EDE24-01-035 V2

CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

REPORT TO:

CITY MANAGER
TO BE REFERRED BY THE OFFICIAL TO MAYCO VIA THE RELEVANT *ENERGY SECTION* 79 COMMITTEE [AFTER CONSIDERATION BY CITY MANAGER]

[OFFICIALS TRAVELLING OVERSEAS FOR COUNCIL RELATED ACTIVITIES]

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1. ITEM NUMBER

2. SUBJECT

FEEDBACK ON THE INTERNATIONAL/OUTSIDE THE BORDERS OF THE RSA TRIP UNDERTAKEN FROM 9-16 DECEMBER 2023 TO ATTEND THE ELECTRICITY DISTRIBUTION INDUSTRY (EDI) STUDY TOUR HOSTED BY THE SOUTH AFRICAN-GERMAN ENERGY PROGRAMME IN AUSTRALIA

ONDERWERP

TERUGVOERING OOR DIE INTERNASIONALE REIS (BUITE DIE GRENSE VAN DIE RSA) VAN 9 TOT 16 DESEMBER 2023 NA AUSTRALIë VIR DIE BYWONING VAN DIE STUDIETOER OOR DIE ELEKTRISITEITSINDUSTRIE (EDI) AANGEBIED DEUR DIE SUID-AFRIKAANS-DUITSE ENERGIEPROGRAM (SAGEN)

ISIHLOKO

INGXELO ENGASEMVA KOHAMBO KUMAZWE APHESHEYA/ANGAPHANDLE KWEMIDA YASEMZANTSI AFRIKA EQHUTYWE UKUSUSELA NGOWE9 UKUYA KOWE16 KWEYOMNGA 2023 UKUZIMASA EZOKHENKETHO OLUNGOPHANDO KUVELISO LONIKEZELO LOMBANE (EDI) ECHOTSHELWE NGABE SOUTH AFRICAN-GERMAN ENERGY PROGRAMME, E AUSTRALIA

LSU: Q2416

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3. EVENT SUMMARY

EVENT DETAILS	
CONFERENCE/SEMINAR	**Electricity Distribution Industry (EDI) study tour hosted by the South African-German Energy (SAGEN) Programme**
OTHER	**To understand the potential impacts of the proposed wholesale market reform on the EDI as well as understand the impact of an upscaled distributed energy resource (DER) market on municiplaities**
DATE	**09-16 December 2023**
VENUE	**various**
TOTAL COST TO THE CITY	**R31 190**
CITY	**Sydney, Adelaide and Melbourne**
COUNTRY	**Australia**

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ATTENDEE DETAILS	
NAME AND SURNAME	DESIGNATION
Leila Mahomed Weideman	**DIRECTOR SUSTAINABLE ENERGY MARKETS**
PROVIDE SUMMARY OF HOST ORGANISATION / CITY	
SAGEN is the South African arm of the German Society for International Cooperation (GIZ), a government-owned development agency dedicated to international development cooperation. GIZ is actively engaged in a diverse array of projects and initiatives aimed at fostering sustainable economic development, enhancing infrastructure, and addressing social and environmental challenges in numerous countries worldwide. GIZ holds a prominent role in the global implementation of policies and projects. The GIZ have been in collaboration with the City of Cape Town in shaping the energy transition in South Africa for Renewable Energy Projects: These projects aim to promote the use of renewable energy sources such as wind and solar power. GIZ currently provides a part-time secondment to the Sustainable Energy Markets Department. It was led by Prof Anton Eberhard of the Power Futures Lab at the Business School at UCT. The Australian counterpart was Prof Bruce Mountain of the Victoria Energy Policy Centre at Victoria University in Melbourne.	

4. OBJECTIVE

The objective of the study tour is to provide key leaders in the South African Power Sector with the opportunity:

To learn from the experience of Australia in incentivizing and managing high levels of solar and wind energy on their grid,
in particular:

- the impact of the energy transition and power sector reform on the electricity distribution industry (EDI), specifically on municipal business models;
- the development of electricity markets and the role and opportunities for municipal utilities;
- mechanisms to accelerate and facilitate investment by utilities, businesses and households in renewable energy and storage; and
- managing the impact of increased shares of variable solar and wind energy on market and system operation, mainly at regional and municipal level.

