

SASEC 2024

SOUTHERN AFRICAN SUSTAINABLE
ENERGY CONFERENCE

13 - 15 November 2024

Lord Charles Hotel, Somerset West, South Africa

www.sasec.org.za

PROGRAMME BOOK & ABSTRACTS



CENTRE FOR RENEWABLE &
SUSTAINABLE ENERGY STUDIES



Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT



science & innovation
Department
Science and Innovation
REPUBLIC OF SOUTH AFRICA



sanedi
South African National Energy
Development Institute

Organised by:

CRSES – Centre for Renewable and Sustainable Energy Studies, Stellenbosch University, South Africa

DSI-SANEDI (Hub & Spokes) Centre of Competence in Renewable and Sustainable Energy, Stellenbosch University, South Africa

With the scientific support of:

CRSES, Centre for Renewable and Sustainable Energy Studies, Stellenbosch University, South Africa

DSI-SANEDI (Hub & Spokes) Centre of Competence in Renewable and Sustainable Energy, Stellenbosch University, South Africa

DSI Energy Secretariat in SANEDI, South Africa

NRF - National Research Foundation of South Africa

NRF Community of Practice in Waste to Value, South Africa

NRF Community of Practice in Climate Change Research with Society, South Africa

IEA Bioenergy - Task 36

IWWG, International Waste Working Group

IIASA, International Institute for Advanced Systems Analysis, Austria

Stellenbosch University, Faculty of Engineering

Stellenbosch University, Solar Thermal Energy Spoke

Stellenbosch University, Wind Energy Spoke

University of Cape Town, Wind Energy Spoke

University of Pretoria, Solar Thermal Energy Spoke

Nelson Mandela Metropolitan University, Solar PV Energy Spoke

Fort Hare University, Solar PV Energy Spoke

Groningen University, Netherlands

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Oslo University, Norway

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University of Ghana, Ghana

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University of Rome La Sapienza, Cagliari, Padua, Salerno, Italy

Promoted by:

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DSI Energy Secretariat in SANEDI

SANEDI – South Africa National Energy Development Institute

DSI-SANEDI RSE Hub & Spokes Centre of Competence

IEA Bioenergy

IWWG, International Waste Working Group

SPRINGER Nature – Springer Proceedings in Energy

MDPI – Sustainability Journal

JESA – Journal of Energy Southern Africa, University of Cape Town

ARUA Centre of Excellence in Energy, Stellenbosch University

African Doctoral Academy, Stellenbosch University
 ARUA-Guild Cluster of Research Excellence in Renewable Energy
 InnovUS, Stellenbosch University
 Wubbo Ockels School of Energy and Climate, Groningen University, Netherlands
 ENERghentIC, Ghent University, Belgium
 TUM Seed Centre, Technical University of Munich,
 UK Energy Systems Catapult, United Kingdom
 WEC-SA - World Energy Council - South African Committee
 ACEN, African Circular Economy Network
 IW/WG, International Waste Working Group
 RISE Academy - Rising to the Top Academic Leadership Academy, IFEES, Washington, USA

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Springer Proceedings in Energy
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PREFACE

Stellenbosch University will be hosting the Southern African Sustainable Energy Conference ([SASEC 2024](#)) from 13 to 15 November 2024 at the Lord Charles Hotel in the Western Cape of South Africa.

This year, in collaboration with the DSI-SANEDI RSE Hub and Spokes Programme, the ARUA CoE in Energy and the African Doctoral Academy (ADA) at Stellenbosch University, we will organise also pre-SASEC workshops on 11 and 12 November 2024 at STIAS, on **Academic Writing in Renewable Energy** (day 1) and on **Entrepreneurship and Commercialisation in Renewable Energy Innovation** (day 2), aimed at postgraduate students, postdoctoral fellows and early career researchers.

The Southern African Sustainable Energy Conference - SASEC was established as the official "voice" of the Department of Science and Innovation of South Africa's Centre of Competence in Renewable and Sustainable Energy (DSI-SANEDI (RSE) Hub and Spokes Programme), hosted by Stellenbosch University. Over the years, SASEC has evolved to become a truly international conference, with a Southern African flavour, that focuses on research, development and deployment of methodologies, technologies and systems related to sustainable energy (i.e. energy that can be replenished in the short-term, with no long-term environmental damage). SASEC 2024 provides the opportunity for researchers, engineers, industry practitioners and policy/decision makers to share and discuss recent developments in the field. It is a particularly good opportunity for postgraduate students to showcase their research progress, and to develop knowledge and networks in the field.

