MINISTRY OF ENERGY
AND MINERAL DEVELOPMENT

REC22 & EXPO
Report

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1. EXECUTIVE SUMMARY

The Ministry of Energy and Mineral Development held its 18th Energy and Minerals Week at Speke Resort and Conference Centre, Munyonyo, Kampala from 31st October to 5th November. Aspart of the year's Energy and Minerals Week, the National Renewable Energy platform - NREP held its second annual conference, dubbed **Renewable Energy Conference 2022 and Expo (REC22 & Expo)** from 3rd to 5th November.

REC22 & Expo ran under the theme, "***Renewable Energy for Sustainable Industrialization, Inclusive Growth and Economic Recovery***". The REC22 & Expo event was highly attended with a representation of participants from over 20 countries around the world, namely, Germany, United Kingdom, Ireland, Austria, Sweden, Norway, The Netherlands, Belgium, France, United States of America, Kenya, Rwanda, Zambia, Zimbabwe, Libya, Egypt, Nigeria, United Arab Emirates, India, Bangladesh, Mozambique, and Uganda of course.

The conference sessions addressed pressing issues in the sector under thematic areas, namely, Technology, Capacity Building and Innovation; Energy Finance; Energy Transition; Policy, Planning and Partnerships; and Gender and Inclusivity. The conference provided ways forward for promoting renewable energy for sustainable development. The conference had 28 sessions in total that ran in parallel over the three days. The conference section was highly attended with a daily average physical participation of about 563 people and virtual participation of about 232 people. The official opening session of the conference was attended by 624 people while the official closing session of the conference was attended by 478 people.

The Expo section had 61 energy companies in attendance that exhibited E-mobility, Solar, Clean Cooking and Nuclear Technologies as well as Energy Financing Institutions. Other than the energy companies, six companies exhibited locally made art craft, that is, clothes, paints and other crafts. The expo consisted of both local and international exhibitors showcasing some of the latest state-of-the-art technologies in the energy space.

This document, therefore, provides a background of the renewable energy sub-sector in Uganda and that of NREP. Further, the document provides an account of what transpired at REC22 & Expo by thematic area and its respective sessions therein. For every session, the moderator and panelists, topics of discussion, highlights and recommendations made are noted. Each thematic area discussion is presented with cross cutting recommendations made in the sessions. The document also provides an evaluation of REC22 & Expo based on the collected feedback from the participants. Additionally, the document provides some of the highlights of REC22 & Expo. The document also recognizes the sponsors of REC22 & Expo in a special way.

2. REC22 & EXPO ACTIVITIES

2.1. Opening Ceremony

H.E. Zaake W. Kibendi, Ambassador/ Permanent Representative of Uganda at International Renewable Energy Agency, Abu Dhabi, United Arab Emirates

He commended Uganda for using almost 100% renewable energy. He further alluded to the fact that there is still need for timely feedback and interventions for the improvement of renewable energy technologies adoption in the country, particularly in rural areas.

Pointed out that Covid-19 and climate change experiences should prepare Ugandans to raise the bar through adoption of renewable energy technologies. He mentioned that the technologies in place normally focus on large enterprises leaving small enterprises. Therefore, he encouraged stakeholders to focus on renewable energy technologies that benefit the majority including small enterprises. He alluded to the fact that indoor air pollution dropped during the lockdown when most small enterprises were closed. He emphasized that strategies such as Net-metering would enable everybody to generate and sell surplus electricity to the grid and/or neighborhood.

"Net-metering would enable everybody to generate and sell surplus electricity"

Mr. Phillipe Groueix, Country Chair Total Energies & General Manager in Uganda

He noted the conference and expo had come at a time when energy sector challenges necessitated collaboration in order to achieve economic growth. He mentioned that from a global perspective, Uganda is not immune to the energy sector challenges affecting the world's development. He emphasized that the best energy is energy used efficiently. Thus, the integration of energy remains paramount in Uganda.

"The best energy is energy used efficiently"

Emphasized that focus needs to be on efficiency measures, consideration of all energy sources in the energy mix, net-zero since it can reduce emissions by 30%, transitioning from traditional biomass to modern bioenergy, promoting clean cooking energy e.g., and facilitating energy security to significantly solve the climate and sustainability challenges.

Alluded to the fact that TotalEnergies is currently focusing on developing a liquified petroleum plant for LPG to fuel the transition to clean energy. He also highlighted that TotalEnergies has plans for biodiesel although it is constrained by the availability of materials. He mentioned that massive investment in clean energy remains top priority for TotalEnergies. He indicated that TotalEnergies has a 60% budget for renewable systems to ensure energy security. As such, he alluded to the fact that a Joint Development Agreement (JDA) between TotalEnergies and MEMD towards the transition to clean energy was to be signed at REC22.

Ms. Irene Pauline Bateebe, Permanent Secretary, MEMD

Commended NREP for organizing the conference and expo and further emphasized that running a conference up to Saturday implied the importance and commitment to the renewable energy transition by the stakeholders.

Appreciated the sponsors for supporting renewable energy to ensure a successful conference and expo. Alluded to the fact that the conference is timely, coming at a time when the world is experiencing climate change and sustainability challenges. However, while dealing with such challenges, she highlighted that inclusion is key, emphasizing a focus on a fair and just way of transition as well as the inclusion of refugees and domiciled communities. She noted the need for a holistic framework to ensure strategies to transition and provide just and fair solutions. Also highlighted that the issues of energy security and energy access are core, thus a need to integrate different energies as we focus on decarbonizing.

Emphasized the pillars of energy transition like communities benefiting from clean technologies, local companies participating in the renewable energy sector, and energy plan for refugees and domiciled communities.

Indicated that the electricity cooking tariff was intended to enhance the transition to clean cooking energy. Also mentioned that the government is considering supporting the development of solar power plants. She alluded to the fact that there are government collaborations with NGOs like GIZ that have led to several projects in Lamwo and Kasese districts to enhance the transition.

"There is a need for a holistic framework to ensure strategies to transition are providing just and fair solutions."

Emphasized that the conference and expo is one of the platforms to encourage stakeholders towards energy transition to mitigate energy sector challenges. Also mentioned that the climate change challenge requires emerging countries to transform their energy approaches amid challenges of rapid urbanization, pollution and increasing energy demand facing emerging economies.

Highlighted that the focus should be on data to inform decision making. Thus, acquisition, transfer and use of data are relevant. As such, she mentioned that the government is focused on collaboration on data analysis for well sought thorough decision making.

Mentioned that the government intends to support communities to access clean cooking fuels and technologies. For example, the Energy Access Scale- up Project (EASP) seeks to increase the use of clean energy while ensuring environmental issues are embedded.

Finally, alluded to the fact that the government passed the biofuels Act 2020 and the regulations are at the final stage with an intent to encourage a regulated production and distribution of biofuels in the country.

Invited Hon. Sidronius Okaasai Opolot to give his remarks.

Hon. Okaasai Sidronius Opolot, State Minister for Energy

Highlighted that the presence of the Prime Minister mirrors the government's commitment to renewable energy. Emphasized that renewable energy strategies in the country cover all aspects of development like health, water and environment and this has enabled the government to evaluate the level of renewable energy. He further noted that Uganda has abundant renewable energy sources dominated by hydro at 4,500 MW, geothermal potential at 1,500 MW, solar potential at 5,000 MW and biomass at 1,700 MW.

Alluded to the fact that the Ministry of Energy and Mineral Development has come up with several strategies to guide the uptake of the different renewable energy technologies. He indicated that there is a strategy to facilitate the transition from traditional biomass to clean energy sources like LPG and biogas. Also, he mentioned that the government is assessing the strategy for green hydrogen production and utilization.

"Ministry to support the youth with innovative ideas"

To ensure harmonized planning for the energy sector, the Minister highlighted the fact that the government of Uganda partners with several agencies like IRENA in spearheading energy transition to oppose negative effects of energy.

Noted that MEMD has finalized the policy addressing numerous emerging issues in the energy transition. He highlighted the need for continuous efforts on reducing emissions even whenthe country is largely using green energies. Alluded to the fact that the ministry is focusing on the implementation of regulations for the implementation of biofuels production and use. He indicated that the ministry is also ensuring mechanisms of reducing the useof biomass by using clean cooking technologies.

The Minister pointed to the fact that the search for innovative ideas to enable clean cooking are underway. Highlighted that the ministry will support the youth with innovative ideas to enhance the transitionto clean energy. Indicated that the government is focused on developing skills and maintaining energy systems to enhance the transition to renewable energy. Highlighted that the government needs human resource with skills to check products/appliances in the market for quality and safety.

Indicated that the government continues to focus on developing financing mechanisms to deploy renewable energy technologies. Mentioned that the government intends to negate the void in accessing financing for renewable energy since available modalities are not benefitingsome stakeholders like smallbusinesses. He highlighted that the government's commitment to renewable energy development and deployment explains the establishment of Uganda Energy Credit Capitalization Company (UECCC) to facilitate the financing of renewable energy technologies and enable accessibility by households.

The Minister highlighted that there are several investment opportunities in the renewable energy sector like public private

partnerships (PPPs) for the development of power projects, contribution to equity financing of power projects, promotion of different home technologies like solar dryers, cookers, pressured electricity cookers, infrastructure development, and skilling human resources.

In conclusion, he emphasized that Uganda strives for energy integration for sustainable development. Hence, he further highlighted that there are enormous investment opportunities in renewable energy. He pointed out that renewable energy meets over 90% of the country's energy needs and thus, the government is committed to supporting it. He ended by pointing out that the government is encouraging private and international stakeholders to be part of the efforts being championed.

Invited the representative for the Prime Minister to deliver her speech.

Hon. Namuyangu Kakya Jeniffer, State Minister in charge of Bunyoro Affairs

Applauded the organizersfor the timely conference and expo on promoting the production and use of renewable energy in Uganda. Emphasized that there is a need to plan for energy to enhance sustainability. Mentioned the fact that majority of the population relies on charcoal and firewood, hence cutting trees which leads to forest degradation and eventually deforestation. She also pointed out that even the educated and leaders still depend on charcoal and firewood for cooking. She thus noted that such behavior calls for urgent attention!

Emphasized the need for the shift to renewable and clean energy to stop indoor air pollution by developing technologies which produce energy that protects our environment. She noted that the solution to climate change is to phase out fossils and transition to renewable energy.

"Plan for energy to enhance sustainability"

Noted that Uganda is pursuing a strategy to double its share of renewable energy. Hence, as the country pursues poverty eradication projects, she indicated that there is a need to focus on and include the provision of access to clean energy.

Emphasized that the energy security of the country can be handled by both renewableand non-renewable sources while ensuring best practices as emphasized in COP27. Also indicated that there isa need to focus on the use of urban waste. She alluded to the fact that the government is engaging in PPPs to turn waste into a resource.

Noted that the country is planning an LPG refinery to increase clean energy sources following oil gas extraction. She encouraged the participants to share practical outcomes that the government can base on for energy transition. Further encouraged participants to tour Uganda and explore the abundant energy resources and beauty of the country.

Declared the Renewable Energy Conference and Expo (REC22 & Expo) officially Open.

2.2. Technology, Capacity Building and Innovation

■ 2.2.1. North to South Technology Transfer

Moderator: *Prof. Samson Rwahwire* - Director for the Directorate of Graduate Studies, Research and Innovations at Busitema University

Panelists: *Dr. Pau Farras* - National University of Ireland (NUI), *Dr. Michael Wullenkord* - German Aerospace Center (DLR), *Dr. Justus Masa* - Max Planck Institute for Chemical Energy Conversion, and *Dr. Juliet Kyayesimira* - Kyambogo University.

Paper Presentation: *Don Bosco Tiromwe* on "Exploring Geothermal Efficiency in Heating and Cooling" and *Gilberta Luba Thwala* on "Geothermal Exploration: An experience from Zimbabwe."

Discussed technology transfer from Global Northto South. With the fast-evolving nature of the energy sector, it was pointed out that the right time to establish partnerships and collaboratewith the Global North in developing and deploying technologies was now. This session featured researchers, innovators, and practitioners from the Global North with their counterparts from the Global South discussing avenues of developing and deploying technology. The session included a delegation from FlowPhotoChem, a multinational EU-funded project developing new and sustainable ways of manufacturing chemicals using carbon dioxide and sunlight.

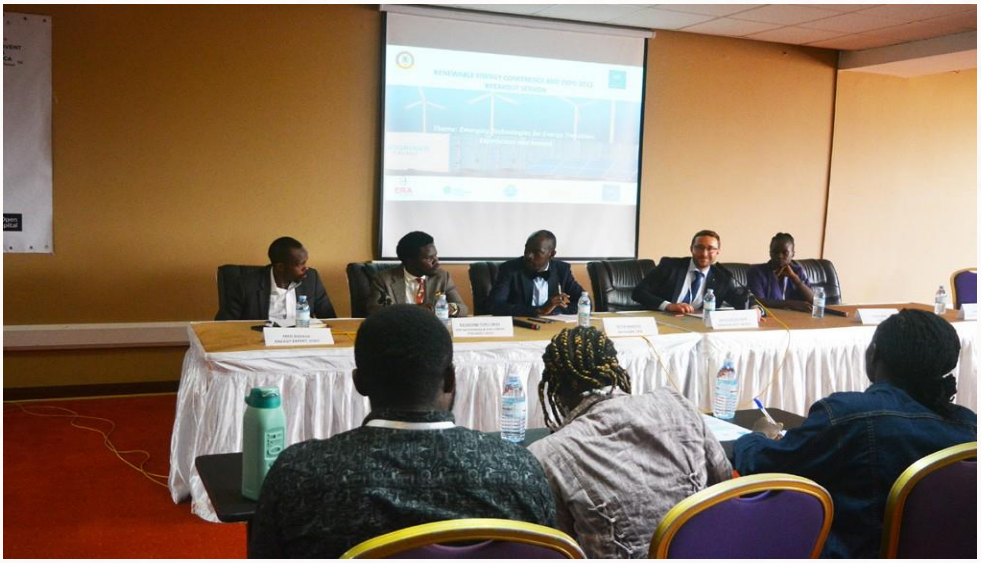
Addressed the cost of technology transfer, partnerships, mindset about technologies, technology trends, market readiness and the role of the governmentin technology transfer from Global North to South.

