

South African International Renewable Energy Conference

Cape Town International Convention Centre

4th – 7th October 2015

Conference Report



Contents

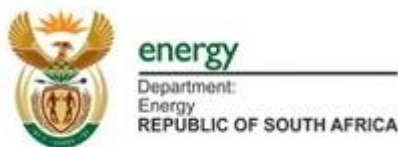
Messages from the Hosts and Convenor.....	3
Welcome to South Africa – A message from the South African Minister of Energy	4
A message from the Chair of the South African National Energy Development Institute	5
A message from the German Federal Minister for Economic Cooperation and Development	6
A message from the Chair of the Renewable Energy Policy Network for the 21 st Century	7
Conference Declaration	9
Overview of the Conference Programme.....	16
Pre-Conference: Setting the Stage	19
Side Events.....	19
Renewable Energy Expo.....	22
Day One: Challenges and Opportunities for RE	23
Official Conference Opening.....	23
High-level Panels	26
Parallel Sessions	29
Energy Access.....	29
Socio-economic Development	Error! Bookmark not defined.
Africa Continental Interconnectivity including Africa Clean Energy Corridor.....	Error! Bookmark not defined.
Regulatory Frameworks	Error! Bookmark not defined.
Finance Mechanisms.....	34
Skills Development.....	35
Road to COP21: Renewables solution agenda	Error! Bookmark not defined.
Side Events.....	35
Day Two: Innovation in RE Applications and Technologies.....	37
Opening Plenary	37
Parallel Sessions	39
Energy-smart Cities	39
Transport and Eco-mobility	40
Technology Innovations - Wind: grid-based	41
Technology Innovations - Solar (PV): Grid-based	42
Technology Innovations – Concentrated Solar Power	43
Cooking Energy	44
Energy Storage	45
Integration of Renewable Energy and Energy Efficiency into High Temperature Applications	46

Technology Innovations – Wind: Hybrid	47
Technology Innovations – Solar: Off-grid.....	48
Rural Electrification: Decentralised aspects.....	49
Technology Innovation: Geothermal	50
Technology Innovation – Hydro/Ocean	51
Technology Innovations: Biomass.....	52
Side Events.....	53
Closing Plenary – Key findings from SAIREC and adoption of SAIREC declaration	54

Messages from the Hosts and Convenor

In October 2015, South Africa became the sixth country, and the first in Africa, to host the International Renewable Energy Conference (IREC). Convened by the Renewable Energy Policy Network for the 21st Century (REN21), IREC is a high-level political conference series hosted by a national government. Previous hosts include: Bonn, Germany (2004), Beijing, China (2005), Washington, USA (2008), Delhi, India (2010), Abu Dhabi, UAE (2013).

The South African International Renewable Energy Conference – SAIREC 2015 – provided a global platform for government ministers, high-level decision makers, experts, specialists and thought leaders, as well as private sector players and civil society, to discuss and exchange their vision, experiences and solutions to accelerate the global scale-up of renewable energy.



SAIREC was hosted by **South Africa's Department of Energy**, under the leadership of the Minister of Energy, Ms Tina Joemat-Pettersson. South Africa's pioneering Renewable Energy Independent Power Producers Procurement Programme is implemented through the Department.



The **South African National Energy Development Institute (SANEDI)**, a state-owned entity, co-hosted the event. SANEDI is responsible for researching and developing solutions around energy innovation and efficiency to promote energy security and sustainability.



REN21 is a multi-stakeholder network based at the United Nations Environment Programme (UNEP) that brings together key actors to advance renewable energy and is convenor of the IREC conferences of which SAIREC is the latest.



On behalf of the German Federal Ministry for Economic Cooperation and Development, **GIZ** provides services globally to support cooperation for sustainable development and provided the core funding for the conference.

Welcome to South Africa – A message from the South African Minister of Energy



Minister Tina Joemat-Pettersson

On behalf of our Government, let me take this opportunity to welcome you all to South Africa and to the African Continent for those who are coming from offshore. We are privileged and grateful to have been selected to host this international gathering that includes Cabinet Ministers, the private sector, academia and other experts, as well as delegates from civil society.

Hosting this International Energy Conference is an opportunity that could not be missed, given that Africa is progressing on an economic trajectory that challenges our energy needs. The world over, the energy security problem has taken on an exciting dimension relating to renewable energy deployment.

Although the African continent is richly endowed with natural resources to generate energy, to date we have not taken full advantage of tapping into them for our benefit. As such, Africa needs to embark on a journey to broaden our options by diversifying our energy mix and harnessing renewable energy sources. South Africa is ready to build on the successes of previous IREC hosts: Germany, China, the United States of America, India are the United Arab Emirates.

It is worth reflecting on what has been achieved to date and to chart a way forward with all like-minded countries that want to invest in the clean technology sector and renewable energy in particular. It is our belief that the renewable energy value chain offers solutions for increasing energy access, security of supply, emissions reduction, sustainable development and significant improvement in socio-economic development.

We welcome you all to South Africa and we invite you all to join us in this platform to create partnerships in scaling up renewable energy and increase the benefits through investments, building skills and creating jobs to strengthen our economies. We hope that you will also take the opportunity to enjoy the beauty and richness of South Africa's landscape and our people.

H.E. Ms Tina Joemat-Pettersson
Minister of Energy, Republic of South Africa

A message from the Chair of the South African National Energy Development Institute



Nothemba Mlonzi

On behalf of the South African National Energy Development Institute (SANEDI), I would like to welcome you to the Mother City.

The International Renewable Energy Conferences are synonymous with the growth of the renewable energy market worldwide.

Now it's Africa's turn to shine. The growth of the renewable energy market in South Africa has been nothing short of meteoric and is testament to what political commitment, a responsive private sector and a clearly defined plan can achieve. SAIREC 2015 will highlight the inherent wealth in renewable energy resources on the continent, as well as identify key investment opportunities.

The event will be a place of learning, where best practice, best of breed technologies and exciting new developments will be shared with delegates.

SANEDI is proud to be associated with SAIREC 2015 for a multitude of reasons. Firstly, SANEDI has a mandate in South Africa to identify and implement solutions based on clean energy technologies and SAIREC 2015 creates an opportunity to highlight the latest and best technologies available in the market today.

Secondly, SANEDI is instrumental in designing and supporting training programmes, as well as participating in International forums to help build research capacity in South Africa. Many world-renowned subject matter experts will attend SAIREC 2015 and SANEDI looks forward to welcoming them to our country.

Lastly, SAIREC 2015 is an opportunity for us to profile the array of projects that we undertake on behalf of South Africa, raising awareness for these projects that have been designed to reduce carbon emissions, accelerate the uptake of clean energy technologies and transform the job market in terms of gender and equity.

I want to welcome all our delegates to this auspicious event. Your inputs at SAIREC 2015 will contribute greatly to its success and I look forward to your participation over the coming days.

Ms Nothemba Mlonzi
 Chairperson, SANEDI Board

A message from the German Federal Minister for Economic Cooperation and Development



Dr Gerd Müller

There can be no development without energy. And yet about one sixth of the world's population has no access to electricity or modern cooking energy. Furthermore, power generation using fossil fuels is contributing massively to global warming.

That is why we are seeking to bring about a global energy transition towards greater use of renewable energy sources. The South African International Renewable Energy Conference (SAIREC) is an excellent platform in order to advance a global transition towards sustainable energy systems. I am confident that SAIREC will also make an important contribution to the preparations for the United Nations Climate Change Conference being held in Paris later this year.

We, in Germany, are not only working to achieve an energy transition back in our own country but are also supporting important initiatives with the same aim all around the world. One such example is the African Renewable Energy Initiative, AREI, launched by the African Union. Under the Initiative, an extra 10 gigawatts in renewable energy capacity is to be installed in Africa by 2020. This is equivalent to the capacity of ten large coal-fired power stations. Angela Merkel and the other G7 heads of state and government declared their support for the African Renewable Energy Initiative (AREI) at the G7 summit at Schloss Elmau in June this year, and called for a carbon-free world economy by the end of the century. Their appeal has spelled out the really big goal.

There could not have been a better choice than South Africa to host this conference, for South Africa has increased its use of energy from renewable sources at a remarkable rate in recent years. I would like to thank the South African government for its committed work and generous hospitality. I wish you and the other participants a lively and fruitful exchange of experience during the South African International Renewable Energy Conference.

Dr Gerd Müller

Federal Minister for Economic Cooperation

A message from the Chairman of the Renewable Energy Policy Network for the 21st Century



Dr. Arthouros Zervos

There has been a rising awareness worldwide that renewable energy and energy efficiency are critical not only for addressing climate change, but also for creating new economic opportunities and for providing energy access to the billions of people still living without modern energy services. Over the past decade, and particularly in recent years, advances in renewable energy technologies, increases in capacity, and rapid cost reductions have occurred globally. This has attracted significant investment in renewable energy.

It is my honour to welcome you to the South Africa International Renewable Energy Conference (SAIREC), the first International Renewable Energy Conference on the African continent. SAIREC comes at a time when an energy transition towards renewables is accelerating worldwide. On the African continent, South Africa is leading the way with its Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) and is therefore the ideal host for such an international gathering.

Under the theme of RE-Energising Africa, delegates at SAIREC will have the opportunity to discuss the renewables value chain, regulatory frameworks for a transition to renewables, how to improve energy access with renewables, the role of women in renewable energy, advances in renewables in energy smart cities, in transport and eco-mobility and much more. Plenary and parallel sessions, side events and an accompanying exhibition provide an opportunity to discuss, learn and network among a wide variety of players.

The IREC conferences provide a multi-stakeholder platform for government, private sector and civil society leaders to address jointly the goal of advancing renewable energy. SAIREC is the sixth IREC, building on the success and outcomes of the previous events in Abu Dabi (2013), Delhi (2010), Washington (2008), Beijing (2005), and Bonn (2004). It is the first IREC to be held on the African continent. SAIREC benefits from the generous backing of the German government and from the coordinated efforts of the Department of Energy - South Africa, SANEDI and REN21

It is our sincere hope that SAIREC will serve as a catalyst for renewables, both on the African continent and globally, helping to meet the energy needs for all.

Dr. Arthouros Zervos
Chairman, REN21

RE-Energising Africa!

SAIREC welcomed 3,600 registered participants from 82 different countries. Participants were drawn from governments, the private sector, civil society and local and international NGOs, and given the focus on Africa, representation from African countries was particularly strong. Many of the world's leading renewable energy experts were present to share their insights and perspectives in the panel discussions, parallel sessions and side events.



Renewable Energy has a vital role to play in Africa's future. The impact of making clean, safe energy accessible to all has the potential to transform communities, creating new opportunities for the next generation. On the opening day of the conference, winners of the RE-Energising Africa Art Competition were announced by the Head of South Africa's Independent Power Producers office, Karen Breytenbach. The competition involved primary schools from areas in which projects under South Africa's REIPPP programme have been established.

The Cape Town International Convention Centre housed the event with efficiency and style. The cocktail reception to welcome participants on Sunday the 4th October 2015 and the next day's gala dinner afforded conference participants opportunities to mingle and make the connections that put faces to names.

