PIESA
THE POWER INSTITUTE FOR EAST & SOUTHERN AFRICA

ANNUAL REPORT 2020

COVID-19 AND ITS IMPACT

The Power Institute for East and Southern Africa (PIESA) is a voluntary regional power utility association established on 28 February 1998. We aim to improve electrification in East and Southern Africa through sharing information, research, technology, skills and experiences for the benefit of customers and suppliers in the electricity distribution industry. The main focus is on technical rationalisation to achieve economies of scale with local manufacturers in an effort to enhance electrification in the region.

CONTENTS

VISION

PIESA is the catalyst for sustainable regional technological cooperation in expanding the Electricity Distribution Industry and stimulating electrification for regional growth and development.

OBJECTIVES

To stimulate the electrification of the region by:

- Broadening Membership - Participation from all regional electricity distributors and supporting industries
- Maintaining a centralised integrated information system for technology related to the distribution of electricity
- Developing mechanisms for the continuous capture of experiences of members to improve efficiencies (feedback loop)
- Encouraging the use of local resources and the manufacture of equipment for use in the distribution industry
- Optimising and harmonising technical equipment specifications and codes of practice for the regional environment
- Promoting applied research in areas that are relevant for the effective performance of the members
- Developing a culture of technology transfer and skills development among members
- Developing strategic alliances and partnerships in research, industry and manufacture and other similar organisations
- Compilation of standards and guidelines with the objective of minimising the impact on the natural environment
- Being flexible to the needs of an evolving Electricity Distribution Industry
- Facilitating dialogue relating to the Electricity Distribution Industry
- Promoting energy efficiency
- Operating, maintaining upgrading and refurbishment of assets cost effectively.
- Promoting occupational health and safety.

MEMBERS OF THE PIESA BOARD

Mr Mohlomi Seitlheko
Chairman
LEC

Mr Vally Padayachee
Executive Officer
PIESA

Eng. Bukhosi Siso
Director
ZESA

Mr Simbiso Chimbima
Director
UMEME

Ms Sophia S Mgonja
Director
TANESCO

Ms Sumaya Nassiep
Director
Eskom

Mr Patrick Mwila
Director
ZESCO

Ms Refilwe Mokgosi
Director
AMEU

Mr Harold Hayes
Affiliate Rep
Director

Director
SNEL

CHAIRMAN'S REPORT

Mr Mohlomi Seitlheko
BSc (Elect), MBA
Chairperson of The PIESA Board

I would like to start by recognising the contribution of the retired PIESA Board Chairman, Eng Bukhosi Siso whose leadership and enormous contribution to PIESA's growth and development can easily be recognised. I'm really privileged to have been part of the Board he led and to now follow in his footsteps as the new PIESA Board Chairperson.

PIESA went through extremely challenging COVID 19 conditions in the early months of 2020; marked by muted economic growth due to regional total lockdown as countries tried to manage and cub the spread of the virus. PIESA utilities were no exception, electricity industry slowed down and many planned projects were halted due to the lockdown in different regional countries. Electrification was suspended in many countries as funding was diverted to finance emergency budgets to fight the pandemic. Increasing pressure on financially stressed consumers and unemployment at high levels, due to job losses which continue to prevail in the region. COVID 19 forced utilities and industries to devise new ways of doing business and PIESA was no exception. PIESA had to introduce virtual meetings and virtual training sessions for its members as international and regional travel between countries was prohibited.

Despite these challenging times, PIESA still managed to generate value for member utilities and other stakeholders. PIESA facilitated a course on utilities management that was attended by many PIESA utilities and very successful.

Given the impact of the COVID-19 pandemic, all of the PIESA meetings have gone virtual until further notice. To increase our value add to members, PIESA will also be focusing on the hosting of relevant webinars. A successful, ten session, virtual PIESA webinar on utility management was held in June 2020.

This year saw the completion of some pilot projects, supported by PIESA through PIESA's strategic partners, such as Landis & Gyr. Smart metering project piloted by Lesotho Electricity Company (LEC) and Landis & Gyr was initiated by the two companies through PIESA as one of the PIESA initiatives to promote new technologies in the region. The pilot was a success and LEC is currently implementing the functionality and evaluating the project.

I would like to give a special thanks to IERE for their full support to PIESA activities and for financing the PIESA training and development initiatives. The annual budget support that IERE provides to PIESA is fully appreciated and I look forward to more collaboration between the two organisations in future.

I also want to take this opportunity of thanking the PIESA Secretariat for their continuous support over the years.

FROM THE DESK OF THE EXECUTIVE OFFICER

Vally Padayachee
CD (SA); FInstD; FIRMSA; MBA; MSc (Eng); GCC; EDP (Wits)PIESA Executive Officer

As I pen my report, we are in the midst of one of the deadliest pandemics to confront the whole world i.e. the COVID-19 pandemic. To date (3rd week in November 2020) and according to the WHO the global confirmed cases due to the COVID pandemic is 58 425681 while the confirmed death cases is approximately 1385218. In the same time Africa's confirmed cases are 1452332 while the death toll is approximately is 32659

It is too early to know the full impact of COVID-19 on Africa. To date the experience has been varied. There are causes for concern, but also reasons for hope. Early estimates were pessimistic regarding the pandemic's impact on the continent. But the relatively low numbers of COVID-19 cases reported thus far have raised hopes that African countries may be spared the worst of the pandemic.

The COVID-19 pandemic has caused many disruptions to the power sector. We believe that as the impact of the COVID-19pandemic subsides and mobility increases, economic activity is going to increase. This should increase commercial and industrial demand for power or electricity, which will bring relief to many of the problems faced during the crisis.

