

Details of authors

Ali M Abdelsalam B Sc Eng (Mechanical) M Sc (Mechanical Eng)
PhD Research Scholar, Mechanical Engineering Department, Anna University, Chennai, India
Institute for Energy Studies, CEG Guindy, Anna University, Chennai 600025, India
Tel: +91 9791010754
Fax: +91 44 2235 1991
E-mail: alimabdelsalam@gmail.com

Ali M Abdelsalam is a mechanical engineer with a Master's degree in the field of Fluid Mechanics and its Applications. Currently, he is doing a PhD in Mechanical Engineering at Anna University, India, in the field of Wind Energy. He is also an Assistant Professor in the Mechanical Power Engineering Department, Menoufiya University, Egypt. He has 9 years of experience in teaching various academic courses in Mechanical engineering. His fields of scientific research are Computational Fluid Dynamics CFD, Wind Energy, and Turbulent Flows.

Kehinde O Awodele BSc Eng (Electrical & Electronic Engineering) M Sc (Electrical Power & Machines)

Lecturer: Power Engineering, Department of Electrical Engineering, University of Cape Town, Private Bag X3, Rondebosch, 7701, Cape Town, South Africa

Tel: +27 21 650 4093

Fax: +27 21 650 3465

E-mail: Kehinde.awodele@uct.ac.za

Kehinde Awodele is an electrical engineer with Master's degree in Electrical Power and Machines, currently pursuing the PhD degree in electrical engineering. She worked in the electricity meter manufacturing industry in Nigeria for several years and had a series of training at the Technical partners/equipment manufacturers' plants in Switzerland, Germany and Greece. She later lectured at the Polytechnic of Namibia in Windhoek. Currently she is lecturing in the Department of Electrical Engineering, University of Cape Town, South Africa. Her research areas include power system distribution system reliability, customer interruption costs modelling, distribution system quality regulation, power quality and demand side management.

Michelle Barnard LLB LLM (NWU)
Faculty of Law, North-West University, PO Box 431, Potchefstroom 2526
Tel: (018) 299 1033
Cell: 072 201 3589
E-mail: Michelle.Barnard@nwu.ac.za

Michelle Barnard is a Junior Lecturer at the North-West University (NWU), Potchefstroom Campus since 2008. She specialises in international law, in particular international sustainable development law and regional energy law. Michelle completed her LLB in 2003 and there-after completed her LLM dissertation titled: 'The unification of international private law rules pertaining to Contracts for the International Sale of Goods in SADC' in 2005. She is currently a doctoral candidate at the NWU where she focuses her research on aspects pertaining to the promotion of sustainable development via improved access to modern energy sources, specifically nuclear energy. The title registered for the LLD is 'Nuclear Energy in Africa: A legal framework for sustainable energy access' – promoter: Prof W Scholtz. Michelle is a published author on the topics related to her primary fields of research.

Morgan Bazilian BA (Hons) M Arch (Building Energy Analysis) M Sc (Physics and Energy Studies) PhD (Energy Studies)

Affiliate Professor

Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology

Brinellvägen 68, 100 44 Stockholm, Sweden

E-mail: morgan.bazilian@desa.kth.se

Dr Morgan Bazilian is currently an Affiliate Professor at KTH. In addition, he is the current Deputy Director of the Joint Institute for Strategic Energy Analysis (JISEA). JISEA conducts leading-edge interdisciplinary research and provides objective and credible data, tools, and analysis to guide global energy investment and policy decisions. He is also a Senior Research Fellow at the Global Green Growth Institute. Previously, Dr Bazilian was the Special Advisor to the Director-General of UNIDO on international energy policy. In this role he was deeply engaged with the design and implementation of the United Nations Sustainable

