UJ ENERGY RESOURCE WASTE SUSTAINABILITY PLAN 2022-2025	
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Related Documents

UJ documents (e.g. Policies, Regulations, Guidelines, Contracts)	**Other** (e.g. Legislation, DoE and HEQC directives and guidelines)
• **UJ Policy on Policy Document** • **UJ Strategic Plan 2025** • **UJ Operational Plan**	• National Environmental Management Act – Environmental Laws Amendment – No 14 of 2009 • Carbon Tax Act 15 of 2019 • National Energy Efficiency Strategy of the Republic of South Africa (2015 revision) • National Energy Regulator of South Africa • DOE integrated energy plan (revision of 2016) • DOE integrated resource plan (draft for comment 2018)
Stakeholders affected by this document (units and divisions who should be familiar with it):	• All UJ employees • All UJ students • All UJ external stakeholders
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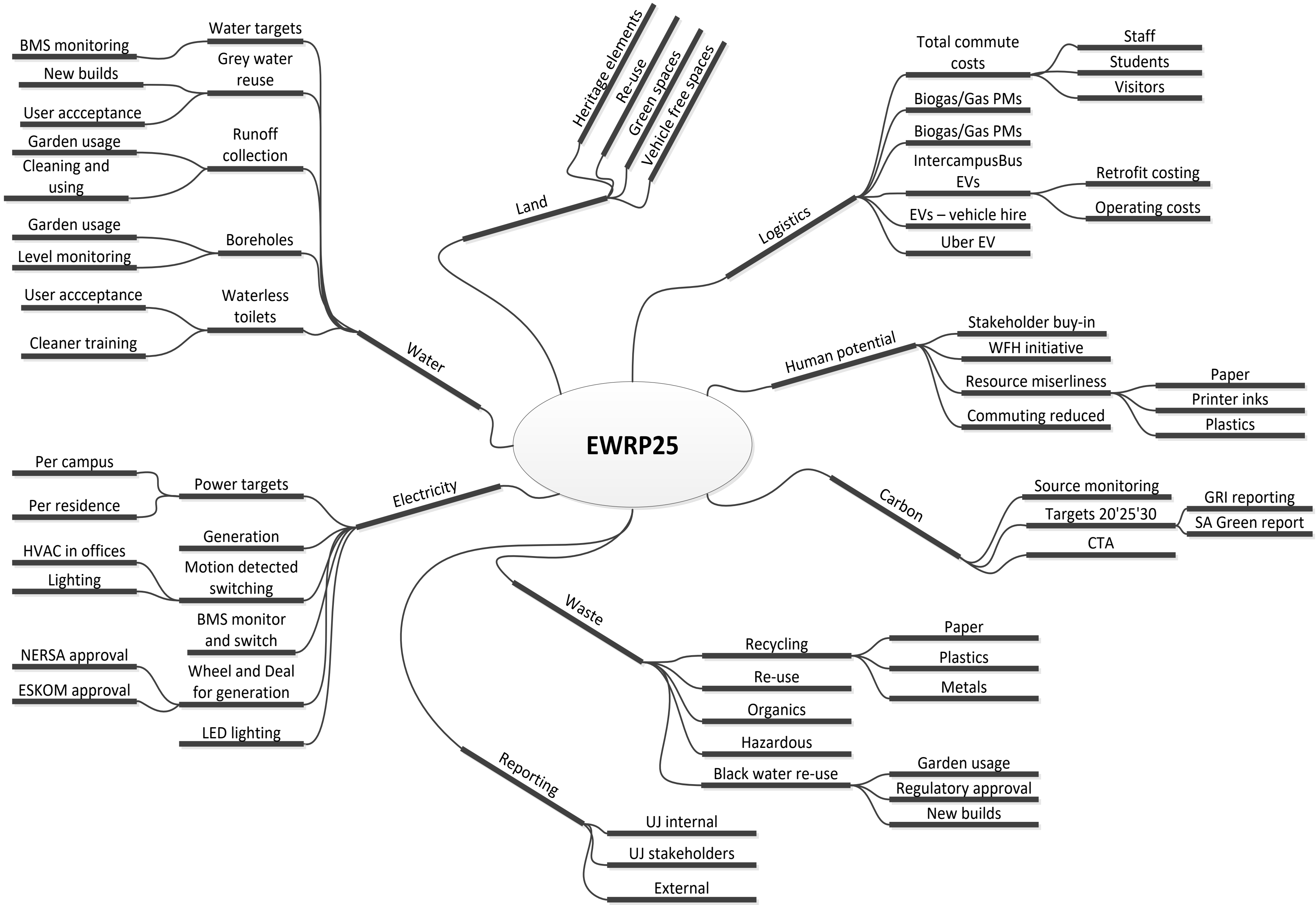
UJ PHYSICAL RESOURCES SUSTAINABILITY ISSUES



1. OVERVIEW

Sustainability in its broadest sense is about the reality of living on a resource constrained planet with a growing and increasingly split population. The politics of inequality are not at the bar here – what is, is the need to address the disproportionate nature of the manner in which resources are exploited and used on the planet. The UN has as part of its new millennium aims, the 2030 Agenda for Sustainable Development, developed a comprehensive set of goals that, if achieved, may provide the basis for a more equitable and sustainable place for all on our planet. These seventeen Sustainable Development Goals (SDGs) can be listed as:

1. No poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry innovation and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below the water
15. Life on land

16. Peace, justice and strong institutions
17. Partnerships for the goals

One of the central aspects of the UN's 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) is the significant role that stakeholders have been assigned in their implementation, follow-up and review. Now more than six years into the implementation of the 2030 Agenda, several countries' strategies to engage stakeholders are still in the early stages. Many stakeholder engagement practices are strong in some ways but weak in others, with little guidance available for a systematic analysis. The COVID-19 pandemic has added to the challenges of engaging stakeholders in implementation efforts. Now, it is more important than ever to ensure that stakeholders at all levels – not just national government levels – must take up the baton to implement change from a grass roots level. The case for the intertwined nature of sustainable development of social change and resource change has been adequately made by others – here we will accept this as a starting point and argue for the levels of change that the University of Johannesburg (UJ) and its direct stakeholders can be held directly accountable for.

Sustainability and the anthropogenic climate debate has already had a relatively short, checkered and disputatious history. What cannot be nay-sayed is that climate or climate initiated related extreme events of the past decade – whether droughts in the Western Cape, hurricanes in the USA or Australian brush fires – must impress on all reasonable persons the dire consequences of unrestrained and unsustainable development practices.

While academics may therefore continue to debate and define, operationally, the idea of climate change and associated anthropogenic effects, the world, and specifically closer to home, UJ, needs to act, and act firmly and timeously. This Energy Resources and Waste Plan for 2025 (ERWP 2025) of the UJ is meant as a guide to all internal staff and students and more generally all UJ stakeholders as a first map to a more Sustainable future.

The UJ Sustainability Policy itself is an Operational Policy and thus speaks to the operational aspects of promoting economic, social and environmental sustainability within the stricter confines of the UJ – but with the expressed desire that UJ stakeholders will draw on its principles in terms of the actions universally. This operational orientation is relevant to the UJ positioning itself within the domain of its peers in such a way as to be a leader in sustainability.

