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# The Green Economy in the Gulf

Edited by  
Mohamed Abdel Raouf and Mari Luomi

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# The Green Economy in the Gulf

Filling a void in academic and policy-relevant literature on the topic of the green economy in the Arabian Gulf, this edited volume provides a multidisciplinary analysis of the key themes and challenges relating to the green economy in the region, including in the energy and water sectors and the urban environment, as well as with respect to cross-cutting issues, such as labour, intellectual property and South-South cooperation.

Over the course of the book, academics and practitioners from various fields demonstrate why transitioning into a 'green economy' – a future economy based on environmental sustainability, social equity and improved well-being – is not an option but a necessity for the Gulf Cooperation Council (GCC) states. Through chapters covering key economic sectors and cross-cutting issues, the book examines the GCC states' quest to align their economies and economic development with the imperatives of environmental sustainability and social welfare, and proposes a way forward, based on lessons learned from experiences in the region and beyond.

This volume will be of great relevance to scholars and policymakers with an interest in environmental economies and policy.

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**Mari Luomi** is Research Associate at the Oxford Institute for Energy Studies, UK.

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 **Routledge**  
Taylor & Francis Group  
LONDON AND NEW YORK

**earthscan**  
from Routledge

  
**Gulf Research Centre Cambridge**  
Knowledge for All

First published 2016  
by Routledge  
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge  
711 Third Avenue, New York, NY 10017

*Routledge is an imprint of the Taylor & Francis Group, an informa business*

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*British Library Cataloguing in Publication Data*

A catalogue record for this book is available from the British Library

*Library of Congress Cataloguing in Publication data*

A catalog record has been requested for this book.

ISBN: 978-1-138-92742-1 (hbk)

ISBN: 978-1-315-68261-7 (ebk)

Typeset in Goudy  
by Out of House Publishing

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<sup>4</sup> The opinions expressed are those solely of the author and do not necessarily represent those of the UNDP, the RIO+ Centre, the UN or its Member States.

<sup>5</sup> The opinions expressed are those solely of the author and do not necessarily represent those of the UNDP, the RIO+ Centre, the UN or its Member States.



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<sup>6</sup> The author writes in her personal capacity only, and the views expressed do not necessarily reflect the views of the United States Department of Labor or the International Labor Affairs Bureau.

# Foreword

I am truly delighted to see that Dr Mohamed Abdel Raouf and Dr Mari Luomi have authored this extremely important volume entitled *The Green Economy in the Gulf*. There are a large number of reasons why this book can have a profound impact on thinking by policy makers in the Gulf region itself as well as others round the world in relation to their research on the nations of the Gulf. The entire Gulf region is extremely vulnerable to the impacts of climate change, particularly in respect of sea level rise, increase in the intensity and frequency of heat waves and extreme precipitation events, impacts on food production and marine resources as well as marine ecosystems. It is, therefore, essential that the unchecked increase in consumption of fossil fuels in the Gulf region be moderated through a set of policies that recognise the scarcity of these resources and reflect their real value. There are projections for oil consumption, for instance, which show some of the current exporters of hydrocarbons possibly becoming importers over a period of time. Rational pricing of petroleum products in these countries would extend the life of their recoverable reserves and thereby provide significant economic benefits. Also, given the vulnerability of the region to the impacts of climate change the leaders of the nations in the Gulf would undoubtedly want to be a part of the solution when it comes to dealing with the challenge of climate change.

In my discussions with the leadership of several countries in the region I have always emphasised two important issues. First, those countries which are currently major exporters of hydrocarbons have the benefit of large-scale revenues which need not be frittered away in current consumption, but which, for the benefit of the societies involved in the region, should be invested in creating options by which the region can remain a major exporter of energy. As it happens, the Gulf region has a vast area of land and abundant sunshine, with insolation levels that would make the development and use of solar energy technologies particularly attractive. It is, therefore, entirely feasible to see that over a period of time export of hydrocarbons would give way to export of renewable energy. There is, for instance, the vision of the Desertec project in North Africa where it is conceptualised that solar energy would be produced and supplied to Southern Europe from the states of North Africa. Such a concept should be explored in the Gulf region as well, because that would make it possible not only to export energy to

neighbouring regions but also for attracting energy-intensive industries to locate in these countries with the prospect of assured supply of renewable energy well into the future.