Energy for All initiative, and managed UN-Energy. UN-Energy is the UN's interagency mechanism on all energy issues. Prior to his time in the United Nations, D. Bazilian held a political appointment as Chief of Cabinet for the Minister of Energy in Ireland, after being Director of the clean energy division of Ireland's National Energy Authority for several years. He has been the lead climate change negotiator for the European Union on low-carbon technology, and a member of the UNFCCC's Expert Group on Technology Transfer (EGTT). He has been a national representative to various International Energy Agency governing bodies and executive committees, as well as to the European Union's energy research and development programs. Dr. Bazilian holds a Ph.D. and master's degrees related to the techno-economic aspects of energy systems, and he has been a Fulbright Fellow. His book, *Analytical Methods for Energy Diversity and Security*, was published by Elsevier Science in 2008 and remains a core reference in this area of energy policy. He has been a contributing author to the IPCC and the Global Energy Assessment. He holds senior research affiliations at Cambridge University, and the International Institute for Applied Systems Analysis (IIASA), and is Adjunct Professor at Columbia University.

Warren J Brettenny

Department of Statistics, Nelson Mandela Metropolitan University, PO Box 77000 Port Elizabeth, 6031
Tel: +27 41 504 2895
Fax: +27 41 504 2659
E-mail: warren.brettenny@nmmu.ac.za

Warren Brettenny's field of study is in the Department of Statistics, Nelson Mandela Metropolitan University.

Oliver Broad M Sc (Eng) M Sc (Mech Eng)

Research Engineer
Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology
Brinellvägen 68, 100 44 Stockholm, Sweden
Tel: +46 73 646 0081
E-mail: broad@kth.se

Oliver Broad joined KTH's division of Energy Systems Analysis as a Master Student Intern in February 2012 focusing on the modelling of electricity generation systems in Northern Africa. After developing a full power pool model in collaboration with the International Renewable Energy Agency using a least cost optimisation approach, he compared the outcomes of multiple scenarios and their respective implications for this region. Having graduated from his Double Degree of Engineering from KTH- Stockholm and ECN-Nantes, Oliver works as a Research Engineer and Team Leader for Africa

focused – Energy 4 All – modelling and research work at the division. Ongoing projects include collaborations with the World Bank, investigating the climate vulnerability of the African infrastructure through integrated energy optimisation and water accounting models, and the African development Bank estimating the power infrastructure needs of the Northern African power pool.

Clement Burnier MSc (Eng)

Research student, ESIEE, Amiens, France
Clement Burnier's research interests include Energy Management, Renewable and Sustainable energy and Demand Side Management.

Chantelle M Clohessy M Sc Mathematical Statistics

Department of Statistics, Nelson Mandela Metropolitan University, PO Box 77000 Port Elizabeth, 6031

Tel: +27 41 504 4121

Fax: +27 41 504 2659

Cell: +27 83 371 1881

E-mail: chantelle.clohessy@gmail.com

Chantelle Clohessy is a Doctoral candidate in the Department of Statistics, Nelson Mandela Metropolitan University.

Dolf Gielen MA (Env Sc) PhD (Energy and Materials Modelling)

Director of the Innovation and Technology Center – IITC, International Renewable Energy Agency (IRENA)

Robert Schuman Platz 3, 53111, Bonn, Germany
E-mail: DGielen@irena.org

Before joining IRENA, Dolf Gielen was Chief of the Energy Efficiency and Policy Unit at the United Nations Industrial Development Organization (UNIDO), Vienna. In that capacity, he managed a number of large projects involving energy efficiency and renewable energy (including those in Sri Lanka, Ukraine and India). Previously, he was a Senior Energy Analyst in the Energy Technology Policy Division of the International Energy Agency, Paris. Dolf Gielen has a PhD in Energy and Materials Modelling from the Technical University of Delft. He graduated with an MA in Environmental Sciences at the University of Utrecht, the Netherlands.