Over the past few months, lockdown measures have significantly reduced electricity demand in the commercial and industrial sectors. The International Energy Agency (IEA) estimates that global electricity demand decreased by 2.5 percent in Q1 2020 and forecasts a 5 percent contraction by the end of the year. In March and April 2020, the IFC observed a 15 percent drop in demand, on average, in many countries where it does business.

Like many other organisations and countries globally that were severely impacted by the Covid pandemic the activities of PIESA as also not spared. All PIESA in-person meetings where cancelled and where replaced by virtual meetings. As a PIESA we also focused on hosting webinars as a value add to our members. In this respect PIESA hosted an excellent 11 virtual sessions (2 hours each session) virtual in June 2020 on Utility Management. This programme was well attended – on average we had approximately 150 participants while at its peak we had over 200 attendees. Once again we are thankful to IERE for kindly sponsoring this webinar session.

The review period has been one of numerous challenges that continues to impact on power service delivery and expanding electrification.

The 2019 General Meeting and PIESA-IERE South Africa Forum ("Conference") with theme "Electricity & the 4th Industrial Revolution – an Africa perspective" was hosted by both IERE and PIESA from 28 - 30 October 2019 at the Sun City Resort, South Africa.

The International Electric Research Exchange ("IERE") is a worldwide, non-profit organization that was established in 1968 as the International Electric Research Exchange ("IERE") serving executives, senior managers, engineers, and researchers who are responsible for electricity and energy related R&D and solutions. IERE represents the electricity & energy supply industry, equipment providers, energy associations, academic researchers and government.

It was indeed an honour and a privilege for me to have been appointed jointly by both the PIESA and IERE leadership to be the Overall Forum Chairman of the aforementioned international 2019 PIESA-IERE General Meeting and South Africa Forum ("Conference").

There was almost unanimous consensus from those that attended that this was an excellent conference that was well managed and with excellent presentations and papers delivered. The conference proper extended for two days and 29 presentations were delivered in the five sessions. There was a good spread of presenters coming from different parties of the world. There was also a good spread of session chairpersons also coming from different countries.

In total there were approximately 170 delegates that registered and in this respect the conference was attended by delegates from various parts of the world and included Japan, China, Hong Kong, Korea, Indonesia, South Africa, Malawi, Zimbabwe, Lesotho, Uganda, Tanzania, UK, Germany, Philippines, Malaysia, Thailand, France and Singapore.

PIESA is still working very hard at maintaining external stakeholder relationships, which include executive membership of IERE and affiliate membership

The electricity utility sector though still severely impacted by the COVID -19 pandemic is still going to be impacted by the fourth industrial revolution and probably by the fifth industrial revolution which is going to further compel PIESA members countries to rethink their business models to remain viable.

We will as a PIESA going forward focus on 4IR emerging technologies to stimulate and accelerate electrification in PIESA member countries for growth and development

PIESA will also continue to focus on further electrification which will still be a priority; PIESA will also endeavour to assist members countries in addressing challenges associated with increasing technical and non-technical losses; increasing ingress of renewables especially distributed energy in the energy mix and theft and vandalism.

In many countries, including South Africa, current energy systems are based primarily on fossil fuels, such as coal and oil. The problem is that fossil fuels have a number of undesirable aspects. A future energy system based primarily on RE will be better for people and the planet. A Just Energy Transition (JET) aims to make the process of shifting to a better energy system as fair and 'just' as possible. PIESA will also pay careful attention to and support initiatives in promoting a JET in PIESA member

countries.

We still continue to be grateful to IERE for continuing to provide PIESA with much needed funding for key projects and initiatives. Piesa has been and will also be giving increased focus to increasing its membership base especially the affiliate's membership.

PIESA will still continue to focus on sharing case studies, knowledge and information amongst its members and to explore and investigate ways of introducing eLearning in respect of training, development and mentoring of especially technical and engineering professionals and other resources at its member utilities.

Standardisation continues to also be a key focus for PIESA especially from a perspective of improving service delivery and fast-tracking electrification rollout.