UJ has already committed itself to improve on its sustainability practices via targets presented to the Management Executive Committee MEC and the Physical and Resources Committee of Council (PRCC) during the past few years – updated and made more relevant each year. These targets, while being active KPI related goals, are firstly an instantiation of the desire of the broader UJ community to align itself with a growing world-wide trend of recognizing the limits to growth which the world faces. As a direct result UJ has already made some limited progress to reduce all resource usage, increase waste recycling and develop alternative energy sources. In practice this has resulted in a partially successful approach that has resulted in the placement of specific targets in the 2025 UJ Strategic Plan which itself leads to very clear, albeit it somewhat restricted, requirements on the institution to improve on its environmental responsibility with respect to the sustainability elements that make up the UJ sustainability and carbon footprint metrics.

The university therefore has a responsibility to the environment, the greater community, and to itself to actively minimise any harmful impact on the environment through the effective management of its use of all the energy, resources and waste (ERW) related elements that together result in our overall impact on the environment – specifically as measured by UJ's contribution to the world-wide carbon dioxide (CO_2) generation – which is arguably the greatest contributor to the climate crisis facing the world at this point in time while at the same time driving positive change in terms of the SDGs that are aimed at social development. Some of these goals are closer to home – SDG 4 & 5 about Quality Education and Gender Equality are certainly areas that UJ can lead change in South Africa.

Looking forward, the institution will ensure that our students and the community at large know and understand sustainability, that the institution will ensure that our research outputs provide solutions to the existing sustainability challenges faced, that the institution will attempt to be in the forefront of innovation and development regarding sustainability, and that the institution will endeavor to become an energy neutral and carbon zero institution.

Typical international university targets can be captured as per the following extract from a highly rated university in the southern hemisphere. It must be noted however that single numbers can never capture fully the specifics of a particular institution's sustainability, green or carbon footprint targets. At least part of the reason is that various institutions consider items as under their control or not, and if deemed not as under their control a particular source of carbon etc. may then be ignored while being taken into account by other institutions. An example of such an item would be in-out commuter carbon generation by staff and students at a university – some may see this as potentially under their control while others see this as the result of local planning and historical factors and not therefore directly influenceable. It is when UJ can meet and exceed similar benchmarks that we will be able to justifiably claim to be an international leader in tertiary education facilities.

Measures: The following targets[1]

	2011	2020
Energy consumption (kWh/m² GFA)	150	147 (-2%)
Waste water (m³/m² GFA)	0.70	0.60 (-14%)
Paper (A4 reams/EFTS)	3.70	3.07 (-17%)
Solid waste to landfill (m³/EFTS)	0.43	0.34 (-21%)
CO_2 emissions (t CO_2-e/EFTS)	0.81	0.69 (-15%)

This document has as its sole purpose an attempt to focus the discussion on sustainability and generate measurable targets as processes that will result in UJ becoming a national, and over time an international, leader in the challenge to return to a fully balanced resource based economy – one that sustains life and generates a future for all the nation's citizenry.

Given the above table the UJ figures based on registered students and floor areas would imply the following values if we were to use the 2020 aspirational values published by a leading southern hemisphere university.

Measures: The following targets

	UJ Gross values	UJ unit values (2022)	Competitor 2020
Energy consumption (kWh/m² GFA)	46 679.4MWh	69.4kWh/m² GFA	147kWh/m² GFA

[1] Energy consumption in buildings only; CO_2 emissions as a result of energy consumed in buildings, waste disposed of to landfill and work-related air travel. GFA is Gross Floor Area; EFTS – Equivalent Full Time Student

Waste water (m^3/m^2 GFA)	883 615m^3	1.23m^3/m^2 GFA	0.60m^3/m^2 GFA
Paper (A4 reams/EFTS)	39.5m pages	0.39 reams	3.07 reams
Solid waste to landfill (m^3/EFTS)	1 590m^3	0.032m^3/EFTS	0.34m^3/EFTS
CO_2 emissions (t CO_2-e/EFTS)	44 986 t CO_2	0.89t CO_2/EFTS	0.69t CO_2/EFTS

As can be seen from the comparative table above UJ outperforms the leading southern university cited in some but not all categories. In areas such as water and direct carbon dioxide (CO_2) generation UJ performs relatively poorly at the 2022 data point.

2. INTRODUCTION

The vision and mission of the University of Johannesburg (UJ) incorporates strategic objectives that all play a role in shaping all of its Operational Policies and none more so than the draft Sustainability Policy which has been presented to UJ Senior Management for consideration. The ERWP Policy itself is an Operational Policy and thus speaks to the operational aspects of promoting economic, social and environmental sustainability. This operational orientation is relevant to the UJ positioning itself within the domain of its peers in such a way as to be a leader in Sustainability. As a modern African university that asserts academic freedom in a progressive sense, providing education that is affordable, contributing to a sustainable society and cultivating responsible global citizens it has an obligation to promote a responsible attitude to the broader environment in which its staff, students and other stakeholders find themselves.

UJ has therefore already committed itself to improve on its sustainability practices over a number of years via targets presented to the Management Executive Committee (MEC) and the Physical Resourcing Committee of Council (PRCC) over the past few years. In practice this has resulted in a partially successful approach that resulted in the placement of specific targets in the 2025 UJ Strategic Plan which placed a very clear, albeit it somewhat restricted, requirement on the institution to improve on its environmental responsibility with respect to a few sustainability elements. In particular, Strategic Objective Six of the Global Excellence Stature (GES) states that:

> *"We will also minimize harmful impact on our environment through managing our carbon[2] footprint, reducing energy and water wastage, encouraging paperless communication, and overall fostering of a culture of responsible stewardship."*

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[2] While for short hand reasons we will only use carbon (or occasionally CO_2) generation as a proxy for sustainability targets it is recognized of course that in general CO_2 is one of the least problematic green-house gases (GHGs) – but since all other GHGs are often simply converted to their equivalent CO_2 tonnage equivalent the rest of the document will restrict its references to CO_2 and expect the reader to expand this reference to all GHGs associated with a particular topic.

This particular comment from the UJ strategic objective 6 of the GES dovetails perfectly with the physical resource SGDs that could be seen to be front and center in the vision of the Facilities Management departments[3].

The university's responsibility to the wider world therefore requires that we start a process to eventually become resource and carbon neutral in all spheres of our activities. Even supposedly sustainable products such as paper – of which UJ used more than 145 million A4 sheets in 2019 are to be reconsidered given the often-forgotten environmental costs of paper production – water and electricity in a water and power scarce country such as South Africa. UJ as a community should therefore act decisively to addresses sustainability not in a narrow and limited manner but in a much more holistic approach. This view will inform the remainder of this policy document.