Rupert Gouws B Eng (Elect) M Eng (Elect)

PhD (Elect Eng) Pr Eng CMVP
Senior Lecturer, School of Electrical, Electronic and Computer Engineering
North-West University, Private Bag x6001, Post-point 288, Potchefstroom, 2520, South Africa
Tel: +27 18 299 1902
Fax: +27 18 299 1977
E-mail: rupert.gouws@nwu.ac.za

Rupert Gouws holds a PhD degree in Electrical and Electronic Engineering from North-West University (Potchefstroom Campus). He has consulted to a variety of industry and public sectors in South Africa and other countries in the fields of energy engineering and engineering management. Currently he is appointed as a senior lecturer specialising in energy engineering, electrical machines and control at the North-West University. The Engineering Council of South Africa (ECSA) registered him as a Professional Engineer and the Association of Energy Engineers (AEE) certified him as a Certified Measurement and Verification Professional (CMVP).

Sebastian Hermann *B Sc (Env and Res Management) M Sc (Eng)*

PhD candidate

Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology

Brinellvägen 68, 100 44 Stockholm, Sweden

E-mail: sebastian.hermann@energy.kth.se

Sebastian Hermann joined the division of Energy Systems Analysis (dESA) in March 2011. He holds a MSc in Renewable Energy Systems and a B.Sc. in Environmental and Resource Management. Before joining KTH, Sebastian worked as Associate Expert at the Energy and Climate Change Branch of the United Nations Industrial Development Organization (UNIDO) in Vienna, Austria. Activities at UNIDO included technical project evaluation in the field of renewable energy and climate change, as well as scientific research on energy systems and their effects on social and economic development and the environment. Besides working for UNIDO, Sebastian gained valuable practical experience during his assignments with the German Energy Agency as well as with the German Technical Cooperation Agency (GTZ) in different developing countries.

Mark Howells *B Sc (Chem Eng) M Sc (Energy Studies) PhD (Energy Studies and Economics)*

Professor and Head of Division

Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology

Brinellvägen 68, 100 44 Stockholm, Sweden

E-mail: mark.howells@energy.kth.se

Mark Howells is professor in Energy Systems Analysis. The field of research covers energy systems analysis, methodological development and modelling of energy systems in global and regional perspectives with the aim to develop decision support systems for decision makers. Before joining KTH Prof. Howells worked at the Planning and Economic studies Section (PESS), in the

International Atomic Energy Agency (IAEA) in Vienna. There he worked with application of energy systems analysis to answer questions which relate to social, economic, environmental and other strategic goals. Prof. Howells is proficient in the application of most energy models presently established including LEAP, MARKAL, TIMES and MESSAGE. Developing new models such as CLEW (Climate, Land-use, Energy and Water), a multi-resource model aimed at coordinating policy in various resource related areas; and OSeMOSYS, the Open Source energy Modelling System aimed at adding optimization capacity to energy modelling.

Raymond Kimera *BSc (Elec) MSc (Energy)*

Tel: +256 753443079

E-mail: rymndz@gmail.com

Raymond Kimera is an Electrical engineer, with a Master's degree in Energy Studies from the University of Cape Town. He is currently working with International Energy Technik, Kampala, Uganda.

Asami Miketa *MA (Theoretical Economics)*

PhD (Media and Governance)

Project Officer – Scenarios and Strategies,

Innovation and Technology Centre – IITC,

International Renewable Energy Agency (IRENA),

Robert Schuman Platz 3, 53175, Bonn, Germany

E-mail: AMiketa@irena.org

The focus of Dr. Asami Miketa's work at the IITC/IRENA is in the field of regional renewable energy deployment scenarios and capacity building in energy planning. Dr. Miketa received a master's degree in theoretical economics in 1997 and a PhD in media and governance in 2002, both from the Keio University in Japan. Her PhD thesis dealt with modelling of energy-economy linkage for Asian countries. From 1996 to 2000, she worked as a research assistant for APEC Economic, Environmental, and Energy Modelling and Database project supported by the government of Japan. Then in 2000, she joined the Environmentally Compatible Energy Strategies Project at International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria, as a research scholar where she was responsible for a number of research projects, assessing long term energy supply options using various energy modelling tools. Before joining the International Atomic Energy Agency (IAEA) in 2005 as an energy system analyst/economist, she worked for the Tokyo Institute for Technology, Science of Institutional Management of Technology in Japan for few months. During her 7 years tenure at the Planning and Economic Study Section at the IAEA she developed and conducted various energy planning training programs mainly in Africa and Asia and contributed to several energy assessment studies in these countries. Her main research focus