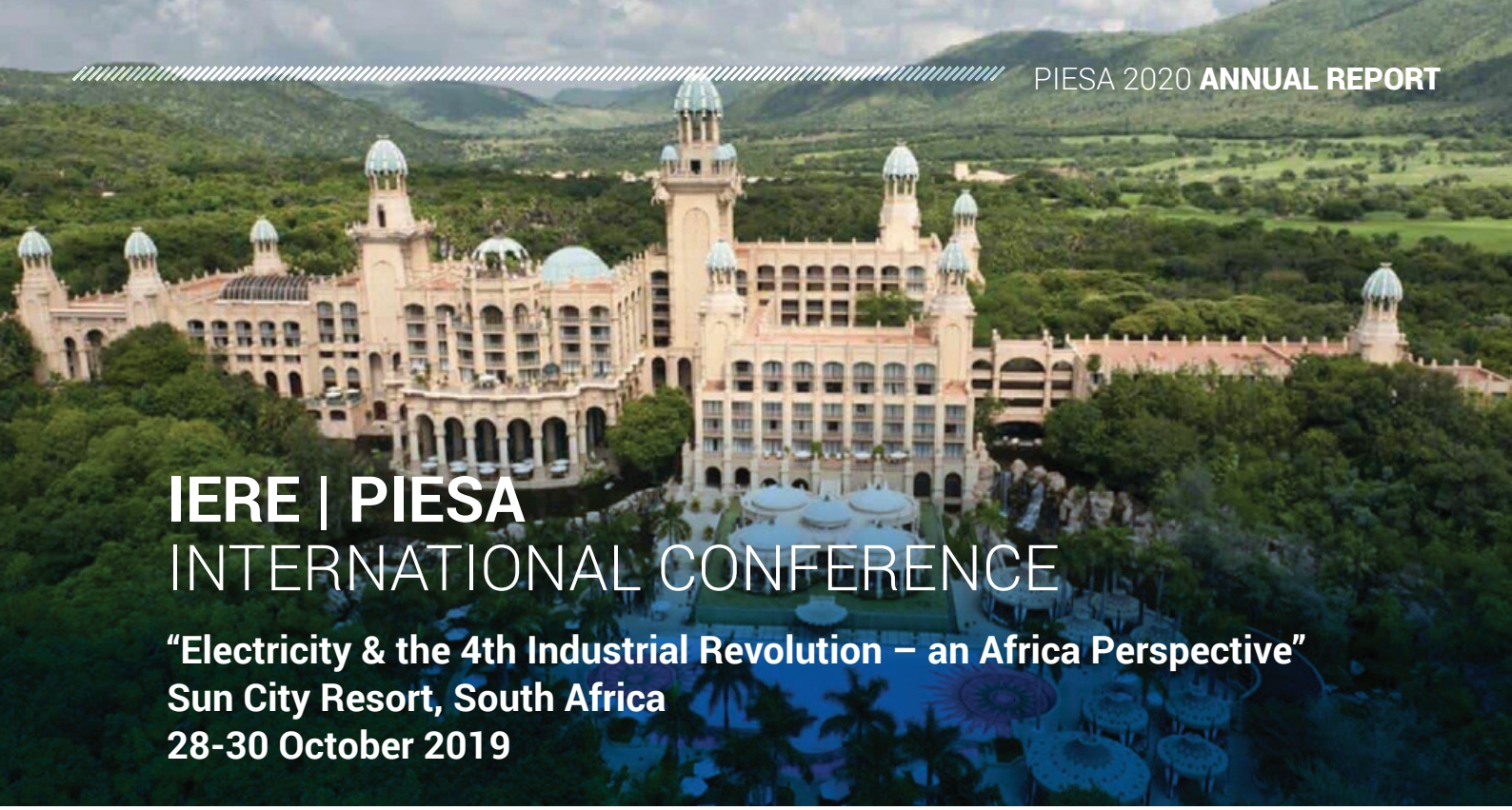
Once again as as reported previously a major challenge that is looming is the TID 2024 rollover challenges associated with STS type prepayment meters.

The existing centuries old business models for utilities will have to realigned to cater for the changing operating landscape.

I also want to take this opportunity of thanking the members of the Board of Directors for their continued leadership and support of PIESA, the PIESA Secretariat and all the other members of PIESA and especially those that have assisted in keeping the PIESA ship afloat during the ensuing period of the COVID -19 pandemic. . I want to also say a very special thank you to our immediate past Chairman Dr Alfredo Kaponda who resigned from PIESA after serving only a few months as Chairman because he retired from Escom Malawi. Dr Kaponda had served PIESA in other capacities over the years including as a long serving board member. I also want to welcome the new Chairman of the PIESA Board of Directors, Mr Mohlomi Seitlheko from LEC, Lesotho. We wish Mr Seitheko all the very best and every success as Chairman of PIESA.

I also want to take this opportunity on behalf of PIESA to express our sincere thanks and appreciation to Mr Greg Tosen who has retired from Eskom and is no longer a member of the PIESA Board. Greg also represented PIESA on the Board of IERE wherein he was Chairman for a few years and also most recently has stepped down as Chairman.

In conclusion I want to also take this opportunity of wishing all PIESA members everything of the best for 2021. Given that the impact of the Covid pandemic is still around notwithstanding that a vaccine maybe available shortly the PIESA family must stay safe, stay serene and stay secure – continue to wear masks, social distance, stay indoors if you can, and sanitise regularly.



IERE | PIESA
INTERNATIONAL CONFERENCE

"Electricity & the 4th Industrial Revolution – an Africa Perspective"
Sun City Resort, South Africa
28-30 October 2019

