

# Four scenarios for 2050



# Energy To 2050 Scenario For A Sustainable Future

**Joachim H. Spangenberg**



## **Energy To 2050 Scenario For A Sustainable Future:**

Energy to 2050 Maria Rosa Virdis, 2003 Analysing the interaction between energy and climate change mitigation issues requires the adoption of a long term perspective looking up to fifty years ahead The future cannot be predicted particularly over longer periods However strategic planning and political decisions demand that we explore options for the future and these are best developed through scenarios conjectures as to what might happen in the future based on our past and present experience of the world and on plausible speculation about how these trends may further evolve This volume looks at different types of scenarios evaluating how they can be used to analyse specific aspects of the interaction between energy and environment over the longer term It examines exploratory scenarios based on different expectations of technical and or policy developments over the next 50 years and normative scenarios based on a set of desirable features or norms that the future world should possess These long term scenarios complement the IEA s World Energy Outlook which presents a mid term business as usual scenario with some variants **Energy to 2050** , *Energy to 2050* Maria Rosa Virdis, 2003

**International Seminar On Nuclear War And Planetary Emergencies - 36th Session** Richard C Ragaini, 2007-07-02 The Erice International Seminars are multidisciplinary seminars attended by over 100 eminent participants from all fields of science Each year a few scientific issues are selected and experts are invited to present contrasting views during the plenary multidisciplinary sessions of the seminar followed by general debates These sessions offer a unique opportunity for specialists to enlarge their fields of vision by being confronted with ideas and suggestions from high level scientists in complementary domains of science Associated workshops allow the experts to further refine and process the ideas evoked during the seminar This year s topics are all currently of high relevance For example on energy issues we have focused on the future of global nuclear power On global monitoring of the planet we have focused on the proliferation of nuclear weapons and the Nuclear Proliferation Treaty On climatology we have investigated the role of aerosols on global warming and their satellite detection On pollution the role of plastic contaminants in water was revealed through a series of disquieting reports *Long-range Futures Research* Robert H. Samet, 2009-03-24 This highly readable study explains how complexity science provides an evolutionary model for the civil system with a new world view that out ranges United Nations reference scenarios to beyond 2150 The Future of Energy Use Phil O'Keefe, Nicola Pearsall, Geoff O'Brien, 2010-02-09 Following the success of its predecessor this second edition of The Future of Energy Use provides essential analysis of the use of different forms of energy and their environmental and social impacts It examines conventional nuclear and renewable sources and technologies using relevant case studies and providing a vital link between technology and related policy issues The new edition has been comprehensively developed and updated including new text diagrams and tables with entire new sections that reflect the significant changes that have occurred since the first edition New material includes a stronger focus on climate change policy and energy security a discussion of the long run marginal costs of oil coverage of the biofuels

debate in both the developed and developing worlds an outline of developments in the built environment including transport issues and the relationship between behaviour and energy use It reviews policy shifts with relation to energy efficiency carbon capture and storage combined heat and power and combined cycle gas turbines There is new coverage of nuclear waste storage and proliferation and new material on microgeneration and biofuels as well as essential new information on carbon markets and the hydrogen economy The result is a unique introduction and guide to all the vital issues within energy for students academics and professionals new to the field

*Energy from the Desert* Kosuke Kurokawa, 2012-05-04 The world's deserts are sufficiently large that in theory covering a fraction of their landmass with PV systems could generate many times the current primary global energy supply In three parts this study details the background and concept of VLS PV maps out a development path towards the realization of VLS PV systems and provides firm recommendations to achieve long term targets This represents the first study to provide a concrete set of answers to the questions that must be addressed in order to secure and exploit the potential for VLS PV technology and its global benefits

**Scenarios and Indicators for Sustainable Development-Towards A Critical Assessment of Achievements and Challenges** Joachim H.

