

ADDRESS BY WFEO PRESIDENT



Prof. Dr. GONG Ke

Prof. Dr. GONG Ke is an electronics engineer with expertise in information, communication technology, and more than 30 years' experience in engineering education, research, and management.

Since 2009, he has dedicated himself to WFEO activities and has made great contributions to the development of WFEO with his efforts and experience. As the chairman of China National Committee of WFEO, he has organized and led Chinese engineers to actively participate in WFEO's activities and given full support to WFEO's activities in China.

He has also stressed the essential role of engineering and engineers in the United Nations' sustainable development agenda through his engagement in drafting relevant documents and his attendance in high-level forums of the UN.

He was one of the 26 members of the United Nations Secretary-General's Scientific Advisory Board. He has established strong bonds with the United Nations, other international organizations and industrial communities

KEY NOTE SPEAKERS

KEY NOTE PAPER 1



Dr. Marlene Kanga

Dr. Marlene Kanga was President of WFEO (2017-2019), she is a chemical engineer and was National President of Engineers Australia in 2013.

Dr. Kanga has been involved with WFEO since 2007. During her term as WFEO President she brought together members, engineering organizations and member states at UNESCO in a collaborative effort to successfully declared 4th March, the founding Day of WFEO, as World Engineering Day.

Her strategic vision on the essential role of engineers in advancing the UN Sustainable Development Goals was first stated in the WFEO Engineering 2030 Plan in November 2017 and the WFEO UNESCO Paris Declaration, March 2018. This has resulted in collaborative initiatives with UNESCO, other international engineering organizations and member in projects that advance the 2030 Agenda.

Dr. Kanga is a board member of large organizations in Australia including Sydney Water Corporation, AirServices Australia, Standards Australia and other boards involving innovation. She is a director of iOmniscient Pty. Ltd. which has developed artificial intelligence for video technologies.

Dr. Kanga is an Honorary Fellow of the Institution of Engineers Australia, Honorary Fellow of the Institution of Chemical Engineers (UK), a Fellow of the Academy of Technology Science and Engineering (Australia), a Foreign Fellow of the ASEAN Academy of Engineering and Technology.

She has been listed among the Top 100 Women of Influence and the Top 100 Engineers in Australia and is a Member of the Order of Australia, a national honor, in recognition of her leadership of the engineering profession.

KEY NOTE PAPER 2



**Eng. Mustafa
Balarabe Shehu**
FNSE, FESN

Eng. Mustafa Balarabe Shehu is the Executive Vice President of the World Federation of Engineering Organizations (WFEO), a past President of the Federation of African Engineering Organizations, FAEO as well as the Nigerian Society of Engineers NSE. He is also Chairman/CEO, MBS Engineering Limited with offices in Kano and Abuja.

He graduated as an electrical engineer in 1985 from Ahmadu Bello University, Nigeria. His working career started with the Lagos Thermal Station Egbin in Lagos under the National Electric Power Authority from 1986 to 1988. He then got appointed by the Kano State Rural Electricity Board in 1988 where he served as Senior Engineer, up to the position of Deputy Director at which position he resigned in 1998.

In 1998, he established with colleagues, MBS Engineering Limited. It is an engineering firm involved in power systems designs, building services, renewable energy technologies, environmental engineering, cost engineering and project management amongst other services. It has wide clientele base ranging from Federal and State Government Organizations as well as the private sector and international organizations.

Engr. Mustafa Shehu participates actively in the services and activities of National, professional and business organizations. It is in these regards; he holds (held) the following positions:

1. Executive Vice President of the World Federation of Engineering Organizations November 2019-Date
2. President, Federation of African Engineering Organizations (FAEO) 2015-2016
3. President, Nigerian Society of Engineers (NSE), 2012- 2013
4. Board Member, Nigerian Bulk Electricity Trading Company, May 2020-Date
5. Member, Governing Council, National Agency for Science and Engineering Infrastructure, NASENI (2012-2013)
6. Member, Council for the Regulation of Engineering in Nigeria, COREN (2011-2017)
7. Co-Chair, Infrastructure Policy Commission of the Nigeria Economic Summit Group, NESG (2012-2013)
8. Member, National Refineries Special Taskforce, 2012
9. Member, Consumer Complaints Handling Forum for the Nigerian Electricity Regulatory Commission, NERC, (2008-2011)
10. Deputy President, Kano Chamber of Commerce, Industries, Mines & Agriculture (KACCIMA), (2013-2016)

He is a recipient of so many Awards from National and International Engineering Institutions, educational institutions as well as community-based organizations. He is a Fellow of the Nigerian Society of Engineers, Nigerian Institution of Electrical and Electronic Engineers as well as Fellow of the Solar Energy Society of Nigeria.