Conference Declaration



SAIREC DECLARATION adopted at the SOUTH AFRICAN INTERNATIONAL RENEWABLE ENERGY CONFERENCE (SAIREC) Cape Town, 4 – 7 OCTOBER 2015

1. Ministers and Government Representatives from 82 countries as well as representatives from the private sector including NGOs, academia, business and industry as well as international organisations and civil society participated in the South Africa International Renewable Energy Conference 2015 (SAIREC, 4 – 7 October 2015 in Cape Town) with the aim of up-scaling and mainstreaming renewable energy in order to achieve a global sustainable energy transition. The SAIREC delegates expressed their conviction that the increased deployment of renewable energy will have a direct impact on improved global energy access, improved energy security, on mitigating greenhouse gas emissions and climate change as well as on sustainable economic development. SAIREC is the sixth meeting in the series of the International Renewable Energy Conferences (IRECs) building upon successful outcomes in Abu Dhabi in 2013 (ADIREC), New Delhi in 2010 (DIREC), Washington in 2008 (WIREC), Beijing in 2005 (BIREC), and in Bonn in 2004 (Renewables 2004).
2. SAIREC is the first international conference dedicated to renewable energy in the service of sustainable development after the Conference on Financing for Development (July 2015 in Addis Ababa) and after the adoption of the 2030 Agenda for Sustainable Development in September 2015 by the UN-General Assembly which will be guided by 17 global sustainable development goals (SDGs). Participants of SAIREC considered SDG 7 on sustainable and modern energy for all, with its three targets on access, renewables and energy efficiency, to constitute a solid guiding framework for their deliberations and future cooperation with special focus on RE-energising Africa.
3. With a view to a successful outcome of the 21st Conference of the Parties under the United Nations Framework Convention on Climate Change (UNFCCC), participants further underlined the central role of renewable energy and energy efficiency in global endeavours to mitigate climate change, and its contribution to the global solutions in keeping anthropogenic induced global warming below the dangerous 2 degree Celsius threshold.

4. Furthermore SAIREC is a building block of international endeavours to give effect to the UN Decade on Sustainable Energy for All (2014 - 2024).

KEY ELEMENTS TO ENHANCE THE ENERGY TRANSITION WITH RENEWABLES IN AFRICA AND GLOBALLY

5. We note that to **make universal access a reality** by 2030, 1.3 billion people, out of which 621 million in the Sub-Saharan region, should be provided access to electricity. The scale of the challenge requires that all approaches, including grid and off-grid solutions are taken into account and adopted based on national appropriateness and efficiency principles. Rural and urban demands can best be met with a diverse technology mix that takes full advantage of sub-Saharan Africa's exceptional and sustainable solar, wind, geothermal, biomass, and hydropower resources. Furthermore, as of today 2.9 billion people lack access to clean forms of cooking energy which needs to be addressed in order to achieve the universal access target.
6. We acknowledge the **dynamic development that renewable energy has seen** over the last years. Due to the rapid cost reduction, in particular of solar and wind energy, renewable technologies in some markets have become the technology of choice. Together with energy efficiency, it enables sustainable energy access especially for the poor, thus promoting social justice; it creates economic and job opportunities; it improves air quality and mitigates climate change; it can contribute to heightened food and water security and gender equality; and it enhances energy security, human health and sustainable development. In order to make the global transition to renewable energy happen rapidly, the following elements are crucial:
7. **Promoting transparent and effective procurement process:** This has been identified as one of the restrictive enablers in increasing the rollout of RE projects in Africa and especially in SADC. South Africa's successful renewable energy competitive Bidding and Procurement process is regarded as the main driving force behind the large interest in the country's renewable energy programme, but also contributing in driving down the costs of RE projects. The SA IPP Unit services and experience have been offered to the SADC Region and Africa to manage their renewable energy projects bidding and procurement processes.
8. **Prioritising renewable energy globally:** The world is richly endowed with renewable energy resources – which should rapidly be developed in support of a low-carbon future. Today, renewable energy technologies are viewed not only as tools for improving energy security and mitigating and adapting to climate change, but are also increasingly recognised as investments that can provide direct and indirect sustainable economic advantages by reducing dependence on imported fuels; improving local air quality and safety; advancing energy access and security; propelling economic development; and creating jobs.
9. Africa is richly endowed with renewable energy resources. Nevertheless, the continent overall is still facing the highest energy poverty in the world. With the

support of **financing, technology and institutional capacity building** from developed countries and the private sector, Africa will be able to greatly enhance its economic, social and environmental development using a diversity of renewable energy sources.

10. **Skills transfer and development:** Noting the shortages of skills coupled with limited financial resources for training, increased cooperation in skills development in this sector is a priority. In order to realise Africa's potential as a technological and industrial hub, it is imperative, with the help of regional resource assessment projects, to develop the necessary skills base to facilitate technology transfer, and to ensure that technologies are needs-driven and appropriate for local conditions including undertaking regional resource assessment projects.
11. **Securing financial resources:** A key constraint to the effective execution of both small and large-scale renewable energy projects is the lack of resources for project preparation and development – from concept to financial close and execution. In addition, most major energy projects require long term finance with repayments linked with project revenue generation. In developing countries the revenue generation can be inadequate to support energy infrastructure projects, interregional transmission and renewable energy projects. Innovative financial tools and mechanisms should be deployed to mitigate such challenges. In this context, we welcome the recent consensus reached on infrastructure financing at the Third International Conference on Financing for Development held in Addis Ababa in July 2015. The newly created Green Climate Fund should also provide a new finance stream for renewable energy deployment. A special challenge to be addressed is how to raise equity for domestic and local investors in developing countries, such as local communities.
12. **Research and Development:** We reaffirm the importance of investments in research, development and deployment (RD&D) and of international cooperation in RD&D for more cost-effective and advanced energy technologies. In many African countries, investments in targeted research and development in the energy sector are much lower than in other comparable sectors of the economy and incommensurate with the scale of the task at hand.
13. **Regulatory Frameworks:** Costs for renewable energy have already decreased significantly, yet sustainable energy will only become available for all if we continue to scale up both grid-connected and off-grid renewable energy deployment to set in motion a virtuous cycle of cost-reduction followed by even more significant scaling up. Consistent and sustained and long-term government policies are important to provide investment security and impact favourably on technology deployment. Supportive, reliable and predictable market and policy frameworks, procurement policies, a level playing field, providing access to affordable long-term finance, all will help increase the uptake of renewable energy. The integration and mainstreaming of renewable energy into national and regional strategies for economic and social development, development of national climate policy, agriculture, industrial development, education, health and family welfare, will further provide more opportunities for

scaling-up. We call upon utilities to adapt to this new paradigm of decentralised electricity generation and to develop new business models.

14. We acknowledge the success of **South Africa's Renewable Energy Independent Power Producers Procurement Programme** which resulted in massive upscaling of renewable energy power capacity, while at the same time significantly decreasing electricity generation cost, creating socio-economic and environmentally sustainable growth, and starting a renewable energy industry in South Africa. We underline the value of implementation models that include small-scale community-owned or cooperative initiatives.
15. We emphasise the role that **decentralised energy supply** plays in the global energy transition, especially on the African continent. Off-grid and mini-grid systems, as well as hybrid systems for transition periods play a crucial role in enabling access to energy through renewables in rural areas.
16. We further recognize the role that the integration of renewable energy in **urban planning** can play in improving infrastructure and enhancing quality of life in cities globally and in Africa.
17. We call for cooperative international action to **strengthen human and institutional capacities** in developing countries to achieve the Sustainable Development Goal on Energy, stressing the importance of the United Nation's "Sustainable Energy for All" (SE4All) initiative including IRENA as the renewable energy hub within SE4All and the SE4All Africa Hub hosted at the African Development Bank in partnership with the African Union Commission, the NEPAD Agency and UNDP. We also acknowledge the important role of the Committee of African Heads of State on Climate Change (CAHOSCC) under the UNFCCC. We call for close cooperation and coordination with local and regional actors to mainstream activities.
18. **Localising supply chains and local investment:** Whilst growing African energy economies, we need to increase localisation of supply chains for not only the supply of equipment and plants, but also the maintenance and operation of facilities, while recognising the benefits of and the need for an open market to attract international investments. Installations with local ownership can make sure that the local communities benefit directly and that they are involved in the planning process. This will create jobs and grow skills as well as may reduce costs and will substantially increase social acceptance.
19. **Integrated planning:** The energy sector does not operate in isolation; infrastructure such as power lines, pipelines, water, and transport are interdependent. Integrated planning is critical to the sustainability and further development of our economies and societies. Furthermore, uptake of renewable energy especially in Africa requires reliable, secure, and efficient transmission infrastructure which can be achieved through regional interconnectivity enhanced by integrated planning and harmonised regulatory policies. A nexus approach that integrates policies, especially regarding energy, water and food security, can help to identify synergies and avoid conflicts.

20. We highlight the need to advance **national and regional market designs** including the phasing-out of fossil-fuel subsidies to ensure a reliable, cost-efficient and effective market and system integration of large shares of renewables, guaranteeing the highest possible degree of supply security, while keeping the cost down for consumers and industry.
21. We urge the countries in Africa and also in other continents to develop and implement **National Renewable Energy Action Plans** with clear targets in terms of quantity and time horizon for the deployment of all renewable energies available in a country such as biomass/biogas, wind, solar electricity and heat, hydro and geothermal energy and to coordinate the progress on a continental level. In this regard we welcome the development of **SE4All Action Agendas** as umbrella energy sector development documents looking at access, renewables and energy efficiency in a holistic manner, which are under development in more than 25 African countries.
22. Noting the **significant contribution of women** to society and economies globally and on the African continent, we emphasise the importance of involving women in all stages of sustainable energy development, keeping in mind lack of access to modern energy services places a particularly heavy burden on women.
23. We urge an additional effort to **promote sustainable cooking** that concentrates on the deployment of new, sustainable and efficient technologies for the supply of energy for cooking in rural Africa such as adapted biogas installations, improved cook stoves in combination with solar energy, new efficient technologies for charcoal production, programs for reforestation and sustainable forest management.
24. **Regional trade and energy resource development:** We encourage enhanced support from development partners for scaling up regional energy trade and developing of clean and renewable energy resources. We note the urgency to support regional strategies and complete key regional transformational projects that will secure sustainable, efficient and affordable energy supply based on economies of scales and diversification of the energy mix at the power pool level and other associated structures.
25. **Programme for Infrastructure Development in Africa:** We acknowledge the role of PIDA, the Programme for Infrastructure Development in Africa in driving better cooperation and collaboration between national, regional and international bodies to develop a vision, policies, strategies and a programme for the development of priority infrastructure in energy.
26. We welcome **ELECTRIFI** as a unifying initiative facilitating the provision of “patient” capital needed to up-scale access to the energy poor with renewable energy.
27. **Clean Energy Corridor Initiatives:** We highlight the importance of the Africa Clean Energy Corridor initiative, put forward by the International Renewable Energy Agency (IRENA) and endorsed by Ministers from countries of the Eastern Africa Power Pool (EAPP) and the Southern African Power Pool (SAPP) at the fourth IRENA Assembly in January 2014, promoting renewable power to support Africa’s economic growth. By

2030, half of all electricity in Eastern and Southern Africa could come from clean, indigenous, cost-effective renewables, allowing for a substantial reduction in carbon dioxide emissions. This Corridor has become a model of regional cooperation in the action on climate change and should be replicated in other parts of the world.