The Sustainable Energy Markets Dept recently developed the City's Energy Strategy and these engagements will support the development of a practical and viable ensuing Implementation Plan.

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The City of Cape Town has already positioned itself to become a Distribution System Operator (DSO) and is likely to be the first and only Municipal DSO along with the 5 Eskom Distribution DSOs which will allow participation in the to-be established South African wholesale market. The objective was to leverage the wealth of knowledge and practical wisdom from Australia, focusing on policies, strategies, market dynamics, regulatory reforms, and system operations that can expedite the energy transition in South Africa and in particular the City of Cape Town.

5. OUTCOMES

Considering the similarities between SA and Australia such as

- coal domination,
- high electricity prices,
- high solar radiation;
- long stringy networks and
- basic facts such as Installed Capacity (Australia 55 GW vs SA 47MW) and Maximum Demand (Australia 33 MW and SA 33MW) and in Electricity Consumption (Australia 188 TWh and SA 198TWh)

there are numerous lesson to be learnt, particularly, in an area that does differentiate the 2 countries:

Australia's significant contribution of distributed energy in the power system. There are 3.60 million PV installations in Australia, totalling 33 GW.

The Australian progress on the uptake of rooftop solar offers several lessons for South Africa as municipalities experience the growing trend of sharp increases in rooftop solar due to our national supply shortages:

National and Federal government policies and financial incentives have collectively helped drive the uptake of rooftop solar in Australia. By reducing the upfront costs, providing financial returns, and offering attractive financing options, these measures have made solar energy more affordable and appealing to consumers, resulting in the success of the Australian rooftop solar program.

The lessons for consideration are:

Public Awareness and Education: Australia has invested in public awareness campaigns to educate consumers about the benefits of rooftop solar and address any misconceptions or barriers through educational initiatives to increase awareness about the advantages of solar energy and promote the uptake of rooftop solar. Awareness campaigns and educational programs have played a crucial role in promoting the benefits of rooftop solar. These initiatives have helped dispel myths,

address concerns, and increase public understanding of solar energy, leading to greater acceptance and adoption.

Streamlined Installation Processes: Australia has implemented streamlined processes for the installation of rooftop solar systems, including standardized guidelines and simplified paperwork. South Africa can adopt similar measures to reduce administrative burdens and make it easier for consumers to install solar panels on their rooftops.

Industry Growth and Competition and Technological Advancements: The growth of the rooftop solar industry in Australia has led to increased competition among solar installers. This competition has driven innovation, improved installation practices, and reduced costs, making rooftop solar more attractive to consumers. Advancements in solar technology, such as more efficient solar panels and improved battery storage systems, enabled inverters have made rooftop solar more reliable and cost-effective. These technological advancements have further incentivized consumers to invest in solar energy. Support for R&D and innovation is embedded and budgeted for at various levels of government and industry stakeholders it would seem.

Community Engagement and Support: Australia has seen success in fostering community engagement and support for rooftop solar through initiatives such as community solar programs and bulk-buying schemes. South Africa can explore similar community-driven approaches to encourage collective action and increase the uptake of rooftop solar.

Integration with Grid Infrastructure: Australia has invested in upgrading grid infrastructure to accommodate the increasing penetration of rooftop solar. South Africa can learn from this and ensure that the grid infrastructure is capable of handling a higher share of decentralized solar generation, facilitating the seamless integration of rooftop solar systems into the existing electricity system.

Collaboration and Partnerships: Australia has fostered collaboration between government, industry stakeholders, and research institutions to drive the uptake of rooftop solar. South Africa can encourage similar partnerships to leverage expertise, share best practices, and drive innovation in the solar energy sector.

While the rooftop solar program in Australia has been successful, there are still some key challenges that need to be addressed. These challenges include:

a. Regulatory Framework: The regulatory framework surrounding rooftop solar can pose challenges to its expansion. Issues such as complex permitting processes, zoning restrictions, and interconnection rules can create barriers for potential solar

adopters. Streamlining and simplifying the regulatory framework, along with clear guidelines and processes, can encourage greater rooftop solar uptake.

b. Technical and Maintenance Support: Adequate technical support and maintenance services are essential for the long-term performance and reliability of rooftop solar systems. Ensuring that there is a skilled workforce and accessible support networks for system installation, maintenance, and repairs is crucial for building confidence among consumers and ensuring the continued success of the rooftop solar program.

c. Grid Integration: As the number of rooftop solar installations increases, there can be challenges associated with grid integration. The intermittent nature of solar energy generation can impact grid stability and management. To ensure smooth integration, the grid infrastructure needs to be upgraded and modernized to accommodate the growing capacity of rooftop solar. This includes investments in grid infrastructure, such as smart grids and energy storage systems, to facilitate efficient energy distribution and management.