KEY NOTE PAPER 3



**Prof. Dr. José Manuel
Vieira**
WFEO President Elect

Positions

- 1997-present. Full Professor, Department of Civil Engineering, University of Minho, Portugal. Head of the Hydraulics Division. Co-ordinator of research projects and supervisor of PhD and MSc theses in the domain of Environmental Hydraulics.
- 1998-2002. Vice-Rector, University of Minho, Portugal.
- 1990-1998. Pro-Rector, University of Minho, Portugal.
- 1979-1997. Assistant Professor and Associate Professor, Department of Civil Engineering, University of Minho, Portugal. Head of the Hydraulics Division.
- 1977-1979. Design and Production Civil Engineer. Construction companies, Braga, Portugal. Design and construction processes in buildings and public works.

Education

- Agregado, University of Minho, Portugal, 1997.
- Higher Portuguese academic title.
- PhD in Civil Engineering, University of Minho, Portugal, 1986.
- MSc in Sanitary Engineering, IHE-Delft, Netherlands, 1982.
- Licenciatura (BSc) in Civil Engineering, University of Porto, Portugal, 1977.

Teaching activities

Lecturer and pedagogic coordinator in graduation and post-graduation subjects of Civil Engineering. Hydraulics, Hydrology, Sanitary Engineering, Water Management. Universities of Minho and Coimbra (Portugal), Santiago de Compostela (Spain), São Paulo (Brazil).

Research & Development activities

Coordinator and participant in several national and international financial competitive R&D projects. Domains of research: water resources management (water quality mathematical modelling in rivers, estuaries and coastal zones); sanitary engineering (drinking water treatment, wastewater treatment, waste management).

Author of scientific work

Over 200 publications in books, chapter of books, articles in peer review journals, and papers in national and international conferences.

KEY NOTE PAPER 4



Eng. Nicholas
Musuni
EBK Registrar/CEO

KENYA VISION 2030 AND THE BIG FOUR AGENDA; THE ENGINEERING PERSPECTIVE - 26TH NOVEMBER 2020

Kenya Vision 2030 is the long-term development blueprint for a better society by the year 2030. The vision aims at attaining a globally competitive and prosperous Kenya by transforming into a newly industrialising, middle-income country providing a high quality of life to all its citizens in a clean and secure environment.

The Vision is based on three pillars: Economic, Social, and Political. **Economic Pillar** aims to achieve an average economic growth rate of 10 per cent per annum and sustaining the same until 2030. **Social Pillar** seeks to engender just, cohesive and equitable social development in a clean and secure environment while **Political Pillar** aims to realize an issue-based, people-centred, result-oriented and accountable democratic system.

The economic, social and political pillars of Kenya Vision 2030 are anchored on the foundations of macroeconomic stability; infrastructural development; Science, Technology and Innovation (STI); Land Reforms; Human Resources Development; Security and Public Sector Reforms.

Vision 2030 is implemented through 5 Year Medium Term Plan. The first (2008-2012) and the second (2013-2017) medium term plans have successfully been implemented.

The 'Big Four' Agenda

The 3rd phase of Vision 2030 is being implemented through the Third Medium Plan. It has been conceptualized as the 'Big Four'. The Big four agenda items are food security; affordable housing; manufacturing; and universal healthcare for all.

Food security focuses on initiatives that guarantee food security and nutrition to all Kenyans. **Affordable housing** supports the construction of at least 500,000 affordable new houses for Kenyans. **Manufacturing** supports job creation by increasing value addition and raising the manufacturing sector's share of GDP to 15% while **universal healthcare** aims at providing universal health coverage thereby guaranteeing quality and affordable healthcare to all Kenyans. Full implementation of the 'Big Four' is therefore critical to the realization of the Vision 2030.