28. **African Renewable Energy Initiative (AREI):** We highlight the importance of the African Union Assembly's decision Assembly/AU/16 (XXVI) on accelerated access to energy in Africa and the African Renewable Energy Initiative, which has been considered by the Committee of African Heads of State and Government for Climate Change (CAHOSCC) and the African Ministerial Conference on the Environment (AMCEN). We welcome the expression of support for the African Renewable Energy Initiative by the G7 in its Elmau communiqué and the coordination work that is underway between AMCEN and the G20 to ensure synergy with the G20 Energy Access Action Plan.
29. **Regional cooperation:** We stress the importance of regional centers as created by UNIDO and its partners – in particular in Africa ECREEE, SACREEE and EACREEE - as a powerful way to simultaneously address the challenges of energy access, energy security and climate change mitigation and welcome the establishment of a renewable energy and energy efficiency center for the SADC region as agreed by ministers during the 34th meeting of Southern African Development Community (SADC) end of July 2015 in South Africa. Furthermore, we welcome the work of UNIDO and REN21 on regional reports on renewable energy and energy efficiency as reference points for the work of these centers.
30. **International cooperation:** We emphasise the role that international cooperation plays in fostering renewable energy, energy efficiency and modern and sustainable energy access globally and on the African continent.
31. We welcome **close collaboration between IRENA, the International Energy Agency (IEA) and REN21** and contributors to these organisations on collecting streamlined renewable energy data globally, and we encourage further policy development and best practice sharing. The integration and mainstreaming of renewable energy into national sustainable development strategies for poverty reduction, industrial development, agriculture, education, health and family welfare will additionally provide opportunities for scaling-up.
32. Furthermore, we encourage the participation of African countries in the **International Energy Agency (IEA) Technology Network**, which is an effective catalyser for multilateral cooperation and for sharing best practices in renewable energies.
33. We welcome the **Africa-EU Energy Partnership (AEEP)** as an exemplary strategic cooperation platform between the African continent and the European Union for jointly addressing energy challenges. We further recognise the efforts of the G20 to foster energy access, renewable energy, and energy efficiency.

VOTE OF THANKS

34. We express our sincere and deep appreciation and thanks to the people and the government of South Africa for successfully organising this conference and for their hospitality and generosity.



Overview of the Conference Programme

Preconference: Sunday 4th October 2015

08:00 – 18:00	Registration
10.00 – 17.30	SAIREC Side Events
18:00 – 21:00	Welcome Cocktail Reception

Day 1: Monday 5th October 2015

07:00 – 08:45	Registration
09:00 – 10.30	Official Conference Opening
10:30 – 11:00	Tea Break and Media Briefing

Ministerial and High-level Panels

11:00 – 12:00	Sustainable Energy for All: Renewable Energy, a tool for economic development and poverty alleviation
12:00 – 13:00	Energy Transition with Renewables in Africa and Globally
13:00 – 14:30	Lunch / SAIREC Side Events

Afternoon Parallel Sessions

14:30 – 16:00	Africa Continental Interconnectivity including Africa Clean Energy Corridor	Regulatory Frameworks	Socio-economic Development	Road to COP21: Renewables solution agenda
16:00 – 16:30	Tea Break			
16:30 – 18:00	Energy Access	Finance Mechanisms	Skills Development	Road to COP21: Renewables solution agenda (cont.)
18:00 – 19:30	SAIREC Side Events			
19.30 – 23.00	Gala Dinner (by invitation only)			

Day 2: Tuesday 6th October 2015

09:00 – 09:30	Day 2 Opening Plenary
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Morning Parallel Sessions

09:30 – 11:00	Energy-smart cities	Transport and Eco-mobility	Technology Innovations – Wind: Grid-based	Technology Innovations – Solar PV: Grid-based	Technology Innovations – CSP
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11:00 – 11:30	Tea Break
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11:30 – 13:00	Cooking Energy	Energy Storage	Integration of RE + EE into High Temperature Applications	Technology Innovations – Wind: Hybrid	Technology Innovations – Solar: Off-grid
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13:00 – 14:30	Lunch / SAIREC Side Events
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Afternoon Parallel Sessions

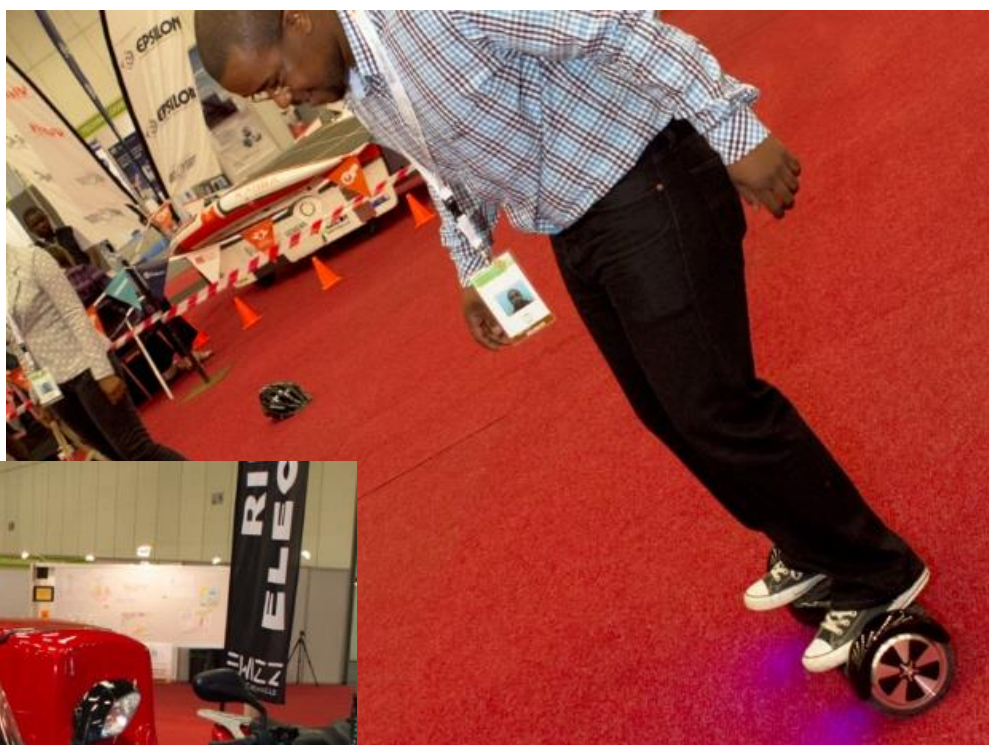
14:30 – 16:00	Rural Electrification: Decentralised aspects	Technology Innovations - Geothermal	Technology Innovations - Hydro	Technology Innovations – Biomass
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16:00 – 16:30	Tea Break
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16:30 – 18:00	Closing Plenary: Key findings from SAIREC and adoption of SAIREC declaration Auditorium 1
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Field Trips: Wednesday 7th October 2015

SAIREC site visits to renewable energy installations
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REN21 Renewable Energy Policy Network for the 21st Century



Preconference: Setting the Stage



Sunday the 4th October provided an opportunity for delegates to register and receive their conference packs at the Cape Town International Convention Centre (CTICC) and attend a range of stimulating side events to prime them for the formal conference proceedings on the Monday.

A cocktail reception was held on Sunday evening at the CTICC to welcome delegates to the conference. At the event, the winners of the RE-Energising Africa Art Competition were announced by the Head of the Independent Power Producers office at the South African Department of Energy, Ms. Karen Breytenbach. This competition was held amongst primary schools from areas in which projects under South Africa's REIPPP programme have been established. Another highlight was the announcement of the winners of the small projects bidding round (<https://www.ipp-smallprojects.co.za/>) of South Africa's Renewable Energy Independent Power Producers Procurement Program (REIPPP).

Side Events

Twenty pre-conference side events were held over the course of Sunday, with a further 21 side events being held during lunch and in the evenings on Monday and Tuesday.

Pre-Conference Side Events – Sunday 4th October

The side events provided an opportunity for delegates to learn about and engage with a wide range of renewable energy initiatives and projects. Some of the highlights included

Promethium, in partnership with **zaRECS** and **Nano Energy** presented their research on opportunities afforded by the South Africa's Carbon Tax to stimulate the market for renewables. There is already a self-regulating voluntary market for Renewable Energy Certificates (RECs) that have the potential to be traded as offsets under the carbon tax. The JSE has tested a trading platform. The key message of the session is that, particularly for community-based projects, RECs can provide an affordable, practical mechanism for ramping up the availability of carbon offsets under the Carbon Tax.

The **IRENA Virtual Sustainable Energy Marketplace in Africa** is a virtual database of projects, service providers and technology suppliers, host governments and financiers. It already contains over 300 renewable energy projects in development stages totalling 57 GWs as well as information on policy and regulations. The marketplace is intended to support initiation, development and financing of sustainable energy markets by improving market transparency and providing powerful search tools to help stakeholders find each other and make contact. www.irena.org/marketplace

The **IPP Office of SA's Department of Energy (DoE)** side event showcased the country's REIPPP programme; South Africa's flagship programme for renewable energy implementation that provides lessons learned and best practice models of global relevance. In 4 bidding rounds, 92 projects have been awarded to a value of over R192 billion, bringing a total of 6328 MWs online. The programme also stimulates the local RE Industry: Since its inception, 19,000 job years have been created and R19.1 billion has flowed to socio-economic development and enterprise development activities. It has established the Northern Cape as home to the world's largest solar projects.

BAPEPSA is an initiative of the Dutch and South African governments to develop an action plan for increasing the utilisation of biomass for electricity generation. The side event explained that biomass can perform as a base load power generator, contributing to the electricity grid during peak consumption times, and as a result can address South Africa's load shedding challenges while mitigating GHG emissions. In purely economic terms biomass makes sense, and sustainable implementation is needed to see this sector realise its potential.

SAPVIA hosted a side event highlighting the concept of a potential for rooftop PV to provide base load electricity. The challenge in SA is to establish a legal and technical framework governing the generation and sale of electricity into the grid that is practical for rooftop PV and can help achieve scale. Cape Town City is piloting a model that allows small-scale rooftop PV electricity generators, such as home-owners, to feed into the grid.

UNIDO International Center for Small Hydro Power (ICSHP), hosted a side event that explored the huge – and as yet largely untapped potential for small-hydro electricity

generation in Africa. Opportunities range from small projects involving rural farmers, to projects involving municipal water infrastructure in urban centres.

The **Alliance for Rural Electrification's** side event presented a variety of approaches that demonstrate the viability of innovative approaches to financing and developing rural electrification projects. These included fee-for-service models where communities pay a tariff for solar PV electricity.

The **Africa Clean Energy Corridor** event illustrated the roles of IRENA and the AU commission in the **Africa Clean Energy Corridor (ACEC)** process along with NEPAD implementing on behalf of the African Union (AU). The ACEC involves 21 countries in East Africa and has recently been extended in a similar programme to the ECOWAS (West African countries). ACEC drives energy cooperation between countries and facilitates the exchange of information and ideas to help create much-needed harmonisation of energy policy. Through this initiative, African government ministers are starting to discuss truly ambitious regional energy programmes on the order of 100-300 Gigawatts by 2030.

The **SANEDI Investor Forum** provided a platform for companies engaged in innovative renewable energy projects to provide short, direct presentation on investment opportunities and challenges, with questions and answers directed at the panel and presenters. Among the projects presented was the business case for energy from anaerobic digestion of bio-energy crops grown on mining-degraded land. Projects like these have the potential to convert environmental liabilities into assets, generating affordable electricity and reducing the carbon footprint of mining companies – and therefore, potentially, their liability in terms of South Africa's proposed carbon tax.



Renewable Energy Expo

The conference exhibition proved popular, providing delegates with an opportunity to view a diverse array of renewable energy technologies, and obtain information about approaches to increasing renewable energy uptake.

The SAIREC exhibition contained a dedicated eco-mobility section. Delegates could be seen taking a break from the main proceedings to ride electric bicycles powered by the energy-dense modular battery systems being developed by the **Energy Storage Innovation Lab of the University of the Western Cape**, one of the fascinating exhibits at **Department of Science and Technology's** stand.

The **Nelson Mandela Bay University** stand showcased their fascinating work on the use of microalgae to usefully agglomerate fine coal discards into a high quality fuel and significantly enhance the performance of pyrolysis in converting coal to oil. The microalgae processes have a continuous growth regime that cleans non-potable water and can be fed by CO₂ and NO_x in flue gases, potentially reducing the carbon footprint of coal-power plants.

