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978-0-521-76342-4 - Smart Solutions to Climate Change: Comparing Costs and Benefits

Edited by Bjorn Lomborg

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Smart Solutions to Climate Change

The failure of the Copenhagen climate conference in December 2009 revealed major flaws in the way the world's policy makers have attempted to prevent dangerous levels of increases in global temperatures. The expert authors in this specially commissioned collection focus on the likely costs and benefits of a very wide range of policy options, including geoengineering; mitigation of CO₂, CH₄, and "black carbon"; expanding forest Carbon Sequestration; R&D of low-carbon energy; and encouraging green technology transfer. For each policy, the authors outline all of the costs, benefits, and likely outcomes, in fully referenced, clearly presented chapters accompanied by shorter, critical alternative Perspective papers. To further stimulate debate, an Expert Panel of economists, including three Nobel laureates, evaluates and ranks the attractiveness of the policies.

This authoritative and thought-provoking book will challenge readers to form their own conclusions about the best ways to respond to global warming.

BJØRN LOMBORG is Director of the Copenhagen Consensus Center and Adjunct Professor in the Department of Management, Politics and Philosophy at Copenhagen Business School. He is the author of the controversial bestseller, *The Skeptical Environmentalist* (Cambridge, 2001), and was named as one of the top 100 intellectuals by *Foreign Policy* and *Prospect* magazines in 2008.

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Abbreviations and acronyms

ABC	Atmospheric Brown Clouds	EMF	Energy Modeling Forum
ABI	Association of British Insurers	ENSO	El Niño-southern oscillation
AC	air capture	EPA	Environmental Protection Agency (USA)
AC	average cost	EPO	European Patent Office
ACEI	Autonomous Carbon Efficiency Improvement	EST	environmentally sound technologies
AEEI	Autonomous Energy Efficiency Improvement	ETS	emission trading scheme
AETG	advanced energy technology gap	ETS	Emission Trading System
APP	Asia Pacific Partnership	FDI	foreign direct investment
B/C	benefit-cost	FEEM	Fondazione Eni Enrico Mattei
BAU	business-as-usual	FSU	former Soviet Union
BCA	benefit-cost analysis	FUND	Climate Framework for Uncertainty, Negotiation, and Distribution
BCR	benefit-cost ratio	G4M	Global Forest Model
CBA	cost-benefit analysis	GAINS	Greenhouse Gas and Air Pollution Interactions and Synergies
CCN	cloud condensation nucleae	GCC	global climate change
CCS	carbon capture and storage	GCM	general circulation model
CCSP	Climate Change Science Program	GCP	Global Carbon Project
CDM	clean development mechanism	GDP	gross domestic product
CE	climate engineering	GE	geoengineering
CES	constant elasticity of substitution	Gg	giga-gram
CFC	chlorofluorocarbon	GHG	greenhouse gas
CGE	computable general equilibrium	GLOBIOM	Global Biomass Optimization Model
CIO	carbon intensity of output	GtC	gigatons of carbon
CIR ³ D	carbon intensity-reducing return to R&D investment	GTP	Global Temperature Potential
CIS	Commonwealth of Independent States	GWe	giga-watt electric
CNG	compressed natural gas	GWP	global warming potential
COP	Conference of Parties	GWP	gross world product
CRP	Conservation Reserve Program (USA)	HDDV	heavy-duty diesel vehicles
CV	current value	HFC	hydrofluorocarbon
DALY	disability adjusted life year	IA	impact assessment
DICE	Dynamic Integrated model of Climate and the Economy	IA	integrated assessment
EDF	Environmental Defense Fund	IAM	integrated assessment model
EI	energy intensity of output	ICES	Intertemporal Computable Equilibrium System
EJ	exajoules	IEA	international environmental agreement

IEA WEO	International Energy Agency World Energy Outlook	OHI	other high-income countries
IFR	integral fast reactor	OLS	ordinary least squares
IGCC–CCS	integrated coal gasification combined cycle power plant	PDF	probability density function
IIASA	International Institute for Applied Systems Analysis	PFC	perfluorocarbons
IPCC	Intergovernmental Panel on Climate Change	PM	particulate matter
IRR	internal interest rate	PPP	purchasing power parity
ISM	Indian summer monsoon	ppb	parts per billion
ITC	induced technological change	ppm	parts per million
LBD	learning-by-doing	ppmv	parts per million by volume
LBR	learning-by-researching	PV	present value
LDC	least developed country	QALY	quality of life
LFG	landfill gas	R&D	research and development
LLF	long-lived fluorinated gases	RCIO	rate of decline in the carbon intensity of output
LNG	liquefied natural gas	REDD	Reducing Emissions from Deforestation and Forest Degradation (avoided deforestation)
LPG	liquefied petroleum gas	RICE	Regional Dynamic Integrated model of Climate and the Economy
MAC	marginal abatement cost	SCC	social costs of carbon
MC	marginal costs	SF ₆	sulfur hexafluoride
MEF	Major Economies Forum	SLF	short-lived fluorinated gases
MER	market exchange rates	SPM	Summary for Policy Makers (IPCC)
MFI	micro-finance institution	SRES	Special Report on Emission Scenarios
MMV	measurement, monitoring, and verification	SRM	solar radiation management
MT	million ton	SSA	sub-Saharan Africa
MTC	metric ton of carbon	SYR	Synthesis Report (IPCC)
NAPA	National Adaptation Programmes of Action	TFP	total factor productivity
NAS	National Academy of Sciences	Tg	teragram
NC	No Controls	THC	Thermohaline Circulation
NCAR	The National Center for Atmospheric Research	TOA	top of the atmosphere
NGO	non-governmental organization	TT	technology transfer
NIS	newly independent states	TW	terawatt
NPV	net present value	UNFCCC	United Nations Framework Convention on Climate Change
NRTEE	National Roundtable on the Environment and the Economy (Canada)	UV	ultraviolet
O&M	operation and maintenance	VOC	volatile organic compounds
OC	Optimal Controls	VOI	value of information
OC	organic carbon	VSL	value of a statistical life
ODA	overseas development aid	WHO	World Health Organization
OECD	Organization for Economic Cooperation and Development	WM	Waxman–Markey (bill)
		WTAC	willingness to accept compensation
		WTP	willingness-to-pay
		YLD	years lost due to disability
		YLL	years of life lost