Alluded to the fact that the average technology transfer cost is nearly 20% of total project costs. Pointed outthat technology transfer requires deliberate and costly action between countries derived from the effect on production, wages, prices and welfare of lower transmission and absorption costs, and productivity and population shocks. Also highlighted that Africans and Ugandans in particular have a mindset that technologies are brought from Global North to South with indirect intentions, which is not the case. Emphasized that people are conservative to new technologies e.g., the use of an electric pressure cooker which would be accepted easily where technology is market driven. Alluded to the fact that Global South to North technology transfer can actually be financed into practicability. Discussed new technologies such as hydrogen production and adoption in Uganda. Emphasized that the market for hydrogen in the Global South is ready and fertile enough. However, pointed out the limitation of capital to procure the technology. The government of Uganda was applauded for taking steps in

ensuring that the need for technologies is funded and supported by setting up a conducive policy environment. Highlighted that an Act was developed to support production and distribution of biofuels. Likewise, the government was commended for the continuous support towards capacity building in the energy sector through partnerships with development partners and universities.

Recommended partnerships and involvement in research as measures of easing technology transfer and adoption in the Global South. Also alluded to the need for extensive awareness and sensitization campaigns about new technologies and their benefits to the citizenry of the Global South. Furthermore, it recommended that financing could foster community acceptance of the ideas and innovations. Emphasized that financing of incubators in the Global South could attract partnerships and international organizations for development and deployment.

■ 2.2.2. Emerging Technologies for Energy Transition: Experiences and Lessons



Moderator: *Ms. Sana Musanje* - Country Representative for HDF Energy

Keynote Speaker: *Hon. Maria Kiwanuka* - Presidential Advisor on Finance delivered the keynote speech.

Panelists: *Mr. Nicholas Lecomte* - General Director for HDF Energy, *Mr. Fred Barasa* - Energy Expert at GGGI Uganda, *Mr. Desmond Tutu Opio* - Senior Monitoring & Evaluation Specialist at UECCC, *Ms. Eileen Lara* - Head of Solar at CREEC, *Mr. Daniel Malinga* - Principal Engineer at ERA.

Featured distinguished investors, developers, and government entities that shared experiences on policy, regulation, investment and finance, research, and developing energy projects in Uganda and recommendations that African countries should adopt to achieve a sustainable energy transition.

Discussed energy technologies such as Green Hydrogen. Addressed the potential of green hydrogen, financing of emerging technologies, grid stability, market status, safety, regulations and policies for the case of Uganda.

Emphasized that green hydrogen is a silver bullet to beat the 2050 projected deadline to reduce emissions by double the current levels. Noted the prevailing need to have green firms as stand-alone, providing both generation and storage facilities in order to enable sustainable utilization of renewable energy. In addition, it was highlighted that green hydrogen infrastructure makes sense now due to increased funding from the global superpowers (Europe). Pointed out that 18 financial entities in Uganda such as Stanbic Bank, Equity Bank, Centenary Bank, among others, were facilitated to develop stand-alone renewable energy products to boost renewable energy technologies uptake. Also noted that some projects are not bankable because they do not have inhouse organization such as bookkeeping, which is an indication that capacity building and technical assistance are still needed

in the energy sector.

Noted that national research to aid in identification of the viability of green hydrogen energy in Uganda is set to be done to determine the potential of Hydrogen production available to guide investors and concerned parties. Also indicated that assessment was ongoing to examine the grid stability in case of blackouts and unreliability of the national grid. Further noted that HDF Energy prospects to be the largest green energy producer involved in developing hydrogen cells, clean cooking with hydrogen as well as interacting with institutions through research, demonstration and innovation.

In regard to ensuring safety of hydrogen production and distribution in Uganda, it was alluded to that there are health safety codes, primary grid safety code and electricity grid code in place. To support the development and deployment of green hydrogen in Africa, it was pointed out that HDF Energy is investing USD 170 Million in a Hydrogen plant in Namibia, which is set to be the largest in Africa. Likewise in South Africa, HDF Energy had set aside USD 3 Billion to substitute coal powered generation firms.

Recommended the development of a national hydrogen strategy to guide the public and private sectors. Also, suggested coerce funding and investment set policy priorities for green hydrogen energy to be produced i.e., industry-specific and an enabling conducive environment for equitable financing and recovery of funds by investors. Recommended a certification scheme to track the green hydrogen from generation to end-use, especially focusing on ensuring it is produced from green sources. Emphasized that the government should boost research on green hydrogen and other energy technologies to avail data that may attract funding, enabling local context-specific solutions in the industry to apt its utilization. Highlighted the need to look at the risks associated with generation and use of these new green technologies to adopt them into the national safety framework.

■ 2.2.3. Waste to Use Approaches: A Case of Uganda

Moderator: *Mr. Tom Sengalam*a - Team Leader at UNDP

Panelists: *Ms. Paula Coetze* - Stanbic bank, *Ms. Rhoda Nyaribi* - Mbale City, *Eng. Johnson Amayo* - Deputy Executive Director, NWSC, and *Joel Kagina* - Manager Waste and Sanitation, KCCA

Presenster: *Dr. Miria F. Agunyo* - NAMA Biogas Project implemented by the Ministry of Energy and Mineral Development, *George Asiimwe* - Senior Urban Manager, NAMA Biogas Project, *Dr. Collins Okello* - Dean, Environment and Agriculture, Gulu University

Pointed out that urban authorities in Uganda continue to grapple with overwhelming volumes of waste due to high population growth rate (3.1%) and urbanization rates (5.4%). Emphasized that the waste problem is exacerbated by unsustainable waste management practices which can be characterized as rudimentary with minimal recovery from the different waste streams. The discussion was geared towards finding solutions to barriers impeding development of the waste to energy value chain in Uganda.

Two presentations were made in this session. They highlighted the experience of the NAMA Biogas project in its quest to improve waste management practices in urban areas of Uganda through introduction of Integrated Waste Management and deployment of biogas to electricity plants as sustainable waste management systems and the status of waste management in Kampala Capital City Authority (KCCA).

Noted the challenges facedby urban authorities in waste management. Recommended possible solutions using the success of established biogas to electricity plants at the National Water and Sewerage Corporation and ongoing research in waste to energy systems at Gulu University while Stanbic bank demystified the issues regarding financing models for renewable energy projects.

Noted major challenges impeding development of the waste to energy value chain included inadequate policies that promote waste to energy systems at central and local government levels, lack of technical capacity to develop bankable renewable energy projects, lack of technical capacity to plan for, operate and maintain high-level technology and large-scale waste to energy systems, bureaucracy in permitting, licensing and project development for waste to energy systems in urban areas, and lack of access to finance for waste to energy projects.

Recommended the amendment of the electricity policies and laws to provide for alternative models for generation and sale of electricity, streamlining of the licensing and permitting procedures for waste to energy projects in Uganda, designing of business models thatclearly show risk allocations. Also, highlighted the need for increased government support for renewable energy projects and an investment plan for the private sector in the waste to energy value chain. Further recommended strategic partnerships, awareness and capacity building on waste to energy conversion.

■ 2.2.4. Internet of Things: Knowledge Gaps and Data Management towards Energy Access

Moderator: *Eng. Simon Peter Ssekitoleko* - Assistant Commissioner at the Ministry of Energy and Mineral Development.

Panelists: *Dr. Ernest Mwebaze* - Executive Director at Sunbird AI; *Ms. Emily Nakazzi* - Manager of Business relations at NITA-U; and *Dr. Mary Suzan Abbo* - Managing Director at Centre for Research in Energy and Energy Conservation.

Alluded to the fact that the internet continues to present many opportunities in service delivery in the public and private sector, business management, industrial revolution, through improved data collection, processing, storage and accessibility of small to large data sets. Noted that Artificial Intelligence, an upgrade of computer systems to perform some tasks normally requiring human intelligence, has also been identified as an opportunity for enhancing planning and decision making in the renewable energy sector. Discussed the challenges, lessons and opportunities in Uganda's information technology sector.

Noted that the Government of Uganda through the National Information Technology Authority (NITA-U) is implementing the UGhub systems and data integration platform in order to integrate individual internet systems of central and local government authorities. Further emphasized that through this integrated system, artificial intelligence is envisioned to be applied to enhance timely data collection, capacity gaps assessments and hence planning for the renewable energy sector. To achieve an efficient integrated system, it was highlighted that challenges experienced are identified and potential solutions and opportunities available to the private sector are noted.

Pointed out the challenges experienced in developing an integrated internet knowledge management system such as scanty and unreliable data sources, inaccessibility ofdata, inadequate infrastructure, inadequate technical capacity in pertinent fields including GIS. Highlighted milestones so far achieved by the government in integrating data systems through the internet of things that include enactment of the Data Protection and Privacy Act 2019, implementation of the national integration system which currently has about 22 banks and 50 government authorities; integration of government system over4,000 km of fiber and Wi-Fi hotspots have been extended nationwide. Among the opportunities alluded to were commercialization of the different steps in the value chain which is a source of employment especially when large data sets are involved and the enormous partnerships with the public-sector in-service provision.

Recommended the strengthening of the current regulatory framework to alleviate fears of security especially with services that require outsourcing and the need to translate user information to different languages where possiblefor increased consumption,human capacity development, capital development and enhancement of network infrastructure to enhance data acquisition, analysis, storage and accessibility concerns.

■ 2.2.5. Essential Minerals Dialogue

Moderator: *Ms. Loyola R. Karobwa* - Mining Lawyer at the Directorate of Geological Survey and Mines of the Ministry of Energy and Mineral Development

Panelists: *Mr. Chris Lubangakene* - Assistant Commissioner Laboratories; *Mr. Bwesigye Don Binyina* - Executive Director of Africa Centre for Energy and Mineral Policy; and *Ms. Suzan Nakanwagi* - Research Associate and PhD scholar at the University of Dundee.

Discussed Uganda's mineral resources. Indicated that the recent geo-data from nation-wide surveys shows that Uganda has large underexploited mineral deposits and rare earth elements. Also pointed out that Uganda has significant quantities of clay and gypsum. Whereas minerals are used in a range of industries for different purposes, it was highlighted that there are *critical minerals* which are used for manufacturing/ fabricating renewable energy technologies and appliances. It was emphasized that these critical minerals have two properties: they are essential for the functioning of modern technologies and economies; and their supply has a potential to be disrupted by natural or human factors. Discussed the status of critical minerals and geothermal resources in Uganda, opportunities that are yet to be tapped into by the private sector and made recommendations for development of the sector.

Brought to the attention of the participants that the Government of Uganda has recently passed the Mining and Minerals Act 2020 in order to regulate activities in the Minerals sector. Also noted that aspects of exploration, licensing, lease of land for mining activities, local content, exportation of unprocessed minerals and extraction of mercury were provided for in a bid to enhance private sector investment while protecting rights of the local population. However, it was also noted that African countries are implementing individual policies and regulations on minerals which in some instances

are conflicting. It was also highlighted that the mineral sectors of African countries are at different levels of development. Pointed out some of the critical minerals that have been explored in Uganda which include copper, tin, tungsten, tantalite, graphite, lithium and others.

Noted the main geothermal energy resources for Uganda, namely, Katwe-kikorongo in Kasese district, Buranga in Budibugyo district, Kibiro in Hoima district and Panyamoi in Nebbi district. It was also highlighted that studies indicate that Uganda has a potential to generate 1,500 MW from its geothermal resources. However, it was pointed out that there is a need for strategic partnerships to enable investment in infrastructure. Furthermore, it was also noted that the government has put in place actions to promote further exploration of the geothermal and mineral resources. In addition, it was highlighted that a geothermal resources map of Uganda, a profile of critical minerals detailing their location and possible quantities will be produced soon. The two instruments will provide more information for private sector investments.

Recommended that sector stakeholders should interest themselves in geothermal energy development and deployment. Also called upon the government to support nascent energy technologies through incentives and championing awareness and sensitization campaigns. Furthermore, the government was called upon to financially support geothermal technology development in the country. Recommended capacity building and technical assistance to enhance the skills and knowledge about these critical minerals in the country.

■ 2.2.6. Energy Advancement: Modern Charcoal and Biofuel

Moderator: *Ms. Zainabu Kakungulu* - Program Officer, Sustainable Charcoal Value Chain Project at FAO Uganda

Panelists: *Dr. Nicholas Mukisa* - Deputy National Coordinator at NREP, *Mr. Michael Ahimbisibwe* - Principal Energy Officer at MEMD, and *Mr. Harry Oryema Langalanga* - Chairperson Board of Directors at Uganda National Biogas Alliance (UNBA).