The renewable energy demonstrations and products proved a popular aspect of the exhibition. **Total** showcased a number of different solar PV products, including an all-in-one battery, panel and light. The **University of Stellenbosch's Centre for Renewable and Sustainable Energy Studies** had a heliostat model on display. Electric vehicles on display included the **University of Johannesburg's** long distance solar PV vehicle, the **Nissan leaf** and an electric scooter.

The **City of Cape Town's** exhibition stand showed their implementation of feed-in tariffs for home-owners and businesses. **NERSA** is building on Cape Town's experience to develop municipal guidelines that promise to boost small-scale renewables.

Government stands such as the **German Pavilion** and **Austrian Development Agency** illustrated national approaches to renewables. Delegates could also collect information on renewables including the latest status report on renewables from the **REN21 networking area**. The *SADC Renewable Energy and Energy Efficiency Status Report* was launched on the Monday evening at a REN21/UNIDO side event, and is available at www.ren21.net.

The **UN Women exhibition** showcased technologies that have a positive impact on women's lives, especially those technologies that will improve the living conditions of rural and peri-urban women and their households.

Day One: Conference Opening

“This conference holds the future of South Africa and Africa in its hands in charting the way in developing renewable energy and transforming the continent to eradicate poverty.”

H.E. Tina Joemat-Pettersson – Minister of Energy, Republic of South Africa



Keynote speakers: Mr Arthouros Zervos – Chair, REN21; Mr Adnan Z. Amin – Director-General, International Renewable Energy Agency (IRENA); Mr Walter Lindner – German Ambassador in South Africa; H.E. Dr Elham Ibrahim – African Union Commissioner for Infrastructure and Energy; H.E. Ms Tina Joemat-Pettersson – Minister of Energy, Republic of South Africa

Facilitator: Mr Victor Kgomoewana

Official Conference Opening

In the opening address to the conference, **Mr Zervos** referred to the leading role played by South Africa in renewable energy on the African continent, and the abundant renewable resources that Africa is blessed with. He noted that significance of regional work being done through SADC on developing harmonised regulatory frameworks for renewable energy and the need to work together towards common goals, with SAIREC representing an opportunity to drive international efforts forward.

Mr Amin noted the increase in electricity demand in Africa, which is projected to generate 310 GW by 2030, with the REMAP Africa 2030 report providing a road map for the role of renewable energy in this revolution. Mr Amin pointed to the role of electricity in supporting improved healthcare, stimulating economies and assisting in the eradication of poverty. In his concluding remarks, Mr Amin stressed the importance of private investment in supporting the renewable energy revolution in Africa.



Ambassador Lindner noted the financial contribution Germany had made to the hosting of SAIREC and the close strategic partnership between Germany and South Africa in developing South Africa renewable energy sector. The Ambassador spoke about the progress Germany has made in incorporating renewable energy into their energy mix, and their ambitions to increase the share of renewables from 30% to 80% in the next 35 years, while reducing energy consumption and greenhouse gas emissions. In the context of increased energy demand and access to electricity in Africa, the Ambassador said that Africa has the potential to become a leader in the global energy transition to renewables given its wealth of resources in terms of water, sun and wind. In the context of climate change and the current Syrian refugee crisis in Europe, the ambassador reflected on the importance of the goal of universal sustainable development and energy access for all in securing peace and security.



H.E. Dr Ibrahim reflected on the importance of SAIREC as taking place when at a juncture when Africa is developing the infrastructure for renewable energy at continental, regional and local levels. She observed that the conference would strengthen strategies and commitments aimed at addressing the challenges that Africa faces presently, and help to harness the opportunities provided by renewable energies all over the world.

Dr Ibrahim observed that 600 million Africans do not have access to electricity. In addressing this, Africa has to utilise its abundant energy resources, including renewable and fossil fuels, and deploy a variety of technologies for on-grid, off-grid and mini- and micro-applications. She noted that renewable energy is crucial to securing modern energy access, and that there is a great need to discuss the various strengths of renewable energy, as well as the institutional, financial and constitutional barriers.

In the concluding keynote address, South Africa's Minister of Energy, H.E. **Ms Joemat-Pettersson**, noted that SAIREC was the first IREC to be held on African soil and encouraged REN21 to rotate future conferences between developed and developing countries. The Minister affirmed South Africa's commitment to: assisting the African continent to bring access to modern and sustainable energy to 100 million households; doubling capacity in electricity and gas connections in cross-border relations; developing 5000 megawatts of wind power and all forms of other solar energy. The minister also announced a new commitment to adding a 1500 megawatts solar energy project in the Northern Cape Province.

The Minister said that the lack of access to reliable electricity undermines economic development in Africa. Scaling up the supply of electricity in developing countries requires investments in renewable energy. South Africa's sound procurement policy is transparent and ensures stability and as a consequence has attracted large investments in renewable energy.

Minister Joemat-Pettersson observed that SAIREC was taking place in the context of the 21st Conference of Parties of the United Nations Framework Convention on Climate Change in December 2015, in Paris. She said that South Africa remains committed to engaging in a meaningful way, and further strengthening its stance on climate change. She also said that the outcomes of SAIREC would help South Africa to develop policies on renewable energy for its energy masterplan.



High-level Panels

Session I: Sustainable Energy for All: Renewable Energy, a Tool for Economic Development and Poverty Alleviation

Panel: Ms Rachel Kyte – Vice President for Sustainable Development, World Bank and Executive Committee member, SE4ALL; Ms Giner-Reichl – President, Global Forum for Sustainable Energy (GFSE); Mr Pradeep Monga – Director, Energy and Climate Change Branch, United Nations Industrial Development Organization (UNIDO); Ms Juliette Biao Koudenoukpo – Director & Regional Representative, Regional Office for Africa, United Nations Environment Programme (UNEP); Mr Daniel Schroth – Coordinator, SE4All Africa Hub

Moderator: Ms Tania Roediger-Vorwerk – Deputy Director General, German Federal Ministry for Economic Cooperation and Development (BMZ)



The two high-level panels consisted of two sessions in which a panel of international experts provided brief inputs on the topics at hand, and responded to questions from the conference participants.

The **Session I** panel helped to contextualise SAIREC in relation to the United Nations Sustainable Development Goal 7: “Ensure access to affordable,

reliable, sustainable and modern energy for all” and the Sustainable Energy for All High-Level Events at the Sustainable Development Summit in New York held in September 2015.

Opening the session, Ms Kyte spoke about the importance of renewable energy in combating climate change, and stressed the need to increase partnerships between the private sector and government. **Ms Giner-Reichl** spoke to the links between poverty and under-development and lack of access to energy: 13% of the world, and 25% of Africans, have no access to electricity. There needs to be a focus on bringing green energy to the poor. She noted that there are many African entrepreneurs initiating effective renewable energy projects and solutions on a smaller scale. **Mr Pradeep Monga** discussed the renewable energy-water-health nexus, the intersection of water, energy and land, and the interconnectedness of human health and ecosystems. **Ms Juliette Biao Koudenoukpo** stressed the importance of regional cooperation, and the need to improve the monitoring and the availability of data for the development of national baselines and planning and to

facilitate information sharing and learning. **Mr Daniel Schroth** emphasised the importance of political considerations, and the need for government involvement. He said that the African Development Bank has a key role to play in facilitating long term partnerships in the renewable energy sector.

Session II: Energy Transition with Renewables in Africa and Globally

Panel: Mr Paul Simons (keynote speaker) - Deputy Executive Director, International Energy Agency; H.E. Ms Elham Ibrahim – Commissioner for Infrastructure and Energy, African Union; Mr Rainer Baake – State Secretary, Federal Ministry for Economic Affairs and Energy; Mr Kumi Naidoo – Executive Director, Greenpeace; Ms Ayanda Nakedi – Senior General Manager, Renewables Business Unit Eskom, South Africa; Mr Yi Yuechun - Deputy Director General, National Energy Administration, China

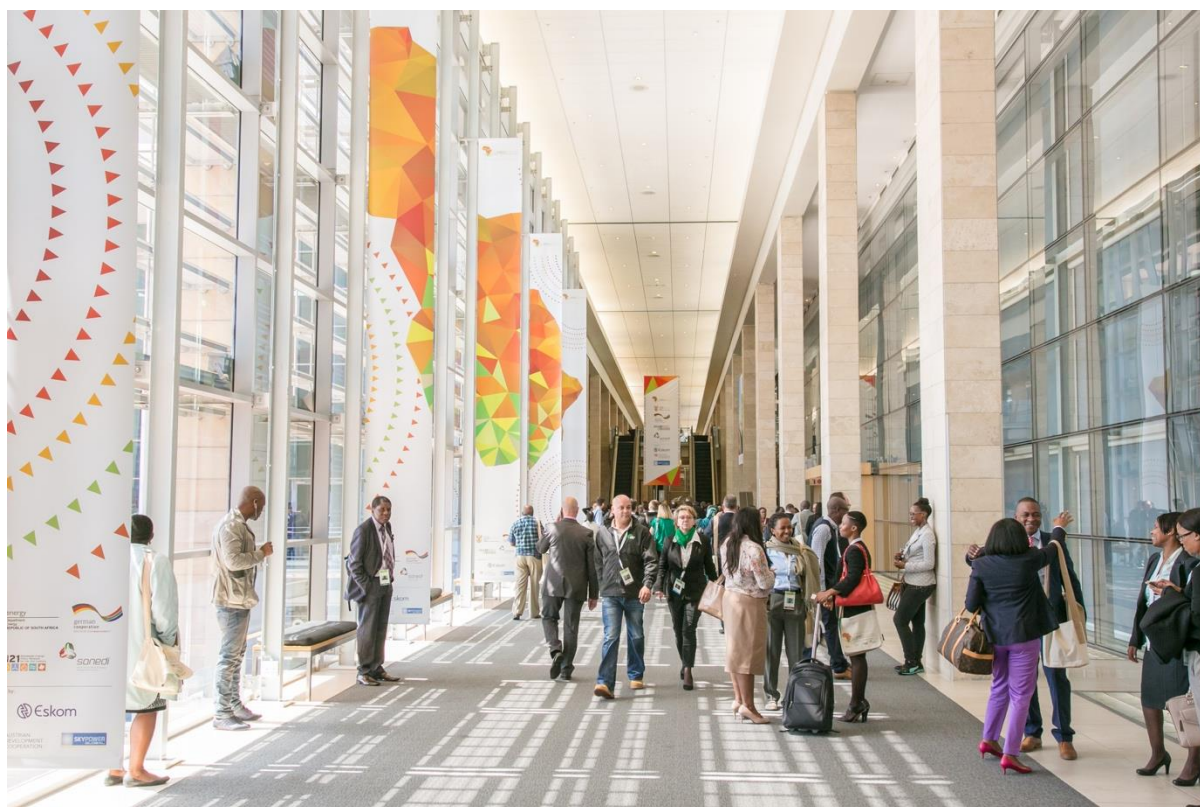
Moderator: Mr Wolsey Barnard – Acting Director General, Department of Energy, South Africa



In his opening address **Mr Simons** stressed the importance of renewable energy in the context of the COP 21 negotiations, and reported that the IEA will be developing scenarios based on the Intended Nationally Determined Contributions (INDCs). Despite projections of low oil prices in the medium term, a renewable energy revolution is underway – from 2010 to 2015 wind generation costs fell by one-third and Solar PV had a two-third decline. Mr Simons said that domestic actions needed to be combined with coordinated actions on the African continent, and that South Africa's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) programme can be used as a template for best practice.