Engineering practice cuts across virtually all the sectors of the economy and is undoubtedly an important enabler in the achievement of the development agenda. Engineers play critical role in ensuring the industries gets reliable energy supply, ensures connectivity through adequate infrastructure and facilitate creation and generation of wealth through efficient systems and processes for production. The professional services range from conceptualising the needs of the society at large and specific industry in particular, assessing the technical and economic feasibility of various available solutions and design and development of the preferred options. As such engineers will be critical in the design of reservoirs, water dams and canals for distribution of water for irrigation to enhance food production, design and construction of healthcare facilities and equipment to support universal healthcare, design and construction of safe building structures and relevant physical infrastructure including roads and rail to support decent and affordable housing as well innovate, design and develop efficient product development systems to support manufacturing agenda.

In doing this engineers promote sustainable developments through taking into account socio – political and environmental factors and provide mitigation measures to the adverse effects of the engineering works and are governed by code of ethics and conduct for engineers that remind them of the obligations to society.

KEY NOTE PAPER 5



Ezra Odhiambo,
*Chairman-Nuclear
Power & Energy
Agency*

**Session Chairperson
Fellow Engineers
Distinguished guests
Ladies and Gentlemen**

Good Morning, I am pleased and honored to join you all during this 27th IEK international conference. Indeed the COVID 19 pandemic has impacted the world severely with great opportunities presenting itself in the virtual platforms.

The Sustainable Development Goals is the universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. Goal number seven is about Ensuring access to affordable, reliable and modern energy for all.

Energy demand and economic growth are closely interlinked. In order to meet the growth aspirations of the Vision 2030 and Big 4 Agenda, clean affordable and reliable energy has been identified as a key enabler.

Ladies and Gentlemen,

Diversification of the energy systems is critical for attainment of the country's energy security. To this end, Nuclear Power and Energy Agency (NuPEA) is established under the Energy Act 2019 mandated to promote the development of nuclear electricity generation in Kenya; and carry out research, development and dissemination activities in the energy and nuclear power sector.

The Agency is following the International Atomic Energy Agency (IAEA) Milestone Approach which is a phase approach for new comer countries introducing Nuclear Power Programme. The Milestone Approach has three phases and at the end of each phase there is a Milestone to be achieved. The Milestone Approach also identifies 19 key issues that the country need to develop before commissioning the nuclear power plant.

Ladies and Gentlemen,

In implementing the nuclear power programme, NuPEA has worked closely with the stakeholders in the establishment of a robust regulatory framework, which will regulate the application of nuclear science, and technology in the country. Furthermore, NuPEA has undertaken various technical studies including siting, reactor technology assessment, and grid study. In ensuring competent and skilled workforce, the Agency has endeavor to establish local and international capacity building initiatives.

The Agency is also in the process of establishing the nuclear research reactor at Konza Technopolis. Besides training, the research reactor will provide medical isotopes, which are useful in treatment and therapy of various ailments including cancer.

The country have also commenced the process of acceding and ratifying the international treaties and conventions that relates to nuclear safety, safeguards and security. This demonstrates the diligence and duty of care in fulfilling her international undertakings and obligations. The ratification of these international treaties also promote and assure confidence to, local, regional and international community.

Ladies and Gentlemen,

The Agency contribution to the BIG 4 Agenda and the Vision 2030 will be the enhancement of the local industry to provide components and services to the nuclear programme, thus enhancing the contribution of respective industries towards the country's economic development further the nuclear power plant will provide adequate, clean, reliable and stable electricity to power the Kenya Vision 2030 programme and the Big 4 Agenda projects and programmes.

NuPEA is also the National Liaison Office (NLO), which coordinates the implementation of International Atomic Energy Agency (IAEA) projects in all fields of peaceful uses of nuclear science and technology.

The projects in agriculture are aimed at improving crop and animal production to enhance food security in the country. This has been achieved through training of young Kenyan and farmers on scientific and innovative ways of improving crop and animal production for food security and development using mutant varieties of rice, forages and wheat through the irradiation techniques to produce rice, forages and wheat which are resistant to drought and disease.