Discussed Uganda's biomass energy subsector. Emphasized that the implementation of regulations for charcoal and biofuels production and deployment is highly desired. Pointed out that the production and use of charcoal and biofuels is ongoing unregulated across the country. It was noted that it is important to safeguard against use of high value tree species and food crops for fuel production. Discussed the requirement for policy and regulatory frameworks to govern the subsector.

The discussion highlightedthe ubiquitous reliance of the Ugandan population on biomass fuels (charcoal and firewood) for cooking which currently exceeds 80%,which has negative social, economic and environmental consequences. Pointed out the urgent need for the government to consider inclusivity in the energy transition.

Noted the existence of biofuels regulatory frameworks but decried the lack of a commensurate institutional arrangement to enforce or implement the regulations.It was highlighted that this has led to the neglect of the sub-sector that has resulted in overexploitation of available resources to fill the energy gap and also environmental degradation. Also noted the competitive demands on agricultural crops for provision of bioenergy and food, and the need for proper delineation of crops for biofuels to ensure both food and energy security.

Emphasized that there are immense possibilities existing for producing clean energy from available abundant biomass resources if only proper and relevant enabling policies, operational technological arrangements as well as proper standards were in place and followed.

Pointed out the major challenges to biogas adoption as lack of enabling policies to transport or share biogas fuel by big producers, lack of packaging technologies to package biogas fuel, absenceof standards and policies to develop commercial biogas systems.

It was noted that the Uganda National Biogas Association (UNBA) signed a memorandum of understanding (MoU) with the German Biogas Association to boost capacity, share ideas and grow the biogas energy in Uganda. It was highlighted that the MoU addresses technology transfer, capacity building in institutions and developing standards for biogas generation. Youth placement in internships was identified as a good strategy for technical skills development among the youth.

Recommended focus on sustainable production and use of wood biomass in the medium to short term, enhanced implementation and enforcement of regulationsin the biomass sub-sector to protect invaluable naturaltree species and to ensure sustainable production for energy and food, formulate meaningful and actionable cross or multi - sectoral policies in consultation with the private sector as well as the general public. Emphasized an urgent need to address the sustainable issues as well as enhancing the transition to cleaner fuels. Furthermore, recommended awareness and sensitization of citizens about the different biomass energy technologies and benefits.

■ 2.2.7. Renewable Energy Innovation Challenge 2022 (REIC22)

Moderators: *Mr. Patrick Mugisha* - ILA, *Ms. Pearl Nimusiima* - Bid Capital Partners, and *Mr. Paul Collins Okello* - UN Women.

Emphasized that most developing countries including Uganda do not invest as much as is required to support innovations in renewable energy. Also, noted that legislation on patents and intellectual property rights is not fully understood, neither known by the public. Further pointed out that incentives and partnerships for advancing prototypes are also few. In order to spur innovation in the renewable energy sub-sector, it was highlighted that the Ministry of Energy & Mineral Development with support from UN Women and Innovent Labs Africa (ILA) inaugurated a Renewable Energy Innovation Challenge (REIC22) under the theme '***Catalyzing innovations for high-impact renewable energy solutions***' at REC22 & Expo.

Pointed out that the 3-day session consisted of an ideathon, a hackathon and innovation masterclasses that commenced on 3rd November, 2022 and ended on 5th November, 2022. Noted that the 3-day sessions were precluded by a call for innovative ideas which commenced on 7th September, 2022. Highlighted that the aim of the sessions was to build the capacity of young innovators in business development in the renewable energy sector through training and networking. Participants were invited to take part in the three days' sessions at the REC22 where capacity building and learning took place through innovation masterclasses.

Emphasized that the call for innovative ideas focused on six themes which included energy efficiency and energy technology development and deployment; data, information and knowledge management; advances in rural electrification and off-grid options; energy transition and development; integrated development of renewable energy and oil & gas; energy in emergency, refugees and host communities. Some of the topics covered included intellectual property management, competitiveness and investment readiness, and gender equality in the energy transition respectively.

Noted the issues that emerged from sessions as inadequate mentorship in innovative approaches for renewable energy solutions, inadequate strategic partnerships to develop renewable energy solutions in terms of financing, marketing and business development, lack of capacity to conceptualize gaps in service provision or technology development in the renewable context including failure to identify low hanging fruits in non-conventional aspects of the renewable energy value chain i.e. energy efficiency.

Twenty-four proposals canvassing the six were received and thirteen were selected by two independent judges. Thirteen proposals were then assessed by 3 independent judges where winners were selected based on the criteria of technical feasibility, level of innovativeness, replicability/ scalability, transformational potential, potential for livelihood creation (poverty reduction), and potential for gender equality.

The winning proposals were awarded as summarized below.

SN		Name	Theme	Project title
1	Winner	Nuwagaba John Charles	Energy Efficiency and Energy Technology Development and Deployment	Solar Water Pump
2	1st runner up	Kauta JohnBaptist Eshana	Energy Efficiency and Energy Technology Development and Deployment	A pay power system that allows power in shared spaces to pay for only what they consume
3	2nd runner up	Chen-Chen Cornelius	Energy Transition and Development	Powerful DC Kettle
4	Best Female Award	Sarah Nakaziba	Data, Information and Knowledge Management	Inro Ya Nishati

Post innovation challenge support in business development will be provided to the winners for a period of three months, starting from mid-November, 2022. Highlighted areas of support include business coaching, mentorship and training on product development, business modeling, market analysis, comparable product analysis and value proposition.

■ 2.2.8. Recommendations

From the different sessions held under the thematic area "*Technology, Capacity Building and Innovation*", the following recommendations emerged across the sessions.

- Establish partnerships and collaborate with the Global North to develop and deploy technologies. Maximizing partnerships by working in collaboration with other stakeholders was emphasized as one of the ways Uganda could accelerate its energy transition, particularly by developing nascent energy technologies.

- Improve financing to foster community acceptance of the ideas, innovations and attract partnerships and international organizations for development and deployment. Emphasized development of renewable energy solutions in terms of financing, marketing and business development.

- Conduct national research to aid in identification of the viability of nascent energy technologies in Uganda to determine their potential. Gathered data would be crucial in attracting funding and enabling local context-specific solutions in the industry to apt its utilization.

- Conduct extensive awareness and sensitization campaigns about new technologies and their benefits to the citizenry of the Global South. Awareness on the different clean energy technologies will amplify their diffusion in the communities and foster national energy transition. The government should champion awareness and sensitization campaigns for renewable energy technologies.

- Support nascent energy technologies through capacity building and technical assistance. Capacity building and technical assistance will enhance the skills and knowledge of the sector players about clean energy technologies which will ease their adoption and maintenance across the country.

- Amend the electricity policies and laws to provide for alternative models for generation and sale of electricity. Also, streamline the licensing and permitting procedures for nascent energy technologies in Uganda. Likewise, the government should develop national strategies for nascent energy technologies like green hydrogen and waste to energy.

- Strengthen the current regulatory framework to take the edge off fears of security especially with services that require outsourcing and translating user information to different languages for increased consumption, human capacity development and improving network infrastructure to enhance data acquisition, analysis, storage and accessibility concerns.

2.3. Energy Finance

■ 2.3.1. Financing Energy Entrepreneurs and Markets in Uganda

Moderator: *Ms. Maud Watelet* - ElectriFi Senior Investment Officer, EDFI MC

Keynote Speaker: *H.E. Jan Sadek* - Ambassador of the European Union to Uganda

Panelists: *Ms. Caroline Nijland* - Finance Catalyst of GET.Invest, *Mr. Lenart De Ridder* - Team Leader for Infrastructure at the EU delegation in Uganda, *Dr. Brian E. Isabirye* - Commissioner Renewable Energy Department at MEMD, and *Ms. Waringa Matindi* - CEO at Village Energy.

Alluded to the fact that Uganda is endowed with abundant renewable energy resources. However, it was stated that the development andutilization of these resourcesis lagging. Discussed advancedinnovative and inclusive joint public private collaborations to support renewable energy entrepreneurs committed to accelerating clean energy access in Uganda.

Highlighted that the EU is stepping up its developments by investing in different projects across the world to increase the use of clean energy. During this session, the EU delegation **officially launched the ElectriFI Uganda countrywindow** (*ElectriFI is a closed facility focused on access to energy in frontier markets investing where there is no access to on-grid or off-grid electricity*). Highlighted that ElectriFI Uganda is intended to support investment in different renewable energy projects, generating capacities from sustainable energy sources and creating new jobs like training solar technicians. Further noted that ElectriFI Uganda also has incubation grants support, scaling up operations that bring in development and initial growth that triggers balancing finances. Likewise,it was hinted that GET.Invest is another European Programme that consists of a pipeline of investments for ready projects. It was also indicated that GET.Invest provides advisory services to project owners and organizes studies that address capacity building.

Alluded to the fact that the government of Uganda has created an ideal environment for energy technologies in clean cooking and clean energy. However, the government was called on to demonstrate that the different technologies are important to the people. Also, for the rural areas where people are poor, the government was tasked to take a key role in connecting off-grid energy systems to curb the reliance on traditional biomass.

Generally, the discussion alluded to the fact that the renewable energy sector has to be supported with good policies and regulations. Suggested

that the government should provide incentives to the end-users of renewable energy, create awareness on energy products and carry out research on issues affecting the sector. Furthermore, companies were encouraged to improve the quality of products, comply with taxes and standards in order to build trust and confidence of their clients.

Recommended that Africa ought to define what and where they are transitioning from.

Also, it was recommendedthat energy businesses should work on their projects to ensure bankability as well as bookkeeping to easily secure funds from financing institutions. Highlighted that African businesses, particularly in Uganda are not at the level of the ticket size financing offered by the different international organizations. Thus, it was recommendedthat financing organizations should modify their fund sizes to accommodate all interested

clients. Financing institutions were called on to occasionally organize financial literacy sessions for their potential clients to equip them with the basic financial management skills and knowledge. Noted that awareness on the available financing facilities by the target clients is still wanting. Thus, recommended awareness and sensitization campaigns to advance financing acquisition and access by energy sector players.

■ 2.3.2. Energy Financing Vehicles

Moderator: *Mr. Douglas Baguma* - Board Chairman at Uganda Solar Energy Association

Panelists: *Ms. Specioza Ndagire* - Managing Director at UECCC, *Mr. Julius Magala* - Energy Access Coordinator at UNCDF, and *Mr. Louis Arinaitwe* - Country Director Department for International Trade at BritishHigh Commission.

Noted that as distributed renewable energy crossesinto the mass rollout, off- grid options become critical to accelerate adoption and advance rural electrification alongside grid extension. Discussed the existing gaps in energy financing and what the different players

i.e., government and donor communities e.g., United Nations Capital Development Fund (UNCDF) are doing in addressing the barriers. Identified energy access barriers that include affordability issues, policy framework gaps, regulatory bureaucratic process, and a high taxation

regime for renewable energy technology.

Alluded to the need for development of financing facilities and initiatives to advance the energy transition in poor countries. Highlighted the government initiatives through

its agencies like Uganda Energy Credit Capitalization Company (UECCC) that have put in place innovative customer-oriented facilities, for example, financing programs to solve energy affordability barriers like Loan schemes for solar equipment through Commercial Banks. Also, partnerships with grass-root based service providers like SACCOs, microfinance companies to support thesector by providing clients with very low-cost loans in order to access solar lanterns. Noted the concern of high interest rates (≥ 20%) and to address this, it was mentioned that the government embraced programs like the Global Energy Transfer Feed-in Tariff (GET-FiT) Programme to make projects bankable and feasible at affordable power costs. It was also indicated that UNCDF is working with the Uganda Solar Energy Association (USEA) on policy advocacy to address issues of taxation applied to Solar Technologies. Likewise, it was reported that UNCDF provides technical assistance (like training in financial management) and business models for companies involved in renewable energy. Pointed out that there is a good amount of funding and low-cost loans at the institution that people should embrace i.e., at UECCC. Recommended the necessity of organizations e.g., UECCC, UNCDF, etc. to create partnerships and work together to reduce scenarios of bureaucracy and share information about each otherto create awareness amongst the targeted clients. Also highlighted that technical assistance should be taken seriously to ensure consistency and understanding of renewable energy technology implementation. Finally, recommended private sector players to ensure bookkeeping is well done prior to applying for funds from financing organizations.

2.3.3. Recommendations

From the different sessions held under the thematic area "*Energy Finance*", the following recommendations emerged across the sessions.

- Government should support the development of the sector with good policies, provide incentives to end-users, champion the creation of awareness, and lead on research in the sector. Government should make the standards mandatory by enforcing a certificate of compliance for all energy sector actors to uphold the quality of products and services in the country.
- Energy businesses should refine their renewable energy projects to ensure bankability to easily secure funding from financing institutions. Bookkeeping by businesses should be prioritized.
- International financing organizations should modify their ticket funding sizes to accommodate varied sizes of interested clients' projects. Local financing organizations in renewable energy sector e.g., UECCC, UNCDF should create partnerships and work together to reduce scenarios of bureaucratic red tape setbacks, and share information about their activities to clients
- Financing institutions should occasionally organize financial literacy sessions for potential clients to offer basic financial management skills and knowledge on available financial facilities
- Pay heed to technical assistance to ensure consistency and understanding of renewable energy technology implementation

2.4. Policy, Planning, and Partnerships

■ 2.4.1. Bold Conversation: Transformative Energy

Moderator: *Eng. Simon Kalanzi* - Commissioner Energy Efficiency and Conservation Department at MEMD

Panelists: *Mr. David Othieno* - Cluster Coordinator and Head of Program at GIZ Uganda, and *Ms. Dagmar Zwebe* - Country Representative at GGGI Uganda.