The intermittent nature of solar energy generation can have an impact on grid stability and management in several ways:

1. Variability in Power Generation: Solar energy generation is dependent on the availability of sunlight, which varies throughout the day and is affected by weather conditions. This variability can lead to fluctuations in power generation from rooftop solar installations. Sudden changes in cloud cover or the onset of darkness can cause a rapid decrease in solar generation, leading to a drop in available power supply. Conversely, when the sun is shining brightly, solar generation can increase rapidly. These fluctuations can pose challenges for grid operators in maintaining a stable supply-demand balance.

2. Grid Imbalance: The intermittency of solar generation can create imbalances in the grid. If there is an oversupply of solar power due to high generation and low demand, it can lead to grid instability, voltage fluctuations, and potential equipment damage. On the other hand, sudden drops in solar generation can create a shortage of power, potentially leading to blackouts or the need for alternative power sources to compensate for the shortfall.

3. Grid Management Challenges: The intermittent nature of solar energy generation requires grid operators to carefully manage and balance the electricity supply and demand in real-time. This involves forecasting solar generation patterns, coordinating with other renewable and conventional power sources, and implementing strategies to mitigate the impact of solar intermittency on grid stability. It may require deploying energy storage

systems, such as batteries, to store excess solar energy during periods of high generation and release it during periods of low generation.

4. Voltage and Frequency Regulation: The intermittent nature of solar generation can also impact voltage and frequency regulation in the grid. Sudden changes in solar generation can lead to voltage fluctuations and frequency deviations, which can affect the performance of electrical equipment and appliances connected to the grid. Grid operators need to continuously monitor and adjust voltage and frequency levels to maintain grid stability and ensure the reliable operation of the electrical system.

To address these challenges, grid operators are implementing advanced grid management techniques and technologies. This includes the integration of energy storage systems, demand response programs, smart grid technologies, and sophisticated forecasting and control systems. By effectively managing the intermittent nature of solar energy generation, grid stability can be maintained while maximizing the utilization of renewable energy sources.

Grid operators are taking several measures to address the challenges associated with solar intermittency. Some of these measures include:

1. Energy Storage Systems: Grid operators are deploying energy storage systems, such as batteries, to store excess solar energy during periods of high generation and release it during periods of low generation. Energy storage helps to smooth out the fluctuations in solar generation and provides a buffer to balance supply and demand on the grid. It allows for better integration of intermittent renewable energy sources like solar into the grid and provides grid operators with more flexibility in managing the variability of solar power.

2. Forecasting and Predictive Analytics: Grid operators are using advanced forecasting techniques and predictive analytics to accurately forecast solar generation patterns. By analyzing historical data, weather conditions, and other relevant factors, grid operators can predict the amount of solar power that will be available at different times of the day. This information helps in better planning and managing the grid, optimizing the use of solar energy, and ensuring a stable supply-demand balance.

3. Demand Response Programs: Grid operators are implementing demand response programs to incentivize consumers to adjust their electricity usage based on the availability of solar power. During periods of high solar generation, grid operators can send signals to consumers to reduce their electricity consumption or shift it to off-peak hours. This helps in better

matching the supply and demand of electricity and reduces the strain on the grid during times of low solar generation.

4. Grid Flexibility and Interconnection: Grid operators are working towards enhancing the flexibility and interconnection of the grid. This involves improving the capacity of transmission lines and interconnecting different regions or countries to access a wider geographic spread of solar resources. By having a more interconnected and flexible grid, grid operators can tap into solar resources from different locations, reducing the impact of localized solar intermittency and ensuring a more reliable and stable power supply.