H.E. Ms Ibrahim reported that the vision of the African Union's Agenda 2063 is for every African person to have access to clean energy. He suggested that there is potential for Sub Saharan Africa to use renewables as a leapfrogging developmental strategy, if issues of technical, institutional and political capacity can be addressed. Involvement of the private sector, enabling policies, and regional partnerships would be key to achieving this. Providing a German perspective, **Mr Baake** highlighted the importance of the political will shown by the German Parliament in 2000 in deciding to phase out nuclear energy and increase renewable energies and creating regulatory frameworks to support renewables. He also stressed that Germany's success in renewables was built on integrated energy markets and investments in

flexible grid management. **Mr Naidoo** spoke about Greenpeace's 2050 vision of 100% renewable energy access for all. Referring specifically to South Africa, he mentioned the importance of feed-in tariffs and net metering in stimulating decentralised renewables and incentivising reduced energy consumption. **Ms Nakedi** from South Africa's national power utility company said that Eskom supports a diversified energy mix and is leveraging the renewable technologies market to increase its financial sustainability. **Mr Yuechun** reported that the Chinese government will set up a co-operation fund of about \$3 billion to support the development of a "global energy internet" – a high voltage energy transmission network capable of sharing renewable energy around the world, which will facilitate countries rich in renewables exporting energy globally.



Parallel Sessions

Africa Continental Interconnectivity including Africa Clean Energy Corridor

Panellists: Mr Sisa Njikelana, Chairperson, South African Independent Power Producers Association (SAIPPA), South Africa (keynote speaker); Mr Gurbuz Gonul, Acting Director – Country Support and Partnerships, International Renewable Energy Agency (IRENA); Mr Segomoco Scheppers – Senior General Manager, Eskom, South Africa; Mr Remigious Makumbe, Director of Infrastructure and Services, SADC Secretariat; Mr Elijah Sichone, Executive Secretary, Regional Electricity Regulators Association

Moderator: Dr Thembakazi Mali, Senior Manager Clean Energy, South African National Energy Development Institute (SANEDI), South Africa



Mr Mayaki said that the SADC industrialisation drive requires partnership from business, civil societies, academia and the global village. Addressing poverty should be a critical priority for interconnectivity. Regional interconnectivity initiative can support the transition to a low carbon economy. Key drivers of interconnectivity include: enabling policies, law and regulation; investment; fairness and transparency; harmonisation; and

overall policy integration and synergies on the continent.

Mr Gonul noted that trade is a key strategy for triggering African industrialisation and market integration within Africa is critical to large scale RE deployment. An IRENA report indicates that Africa can quadruple the renewables share of generation by 2030. **Mr Scheppers** explained that the development of business interests outside of its South African base was a priority for ESKOM. Creating a larger power pool can unlock 40-50% greater investment in Africa's power needs by 2030. The Southern African Power Pool (SAPP) has been operational for 20 years, and all but 3 of the 14 countries in SAPP are interconnected. Guidelines for national regulators have been developed to reduce barriers to interconnection and a regional grid code is being drafted. An independent power producer framework has also been developed with the help of the United States and with assistance of the EU, guidelines for mini grids have also been developed.

Challenges to interconnectivity include: unbankable projects, project preparation, inability to secure Power Purchasing Agreements, inter working of countries and getting the private

sector on board. Funding is not a barrier. The continent needs an integrated resource plan. Best practices must be documented so that lessons can be learned.

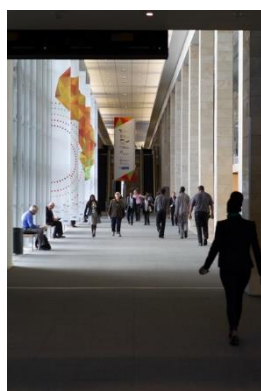
Regulatory Frameworks

Panellists: Mr Tomas Kåberger - Executive Board Chairman, Japan Renewable Energy Foundation (keynote speaker); Mr Martin Schöpe – German Federal Ministry for Economic Affairs and Energy (BMWi); Mr Li Junfeng – President, Chinese Renewable Energy Industry Association; Mr Ompi Aphane – Deputy Director General, Department of Energy, South Africa; Mr Mbulelo Ncetezo, Executive Manager: Electricity Regulation, National Energy Regulator of South Africa (NERSA)

Moderator: Mr Paolo Frankl, Head of Renewable Energy Division, International Energy Agency

Mr Kåberger said that for Africa to leapfrog into a position of leading renewable energy generation, good policies and regulatory frameworks will be required. Cost barriers for RE are disappearing and rather than subsidies, the sector needs to explore viable implementations for new business models. The real barriers are access to financial mechanisms for project development, tariff uncertainty, and opaque rules and regulations.

Mr Martin Schope noted that the German regulatory frameworks had focused on the three related elements of climate targets, renewable energy, and energy efficiency. **Mr Li Junfeng** observed that that we are entering an era where renewables will become a major generator of energy and this will bring new regulatory challenges. **Mr Aphane** said we need to understand how tax rules, incentives and regulatory institutions can remove barriers to renewable energy development.



Mr Ncetezo explained that clear pricing and tariff regulations with transparent cost recovery rules help in planning a price path and attract the private sector by reducing risk and increasing investor confidence. Licencing attached to conditions which support partnerships helps ensure projects are bankable. In developing countries regulatory frameworks should encourage local participation to encourage job creation, skill transfer and support local economic development and the upliftment of local communities.

Socio-economic Development

Panellists: Mr Pradeep Monga – Director, Energy and Climate Change Branch, UNIDO (Keynote speaker); Rabia Ferroukhi – Deputy Director: Knowledge, Policy and Finance Centre, International Renewable Energy Agency (IRENA); Ms Meryem Lakhssassi – Sustainable Development Officer, Moroccan Agency for Solar Energy; Mr Evan Rice – CEO, GreenCape, South Africa; Mr Jannie Retief – CEO, AIIM Renewable Companies, South Africa

Moderator: Ms Christine Lins, Executive Secretary, REN21



In his keynote address, **Mr Monga** provided an overview of global investment trends in renewable power and fuels, which show rapid growth. He noted the level of employment in renewables has increased substantially, with direct and indirect job creation reaching 7.7 million by the end of 2014.

The potential for renewable energy to create income for women was discussed. **Ms Ferroukhi** outlined how developmental benefits need to be purposively leveraged by governments through setting construction and operating rules that create local jobs, local procurement, small enterprise development, empowerment of women, skills development and community ownership. More data is needed to show the impact of RE projects in order to convince

governments to mainstream incentives for renewable energy in national industrial policies.

Long term, stable policy frameworks will incentivise foreign companies to set up local production. **Ms Lakhssassi** from Morocco and **Mr Retief** from South Africa both spoke about their countries' experiences in this regard. Morocco is planning to commission 2000 MW of solar power by 2020, informed by South Africa's Independent Power Producers (IPP) programme. South Africa's IPP programme provides a rigorous and formal process for achieving developmental benefits, but risks falling into the trap of providing checkboxes for developers, rather than creatively exploring more sustainable, long term community interventions.

Road to COP21: Renewables solution agenda

Panellists: : Ms Marie-Hélène Aubert – Special Advisor on climate change to the French President, France (keynote speaker); Ms Vera Rodenhoff, Head of Division, International Affairs for Environment and Energy, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany; Mr Stephan Singer – Director Global Energy Policy, WWF International; Ms Hela Cheikhrouhou – Executive Director, Green Climate Fund; Mr Mokshanand Dowarkasing, Climate and Energy Coordinator, Greenpeace International, The Netherlands

Moderator: Mr Mark Radka, Director Energy, Climate and Technology Branch, United Nations Environment Programme (UNEP)

Ms Aubert outlined the four pillars of the Lima-Paris Action Agenda (LPAA), an alliance between state and non-state actors on climate action with respect to the objectives of COP21: (1) A universal, legally binding agreement; (2) all countries to submit national contributions; (3) climate finance to enable the transition to low carbon, resilient economies; (4) strengthen the multi-partner initiatives of the Action Agenda. Ms Aubert said there would be a special focus on RE for Africa, placing the importance of SAIREC in sharp focus. She stressed the importance of the LPAA as a coalition, urging states to partner with domestic non-state actors in undertaking commitments. **Ms Cheikhrouhou** said that the two pillars of decarbonising the global economy were renewable energy and energy efficiency. It was noted that renewable energy was not adequately addressed in draft Paris agreement.

We need to achieve a globally agreed upon harmonisation of renewable energy (RE) policies and finance mechanisms through a COP21 agreement that is solid and actionable. It was also stated that this must involve ambitious targets for phasing out fossil fuels and replacing them with renewables by 2050, with the long-term goal of 100% renewable energy. **Mr Singer** cautioned of the need to avoid documents that were too political for academics and too technical for heads of state. He said that while COP21 provides a platform for renewable energy, it should not be regarded as the main driver. The unprecedented growth in renewable energy, particularly in developing countries, has been driven by non-state actors. It was noted that there was a (healthy) tension between centralised and de-centralised approaches to renewable energy, reflected in debate on the role of non-state actors. During discussion there was some debate about the role of nuclear energy in South Africa's energy mix. It was suggested that South Africa's progress in implementing renewable energy since 2004 suggested it could be deployed more rapidly and cheaply than nuclear energy, and has greater job creation potential. The importance of cities in promoting uptake of renewables was noted, and the need for them to work with national governments around the COP21 agenda.

Energy Access

Panellists: Mr Mahama Kappiah (Keynote Speaker) – Executive Director, ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE); Mr Robert Aitken – Managing Director, Restio Energy, South Africa; Ms Grace Mukasa – Regional Director, Practical Action Eastern Africa; Mr Koen Peters – Executive Director, Global Off-Grid Lighting Association (GOGLA); Mr Daniel Schroth – Coordinator, SE4All Africa Hub

Moderator: Mr Mike Enskat, Head of Section Energy, Water and Transport, Deutsche Gesellschaft für International Zusammenarbeit (GIZ), Germany

Over one billion people around the world do not have access to energy. The SDG 7 goal is to achieve access for all to sustainable, reliable, affordable and modern energy by 2030. In his opening address **Mr Kappiah** explained how the ECOWAS Centre for Renewable Energy is working to bring clean energy to the West Africa region. A main component of the centre's work is assisting the region's countries in the development of national Renewable Energy and Energy Efficiency Policies, both which are aimed at building clean energy economies and sustainable development for the future. The successful implementation and execution of the policies will require the involvement and input of all the relevant stakeholders.

Ms Mukasa highlighted the different levels at which the term 'energy access' needs to be understood. These levels include 1) the household level 2) the productivity level (farming and enterprises), and 3) the services level (schools, governmental institutions and health centres). Energy access at these levels means improving health, time saving which enables higher levels of productivity, enabling education, decreasing vulnerability to violence, empowering women and eradicating poverty.

Mr Schroth highlighted the importance of financing for large scale infrastructure and governments need to address barriers to access to finance and need to implement enabling policies and regulatory frameworks to support energy access for all. The issue of energy access is also an issue of social equity. Conventional planning for energy has failed and Africa needs to look at alternative distribution methods. This should include common definitions of energy access to guide policy and regulatory frameworks across the continent of Africa. Achieving the SDG 7 2030 goal will require a focus on off-grid energy access.