2.1 Sustainability

Sustainability as the broadest level of the concept requires that all decisions that impact on the environment – even those that impact on the environment in a non-apparent manner[4] – should be considered relevant to the systematic process of determining the changed operational processes that will make UJ a responsible and leading local and global citizen. As argued in the Introduction sustainability thus embraces the totality of the 17 SDGs as far as the overall task of ensuring sustainability on a national and international scale. At the most local scale – i.e. the university – the ability to directly influence the achievement of all 17 SDGs is difficult. At this point UJ and Facilities Management in particular should focus on the achievable in the short term and extend its influence to the SGDs that UJ and its stakeholders are not immediately able to influence but may need to consider only in the future.

Notwithstanding the aforementioned, sustainability is too often viewed in a very narrow light and the limits of what must be aimed at in terms of the organization's sustainability targets is therefore constrained. Thus, many of the possible benefits and advantages are not achieved of a more all-encompassing perspective. It is the aim of this proposed development document not to fall into this trap. As a result, in this document, we will make use of the broadest sense of the term in the area of physical resources and include areas for consideration and possible mitigation that extend beyond the normal electricity and water usage and CO_2 production. For the remainder of this document sustainability will be defined in the following manner:

> **Definition**: Sustainability: In a strict sense this refers to the conservation of all bio-physical, social and environmental elements of the environment – specifically including natural resource conservation – including energy, land, biological species and the minimization, recycling and reuse of all waste production resulting from any anthropogenic activities but not limited to other areas that might be entertained later.

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[3] The relevant SDGs for physical resources are: #6 Clean water and sanitation | #7 Affordable and clean energy | #11 Sustainable cities and communities | #12 Responsible consumption and production | #13 Climate action | #15 Life on land | #17 Partnerships for the goals

[4] For instance, although paper is seen as a renewable resource because wood can be harvested in a responsible and renewable manner the production of paper itself requires large amounts of water and produces substantial environmental waste. As UJ we should thus actively strive to reduce to the barest minimum the amount of paper used.

Sustainability also inherently implies an appreciation for a longer-term perspective to all activities whether they are operational, developmental or restorative in terms of the broadest possible understanding of the term “environmental”.

Sustainability at its core is not restricted to a mere technological / accounting view of what constitutes sustainable use and development of natural resources and the minimization of waste. UJ as a leader on society must also embrace a social-ecological interpretation of sustainability where practices and actions are viewed in terms of their benefit regarding protecting and improving the well-being of interacting social elements – including quality of life as well as cultural, economic and geosocial concerns.

2.2 Purpose of the Policy

The purpose of the Sustainability Policy for UJ is to:

- Provide a clear, unambiguous operating framework that will guide the development of processes and projects that will result in UJ achieving its stated economic, social and environmental sustainability objectives.
- Demonstrate the commitment of UJ in support of economic, social and environmental sustainability as enunciated in the SDGs.
- Provide guidelines for ensuring compliance to applicable standards and legislation.
- Provide guidance on interventions to be taken that will result in all stakeholders being aware of the coordinated approach to sustainability.
- Raise awareness of environmental responsibility and the need to reduce the impact that UJ has on the environment both locally and globally.
- State objectives that are SMART[5] and that reflect the UJ commitment to the UN SDGs and the broader areas of sustainability and climate crisis mitigation.
- Reduce the consumption of natural resources

2.3 Energy

Energy comes in many forms and the generation, transmission, storage and consumption of it is the natural focus of sustainability and carbon generation today. Energy is however not the enemy – modern society requires energy to function and a university is no different from society as a whole. All energy is however not equal – generator electricity is especially “dirty” – stored resources (energy or physical resources) are normally cleaner and solar photovoltaic or wind generated power is perhaps the cleanest generated resource (notwithstanding the carbon generation of the original PV cell generation carbon production or the turbine construction carbon cost itself).

Whether it is national legislation, like NEMA or the CTA, or international benchmarks (such as the international reporting standards – GRI for instance – which could in future be the preferred UJ reporting standard) it is important that we need to properly consider the various foci of actions to get buy-in from all UJ participants to judiciously limit power consumption and resulting CO_2 generation. In time an equivalent model of power generation per kg equivalent CO_2 should become the reporting norm for all generation activities. In fact, the SA national building regulations will require all buildings in certain categories to report an audited energy consumption per m^2 at the entrance to these buildings by December 2022 as part of a campaign to raise awareness of the relative energy performance of various public facilities.

[5] Specific, Measurable, Achievable, Relevant, and Time bound

At the publication point of this document UJ already complies with all the SA national building regulations promulgated.

2.4 Resources

All finite resources, be they physical materials, minerals or biologicals or intangibles such as power and radio spectrum, in terms of this document should be part of a proper sustainability planning agenda. In terms of UJ, as a first step, this can however be restricted to those that are required for the operation of the university as an active entity. These resources are broadly of course linked to air, water, land/soil, energy and minerals.

UJ has a responsibility to use responsibly and conserve as far as possible those resources that are non-renewable or are strictly finite – for instance non-renewable fuels, minerals, and the finite land/soil resource. As the levels of known reserves for all non-renewables is run down so we will in future be judged in terms of our present usage of these resources. Poor utilization of even land can be criticized from a pure sustainability perspective.

Even renewable resources should be used more responsibly than may have been the case in the past. Arguing that solar generated electricity is somehow sustainable and therefore “free” or “carbon neutral” should be no license for the poor or wasteful use thereof.

A major requirement for UJ to be a responsible international citizen is that it actively moves towards a resource usage miserliness that embodies an acceptance of the limits on resource production – whether renewable or not in all categories that this report will talk to: power/energy, air, water, land, minerals or waste.

Sustainability as a concept has an all too recent history and definition. In a world which until recently appeared to have unlimited resources and energy sources it is still a matter of some debate whether the Sustainability process should be driven by the climate issue, a concern around world population or simply a concern for the future of our own children.

Notwithstanding the above perspective there are very few persons today that do not in some way understand the need for a more circumspect approach to the world, its resources and its limits. UJ should be influencing its present and future generations of staff and students to become more responsible in the broadest possible way.

The university therefore has a responsibility to the greater community, the environment and to itself to actively minimise any harmful impact on the environment through the effective management of our carbon footprint, which requires the participation of the entire university community.

2.5 Waste

Sustainability includes the concept of reducing the wastefulness that has for too long characterized modern societies. While waste cannot be used up like a positive resource in effect its accumulation (as a negative resource) threatens the future of the world in no less a way. By a proper consideration of the reuse of existing materials, power, or other resources and the recycling of as much waste as possible by its citizens the worldwide scourge of pollution can also be addressed in a similar manner to the unrestricted use of inherently limited resources.

UJ and all of its stakeholders must accept that to consider as a minimum the situation that UJ wishes to be a responsible steward of the earth's resources it should also be a responsible steward of the waste that it generates.

Whether we consider the wastefulness of single use plastics (SUPs) or the non-recycling of very recyclable materials such as paper / cardboard the aim should be to reduce the impact of UJ's resource consumption by reducing that amount of material that is true (and unrecyclable) waste.