is the assessment of various energy technologies in terms of cost effectiveness, including externalities. Her scientific interests also include the development, implementation, and application of energy-economy-environmental models, scenario analysis, externalities of energy supply and use.

Richard Okou *B Sc(Elec Eng) M Sc (DSEE)*

PhD (Elec Eng), Reg. Eng (Ug) MIEEE, MIET, MUIPE

Associate Professor and Team Leader, Integrated Power and Energy Systems Group, Department of Electrical & Computer Engineering, Makerere University, Uganda

Tel: +256 779544707

E-mail: richoko@gmail.com

Richard Okou received his Bachelor's degree in Electrical Engineering from Makerere University, Uganda, in 2004, his Master's degree in Sustainable Energy Engineering from the Royal Institute of Technology, KTH, Sweden in 2006 and his PhD degree in Electrical Engineering from the University of Cape Town, South Africa, in 2010. Dr Okou joined the industry in 2004 where he worked as a UN volunteer under the UN/Cisco systems partnership as an IT specialist. During this time, he pursued a Masters in sustainable energy. In 2007, he left the Cisco program to pursue his PhD which he completed in 2010. From June 2010 to Nov 2011, he worked as a Senior Research Officer at University of Cape Town where he was involved in research on smart grids, integration of renewable energy onto the grid, energy storage, electrical machines and energy efficiency. He also consulted for Technology Innovations Agency of South Africa and worked with numerous agencies (Eskom South Africa and the Council of Scientific and Industrial Research) on issues related to renewable energy, grid integration and smart grid.

In 2012 he joined Makerere University, Uganda as a lecturer and is currently an Associate Professor where he is involved in teaching, research and supervision of PhD and Masters Students. Dr. Okou has consulted for the German Technical Cooperation, Office of the Auditor General in Uganda among others. He has published widely in international peer reviewed journals and conference proceedings. His research interests include renewable energy and smart grid which includes: power management of energy storage in grid connected micro grids, grid integration of renewable energy at the transmission level, Electric vehicles as energy storage buffers, rural electrification, and electrical machines among others. Dr. Okou is a registered engineer in Uganda, a member of the IEEE, IET, Engineering Council of South Africa (EWSA) and Uganda Institute of Professional Engineers (UIPE).

Olawale Popoola *B Tech (Quality) M Tech*

(Electrical) C.M.V.P

Lecturer / Energy Project Engineer, Electrical Engineering Department / Centre for Energy and Electric Power, Faculty of Engineering and the Built Environment, Tshwane University of Technology, Private Bag, X680, Pretoria 0001. South Africa

Tel: 012 382 5195

Fax: 012 382 5266

E-mail: popoolao@tut.ac.za.

Olawale Popoola is presently working as an Energy Project Engineer at the Centre for Energy and Electric Power and also as a Lecturer at the Department of Electrical Engineering, Tshwane University of Technology. He is currently studying for his doctoral degree. His research interests include Energy Management, Renewable and Sustainable energy, Demand Side Management, Quality Management. (special focus on Continual Improvement in Learning Organization), Power electronics application in power systems as well as Laser applications. Mr Popoola is a senior member of the South Africa Institute of Electrical Engineers and the South Africa Quality Institute in addition to being a member of South Africa Association for Energy Efficiency. He is a Certified Measurement and Verification Professional and member of the Association of Energy Engineers.

