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Future of CO_2 Capture, Transport and Storage Projects

Analysis using a Systemic Risk Management Approach

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Jaleh Samadi
MINES ParisTech
Paris
France

Emmanuel Garbolino
CRC
MINES ParisTech
Sophia-Antipolis Cedex
France

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Preface and Acknowledgements

The current book is an update of a Ph.D. thesis made in MINES ParisTech, from 2009 to 2012. The research question came up at that time is still topical. That is why we decided to readdress the question and analyze the evolution of the situation concerning Capture, Transport and Storage of CO_2 projects.

I wish to express my gratefulness to all the persons who made this possible, and especially my parents for their endless love and support.

Paris, France Jaleh Samadi

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About the Authors

Jaleh Samadi was awarded a Ph.D. in Engineering Science at MINES ParisTech, France. Since then, she has worked as Project Manager and Safety Engineer at EReIE (Energy Research, Innovation & Engineering) in France. She has been specially involved in the development and construction of an innovative biogas treatment/bioLNG production unit.

Since 2016, Dr. Samadi continues her professional career as a Project Manager and Business Developer in JIFMAR Offshore Services in France.

She continues her research on the development of CTSC technology as well as Risk Management approaches.

Emmanuel Garbolino was awarded a Ph.D. in Geography at the University of Nice-Sophia Antipolis, and since 2002 has been a Lecturer and Assistant Professor at the CRC, MINES ParisTech.

Dr. Garbolino's research areas include climate change impacts on ecosystems and human societies, modeling of natural and anthropogenic systems, risk engineering dedicated to natural and anthropogenic hazards (risk assessment and prevention, crisis management, and damage assessment).

Dr. Garbolino is a member of the Education and Research Centre on CO_2 Capture, Transport and Storage.

Abbreviations

atm.	Atmosphere (pressure unit of measurement)
Ar	Argon
AS/NZS 4360: 2004	Australian/New Zealand risk management standard, version 2004
Bar	Pressure unit of measurement
BLEVE	Boiling Liquid Expanding Vapor Explosion
°C	Degrees of Celsius (temperature unit of measurement)
CCS	CO_2 Capture and Storage
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CTSC	Capture, Transport and Storage of CO_2
DNV	Det Norske Veritas
EIA	Environmental Impact Assessment
EOR	Enhanced Oil Recovery
ESD	Emergency Shut Down
EU	European Union
GCCSI	Global CO_2 Capture and Storage Institute
Gt	Giga (10^{12}) tonnes
H_2	Hydrogen
H_2S	Hydrogen Sulfide
HSE	Health, Safety and Environment
ICPE	Installation Classée pour la Protection de l'Environnement
IEA	International Energy Agency
IEC 60300-3-9: 1995	International Electrotechnical Commission standard for risk management. Guide to risk analysis of technological systems, version 1995
IPCC	Intergovernmental Panel on Climate Change
IRGC	International Risk Governance Council

ISO/IEC 73: 2002	International standard for risk management—Vocabulary —Guidelines for use in standards, version 2002
km^2	Square kilometer
km	Kilometer
LNG	Liquified Natural Gas
LSIP	Large-Scale Integrated Project
m	Meter
max.	Maximum
MIT	Massachusetts Institute of Technology
Mtpa	Million tonnes per annum
N_2	Nitrogen
NGO	Non-governmental Organization
NO	Nitrogen monoxide
NO_2	Nitrogen dioxide
O_2	Oxygen
ppm	Parts per million
SO_2	Sulfur dioxide
STAMP	Systems-Theoretic Accident Model and Processes
STEL	Short-Term Exposure Limit
STPA	Systems-Theoretic Process Analysis
t	Tonnes
UK	United Kingdom
USA	United States of America