Technical cooperation projects related to health are mainly on detection, diagnosis and treatment of cancer. The projects have made major contributions to the health sector including; capacity development through training of radiologists, radiographers and medical physicists and acquisition of radiotherapy equipment for cancer diagnosis and treatment. In the fight against COVID -19 pandemic, the IAEA through NuPEA donated 4 state of art Covid-19 diagnostic kits. The diagnostic Kits provides a significant boost to the country's efforts in the fight against the coronavirus pandemic.

Technical projects in industry have facilitated training of Kenyans in use of radiation techniques in industrial processes like non-destructive testing and radiotracer analysis as well as donation of equipment for Non-Destructive Testing for elemental and radioactivity analysis and checking of flaws and leakage in pipes carrying fluids.

Ladies and Gentlemen,

In conclusion, the engineering fraternity plays an important role in the nuclear power programme and we look forward to a robust engagement and partnership as the country implement the nuclear power programme

Kenyans, Stay Safe, Stay Healthy as we all fight the COVID 19 Pandemic and acclimatize to the new normal.

Mr. Ezra Odondi Odhiambo
CHAIRPERSON

KEY NOTE PAPER 6



Pavel Oimeke,
DG, EPRA

Mr. Pavel Oimeke is a renewable energy and energy efficiency specialist with close to two decades of experience. He has served in various capacities at EPRA including as the Director Renewable Energy at the Authority, a position he held until his appointment as Director General in August 2017.

Prior to joining the Authority, Mr. Oimeke was involved in research and development of renewable energy solutions for the manufacturing and tea sectors in Kenya. He served as a consultant for the World Bank funded multi-agency programme, the Lake Victoria Environment Management Programme (LVEMPII) implemented in Kenya, Uganda and Tanzania. He has also consulted in Renewable Energy and Energy Efficiency in Uganda and Malawi.

Mr. Oimeke has also worked at Finlays Kenya Ltd. and Kenya Tea Development Agency (KTDA). He holds a Bachelor's degree in Chemical and Process Engineering from Moi University, Kenya; a Diploma in Energy Planning and Use from Life Academy, Sweden, a Certificate in Corporate Governance and is currently pursuing a Master of Science degree in Sustainable Energy Engineering from Kenyatta University.

He is registered with the Institute of Engineers of Kenya (IEK), the Association of Energy Professionals East Africa (AEPEA), and Engineers Board of Kenya (EBK). He is also a member of the Institute of Leadership and Management (ILM), UK.

KEY NOTE PAPER 7: ENGINEERING RESPONSE TO COVID-19 PANDEMIC The Likoni Floating Bridge Project



Eng. Peter Mundinia,
DG, KeNHA

Background and Introduction

- Covid-19 broke out in Wuhan China late 2019.
- First case was reported in Kenya in March 2020
- Containment measures by Government were issued starting March 2020 among which was; • Sanitize • Wear masks • Social distancing • Cessation of movement
- Construction of the floating pedestrian bridge is a high-level decision in Government in response to the COVID-19 pandemic and pedestrian congestion at the Likoni Channel
- Under normal circumstances, the ferries operate under heavy human traffic
- Approx. 300,000 persons cross the Likoni channel using the ferry per day
- Reduced working hours by the laws of cessation of movement increased congestion at the ferry

Project Summary

Project Name	Construction of Likoni Floating Bridge
Location	From North to South in Likoni region Mombasa County
Employer	Kenya National Highways Authority
Contractor	China Road & Bridge Corporation (CRBC)
Employers Representative	Director (HPD)
Commencement date	15 th July 2020
Time for completion of instructed works	6 months
Original date of Completion	11 th Jan 2021

Project Name	Construction of Likoni Floating Bridge
Defects Liability period	6 months
Elapsed time	128
% elapsed time	69%
Overall Weighted progress	88%
Contract sum	Kshs 1,961,562,031

Key Features of the bridge

- Pedestrian handling facility at both ends
- Fixed approach trestles
- Transition deck from fixed trestle to floating deck
- Floating deck
- Approach roads with pedestrian walkways
- Matatu terminus at both ends

Key Technological Highlights

- Vertical & raked Steel driven piles under marine conditions using rigs on barges
- Finishing of piles by sand filling, concrete capping for stability and durability
- Floating pontoons adjusting the deck to tide levels
- Opening and closing to allow ships passage into and out of the harbour
- Fixing of prefabricated bridge trusses and decks to achieve project delivery times

