UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

THE ROLE OF SCIENCE, TECHNOLOGY AND INNOVATION IN PROMOTING RENEWABLE ENERGY BY 2030





UNITED NATIONS

UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

THE ROLE OF SCIENCE, TECHNOLOGY AND INNOVATION IN PROMOTING RENEWABLE ENERGY BY 2030





UNITED NATIONS Geneva, 2019

© 2019, United Nations

This work is available open access by complying with the Creative Commons licence created for intergovernmental organizations, available at: http://creativecommons.org/licenses/by/3.0/igo/.

The findings, interpretations and conclusions expressed herein are those of the authors and do not necessarily reflect the views of the United Nations or its officials or Member States.

The designation employed and the presentation of material on any map in this work do not imply the expression of any opinion whatsoever on the part of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Photocopies and reproductions of excerpts are allowed with proper credits.

This publication has not been formally edited.

United Nations publication issued by the United Nations Conference on Trade and Development.

UNCTAD/DTL/STICT/2019/2

NOTES

The United Nations Conference on Trade and Development (UNCTAD) serves as the lead entity within the United Nations Secretariat for matters related to science and technology as part of its work on the integrated treatment of trade and development, investment and finance. The current UNCTAD work programme is based on the mandates set at quadrennial conferences, as well as on the decisions of the General Assembly of the United Nations and the United Nations Economic and Social Council that draw upon the recommendations of the United Nations Commission on Science and Technology for Development, which is served by the UNCTAD secretariat. The UNCTAD work programme is built on its three pillars of research analysis, consensus-building and technical cooperation, and is carried out through intergovernmental deliberations, research and analysis, technical assistance activities, seminars, workshops and conferences.

This series of publications seeks to contribute to exploring current issues in science, technology and innovation, with particular emphasis on their impact on developing countries.

The term "country" as used in this study also refers, as appropriate, to territories or areas. In addition, the designations of country groups are intended solely for statistical or analytical convenience and do not necessarily express a judgment about the stage of development reached by a particular country or area. Mention of firms, organizations or policies does not imply endorsement by the United Nations.

Reference to dollars (\$) means United States of America dollars.

ACKNOWLEDGEMENTS

This study was prepared with the overall guidance of Shamika N. Sirimanne, Director of the Division on Technology and Logistics and by a team comprising Dong Wu (team leader), Katalin Bokor, Jillian Rose Helser, Michał Miedzinski and Blanche Ting, under the supervision of Angel González Sanz, Chief, Science, Technology and ICT Branch.

The report benefited from major substantive contribution by Jim Watson (University of Sussex and United Kingdom [of Great Britain and Northern Ireland] Energy Research Centre), and Nick Hughes (Institute for Sustainable Resources, University College London), principal consultants for the study.

UNCTAD appreciates valuable inputs provided by the Governments of Austria, the Plurinational State of Bolivia, Bulgaria, Canada, Germany, Hungary, the Islamic Republic of Iran, Japan, Kenya, Pakistan, Portugal, South Africa, Turkey, Uganda and the United States, as well as from the United Nations Major Group for Children and Youth.

The publication benefited significantly from discussions and inputs during the Intersessional Panel of the Commission on Science and Technology for Development (November 2017), as well as the twenty-first session of the Commission (May 2018).

Nadège Hadjemian designed the cover. Stephanie Kermoal provided administrative support.

000000

TABLE OF CONTENTS

1.	Intro	duction	1
2.	Background and context		
	2.1	Recent global trends in renewable energy deployment	2 2
	2.2	Technological and non-technological barriers and drivers in renewable	
		energy deployment	5
	2.3	New and emerging renewable energy technologies	7
3.	Inno	vation pathways to meet the challenges	9
	3.1	The systemic nature of renewables innovation	9
	3.2	The importance of policy mixes in governing innovation systems	10
	3.3	Countries have different national renewables pathways	10
4.	Key issues in the innovation and deployment of renewables		
	4.1	Technical challenges of integrating renewable energy into electricity grids	12
	4.2	Renewable energy market and policy challenges	14
	4.3	The role of renewable energy in extending access to electricity	21
	4.4	Using renewable energy in the household sector for cooking	25
5.	Strat	egies and policies	31
	5.1	The importance of policy mixes	31
	5.2	The role of international and interregional collaboration	32
6.	Key findings and policy recommendations		
	6.1	Renewable energy and the Sustainable Development Goals	34
	6.2	Policies and strategies to support renewable energy	34
	6.3	Challenges and opportunities for developing countries	35
	6.4	International collaboration	35
Refe	rences		37

LIST OF FIGURES

Figure 1.	Global primary energy demand by energy source	3
Figure 2.	Renewable energy in Brazil, China, India and South Africa, 2006 and 2016	4
Figure 3.	Renewable energy in Costa Rica, Kenya and Viet Nam, 2006 and 2016	4
Figure 4.	Global investments in renewable energy	6
Figure 5.	The evolution of thinking of innovation processes: Moving from a linear model to a systematic model	9
Figure 6.	Annual installations and PV cell production in Germany, 2000–2013	17
Figure 7.	Cost of cooking a meal in Kenya and India	29

LIST OF BOXES

Box 1.	Adapting grid infrastructure to renewable energy deployment: Case studies	12
Box 2.	The Risø test laboratory	14
Box 3.	Wind power in China	16
Box 4.	Solar PV in Germany	16
Box 5.	Solar PV in China	17
Box 6.	Changing landscape in financing renewable energy	19
Box 7.	Lessons learned from the first rural electrification strategy and plan of Uganda	20
Box 8.	Harnessing the potential of microhydropower plants in the Democratic Republic of the Congo	22
Box 9.	Pico hydropower plant at the Rwenzori Mountaineering Services in Uganda	22
Box 10.	EcoZoom wood and charcoal stoves in Kenya	26
Box 11.	Using biogas plants for cooking in Bangladesh	27
Box 12.	Bioethanol in Ethiopia	27
Box 13.	United Kingdom: Offshore wind accelerator	32
Box 14.	International initiatives to promote innovation in clean energy	33

预览已结束, 完整报告链接和二维码如下:



https://www.yunbaogao.cn/report/index/report?reportId=5_8912