Holger Rogner *M Sc (Ind Eng) PhD (Energy Economics)*

Guest Scholar at IIASA and Affiliate Professor at KTH

Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology

Brinellvägen 68, 100 44 Stockholm, Sweden

E-mail: holger.rogner@desa.kth.se

Dr Holger Rogner is currently an Affiliate Professor at KTH. He is an expert in the application of systems analysis to long-term energy demand and supply issues and their underlying driving forces, i.e., economic development and growth as well as innovation and technology and social change. His work focuses on the identification of techno-economically feasible paths to sustainable energy systems. Typically, his analyses involve the entire energy system from resource extraction to the provision of energy services. Options are viewed through the lenses of technology and innovation as well as economic, environmental, socio-political and international compatibility. Dr Rogner provides leadership and guidance to international and multi-disciplinary research teams. He also serves as a consultant to private and public sector organizations. The results of his research assist the formulation of long-term energy policy targets for national and international institutions. Utility and other private sector energy

business underpin their corporate planning and investment strategies with Dr. Rogner's comprehensive energy systems analyses. Since 1993 he has been involved in the activities of the International Panel on Climate Change (IPCC) as lead author or coordinating lead author.

Adoniya Sebitosi *B Sc (Eng)(Hons)(Nairobi) PhD (Cape Town) CEng, REng. MIET MIEEE MIDiagE, MIEK*

Professor, Centre for Renewable and Sustainable Energy Studies, University of Stellenbosch, Matieland 7602
E-mail: sebitosi@sun.ac.za

Prof Sebitosi obtained his B Sc (Eng) with honours in electrical engineering from the University of Nairobi. He then joined industry and obtained extensive technical and managerial experience. His responsibilities included industrial quality assurance and training of service engineers in various countries in sub-Saharan Africa. He consequently attained various professional qualifications including Registered Engineer of Kenya and Chartered Engineer of the United Kingdom. In 2001 he joined the Department of Electrical Engineering at the University of Cape Town and subsequently obtained M Sc (Eng) and PhD degrees with distinction. He was nominee for the Joseph Arenow best PhD award in 2005. He was on the teaching staff of Department of Electrical Engineering, at UCT between 2005 -2008. He then joined Stellenbosch University in 2009 as senior lecturer and is currently Professor, Centre for Renewable and Sustainable Studies, in the Department of Mechanical and Mechatronic Engineering, Stellenbosch University.

He is rated by the National Research Fund of South Africa, as an Established Researcher. He has published 30 papers in refereed international journals including Elsevier's Energy Policy, Energy Conversion and Management and IEEE Transactions on Energy Conversion as well as 29 refereed conference proceedings. He has co-published 1 book and 2 book chapters and 4 contract reports. He was lead coordinator for energy curriculum development for the master's program of the Pan African University Institute for water and energy. He is also a reviewer and editorial board member for several international journals and the National Research Fund (NRF) of South Africa. He is a recipient of the Rector's award 2010 Stellenbosch University.

His research and professional interests include rational use of energy, (incorporating energy conservation, renewable energy, and water-energy nexus), energy policy, rural energisation, industrial quality assurance and power quality. His hobbies include writing African indigenous poetry and African cultural dance. He has extensively travelled, particularly across sub-Saharan Africa.

Gary Sharp

Department of Statistics, Nelson Mandela Metropolitan University, PO Box 77000 Port Elizabeth, 6031
Tel: +27 41 504 2288
Fax: +27 41 504 2659
E-mail: gary.sharp@nmmu.ac.za

Dr Gary Sharp is Head: Department of Statistics, Nelson Mandela Metropolitan University.