Finance Mechanisms

Panellists: Ms Silvia Kreibiehl, Head of Centre, Frankfurt School – UNEP Collaborating Centre for Climate & Sustainable Energy Finance (keynote speaker), Germany; Mr Busso van Alvensleben, Director for the Pretoria Office, KfW, Germany; Ms Rentia van Tonder - Head: Renewables, Power & Infrastructure, Standard Bank, South Africa; Ms Karen Breytenbach, Head IPP Office, Department of Energy, South Africa; Ms Silvia Martinez Romero, Senior Renewable Energy Specialist, World Bank;

Moderator: Mr Kadri Nassiep – CEO, South African National Energy Development Institute (SANEDI), South Africa



The keynote speaker, **Ms Kreibiehl**, pointed out that renewables are no longer a niche market but are attracting greater investment than traditional energy sources – sometimes in unexpected locations. The public sector does not always appreciate the important role of private sector finance. While low-cost debt from development finance is an attractive option, private finance must not be crowded-out. Bankable projects are the

bottleneck, not the availability of private finance. Trends in financial instruments to scale up global investment in renewable energy include: Auctioning for power purchase agreements; green bonds; yieldcos; investment funds focused on emerging markets; lower-cost debt; an enabling environment and risk mitigation instruments.

Mr Alvensleben stressed the need for retail banks to offer loans for small household projects, such as rooftop solar, and to introduce new products into the financial markets. **Ms Romero** observed that there are still challenges in the financing of small scale IPP projects – the lessons learned from big projects need to be carried through to this sector. **Ms Van Tonder** said that Standard Bank will be introducing new financing instruments. **Ms Breytenbach** explained that South Africa's REIPPP Programme was a success because the DOE team was instrumental in getting Treasury, Eskom, the DFIs and private banks to work together in building a functional programme. The bulk of the debt in the REIPPP programme (roughly R150-billion) was serviced by local commercial banks.

Skills Development

Panellists: Dr Karen Surridge-Talbot – Centre Manager, Renewable Energy Centre of Research & Development, SANEDI (keynote speaker); Mr Wim Jonker Klunne – Programme Director, Energy and Environment Partnership Southern and East Africa (EEP); Ms Hasna Khan, Director, Prokaushali Sangsad Limited, Bangladesh; Mr Jose Angel Perez, Vice President, Spain & Africa Renewable Energy Consortium, Spain; Mr Mohammed Naim Rassool - Director, The South African Renewable Energy Technology Centre (SARETEC), South Africa;

Moderator: Mr Rainer Hinrichs-Rahlwes, Vice-President, European Renewable Energies Federation (EREF)



Dr Surridge-Talbot pointed out that skilled labour drives renewable energy. Localisation has far reaching consequences in terms of skills requirements, and because local skills are often not in place, South Africa imports these skills. To this end, South Africa has set up a renewable energy training centre (SARETEC) which works with the private sector and existing training institutions to address the skills gaps in the sector, and is now beginning to assist with setting up

training centres in other African countries. SARETEC's initial focus was on the wind industry, but is now expanding to the biomass and solar industries. **Mr Jonker** stressed the importance of determining skills capacity when allocating grant funding for renewable energy projects, and the need to engage with local education and training institutions to build this capacity. **Mr Perez** noted how South Africa had benefited from skills transfer through the involvement of Spanish companies locally, making remarkable progress in skills development. **Mr Rassool** spoke to the need to train for jobs, not just skills – for instance, project developers need to acquire project concept writing skills as well as the skills needed to run a successful business.

Side Events

Over 14 side events were held on Monday. During the lunch break, WWF and REEEP hosted a thought provoking discussion on the future of renewable energy in Africa. The renewable resources and energy need certainly exist, but challenges in creating “sustainable virtuous cycles” persist based on the need for long term policy stability informed by sound data. Achieving scale is critical to financing renewable energy projects and can be driven by



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innovative strategies for grouping together small-scale projects, productive applications for energy, and regional integration. The market needs to be “derigged” by pricing in carbon and other social and environmental externalities into energy costs – and removing fossil fuel subsidies.



Day Two: Innovation in Renewable Energy Applications and Technologies

Opening Plenary

Keynote speakers: **Mr Ngobeni Maduna** Independent Power Producers Programme office, South Africa; **Mr Xia Zong** China's State Power Investment Corporation; **Ms Kornelia Shilunga**, Deputy Minister of Mines and Energy for Namibia

Facilitator: **Mr Ompi Aphane** – Deputy Director General, Department of Energy, South Africa

The opening plenary session on Day Two was chaired by **Mr Ompi Aphane** from the Department of Energy, South Africa. **Mr Ngobeni**, from South Africa's IPP Office, spoke about the successes and lessons learned in implementing RE through his office. Mr Ngobeni spoke about his Office's willingness to support renewable energy procurement in other African countries, while acknowledging that each country had its own unique challenges and opportunities. He underlined the importance of providing tangible benefits to communities through the implementation of renewable energy projects that would create new revenue streams for communities – and the importance, in the South Africa context, of ensuring that Black Economic Empowerment was integrated into RE projects.

Mr Zong delivered a short presentation on China's progress in implementing renewable energy, and the projects his company is involved in, which range cover a broad range of RE technologies, and includes a Integrated Energy project that combines a number of different power sources to generate maximum benefits and returns.

Ms Shilunga spoke about the recent decision to host the Southern African Development Community (SADC) Regional Centre for Renewable Energy and Energy Efficiency (SACREE) in Namibia. SACREE will provide a regional platform for leadership to enhance energy security through the uptake of renewable energy in the region. Ms Shilunga said she was looking forward to the support of the SADC states in making SACREE fully operational and sustainable in the long term.



Conference participants mingle in the entrance hall of the Cape Town International Convention Centre on the morning of the final day, preparing for another full and stimulating day of presentations and discussion.

Parallel Sessions

Energy-smart Cities

Panellists: Mr Thabo Manyoni, Chairperson, South African Local Government Association (SALGA), South Africa (keynote speaker); Mr Martin Hiller, Director General, Renewable Energy & Energy Efficiency Partnership (REEEP); Mr Ali Alshafar, Minister of Foreign Affairs, United Arab Emirates; Mr Sithole Mbanga, CEO, South African Cities Network, South Africa; Mr Emani Kumar, Deputy Secretary General, ICLEI - Local Governments for Sustainability, Mr Thabo Manyoni, Chairperson, South African Local Government Association (SALGA); Mr Steven Bland, ICLEI - Local Governments for Sustainability; Mr Roberto Ridolfi, Director for Sustainable Growth and Development, DG International Cooperation and Development, European Commission

Moderator: Mr Kadri Nassiep - CEO, South African National Energy Development Institute (SANEDI), South Africa

Mr Manyoni spoke of the need to locate the concept of smart cities within the African context of rapid urbanisation creating socio-economic and infrastructural challenges for planners. presents urban planners and policy makers with many challenges. African cities need to adopt hybrid energy systems that are flexible and resilient, and leverage new technologies and consumer behaviour change. Research suggests that energy savings of up to 35% can be achieved by behaviour change alone.

There is a need to educate politicians and gain political will with regards to the role they play in the development and promotion of Smart Cities. All cities have social issues and inclusivity is key in the move towards a smart city as efficiency and sustainability are linked to inclusivity. Smart cities require integrated planning to enable the implementation of hybrid energy systems for improved energy distribution and reliability, while meeting the need for inclusive cities that provide energy access for all. Linking knowledge silos within cities to share information and skills is the key to success. It's not the grid that is smart, but rather the skills and knowledge that shape its design.

Transport and Eco-mobility

Panellists: Mr Cornie Huizenga – Secretary-General, Partnership on Sustainable Low Carbon Transport (keynote speaker); Ms Tania Roediger-Vorwerk – Deputy Director General, Federal Ministry for Economic Cooperation and Development (BMZ), Germany; Ms Nickey Janse van Rensburg – Manager, Faculty of Engineering and the Built Environment, Mechanical Engineering Science, University of Johannesburg, Mr Andrew Taylor, Managing Director, Cape Advanced Engineering (CAE), South Africa; Ms Monika Zimmermann, Deputy Secretary-General, ICLEI

Moderator: Mr Carel Snyman – Senior Manager Green Transport, South African National Energy Development Institute (SANEDI)

Mr Huizenga lamented that transport is not a major part of the renewable energy discussion despite it being a growing sector with cross cutting impacts for multiple Sustainable Development Goals. CO₂ emissions from transport are projected to increase by 60% from 2015 to 2050. Mr Huizenga suggested that urban electric mobility was a critical component of low carbon transport approaches with significant synergy with the renewables industry. We need to develop technology partnerships and transfer through groups such as the Zero-Emission Vehicle Alliance.



Decarbonising fuel through the use of biofuels and electric mobility should have a high priority in the transport sector, but **Mr Snyman** noted that Africa is only just starting to explore these options. Concerns about the impact of electric vehicles on unstable grids were raised, although it was noted that energy storage in vehicle batteries could be used to stabilise the grid.

Ms Janse van Rensburg stressed the importance of centred rural and urban planning, and supporting shifts to non-motorised transport. **Ms Zimmerman** suggested that muscle power should be regarded as a form of renewable energy. **Ms Roediger-Vorwerk** suggested that more interconnected thinking on transport planning, climate, health and energy was needed, particularly as economic development raises the issue of transporting large number of people to work.

During discussion it was suggested that research into batteries/energy storage was a critical enabling technology for renewables and transport. There is a need for policy instruments to further the use of Electric Vehicles (EVs) and renewable energy, and dedicated funding for electric vehicles and biofuels. The need to raise public awareness of ecomobility was stressed - it will require effective communications strategies to shift mind sets.

Technology Innovations - Wind: grid-based

Panellists: Mr Steve Sawyer, Secretary-General, Global Wind Energy Council (keynote speaker); Ms Stefanie Bourne - Senior Consultant, DNV GL; Ms Ayanda Nakedi, Senior General Manager: Renewables Business Unit, Eskom, South Africa; Mr George Pergamalis, Head Business Development Africa & Middle East, Enel Green Power, South Africa; Mr Flemming Schlier, Advisor, VESTAS, South Africa

Moderator: Mr Johan Van den Berg, Chairman of Board & CEO, South African Renewable Energy Council & South African Wind Energy Association, South Africa.

Ms Bourne reported that wind is generating around 3% of global electricity currently and it is predicted that it should supply 6-8% by 2020, 20% by 2030, and 30% by 2050. Asia is now largest market, with China installing more wind generated capacity in 2014 than Spain had done in 20 years. Evolutionary changes are occurring with regards to size and efficiency, with the biggest gains being made in off shore wind turbines.

It was noted that some of the general challenges in terms of grid based electricity in sub-Saharan Africa include lack of access to the grid, load shedding and high tariffs. Potentially wind can be an important part of the solution to Africa's energy problems. However as of today costs of integrating wind into the grid as a non-dispatchable generator are a limiting factor. Smart tariff regimes can go some way to alleviating the storage problem. Although grid compatibility and capacity is currently an obstacle, wind resource atlases should facilitate planned extensions of the grid. Grids are becoming more sophisticated, looking more like a dynamically routed system such as the internet than the old telephone system. Combining wind with other renewables and wheeling power across regional grids will help with this. Combining wind in a portfolio of renewables will allow energy companies to use hedging strategies to reduce risk.

Local community support for wind farms is critical, and wind energy needs to be linked to socio



economic development and delivery of core services. Internationally, a variety of models for community ownership have proved successful and should be explored further. South Africa's REIPPP is a good example of People, Planet, and Prosperity. Morocco uses an industrial integration model. Local skills development is important and needs to be strengthened. Development Finance Institutions can help to reduce tariffs and they have experience of working with governments to create an enabling environment that should be leveraged.