Spangenberg, 2019-03-14 Globalization and telecoupling are enhancing the complexity of the coupled socio ecological system constituted by the interaction between the global ecosphere and the anthroposphere As a result the demand for tools to identify transformative innovations assess future risks and support precautionary decisions for sustainability is growing by the day in business and politics Scenarios are a means of simplification reducing the real world complexity to a limited number of essential factors to analyze their interactions and support policy formulation with indicators as communication and monitoring tools In particular in a time of fake news and alternative truths a critical reflection amongst producers and users of scenarios and indicators is overdue the capability for critical self reflection is what distinguishes science from pseudo science and is a condition of trust The authors of this book test established measurement and modeling approaches against new challenges assess the weaknesses of prevailing innovation theories and the political ideological embedment of archetypical scenarios highlight deficits in taking the physical basics into account and the need to understand global interaction and the stepwise process of energy transitions point out technical as well as conceptual weaknesses in data collection harmonization and indicator generation always with a view to solving problems

**Energy, Sustainability and the Environment** Fereidoon Sioshansi, 2011-06-02 The complexity of carbon reduction and economic sustainability is significantly complicated by competing aspects of socioeconomic practices as well as legislative regulatory and scientific requirements and protocols An easy to read and understand guide Sioshansi along with an international group of contributors moves through the maze of carbon reduction methods and technologies providing steps and insights to meet carbon reduction requirements and maintaining the health and welfare of the firm The book's three part treatment is based on a clear and rigorous exposition of a wide range of options to reduce the carbon footprint Part 1 of the book Challenge of

Sustainability examines the fundamental drivers of energy demand economic growth the need for basic energy services and the interdependence of economic political environmental social equity legacy and policy issues Part 2 of the book Technological Solutions examines how energy can be used to support basic energy service needs of homes commercial and industrial facilities and for other applications Part 3 of the book case studies covers a number of innovative projects initiatives concepts or self imposed targets in different parts of the world with the aim of significantly reducing energy use and carbon footprint of a company a community a city or an entire country There was a widespread recognition among environmental engineers and energy economist of the importance of carbon reduction while sustaining the firm s economic growth The only book to bring together both subjects into one easy to understand reference Carbon Reduction and Economic Sustainability not only clearly explains which option has the lowest energy carbon footprint but also which option would better suit the business in question This includes carbon reduction for residential transport industrial and public sectors The only book to clearly explain the economic and environmental engineering aspects of carbon reduction Case studies taken from a number of international projects Carbon reduction options for all sectors of society The role of the planning system in carbon reduction

**Sustainable Development, Energy and the City** Voula P. Mega, 2006-03-20 Advancing towards sustainable development will be impossible without the active participation of informed and aware citizens and decision makers This publication will provide the unspecialised decision makers citizens students and policy makers of the future with significant information about a dynamic sector energy and a space city that are critical for sustainability Cities and the energy field are now on the verge of dramatic changes Urban energy systems are capital intensive and have long lives Immediate change is difficult and innovation is crucial for inefficient patterns to be transformed into more intelligent systems Strongly entrenched ideas start to vacillate and new investments challenge the inertia of old infrastructures New concepts values and technological breakthroughs emerge linked to policy and market initiatives public expectations and scientific developments

Sustainable Futures in the Built Environment to 2050 Tim Dixon, John Connaughton, Stuart Green, 2018-01-09 Brings together leading thinking on issues of new professional practice and on the future of a sustainable built environment This book focuses on both construction and development issues and examines how we can transition to a sustainable future by the year 2050 bringing together leading research and practice at building neighbourhood and city levels It deftly analyses how emerging socio economic technological and environmental trends will influence the built environment of the future The book covers a broad spectrum of interests across the scales of buildings communities and cities including how professional practice will need to adapt to these trends The broader context is provided by an analysis of emergent business models and the changing requirements for expert advice from clients Sustainable Futures in the Built Environment to 2050 A Foresight Approach to Construction and Development features chapters covering data and trends including historical data and UK and international case studies policies and practice related to the field current state of

scientific understanding key challenges key technological advances including disruptive and systemic technological innovations change issues and critical uncertainties and future visions It provides A strong conceptual framework based on a Foresight approach Discussion of the key data and trends that underpin each chapter Coverage of both construction and property development Specially commissioned chapters by academics and practitioners A synthesis of the main findings in the book and key insights for the future to 2050 Sustainable Futures in the Built Environment to 2050 A Foresight Approach to Construction and Development is an important book for postgraduate students and researchers construction real estate and property development specialists engineers planners architects foresight and futures studies specialists and anyone involved in sustainable buildings