The scientific programme of SASEC 2024 is structured in 4 plenary/panel sessions, a policy roundtable, and 3 parallel sessions discussing 9 thematic areas for a total of **20 sessions** and includes more than **120 presentations**.

The presentations are organised in Oral sessions, Workshops, and Poster sessions. In addition to these traditional sessions, the Conference includes four plenary Focus Sessions and one Policy Roundtable, to be held in the morning, dedicated to specific themes of high public interest.

All abstracts, full papers and briefing notes submitted underwent a thorough peer-review process by a committee of 3 experts (per submitted paper), drawn from the Scientific Technical Committee. The SASEC 2024 Proceedings will be published by SPRINGER Nature in the SPRINGER Energy Proceedings Series, which will be available for purchase in March 2025. Selected papers will be identified for further submission (in an upgraded form) to participating scientific journals or book series: IET Journal, JESA, Sustainability (MDPI), SPRINGER Nature "Waste as a Resource" Series, ELSEVIER, etc.

Thematic Focus Areas discussed in parallel sessions:

- Solar thermal energy systems
- Solar PV energy systems
- Wind energy systems
- Green Hydrogen and Power2X
- Critical materials, end-of-life options and circularity of renewable energy technologies
- Bioenergy and Waste to Energy
- Just energy and Decarbonization transition
- Power systems planning, operations and demand side
- Renewable energy resource assessment and deployment, modelling and decision support tools

Themes discussed in plenary/panel sessions and policy roundtable:

Panel Session 1: The Power of RDI in the Economic Development of South Africa and the Region

Panel Session 2: The Power of Science Diplomacy in Building Sustainable Energy Corridors

Policy Roundtable: The Power of Science Diplomacy in Navigating a "Balanced" Just Energy Transition

Panel Session 4: New Skills Development for the Just Energy Transition

REVIEW OF PAPERS

Each abstract, full paper and/or briefing note submitted to the SASEC 2024 Secretariat underwent a **lengthy and careful peer-review process** carried out by a **review committee of 5 (five) experts**, including the Chair and the Scientific Secretary (Prof. Cristina Trois and Dr Richmore Kaseke), 3 (three) reviewers from an International Panel of Referees (See Scientific Committee). The SASEC 2024 Proceedings will be published by Springer Nature in the Springer Energy Proceedings Series, which will be available for purchase in March 2025. The Editor in Chief of Springer Proceedings in Energy will also provide an additional final review of the accepted papers, prior to publication, to ensure the high quality of the proceedings, in accordance to the publisher' standards. Selected papers will be identified for further submission, in an upgraded form, to participating scientific journals or book series: IET Journal, JESA, Sustainability (MDPI), Springer Nature "Waste as a Resource" Series, Elsevier, etc.

COMMITTEES

ORGANISING COMMITTEE

Name	Role
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Dr Richmore Kaseke	Scientific Secretary of the Conference and Coordinator of the Technical Review Committee
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Elmien Lovell	Financial Administration
Sandelize Heydenrycht	Assistant Logistics/Liaison Guest Speakers
Yumna Parker	2-day Pre-Workshops and liaisons with international guest speakers and ADA
Sedzani Ratsibi	Sponsorships and Coordination of DAY 2 workshop on Entrepreneurship of RE
Andrea Dell'Orto	2-day Pre-Workshops and liaisons with international guest speakers and ADA
Keziah Maher	Logistics

REVIEW COMMITTEE

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Dr Justice Chihota	CRSES, Stellenbosch University
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Prof Ernest van Dyk	Nelson Mandela University
Dr Chantelle Van Staden	Stellenbosch University
Dr Frederik Vorster	Nelson Mandela University