Noted that Uganda ratifiedthe Paris Agreement in 2016 and has recently revised its Nationally Determined Contributions from 22% to 24.7%. Highlighted that the Energy sector is one of the key emitting sectors because energy is a driver for other sectors of the economy including agriculture. Also pointed out that central to achieving the revised emission reduction target is the transition to clean energy. However, it was noted that transition is unique to different countries.

Discussed greenhouse gas emissions, water-energy-food nexus, climate change, energy planning and deployment from the development partner's perspective. Explored howto accelerate clean and sustainable energy access that leverages the water, energy and food nexus. Highlighted the fact that conversion of land use to agriculture, use of fertilizers during food production and poor food waste management contribute to greenhouse gas emissions. Pointed out thatthe high population growth rate (3.1%) for Uganda means that the demand for food will continue to increase hence more emissions from the agricultural sector. Emphasized that coordination of water, energy and food nexus is key in dealing with the effects of climate change.

Affirmed their organizations' commitment to supporting and facilitating energy transition in Uganda. Highlighted some of their organizations' activities dedicated to supporting energy transition such as capacity building, technical assistance, awareness campaigns and others. Appreciated the government for the existent conducive working relationship that enables development partners to support the energy sector.

Recommended that the nexus between energy, food and climate should be explored, among other strategies, through waste to energy projects whose potentialhas not yet been harnessed. Called on the government to investigate and invest in waste to energy conversion technologies in order to quick start the rollout of such projects across the country. Highlighted that integratedenergy planning in the different sectors will ensure an energy mix that promotes optimum exploitation of renewables and petroleum resources while observing a low carbon path. Noted the necessity to engage all stakeholders at all stages of energy planning.

■ 2.4.2. Clean Cooking in Energy Planning

Moderator: *Mr. James Baanabe* - Consultant at MECS

Panelists: *Dr. Anna Clements* - Research Lead for Uganda and Tanzania at MECS; *Mr. Kato Moses* - CEO at PowerUP; *Mr. Peter Mwesiga* - Project Lead at Umeme, *Ms. Agnes Naluwagga* - Regional Testing and Knowledge Center Coordinator at CREEC, and *Ms. Justine Akumu* - Energy Officer at MEMD.

Highlighted that in order to match the global need for clean cooking, there is an urgencyfor increased energy planning and investment. Indicated that increased capital and public-private partnerships could help millions of people to gain access to modern energy for cooking by 2030. Explored investment and market trends (i.e., for electric pressure cookers, solar cookers, etc.), spotlighted business model innovations in the sector, and discussed emerging market drivers and hindrances. Also explored the e-cooking supply chain opportunities in Uganda.

Discussed the integration of clean cooking in energy planning, the opportunities and barriers to the uptake of clean cooking technologies, the different strategies to increase adoption and affordability for clean cooking, and the environmental and social benefits associated with clean cooking. Highlighted the need to transit from the use of solid biofuels for cooking and to decrease carbon emissions from biomass and reduce environmental degradation while improving health conditions of the population.

Shared the different challenges faced in acquiring and using clean cooking equipment especially the electric pressure cookers (EPCs). Pointed out the perceived high upfront cost of the appliances to theaverage households, the lack of awareness on the equipment and funding opportunities, the less dependable availability of electricity and the lack of consistent International Standards on EPCs.

Recommended that the government and powerutilities should increase availability and accessibility to dependable and good quality power. Highlighted the necessity to carry out sensitization to create and increase awareness among the population on the advantages of using EPCs. Encouraged business enterprises to adopt innovative financing strategies. Recommended subsidization schemes to enhance adoption of clean cooking technologies like EPCs. Also, called for the incentivization of the private sector to set up manufacturing infrastructure for EPCs in the country.

■ 2.4.3. Consolidated Infrastructure and Policy Support for E-mobility

Moderator: *Mr. John Paul Asiimwe* - National Planning Authority

Panelists: *Mr. Jakob Hornbach* - CEO at Bodawerk, *Allan Muhumuza*- Team leader at Science Technology & Innovation Secretariat, *Eng. David Birimumasso* - Acting Assistant Commissioner EECD at MEMD and *Ms. Juliana Lanyero* - CEO at Cloud green.

Noted that globally, the automotive future is looking increasingly electric due to growing regulatory moves, including forthcoming bans on sales of internal combustion engine (ICE) vehicles, shifting consumer behavior, and ongoing improvements in battery and charging technology. Highlighted that the transport industry is one of the leading energy consumers and carbon emitters globally. Pointed out that with the high traffic congestion in the Global South, cleaning up this industry is urgent. Discussed experiences of E-mobility on a global scale from manufacturers, regulators and users highlighting the challenges and opportunities of the Global South.

The discussion revolvedaround transport as a key contributor to greenhousegas emissions. Advised that e-mobility is a greener and cost-effective technology alternative compared to fossil fueled vehicles. Noted that in an effort to promote the uptake of e-mobility in the country, these key areas, namely, development of supportive infrastructure; formulation of supportive policies; promoting local manufacturing of e-bikes and buses; integration of e-mobility in administrative plans of urban areas should be prioritized.

Mentioned key issues of concern about fossil fuels such as fluctuation of prices, uncertainty in supply and pollution. Alluded to the fact that e-mobility presents an opportunity to improve the resilience of livelihoods of people who earn a living from the transport sector. Noted that as a new technology, e-mobility faces challenges of unclear governance, limited awareness and inadequate market research.

Some of the recommendations included the development of policies and guidelines for the wide range of e-mobility alternatives including road and water transport as well as incorporating carbon financing mechanisms to subsidize the cost of investments.

■ 2.4.4. Productive Use of Energy and Commercialization

Moderator: *Mr. Perez Magoola* - Senior Analyst at Open Capital

Sector Presentation: *Mr. Leslie Munanura* - Project Development Program Officer at GIZ on "Sector analysis on the potential of Renewable Energy captive power projects in the C&I Space."

Panelists: *Ms. Carolyn Kirabo Nakajubi* - Project Manager at Environmental Alert, *Dr. Frank Ssebbowa* - Senior Advisor at UOMA, *Mr. Brian Kawuma* - Productive Use Coordinator at Power for All, *Mr. Joash Bwambale* - WASH Facilitator at Engineers without borders USA, and *Mr. Amos Tamusuza* - Senior Energy Officer at MEMD.

Paper Presentation: *Ms. Zoe Slattery* on "Productive Use Rural Cooling and Storage".

Highlighted that for decades, energy has majorly been used for lighting and cooking. However, noted that the application of energy to enhance productivity in different sectors of the economy is gradually being adopted. The productiveuse of energy in agriculture, health, and education was discussed by key players from the private sector, government and civil society organizations. Experiences, challenges, and recommendations to increase adoption of energy for productive use were deliberated upon.

It was reported that the phenomenon of productiveuse of energy is not fully understood especially in terms of technology deployment. Under the framework of Efficiency for Access, productive use encompasses any and all technologies that have relevance for economic and social impacts.

Productive use of energy in key sectors such as agriculture, education and health to enhance social inclusion, energy efficiency, optimum useof energy and innovationin service provision. Challenges faced in adoption of energy for productive use include shortfalls in market intelligence; sensitization; and inadequate access to relevant information were discussed.

Some of the recommendations that emerged from the discussion include enhancing theunderstanding of a technology's unique relevance through awareness campaigns; need for affordable pricing models of industrialization and production; need for strategic partnerships; establishing demonstration centers for productive use of energy and sensitization through community champions like local leaders, religious leaders, opinion leaders as well as policy makers in the government to shift responses, integrating policies and regulations for commercialization and productive use of energy.

■ 2.4.5. Energizing Uganda: Private Sector Experiences

Moderator: *Dr. Nicholas Mukisa* - Deputy National Coordinator at NREP

Panelists: *Mr. Rabin Das* - Country Director at SolarNow, *Mr. Rikki Verma* - CEO at Nexus Green LTD, *Ms. Sarah Babirye* - Project Coordinator at UNACC, *Ms. Stella Lunkuse* - CEO at Solar Nation and *Ms. Laura Cocoran* - Chief Business Development Officer at Aptech Africa.

Paper Presentations: *Dr. Muyiwa S. Adaramol*a on "Economic Viability of Grid-tied Solar for Households", *Ms. Nakiyende Hebert* on "Solar Fishing Technologies for Increased and Sustainable Fisheries Production", *Mr. Tonny Kukeera* on "Off-grid Energy Industry Post Covid-19 Crisis", and *Dr. Benard Jones* on "Farmers Enterprise Centres"

Alluded to the fact thatas of 2021, Uganda had about 57% of its population electrified, where the private sector contributed two thirds. Key private sector players shared their experiences in extending electricity access to the last mile user in Uganda. Also, discussed some of the mechanisms for advancing electrification from the private sector perspective. Highlighted how best to achieve Uganda's Vision 2040 electricity generation and consumption targets.

Noted that with the shift in focus from low incometo middle income earners, businesses were receiving increased income and have continued to receive good reports regarding the benefits from the consumption oftheir products. However, as part of the experience across Uganda over time, it was stated that solar cannot be an alternative to the grid power but a supplement. Noted that while affordability of systems is key, most businesses have no reverence for quality control but are rather more interested in profits. Further highlighted that the quality of installations and after-sale services are also a glaring concern because it determines functionality. Indicated that there hasbeen a lot of improvement in designing, engineering, lighting, tailor-made solutions and noted the need to involve the client in proper education about the system is important.

Alluded to the fact that there has been a gradual transition from traditional cooking systems to improved forms of cooking like LPG, Biogas and electric pressure cookers. Noted that an improvement had been registered in adoption of clean cooking energies, creation of awareness and addressing the issues of quality and clean cooking using solar systems. Mentioned that registered success was attributed partly due to the campaigns held at

national level by the government through the Ministry of Energy and Mineral Development, and development partners like GIZ and Modern Energy Cooking Services (MECS). Indicated that the electricity cooking tariff has become a tool of awareness and facilitating adoption of clean cooking technologies.

Cited some of the challenges hindering the uptake of clean energy that related to quality against cost of the product, stringent measures required by financial institutions to access financing, laxity nature of standards in the sector, a need to invest more in clean energy to produce more, sensitization at all levels to improve awareness and the elimination of brokers in the supply chain to increase the profits in approaches of reducing costs by dealing directly with manufacturers.

Recommended that the introduction of tax waivers and subsidies would encourage investors and consumers to take up clean energy. Also endorsed having standards made mandatory as well as stringent enforcement regulations to foster quality for both imported and homemade products. Also recommended collaborations and partnerships amongst the sector stakeholders. Finally, emphasized the need to increase awareness and sensitization of people about clean energy technologies.

■ 2.4.6. Policies, Regulations, Standards and Partnerships

Moderator: *Dr. Nicholas Mukisa* - Deputy National Coordinator at NREP

Opening Remarks: *Eng. Richard Ebong* - Senior Standards Officer at UNBS

Panelists: *Eng. Winnie Grace Onziru* - Senior Standards Officer at UNBS, *Mr. Hakim Muyanja* - Energy Officer at Ministry of Energy and Mineral Development, *Mr. Anthony Akatuchungura* - Officer at Biogas solutions Uganda and *Mr. Benard Mbaine* - Vice Chairperson Board of Directors at UNREEEA.

Highlighted key initiatives by Uganda National Bureau of Standards (UNBS) on standards promotion especially digitalization with most of the services offered such as UNBS certification, standards, scanning of products. Discussed the enabling environment in the renewable energy sub-sector for adoption and uptake of the RE technologies and services with the main focus on standards, policy frameworks which have been put in place by the key sector agencies and stakeholders. Deliberations included interventions in the sector to ensure that products are up to standards, adoption of biogas systems, policy environment and partnerships.

Noted efforts that are underway to equip UNBS laboratories and

to extend services across the country, regional UNBS offices were opened. Mentioned that solar standards are in place and code of practice for solar technicians is at the final stage.

Alluded to the fact that there is a skill gap amongst the technicians and artisans in the installation of the RE technologies. Emphasizedthe essence of implementing capacity building programmes, conducting research and working with financiers to provide funding would narrow down the skills gap. Likewise, collaborating with training institutions and curriculum development to regulate the training is vital at this stage.

About the performance of biogas systems in Uganda, it was highlighted that 30% of Biogas digesters are non-functional. To address these failure rates, it was noted that measures were in place to work with the locals and training institutions to track non-functional digesters and budget for repairs to benefit the digester owners and working with financial institutions to provide loans to farmers.

As a recommendation, in unison the discussants alluded to the fact that a certificate of compliance should be issued for the technicians and companies dealing in renewable energy technologies to promote quality services and products in the sector. Emphasized the essence of developing and adopting standards as well as designing financing facilities with longer grace periods and investing in the e-waste disposal.