Participants and panellists during wind grid-based session

Technology Innovations - Solar (PV): Grid-based

Panellists: Mr Paddy Padmanathan (keynote speaker) – President and CEO, ACWA Power, Saudi Arabia; Mr Agostinho Miguel Garcia – Principal Consultant, Sun Business Development Lda, Portugal; Mr Frank Spencer – Chair of the Embedded Generation Sub-Committee, SAPVIA, South Africa; Ms Jasandra Nyker – CEO, Bio Therm Energy (Pty) Ltd, South Africa; Mr Senzosenkosi M Myeni – Renewable Technologies Manager, Eskom, South Africa;

Moderator: Mr Moeketsi Thobela – CEO, South African Photovoltaic Industry Association (SAPVIA)

Mr Padmanathan said that future power systems must be flexible in order to maximise the contribution of photovoltaic solar (PV). Energy transitions are capital intensive, and finance costs need to be reduced – although developers in Dubai have been able to finance up to 80% of project development costs, suggesting high capital costs need not be an obstacle. Being cost-competitive is not enough – PV projects need to demonstrate their contribution to other economic sectors. Mr Padmanathan also said that it was critical to understand the economies of scale needed to create localisation potential.

During the panel discussion it was suggested that regulation and policy frameworks are the main barrier to flexibility in energy systems, rather than the technical requirements for transitioning from a decentralised, fossil fuel based utility grid. **Ms Nyker** said that the overall budget for investments in grid development needed to consider the job creation opportunities that could be created and environmental benefits. There is also potential for flexibility on the demand side, whereby customers choose the type of electricity purchased, and the time of purchase.

Technology Innovations – Concentrated Solar Power

Panellists: Mr Pancho Ndebele (keynote speaker) - Chief Executive Officer, Emvelo, South Africa; Mr Luis Crespo – President, European Solar Thermal Electricity Association (ESTELA), Belgium; Mr Chris Ehlers – Business Director, Southern Africa, ACWA Power; Mr Michael Geyer – Director, International Business Development, Abengoa Solar, Spain; Mr Vikesh Rajpaul, Programme Manager – Concentrating Solar Power, Renewables Business Unit, Eskom, South Africa

Moderator: Mr Saheed Okuboyejo – OEM Representative, SASTELA Executive Committee, BrightSource Energy/SASTELA, South Africa

Mr Okuboyejo observed that Southern Africa has an exceptional solar resource and already has an integrated regional grid, although there is scope for more extended regional interconnection. He also noted some of the advantages of CSP i.e. it is a dispatchable solution for base load and peaking power that can stabilise the grid and complement intermittent RE sources. REIPPP CSP prices are dropping, and will drop more as allocations and competition increase. Already the price has dropped from R3 kwh to a R1.37 cap in the current REIPPP bidding round. CSP Water use is comparable to conventional steam driven power generation. South Africa's projects use dry-cooling, which requires 90% less water than wet-cooling. CSP compares favourably with coal in terms of job creation per MW, especially when social and environmental externalities (e.g. carbon) are taken into account. Mr Okuboyejo argued the case for building sufficient scale to support a regional industry around manufacture of CSP components.

During the panel discussion Mr **Crespo** spoke about the potential for using the airbus model of distributed manufacture, with different locations specialising in different components. He pointed to the need to differentiate in a competitive market – for instance in terms of cost, time, quality or innovation. **Mr Ehlers** said that REIPPP provides an excellent procurement framework that needs to be coupled with long-term regional vision to create economies of scale and drive localisation. Value chain analysis is key to driving down costs, and training and research is key to developing the human resource component. **Mr Geyer** noted that Spain's development as a CSP hub was constrained by energy surpluses in Europe, whereas Africa was energy hungry. **Mr Rajpaul** said although the price of CSP should be considered in terms of trade-offs such as socio-economic development, jobs and carbon, in Chile CSP is competitive for baseload without incentives and finance costs will drop as confidence develops.

Cooking Energy

Panellists: Mr Waltaji Terfa Kutane (keynote speaker) – World Health Organisation (WHO), Ethiopia; Mr Sire Abdoul Diallo, WACCA Coordinator, ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) - West Africa Clean Cookstove Alliance (WACCA); Ms Maria del Rosario Loayza C., Deputy Director, GIZ EnDev, Mozambique; Mr Johan de Koker, Director: Sustainable Energy Technology and Research Centre, University of Johannesburg, South Africa; Mr Carl B Pendragon, Carbon Wealth Scandinavia AB, Sweden

Moderator: Mr Gama Mutemeri – CEO, TTO Climate, South Africa

Mr Kutane pointed out to participants that perhaps nowhere is the question of access to safe and affordable energy more important than in how the energy poor cook their food. It's not just a matter of energy efficiency, or the health issues created by indoor air pollution, but also one of eradicating poverty. Charcoal as a domestic fuel source is driving deforestation. Africa urgently needs to leap frog technologies, skipping fossil fuels and moving straight to low cost, environmentally-friendly fuels.

Sustainable biomass alternatives exist, such as fuel briquettes made from fast-growing grasses, and biogas. This biomass fuel source is affordable and has a significantly lower negative environmental impact than traditional fossil fuel resources. Awareness raising must be done in poor rural communities to address health impacts associated with cooking methods, with consideration of cultural and traditional beliefs when working with these communities. These can be barriers to behaviour change, such as the belief that smoke inside a house keeps away mosquitos and spiders.

Local and global dissemination approaches can complement each other to build a thriving market. The cooking energy sector needs enabling policies at global and local levels. The private sector needs to work with the public sector to drive this issue onto the agenda and there is a need for business plans on how to roll out clean stoves to the poor.

Energy Storage

Panellists: Mr Cédric Philibert (keynote speaker) – Energy and Climate Change Analyst, International Energy Agency (IEA); Mr Tobias Bischof-Niemz, Chief Engineer: R&D Core (Energy), Council for Scientific and Industrial Research (CSIR), South Africa; Mr Mike Levington, Deputy Chairperson, South African Photovoltaic Industry Association (SAPVIA), South Africa; Ms Daniela Schmidt, Innovation and Technology Centre, International Renewable Energy Agency (IRENA); Mr Barry MacColl, General Manager - Research, Testing and Development, Eskom, South Africa

Moderator: Mr Bernard Bladergroen, Associate Professor, University of the Western Cape, South Africa

In his keynote address, **Mr Philibert** made the point energy storage is incredibly diverse, and encompasses power quality improvements. Energy storage needs to be approached from an integrated understanding of the different components of the energy system and can improve grid stability reliability and resilience. Pumped Storage Hydroelectric (PSH) plants are the most extensively deployed strategy for storing RE, with batteries only representing about 1% of total storage capacity. There is still large potential for new PSH plants, particularly in developing countries. Thermal storage of energy is becoming more important. Solar water heaters are an energy storage mechanism, and South Africa's solar water heater programme has contributed significantly to reducing peak demand.

There was consensus amongst the panellists that solar PV and batteries would not be the only component of future energy systems. A broad portfolio of RE technologies, coupled with a flexible grid, reduces the need for storage – and there is a definite role for PSH. **Mr Bischof-Niemz** said that there was a role for small-scale storage solutions implemented at the point of demand, and that policy should not be confined to mega projects. **Mr Schnabel** and **Mr MacColl** both spoke about the importance of batteries both as a source of supply and demand, and as a valuable enhancement of rooftop solar PV. More extensive use of batteries – for instance in electrical vehicles and household rooftop PV – could smooth out disparities between supply and demand and alleviate the need for load shedding unnecessary are technology intensive. However, we do urgently need technical, policy and legal frameworks to allow private individuals to feed back into the grid as it is generally more cost effective to use the grid to store energy.

Integration of Renewable Energy and Energy Efficiency into High Temperature Applications

Panellists: Mr Robbie McNaughton (keynote speaker) – Team Leader, Solar Thermal Processes, The Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; Mr Werner Weiss – Managing Director, Institute for Sustainable Technologies, Austria; Mr Douglas Arent – Executive Director of the Joint Institute for Strategic Energy Analysis, NREL; Mr Martin Roeb, Deutsches Zentrum für Luft- und Raumfahrt (DLR), Germany; Mr Thomas Roos, Council for Scientific Industrial Research (CSIR), South Africa

Moderator: Mr Jan van Ravenswaay – SolarPACES National Solar Fuels Representative, North West University, South Africa



Mr McNaughton noted that in SA only 50% of emissions are from electricity. Many heating processes currently driven by electricity or fossil-fuels can be replaced by solar thermal energy with low or no emissions. In the low/medium temperature range solar thermal applications include steam production, desalination, and absorption chillers. High temperature solar thermal power is used in solar furnaces and photothermal

reactions that produce a range of materials containing embedded solar energy, including cracking methane to produce hydrogen as a solar fuel. In this form, it is possible to export solar energy.

The solar powered production of renewable hydrocarbon fuels is a promising area of research involving the reduction of CO₂ and water into syngas, which can then be converted into liquid hydrocarbon fuels such as petrol using the Fischer-Tropsch process. Potentially, this can be used to capture CO₂ emissions from burning fossil fuels and reuse it to create a clean fuel using solar power. Carbon capture uses steam, so solar thermal has a role to play all along the value chain.

During the panel discussion, it was pointed out that the concept of renewable hydrocarbon fuels was challenging, and would require a new way of thinking about CO₂ emissions reductions. **Mr Weiss** described the policies and programmes that were in place in Europe to promote low temperature solar thermal industrial applications (at below 250°C). **Mr Arent** described how projects that combine the high capital and low operating cost of solar thermal energy with volatility of gas/oil have proved attractive to investors in the USA.

Technology Innovations – Wind: Hybrid

Panellists: Mr Stefan Gsänger (keynote speaker) – Secretary General, World Wind Energy Association (WWEA); Ms Dipolelo Elford – South African Wind Energy Association (SAWEA); Mr Tetsunari Iida – Chairperson and Founder, Institute for Sustainable Energy Policies, Japan; Mr Gadi Hareli – CEO, Israeli Wind Energy Association; Mr André Otto – Technical Advisor Renewable Energy, SANEDI, South Africa

Moderator: Mr Morten Petersen - Chair, Danish Small Wind Association, Denmark

Mr Gsänger described hybrid systems where wind works with other renewables as: “a symphony of renewables”, which have gained traction in small systems of less than 1000kW in Morocco and other African countries. There is a clear link between energy supply and poverty alleviation. Hybrid renewable energy systems are a good way to improve people's lives where the grid is not available as it gives access to power which leads to water, better education, health, public safety and job creation through enhanced economic activity.

The main barriers to roll out of hybrid installations are lack of awareness and the finance, policy and legal environment. **Ms Elford** said that agencies such as the Development Bank of South Africa are willing to provide funding for innovative hybrid projects – government needs to increase awareness of these opportunities. **Mr Hareli** said that rural communities will pay for affordable power that improves access to basic needs such as water. Governments can set up an enabling legal and policy framework to support locally community owned energy systems. A holistic approach to project development is needed that promotes the productive use of energy and energy-based rural businesses. Subsidies and policy support for mini grids are needed – this could include liberalisation of tariffs and/or the introduction of feed-in tariffs for community investors. **Mr Otto** said that lessons learned from South Africa's first hybrid projects underscored the importance of addressing socio-economic and community factors – community expectations must be managed.

Technology Innovations – Solar: Off-grid

Panellists: Mr David Renné (keynote speaker) – President, International Solar Energy Society; Ms Karin Hollerbach, - Advisor, Triana Group, United States; Mr Sifiso Dlamini – Director, NuRa, South Africa; Ms Tania Roediger-Vorwerk – Deputy Director General, Federal Ministry for Economic Cooperation and Development (BMZ), Germany; Mr Klaus Maier – Corporate Development Manager, Mobisol, Germany; Mr Ernesto Macias – President, Alliance for Rural Electrification (ARE), Belgium

Moderator: Ms Mokgadi Modise, Chief Director, Department of Energy, South Africa

Mr Renné quoted from the REN21 Renewables 2014 Global Status Report, saying that solar PV was projected to total 200 GW by end 2015, or 1% of total energy capacity. He also noted how technology improvements are linked to price reductions - every time module capacity doubles, prices are reduced by roughly 50%. Progress with the technology is improving energy access, and in many SADC regions off-grid solar is a least cost option. According to South Africa's Department of Energy there have been 43 000 new off-grid connections in South Africa. There are a variety of financing options and business models for off-grid solar such as: fee for service; micro-finance pay as you go schemes, PPPs (concessions) and grants.