5. Advanced Grid Management Technologies: Grid operators are adopting advanced grid management technologies to monitor and control the grid in real-time. These technologies include smart meters, sensors, and communication systems that provide real-time data on electricity consumption, solar generation, and grid conditions. Grid operators can use this information to make informed decisions, quickly respond to changes in solar generation, and maintain grid stability.

By implementing these measures, grid operators can effectively manage the challenges associated with solar intermittency and ensure the reliable integration of solar energy into the grid. These measures not only improve grid stability but also contribute to the increased utilization of renewable energy sources and the reduction of greenhouse gas emissions.

Demand response programs incentivize consumers to adjust their electricity usage based on the availability of solar power by offering financial incentives or other benefits:

1. Time-based Pricing: Demand response programs often involve time-based pricing, where electricity prices vary based on the time of day. During periods of high solar generation, when there is excess electricity supply, prices may be lower. Conversely, during periods of low solar generation, when electricity supply is limited, prices may be higher. By adjusting their electricity usage to align with periods of high solar generation, consumers can take advantage of lower prices and save on their electricity bills.

2. Peak Time Rebates: Some demand response programs offer peak time rebates to consumers who reduce their electricity usage during peak demand periods. These rebates can be in the form of direct monetary incentives or credits on future electricity bills. By reducing their electricity consumption

during peak times, consumers can earn financial rewards, encouraging them to adjust their usage patterns in response to solar generation fluctuations.

3. Energy Efficiency Programs: Demand response programs often promote energy efficiency measures as a way to reduce electricity consumption. Consumers who participate in these programs and implement energy-saving measures, such as installing energy-efficient appliances or improving insulation, may be eligible for incentives or rebates. By reducing their overall electricity demand, consumers can contribute to a more stable grid and better align their usage with solar availability.

4. Smart Home Automation: Demand response programs can leverage smart home automation technologies to enable consumers to automatically adjust their electricity usage based on solar availability. Smart devices and appliances can be programmed to optimize energy consumption, such as running major appliances or charging electric vehicles during periods of high solar generation. This automation reduces the reliance on manual adjustments by consumers and ensures efficient utilization of solar power.

5. Educational Campaigns and Real-Time Feedback: Demand response programs often include educational campaigns and provide real-time feedback to consumers about their electricity usage patterns. By raising awareness about the benefits of adjusting usage based on solar availability, consumers can make informed decisions and actively participate in demand response initiatives. Real-time feedback, such as energy usage dashboards or mobile apps, allows consumers to monitor their electricity consumption and make adjustments accordingly.

By providing these incentives and tools, demand response programs encourage consumers to align their electricity usage with the availability of solar power. This helps to balance the supply and demand on the grid, optimize the utilization of renewable energy resources, and ensure a more reliable and sustainable energy system.

6. ACTIONS REQUIRED

- Share relevant information and contacts with colleagues.
- Support SALGA, who also participated in the study tour, on crafting EDI reform actions.

7. IMPLICATIONS

7.1	**Constitutional and Policy Implications**	No ☒	Yes ☐
7.2	**Environmental implications**	No ☒	Yes ☐
7.3	**Financial Implications**	No ☒	Yes ☐
7.4	**Legal Implications**	No ☒	Yes ☐
7.5	**Staff Implications**	No ☒	Yes ☐
7.6	**Risk Implications**	No ☒	Yes ☐

7.7 POPIA Compliance

☒ It is confirmed that this report has been checked and considered for POPIA Compliance.

NOTE: POPIA Section MUST be completed otherwise the report will be returned to the author for revision.

Contact your Directorate POPIA Stewards should you require assistance.

The City has a contract in place with XL Embassy Travel for the safe-keeping of Traveler's personal information as required by the POPI Act.

8. RECOMMENDATIONS

It is recommended that the feedback report on the **Electricity Distribution Industry (EDI) study tour hosted by the South African-German Energy (SAGEN) Programme** undertaken by Leila Mahomed Weideman **on** 9-16 December **be considered and noted.**

AANBEVELINGS

Daar word aanbeveel dat die terugvoeringsverslag oor Leila Mahomed Weideman se **studietoer oor die elektrisiteitsverspreidingsindustrie (EDI) aangebied deur die Suid-Afrikaans-Duitse Energieprogram (SAGEN)** van 9 tot 16 Desember 2023 **oorweeg word en dat daarvan kennis geneem word.**

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IZINDULULO

Kundululwe ukuba **makuthathelwe ingqalelo kwaye kuqwalaselwe** ingxelo engasemva kohambo olumalunga **nezokhenketho olujoliswe kuphando ngoVeliso loNikezelo loMbane (EDI) oluchotshelwe ngabeSouth African-German Energy (SAGEN) Programme**, oluqhutywe nguLeila Mahomed Weideman ukususela ngowe9 ukuya kowe16 kweyoMnga 2023.