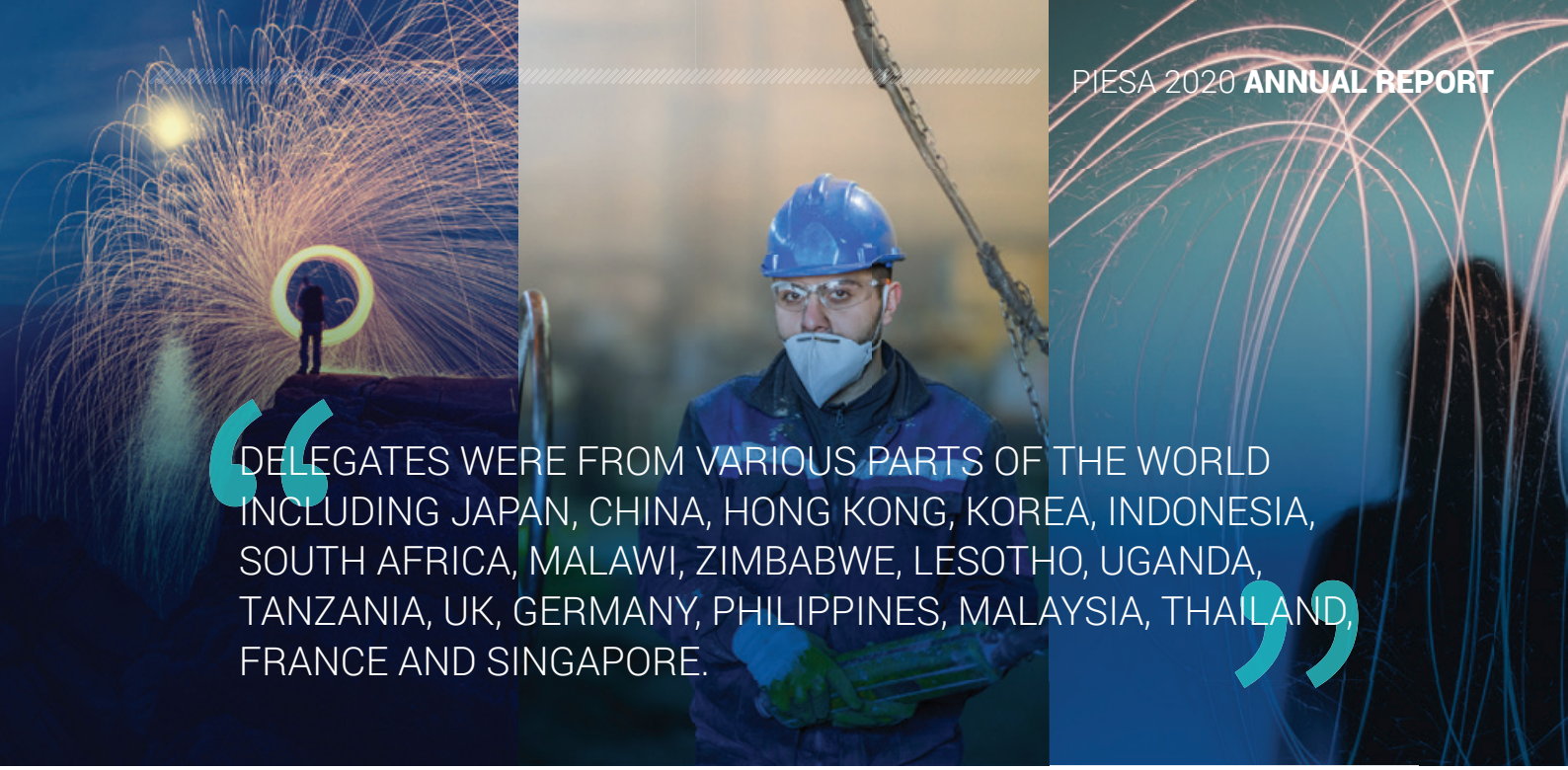
It was indeed an honour and a privilege for PIESA Executive Officer, Vally Padayachee to have been appointed jointly by both the PIESA and IERE leadership to be the Overall Forum Chairman of the aforementioned international 2019 PIESA-IERE General Meeting and South Africa Forum ('Conference').

IERE is a worldwide, non-profit organization that was established in 1968 as the International Electric Research Exchange ('IERE') serving executives, senior managers, engineers, and researchers who are responsible for electricity and energy related R&D and solutions. IERE represents the electricity & energy supply industry, equipment providers, energy associations, academic researchers and government.

IERE's vision is to be a unique global platform serving its members through the exchange of technical expertise and know-how of advanced and appropriate technologies and research and development in the electric power sector.

IERE's mission is to:

- **Evaluate innovative and emerging technologies and promote their implementation to realize safe, sustainable, affordable and resilient electric power systems.**
- **Help establish corporate strategy related to R&D given the emerging trends influencing the evolving power industry landscape.**



> DELEGATES WERE FROM VARIOUS PARTS OF THE WORLD INCLUDING JAPAN, CHINA, HONG KONG, KOREA, INDONESIA, SOUTH AFRICA, MALAWI, ZIMBABWE, LESOTHO, UGANDA, TANZANIA, UK, GERMANY, PHILIPPINES, MALAYSIA, THAILAND, FRANCE AND SINGAPORE.

The majority of feedback from those that attended was that this was an excellent conference that was well managed and with excellent presentations and papers delivered. The conference ran for two days and 29 presentations were delivered in the five sessions. There was a good spread of presenters coming from different parts of the world. There was also a good spread of session chairpersons coming from different countries.

In total there were approximately 170 delegates that registered and in this respect the conference was attended by delegates from various parts of the world and included Japan, China, Hong Kong, Korea, Indonesia, South Africa, Malawi, Zimbabwe, Lesotho, Uganda, Tanzania, UK, Germany, Philippines, Malaysia, Thailand, France and Singapore.

Besides the content of the various presentations and papers that were delivered, the choice of the overall forum or conference theme for the conference i.e. **'Electricity & the 4th Industrial Revolution – an Africa perspective'** also contributed to significantly enriching the body of knowledge (in some cases wisdom) that was presented and/or shared at the conference. As further elaboration of the aforementioned theme, the 4th Industrial Revolution, is the advancement and emergence of new technologies that is ushering in a new era that sees a greater impact of digitization on our lives, in ways that are new and unanticipated.

According to a quote from an article on the World economic forum website, the **'Fourth Industrial Revolution can be described as the advent of cyber-physica systems'** involving entirely new capabilities for people and machines.

While these capabilities are reliant on the technologies and infrastructure of the Third Industrial Revolution, the Fourth Industrial Revolution represents entirely new ways in which technology becomes embedded within societies and even our human bodies.

With emerging technologies moving at a rate of knots, the question then is, what do we want these technologies to do for us and what impact will it have on all of us?

As the novelist William Gibson famously said: **"The future is already here – it's just not very evenly distributed."** Indeed, it is time to see an even distribution of this potential. It is time for Africa!