Mr Dlamini said that African countries should be wary of product dumping in terms of PV imports. He also suggested that centralised procurement reduces costs through economies of scale. **Mr Maier** stressed the importance of remote management and customer training in extending the lifetime of systems. Off-grid solar is not a transitional solution – it should be regarded as a permanent part of the energy mix. He also mentioned the importance of recycling procedures for systems at the end of the life cycle. **Ms Roediger** said that the target market is not just a consumer of electricity, once connected they become consumers of more industrial services or retail products and business owners or service providers.

Rural Electrification: Decentralised aspects

Panellists: Mr Ernesto Macias (keynote speaker) – President, Alliance for Rural Electrification (ARE), Belgium; Mr Wolsey Barnard – Acting Director General, Department of Energy, South Africa; Mr Fuad Siala – Consultant, OPEC Fund for International Development (OFID); Mr Ibrahim Togola – Director, Mali Folkecenter

Moderator: Ms Ina de Visser – Renewable Energy Cooperation Programme, Africa – EU Energy Partnership

Energy access is the number one priority and rural electrification plays an essential part in achieving this. The keynote speaker, **Mr Marcias**, highlighted the importance of integrating all the stakeholders when developing rural electrification programmes. He noted that job creation is enhanced by exploring all business opportunities and that adequate business models are necessary to address the challenges that may arise.

It was also noted that there has been significant increase in the demand for rural electrification and there has been a positive mind shift by governments to renewable energy as a solution to rural electrification. This has been mirrored by increased investment in rural electrification over the last few years.

In order for rural electrification to improve there needs to be in place adequate and flexible policy frameworks, electricity charges must be affordable and sustainable. Support from global financial institutions must be encouraged and investment should not be short-term but rather considered as a long-term investment. Rural electrification starts with political will. The target market for rural off-grid projects is not just a consumer of electricity - they become consumers of more industrial services or retail products and business owners or service providers. Rural electrification should be coupled with the introduction of energy saving appliances to make energy access sustainable.

Technology Innovation: Geothermal

Panellists: Ms Marietta Sander (keynote speaker) - Executive Director, International Geothermal Association; Mr Jectone Tocho Achieng – Project Manager, Geothermal Development Company of Kenya; Ms Safiatou Alzouma – International Renewable Energy Agency (IRENA); Mr Jón Örn Jónsson – Country General Manager Ethiopia, Reykjavik Geothermal, Iceland; Mr Markos Melaku – Independent Geothermal Consultant, Ethiopia

Moderator: Mr Philippe Niyongabo – African Union Commission (AUC)

The Asia Pacific is the leading market for geothermal energy, but Africa is growing. The potential of the resource is still largely untapped – Kenya is leading the charge in Africa, with 611 MW installed, representing 25% of total grid capacity and an increase of installed capacity of 56% in 2014. In her keynote address, **Ms Sander** said that Kenya had achieved this through speedy processing of applications and effective public-private cooperation. The Kenyan government created a Special Purpose Vehicle to kickstart the geothermal sector. Development finance has been important in overcoming high upfront capital investment costs.

Ms Alzouma spoke about the Global Geothermal Alliance that brings together the public, government and private sectors to develop the sector. **Mr Niyongabo** presented on the Geothermal Risk Mitigation Facility which receives its mandate from the energy ministers of 11 countries. It shares geothermal project risks between public and private sector and mitigates risks for project finance by promoting enabling policy frameworks and providing grant finance for initial project development. **Mr Melaku** focused on applications of the technology, which include: industrial and domestic heating; agricultural applications such as heating greenhouses and aquaculture ponds; and recreational uses that support tourism. In terms of electricity generation, geothermal energy provides stable base load power with a 95%+ capacity factor and a small spatial footprint, at a very competitive price.

Technology Innovation – Hydro/Ocean

Panellists: Mr Richard Taylor – Executive Director, International Hydropower Association (IHA); Mr Rudy De la Cruz – Manager, Project Integration, Eskom, South Africa; Mr Ato Abdulhakim Mohammed – Senior Executive Advisor, Ethiopian Electric Power Corporation, Ethiopia; Mr Freddy Lamfel – Chief of Staff to the Minister of Hydraulic Resources and Electricity, Democratic Republic of the Congo; Ms Laura Nhancale, Director of Studies and Planning, Ministry of Energy, Mozambique

Moderator: Mr Bo Barta, Energy and Water Resources Engineer, South Africa.

In the keynote presentation, **Mr Taylor** stated that Hydropower contributes 16.6% of the world's power and can provide a highly flexible source of grid power. South Africa is at the forefront of developing in-line power generation solutions using municipal water infrastructure. Off-shore hydropower is still maturing as a technology and is now attracting significant research and development finance. Approximately 100 GW of untapped potential exists in the Congo. Regional co-operation and development planning is the key enabler of large-scale hydro in Africa.

During the panel discussion **Mr Mohammed** and **Mr Lamfel** spoke of logistical and maintenance challenges with hydro projects in Ethiopia and the Congo respectively, and pointed to the need for financial and technical partnerships. **Mr De La Cruz** emphasised the socio-economic impact of water energy on people in developing countries, pointing to the need for joint ventures to have a broader focus that included contributing to social infrastructure such as schools.

Technology Innovations: Biomass

Panellists: Ms Meghan Sapp (keynote speaker) - Secretary General, Partners for Euro-African Green Energy (PANGEA), Belgium; Mr Benard Muok – Director of Program, African Centre for Technological Studies, Kenya; Mr Gerard J. Ostheimer – Global Lead, SE4All Sustainable Bioenergy High Impact Opportunity, United States; Mr Sean Thomas – CEO, Bio2Watt, South Africa; Mr Mark Tiepelt – Chairman, Southern African Biogas Industry Association (SABIA); Mr Michael Wild – President, International Biomass Torrefaction Council (IBTC), Belgium

Moderator: Mr Heinz Kopetz, President, World Bioenergy Association (WBA)

Ms Sapp said that about 2.6-billion people depend on traditional biomass for their energy needs. Bioenergy, in the form of liquid, solid, and gaseous fuels contributes to economic sustainability, value addition, product diversification, job creation and energy independence – it has multiple market applications. It is viable at both small and large scale, with potential mini-grid applications and almost any biological substance can be turned into bioenergy. Essentially, bioenergy can perform as a very cheap and effective battery for modern energy needs.

Mr Muok spoke of the need for competence building in the sector, as compared to developed countries there are significant gaps in the sector in Africa. He said that governments must provide a policy framework that allows the private sector to institutionalise biomass energy.

Food insecure communities are often also energy insecure and the bioenergy process presents options to address both of these challenges. In this way, bioenergy can kickstart a rural economy and break barriers for other RE technologies. The primary barrier to creating the virtuous cycles that will allow rural people to generate their own clean energy is finance. In South Africa, obtaining environmental approvals and permits is also a barrier.

Cooperation between different government units, in particular the Departments of Energy, Environment and Agriculture and Forestry; is key to unlocking bioenergy resources. It was suggested that an international framework for permitting of bioenergy projects would be very helpful for project development in Africa. It was also mentioned that lack of data is hindering project development. The role of the private sector needs to be enabled. **Mr Wild** said that efficiency of the value chain is key to sustainability for bioenergy. He noted that bioenergy is the only renewable energy that has the potential to be carbon negative i.e. function as a carbon sink rather than source.

Side Events

At a side event over lunch, Greenpeace launched their 100% Renewables scenarios with the release of their 2015 Energy Revolution report, during one of the selection of side events on Tuesday. The Greenpeace scenarios call for emissions to peak in 2020 and then decline, with use of all lignite phased out by 2035, coal by 2045, oil and gas by 2050, and nuclear by 2050. Access the report at: www.greenpeace.org.

Closing Plenary: Key findings from SAIREC and adoption of SAIREC declaration

Ms Christine Lins, Executive Secretary of REN21, welcomed delegates to the final plenary and reported that the conference had attracted more than 3600 registrants from 82 different countries. The SAIREC exposition featured over 40 exhibitors showcasing the latest renewable energy technologies and intelligence – including a dedicated Eco-mobility exhibit. The site visits planned for the next day had been booked up almost immediately. Ms Lins listed some of the highlights and key issues that had emerged during the conference:

- Uptake of renewable energy has outstripped expectations, with global investment in renewable energy having surpassed investment in fossil fuel power capacities over the last five years. For the first time in 40 years, in 2014 the world saw a decoupling of global economic growth and CO₂ emissions increase, mainly due to investments in energy efficiency and renewable energy.
- There is a growing awareness of the linkage between renewable energy, climate change adaptation and economic development to eradicate poverty.
- The Sustainable Development Goal (SDG) 7 of sustainable energy access for all will promote renewables. This is particularly pertinent in Africa, where more than 600 million people still do not have access to electricity.
- Africa has the capacity, capability and political will to be a world leader in renewable energy. South Africa's REIPPP programme demonstrates the importance of effective regulatory frameworks in promoting renewable energy.
- Minister Tina Joemat-Pettersson announced a new 1500 Megawatts solar energy project in the Northern Cape that is over and above existing allocations to solar energy in the REIPPP programme.
- Access to information and data on renewable energy is improving all the time. During SAIREC, IRENA launched REmap 2030 for Africa; the IEA presented its Renewable Energy Medium-Term Market Report 2015. Furthermore, a report on the State of Renewable Energy in South Africa by DoE/GIZ was launched as well as the SADC Renewable Energy and Energy Efficiency Status Report by REN21 and UNIDO.

Ambassador Irene Giner-Reichl, President of the Global Forum for Sustainable Energy, led the conference through adoption of the Conference Declaration. A draft version of the declaration had been made available on the SAIREC website and app, with conference participants having been afforded the opportunity to submit comments until Monday the 5th October 2015 at 8pm. Ms Giner-Reichl said that there had been excellent engagement with the document, and that comments were incorporated on the morning of the 6th October, strengthening the document. Once Ms Giner-Reichl had read through the document, it was adopted by acclamation.

South Africa's Minister of Energy, Ms **Tina Joemat-Pettersson** delivered the closing address. She noted that energy contributes to a better quality of life. Modern energy unlocks access to improved healthcare, improved education, improved economic opportunities and, even longer life. Its absence is a major constraint on social and economic development. Africa's energy sector is vital to its development.

The Minister said that governments need to actively pursue low-carbon policies to meet the greenhouse gas reduction objectives and mitigate global warming, and that renewable energy has a major role to play in the energy mix on our respective journeys to lower carbon pathways.

When it is developed from a local perspective, the renewable energy sector provides an opportunity to stimulate new local industries, new opportunities and the empowerment of people through direct and shared ownership with communities. Renewable energy has the potential to stimulate job creation, skills development and a broader local economy as well as positively contributing to our national energy mix.

The Minister noted that the Council for Scientific and Industrial Research has estimated the contribution of grid tied renewables' net benefit to the economy to be R800 million. She went on to state that we also need to take advantage of other renewable energy sources that such as landfill gas and anaerobic digestion to produce biogas, which are both sectors with opportunities to scale up energy production.

In closing, the Minister thanked the German government, the Austrian government, and all the sponsors for their support to South Africa in hosting SAIREC 2015, with a special vote of thanks to the Local Organising Committee.

