agarwal (Joint Secretary, MoF), D. N. Prasad (Advisor, MoC), Rakesh Bhalla (Advisor, IREDA), K. Usha Rao (Senior Project Manager, KfW), and Pradeep Dadhich (Director, Deloitte India) of the workshops for their valuable inputs. A list of experts and stakeholders who were consulted during the course of the study is included in Annexure 1.

Research assistance by Sargam Gupta, Lipi Budhraj, and Nitesh Khandelwal is gratefully acknowledged. Wasim Ahmad provided secretarial assistance.

We would also like to thank Shakti Foundation for the opportunity to undertake this study and extending financial support which made this study possible.

Rita Pandey

# Contents

<b>1</b>	<b>Context and Objectives of the Study</b>	<b>1</b>
1.1	Background	1
1.1.1	National Clean Energy Fund	2
1.1.2	Energy Efficiency	3
1.1.3	Power Plants	3
1.1.4	Renewable Energy	3
1.1.5	Nuclear Energy	4
1.1.6	Transport	4
1.1.7	Agriculture and Forestry	4
1.1.8	Marine and Coastal Environment	4
1.1.9	Initiatives for Enhancing Knowledge and Scientific Findings	5
1.1.10	Enhancing Adaptive Capacity	5
1.2	Objectives of the Study	5
	References	7
<b>2</b>	<b>Existing Framework and Operation of NCEF: A Review</b>	<b>9</b>
2.1	Existing Framework of NCEF	9
2.2	Objectives of NCEF	10
2.3	Projects Eligible for Funding Under NCEF	10
2.4	Mode of Appraisal and Approval of Project Proposals	10
2.5	Funding Limit, Eligibility and Funding Mechanism	11
2.6	NCEF Activities: Based on Information in Public Domain	12
2.7	The Present Framework and Operation of NCEF: An Assessment	12
2.8	Key Findings from Review of Existing Structure and Operation of NCEF	13
	References	14
<b>3</b>	<b>International Clean Energy Funds: A Review</b>	<b>15</b>
3.1	Review of Funds and Learning for NCEF	15
3.1.1	Green Municipal Fund	15
3.1.2	The California Clean Energy Fund	18
3.1.3	Energy Conservation Promotion Fund, Thailand	20



3.1.4	The Clean Energy Finance Corporation. . . . .	21
3.1.5	Malaysian Electricity Supply Industries Trust Account. . . .	23
3.2	Key Lessons from Review of International Clean Energy Funds . . .	23
	References. . . . .	26
<b>4</b>	<b>NCEF: Aligning Activities with the Objectives. . . . .</b>	<b>27</b>
4.1	Niche for the Fund and Value Addition of the Fund Needs to be Spelt Out Clearly so that it is Properly Understood by the Stakeholders. . . . .	27
4.2	Acting as a Catalyst to Help Boost Development of a Robust Clean Energy Industry . . . . .	29
4.2.1	Identifying Technology and Innovation Needs and Instituting a Development Plan for Same . . . . .	29
4.2.2	Financial and Institutional Support for Accelerating Clean Energy Technologies and Innovative Projects . . . . .	43
4.2.3	Skill Development . . . . .	55
4.2.4	Knowledge Creation and Sharing. . . . .	56
4.3	As an Anchor for Establishing Linkages with International Organizations . . . . .	56
4.4	As an Anchor for Synergy and Linkages with Domestic Institutions . . . . .	58
4.5	A Dedicated NCEF Team with Appropriate Expertise and Accountability . . . . .	58
4.5.1	A Professional Organization with Clear Mandate and Accountability . . . . .	58
4.5.2	Administrative Structure . . . . .	59
	References. . . . .	59
<b>5</b>	<b>Monitoring and Evaluation of the Projects and Programs Supported by the Fund. . . . .</b>	<b>61</b>
5.1	Monitoring and Performance Assessment . . . . .	61
5.2	Indicators of Assessment . . . . .	63
5.2.1	Core Indicators . . . . .	64
5.3	Project Classification Method to Facilitate Monitoring. . . . .	65
5.4	Project Eligibility Criterion to Facilitate Monitoring. . . . .	66
5.5	Description of Next Steps. . . . .	71
5.5.1	Business Justification Review and Process of Selecting Business Solution . . . . .	71
5.6	Examples of Tools and Deliverables . . . . .	73
5.6.1	Comparison Between Monitoring and Performance Evaluation of a Project and a Fund . . . . .	74
	References. . . . .	75