KEY NOTE PAPER 8



**Eng. Martin
Manuhwa,**
FAEO President

The current FAEO President is an electrical and energy consultant engineer and is currently the Managing Director of Zimbabwe Africa Infrastructure Development Group (ZAIDG) a company that specializes in Engineering Procurement and Construction Management (EPCM). His engineering practice is in energy, construction projects, work-site project implementation and management. ZAIDG is in partnership with Hatch a leading EPCM Consultancy based in Canada, South Africa and across the globe. ZAIDG and Hatch are currently involved in the engineering services for construction of the Kariba South Power Station Extension (300MW) and Hwange Power Station Expansion (600MW).

Martin teaches part time Engineering graduate students at the Zimbabwe National Defense University and has taught MBAs and MBLs at the University of Zimbabwe and Bindura University of Science Education respectively. His research interest is in the use of Management Information Systems in construction and project management and he is currently a Doctoral Associate at the University of Cape Town where he is researching on the link of ICTs in the Industrial 4.0 Revolution and Productivity in Engineering Projects.

He sits in the advisory Council of the London based Global Infrastructure Anti-Corruption Centre (GIACC). He is a member of the World Federation of Engineering Organization (WFEO) Executive Council. Martin has previously worked for ZESA and Lon-Rho in various capacities in his engineering career. He is the Past President of the Southern African Federation of Engineering Organisations (SAFEEO), and also the Zimbabwe Institution of Engineers (ZIE)

**Eng. Wangai
Ndirangu**
Chairman, KeNHA

KEY NOTE PAPER 9: Irrigation and sustainable land productivity in Kenya

KEY NOTE PAPER 10: Unveiling the Engineers Identification Card



**Eng. Nicholas
Musuni,**
EBK Registrar/CEO

Introduction

The Engineers Rules 2019, Rule No 10 (1), requires the Board to issue engineers with an Identification Card. The need for an identification card arose from the realization that there was no mechanism for engineers to easily identify themselves to the public or relevant authorities especially when providing services outside an office environment.

EBK Identification Card

Engineers Board of Kenya (EBK) has therefore partnered with the National Bank of Kenya (NBK) to generate Engineers Identification Cards that also come with the feature of a customized Visa Smart Cards for additional conveniences to engineers.

Benefit of EBK Identification Card

- The smart card will be your identification card as provided for in the Engineers Rules. This will help to easily weed out persons not licensed to practice as engineers. The public will be sensitized on this important identification document.
- Security – The partnership with NBK Visa Centre on the issuance of the Identification Card provides a secure identification system that is not easily replicated by unscrupulous persons.
- The Identification Card will enable engineers to conveniently carry out financial transactions such as payments for Board activities.
- The Identification Card will make it easier for you to access the Boards services, eg You will be able to avoid long queues at registration desks during the Board activities by simply swiping or scanning your card.
- The VISA – EBK cobranded card can be quickly cancelled and replaced.
- The Identification Card will offer you the control to manage and budget on expenses
- Convenience and ease of use.
- Simplified application and immediate issuance.
- The Card will be configured to be scalable and compatible with all the Board's systems.

How to apply

Visit ebk website, www.ebk.or.ke, and apply online (Engineer ID Application).



KEY NOTE PAPER 11: Expanded Polystyrene (EPS) Technology



**Hon. Eng. Stephen
Ngare**
*Chairman, National
Housing Corporation*

Hon. Eng. Stephen Muriuki Ngare is the Chairman of the National Housing Corporation Board. He graduated with a Bachelor of Science in Civil Engineering from the University of Nairobi and a Master's degree in Environmental Studies specializing in Transportation Planning from York University, Toronto, Canada. He is a Registered Consulting Engineer by the Engineers Board of Kenya and a member of the Kenya Institute of Engineers.

He has over 35 years of extensive experience in the management of road projects in the public sector and has held the position of Deputy Chief Engineer (Roads) in the Ministry of Roads after which he was appointed to the Ministry of Public Works and as a General Manager in charge of Planning and Special Projects in Kenya National Highways Authority (KeNHA).

From 2013-2017, he was the Member of Parliament for Ndia Constituency, Kirinyaga County. He served as a member of Budget and Appropriation Committee, Public Investment Committee and Transport, Public Works and Housing Committee.