■ 2.4.7. Integrated Energy Planning and Frontier Markets

Moderator: *Dr. Gerald Banaga-Baingi* - Assistant Commissioner Technical Planning at MEMD

Panelists: *Mr. Julius Magala* - Energy Access Coordinator at UNCDF, *Eng. Abdon Atwine* - National Electrification Strategy Officer at MEMD, *Mr. Godfrey Bahati* - Commissioner Geothermal Resources Department at MEMD, *Mr. Baguma Sabbiti* - Acting Assistant Commissioner Nuclear Department at MEMD and *Mr. Robbert R. Hoeboer* - Head GIS in Energy Resources Development at MEMD

Focused on integrated planning which looks at combining different sectors of energy, the resources to optimize outcomes and frontier markets which looks at new emerging energy markets. Noted that integrated markets involve long term master plan, databases, organization of structures and Energy transition which shows how to enhance energy usage of Uganda with a systematic plan/roadmap in terms resources and targets. Mentioned that frontier markets are classified as 1st class markets

which are traced in Europe and emerging markets which exist in India, South Africa and the rest of the world. Also discussed the context of Nuclear and geothermal energy. Noted the issues on access rate of energy in Uganda, the Uganda off-grid market, the enabling environment of the energy sector and energy funding.

Regarding the off-grid electricity sub-sector, noted that 32 solar mini grids have been commissioned so far. However, it was highlighted that government support, investors and development partners participation are still needed to boost the sub-sector. It was noted that by the end of the year of 2021 the sales for solar home systems were slow which was attributed to the recovery from impact of covid-19. Mentioned that PayGo model, an alternative mechanism which was introduced to kickstart growth of the renewable energy businesses also faced some challenges such as failure of businesses to qualify for financing due to inadequate management capacity. Also noted that funding is mostly skewed to international organizations and cook stove players from development partners and a few investors. Hinted that the government has put in place an enabling environment through policies and strategies to provide a framework for energy access like mainstreaming of REA into MEMD.

2.4.8. Recommendations

From the different sessions held under the thematic area "*Policy, Planning and Partnerships*", the following recommendations emerged across the sessions.

- Government should promote waste to energy projects as sustainable waste management strategies to minimize volumes of waste in urban centers that are exacerbated by poor waste management practices and minimal recovery. Also streamline the licensing and permitting procedures for nascent clean energy technology projects.
- Government should incentivize nascent clean energy technologies i.e., clean cooking technologies to enhance their uptake across the country to promote the environmental and social benefits associated with clean cooking.
- Government in partnership with sector stakeholders should champion awareness drives on clean energy technologies particularly clean cooking energy technologies, e-mobility, green hydrogen and waste to energy conversion technologies.
- Develop policies and regulatory frameworks for nascent energy technologies like clean cooking technologies, e-mobility, green hydrogen and waste to energy technologies. Also, adopt infrastructural development and carbon financing to support the rollout of nascent energy technologies in Uganda.
- Establish an information management system for energy resources to enable planning and development of plans which cater for different aspects of energy mix and build capacity of SMEs to compete for available financing products.
- Productive use of energy is not fully understood especially in terms of technology deployment hence there is need for understanding the different technology's unique relevance through intensifying awareness and sensitization campaigns as well as demonstrations and pilot projects across the country.
- Establish demonstration centers in partnership with other sector players for productive use of energy and nascent energy technologies. Likewise, engage community champions like local leaders, religious leaders, opinion leaders as well as policy makers to lead the sensitization campaigns in their communities.
- Empower and restock laboratories managed by UNBS, strengthen and harmonize the curricula of renewable energy training institutions to standardize the skill sets for technicians and artisans in the sector. Also, develop regulatory instruments such as certification for artisans and technicians. Adopt a certificate of compliance for all energy sector players.

2.5. Energy Transition

■ 2.5.1. Towards 100% Renewable Energy Transition by 2050

Moderator: *Mr. Micheal Ahimbisibwe* - Acting Principal Energy Officer Bioenergy at MEMD

Panelists: *Mr. Vian Mukisa* - Renewable Energy Manager at ECO, *Mr. Yonah Turinayo* - Program Coordinator at WWF, *Ms. Gloria Namande* - Programme Officer– Energy and climate Change at UNDP Uganda, *Ms. Virginia SSemakula* - Manager Energy, Environment and Climate at Equity Bank

Paper presentation: *Ms. Fiona Babukiika* on "Scaling Up Smart Buildings."

Highlighted that beyond Vision 2040, several scenarios have been investigated to forecast Uganda's 100% transition to renewable energy. Raised the significance of the need for sufficient and dedicated financial resources for renewable energy access, uptake and utilization to forecast Uganda's 100% transition to renewable energy. Recommended the settingup of a dedicated Energy Transition Fund to enable the energy transition. Alluded to the fact that there are finance vehicles used to reach theend-user, for example, Equity Bank through the Equity Green Loan. Indicated that for one to access the renewable energy technology system,they simply have to present the Local Purchase Order (LPO), then the bank finances the supplier and the end-user pays back in installments. Assured the participants that more financing models are coming up.

On addressing the human capital gap, emphasized that there is no action without research and there is no research without action. Suggested building behavior and mindset change programs, focus on research to close the knowledge gap between end-users and players in the sector, and ensure knowledge and experience exchange among technicians.

In conclusion, emphasized actualization of the role of Multi Actor Partnerships (MAP) in the renewable energy transition with reference to the quote "*coming together is the beginning, keeping together is the process and working together is the success*".

■ 2.5.2. Net Zero Ambition: Leading the Energy Transition Agenda

Moderator: *Mr. Okama Zion* - Senior Business Developer Renewables at TotalEnergies EP Uganda.

Online Presentation: *Mr. Jean Baptiste Chabert* on "Reliable, competitive and sustainable renewable energy solutions that TotalEnergies is implementing worldwide"

Ms. Yaël Wibaux on "Ambition of TotalEnergies to supply more affordable and reliable clean energy"

Alluded to the fact that net-zero equals more energy and less carbon, thus, the rebranding of Total to TotalEnergies because energy is reinventing itself. Mentioned that several developing countries in emerging economies have abundant energy resources, both renewable and conventional despite

their low electrification rates. Explored whether emerging economies should concentrate on developing renewable energies only or combine it with fossil fuel developments. Shared experiences, lessons and best practices from elsewhere for integrating renewable energy and conventional energy.

During the session, a Joint Development Agreement between the Government of Uganda and TotalEnergies was signed by *Hon. Okaasai Sidronius Opolot* - State Minister of Energy on behalf of the Government of Uganda and *Mr. Phillipe Groueix* - Country Chair Uganda on behalf of TotalEnergies. The agreement is envisaged to see the installation of one gigawatt (1 GW) of renewable energy, namely, solar, wind and Geothermal in Uganda by the year 2030. Emphasized that Uganda is one of the countries where TotalEnergies is contributing towards enhancing the energy transition.

Furthermore, TotalEnergies committed to develop suitable infrastructure to enhance the e-mobility drive in the country which will include charging stations among others. TotalEnergies was applauded and urged to consider youth inclusion given the enormous number of opportunities in skills development and employment surrounding the enhancement of the energy transition agenda.

■ 2.5.3. Energy Transition in Emerging Economies

Moderator: *Ms. Irene Pauline Bateebe* - Permanent Secretary at MEMD

Panelists: *H.E. Maria Hakansson* - Ambassador of Sweden to Uganda, *H.E. Elin Ostebo Johansen* - Ambassador of Norway to Uganda, *H.E. Mathias Schauer* - Ambassador of Germany to Uganda, and *H.E. Jan Sadek* - Head of the European Union mission to Uganda.

Discussed the energy transition and financing in emerging economies. Brought together representatives from different foreign missions working to accelerate the energy transition. Served as a call to action to develop financing facilities and initiatives to advance the energy transition.

On what Africa can learn from a just transition to 100% renewable energy, it was highlighted that a just transition is an opportunity to ensure recovery strategies. In pursuit of just transition, it was noted that focus should be on net-zero efforts through shifts in technology, investment

in energy efficiency and infrastructure as well as on mindset change.

Emphasized that pooling financial resources as well as developing a long-lasting energy plan to rely on own energy is crucial. Emphasized that private sector involvement and participation in energy planning and development atall stages is very important in support of sector coordination.

Noted that the private sector invests and plays a crucial role in the renewable energy sector. However, more security for investors is needed in terms of how they benefit from energy proceeds. Emphasized attracting investment through information systems to investors, institutional building to help obtain financial support, and cooperating with agencies like the International Energy Agency (IEA). Alluded to the fact that a holistic approach that includes stakeholders at all levels is vital in enhancing technology adoption. Hinted that the private sector supports compliance with standards as well as attracting international funds in the sector. Also, highlighted private sectorand government partnership through Public Private Partnerships are fostering energy development and access around the world and Uganda is no exception.

In closing remarks, highlighted that investments in renewable energy remain a big problem in Africa. Recommended that investments by the private sector to enhance the transition to clean energy deployment is crucial. Also, alluded to the urgency needed to pay attention to climate change. Emphasized that the time for a solid commitment to sustainable energy is now. Further recommended engaging in partnerships for a collective solution.

2.5.4. Recommendations

From the different sessions held under the thematic area "*Energy Transition*", the following recommendations emerged across the sessions.

- Set up a dedicated Energy Transition Fund to enable the energy transition. Regardless of the available financing facilities in the commercial banks, the energy sector continues to grapple with the challenge of access to finance that needs urgent attention.
- Build partnerships with the different actors for a collective solution. The Ministry of Energy and Mineral Development should work closely with the local government leaders as well as civil society organizations to advance the energy transition discussions and adoption at the grassroot level.
- Establish information systems to attract investors. Emphasis should be on collecting and consolidating sector data to ease planning and policy making. This undertaking will as well ensure financial security for the investor.
- MEMD should lead the awareness and sensitization campaigns on renewable energy technologies and their benefits to the livelihoods of Ugandans. Building behavior and mindset change programs to increase awareness and uptake are crucial in the energy transition phase.
- Focus on research to close the knowledge gap between users and players in the sector. Higher institutions of learning would work closely with the energy sector players to undertake research that speaks to the socio-economic and technical needs of people. Also, ensure knowledge and experience exchange among sector players.
- Come up with business models that reduce the cost of renewable energy technologies. Government should create a conducive business environment by adopting just andfair policies that support private sector investment in clean energy deployment.

2.6. Gender and Inclusivity

■ 2.6.1. Future at Stake! It is Time to Lead the Transition

Moderator: *Mr. Edwin Muhumuza* - CEO at Youth Go Green.

Panelists: *Ms. Julian Lanyero* - CEO at Cloud Green, *Mr. Paul Kamoga* - Project Manager for PAY-N-PUMP at Aptech Africa, *Mr. Allan Okello* - Head of Business Unit at Tukole Solar, *Mr. Hakim Owinyi* - Community Civil Educator and *Mr. Ronald Ogwang* - CEO at Tangaaza.

Convened young peopleand equipped them with the knowledge and resources needed to amplify and strengthen advocacy efforts for clean and just energy access. Tabled that young people can compete favorably to attain financing when their ideas and innovations are communicated and stipulated articulately to the financing platforms coupled with revision in the procedures undertaken toattain these grants.

Highlighted that the government can enable rural areas to access cleaner energy by enabling big prosumers to set up more renewable energy systems which should allow the price per kilowatt hour to drop and be affordable in the rural areas. With the climate crisis on the rise, it was deliberated that renewable energy can address thisissue through targeting daily energy consumers at the grassroots not limitedto the employment of clean cooking, sun-dryers and E-bikes.

With the net-zero agendaon the global rise, the panel discussed that the transformations should start in the rural context highlighting cultural revolutions such as putting a stop to bush burning, harvesting biomass as energy and encouraging tree planting drives. Noted that education drives about energy issues such as climate change and research are some of the ways noted to sensitize and create awareness to the local communities to improve their thoughts and facilitate mindset change. Embracement of practical knowledge in institutions of learning, hands-on training of users by the suppliers of renewable energy appliances were some of the recommendations suggested to help stakeholders level the platform for the unprivileged areas and people in Uganda. Translation of user manuals to local languages to improve usability and outreach of appliances was also suggested as a way to help simplify the renewable energy conversation. The government was also called upon to provide infrastructure through cell phone data and avail the necessary expensive tools to promote youth inclusion.

■ 2.6.2. In Her Voice: Energy in Hard-to-reach Areas

Moderator: *Ms. Joyce Nkuyahaga* - Senior Technical Advisor at USAID-PAOP.

Panelists: *Ms. Pia Hopfenwieser* - Project Manager at Endev-GIZ Uganda, *Ms. Elizabeth Mwerinde Kasedde* - Executive Director at Equity Bank, *Ms. Mary Immaculate Awor* - Partnership and innovations specialist at CARE Uganda, *Ms. Loy Florence Kyozaire* - CEO at SENDEA, and *Ms. Caroline Aguti* - Head Health, Safety and Environment at MEMD.

Paper Presentation: *Mr. Chinedu Miracle Nevo* on "Start-ups: Experience from elsewhere", *Dr. Miria Nakamya* on "Biofuels in Natural Resource Dependent Economy"

Highlighted that Africa leads the world in terms of the number of women business owners. In fact, women in Africa are more likely than men to be entrepreneurs. However, in Sub-Saharan Africa and other developing countries, it was noted that women's involvement in energy entrepreneurship isat a minimal level, yet they lead in the search for energy for cooking. Highlighted that women entrepreneur in Uganda lead only about30% of energy businesses. Discussed energy in hard-to-reach areas by considering women entrepreneurs.

Highlighted some of the challenges hindering women participation in the energy sector activities, the role of the government through MEMD in supporting women entrepreneurs, the role of commercial banks in financing women entrepreneurs, and the future of women in the energy space.