Energy Security for the EU in the 21st Century José María Marín Quemada, Javier García-Verdugo, Gonzalo Escribano, 2012-03-12 Recent developments like the rising trend in crude oil price the international economic crisis the civil revolts in Northern Africa and the Middle East the nuclear threat in Japan after the tsunami the oil spill in the Gulf of Mexico and the economic growth of emerging countries like China and India have a direct relation to the security of energy supply anywhere in the world This book provides a comprehensive analysis of energy risks energy scenarios and energy policies with special reference to the European Union and its member states emphasizing the economic and geopolitical dimensions of energy security The book assesses both quantitatively and qualitatively the socioeconomic and political risks related to the European energy supply together with the EU s energy relations with other countries Two innovative indicators have been developed to estimate geopolitical energy risks and energy related relations with other countries The book also examines the process of convergence of member states energy security policies the path towards a common European energy policy and the process of Europeanization projected towards the energy corridors through which the EU receive energy imports In addition alternative strategic scenarios related to energy risk are assessed Finally guidelines for the EU s energy policy and new strategies using energy corridors are suggested in order to maximize EU s energy security The book should be of interest to students and researchers across a wide range of subjects including energy economics and policy energy and foreign policy in the EU energy policies in EU member states and several aspects related to international political economy

**Exploring and Shaping International Futures** Barry B. Hughes, Evan E.

Hillebrand, 2015-12-03 People who run cities like to play Simcity to find out how impossible their jobs are Hughes gives everyone a chance to play a kind of Simplanet with outcomes far more complex and uncertain In the process the book and the computer program provide a coherent path to understanding an anarchic world Ronald A Francisco University of Kansas What will be the future of human demographic economic environmental and political social systems throughout the 21st century Where do current changes appear to be taking us What kind of future would we prefer How much leverage do we have to bring about the future we prefer Do YOU share these interests of the book If yes you should study the book and learn how to cope with the future with the International Futures approach IFs developed by the authors This large scale integrated

global simulation modeling system is a user friendly professional tool for long term policy analysis and an educational tool in universities I had a pleasure to learn it personally by cooperating with Barry Hughes Pentti Malaska Professor of MS DrTech futurist Honorary member of the Club of Rome What will be the long term impact of AIDS in Africa or concentration of global oil production in the Middle East Exploring and Shaping International Futures helps readers understand such global trends in demographic economic energy food environmental and socio political systems It allows businesspeople government officials and others to think concretely about global futures in each of these areas It is the only book on the market that allows readers to use a computer simulation to track global trends and to develop alternative scenarios around those trends It is one of relatively few books that really brings computer technology into the classroom boardroom or policy planning commission The International Futures IFs computer simulation around which the book is built is now widely used in policy analysis as well as education It has been instrumental in projects undertaken by such groups as the European Commission the U S National Intelligence Council and the United Nations After three decades of development and refinement the computer model is now easy to access and use Readers can access the website with the IFs computer model at [www.ifs.du.edu](http://www.ifs.du.edu) *Climate Change 2022 - Mitigation of Climate Change* Intergovernmental Panel on Climate Change (IPCC),2023-08-17 This Working Group III contribution to the IPCC Sixth Assessment Report provides a comprehensive and transparent assessment of the literature on climate change mitigation The report assesses progress in climate change mitigation options for reducing emissions and enhancing sinks With greenhouse gas emissions at the highest levels in human history this report provides options to achieve net zero as pledged by many countries The report highlights for the first time the social and demand side aspects of climate mitigation and assesses the literature on human behaviour lifestyle and culture and its implications for mitigation action It brings a wide range of disciplines notably from the social sciences within the scope of the assessment IPCC reports are a trusted source for decision makers policymakers and stakeholders at all levels international regional national local and in all branches government businesses NGOs Available as Open Access on Cambridge Core

**The Oxford Handbook of Industrial Policy** Arkebe Oqubay,Christopher Cramer,Ha-Joon Chang,Richard Kozul-Wright,2020-10-20 Industrial policy has long been regarded as a strategy to encourage sector industry or economy wide development by the state It has been central to competitiveness catching up and structural change in both advanced and developing countries It has also been one of the most contested perspectives reflecting ideologically inflected debates and shifts in prevailing ideas There has lately been a renewed interest in industrial policy in academic circles and international policy dialogues prompted by the weak outcomes of policies pursued by many developing countries under the direction of the Washington Consensus and its descendants the slow economic recovery of many advanced economies after the 2008 global financial crisis and mounting anxieties about the national consequences of globalization The Oxford Handbook of Industrial Policy presents a comprehensive review of and a novel approach to the conceptual and theoretical

foundations of industrial policy The Handbook also presents analytical perspectives on how industrial policy connects to broader issues of development strategy macro economic policies infrastructure development human capital and political economy By combining historical and theoretical perspectives and integrating conceptual issues with empirical evidence drawn from advanced emerging and developing countries The Handbook offers valuable lessons and policy insights to policymakers practitioners and researchers on developing productive transformation technological capabilities and international competitiveness It addresses pressing issues including climate change the gendered dimensions of industrial policy global governance and technical change Written by leading international thinkers on the subject the volume pulls together different perspectives and schools of thought from neo classical to structuralist development economists to discuss and highlight the adaptation of industrial policy in an ever changing socio economic and political landscape