The second point that I always make to policy makers in the region is for them to develop a vision by which agriculture and plant based products can be promoted over time. This, of course, would require a sustained effort to improve soil quality through a progressive programme of plantation by which, through successive phases, the topsoil quality can be enriched with dropping of leaves from successive types of plants into the soil, thus using nature to bring about an enrichment of the soil in these nations. Such a programme would have to be a central part of development policy and investment planning. In fact, I have been exhorting the oil exporting nations to 'convert your oil wealth into soil wealth'. Essentially, this would require a vision that looks into the decades ahead, which is what this book is all about.

What is particularly noteworthy about this publication is its down to earth practical orientation which takes into account barriers to greening the energy sector, the needs for pricing reform and strategies for improving energy efficiency and promoting renewable energy on a large scale. The emphasis on green buildings is also particularly relevant. With the massive construction which has taken place in the region and prospects for growth in the future, buildings cannot be locked into an energy-intensive pattern and design. Experience elsewhere has clearly shown that green buildings which demonstrated high efficiency in the use of energy, water and other resources can be an economically viable proposition. My institute, TERI, has been a pioneer in this field in India, and is a humble reflection of Gandhiji's advice to 'be the change you want to see in the world'. The buildings that TERI constructs for itself set a benchmark in energy efficiency. Our major training complex RETREAT, which is on the outskirts of Delhi, uses no power from the grid, and yet we actually save money on this complex, because the additional initial investment has been recovered in a very short period of time providing an extremely attractive payback period.

This scholarly yet practical book by the authors really needs to be disseminated on a wide scale in the Gulf region, and I would go to the extent of suggesting that very simple outreach programmes on its major findings and directions should become an essential part of outreach that the authors may plan through films, TV and the print media. It is essential that through this valuable piece of work we bring about a change in mindsets and open the eyes of policy makers and decision makers on how it is totally possible for the economy of the region to become green and for prosperity to increase at the same time. The average reader would find this book a refreshing piece of knowledge which can bring about a change in the pattern of development in the Gulf for the benefit of not only the people of the region but the world as a whole.

*Dr Rajendra K. Pachauri*  
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*Panel on Climate Change*

# Acknowledgements

This volume is based on a selection of papers presented at the Green Economy in the Gulf Region workshop, which was held on 25–28 August 2014 at the University of Cambridge in the United Kingdom. The co-editors would like to extend a warm thank you to all participants of the workshop, totalling 19 scholars and practitioners specialising on the Gulf, who convened over three days to present academic papers and discuss the prospects of a green economy in the six Gulf Cooperation Council member states. The discussions held during the event greatly enriched the chapters of this volume, and also helped the co-editors and authors together define a number of overarching themes and challenges relating to the topic.

The co-editors are also deeply grateful to the organisers of the 2014 Gulf Research Meeting of the Gulf Research Centre Cambridge (GRCC), under the umbrella of which the workshop took place. In particular, we would like to thank Dr Abdulaziz Sager, Chairman and Founder of the Gulf Research Center (GRC), and Dr Christian Koch, Director of the GRC Foundation in Geneva, as well as Elsa Courdier at the GRC Foundation, Dr Oskar Ziemelis, Interim Director of the GRCC, and Sanya Kapasi at the GRC, for their tireless work and support.

It is our sincere wish that this volume will contribute to advancing a purposeful, facts-based and positively oriented debate on the future of the green economy in the fast-transforming Gulf states, which are increasingly exploring the opportunities and prerequisites for success and prosperity beyond the brown economy.

*Dr Mohamed Abdel Raouf  
Dr Mari Luomi  
Cairo and Curitiba  
January 2015*

# Abbreviations

ADNOC	Abu Dhabi National Oil Company
ATV	average thermal value
AUD	Australian dollar
AVF	average value of fuel input for generation of unit of electricity
BAU	business as usual
BREEAM	Building Research Establishment Environmental Assessment Methodology
BRICS	Brazil, Russia, India, China and South Africa
CAGR	compound annual growth rate
CBD	Convention on Biological Diversity
CCS	carbon capture and storage
CDM	Clean Development Mechanism of the Kyoto Protocol
CDR	carbon dioxide recovery
CFL	compact fluorescent lamp/light
CO <sub>2</sub> (e)	carbon dioxide (equivalent)
CSP	concentrated solar power
DAC	Development Assistance Committee (OECD)
DMP	domestic market price
DSM	demand-side management
DWC	Dubai World Central – Al Maktoum International Airport
DXB	Dubai International Airport
ECF	energy contents of each fuel type
ECRA	Electricity and Co-Generation Regulatory Authority (Saudi Arabia)
ECSUE	economic cost of saved unit of electricity
EIA	United States Energy Information Administration
EOR	enhanced oil recovery
EPF	power generation by each fuel type
ESCO	energy service company
ESG	environmental, social, governance
EST	environmentally sound technology
EU	European Union