Noted that some of the hindrances to women entrepreneurs are limited access to capital assets, lackof ownership to financial resources, unfair social structural burden that requires women to take careof the whole family, and the gender stereotyping notion were highlighted as the key challenges. Called on the government to reduce taxes on renewable energy equipment for affordability, spearhead awareness on renewable energy and gender mainstreaming. Highlighted that the government set up the Uganda Energy Credit Capitalization Company that lends to energy sector stakeholders through commercial banks, e.g., Equity bank. Capacity building and technical assistance targeting women, particularly in rural areas were envisaged to enhance women participation in the energy sector.

■ 2.6.3. Energizing Refugee and Host Communities

Moderator: *Mr. Usamah Kaggwa* - Acting Assistant Commissioner at MEMD

Panelists: *Ms. Ruth Komuntale* - Managing Director at ECOCA and *Ms. Wieteke Daniels* - Director of programmes at Mercy Corps.

Paper Presentation: *Dr. Jackie Epila on* "Restoration of carbon in a degraded savannah".

Alluded to the fact that Uganda is currently a host to more than 1.5 million refugees with the number increasing every year. One of the basic challenges faced by both refugee and host communities is access to clean and reliable energy for cooking and lighting. Shared experiences from humanitarian, government and donor communities, the challenges in energizing refugee and host communities, and the recommendations for enhancing national response capacity for energy access.

Highlighted that Ugandais Africa's largest refugee-hosting country and 4th largest globally, with a long history of hosting refugees and asylum seekers since 1959. As of January 2022, Uganda hosted over 1,582,892 refugees (814,559 females and 768,333 males) from over 10 countries. Discussed how the activities of their organizations fit well in the Sustainable Energy Response Plan (SERP) of ensuring that Refugees and Host communities attain universal access to affordable, reliable and clean energy for socio-economic transformation in an environmentally sustainable manner.

Recommended that handling of refugee related energy needs should be effective in nature. That is, all partners need to communicate and collaborate clearly on their existing and planned programmes and investments in refugee-hosting districts. Noted that most districts hosting refugees are already vulnerable as a result of underlying poverty, limited resilience to shocks, limited capacity of local institutions and low levelsof human capital. Therefore, highlighted the importance for national and international actors to collaborate to ensure the refugee and host communities have a sustainable energy supply for development. Recommended that energy access programmes for refugee and host communities should be designed using an alternative approach to standard development programming, taking into consideration gender, age, disability and other vulnerabilities in refugee and host communities.

To reduce the affordability gap, it was recommendedthat financial incentives and easy payment modalities of renewable energy technologies should be developed to expand the market for increased access to quality energy products and services. Some of the highlighted aspects include subsidies, reduced taxes, and supplier incentives and guarantees.

■ 2.6.4. Energy Decentralization Sub-Regional Forum

Forum Chair: *Dr. Brian E. Isabirye* – Commissioner RED at MEMD

The Ministry of Energy and Mineral Development in partnership with GIZ organized the Energy Decentralization Sub-Regional Forum with the objective of sharing updates since the last forum in June 2022 and to work on the draft strategy to improvethe operation and maintenance of renewable energy systems in social institutions under District Administration.

The forum attracted a total of 54 participants, where 11 of them were female, from MEMD, Ministry of Local Governmentand District Local Governments. District Energy Focal Persons and District Planners came from the22 Decentralization Pilot Districts, namely, Adjumani, Agago, Amolatar, Alebtong, Apac, Arua, Dokolo, Gulu, Kitgum, Koboko, Kolo, Lamwo, Lira, Maracha, Moyo, Nebbi, Otuke, Oyam,Pader, Soroti, Yumbe, and Zombo,as well as from Obongi.

A special welcome was given by the Commissioner of the Renewable Energy Department.

After updates from the last forum were shared, the recently launched Sustainable Energy Response Plan (SERP) for Refugees and Host Communities, supported by GIZ, was presented. Further, updates on the on-going revision of the Energy Mainstreaming Guidelines for local governments were also shared and discussed.

Furthermore, focused on the situation analysis and draft strategy for Operation and Maintenance in social institutions. The participants jointly worked on case studies and discussed roles and responsibilities of the various officers involved from institution to Higher Local Government and even MDAs to improve sustainable functionality of any installed system and hence service delivery in the future.

The key meeting outcomes included participants alluding to the fact that they were well aware of SERP and requested for its implementation to be a Sub-regional Approach instead of District Centered Approach. Feedback to the updated Energy Mainstreaming Guidelines that are currently reviewed was shared. Furthermore, highlighted an elaboration of examples for an O&M structure for RE/EE technologies in social institutions. Also, networks were strengthened and two Ministry of Local Government officers who were recently appointed to join the Decentralization Task Force were welcomed to the community of Energy Focal Persons at MDAs and DLGs.

2.6.5. Recommendations

From the different sessions held under the thematic area "*Gender and Inclusivity*", the following recommendations emerged across the sessions.

- Government should reduce taxes on renewable energy equipment for affordability, provide infrastructure through cell phone data and avail the necessary expensive tools to promote youth inclusion.

- Government should spearhead awareness on renewable energy and gender mainstreaming. Given that the energy sector is dominated by men, it is paramount to have the Ministry of Energy and Mineral Development champion sensitization and creation of awareness on clean energy and entrepreneurial opportunities in the energy sector particularly amongst women and youth groups across the country.

- Develop capacity building and technical assistance packages targeting women and the youth, particularly in rural areas and refugee communities to enhance their participation in the energy sector.

- Collaboration and clear communication between national and international actors regarding their existing and planned programmes and investments in refugee-hosting districts to ensure the refugees and host communities have a sustainable energy supply for development.

- Energy access programmes for refugee and host communities should be designed using an alternative approach to standard development programming, taking into consideration gender, age, disability and other vulnerabilities in refugee and host communities.

- Practical knowledge in institutions of learning, hands-on training of users by the suppliers of renewable energy appliances should be embraced to help stakeholders level the platform for the unprivileged areas and people in Uganda. Translate user manuals to local languages to improve usability and outreach of appliances.

- Financial incentives and easy payment modalities of renewable energy technologies targeting women and the youth should be developed to reduce the affordability gap and expand the market for increased access to quality energy products and services.

2.7. Closing Ceremony

Renewable Energy Conference 2022 Awards (REC22 Awards)

As part of the REC22 Activities, there was recognition of the best performing sector players in the Renewable Energy sector for the year.

Below is the List of the winners.

No	Category	Award Winner
1	Development Partner of the Year	The World Bank
2	Partnership of the Year	Global Energy Alliance for People and Planet
3	Media Partner of the year	Next Media
4	Clean Cooking company of the Year	Bold Energy
5	PUE application of the Year	Agsol's rice mill/maize huller
6	Financier of the Year	UECCC
7	Solar Home System	Engie Energy Access
8	Mini grid Developer of the Year	Winch Energy
9	Utility Scale Project	Busitema 4MW solar project
10	Foreign Mission of the Year	Germany
11	Clean Energy Implementer of the Year	GIZ
12	Best Exhibitor of the Year	Nexus Green
13	Most Valuable Sector Player of the year	Hon Ruth Nankabirwa
14	Lifetime Achievement of the Award	Eng. Mulengeezi Moses

Closing Remarks

Remarks from Hon. Sidronius Okaasai Opolot, the State Minister for Energy at the Ministry of Energy and Mineral Development were delivered by Dr. Frank Ssebowa.

Appreciated the participants that attended the 3-day engagements of discussions and dialogue and appreciated the hard work, dedication, and the willingness to build consensus.

Thanked everybody and their teams for extraordinary and heroic efforts. In a special way appreciated the organizers for incredible work that had gone into making REC22 & Expo a huge success! Assured the participants that REC23 & Expo will be hosted in this same venue, in November 2023, and will be bigger and more exciting. Everyone is invited in advance!

Highlighted the achievements which were collectively delivered at REC22 & Expo which managed to bring together hundreds of stakeholders to share experiences, lessons learnt and best approaches for tackling the energy sector challenges and to foster renewable energy and energy efficiency adoption in Uganda. Highlighted the success of the event which managed to bring together more than 20 countries to participate.

Added that the Innovative recommendations for ambition and action by allof the participants had been highlighted. Recommended that the work must start now. Action and implementation to match ambition must continue!

Highlighted that the most critical challenge will be increasing access to affordable and patient finance.

Announced that TotalEnergies and HDF Energy had developed interest to engage in huge investments in renewable energies in Uganda at REC22 & Expo. Noted that TotalEnergies committed to continue supporting REC & Expo as the Platinum Sponsor.

Mentioned that we had been shown clear evidence that doubling the share of renewable energy is economically viable and beneficial for all of us which can be achieved through a strong partnership with key stakeholders.

Advised the young people who were present and emphasized that whatever people's individual views, the reality is that the whole talk was about future generations.

He finally thanked the Minister

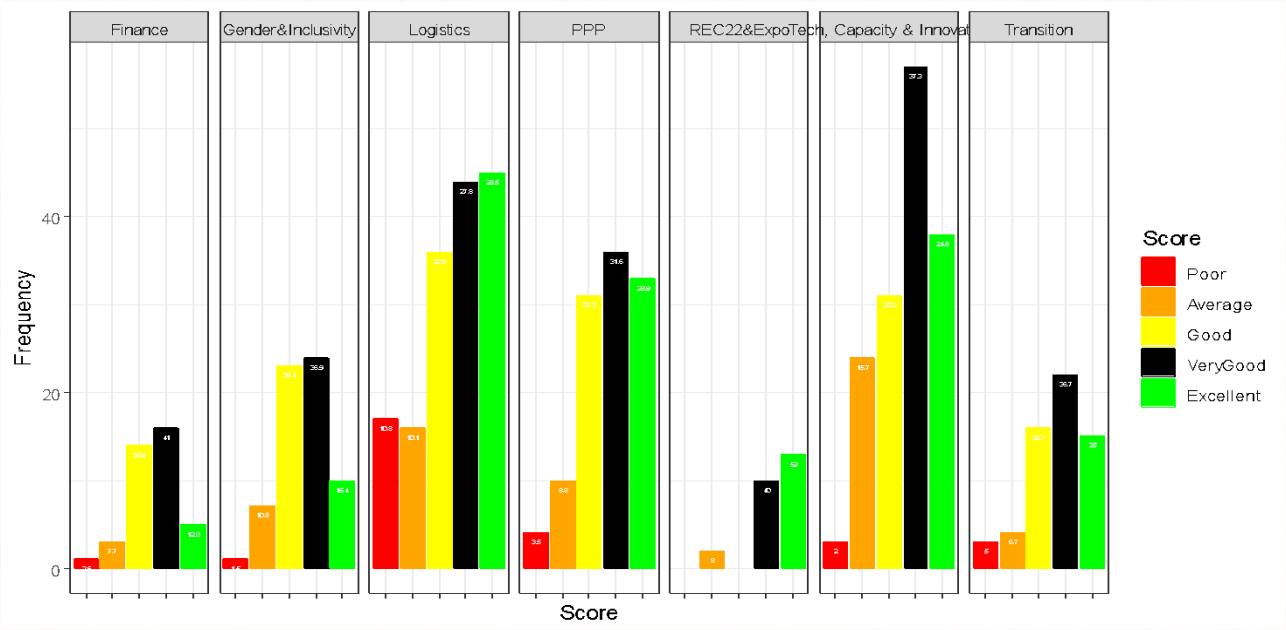
of Energy and Mineral Development, Hon. Dr. Ruth Nankabirwa Ssentamu and all the stakeholders for strong commitment and support and the sponsors, particularly TotalEnergies, UNCDF, GIZ, HDF, for all the support!

3. REC22 and Expo Evaluation

This section assessed the participants' feedback to help understand the strengths and weaknesses of the REC22 & Expo to contribute to the improvement in future events. Assessment methodology involved quantitative criterion (5 = very good; 1 = very poor), and qualitative and sentiment assessment of the text feedback.

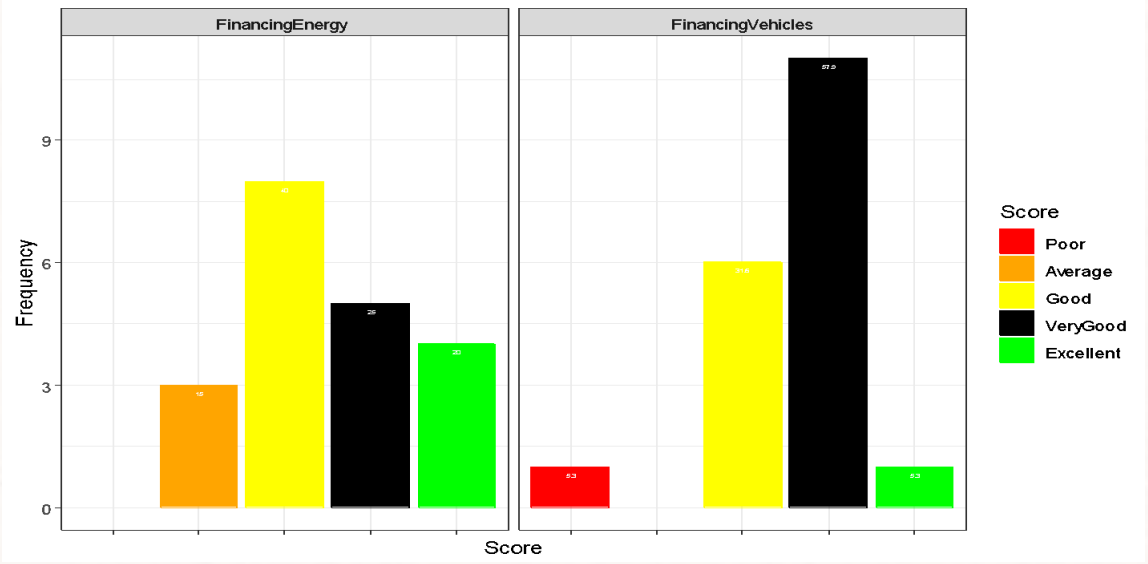
3.1. Overall

Generally, from the participants' feedback collected, REC22 & Expo was overwhelmingly ranked successful (92%), with only 8% finding the event average. With the exception of Logistics (89.2%), all the Thematic areas scored above 90% pass mark (Good, Very Good and Excellent).