2.6 Carbon Generation

Carbon generation is more than just the sum of the resource usage side effects of the various resources already presented, it is, according to most scientific evidence, the most reliable indicator of the effect of humans after the Industrial Revolution on the health of the planet. Given the nature of the atmosphere and meteorological effects it is true that all anthropogenic carbon eventually affects all of the earth's inhabitants. It is perhaps the clearest case of all local effects eventually summing to be a global (and globally experienced) effect.

It is therefore not surprising that much of the climate debate centers around the acceptance of the nature of anthropogenic carbon generation. While this academic debate rages the simple truth remains that reducing carbon generation without considering economics is perhaps the easiest and most direct manner to change the future habitability of the planet. In South Africa there are already pieces of legislation that UJ must comply with to be considered a responsible citizen in terms of sustainability, these are viz.:

- National Environmental Management Act (2015)
  UJ's activities:
  - Required by 31 Dec 2019 registration of all businesses that have activities that affect the environment
- Carbon Tax Act (2019)
  UJ's activities:
  - Requires 3 phases before 2022
  - First phase requires registration of all carbon generation due to power generation in broadest sense
  - Will require active monitoring of standby generators since tax will be based on either IPC rules or proven actual usage
  - Requires a full database of generation facilities including type, power generation, fuel usage and hours used in a tax year
  - Already compiling list of generators and details needed for registration

Also of importance is the recognition that not all GHGs are created equal – and while it may seem short sighted to focus on some GHGs more than others it is only rational approach to remove from use those GHGs that have the most severe impact. These GHGs mainly include carbon dioxide, methane, nitrous oxide and fluorinated gases. There is a limit for each of these GHGs that the earth can manage and retreat from the climate catastrophe. We are now at, or very near, this limit and the earth will increasingly see more thermal energy trapped in the environment leading to a possible thermal runaway situation. Anecdotal, and some recent measurement data supports the proposition that hot areas are getting progressively warmer, glaciers are melting more rapidly than ever and summers are stretching in most areas throughout the world. What cannot be denied by even the most ardent climate crisis denier is that the appearance of extreme weather events is increasing.

Government agencies across the world are measuring, and as in South Africa some of now taxing, the use of these GHGs. This tracking must lead inexorably to the reduction of processes to implement reductions in the use of these GHGs so that their levels in the atmosphere can stay at or below present levels.

Although the most potent GHG is methane, the worst one is still considered to be CO_2, as it is the primary gas that enters the atmosphere and has the most stable lifetime. This gas occurs naturally in the atmosphere as all animals exhale it during breathing and plants release it at night. It is also an important output from volcanic eruptions, wildfires etc. Human activities such as burning of fossil fuels and chemicals in certain petrochemical industries have however raised the level of CO_2 generation to alarming levels, making it a key GHG that drives global climate change. This creates a cycle where air pollution contributes to climate change, and climate change creates high temperatures. In turn, higher temperatures intensify some types of air pollution.

If the emission of CO_2 is controlled, it would be an almost complete solution for global warming. As a concerned global citizen UJ needs to be more cautious with our carbon footprint. This can be, and must be, done by reducing, recycling, or substituting processes for those that produce CO_2 as far as is possible.

2.7 Benchmarks

UJ's performance cannot be considered separate from its peers nationally and internationally. Whether it is related to actual energy density, waste generated (or paper consumed) and recycled, it will always be important to reflect on UJ's relative sustainability as well as its absolute resource usage.

For this reason, it is expected that as part of the expanding effort to become sustainable that annual reporting on issues of targeted performance that as far as is possible recent national and international actual performance figures are also used to reflect on actual performance.

Where national or global peer institutions also report on sustainability measures in a compatible manner (perhaps also using the same reporting standards – see the section on Reporting Standards) it may be possible to directly compare performance on either a per area / per building area / per equivalent full-time student or per stakeholder basis.

A typical top international university's reporting of all of its sustainability measures can be as complicated as in the next figure. Initially at least UJ should curate such a list to determine those targets that are of importance and are reflected in the PRCC Annual Sustainability targets. In cases where the PRCC targets are shown to be lacking formal approval to add additional sustainability related targets would have to be requested. In such a case retro-calculating baseline values back to 2011 or 2015 would be unreasonable since there required underlying measurements would not have been made and the resulting figures not much more than educated guesses.

	2019/20 ◊	2018/19	2017/18	2016/17	2015/16	2014/15
Total Scope 1 and 2 carbon emissions (energy and fuel use) (tCO_2e) *	53,931	57,872	62,014	69,734	74,828	80,882
Carbon emissions from water use (tCO_2e)	419	456	437	345	357	383
Total Scope 1 and 2 carbon emissions per FTE staff and student (tCO_2e/FTE) **	1.7	1.9	2.1	2.4	2.6	2.9
Carbon emissions from water use per FTE staff and student (tCO_2e/FTE)	0.013	0.015	0.015	0.012	0.012	0.014
Total Scope 1 and 2 carbon emissions per total income (tCO_2e/£1000) **	0.048	0.053	0.062	0.076	0.081	0.096
Carbon emissions from water use per total income (tCO_2e/£1000)	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005
Total water consumption (m^3)	426,953	461,578	445,578	352,084	363,983	390,099
Total water consumption per FTE staff and student (m^3/FTE)	13.7	15.1	14.9	12.1	12.7	14.0
Waste mass generated per FTE staff and student (tonnes/FTE)	0.20	0.15	0.18	0.47	0.28	0.29
Waste sent to landfill (tonnes)	72	257	409	1,402	2,448	2,030
Percentage of waste generated that is recycled or composted (construction and non-construction waste) (%)	73	54	67	82	70	74
Scope 3 emissions (water; commuting; business travel; waste) (tCO_2e)	15,197	30,461	29,513	28,581	20,903	21,229
The percentage of new buildings that are certified at least BREEAM Excellent or equivalent (%)	50% (1 of 2)	66.6% (2 of 3)	50% (1 of 2)	50% (2 of 4)	50% (1 of 2)	50% (2 of 4)
External awards for sustainable construction/design	No awards	1 award	2 awards	1 award	no records	no records
Percentage modal split for commuting by staff single occupancy car journey (%)	31	31	30	26	25	24

	2019/20 ◊	2018/19	2017/18	2016/17	2015/16	2014/15
Percentage modal split for commuting by staff car share (%)	6	6	6	10	8	8
Percentage modal split for commuting by staff bus (%)	8	9	7	7	7	8
Percentage modal split for commuting by staff train (%)	8	6	6	6	6	6
Percentage modal split for commuting by staff cycle (%)	36	37	39	42	42	42
Percentage modal split for commuting by staff walk (%)	9	8	9	8	10	10
Percentage modal split for commuting by staff motorbike (%)	1	1	1	1	1	1
Percentage modal split for commuting by staff other (%)	1	1	2	1	1	1
Per capita carbon emissions from flights (tCO_2e/FTE)	0.56	1.00	1.09	1.00	0.74	0.77
Number of awards won by Green Impact teams	46	50	46	45	43	37
Number of members of the Environment and Energy Coordinator Network	81	112	98	100	103	97

*The reported KPI is our Location-based emissions figure. We also report our Market-based emissions figure, to take account of the renewable electricity we procure via a Power Purchase Agreement, but this figure is not currently reported as a KPI. See the Carbon and Energy section for details.

