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Transition to Sustainable, Secure Energy Future
City of Cape Town

AMEU/SAIEE JET Webinar

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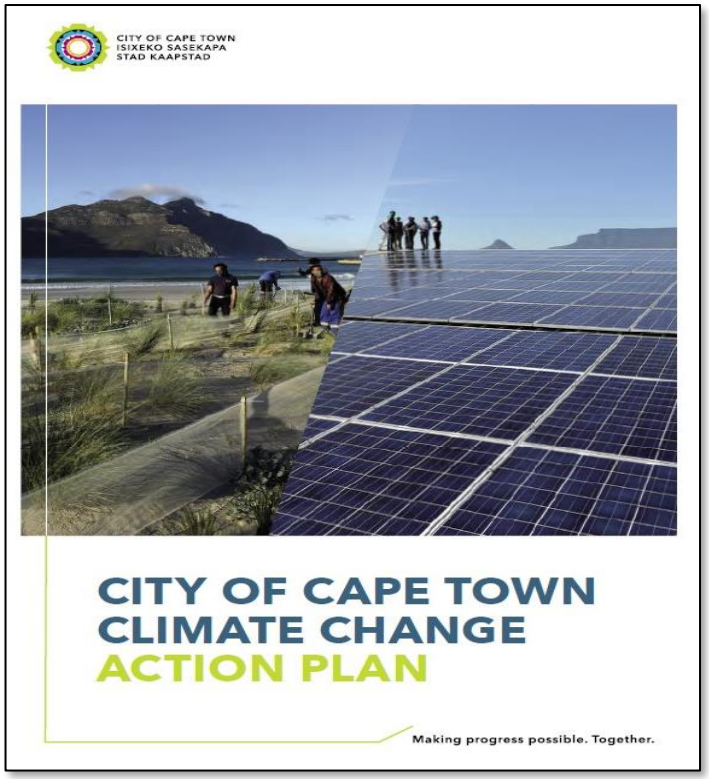
Making progress possible. Together.

CoCT Climate Action Imperative (RE Program)

- City will contribute to reduction in climate change impacts that risk socio-economic development, environmental sustainability, and human health and well-being
- Becoming leader in transitioning to competitive, resilient and efficient green economy key objective
- Entered into global climate change action commitment with C40



SFA 8: Zero-emission buildings and precincts

SFA 7: Carbon-neutral energy for work creation and economic development

CoCT Embedded IPP Program

- Embedded IPP Tender launched in Feb2022
- Targeting "lower carbon energy" embedded IPPs up to 200MW
- Fully lifted licensing exemption threshold may speed up process
- City will still conduct grid integration studies to ensure network stability
- Energy cost savings key benefit being pursued by program
- Increase in RE components globally poses risk to meeting tariff cap
- Proposed tariff regime encourages supply of energy over peaks
- Energy may be available for LS mitigation / peak shaving
- First power expected end 2025

Very encouraging response received from market so additional bid windows planned for future

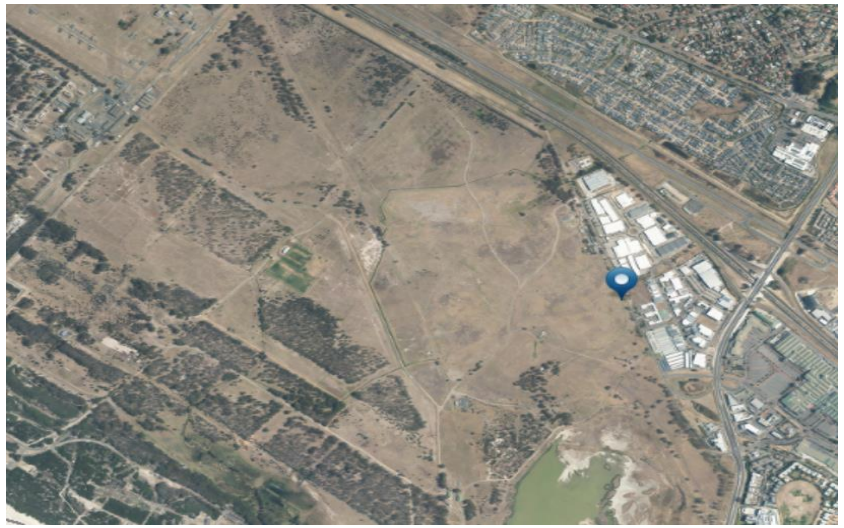
Own-Generation: Atlantis Solar PV

- Atlantis Solar PV project will be 10MW facility connected directly to the City's network
- Sited in Atlantis on vacant land between existing industrial and residential zones (Wesfleur)
- First City utility scale Solar PV plant
- Site will be "future-proofed" to accommodate battery storage
- City has taken investment decision to move project into DD phase
- Execution start planned Q1 of 2023
- Localisation of benefits key component of project objectives

Successful development and execution of Atlantis Solar PV will serve as "lighthouse" project for City – we can go bigger/better

Own-Generation: Paardevlei Solar PV

- City owned Site in Somerset West area (400ha)
- Potentially suitable land parcels identified for 50 - 60MW Solar PV
- Project may include battery storage, depending on timing
- Depending on operating regime ~ can support LS Mitigation
- City secured support from C40 CFF to assess feasibility in 2022/23
- FID projected in 2024, COD in 2026



Paardevlei will be significant "step-up" for City

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Own-Generation: SSEG Solar PV

Rooftop and Small Groundmounted PV:

- Three projects of between 100kWp to 999kWp fully developed
- Feasibility studies completed and FID received
- Target COD of last installation June 2023
- Second phase under development

Floating Solar:

- Pilot project at Kraaifontein WWTW
- Assessment of water evaporation reduction, and higher yield due to cooling effect of water proximity
- Pilot and testing period underway until early 2023
- Additional sites under consideration at Bulk Water Facilities

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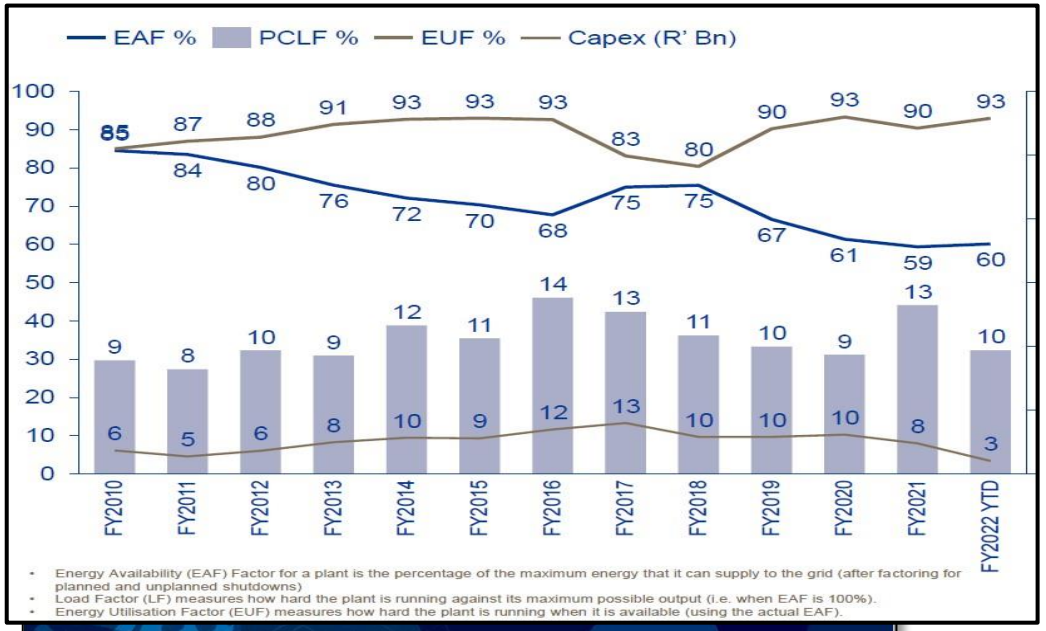
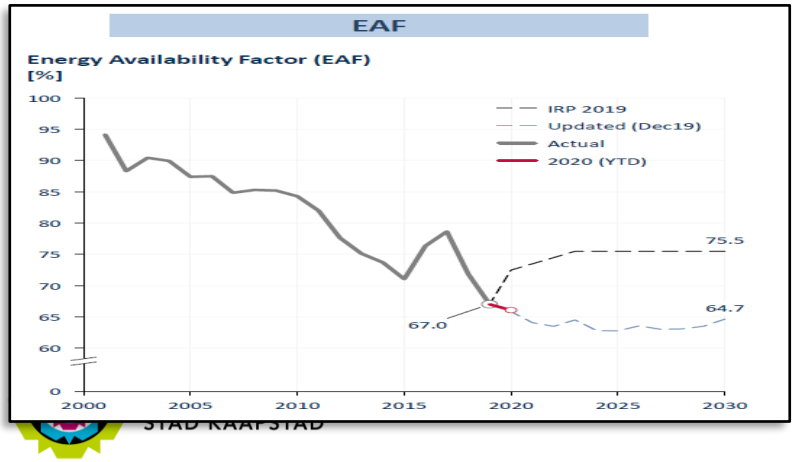
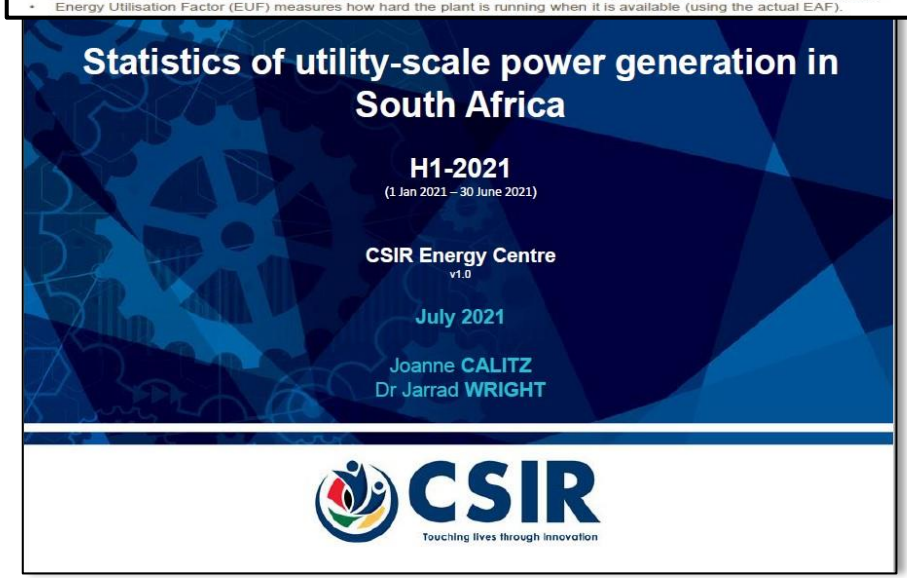
CoCT Energy Security Imperative (Dispatchable Energy Program)

- National energy supply/demand balance ever more precarious
- Most recent Eskom technical performance data points to continuously decreasing EAF and increasing EUF
- Trend does not bode well for machine longevity ~ may lead to widespread generator outages if not stopped
- City does not see improvement in Eskom technical performance over short-medium terms

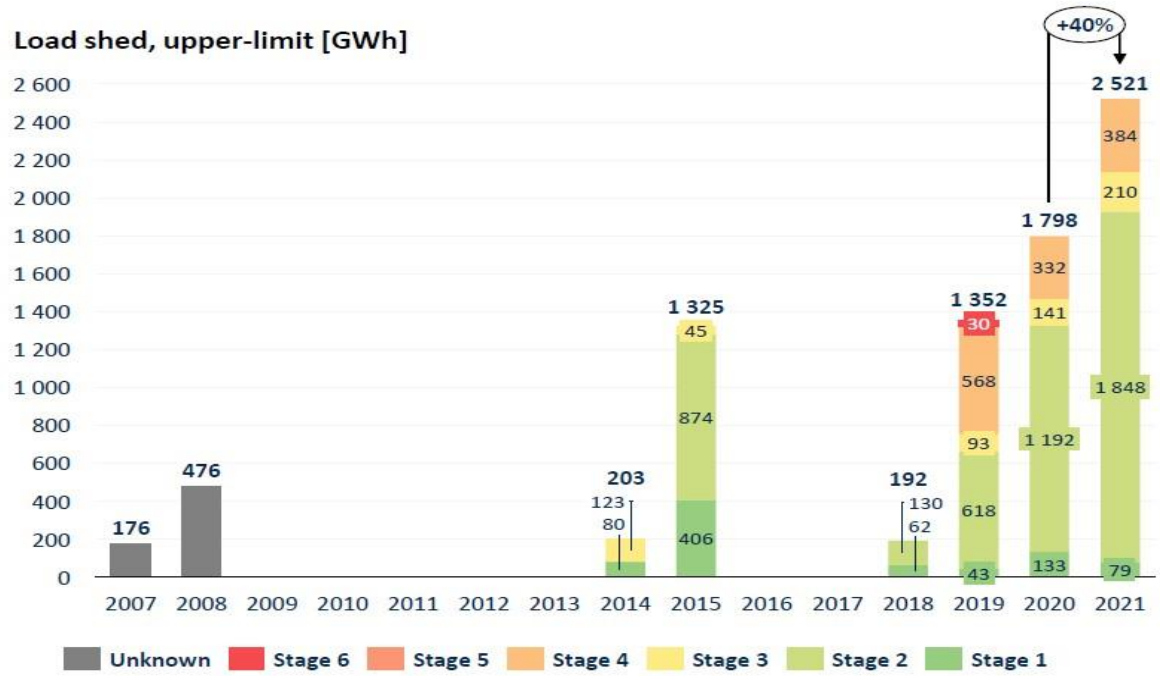






Loadshedding Stats (CSIR)

- Loadshedding levels have been increasing dramatically since 2017, in line with regression in Eskom technical performance
- Loadshedding events are becoming more frequent, are more severe and decoupling from seasonality – **2022 LS will be worst on record**



Year	Duration of outages (hours)	Energy Shed (GWh)
2007	-	176
2008	-	476
....	....	....
2014	121	203
2015	852	1325
2016	-	-
2017	-	-
2018	127	192
2019	530	1352
2020	859	1798
2021	1169	2521

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City is pursuing dispatchable technologies able to provide power over extended periods

Loadshedding Mitigation Fundamentals

- Eskom technical performance **not** going to improve short/medium term
- **Declining EAF and increasing EUF** of aging Eskom coal fleet pointing towards potential catastrophic collapse of the energy supply/demand balance (Status of Black Start facilities unclear)
- However, SA does not have an installed capacity problem **(~50GW vs ~34GW winter peak)** but an inability to extract required energy from installed generation sources to meet demand over day/week/month
- Adequate response must thus not be constrained to a capacity focused solution (MW only) but focus on broader energy requirement
- National/local response must meet two fundamental criteria:
  - **Dispatchability** (can be switched on when required)
  - **Large Energy Output** (High power output over long periods)

The introduction of additional high energy, dispatchable capacity is a non-negotiable

CoCT Dispatchable IPP Program (Initial Design)

- City fully intent on improving energy security and mitigate against loadshedding impacts
- Over medium/long term: MUST either self-build or buy dispatchable, high CF energy - CAPEX burden deciding factor
- Technology agnostic, but MUST be dispatchable and able to generate for extended periods
- Competitive tender process will be followed – probable cost > Eskom
- Impact on tariff remains key consideration
- Larger scale than Embedded IPP Program envisaged
- Wheeling will be allowed
- Higher complexity level; City is procuring TA Services to support program
- First power expected 2026
- Depending on technologies, various infrastructure enablers may be needed

Dispatchable Energy program has significant catalytic potential for economic growth in City and Province

CoCT Battery Energy Storage Systems (BESS) Program

- City will commence utility scale BESS Program in 2023
- Technology is seen as aiding in dispatchability of CoCT energy supply
- Roadmap under development, with significant work done via Greencape and in-house
- Cognisant of declining cost trends in technologies, but also currency, market, logistics and other risks
- Multiple use cases feasible within City to support BESS business case
- Main focus on network investment deferral, back-up supply to critical facilities and (later) arbitrage
- Arbitrage becomes feasible once "critical installed mass" is reached
- Detailed location analysis has been completed, and business case development (per site) next steps

BESS is major component of City's energy resilience strategy

CoCT Electricity Pathways

- City has commissioned 'Electricity Pathways" least-cost study via CSIR
- Provides "roadmap" on various ways for City to reach energy objectives
- Climate resilience objectives to be balanced with energy security needs of citizens, commerce and industry
- Lowering energy cost over time high priority to reduce energy poverty
- Various scenarios modelled to present City with options and costs
- Results support City taking action now
- Grid constraints major factor going forward in ability to implement plan
- Further work to refine results envisaged

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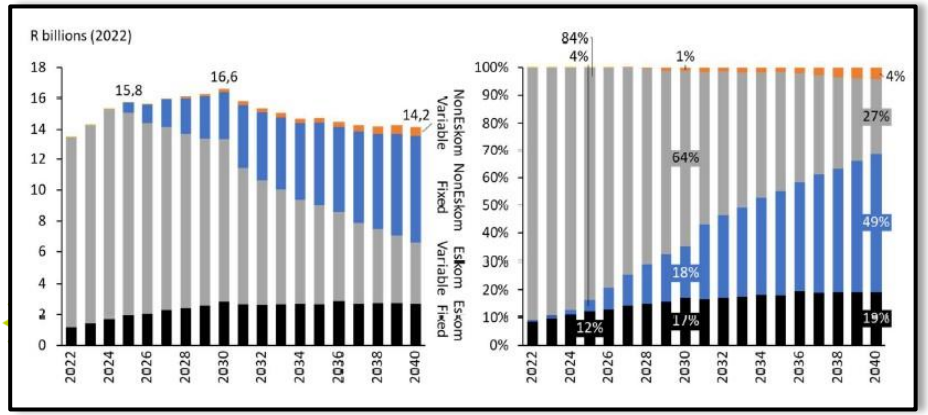
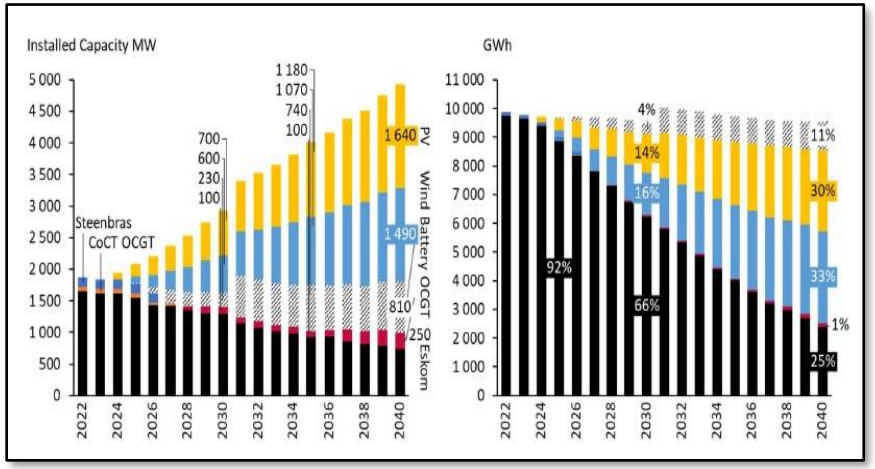
CSIR
Touching lives through innovation

Final Report

MUNICIPAL ELECTRICITY MASTER PLAN (MEMP)

Electricity pathways for the City of Cape Town





MEMP will become standing feature in energy transition

Final Thoughts (and more questions)

- **Striking a balance between climate change resilience and energy security is crucial** – this will require the pursuit of an energy mix of different technologies at national and/or local level
- **Lenders will not finance "newbies" on IPP Procurement programs** – in absence of guarantees, can municipalities really "go it alone" to procure energy? Should they?
- **Additional cost burden** of (dispatchable) energy procurement may be bridge too far for Munics that are less strong financially. Is it really the mandate of Munics to pursue this?
- **Increase in RE component costs** may impact ability to meet IPP Procurement tariff cap requirements, while potential **changes in Eskom tariff structure** may impact business case for IPP Procurement and RE own-build projects.
- **Sustainability of local component manufacturing** is critical to ensure price stability and price shock mitigation – how does this align with calls to scrap local content?
- **Access to land** is very real constraint – revised municipal spatial planning process can enable greater availability of land specific to RE development, but is this the best utilisation of (arable/usable) land?
- **Fast-changing power industry and environment** is challenge – we need to cater for changes coming a decade from now in decision-making through sound risk allocation
- **Infrastructure requirements** must be met to ensure success of energy procurement programs (e.g. gas import capacity at ports) – unlocking value chains increases benefits

The pursuit of a "just" energy transition is a noble goal, but "justice" for who?

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Thank You

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