**Materials Issues for Generation IV Systems** Véronique Ghetta,Dominique Gorse,Dominique Mazière,Vassilis Pontikis,2008-04-23

Global warming shortage of low cost oil resources and the increasing demand for energy are currently controlling the world's economic expansion while often opposing desires for sustainable and peaceful development In this context atomic energy satisfactorily fulfills the criteria of low carbon gas production and high overall yield However in the absence of industrial fast breeders the use of nuclear fuel is not optimal and the production of high activity waste materials is at a maximum These are the principal reasons for the development of a new fourth generation of nuclear reactors minimizing the undesirable side effects of current nuclear energy production technology while increasing yields by increasing operation temperatures and opening the way for the industrial production of hydrogen through the decomposition of water The construction and use of such reactors is hindered by several factors including performance limitations of known structural materials particularly if the life of the projected systems had to extend over the periods necessary to achieve low costs at least 60 years This book collects lectures and seminars presented at the homonymous NATO ASI held in autumn 2007 at the Institut d Etudes Scientifiques in Carg se France The adopted approach aims at improving and coordinating basic knowledge in materials science and engineering with specific areas of condensed matter physics the physics of particle matter interaction and of radiation damage It is our belief that this methodology is crucially conditioning the development and the industrial production of new structural materials capable of coping with the requirements of these future reactors

**Sustainable Energy** D. Elliott,2007-07-31 In this timely book leading authors explore the technologies that might help us to develop a sustainable energy future emphasising renewable energy and the political and economic context needed for them to prosper This collection makes hard headed assessments of what is possible and what is not

**Aligning the Energy Transition with the Sustainable Development Goals** Maryse Labriet,Kari Espegren,George Giannakidis,Brian Ó

Gallachóir,2024-06-11 This open access book brings together concrete analyses from around the world spanning various scales that shed light on strategies for implementing essential energy and climate transitions within the broader context of



UN Sustainable Development Goal SDG imperatives Specifically the book exemplifies the advancement adaptation and utilization of energy systems models to address intricate policy issues around pathways to achieve net zero emissions enhance energy security optimize investments and understand their societal implications It explores the intricate connections between the SDGs concerning energy climate action and other developmental priorities such as employment and economic growth industrial innovation urban development responsible consumption and production and collaborative partnerships Organized into four sections the book illustrates the necessary adjustments of energy system models to guide SDGs evaluates the role of modeling to advance both renewable energy and energy security and showcases how energy systems are harnessed to engage with international national and local policymakers This book is available open access under a Creative Commons Attribution 4.0 International License via [link.springer.com](https://link.springer.com) **Long-Term Integration of Renewable Energy Sources into the European Energy System**

The LTI-Research Group, 2012-12-06 A sustainable European energy system mitigating climate change and solving a number of other key environmental problems will require massive reliance on renewable energy sources combined with a sharp increase in energy productivity Considering that most of the technologies necessary for such a development are already available today's most important questions are How can these technologies be integrated into the European energy system What are the costs and benefits of such a strategy What are the major bottlenecks and obstacles to such a development What measures are necessary to support this development In the book a sustainable scenario and a fair market scenario are developed as a means to demonstrate that concepts for a sustainable future European energy supply are feasible **The Power of Science** Domenico Rossetti di Valdalbero, 2010 This book highlights the interaction between science and politics and between research in economics and European Union policy making It focuses on the use of Quantitative tools Top down and Bottom up models in upstream European decision making process through five EU policy case studies energy taxation climate change energy efficiency renewable energy and internalisation of external costs The author reveals how the European Commission grounds part of its legitimacy on the objectivity of the figures and on its technical charisma Faced by strong stakeholders an elected European Parliament and a Council representing the national interests the Commission defends the credibility of its policy initiatives e.g. energy and environment targets new market mechanisms by scientific reports Through an in-depth analysis of the preparatory legislation Commission White Papers Communications Directive Proposals Staff Working Documents Impact Assessments the author explains how the European Commission justifies economically and supports politically its initiatives This book offers a new way of understanding the EU decision making process with special reference to the energy and environment fields

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