EUR	euro
EWA	Electricity and Water Authority (Bahrain)
FIT	feed-in tariff
GCC	Gulf Cooperation Council
GCCIA	Gulf Cooperation Council Interconnection Authority
GCF	Green Climate Fund
GDP	gross domestic product
GEF	Global Environment Facility (The)
GGFR	Global Gas Flaring Reduction Partnership
GGGI	Global Green Growth Institute
GHG	greenhouse gas
GHI	global horizontal irradiance
GNI	gross national income
GORD	Gulf Organization for Research and Development
GPIC	Gulf Petrochemical Industries Company
GRs	genetic resources
GSAS	Global Sustainability Assessment System
GW(h)	gigawatt (hour)
HFO	heavy fuel oil
IDAE	Instituto para la Diversificación y Ahorro de la Energía (Spanish Institute for Energy Diversification)
IEA	International Energy Agency
IFC	International Finance Corporation
ILC	International Labour Conference
ILO	International Labour Organization
IMF	International Monetary Fund
IPP	independent power producer
IPRs	intellectual property rights
IRENA	International Renewable Energy Agency
IsDB	Islamic Development Bank
ITPGR	International Treaty on Plant Genetic Resources for Food and Agriculture
IWRM	integrated water resources management
K.A.CARE	King Abdullah City for Atomic and Renewable Energy
KAHRAMAA	Qatar General Electricity and Water Corporation
KAUST	King Abdullah University of Science and Technology
KISR	Kuwait Institute for Scientific Research
kW(h)	kilowatt (hour)
LAS	League of Arab States
LDC	least developed country
LED	light-emitting diode
LEED	Leadership in Energy and Environmental Design
LNG	liquefied natural gas
MAR	managed aquifer recharge
(m)bpd	(million) barrels per day

MDGs	Millennium Development Goals
MENA	Middle East and North Africa
MEPS	Minimum Efficiency Performance Standard
(MM)Btu	(million) British thermal units
Mtoe	million tonne of oil equivalent
MW(h)	megawatt (hour)
NAMA	Nationally Appropriate Mitigation Action
NOC	national oil company
NOGA	National Oil and Gas Authority (Bahrain)
ODA	official development assistance
ODI	outward direct investment
OECD	Organisation for Economic Co-operation and Development
OFID	OPEC Fund for International Development
OPEC	Organization of the Petroleum Exporting Countries
PAEW	Public Authority for Electricity and Water (Oman)
PAGE	Partnership for Action on Green Economy
PGRFA	plant genetic resources for food and agriculture
PPP	public-private partnership
PRS	Pearl Rating System
PV	photovoltaic
QSAS	Qatar Sustainability Assessment System
R&D	research and development
Rio+20	United Nations Conference on Sustainable Development (UNCSD)
RRC	resource-rich country
RTA	Dubai Roads and Transport Authority
SCP	sustainable consumption and production
SDGs	Sustainable Development Goals
SEC	Saudi Electricity Company
SEEC	Saudi Energy Efficiency Center
SFD	Saudi Fund for Development
SOC	savings on capital investment
SR	Saudi riyal
SSC	South-South cooperation
TEEB	The Economics of Ecosystems and Biodiversity initiative
TK	traditional knowledge
toe	tonne of oil equivalent
TRIPs	Agreement on Trade-Related Aspects of Intellectual Property Rights
TW(h)	terawatt (hour)
TWW	treated wastewater
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNDESA	United Nations Department of Economic and Social Affairs

UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCWA	United Nations Economic and Social Commission for Western Asia
UNFCCC	United Nations Framework Convention on Climate Change
UPOV	International Union for the Protection of New Varieties of Plants
US	United States of America
US(D)	United States dollar
VSFU	value of saved fuel per unit in power generation
WMP	world market price
WTO	World Trade Organization