PROGRAMME

Day 1 - Wednesday, 13 November 2024

Time	Activity						
07h30 - 08h30	Arrival & Registration						
	Day 1 Plenary Session Venue: Somerset Suites 1&2						
08h30 - 09h00	Welcome & Opening Remarks: Prof. Cristina Trois (Chair)						
09h00 - 10h30	<p>Panel Session 1: The Power of RDI in the economic development of South Africa and the region Chair: Dr Khavharendwe Rambau (DSI) Panellists:</p> <ol style="list-style-type: none"> 1. Prof. Sampson Mamphweli (SANEDI) 2. Prof. Cristina Trois (DSI RSE Hub & Spokes Programme, SU) 3. Prof. Craig McGregor and Prof. Jack Fletcher (Green Hydrogen Platform-SU) 4. Dr Victor Sibiya (World Energy Council-SA Committee) <p>Moderator: Dr Richmore Kaseke (SANEDI) Discussion/Q&A from the audience</p>						
10h30 - 11h00	Day 1 Morning Coffee & Tea						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #e67e22; color: white;">Session 1A</th> <th style="background-color: #f1c40f; color: white;">Session 2A</th> <th style="background-color: #2980b9; color: white;">Session 3A</th> </tr> </thead> <tbody> <tr> <td style="background-color: #e67e22; color: white; text-align: center;"> Solar PV energy systems Venue: Somerset Suite 1 Chair: Prof. Ernest Van Dyk </td> <td style="background-color: #f1c40f; color: white; text-align: center;"> Green Hydrogen and Power2X Venue: Somerset Suite 2 Chair: Prof Jack Fletcher </td> <td style="background-color: #2980b9; color: white; text-align: center;"> Renewable energy resource assessment, deployment, modelling and decision support Venue: Somerset Suite 3 Chair: Prof. Bernard Bekker </td> </tr> </tbody> </table>	Session 1A	Session 2A	Session 3A	Solar PV energy systems Venue: Somerset Suite 1 Chair: Prof. Ernest Van Dyk	Green Hydrogen and Power2X Venue: Somerset Suite 2 Chair: Prof Jack Fletcher	Renewable energy resource assessment, deployment, modelling and decision support Venue: Somerset Suite 3 Chair: Prof. Bernard Bekker
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11h00 - 11h15	<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 33%; vertical-align: top;"> 88 Overview of Photovoltaic Module Quality Risks in South Africa Dr Jacqui Crozier Mcclelland </td> <td style="width: 33%; vertical-align: top;"> 105 Production process for a renewable cooking/heating fuel – gLFG Ms Candace Eslick Ms Bianca Tarboton </td> <td style="width: 33%; vertical-align: top;"> 24 Using Battery Energy Storage Systems and Renewable Energy to Reduce Municipality Energy Costs: A South African Town Case Study Mr Stefan Karamanski </td> </tr> </tbody> </table>	88 Overview of Photovoltaic Module Quality Risks in South Africa Dr Jacqui Crozier Mcclelland	105 Production process for a renewable cooking/heating fuel – gLFG Ms Candace Eslick Ms Bianca Tarboton	24 Using Battery Energy Storage Systems and Renewable Energy to Reduce Municipality Energy Costs: A South African Town Case Study Mr Stefan Karamanski			
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Time	Activity		
11h15 - 11h30	57 Behaviour of electrical characteristics of individual cells in a crystalline photovoltaic (PV) module operating under partial shading conditions Mr Poland Michael	149 Comprehensive assessment of green hydrogen production socio-economic and environmental impacts in South Africa Dr Noluntu Dyantyi-Gwanya	101 Forecasting for the Future: How Machine Learning is Surpassing Traditional Weather Prediction Methods Mr Divan Van Der Bank
11h30 - 11h45	80 Assessment of the Global Horizontal irradiance in relation to the Plane of Array irradiance models in South Africa's climate zones. Mr Brighton Mabasa	145 Improved activity in CO₂-hydrogenation over iron-based catalysts upon in-situ dosing of water Prof Eric Van Steen Mr Nicholas Featherstone	59 Adoption of renewable energy solutions by South African beverage manufacturers – case studies Dr Francois Rozon
11h45 - 12h00	56 Effects of partial shading on thermal and electrical characteristics of half-cell crystalline photovoltaic modules under different operational current-voltage points Dr Monphas Vumbugwa	146 Towards an evidence base to support Power-to-X (PtX) decision-making in South Africa: applying systems thinking, knowledge co-production and spatial analysis Mrs Luanita Snyman-van Der Walt	107 Bioenergy in South Africa's Long-Term Power System Planning Ms Storm Morison
12h00 - 12h15	109 Performance and Safety Testing of End-of-Life Photovoltaic modules Dr Jacqui Crozier Mcclelland	16 Additive manufacturing of multifunctional electrolyser components for hydrogen production Ms Fama Jallow	49 Conceptualising the effect on transformer maintenance due to electricity feedback into consumer microgrid from increased solar grid penetration Dr Dirk Johan Van Vuuren
12h15 - 12h30	Q&A	Q&A	Q&A
12h30 - 13h45	Day 1 Lunch		