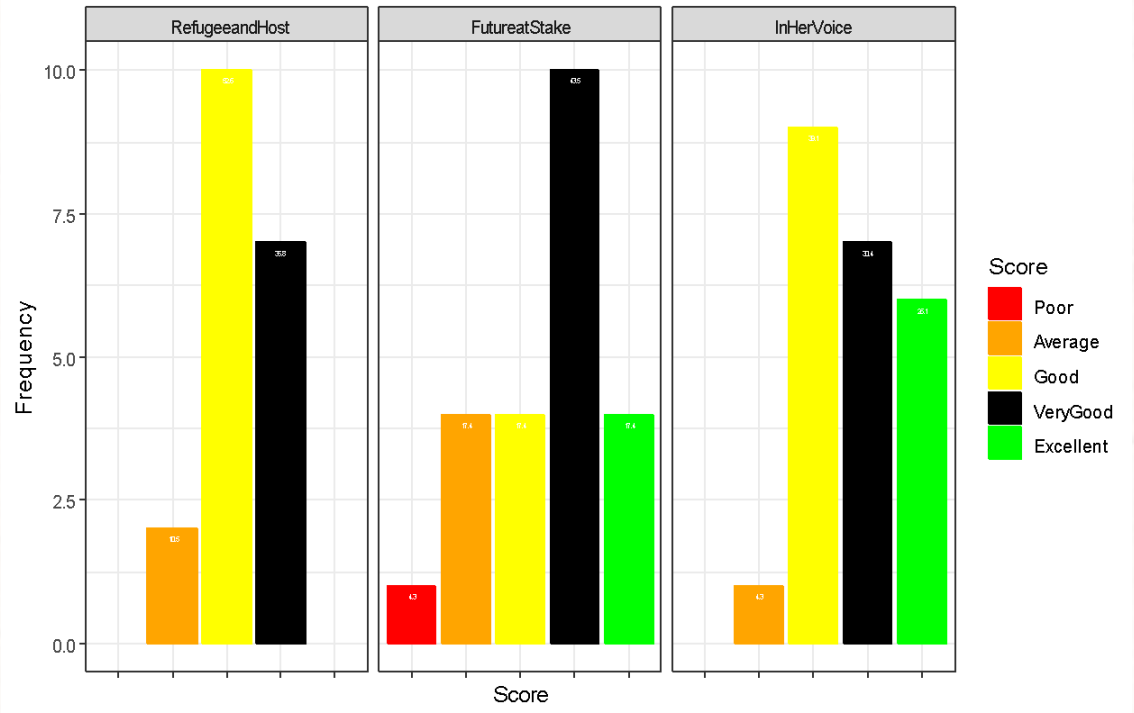
3.2. Energy Finance

In the Energy Financing Theme, the Session on Financing Vehicles was ranked better, although some (5.3%) respondents found it Poor.



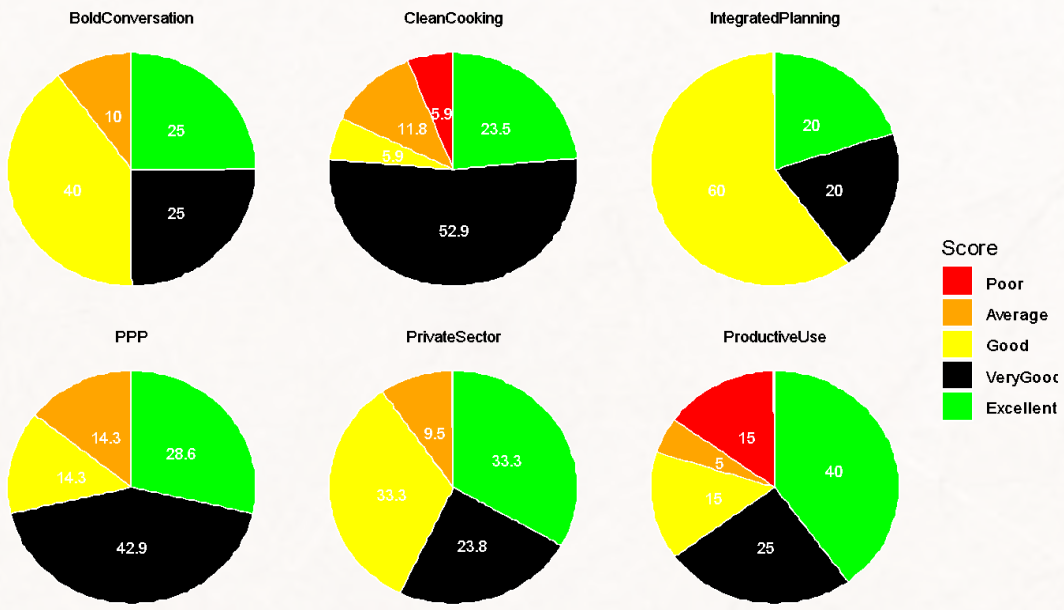
3.3. Gender and Inclusivity

With the exception of the Session on Future at Stake where a few (4.3%), respondents scored Poor, Energizing Refugee and Hosts Communities and In Her Voice scored mostly Good, Very Good or Excellent. The most exciting session was the all-female led panel (In Her Voice).



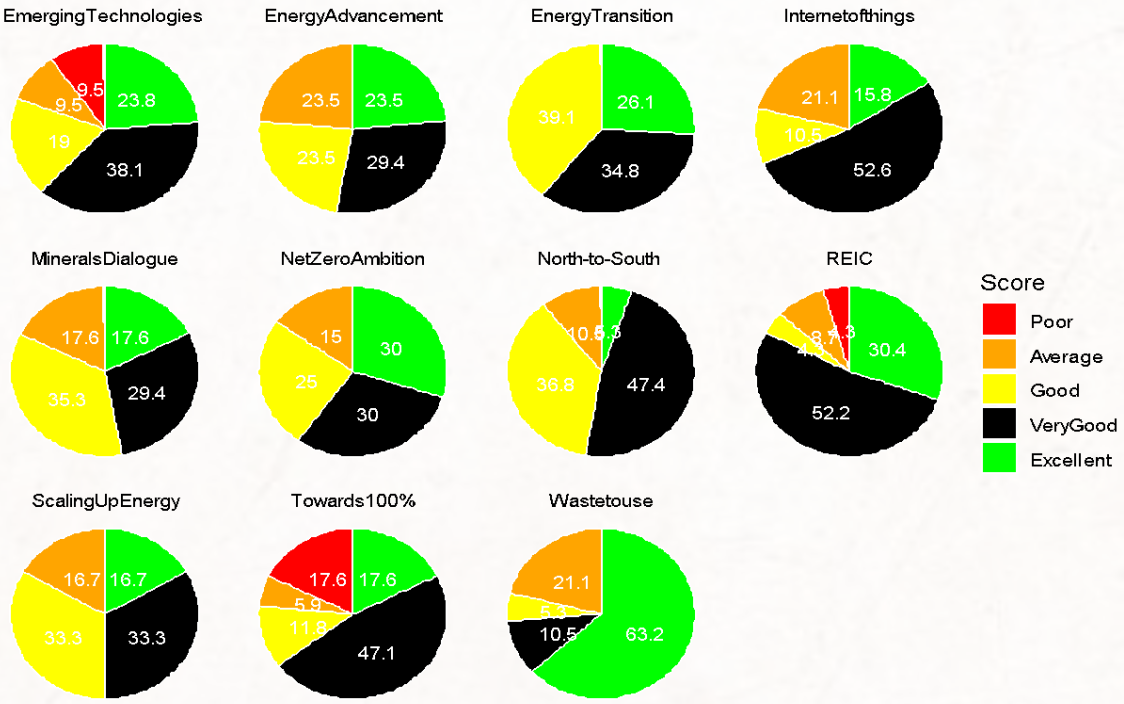
3.4. Policy, Planning and Partnerships

With the exception of the Sessions on Clean Cooking and Productive Use of Energy that few respondents scored Poor, the rest of the Sessions ranked average and above. Paradoxically, Productive Use of Energy that recorded the highest Excellent proportion also had the highest respondents registering Poor.



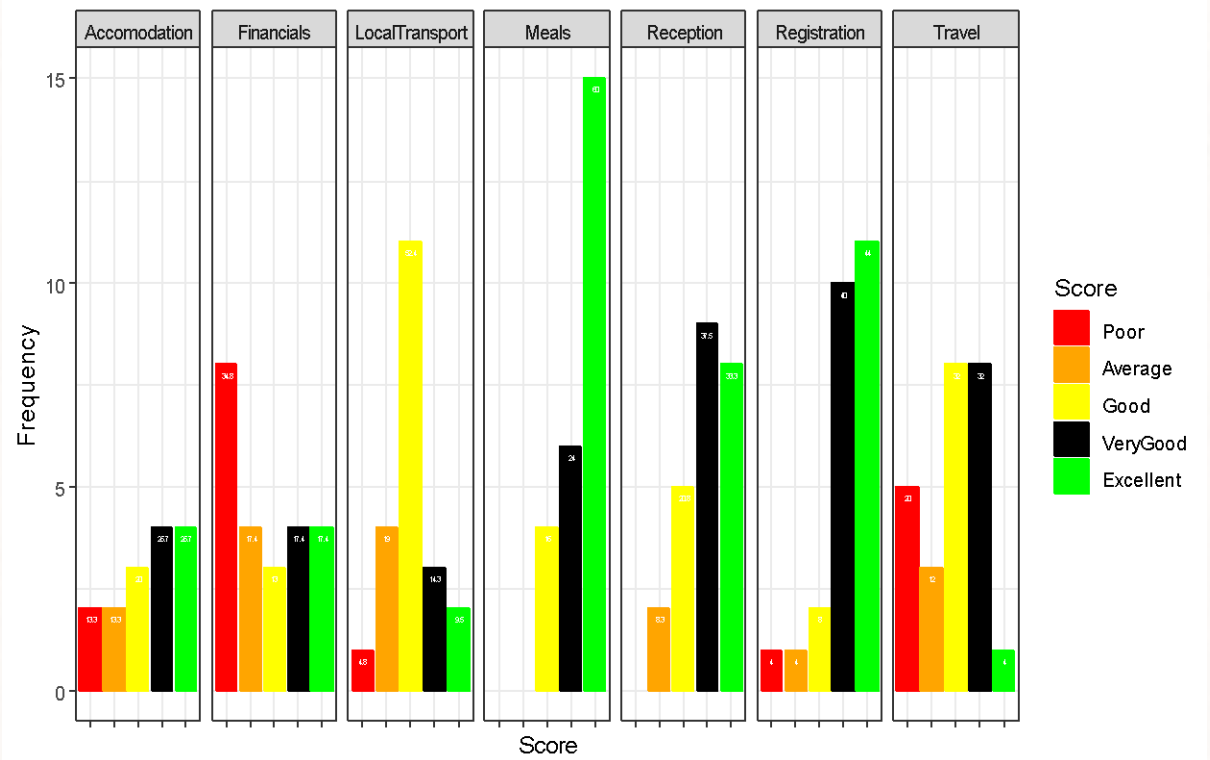
3.5. Technology, Capacity Building and Innovation

Generally, all the Sessions were highly interesting to the participants. The Sessions of Emerging Technologies (9.5%), REIC (4.3%), and Towards 100% (17.6%) recorded some poor ranking. The most excellent session was the Waste to Energy dialogue.



3.6. Logistics

Generally, Logistics were reported successful, with the exception of Financials, Travel and Accommodation that recorded reasonably high Poor rankings. Meals were the best option.