**Calculated using our Location-based emissions figure.

The figure for 'Scope 3 emissions (water; commuting; business travel; waste)' of 15,197 tCO_2e excludes supply chain emissions.

For each of the years above, the reporting period covers the 1st August to the 31st July.

◊ PricewaterhouseCoopers LLP ('PwC') have provided limited assurance over the 2019/20 figures presented in this table. The 2019/20 **assurance opinion** can be found on our website along with our **Methodology Statement** – the basis on which the KPIs are calculated and on which the limited assurance is given. As described in our **Methodology Statement**, the University has adopted what is known as the Operational Control approach, under which the buildings, activities and operations included in our calculations and reporting are those over which the University has direct control or significant influence. Our KPIs therefore do not cover the colleges or the University's subsidiary organisations.

The following KPIs have been removed from the KPI table as they are not assured by PwC or we are not reporting on them anymore: Percentage of energy generated from onsite renewable or low carbon sources (%); Percentage of new buildings and major refurbishments confirmed by the Ecological Advisory Panel as having no net negative impact on biodiversity (%); and the percentage of buildings that have a minimum Display Energy Certificate (DEC) rating of 'D' (%). The reasons for which are explained in the carbon and energy, and biodiversity sections of this report.

3. HISTORY

Sustainability as a concept has an all too recent history and definition[6]. In a world which until recently appeared to have unlimited resources and energy sources it is still a matter of some debate whether the Sustainability process should be driven by the climate issue, a concern around world population, a concern for a limited resource planet or simply a concern for the future of our own children.

Notwithstanding the various perspectives there are very few persons today that do not in some way understand the need for a more circumspect approach to the world, the use of its resources and the limits that are implicit in a finite world with a growing population and appetite for goods and services.

The university therefore has a responsibility to the greater community, the environment and to itself to actively minimise its own harmful impact on the local and global environment through the effective reduction of its anthropogenic CO_2 production. This is equally true of our use of natural (and even recyclable) resources and directly generated resources. The reduction in the quantum of the UJ carbon equivalent footprint, which in some way is a summary of the impact of UJ on the environment, requires the participation of the entire university community. It is also hoped that the change in attitude by UJ stakeholders as a result of the processes envisaged in this document will inspire a change by our stakeholders in their extra-institutional lives. If this happens then this may also spill over into their attitudes and activities when they interact with other communities in which they are active.

[6] We do not inherit the Earth from our ancestors—we borrow it from our children – old adage generally ascribed to Chief Seattle (but doubtful)

3.1 South Africa

South Africa has the unenviable reputation as a ***dirty*** power producing country as a result of its dependence on the generation of electricity from low grade coal (while exporting high grade coal to customers world-wide) in mega-generation plants on the eastern Highveld region. In a world where water and clean air are being more valued these power stations are amongst the highest carbon generation – together with the Sasol fuel from coal plants – units in the world per generated kWh.

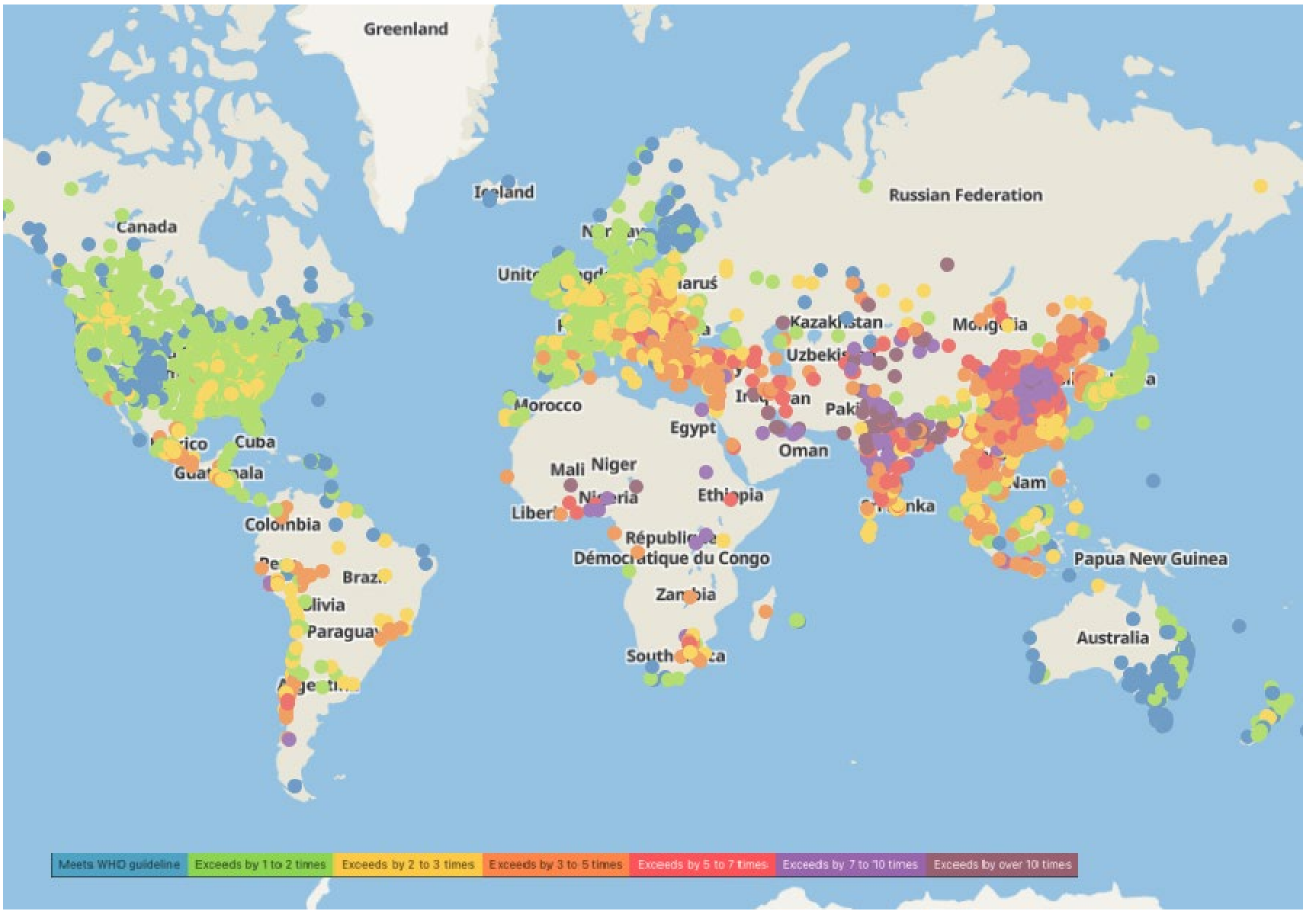
As a country we have however already taken some small steps towards the achievement of a more sustainable development trajectory. There are a small but growing number of green power generation projects using wind and solar as sources but at present this still is less than 2% of total peak generation. As part of a global community, South Africa still has a great deal to be achieved. As the whole world experiences a pandemic resulting in combinations of food price crises, increasing shortages of energy and growing price volatility, the impact of climate change and weather volatility and escalating levels of poverty, the necessity for a consideration of the SDGs and South Africa is clear.