Constantinos Taliotis *B Sc (Env Sc) M Sc (Mech Eng)*

Research Engineer, Division of Energy Systems Analysis, Department of Energy Technology, KTH Royal Institute of Technology, Brinellvägen 68, 100 44 Stockholm, Sweden
Tel: +46 76 409 8119
E-mail: taliotis@kth.se

Constantinos Taliotis is a research engineer with a Bachelors degree in Environmental and Resource Sciences and a Mechanical Engineering Masters degree in Sustainable Technology. Constantinos first joined the division of Energy Systems Analysis at KTH as an MSc Thesis student in February 2012. His thesis involved looking into the effects recent natural gas finds in the Eastern Mediterranean will have on the systems of Cyprus and Israel through the development of different scenarios concerning the possibility of exports of electricity, LNG and petrochemicals. After the completion of his thesis, he joined the division as a researcher and in collaboration with the International Renewable Energy Agency, his work initially focused on modelling scenarios for the energization of the African continent via a cost optimization approach. His most recent endeavour involved the construction of a Global CLEW model, in close collaboration with the United Nations Department of Economic and Social Affairs.

Heino van Jaarsveldt *B Eng (Elect)*

Research Assistant, School of Electrical, Electronic and Computer Engineering
North-West University, Private Bag x6001, Post-point 288, Potchefstroom, 2520, South Africa
Tel: +27 18 299 1902
Fax: +27 18 299 1977
E-mail: Heino.vanJaarsveldt@nwu.ac.za

Heino van Jaarsveldt holds a B Eng degree in Electrical and Electronic Engineering from North-West University (Potchefstroom Campus). His research interests include condition monitoring, energy engineering and electrical machines.

Ramalingam Velraj *B E (Mechanical Eng),*

M E (Mechanical Eng), PhD (Mechanical Eng)
Professor and Director, Institute for Energy Studies
Anna University, Chennai – 600 025, India.
Tel: + 91 44 2235 8051

Fax: +91 44 2235 1991

E-mail: velrajr@gmail.com, velrajr@annauniv.edu
Dr Ramalingam Velraj received his M.E. Degree in the field of Energy Engineering and PhD degree in the field of Thermal energy storage from Anna University, Chennai, India. As part of his doctoral work, he carried out his research at the Solar Institute, Julich, Germany, for a period of 20 months during 1995–97. He has been working at the Institute for Energy studies since 1992. His areas of interest include Thermal Energy Storage, Energy Applications, Heat Transfer, Computational Fluid Dynamics and Heat Exchangers. Under his supervision, 21 PhD candidates have completed their PhDs and he has published 84 research papers in the field of solar drier, solar cooker and energy efficient buildings through PCM based thermal storage. He is also involved in consultancy work in the area of energy applications and performance evaluation of thermal systems.

hydro power projects, and at the Uganda Ministry of Water, Lands and Environment on ecological sanitation.

Frederik Vorster

*Department of Physics, Nelson Mandela
Metropolitan University, PO Box 77000 Port
Elizabeth, 6031*

*Tel: +27 41 504 3051
E-mail: frederik.vorster@nmmu.ac.za*

Dr Frederik Vorster is employed as a Lecturer, Department of Physics, Nelson Mandela Metropolitan University.

Manuel Welsch PhD

*Division of Energy Systems Analysis, Department
of Energy Technology, KTH Royal Institute of
Technology, Brinellvägen 68, 100 44 Stockholm,
Sweden*

E-mail: manuel.welsch@energy.kth.se

Manuel Welsch works as lead researcher at the division of Energy Systems Analysis at KTH Royal Institute of Technology on the development of energy models. These models are applied to support informed decisions on energy policy, system, and technology choices in order to effectively deliver on national, regional and global energy goals. His research work builds on advances in power system planning and design, especially with regard to the current discourse on smart grids. It helps assess how especially developing countries can profit from these developments. In particular, Manuel contributes to the development of the Open Source Energy Modelling System, OSeMOSYS. Before joining KTH in February 2011, Manuel worked at the Energy and Climate Change Branch of the United Nations Industrial Development Organization (UNIDO), focusing on issues pertaining to UN-Energy, the United Nations' inter-agency mechanism on energy. In his previous jobs, he worked at the Energy Facility of the European Commission, at Bernard Engineers on the design of