PIESA and IERE Board Members

International delegates

There were two Keynote Addresses:

1

"The use smart technologies to mitigate revenue collection challenges especially in African electricity distribution utilities" by Eng.

Dr Alfred Kaponda (ESCOM, Malawi) and PIESA Board Member

If electricity distribution businesses are going to fully embrace the benefits of emerging technologies to maximize revenue amid various challenges that cannot be resolved in the short term, emphasis should now move from technologies to packaged solutions as is the current focus on Internet of Things (IOT) in this Fourth Industrial Revolution environment.

2

"Sustainability of (renewable) electricity production"

Prof Dr Jan Mertens (ENGIE)

- The electricity sector must contribute the most to the GHG reduction (40 % of all emissions reduction) and must be carbon free by 2050 and carbon negative soon after
- Urgent need for more R&D and pilots and demo's on new emerging electricity generation (and storage) technologies so we can speed up and prove the roadmaps wrong! CO2 should be seen as a resource and not a waste.
- Sustainability is not only CO2: water issues and mineral depletion are becoming increasingly with respect to renewable electricity production (and storage)
- Avoid the pollution displacement trap so supply chain of renewable electricity infrastructure must be considered.

In the General Session there were three presentations:

1. "The report of IERE activities" by Mr. Gregory Tosen (IERE Chairperson)

2. "The report of PIESA Activities and TIS" by Mr. Vally Padayachee (Executive Officer, PIESA)

3. "Methanol Ageing Marker Project (Phase 2)" by Prof Dr Jan Mertens (ENGIE)

SESSION 1:

Theme: Evolving 4IR technologies and its effect on the customer

There is no doubt digital transformation has blurred the line between man and machine, but in the process, it has also created countless opportunities to engage and assist customers. As the Fourth Industrial Revolution continues to evolve, the key to business success will be evolving simultaneously in order to provide a revolutionary customer experience. IoT, for example, is in the early stages of maturity, and most customers have yet to unlock the full potential and functionality of connected devices.

SESSION 2

Theme: Asset Management – let's get smart about it

Distribution power companies are subject to increasing quality, safety and environmental constraints that, in a highly competitive arena, call for the maximization of asset reliability, efficiency and flexibility, while operation and maintenance costs are reduced. To this end distribution energy companies are adopting an intelligent asset management approach to asset management. Smart or intelligent asset management is a cutting-edge technology that is being increasingly adopted by various industries, and with future inclusion of Industrial Internet of Things ("IIOT"), it is deemed as a sheer necessity in a manufacturing facility where downtime / slowdown affects the bottom line results.

SESSION 3

Theme: Distributed Renewable Energy Technologies: Are we ready?

At the distribution level, increasing numbers of renewables and Distribution Energy resources ("DERs") in general present a host of issues. One of the major challenges is that distribution system operators must transition from managing the safety and reliability of a system with a limited number of energy producers and unidirectional and predictable flow from substations to customers to a system with power flows from many sources at varying times of day and in different directions. These changes mean not only greater operational complexity, but also more complex maintenance and emergency operations. The result will be needed modifications in the design and operation of the distribution system and investments in new or upgraded circuits as well as additional tools, sensors and communication systems.

SESSION 4

Theme: Advanced distribution automation in the 4IR era

The goal of Advanced Distribution Automation ("ADA") is real-time adjustment to changing loads, generation, and failure conditions of the distribution system, usually without operator intervention. This necessitates control of field devices, which implies enough information technology (IT) development to enable automated decision making in the field and relaying of critical information to the utility control centre. The IT infrastructure includes real-time data acquisition and communication with utility databases and other automated systems. Accurate modelling of distribution operations supports optimal decision making at the control centre and in the field. In the era of the 4IR we are going to see a significant convergence of Operating Technologies ("OT") and Information Technologies ("IT") underpinned by smart communications to achieve the goal of ADA.

SESSION 5

Theme: 4IR's impact on revenue collection and non-technical losses

The revenue model on which utility businesses are based on is under threat from the shifting industry norms. The 4th industrial revolution is underway and already utilities are witness to digitalisation, decarbonisation and decentralisation – all affecting their traditional revenue collection strategies and non-technical losses mitigation approaches.

PIESA ADVISORY GROUPS

PIESA Advisory Groups function as forums where PIESA members and technology partners and affiliates meet and discuss pertinent issues and agree on regional strategies and actions. Each Advisory Group has a Chairperson to act as the convener and be responsible in conjunction with the PIESA Secretariat to call the meetings and set the agenda. A Deputy Chair is to provide continuity in the event of absence of the Chair from a meeting and a Secretary is to provide an administration service for the Advisory Group such as agenda and minutes of meetings.

Each Advisory Group will also have a 'sponsor member' who will have a particular interest in the terms of reference of the particular Advisory Committee. This 'Sponsor' shall be a member of the PIESA Board and will be responsible to liaise between the Board and the Advisory Group and convey specific requests for agenda items from the board.

The following four advisory groups have been established:

1. Standardisation
2. Electrification
3. Revenue Protection (Non-technical loss reduction)
4. Environmental and Safety management

The participants are mandated by their corresponding utilities and a chairman is appointed to each Advisory Committees by the PIESA Board. The Advisory Committees delegate strategies and executable projects to any or all of the four services secretariats. Information flow and committee administration is conducted by an operations manager situated in the general administration secretariat.