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Part I

# Green economy and the Gulf

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# 1 Introduction

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For several decades now, the six member states of the Gulf Cooperation Council (GCC) – Bahrain, Kuwait, Saudi Arabia, Oman, Qatar and the United Arab Emirates (UAE) – have been financing their socioeconomic development with hydrocarbon exports. While their high reliance on external oil and natural gas revenues has exposed these countries to economic vulnerabilities, the revenues have also enabled the GCC states to build modern infrastructure, sustain high levels of welfare for their nationals, and exert regional and global influence through sovereign wealth and investments. Given their hydrocarbon wealth, the GCC states have built economies that are energy-intensive and rely on a comparative advantage of cheap energy. Similarly, they have allowed domestic energy prices to remain low, creating hard-to-rid patterns of overconsumption of fuels and utilities and locking in energy-intensive infrastructure and industries.

Over the past decades, with populations, economies and energy demand growing at fast rates, the GCC states have become increasingly aware of the need to work on the domestic side of the resource equation, in other words, improve energy efficiency and invest in cleaner and more sustainable sources of energy. At the same time, on the international side, they have felt threatened by the intensifying global efforts to shift from fossil fuels to a clean energy economy, which could have negative impacts on the mainstay of the GCC economies, oil exports (Luomi 2012a). The magnitude of these pressures and the sense of urgency created by them arguably constitute the clarion call for the Gulf decision-makers to finally make the difficult decisions required for transitioning to the much-spoken-of, but still elusive, post-oil era. At the same time, deep political economy and cultural challenges, namely the persistent rentier state structures and ruling bargains between governments and citizens that are based on a combination of fossil fuel revenue and post-traditional forms of government, still constitute enormous barriers for transitioning to an alternative, more sustainable system.

Taking bold and prompt measures to tackle the domestic resource use challenges and external oil export revenue dependence may constitute the GCC states' last chance to sustain their prosperity into the future. The time of 'brown' economies may be over much sooner than the world's top oil exporters are willing to admit. Amidst the ongoing global economic and environmental crises,

an increasing number of citizens around the world in both developed and developing countries are reaching the conclusion that the current global economic development model has failed both people and nature. Since the financial crisis in 2008, discontent and demonstrations demanding a better quality of life, more social equity and environmental justice have taken place all around the world, from Occupy Wall Street in 2011 to the Arab uprisings, and from the Brazilian street protests in 2013 to the People's Climate March in New York in 2014. Much beyond merely a temporary complication, the entire 'system' – whether related to finance, climate, food, biodiversity or energy – seems to be in a crisis.

Increasing scientific evidence is emerging on the need to change course. In the case of climate change alone, if we are to stay below 2°C of global warming, at current rates of greenhouse gas (GHG) emissions humanity's remaining carbon budget might be exhausted in less than three decades (Levin 2013). This means that global emissions should start peaking soon – something current policies and targets globally do not yet reflect. At an accelerating pace, humans are crossing the 'planetary boundaries' that define our safe global operating space. According to scientists, we have already crossed these boundaries for climate change, biodiversity loss and interference with the nitrogen cycle, and are heading towards the Earth's limits for ocean acidification, freshwater use, changes in land use, and interference with the phosphorus cycle (Rockström *et al.* 2009).

These crises and the mounting scientific evidence have also had an impact on the global development agenda. At all levels, organisations involved in international development are engaging in a global rethink on the current models of development and doing business. One of the key concepts framing this debate has been the 'green economy'. Emerging from the 2008 economic crisis, the green economy, in the context of sustainable development and poverty eradication, has been actively promoted by a number of United Nations (UN) agencies, as well as governments around the world, and has figured among the central themes in discussions around the post-2015 development agenda, stirring a lot of debate but also a rapidly increasing amount of plans and actions.

Reflecting the diversity of the world we live in, and the uniqueness of each country's national circumstances and development priorities, there is no single model or a pathway to the green economy. However, for all countries, shifting to a green economy – one that sets the economy at the centre of generating sustainable development – will require major economy-wide structural and technological changes, or at least the 'greening' of key sectors, such as energy, urban infrastructure, transportation, industry and agriculture. It will also include 'greening' investments nationally and globally, generating 'green' jobs through new 'green' sectors, and supporting and facilitating 'green' trade internationally through national and international policies.

From a Gulf perspective, the key question that begs answering is: why should the GCC states embark on a transition to the green economy – and why should they do so at this point in time? More specifically: how could the GCC states benefit from the green economy, and what would the key cornerstones of such an economy be in a region that has a harsh climate, few other natural endowments