Time	Activity	Activity	Activity
	Session 4A Solar Thermal energy systems Venue: Somerset Suite 1 Chair: Prof. Willem Le Roux	Session 5A Just Energy and Decarbonization Transitions Venue: Somerset Suite 2 Chair: Prof. Lorenzo Squintani	Session 6A Bioenergy and Waste-to-energy Venue: Somerset Suite 3 Chair: Prof. Edson Meyer
13h45 - 14h00	43 Conceptual Development of Domestic Water Heating Technologies in South Africa Incorporating the Low-Grade Heat Storage Material, Sodium Acetate Trihydrate Ms Cayley Hillier	156 Environmental impacts of green ammonia produced in South Africa, transported to Europe and used in Germany for heavy-duty transportation Prof William Stafford Dr Susan Byakika	62 Evaluation of zero dimensional furnace models for biomass fired boilers with the aid of CFD Mr Tinashe Kadakure
14h00 - 14h15	167 Feasibility of South African Natural Zeolites for Low Temperature Thermal Energy Storage Mr Muhammad Sheik	152 Unpacking the multi-level governance discourse on the local transition of electricity generation: A case study of the City of Johannesburg Mr Phetoho Rasebechele	110 Sustainable energy pathways: potential hydrogen production from dark fermentation of slaughterhouse waste Mr Gaogane Jephthah Gaogane
14h15 - 14h30	52 Thermal Energy Storage model for Hybrid Energy System Analysis Mr Frikkie Botha	12 Implementation of Firm-Dispatchable Generation in South Africa as Part of the Transition to a Sustainable Energy System Dr Stephen Clark	48 Unlocking the energy potential of organic waste through double-stage anaerobic digestion for methane and hydrogen production Mr Andrea Dell'Orto
14h30 - 14h45	164 Light trapping utilizing plasmonic nanoparticles in organic solar cells Ass Prof Newayemedhin Tegegne	118 Developing a framework for the insertion of Waste-to-Energy technologies in South Africa: An in-depth analysis of legislative barriers and drivers Prof Cristina Trois	153 Technology innovation system analysis of biogas in South Africa Mr Abiola Kehinde
14h45 - 15h00	46 Technology demonstration of a mobile solar-dish gas-turbine hybrid for Masia village Mr Jan Hendrik de Beer	18 Is Coal ash the new "green" material. Dr Kelley Reynolds-Clausen	
15h00 - 15h15	Q&A	Q&A	Q&A

Time	Activity		
15h15 - 15h45	Day 1 Afternoon Coffee & Tea		
	Session 7A <hr/> Wind energy systems Venue: Somerset Suite 1 Chair: Prof. Maarten Kamper	Session 8A <hr/> Power Systems Planning, Operations and Demand Side Management Venue: Somerset Suite 2 Chair: Prof. Harro Von Blottnitz	Session 9A <hr/> Bioenergy and Waste-to-energy Venue: Somerset Suite 3 Chair: Mr. Alberto Borello
15h45 - 16h00	2 Slip-Permanent Magnetic Coupling Transient Load Reduction Capabilities for Wind Turbine Gearboxes Mr Ryno Gerber	106 Emerging energy storage use cases for utilities in South Africa: A value stacking perspective Mr Tiaan Vivier	111 Assessing the availability of the organic fraction of solid municipal waste for conversion into biogas production in South Africa Mr Gaogane Jephthah Gaogane
16h00 - 16h15	37 Development of Neural Network-based Wind Power Forecasting Models Dr Armand A du Plessis Dr Arnold J Rix	67 Optimising the energy mix for Eco-Industrial Parks in developing countries: a least-cost analysis using PyPSA Mr Jan-Hendrik Grobler	90 Production and utilization options for biochar from biogas digestate Prof Mirko Barz
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16h30 - 16h45	87 Selection of glass alternative materials for manufacturing heliostat reflective facets Mr Jean Schnaar-Campbell	168 The potential of air-to-air heat pumps in the transition to carbon-free heating Prof Michel De Paepe	
16h45 - 17h00	Q&A	Q&A	Q&A
17h00 - 17h30	Poster Session		
17h45 - 20h00	Cocktail & Networking Event at Lord Charles Hotel		