Meeting the SDG targets of sustainable development and doing so in a way that minimizes economic disruption has become a national imperative. In Johannesburg, at the World Summit on Sustainable Development (WSSD), held in September 2002, it was agreed that the greatest challenge of our time was dealing with poverty in a negotiated manner.

Sustainable development is about enhancing human well-being and quality of life for all time for all persons and perhaps most importantly for those most affected by poverty and inequality. Resource use efficiency and intergenerational equity are the core principles of any future looking sustainability agenda related to the SDGs that can result in a equitable and strife free future.

South Africa's development path in a more sustainable direction depends on a national vision, principles and areas for strategic intervention that will enable and guide the development of the national strategy and action plan. The national framework for sustainable development seeks to build on existing programmes and strategies that have emerged in the first 21 years of democracy and aims to identify key, short, medium and long–term challenges in our sustainable development efforts. The setting of specific goal within a framework for a common understanding and vision of sustainable development; and defines strategic focus areas for intervention is vitally important.

While this document is not directly aimed at pollution, pollution mitigation or pollution prevention *per se* it is worthwhile presenting at least one view on South Africa's relative position in terms of air pollution – mostly widely agreed to be the direct result of ***dirty*** power generation, excessive power consumption and excessive poorly managed transport related pollution inputs. The following graphic makes it clear that the southern tip of Africa – while not the worst polluted area in the world it is by no means able to ignore the impact of its dependence on fossil fuel-based power generation and transport.

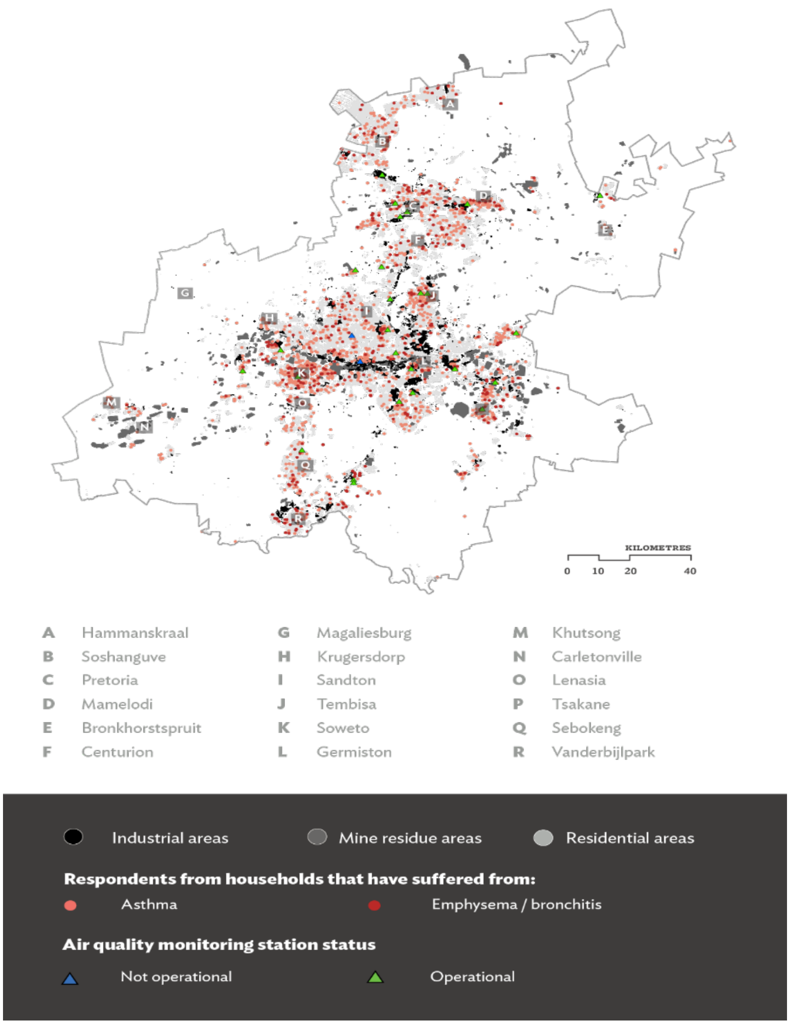


3.2 Johannesburg

Johannesburg is South Africa's (and perhaps the continent's) premier city. In the March 2019 *Jo'burg Comprehensive Vision* document that provides guidance on the future of the city until 2040 the opening statement from the Executive Mayor reads:

> *"Long-term strategy is vitally important for ensuring the prosperity of a city. Good strategy allows us to know what our situation is now; it gives us a framework for imagining what we would like our city to be tomorrow, and it enables us to plan how to get there by identifying what is required to be done.*
>
> *The Jo'burg 2040 Growth and Development Strategy is a tool that will enable our City to develop a coordinated, institutional framework so that we can harness the potential of urbanisation and make the most of these opportunities.*
>
> *This occasion for forward thinking allows the City to think differently and to put in place the stepping stones for real, transformative change that impacts the lives of our people in the most meaningful ways. Our communities have defined a goal-state for Joburg 2040 and the City will ensuring that long-term planning and investment follows to achieve it.*
>
> *Our long-term strategy is strong and robust, but also flexible. It is able to accommodate and adapt to changing contexts by giving shape and direction to short-term programmes and City targets. Additionally a major benefit of the long-term horizon is that it ensures continuity amidst the rapid change and uncertainties which all cities face. This stability inspires confidence in our city – making investors confident to invest and giving our communities confidence that they will see the future they want.*

We want to see bold steps taken to move Johannesburg forward. This aspirational beacon will guide Johannesburg's strategic objectives and direction. Let us plan for better, brighter futures. Day by day and step by step, we are making real and lasting progress in the City of Johannesburg."



It is clear that this document is still silent on the important matter of sustainable development as an input to be considered seriously in the development trajectory of the city.

Fortunately, the remainder of the document does at least put some emphasis on Sustainability and especially on climate change and AGW as a serious problem within the city and its environs. The main thrust in terms of the SDGs within the City however remains related to goals

1. No poverty
2. Zero hunger
3. Clean water and sanitation
4. Decent work and economic growth
5. Reduced inequalities
6. Sustainable cities and communities

The author of the Jo'burg Comprehensive Vision document then summarizes the goal of sustainable development as

Resilient city – *In the future Johannesburg will face enormous changes, some that we can predict and others that are unexpected. If Johannesburg is resilient it will adapt to shifts such as climate change, the shifting world economy, geopolitics and new information technologies. As a resilient city Johannesburg will be able to withstand the shocks of unpredictable change while promoting sustainable development, inclusive growth and well-being*

Sustainable city – *In the future we will face water and energy shortages. If Johannesburg is sustainable it will build economic growth, promote social and human development, make sure that there is good governance and do no harm to the environment. Johannesburg will be able to provide a clean, healthy, safe environment to our children's generation and for generations after that.*

Liveable city – *In the future Johannesburg will offer good quality of life to all its citizens. If Johannesburg is liveable, it will ensure investments in human and social capital, traditional and modern (ICT) communication, infrastructure, transport,* *sustainable economic development and offer a high quality of life, with a wise management of natural resources, through participatory action. Johannesburg will offer its diverse communities opportunities for rich public life and debate in smart, high-quality urban environments.*

It is within this particular framework that UJ must also determine its actions as member of the city's community. The university's responsibility to the greater community of Johannesburg, the local environment and specifically its micro-environment comprising its campuses and environs, is to actively engage in ways to reduce the harmful impact it and its stakeholders have on the environment through the effective management of our carbon equivalent footprint and overall resource usage.