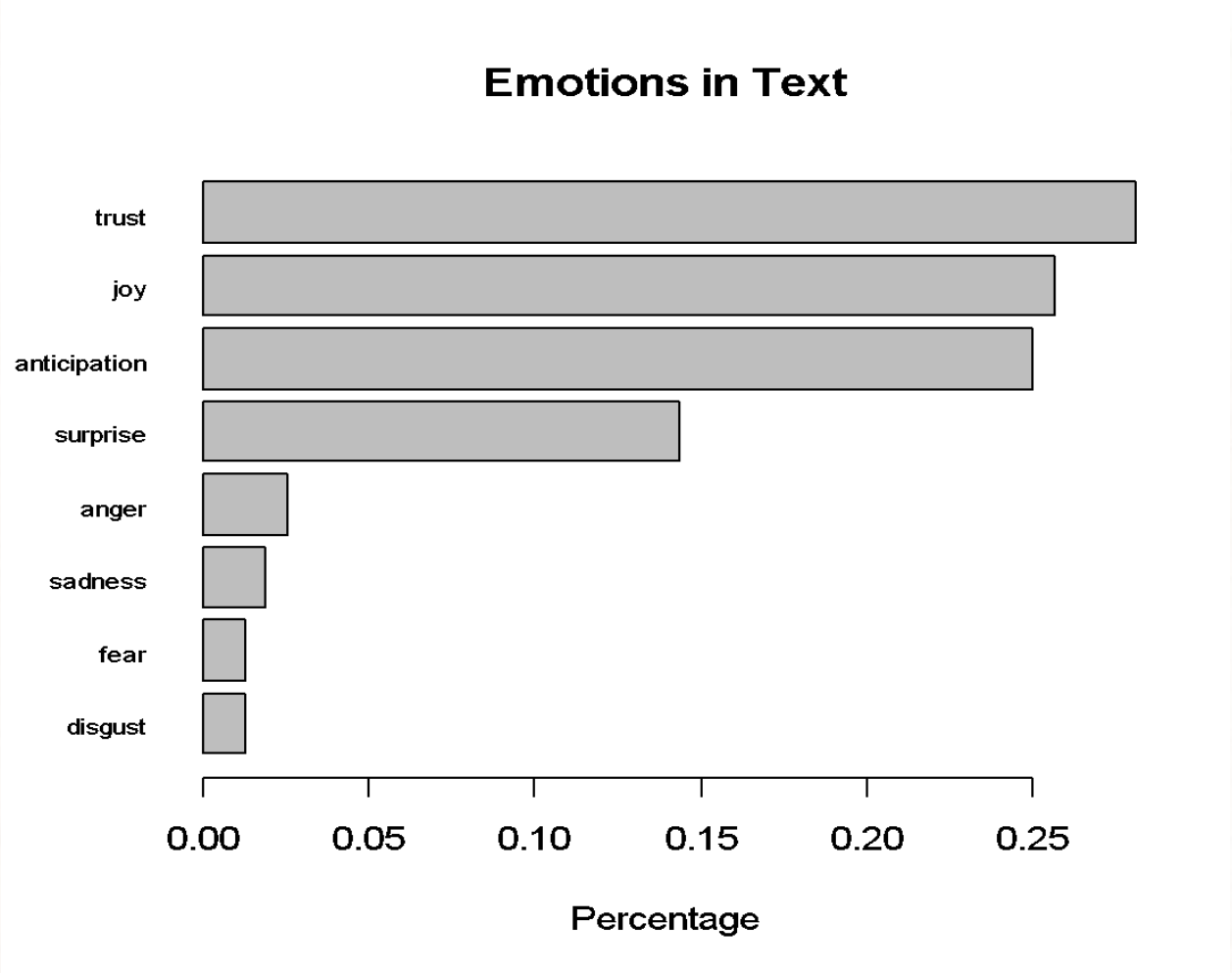
3.7. Sentiment Analysis

A word cloud was used to visualize and analyze comments and feedback from qualitative data on social media (Twitter, LinkedIn, Facebook, WhatsApp and Youtube). The most frequently occurring words in the feedback on REC were "great", "thank" and "well". Negative words like "not" do not feature in the word cloud, which indicates that there were no negative prefixes to change the context or meaning of the words "great", "thank" and "well". This indicates that most responses did not mention negative phrases like "not great". Thus, it is believable that most participants felt that REC22 & Expo was a great event. Further, words like honour, done, good, discussion, youth, congratulation, partnership, impact, wonderful indicated further positive endorsement of the event. The proximity of "Finance" and "better" in the word connection (top of the star) points to a need for better financing of the future REC and Expo events, recounting the logistics findings on poor financing (34.8% ranked Poor).

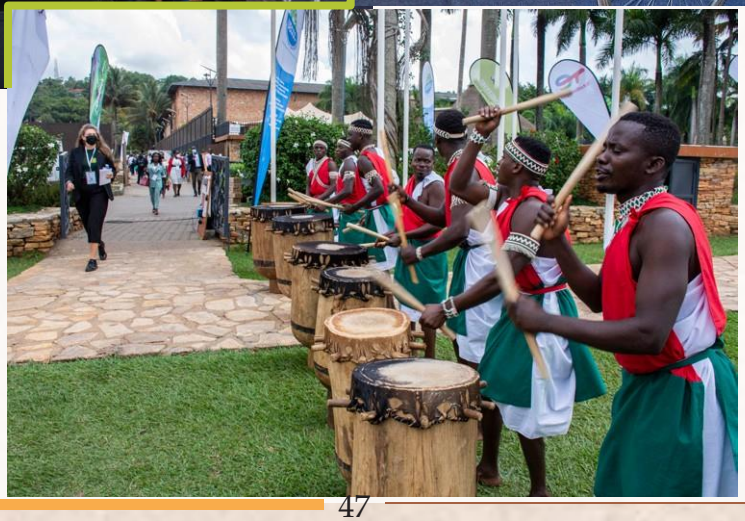
Sentiments (positive, neutral or negative) to better express the degree of positive or negative strength of the sentiment contained in a body of text indicated that the Median value of Sentiment scores was above 0, and can be interpreted as the overall average sentiment across all the responses about the event was positive.

Emotion classification built on the NRC Word-Emotion Association Lexicon with a list of English words and their associations with eight basic emotions (anger, fear, anticipation, trust, surprise, sadness, joy, and disgust) and two sentiments (negative and positive) was done. Results showed that

respondents feedback words associated with the positive emotion of “trust”, “joy” and “anticipation” in the text overwhelmingly dominated by words associated with the negative emotion of “disgust”, “fear”, “sadness” and “anger”. Overall, words associated with the positive emotions account for about 92% of the meaningful words in the text, which can be interpreted as a very good sign of excellent REC22 & Expo event.

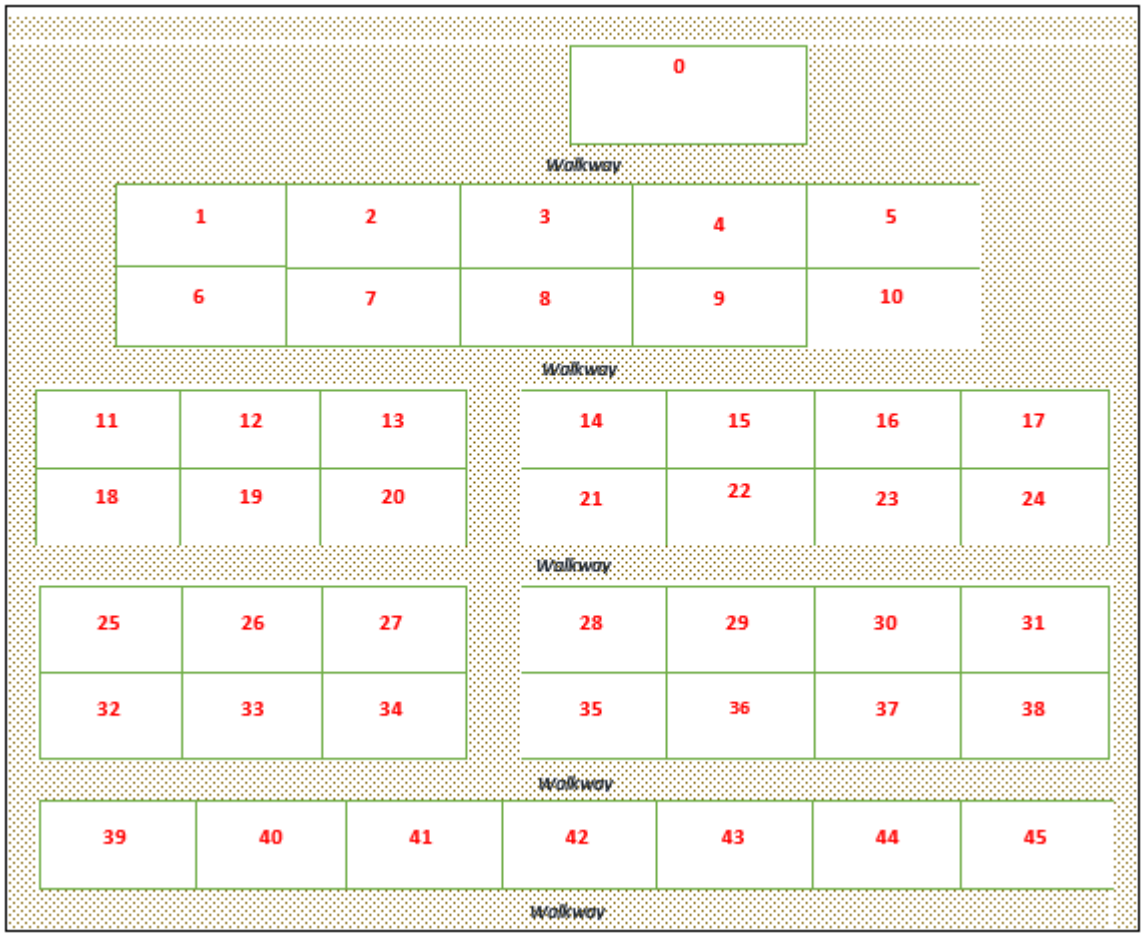


4. EXPO HIGHLIGHTS



Number	Company	Category	Number of Exhibitors per stall	Contacts
1	Total Energies	E- mobility	11	0782521668
2	Cloud Green	E- mobility	2	0755587606
3	Bodawerk	E- mobility	2	0784775067
4	Youth Go Green	Innovation	3	0706917938
5	ILA	Innovation	4	0775410126
6	Minerals -MEMD	Minerals	4	
7	Adapt Plus	Clean cooking	2	0772335382
8	Solar Now	Solar	3	0772711950
9	Equity Bank	Finance	5	0772427494
10	UECCC	Finance	2	0776135188
11	CREEC Makerere	Research	4	0772121458
12	Surechill	Solar Fridge	2	+221774142717
13	Circodu	Research	3	0773349546
14	Environmental Alert	Environment	2	0781239681
15	Eco Tech	Stoves	2	0776524373
16	Aptech	Solar	2	0701522929
17	Veracity	Solar	3	0701472734
18	Nexus Green	Solar	6	0707998855
19	Omnivoltaic	Solar	3	254723424287
20	Innovation Africa	Solar	2	0772307420
21	Green Power International	Solar	2	0705252043
22	Ultra Green volt Power	Solar	2	0776940215
23	Solarika Energy	Solar	2	0754912245
24	Bright life	Solar	3	0750978431
25	UMEME	UMEME	3	0774199458
26	Ento	Solar	2	
27	AES	Stoves	2	0781096059
28	Ugastove & Simoshi	Stoves	2	0780269834
29	Power Trust Solar	Solar	2	0200923413
30	Sprinktech	Solar	1	0705104719
31	Advanced Power Solar Limited	Solar	2	0701349394
32	Bold Energy	Clean cooking	2	0775926657
33	Josa- Green	Solar	2	0703406214
34	EUF	Stoves	1	
35	Potential Energy	Stoves	1	0703673718
36	B.M Energy	Clean cooking	1	0758790263
37	Smart Home	Stoves and Solar	3	0702081062
38	Fres	Solar	2	0701311444
39	Individual stalls	Stoves	3	

Number	Company	Category	Number of Exhibitors per stall	Contacts
40	Eco stove	Stoves	2	0783284756
41	Shield	Solar	3	
42	Divine Renewable energy solution	Solar	1	0702306545
43	Petroleum - MEMD	LPG	2	0772602900
44	Power Corn	Solar	1	0776422424
45	Masupa enterprises	Stoves	1	0772402359
46	UDC	Stoves	3	
47	Nuclear Energy- MEMD	Nuclear	4	0773095211
48	Supa- Sigiri	Stove	1	0751750750
49	Olwa Mark	Stoves	1	0778139122
50	Kwanzaa	Solar	3	0771993115
51	UNDP	Advisory	6	0703673718
52	Biogas- solutions	Bio-Gas	1	0752496128
53	Wes	Clean cooking	1	0787330309
54	Ecoca	Clean cooking	1	0703524000
55	UNBA	Bio-Gas	2	0414699577
56	ChargeKo	Solar		0700736449
57	Ebenezer	Stoves	1	0701595920
58	UETCL	Transmission	1	0414233433
59	UEDCL	Distribution	2	0702479181
60	GIS-MEMD	Data	3	0783939410
61	JEEP	Training	4	0708680572
62	power up	EPC		0788066300
63	RED	Solar	5	0784604927
64	Up energy	EPC	01	0774198895
65	Arem Clean energy solution	Cooking Ethanol	2	0751750750
66	Energy Uganda foundation	Stove	2	0752707474
67	CIFED	Stove	1	0772416435
68	Green Fit	Stove	1	0702977901
69	Wana Solution Uganda Limited	Stove	1	0700719576
70	Bihaeco Venture	Stove	1	0755684828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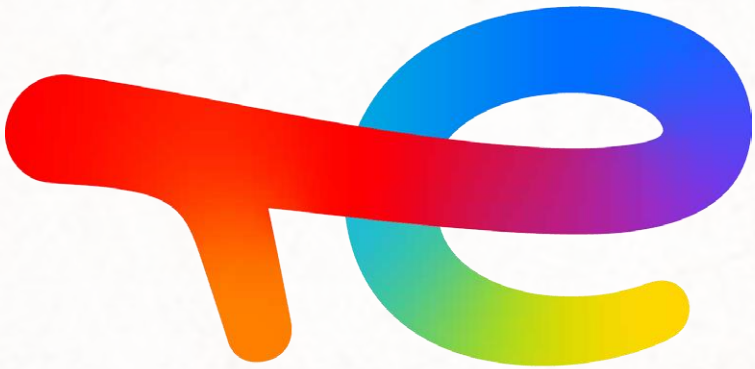
5. CONFERENCE SPONSORS



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