Day 2 - Thursday, 14 November 2024

Time	Activity
07h30 - 08h30	Arrival & Registration
	Day 2 Plenary Session Venue: Somerset Suites 1&2
08h30 - 10h00	<p>Panel Session 2: The Power of Science Diplomacy in Building Sustainable Energy Corridors Chair: Prof. Trois (CRSES) and Prof. Scarlett Cornelissen (Dept. of Political Sciences-SU) Panellists:</p> <ol style="list-style-type: none"> 1. Eudy Mabuza, SA Science Counsellor to the EU (online) 2. Dr Laurent Bochereau, EU Science Counsellor to the AU (online) 3. Prof. Craig McGregor (Green Hydrogen Platform-SU) 4. Marlett Balmer (GIZ) and Dr Karen SurrIDGE (SANEDI) 5. Prof. Lorenzo Squintani (Groningen University/Hydrogen Valley Campus Europe) 6. Dr Ulco Vermeulen (Gasunie, NL) <p>Moderator: Alison April (SU) - Discussion/Response from diplomatic representatives</p>
10h00 - 10h30	Day 2 Morning Coffee & Tea
	Day 2 Plenary/Policy Round Table Venue: Somerset Suites 1&2
	<p>Policy Roundtable: The Power of Science Diplomacy in Navigating a “Balanced” Just Energy Transition Chair: Prof. Scarlett Cornelissen (Department of Political Sciences-SU) and Dr Riedwaan Kimmie (AIA Aerotropolis Institute Africa)</p>
10h30 - 12h00	<ol style="list-style-type: none"> 1. UK Energy System Catapult (online) 2. David Grüttner (Atmosfair) 3. Dr Harry Teifel (Idea 2 Business, Germany) 4. Prof. Cristina Trois (ARUA CoE in Energy/Hydrogen Campus Southern Africa HyCASA, SU) 5. Response from diplomatic representatives
12h15 - 13h30	Day 2 Lunch

Time	Activity	Activity	Activity
	Session 1B <hr/> Solar PV energy systems <hr/> Venue: Somerset Suite 1 Chair: Prof. Arnold Rix	Session 2B <hr/> Green Hydrogen and Power2X <hr/> Venue: Somerset Suite 2 Chair: Prof. Prathieka Naidoo	Session 3B <hr/> Renewable energy resource assessment, deployment, modelling and decision support <hr/> Venue: Somerset Suite 3 Chair: Monique Le Roux
13h30 - 13h45	64 Intelligent Single Axis Solar Tracker with Shade Optimization and Back Tracking Mr Matthew Sivewright	15 Additive manufacturing of porous transport layers for proton exchange membrane water electrolysis Dr Gerrit Ter Haar	28 Analysing the effect of climate change on Photovoltaic solar plants in South Africa Mr Tiaan Snyman
13h45 - 14h00	82 A Methodology for Evaluating the Performance of a Concentrator Photovoltaic Module Ms Elizabeth Hagemann	36 Optimal Sizing of a Green Ammonia Plant in South Africa Mr Joshua Woods	47 Forecast Accuracy for Solar Resource in Tshwane using SolCast Data Services Dr Lawrence Pratt
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14h45 - 15h00	Q&A	Q&A	Q&A