3.3 UJ

In order to influence and affect change within the broader UJ community, it is important that correct measures are put in place such that the university understands its current sustainability position. Gathering of all energy, water, waste information is among the first important tasks to be prioritized. This information will be used to identify areas where:

- Savings can be achieved through awareness and changing of behaviour
- Savings can be achieved through elimination of waste and production efficiency
- Savings can be achieved through improvement of equipment efficiency
- Savings can be achieved through improvement of operational efficiency

Furthermore, the current energy, water and waste usage will be segmented from one bill to multiple bills, such that each department / residence etc. knows their usage as well as their contribution to the universities' total consumption. In addition to this, each employee, lecturer and student should also get an estimate of their individual contribution towards the overall bill, and how this matches up to the average acceptable consumption (internal and external benchmarking).

The policy principles and values that should drive the UJ in terms of a truly sustainable future can be summarized as:

a) To comply with the relevant legal provisions, as well as the requirements set by government policy and regulations on higher education.
b) To ensure that the Policy is transparent and applicable to all stakeholders
c) To facilitate and ensure that the university assumes both financial and social accountability for the use and effective management of its resources.
d) UJ has committed itself to improve on its sustainable practices in all of its activities at the university.
e) To create a culture where the University community is engaged, empowered and enabled in aspects relating to Sustainability.
f) Regarding Energy Management, to ensure that:

  - The Policy is in support of, and gives effect to, the Sustainability committee charter as it also relates to energy use and management.
  - The Policy is in support of the National Energy Efficiency Strategy of South Africa (2008).
  - All energy sustainability measures are taken into account and managed accordingly to ensure energy efficiency best practices.

- Sound risk management is applied and to set restrictions where it may be legally and operationally required.

g) The University EE and DSM project development and implementation processes will follow the standard procedures as required by Eskom DSM as well as stipulated by NERSA in terms of the necessary measurement and verification processes.
h) Eskom accredited and capable energy services companies as well as Eskom accredited measurement and verification companies will be used for project implementation to ensure targeted savings are achieved, and that energy consumption and financial savings reports are certified.
i) Procurement of products and services offers an opportunity for the development of identified emerging SMME players.
j) Development of all new infrastructure and buildings should be tested against relevant standards that apply – e.g. new buildings should preferably be designed for at least 5 star green building rating levels – if not higher and all older buildings and infrastructure should where possible be upgraded from their present resource intensity to more sustainable levels.

3.4 Campuses

UJ has four main campuses and a number of other properties that it owns. As an aggregation of previous existing entities its development was never unitary and driven by an overarching set of developmental guidelines. In fact shortly after the creation of the "comprehensive university" – later named the University of Johannesburg it became obvious that the initial four campuses were very different in terms of development levels and access to facilities.

As a result in 2010, GAPP, an architectural professional company, was tasked with creating an overall Campus Master Plan (CMP) which was to guide the coordinated development of the new university's physical assets. By 2013 this was completed and formed the basis of development of the various campuses – at least in theory. Much of this development plan ignored realities around aggregation, densification and elimination of duplicated facilities in exploring an era of developmental expansion.

Sustainability is not even mentioned in the 2013 CMP and it was primarily concerned with creating facility equality between campuses as well as driving an aggressive expansion process that would have increased the owned physical space of the university dramatically without regard to the energy, resource or waste usage agenda.

Much of the 2013 CMP was never achieved because it ignored natural limits to growth and the economic reality of a market driven local economy. Once the developmental trajectory was known this allowed developers, local agencies and individuals to target the trajectory elements and earn economic benefits by pre-empting UJ's move into the proposed areas.

Since 2020 UJ has started a new CMP – but now more appropriately named a Strategic Development Framework (SDF) which will take into account the changed context of an urban university spread across a diverse space limited on all sides by issues such as developmental costs, urban access limits, security and access but which musts also provide for increased sustainability, reduced waste, increased ground efficiency etc. The draft version of the 2023 SDF therefore refers to amongst others issues around individual campus sustainability, greening and also the need to review design guidelines to forefront the need for more sustainable buildings and infrastructure developments.

The eventual aim of the campus segmented reporting (in addition to the present aggregate only reporting) is to ensure that all campuses are equally incentivized to implement the same level of sustainability mitigation or enhancement processes and systems. While this should be quite easy for power, water and solar it may be more challenging for some campuses when issues such as transportation targets are discussed.

4. A DEVELOPING UJ

UJ, as any organization, is a dynamic, evolving organization – and most certainly in the areas related to sustainability. This implies that there can be no static set of targets or even mitigation strategy that can be held to as a constant.

The original sets of sustainability targets from 2011 were restricted to only electricity usage and the applicable reduction of usage targets. At no stage in 2011 was the discussion of sustainability seen within the contact of the UN SDGs as the broadest set of goals that UJ should be held to aim for.

The UJ 2013 CMP included proposals for items such as additional property purchases, development of further academic buildings and development of additional student accommodation – all based on trends that indicated a growth in aggregate student numbers peaking at about 50 000. We have in the meantime passed the 55 000-student mark and also because of economic factors have not been able to implement many of the 2013 CMP proposals.

In the meantime, UJ stakeholders have responded to changes in the operating, political and economic context within which UJ must function. Reduced government funding for the foreseeable future is a reality in the post pandemic, student free-fee education and NSFAS dominated funding era that all South African universities are facing.

4.1 UJ Sustainability

UJ as entity owns its various energy, resources and waste generation sustainability values. By this is meant that where UJ is responsible for providing a service of any kind that uses or results in the generation or consumption of any of energy, resources and waste then it is a UJ value. This implies that even where UJ contracts with a service supplier such as the student intercampus bus service supplier the resulting diesel usage – and consequent carbon generation – remains a UJ reporting value.

This method of reckoning of sustainability ownership and reporting is essential to ensuring that UJ fully recognizes the various sustainability parameters fully and consistently. This is particularly important in the sense that various departments / divisions will have to "own" their resource efficiency, their emissions and carbon generation. So, students in a residence, tenants in a Student Centre and academics in offices must all be directly made aware of their contribution to the UJ's sustainability performance and commitment to addressing the UN SDGs.