In particular, terms of reference for the Advisory Committees would be to inter alia :

1. Meet on a regular basis,
2. Identify pertinent subjects,
3. Debate and exchange information,
4. Network with each other,
5. Develop regional plans, strategies and initiatives,
6. Share experiences and best practices

This year the work of the various Advisory Groups was severely hampered by the impact of the COVID-19 pandemic. Like many other organisations and countries globally that were severely impacted by the Covid pandemic the activities of PIESA were not spared. All PIESA in-person meetings were cancelled and were replaced by virtual meetings. The Advisory Groups were unable to meet in-person. All such meetings were held virtually but on a shortened time period.

The following reflects some of the key strategies and focus areas for each of the Advisory Groups, during the ensuing financial year:

A. Electrification Advisory Group

The Electrification Advisory Group will continue with following initiatives.

1. To share the strategies of other advisory or working groups on the document portal.
2. To survey members on their electrification %, based on the Board's acceptance of the revised access to electrical energy definition
3. To explore ways and means to assist member countries to rollout electrification infrastructure much quicker
4. To assist member countries to raise much needed funding to rollout electrification infrastructure
5. To explore alternative business models given that the current model of selling electrical energy (kWh) is proving to be no longer viable for most member utilities
6. To investigate the further incorporation of cost-effective renewable energy technologies in the energy mix.
7. Formalising an electrification partnership with POWER AFRICA
8. To investigate and rollout smart technologies, smart grids, etc with a view to improving service delivery
9. Significant attention is being paid to training, development and mentoring initiatives especially with respect to the upskilling of personnel especially technical, engineering and leadership personnel

B. The Environmental and Safety Management Advisory Group

1. There was a need to raise the profile of environmental and safety in the various utilities
2. The Advisory Group resolved that to improve the safety and environment culture in utilities, it is also important to briefly discuss important and relevant safety and environmental issues that would benefit the attendees
3. A wayleave guideline has been prepared and circulated to members
4. The aspect of encroachments was still a cause for concern and requires further investigation to provide relief
5. With respect to Practical Environmental & Social Impact Assessment (ESIA)
6. Eskom will arrange ESIA presentation and site visit.
7. The Advisory Group suggested that each utility should submit a PCB inventory and provided a template to be used which was circulated to all members. The PCB template was workshopped and forwarded to all to populate

C. The Revenue Protection Advisory Group

1. Formalise a partnership between ESCOM, ZESCO and Landis+Gyr for implementation of MD metering pilot project. LEC have already put a plan into action and purchase order provided, equipment delivered and planning implementation. PIESA members to sell these pilots within their own utilities.
2. Implementation of smart residential pilot projects for LEC and ESCOM. LEC have already put a plan into action and purchase order provided, equipment delivered and planning implementation. ESCOM will follow completion of LEC
3. Sensitization of utilities on Rogue metering challenge to put mitigation plans in place and link up with other entities investigation this issue.
4. PIESA Secretariat to organise a webinar for all members on TID rollover and sharing of information thereafter.

D. The Standardisation Advisory Group

1. Harmonization with current standards.
2. Recommendations of PIESA to be integrated in practices of the utilities.
3. Spread lessons learned throughout members
4. Integration with & provide input to work of other standards bodies in Africa.
5. PIESA as a source of reference on standards specifically in the awarding of tenders in the region.
6. Facilitate cross-border trade.
7. Working with the regulator in implementing standards
8. Centralize place to access information seamlessly
9. Integrate PIESA with other standards bodies in Africa
10. Communication of standards to all members countries on a regular basis
11. Communication means, to be defined
12. Follow and report back on what is happening in the member utilities…
13. Identification on new standardization needs,

MEMBERSHIP AND ELIGIBILITY

Membership of PIESA is open to the electricity industry. The number of members from time to time shall not be limited, but shall at no time be less than five (5). Membership may not be assigned or transferred to any other person, company or concern.

Membership is obtained by paying the prescribed contributions as stipulated in Article 14.2 following the acceptance by the PIESA Board of the application for membership.

PIESA has the following two categories of membership:

Full Members are organisations which:

a. Generate, transmit, distribute or buy and sell electricity; or

b. Represent an organisation contemplated in (a).

Co-ordinate with like-minded organisations e.g. SADCSTAN, UPDEA towards the common goal of harmonised standards;

Participate in training activities, exchange programmes and development projects;

Participate in regional workshops and conferences, and network with strategic decision-makers in the electricity industry;

Provide opportunities for market growth and economies of scale for regional manufacturers and suppliers of equipment and services.

Affiliate Members are organisations or individuals with an allied interest to PIESA, and would include,

a. manufacturers and suppliers of services or equipment to the electricity distribution industry,

b. researchers,

c. consultants and

d. financiers.

Benefits to members include:

Access to and participation in the development of standards for the electricity distribution sector;

Sharing of information, technology and skills and, in particular, experiences gained from pilot projects and implementation of new technologies, and local solutions to recurrent problems experienced in the region;

Network with like-minded organisations, joint research activities and access to information from international research organisations e.g. IERE, EPRI, SAPURAB;

Influence the development of standard Specifications appropriate for the region through active involvement in the Advisory Committee;

Utility Members

- AMEU - The Association of Municipal Electricity Utilities of Southern Africa
- ESCOM - Electricity Supply Commission of Malawi
- KPLC - Kenya Power and Lighting Company
- ESKOM - South African electricity supply company
- LEC - Lesotho Electricity Company
- SNEL - Société Nationale d'Électricité (DRC)
- TANESCO - Tanzania Electric Supply Company Limited
- UMEME - Umeme Company Limited
- ZESA – Zimbabwe Electricity Supply Authority
- ZESCO - Zambia Electricity Supply Corporation Limited