Time	Activity		
15h00 - 15h30	Day 2 Afternoon Coffee & Tea		
	Session 4B Wind and solar energy systems Venue: Somerset Suite 1 Chair: Dr Francois Rozon	Session 5B Power Systems Planning, Operations and Demand Side Management Venue: Somerset Suite 2 Chair: Dr Chantelle Van Staden	Session 6B Solar Thermal Energy Systems Venue: Somerset Suite 3 Chair: Prof. Michel De Paepe
15h30 - 15h45	147 Bandgap tuning for efficient perovskite-based solar cell device optimization using Sr-doped La₂NiMnO₆ as the absorbing material Dr Shah Aarif Ul Islam	115 Assessing the economy-wide effect of localizing renewable energy value chains in South Africa Ms Julia Tatham	41 Calibration of a multi-facet vacuum-membrane solar dish array Mr Duncan McGee
15h45 - 16h00	157 Modelling and comparison of solar thermal and PV assisted heat-pump technology for industrial process heat Prof Johannes Koke	11 Power system simulation software for modelling modern grids Mrs Gloria Paulus	53 Micro gas turbine for use in a solar thermal Brayton cycle Mr Evan Humphries
16h00 - 16h15	166 One-dimensional transient thermal model for predicting module temperatures in ground-mounted fixed-tilt and single-axis tracking PV systems Mr Brendan Willemse	130 A Comprehensive and Robust Digital Twin for Biomass Gasification Power Plant with CO₂ Capture Dr Peter Akhator	55 Initial testing of a heat exchanger for aluminium recycling and water heating from the exhaust of a solar-dish Brayton cycle Mr Tlou Mokobodi
16h15 - 16h30	54 An in-depth comparison of the performance of a solar PV powered heat pump compared to solar water heating at scale Mr Tshiamo Segakweng	31 A digital platform to enable virtual energy wheeling Ruan Botma Prof MJ Booysen	72 Heat flux distribution on the XCPC absorber of an external compound parabolic solar collector Mr Sarath Simon

Time	Activity		
16h30 - 16h45		95 Understanding the Reduction of Loadshedding Events: A Technical Analysis Mr Liam Snyman	32 Repurposing a vehicle mass flow sensor for measuring mass flow rate on a solar dish set-up Zwivhuya Lesly Muofhe Mr Tlou S Mokobodu
16h45 - 17h00	Q&A	Q&A	Q&A
18h00 - 21h00	Gala Dinner at Lord Charles Hotel		

Day 3 - Friday, 15 November 2024

Time	Activity
07h30 - 08h30	Arrival & Registration
	Day 3 Plenary Session 3 Venue: Somerset Suites 1&2
08h30 - 10h00	Plenary Session 3: Critical materials, end-of-life options and circularity of renewable energy technologies Chair: Dr Valentina Russo (CSIR)
08h30 - 08h45	29 Enhancing the Circularity of Green Hydrogen Technologies: A Lifecycle Assessment and Policy Strategy Approach Mr Anda Njeza
08h45 - 09h00	165 A Tsunami or a Blessing: Perceptions to PV Module Waste and its Potential Reuse in South Africa Ms Nicole Crozier
09h00 - 09h15	170 Introduction of Framework: Use of Drone Technology with Multispectral Data for Waste Management Strategy Determination Mr Tyrone Bright
09h15 - 09h30	140 An overview of end-of-life of MEAs fuel cells and their recovery via hydrometallurgical technique Ms Sinikiwe Mvokwe

Time	Activity
09h30 - 09h45	94 The Status Quo of Solar PV's Circular Economy in South Africa Mr Donald Fitzgerald
09h45 - 10h00	Moderator: Dr Neville Smith (SANEDI) Discussion/Q&A from the audience (30 mins)
10h00 - 10h30	Day 3 Morning Coffee & Tea
	Day 3 Plenary/Panel Session 4 Venue: Somerset Suites 1&2
10h30 - 12h00	Plenary/Panel Session 4: New Skills Development for the Just Energy Transition Chair: Prof. Prathieka Naidoo (Sasol/NRF SARCHI Chair in Green Hydrogen) Panellists: 1. Dr Harry Teifel (Idea 2 Business, Germany) 2. Dr Natalie Kowalik (African Doctoral Academy, SU) 3. Marlett Balmer (GIZ, Germany) 4. Marianna Petrosillo (RES4Africa Foundation) 5. Dr Sharon Becker (Impact Hydrogen, Netherlands) Moderator: Yumna Parker (ARUA CoE in Energy, SU) - Discussion/Q&A from the audience
12h00 - 12h30	Closing remarks: Prof. Cristina Trois (Chair) and Dr Richmore Kaseke (Scientific Secretary)
12h30 - 13h30	Day 3 Lunch
	Conference Ends

ABSTRACTS

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