<b>6</b>	<b>Evaluation of the Fund</b>	77
6.1	Baseline Identification	78
6.2	Framework for Performance Evaluation	79
6.2.1	Indirect Indicators.	81
6.3	Monitoring of the Fund	81
6.3.1	Mechanism to Ensure Monitoring and Periodic Independent Evaluation of the Fund's Performance	86
<b>7</b>	<b>Findings and Recommendations</b>	87
7.1	Context and Objectives.	87
7.2	Findings and Recommendations	88
7.2.1	Key Findings from Review of Existing Structure and Operation of NCEF	88
7.2.2	Key Lessons from Review of International Clean Energy Funds	89
7.2.3	Proposed Framework for NCEF.	91
7.2.4	Framework for Allocation of Funds	91
7.2.5	Prioritization Across Energy Sectors	93
7.2.6	Financing Models and Mechanisms.	96
7.2.7	Skill Development	98
7.2.8	Knowledge Creation and Sharing.	98
7.2.9	Anchor for Establishing Linkages with International Organizations	99
7.2.10	Anchor for Synergy and Linkages with Domestic Institutions	99
7.2.11	A Dedicated NCEF Team with Appropriate Expertise and Accountability	100
7.2.12	Monitoring and Evaluation of Activities Supported by NCEF.	101
7.2.13	Performance Evaluation of NCEF	102
	<b>Annexure 1: Experts and Stakeholders Consulted During the Course of the Study</b>	103
	<b>Annexure 2: Norms for Computing Likely Energy Saving from RE Usage</b>	105
	<b>Annexure 3: Templates for Monitoring and Evaluation</b>	107

# Figures

Fig. 3.1	Source of funding and size of funds—NCEF versus international funds . . . . .	24
Fig. 3.2	Objectives of the funds—NCEF versus international funds. . . . .	24
Fig. 3.3	Target beneficiaries—NCEF versus international funds . . . . .	24
Fig. 3.4	Administration and management—NCEF versus international funds . . . . .	25
Fig. 3.5	Fund allocation—NCEF versus international funds. . . . .	25
Fig. 3.6	Focus areas for support—NCEF versus international funds . . . . .	25
Fig. 3.7	Financial tools—NCEF versus international funds . . . . .	26
Fig. 3.8	Lessons for NCEF from review of international funds . . . . .	26
Fig. 4.1	Identifying technology needs . . . . .	30
Fig. 4.2	Prioritization options for cleaner coal technologies. . . . .	33
Fig. 4.3	Prioritization options for solar energy technologies. . . . .	35
Fig. 4.4	Prioritization options for wind energy technologies. . . . .	37
Fig. 4.5	Prioritization options for biomass energy. . . . .	38
Fig. 4.6	Prioritization options for energy efficiency . . . . .	42
Fig. 4.7	Technological development phases . . . . .	44
Fig. 4.8	Channels of support through various stages of innovation. . . . .	44
Fig. 4.9	Institutional channels of support for innovation in India . . . . .	50
Fig. 4.10	Framework for financing mechanism by stages of activity . . . . .	50
Fig. 4.11	Bandwidth of opportunities for different energy sectors . . . . .	53
Fig. 4.12	Technology prioritization for off-grid electricity and decentralized thermal applications . . . . .	55
Fig. 5.1	Potential projects across sectors and stages of development . . . . .	65
Fig. 5.2	The generic project results chain underlying the theory of change approach. . . . .	67
Fig. 5.3	Schematic presentation of project impact assessment framework. . . . .	68

# Tables

Table 4.1	Categories for rural electrification . . . . .	40
Table 4.2	Financial and fiscal support for clean energy. . . . .	46
Table 4.3	An illustrative list of financing mechanism for NCEF by type of activity . . . . .	52
Table 5.1	Definitions of different elements of logical hierarchy for the projects . . . . .	69
Table 5.2	Examples of indicators used in conjunction with project activities for monitoring using a project planning matrix . . . . .	72
Table 5.3	Similarities and difference between the performance indicators of the fund and its projects. . . . .	73
Table 5.4	Examples of indicators used in conjunction with project activities for monitoring for solar home systems. . . . .	74
Table 6.1	Relevant performance and success indicators . . . . .	82
Table 6.2	Example of detailed disaggregated logical framework analysis. . .	83