Affiliate Members

- Aberdare Cables
- Circuit Breaker Industries
- Hi-Tech Transformers Maintenance
- Linegear
- Landis + Gyr (Pty) Ltd
- Lucy Electric South Africa
- Metal Frabicators - Zambia PLC
- Powertech Transformers
- Reinhausen South Africa
- Schneider Electric
- TE Connectivity

IERE TECHNOLOGY FORESIGHT

In-depth research on Artificial Intelligence (AI)

Executive summary

Artificial intelligence (AI) is currently a widely discussed topic; it is perceived as a disruptive family of technologies with potential impacts on several aspects of society including electric power companies.Although AI has undergone several hype cycles, it is very likely that it is undergoing a breakthrough currently. Several drivers are pushing AI technologies into practical and value adding applications that can replace and improve traditional processes and methods. Such drivers include high volume of available data, exploding computing power, faster data transfer rates, and declining data storage cost.In fact, several well established AI applications already exist as showcased by the AI use cases of the IERE members presented in this report.

This report aims to provide an improved understanding of the capabilities of AI including a survey of the current AI tools, its limitations and associated challenges, and recommendations on how to harness this family of technology. The findings and recommendations are presented under the following four topics:

1. Utility's Data Management is the core of any AI Strategy: Electric power companies are required to manage large volumes of data generated by the generation, transmission and distribution of power, and retail businesses. AI requires big data for machine learning; therefore, utilities need to strategically capitalize on the fact that they are equipped with this vast resource for different existing and future utilizations. As a part of normal operations, power companies need to equip and prepare their workforce, update their technology platform(s), and proactively develop innovative applications. This may include capturing

expert knowledge of the power sector using AI techniques and retraining/reshaping the workforce to support the changes. For instance, machine learning training should be provided to in house experts, and different AI tools should be tested to build new application(s) and/or refine existing ones. Moreover, data with sufficient quality is of fundamental importance to develop successful AI applications. In addition, big data resources come with big responsibilities. Power companies must ensure that the source, utilization, and ownership of data not only comply with all regulations but also be aligned with the expectations from society, especially in terms of ethical use of AI.

2. Impacts of AI on power systems and the society at large might be profound: With the rapid deployment of Internet of Things (IoT), and ubiquitous and extremely fast connectivity, the adoption of the digital future by a utility will likely be unique to it. Additionally, the pace of adoption will also be specific to each utility. AI may profoundly impact the society: AI is capable of changing customers' behavior, decision making processes, interactions, and social responses; therefore, how AI would be adopted in a specific community and society is currently uncertain or unknown. Furthermore, with the lack of appropriate and up-to-date regulations, and potential bias, misrepresentation, privacy, and ethical considerations of AI applications, a wide range of research, analyses, and discussions are needed in the near future.

3. Balanced partnerships or cooperation with tech giants may be a double-edged sword: AI developments and expertise are most advanced within the tech giants such as Alibaba, Amazon, Apple, Baidu, Google, IBM, Itron, Microsoft, Tencent, Samsung, Siemens, Schneider Electric, Oracle, and Xiaomi. Their common aims are to accumulate maximum possible data in different sectors, develop new services based on this data, and continue improving the performance and results of their AI tools or platforms. There are few AI experts and trained personnel within the power sector currently; therefore, the experience and guidelines needed to formulate balanced contractual and/or cooperation agreements with these tech giants may be useful for IERE members. Through improved information exchange amongst peers, power companies can better protect their expertise and interests while accelerating the development of AI applications within their jurisdictions/domains in a fair and sustainable manner.

4. Strengthening the cooperation on AI among IERE members is required: There are few domain and AI experts within the utilities currently to leverage the international expertise and information exchange platform within the IERE community, more cooperative projects/programs among IERE members are needed for developing the AI technology and applications for dealing with eminent AI solution developers, and for gaining social acceptance of its utilization.

NOTE: This is an Executive Summary of the AI Research Report – if readers wish to obtain the full research report on AI then please contact IERE directly through their website at www.iere.jp

FINANCIAL STATEMENTS

The financial statements are set out on the following three pages.

The Board is responsible for the preparation and fair presentation of the financial statements of The Power Institute for East and Southern Africa, comprising the statement of the financial position at

28 February 2017, and the statement of comprehensive income for the year then ended, and the notes to the financial statements which include the basis of accounting and other explanatory notes, as set out in the audited statements.

The Board is also responsible for such internal control as the Board determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error, and for maintaining adequate accounting records and an efficient system of risk management.

The Board has made an assessment of the ability of the association to continue as a going concern and has no reason to believe that the business will not be a going concern in the year ahead.

The auditor is responsible for reporting on whether the financial statements are fairly presented in accordance with the basis of accounting described in the financial statements.

Approval of financial statements

The financial statements of the Power Institute for East and Southern Africa, as identified in the first paragraph, were approved by the Board and signed by

Chairperson

STATEMENT OF FINANCIAL POSITION

Balance Sheet as at 29 February 2020

	Note(s)	2020 ZAR	2019 ZAR
Assets			
Current assets			
Trade and other receivable	1	455 039	880 997
Cash and cash equivalents	2	340 136	238 097
Total assets		**795 175**	**1 119 094**
Equity and liabilities			
Equity			
Retained income		637 067	877 254
Current liabilities			
Trade and other payables	3	158 108	241 840
Total Equity and Liabilities		**795 175**	**1 119 094**

STATEMENT OF COMPREHENSIVE INCOME

Income Statement for the year ended 29 February 2020

	Note(s)	2020	2019
		ZAR	ZAR
Revenue			
Conference surplus		140 831	-21 978
Membership dues		877 719	1 167 360
Interest received		9 252	48 740
Total income		1 027 802	1 194 122
Expenditure			
Annual report		5 500	11 313
Auditors' remuneration		18 445	21 700
Auditors' remuneration - prior year		-7 905	-
Bank charges		5 929	6 548
Conference venue and meeting costs		83 625	100 895
International travel		-	40 162
Local travel and venue costs		-	30 195
Training Workshop		393	102 630
Printing and stationery		3684	3 828
Secretariat fees		1 056 000	1 043 844
Subscriptions		90 163	73 937
Website and communication costs		12 155	12 621
		1 267 989	1 447 673
Net (loss)/ profit for the year		-240 187	-253 551
Retained income from prior year		877 254	1 130 805
Retained income at the end of the year		637 067	877 254

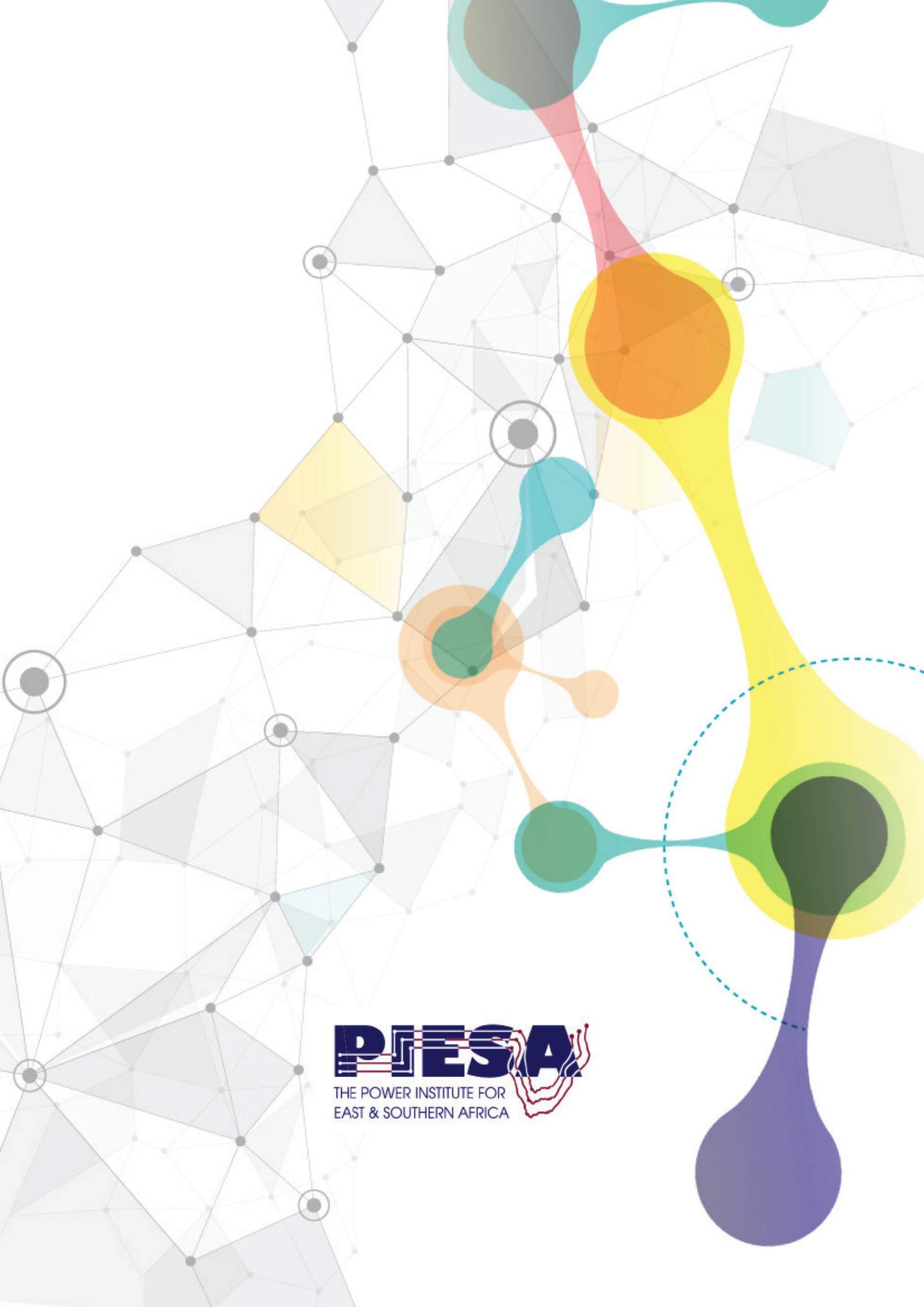
STATEMENT OF COMPREHENSIVE INCOME

Notes to the Annual Financial Statements

	2020 ZAR	2019 ZAR
1. Trade and other receivables		
Prepaid conference costs		27 656
Accrued membership dues	118 918	674 116
Accrued conference fees	143 479	-
VAT	192 642	179 225
	455 039	**880 997**
2. Cash and cash equivalents		
Cash and cash equivalents consist of:		
ABSA call account	21 381	158 107
ABSA money market account	318 755	79 990
	340 136	**238 097**

The Money Market account is interest bearing and carries interest at 5.4% (2019; 7.56%)

3. Trade and other payables		
Harris Dowden & Fontaine	18 445	26 350
Education fund	32 804	32 804
Fees received in advance	105 686	182 686
Sundry	1 173	-
	158 108	**241 840**


PIESA
THE POWER INSTITUTE FOR
EAST & SOUTHERN AFRICA