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9. GENERAL DISCUSSION

Policy and Regulatory Support: Australia's success in rooftop solar can be attributed in part to its supportive policy and regulatory framework that incentivize and support the installation of rooftop solar systems. This can include feed-in tariffs, net metering, and streamlined permitting processes. Australia has experienced high electricity prices, which have motivated consumers to seek alternative energy sources. Rooftop solar has provided an opportunity for individuals and businesses to generate their own electricity and reduce their reliance on the grid and reduce their energy bills. By generating their own electricity, households and businesses can offset some or all of their electricity consumption from the grid. In addition: Australia has favorable climate conditions like South Africa with abundant sunlight throughout the year, this has made rooftop solar an effective and efficient energy solution.

Financial Incentives: The cost of solar panels and installation has significantly decreased over the years. This reduction in costs has made rooftop solar more accessible to a wider range of consumers, leading to increased adoption. Despite declining costs Australia has implemented various financial incentives to encourage the adoption of rooftop solar, such as rebates, grants, and low-interest loans to make rooftop solar more affordable and accessible to a wider range of consumers, including low-income households.

Feed-in Tariffs: Feed-in tariffs are another important policy tool used by the Australian government to encourage rooftop solar. Feed-in tariffs allow solar energy system owners to sell excess electricity generated by their solar panels back to the grid at a premium rate. This incentivizes the installation of solar systems by providing a financial return on the investment and reducing payback periods.

Tax Credits and Incentives: The government offers tax credits and incentives to individuals and businesses that install rooftop solar systems. These incentives can include tax deductions or credits for the cost of purchasing and installing solar panels, inverters, and other necessary equipment. By reducing the overall cost of solar installations, these incentives have encouraged more people to adopt solar energy.

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Low-Interest Loans and Financing Options: The Australian government has also provided low-interest loans and financing options to support the installation of rooftop solar systems. These programs make it easier for consumers to access affordable financing for their solar projects, reducing the financial burden and making solar energy more accessible to a wider audience.

Net Metering: Net metering policies allow solar energy system owners to offset their electricity consumption by exporting excess electricity back to the grid. Under this policy, solar owners receive credits for the electricity they export, which can be used to offset their electricity bills. Net metering provides a financial incentive for installing rooftop solar by allowing consumers to save money on their energy bills.

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10. ANNEXURES
None

FOR FURTHER DETAILS, CONTACT:

DATE	24 January 2024		
NAME	Leila Mahomed Weideman	CONTACT NUMBER	0837892923
E-MAIL ADDRESS	Leila.mahomedweideman@capetowngov.za		
DIRECTORATE	Energy	FILE REF NO	
SIGNATURE :			

EXECUTIVE DIRECTOR: ENERGY

KADRI NASSIEP

The ED's signature represents support for report content and confirms POPIA compliance.

SIGNATURE:

NAME Kadri Nassiep

DATE 25/01/24

COMMENT:

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MANAGER: INTERNATIONAL RELATIONS

COMMENT:

DR. DENVER VAN SCHALKWYK

SIGNATURE: Dr Denver van Schalkwyk

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☐ REPORT COMPLIANT WITH THE PROVISIONS OF COUNCIL'S DELEGATIONS, POLICIES, BY-LAWS AND ALL LEGISLATION RELATING TO THE MATTER UNDER CONSIDERATION.

LEGAL COMPLIANCE

☐ NON-COMPLIANT

COMMENT:

NAME John Laing Smale

TEL

DATE

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Certified as legally compliant based on the contents of the report.

CITY MANAGER

☒ NOTED

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☐ REFER TO THE MAYORAL COMMITTEE VIA THE RELEVANT SECTION 79 COMMITTEE

DATE

COMMENT: