UNIVERSITIES
SOUTH AFRICA

ONLINE LOADSHEDDING WEBINAR
21 July 2023 09h00 – 12h30

REPORT

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1 Welcome and objectives of the webinar

Mr Mahlubi Mabizela (USAf: Director Operations and Sector Support)

1.1. Mr Mabizela welcomed the colleagues and thanked them for honouring the invitation to attend this webinar on the critical topic of energy provision which was affecting service delivery and finances at the universities.

1.2. The universities were at different stages in the implementation of their energy plans. The aim with this engagement was to share best practice and lessons learned around renewable energy resources in order to help the institutions finalise their energy plans. While recognising the differences between institutions, the hope was that they could work together towards an energy strategy framework for the higher education system.

2 Overview of the energy options and landscape

Dr Lawrence Pratt, Principal Researcher Solar PV, CSIR

2.1 Presentation

Dr Pratt gave an overview of the PV rollout at the CSIR, offered some advice around ensuring load shedding resiliency, and discussed how the Council could assist clients through its consulting and testing capabilities.

2.1.1. In 2015, PV had been decided upon as the best short term intervention for reducing the CSIR's energy bill. The grid-tied PV, with single and dual axis trackers, delivered capacities in the region of 2KW in total and generated about 15% of the CSIR's total consumption. The campus was not off-grid, nor was that the goal. Capex of about R35m had been invested over the years, and the savings on energy bills as at February 2023 had been approximately R20m. It was projected that the nominal investment at least should be recouped within the next five years. About 3.1GW per year were produced by 2021, but electric energy production would now start to decline if new generation was not added.

2.1.2. As a National Key Point, the CSIR did not experience loadshedding but plans were now being put in place to protect certain infrastructure (starting with ICT) should that change. An assessment of critical consumption and diesel generator capacity was underway, and options for adding or repurposing existing PV generators for hybrid operation were being considered. Although designed to be grid-tied, most of the infrastructure could accommodate a hybrid system.

2.1.3. There were short, medium and long term solutions to protect against load shedding. Data collection was a critical first step in planning, modelling and implementation. Over and above monthly bills, an hourly or even sub-hourly consumption profile was needed in order to understand the peak load and base load so that a system could be designed that would offer protection for two or four hour blocks of load shedding. Peak load was important for the design of the inverter, and base load for calculating the number of hours of battery storage needed.

2.1.4. The best first step was always to get some PV installed if load shedding was not a concern, and to install some batteries and generators if it was. A small plug-and-play solution to cover a few hours of load shedding per week was fairly simple to implement. In terms of medium term interventions which required a larger infrastructure outlay, Dr Pratt recommended focusing on the battery storage component first. One could just install battery banks and battery bank management systems that integrated with existing generators to power up full or partial load depending on capacities. During load shedding, 75% of activities could be shut down, leaving the critical load to be fed by the battery bank. Implementing PV systems at a later date would help extend the life of batteries as they would not be discharged during the day.

2.1.5. The indicative price for PV was R15-20 per KW DC, but current market prices prevailed. It was also important to remember that prices varied drastically depending on the quality of a system and its components. It was preferable to spend a bit more up front as these were long term investments. Good aftersales support for these complex systems was also critical when choosing a supplier.

2.1.6. Hybrid energy systems delivered load shedding resiliency. High capacity PV systems were expensive to install, but cheaper to run than diesel generators. Diesel was the most cost-effective solution for just a few hours of load shedding per week, but for longer and more frequent periods of no power supply, investing in PV panels and batteries was recommended. Diesel generators would provide backup during unexpected periods of bad weather, for example.

2.1.7. The long term solution was an energy management framework. Energy audits were critical to understand where one’s load was going. Installing meters at substation or even building level was less expensive that bringing in a team to do a physical once-off audit. Metering also provided ongoing data for monitoring and evaluation to support decision making around energy efficiency and conservation, and load shedding protection. Education and awareness campaigns were important in terms of reducing consumption.

2.1.8. The CSIR could assist with energy audits and planning; pre-feasibility studies for PV and PV+ storage and diesel solutions; techno-economic modelling for various scenarios and sensitivities; and quality and reliability testing of PV modules and batteries. PV procurement consulting could also be offered in order to de-risk investments. An important element here was that suppliers should be notified that independent third party testing of components was part of the contract. Procurement should be based on the cost of electricity over the life of the solution rather than the capex, so that one did not opt for the cheapest solution. Requiring that the EPC designing and installing the PV plant operate it for three years was an incentive for them to put in a quality system. The performance ratio of the system should be assessed at the end of three years, and if the guarantee given when the EPC won the contract was not met, a penalty was payable. Clawing back money is this way helped to mitigate the capex outlay.

2.2 Discussion

2.2.1 Comments

i. Mr Gafieldien (SU) commented that the better resourced universities were in a position to pursue the options presented, but there appeared to be a disconnect in terms of solutions for the other institutions and how an understanding of the problem could be communicated to their decision makers. He also noted that even well-resourced universities had splintered solutions over time because of the need for several years' worth of reliable metered data for monitoring and evaluation.

ii. Prof Naidoo (UFS) indicated that, apart from cost, challenges experienced at his university were abuse of installed units, mainly by students, and theft. He stressed that from the USAf side, there needed to be representation to government through the Minister about the crisis that universities, TVET colleges and community colleges were facing, and the need for financial support.

iii. Prof Lazarus highlighted that the universities had to determine what their specific needs were. The priorities identified at DUT were looking after students, the library, and keeping computers and lights going. A 110KW rooftop project installed a few years ago on the library roof was successfully running over 100 computers and lights. Along with grid tied, this was a hybrid system with PV and backup. From there, the university was adopting a phased approach, with a diesel generator PV hybrid system, and looking at other rooftops and the carport where PV would be installed and tied into diesel generators.

2.2.2 Questions

i. One of the difficulties experienced at UKZN was that there was no 'one size fits all configuration' that accommodated different buildings and different campuses. The integration of battery and inverter systems was also a challenge. With a view to optimising the cost of the whole application, evaluating key locations for pieces of equipment, or whether a centralised location would be better had taken some time.

   Dr Pratt said that the first thing to consider was the point solution as it was very important to get the interfaces between the existing infrastructure and the new system right. In terms of PV systems, this came down to the mechanical connection point (on the ground, a pitched roof, etc.) and the electrical connection point. The next consideration was what one would be connecting. Managing the five systems with 20 different components at the CSIR required a wide range of expertise. Having some form of standardisation within a campus was definitely preferable. This was easier to achieve if one's budget allowed one to go to market with one big tender. Doing so leveraged economics of scale and ensured product continuity, in addition to making procurement processes more efficient. Having one supplier was also better from a monitoring and evaluation point of view.

ii. A UKZN service provider had given a presentation on using an existing diesel generator system with PV panels, where the inverter had a control module between the panel and the generator. This allowed the PV panels to produce power by using the generator as the grid reference during load shedding. Dr Pratt was asked whether this was a worthwhile option to research as an interim measure before the expensive procurement of batteries.

Dr Pratt explained that if the actual grid, generator grid and battery grid between them could provide a 50Hz signal to the inverter, then the panels would produce. As a safety mechanism, inverters were designed to shut off if they sensed no grid voltage. In the case of a hybrid inverter, there was an additional mechanism which, in the event of grid voltage going down, disconnected that point of connection and looked for the batteries or the generator, or both. It was his understanding that this then formed the grid giving the 50Hz signal for the panels to produce. He confirmed that it worked to use the generator as the grid-forming source for the PV system, but he was not familiar with the minimum size generator needed.

iii. Mr George (UP) commented that the main difficulty seemed to be finding an inverter that could facilitate the integration into a very large, typically 500KW system and the coordination between diesel generators, mains and PV.

Dr Pratt concurred that inverters were the weak point in these systems. They had a number of moving parts that could fail and which were very difficult to replace when they did. Micro-inverters were popular elsewhere in the world, and he believed that one would start seeing more of them in South Africa. In this case, each module or pair of modules got a micro-inverter. In addition to providing module-level visibility, this also meant that inverter failure would only take out one or two modules. However, it was important to pay attention to the battery management system, because if batteries were failing, the problem might lie with the control system. On larger 500KW systems, one could go up to multi-MW on a single centralised inverter. The CSIR had an example of a single axis tracker 550KW system connected to eight different string inverters which were then combined into a transformer with an output of 1100KV tied into the existing ring and feeding five buildings on the campus.

iv. Mr Gafieldien highlighted the current risk that running generators for emergency backup was pushing major components to the end of their design life. Institutions were having to lease in systems or switch the generators off which threatened the core business of teaching and learning.

Dr Pratt noted that generators failed earlier when they were not run at full capacity. Rather than running generators, PV and grid at the same time, he recommended having generators on fully for 10% of the time, and completely off otherwise.

v. Mr Mabizela raised the question of ensuring that systems did not become obsolete should Eskom delivery return to normal. The cost-effectiveness of system maintenance in the event of a return to normal was also a consideration.

Dr Pratt responded that a grid-tied PV system typically had a 25-year lifetime, and the PV panels would continue to save the universities money despite the cost of maintaining the system and replacing inverters with some frequency. Using PV to charge batteries which were then discharged during peak usage tariff times would reduce the electricity bill. Batteries also had a natural lifetime, and if Eskom returned to 100% service in five years' time, the batteries would have reached their end of life anyway. The same applied to diesel generators, which not expensive to buy.

The CSIR financial models worked with R300 per KW per year for operations and maintenance (O&M), escalating with inflation and factoring in replacement costs over 25 years. This should work if the universities adhered to those budgets, but dual axis trackers should be avoided at all costs as they were a huge O&M challenge. The R300 per KW per year parameter was enough to cover a rooftop type system and should also be adequate for a single axis ground module system.

2.2.3 Dr Pratt's responses to requests for sources of information

i. PVEL published annual PV module quality rankings and had a similar scorecard for inverters.

ii. A presentation on the performance of the CSIR grid-tied system could be shared for benchmarking by universities which had the same type of system, such as WSU.

iii. There was a link to the CSIR's PV procurement guideline on the sseg.org.za website. The guideline included templates for O&M and procurement contracts, and timetables for a typical project.

3 Information sharing – energy solutions at universities

3.1 Presentation by Nelson Mandela University

Dr Andre Hefer, Sustainability Engineer

Dr Hefer's presentation focused on NMU's Power Purchase Agreement (PPA) with a supplier in Gqeberha.

3.1.1. The energy efficiency strategy at NMU was three-pronged; namely, renewable energy, demand management, and backup energy management. In 2016, Manco approved the first 1MW PPA with the university taking ownership of the plant after a 10 year period. The further R65m approved in 2022 for PV across all campuses in 2022 would bring savings of R10m per annum. In 2023, R45m was approved for a centralised generator model which could sync with the PV but which could unfortunately add R25m to annual operational costs. In 2023, the Business Chamber cluster had issued an RFP for 150MW produced in the Free State and Western Cape for 20 odd of the largest power users in the Gqeberha metro, including the university. With this provision, NMU would probably have renewable energy penetration of up to 50% in day-to-day energy usage.

3.1.2. A PV grid-tied plant developed on South Campus was currently producing 16% of the University's overall energy usage. With a peak demand of 3MW and a base load of 1.2MW, there were no plans to put any electricity back into the grid. Two thirds of the panels were fixed, and the other third had dual tracking.

3.1.3. The ten-year PPA approved in 2016 had eventually been finalised in 2018, after multiple engagements, including with the metro, as there was not much familiarity about the impact and management of such large installations at that stage. It took roughly seven months to install the PV plant on a green fields site of about 2 Ha. This was completed in July 2019, and performance to date was very much in line with the initial projections.

3.1.4. The advantages of this climate-smart PPA included the following:

- No initial capital outlay for the PV infrastructure, coupled with low financial and technical failure risk since all the responsibility sat with the company selling the energy. A PV installation was one of the few capital investments that would give an 18-20% return.
- No O&M or insurance costs for the duration of the PPA.
- The purchase price of electricity from the PPA could be lower than the municipal price, or could equalise in a few years, depending on whether the institution would be taking ownership of the plant or not.
- The unit price increased at a fixed rate per annum (6% in NMU's case).
- The institution took ownership of the plant in Year 10, and it would continue to produce energy until it was replaced in Year 20-25.
- With further plants planned, the PPA provided 'a soft landing' for new clients to learn and gain experience in operating with a PV plant.

3.1.5. Pitfalls or disadvantages of a PPA to be aware of included the following:

- The financial benefits from the PV plant were shared with the private partner until the university took full ownership in Year 10.
- Monthly charges in the PPA could fluctuate a little with plant production which was affected by weather and load shedding, as partners often required a minimum amount to keep them viable. (This was not case with NMU as the university only purchased what was produced.)
- Access to the site required a few days' notice. Access to data, which was more important, had also not been easy.
- Universities should be cognisant of the risk of being contractually locked in for an extended period with a developer which could, for example, change ownership or liquidate.
- The technical and performance requirements to be realised at the end of tenure must be so well bound into the agreement that there were no issues when the institution took ownership of the plant. This included how to contractually manage it if these were not met.

3.1.6. As compared to a PPA, an outright purchase that included a 3-year performance and maintenance had the following advantages:

- Income generation towards reducing energy costs and recovering the investment in the plant was realised immediately upon installation of the PV.
- Much of the initial plant underperformance or technical failures would probably be identified in the first one to three years. PV panel degradation also generally manifested within the first few years of installation. Close monitoring could help one get a good understanding of failures in the system within that time.
- Once the 1-3 year performance and maintenance agreement was over, the institution was not tied into someone contractually or financially for any extended period of time, other than the general warrantees or guarantees with equipment suppliers.
- The institution could decide to maintain rolling 3 or 5-year maintenance SLAs with local contractors or even the installer of the plant to alleviate pressure on its maintenance department.

3.1.7. In addition to the obvious initial capital outlay and planning, the disadvantages of an outright purchase were the maintenance costs and technical skills needed once the performance and maintenance agreement expired.

3.1.8. The decision to go with an outright purchase depended on funding and the university's internal capacity or maturity in terms of maintenance or managing SLAs for a multimillion rand technical installation

3.1.9. Professionally simulating the range of needs and outcomes and reviewing the ideal size for each campus was a very valuable exercise. Interestingly, NMU had realised how much in-house technical, financial and academic expertise there was that could be leveraged to achieve the best outcome.

3.1.10. Prof van Dyk from the university's local research entity, PV Insight, emphasised the importance of having decent quality specifications for the device that would be used, as well as quality testing of the modules that would be installed. Particularly in the case of an outright purchase when the institution would have to look after the installation right from the start, putting long term performance monitoring and data collection in place was critical for long term reliability. With a PPA, it was important to know the state of the panels when one took over the plant, and that also required reliable long term data and periodic field testing.

Q & A

i. Dr Hefer was asked whether the PPA at NMU offered flexibility in terms of adding storage capacity so that not only cost savings but also business resilience and continuity were realised, at least for certain critical operations. He responded that there was currently no such flexibility, and any additions or changes would have to be on the side of the University. One such addition was the centralised generator system which would hopefully be online in about 18 months. NMU had not yet considered introducing battery systems due to the high expense, but would probably install another 900KW on South Campus and synchronise it with the centralised generator system.

ii. Dr Hefer undertook to revert on the question of which inverter types the university had installed. In response to a question about whether the university had multiple points of integration with the existing network, he confirmed that only one substation on South Campus was being fed.

iii. Mr Aheer (UKZN) asked about hurdles that had to be overcome in terms of the municipality when concluding the PPA. Dr Hefer responded that the Gqeberha metro had been very open to the discussions, and that the issues had been more of a technical nature than around loss of income and how billing would work. For example, the grid study was done because the metro wanted to understand what exactly the implications of the installation would be on their local grid, transformers and substations. The municipality's openness was possibly because it was one of only two metros in the country which already had trading agreements in place with independent power providers, and therefore understood the discussions better.

iv. Dr Koko (CUT) asked about possible solutions to the problem of the PV plant going down during load shedding. Dr Hefer responded that the NMU plant also became completely isolated during load shedding because it was grid-tied and there was no battery storage system. This would be solved by the introduction of the afore-mentioned centralised generator system that would sync with the PV plants, starting with the one at South Campus. He noted that the PV going down with the grid during the daytime also had financial implications.

v. Dr Kukard (UCT) highlighted that a consumption PPA could place an institution in the difficult position of continuing to pay for the system even if PV generation was curtailed. Prof van Dyk responded that NMU had a consumption PPA. The municipality imposed a daily usage limit of 1KW. An expected level of performance was set annually which scaled down as the system degraded over the period of the agreement, but production had to be over 900KW by Year 9, which was quite a stringent demand. The developer addressed this with the dual axis tracker. It was possible to be sub-optimum for a number of years and then to start optimising so that the minimum performance level required at Year 10 was met.

vi. Prof Naidoo (UFS) raised the question of how the condition of the plant was managed so that in 10 years' time the university did not inherit a system that required complete reworking. Dr Hefer responded that this was the biggest risk for an institution. He thought there was a 5% deviation in the NMU agreement at that time, but was unsure what penalties were built into the agreement. He emphasised the importance of starting very early with discussions about the quality of the various components, and having a clear and detailed technical specification of what would be installed on site, even if the university would not be taking over the plant.

vii. Dr Xhala noted that the University of Zululand was still trying to get Manco approval for an energy management strategy. He asked about the lifespan and maintenance intervals of a PV inverter and battery if the institution went that route rather than PV plant. Dr Hefer responded that it was difficult to comment as maintenance involved so many variables, but there were general terms around the replacement and maintenance of inverters, and battery replacements.

viii. Asked whether he would opt for a PPA again and if there was anything he would change in hindsight, Dr Hefer indicated that he would favour an outright purchase in combination with extremely thorough quality testing and a very strong technical SLA or 1-3 year maintenance performance agreement. On the site in question, the cost of an outright purchase would have been close to R16m at the time, and was probably still very similar, depending on factors such as the type of fencing, groundworks required, and distance to substations.

3.2 Presentation on the University of the Free State

Mr Nicolaas Esterhuysen, Director Engineering Services

3.2.1. Each of the three UFS campuses (Bloemfontein, QwaQwa and South Campus) had at least one solar plant. All the plants were grid-tied and fixed axis with no axis tracking installed, and connected directly to the 11KV internal grid which then distributed power to wherever it was needed on the campus. The plants had been an outright purchase, and the university was doing the managing and monitoring, with an assistance SLA in place with a local provider.

3.2.2. The benefit of a grid-tied plant was that the maximum generation of the plant corresponded with the maximum demand on campus, so the university was assured of using all the solar power it was generating at this stage. As the biggest campus, Bloemfontein was just touching 9KW demand. The plan was to increase capacity by another 1MW in 2024, at which point the university might break even. In 2022, about 11% of the energy across all campuses came from solar production. This would change drastically with the installation of the new ground mounted solar plants.

3.2.3. The university's energy intensity for the three campuses combined (including the solar energy produced) had started off at about 115KW hours per assignable square metre and declined steadily over the past 10 years thanks to energy efficiency initiatives. Energy costs had however steadily increased, primarily due to rising electricity tariffs.

3.2.4. One of the University's initiatives was the introduction of centralised heat pump clusters to heat water in installed storage tanks. Having adequate storage capacity not only ensured adequate supply of hot water to the residences, but allowed the university to switch off heat pumps during peak tariff times, although managing this was still in the testing phase.

3.2.5. Demand side management was an important part of the UFS energy efficiency strategy. There was a master plan for the refurbishment of street lights, and changing sport lights to LED had reduced the energy demand for four masts from 204KW to just 28KW. Passive demand management was achieved by means of remote activation of a building management system that switched off non-essential loads once a specified target was reached. This helped to reduce the demand charge on electricity bills.

3.2.6. A micro grid system had been deemed the only appropriate approach at the rural QwaQwa campus in light of the general electricity supply challenges there over and above load shedding. This was a 1600KVA diesel hybrid system involving four sets of generators with a bulk diesel tank. An incoming substation with a step-up transformer connected directly to the 600KW solar plant across the road. At any one time, 400KW of the site load of 830KW was supplied by generators, and 420KW by the solar plant. The site load would always be a combination of either grid power and solar power, or generator power and solar power. There was no battery backup because the capital cost was too high in relation to the campus size, but combining central diesel generation with the solar was yielding savings in diesel costs. Consolidating the diesel generation into the plant also lowered maintenance requirements and made monitoring easier. Load shedding did not always coincide with peak solar output times, so generators needed to be run as a spinning reserve or hot standby to pick up if solar power went down. Installing a non-essential load management system had enabled the university not to oversize the micro grid, thus saving some capital cost, and to manage the running diesel cost which was very high but kept the campus going. Establishing ways to optimise solar power, especially during grid failures, was the institution's highest priority at this stage in order to enhance the redundancy and reliability of the entire system. The second highest priority was ensuring 24/7 monitoring, and expanding the load control system to switch off non-essential loads.

3.2.7. In terms of security, the installations at all the campuses were fenced off with electric fencing and alarms on top. A high mast light illuminated the area on the QwaQwa campus, and it was covered by about seven CCTV cameras. This was one of the key requirements along with proper access control. In five years, there had only been one attempted theft at the university's experimental farm which also had a small installation.

3.2.8. Partly thanks to self-managing the plants, UFS had extensive data which it was happy to share with the other institutions. There were excellent opportunities for research, and the first academic paper on the micro grid had already been published.

Q & A

i. In response to a question about the University's experience with using the Schneider PME system to manage the entire system, Mr Esterhuysen said that UFS was very pleased with the Schneider platform but noted that it was mostly used for data gathering and reporting. The actual control of the micro grid was done by means of a custom PLC which governed the generators and the solar contribution. UFS was planning to expand the Schneider platform more on the Bloemfontein campus as a tool to for monitoring aspects such as grid status and grid breaker availability.

ii. To a question about costs, Mr Esterhuysen responded that the 1MW solar installation cost about R15m, depending on the ease of grid connection, fencing and so forth. The grid tied solar plant on the QwaQwa Campus had already been constructed in 2022 and two generators were already in place, but having to do an extensive refurbishment of the 11KV switch gear inside the substation had pushed the cost of the micro grid up quite a bit. The additional two diesel generators and the tank had cost about R3m, and the switchgear in the order of R6m.It was difficult to give a figure for running costs since the micro grid was still in the testing phase. A year-on-year comparison was also difficult in light of the massive increase in load shedding in 2023. In the worst load shedding months, electricity and diesel purchases were more or less equal at R700 000.

iii. Asked whether UFS had considered using solar collectors in addition to heat pumps and tanks for heating water during the day, Mr Esterhuysen indicated that the focus at this stage was on reducing energy use in all conditions, but that was something the university might look into in the future.

iv. Mr Mbambeleli (UJ) asked about the load sharing between the solar and generator systems during loadshedding. Mr Esterhuysen responded that underloading the generators was one parameter that had to be carefully managed in order to avoid damage to the engine due glazing of the pistons over an extended period of time. Another point to bear in mind was that the 430KW produced from solar dropped by 300KW when a cloud passed over, which had to be picked up by the generators immediately. This meant that they needed to be synced with the grid, which was the critical role of the control system. It had also been found that, as electronic devices, the inverters were much more capable of ramping up production quickly when a cloud passed over. The generators then curtailed their load because they were mechanical devices, and there had been instances in the beginning when the returning solar would push back into the generators and cause some of them to trip. These were all technical considerations that one might not initially think about and which were difficult to simulate because it was a matter of seconds. The load sharing would normally ensure that the generators connected to the grid would always look at the site load to see if it could be handled by one generator.

v. With respect to whether the micro grid had contributed to cost reductions, Mr Esterhuysen noted that UFS was doing very well with managing its costs, particularly given that QwaQwa was a worst case scenario in terms of energy availability. The micro grid had definitely been worth the money and effort, but it was important to remember that where exactly the application was needed as well as the existing systems played a role in this regard.

vi. Mr Gobardan asked Mr Esterhuysen if he had any advice for less cash flush institutions in terms of quick, short term wins in dealing with load shedding. Mr Esterhuysen recommended that demand side management and energy efficient technology be looked at first. If demand was reduced, systems could even be sized smaller. Purely in terms of cost, a PPA might be a better route for universities that did not have in-house technical expertise. A distributed rather than centralised approach to generators was much quicker to implement, and allowed one to target critical areas more effectively. He also recommended looking at solar and battery storage for smaller buildings to optimise going off-grid.

4 Next steps towards an energy framework for higher education institutions

4.1. Mr Gobardan noted that part of the aim of the webinar was to assist institutions with the finalisation of the energy plans that had to be submitted to the DHET in September 2023.

4.2. Despite the planned panel discussion not being possible, there were elements of a framework in the presentations that could be leaned on. These included:

i. Energy option analyses and feasibility studies.

ii. Energy audits.
iii. Optimising PV size in line with the site, energy demand, and budget constraints (including micro grid options).
iv. Linking plans to long, medium, and short term requirements.
v. Demand side management efficiencies.
vi. Optimising what was already in place.
vii. Load shedding projections, and the impact on not only teaching and learning, but also programming and timetabling.
viii. Education and awareness campaigns.
ix. Monitoring.
x. Whole stakeholder engagement.
xi. Funding considerations such as a PPA for less cash flush institutions, taking the pros and cons into account, and clearly defining roles and responsibilities.
xii. The cost of security measures to safeguard installations.
xiii. Governance architecture and approval processes.
xiv. Policy elements around what happened to the savings that were realised.

4.3. Mr Moleme undertook to share the very basic framework developed by the DHET using ChatGPT and with some assistance from experts in the CSIR by close of business. It was agreed that a small working group would use this to put together a generic framework that would be circulated to the universities through Ms van Rhyn for fleshing out according to their circumstances and requirements. Nominees/volunteers for the working group were:

- Mr Ajesh Aheer (UKZN)
- Mr Nicolaas Esterhuysen (UFS)
- Mr Nadeem Gafieldien (SU)
- Manfred Braune (UCT)
- Prof Ian Lazarus (DUT)
- Dr Andre Hefer (UFS)

4.4. Mr Mabizela reminded the colleagues of Dr Pratt's invitation to consult experts in the CSIR. He also noted that something else to consider was whether there was any intention of becoming a paid source of power supply to the community or municipality, particularly in rural environments. Working with communities offered a form of security beyond the purely commercial perspective. Eskom was also expressing its preparedness to buy electricity from independent producers which was what the universities would be becoming.

4.5. There was support for Mr Gobardan's further suggestion that a technical group be established to enhance collaboration and the sharing of expertise and experiences among the universities. It was agreed that Mr Gobardan would set up such a group to meet quarterly, with support from Ms van Rhyn.

4.6. Mr Gafieldien noted that, as a voluntary association, the Higher Education Facilities Management Association (HEFMA) was serving as an effective platform for collaboration. However, a closer working relationship with USAf was needed because members at certain universities struggled to get the message through to decision makers. Closer collaboration would help to clarify and demystify the topic so that top management understood that energy provision was the biggest risk to the universities' core business and required the investment of much more in the way of resources.

4.7. Mr Moleme highlighted that while there had been an expectation at the March 2023 meeting that there would be substantial government funding support for energy solutions, the DHET had been instructed by National Treasury to implement a 10% budget cut. The universities must still submit their energy plans, but the Department would only be able to communicate how energy solutions could be supported once the cuts had been finalised. Mr Gobardan emphasised the need for financial support in light of this new added burden on the institutions. Perhaps government could facilitate partnerships with other funding sources.

5 Closure

In closing the webinar, Mr Mabizela noted that USAf was in the process of setting up a Sharepoint to act as a repository for presentations, documents, plans and other information that people were willing to share.

The colleagues were thanked for their attendance and participation.