In terms of the new SA NEMA building efficiency requirements that must be affixed to the entrance of each building in excess of 1 000 m^2 this is clearly in line with the SA and UJ aims of requiring the local consumer of energy, resources and the creation of waste to be held made directly aware of the locality of resource usage and waste. In a sense making the information available to the building user should result in an improved understanding of the consequences of simple decisions, such as not switching off lights when leaving the office for the day, and resulting in a more willing partner in the drive for improved sustainability.

4.2 UJ Tenant Sustainability

While UJ as an entity owns its various energy, resources and waste generation sustainability values it is not the owner of reportable figures that are accounted for by tenants of UJ and renters of UJ properties. A tenant in a UJ Student Centre or a person renting an existing UJ off-campus property fall into this category of reporting[7].

To be consistent the simple rules can be posited that:

- If UJ directly pays for the reportable item (energy, resources, waste or CO_2) then this is a UJ reportable item. UJ's water consumption on a particular campus is an example of such an item.
- If UJ directly pays for the reportable item (energy, resources, waste or CO_2) but invoices a third party based on a measured unit of the item then this is also a UJ reportable item. UJ's invoicing of water consumption for a tenant in a Student Centre on a particular campus is an example of such an item.
- If UJ's tenant pays a third-party service provider directly for any reportable item (energy, resources, waste or CO_2) then this is no longer a UJ reportable item but its consumption still needs reporting as being central to the operation or service provision on a campus. UJ's tenant's payment of pay-as-you-go electricity consumption for use in a UJ provided space in a Student Centre on a particular campus is an example of such an item.
- If UJ's tenant pays a third-party service provider directly for any reportable item (energy, resources, waste or CO_2) then this is no longer a UJ reportable item and if its consumption / generation is not on or in a UJ provided space in a Student Centre on a particular campus then this is not a reportable item. UJ's tenant's payment for gas used of campus in a bakery to produce pies for sale in a UJ provided space in a Student Centre on a particular campus is an example of such an item.

This method of reckoning of sustainability ownership and reporting is essential to ensuring that UJ fully recognizes the various sustainability parameters fully and consistently where they are consumed / generated by tenants of any UJ property. While these tenants are encouraged to minimize resource usage it is not possible to enforce reductions as they are finally responsible for their resource usage.

[7] Note that a postgraduate student renting a space in an off-campus residence such as Mayine Residence will not be considered to be a tenant since all residences are inherently UJ owned – even if they are not within the formal boundaries of a specific UJ campus.

In particular cases such as SUPs Facilities Management and Property Management (as the managing agent for UJ in terms of property rentals) will in conversation with the various stakeholders attempt to influence their decisions to convert from SUPs to more environmentally sustainable packaging – especially in the case of items such as Styrofoam food packaging and single use plastic drinking straws.

4.3 Development trajectory

As UJ has moved to more specific developmental and sustainability targets it is important to highlight that sustainability targeting needs to be based on more than simple aggregate data within a specific category. As mentioned above the new SDF of UJ for the decade until 2030 should also usher in a more nuanced approach to development that will allow for the integration of sustainability aspects into the framework.

As UJ develops into a more environmentally responsible citizen it can be expected that it should:

- Targets should be linked to an "effective tenant" model
    a. Take into account absolute numbers of ALL staff, students, and all visitor classes
    b. Take into account differences in usage of a residential student vs a day student
    c. Take into account changes in equipment usage by researchers
    d. Take into account changes required by various stakeholders (PWD etc)
- Sustainability and environmentally necessitated targets should allow for an Return on Investment (RoI) approach for Facilities Management.
- Incentivization in a meaningful way to encourage all UJ stakeholders to review their use of processes / products and reprioritize those that are inherently sustainable /environmentally sound – including a recognition that RoIs of such products may be lower in an absolute sense than those of unsound products / processes but that the difference should be accounted for as being an environmental investment by UJ.
- Targets should also include benchmarking against similar institutions with similar "effective tenant" populations / loads.

4.4 Previous baselines

UJ has reported since the 2011 PRCC Annual Targets which are reported on by Facilities Management to the MEC, PRCC and UJ Council in the Annual Report. These are in a sense the first attempts at a simplistic manner of reporting *ad hoc* sustainability data that was perceived important at that stage. This was done on an *ad hoc* basis without due regard to the overall sustainability targets or the UN SDGs. Some comments on this are:

- Baseline models from 2011 through 2015 are inaccurate to report against: measurement methods have changed and become more accurate – e.g. simple tons of waste recycled [and the associated percentages] can be improved with an increase [not decrease] in absolute carbon footprint, so if UJ simply grows its paper use faster than the increase in recycled paper then a net increase in carbon generation may have occurred even if UJ has recycled more paper.

- Targets have been selected in an *ad hoc* manner and irresponsibly constructed in the past: the targets seemed to be those that were reported on widely as opposed to targets that are understood to relate to the business of UJ (e.g. paper usage) or were related to absolute generation world-wide (e.g. tons of carbon produced).
- Past figures reported were unaudited and often uncorroborated. This must be addressed as reporting becomes more standardized.
- Measurement accuracy and calibration testing were not built into the reporting process: sensitivity to unrecognized items was not specifically reported on or even considered important.
- Certain sustainability related items were simply not recognized and recorded and measured and reported on as such – e.g. intercampus student bus transport system – which when first recognized added more than 2% to the UJ total carbon generation of that year, erasing much of the expected carbon reduction gains.

To address the above items it is important to recognize that UJ should strive for

- An enhanced reporting standard since simple aggregate absolute figures do not properly report gains achieved
- Reporting should proceed to move to a per area / per equivalent full time student basis – see the Net Tenant model section
- Calibration and corroboration are explicitly required to provide accuracy certainty
- Auditing is required by an external agency that has specific experience in sustainability auditing
- Growing its recognition of carbon generation sources / sinks incrementally to the point where the remaining unrecognized elements would contribute little to the absolute figures

As an example of such Annual Targets please see the example 2021 Annual Targets of the PRCC at the end of this document.

4.5 A new model – NET TENANT

In controlling the use of resources, the generation of carbon or the achievements related to recycling it is virtually impossible to simply report absolute figures achieved without taking into account changes in the underlying context of the UJ as a tertiary education facility. This is best explained with reference to the 2019-2022 Covid-19 pandemic period. During this period UJ, in absolute terms, reduced carbon generation by more than 18% in a single year. In actual fact if the number of staff and students on campuses were to be factored in then UJ suffered a substantial increase in carbon generation, electricity and water usage, and a dramatic reduction in recycling achieved.

It is the recognition that individuals are most responsible for energy, resource and waste on the UJ campuses that the transition to a relative measurement and reporting system has become an important necessity. It is also a truism that simple time on campus is a reasonable metric to consider the impact of various classes of stakeholders. For students that come to campus perhaps three days a week their impact and ability to effect change is quite small, whereas a postgraduate residence student that is on campus in a residence for 365 days a year will have a major impact and ability to influence resource consumption.

As a result it is proposed that UJ consider benchmarks that are weighted by the stakeholder population defined in the following manner. This will also allow for comparisons between years when new residences are occupied and there is therefore a resulting increase in resource consumption as the almost fixed number of students moves towards a greater number of residence and a lower number of day students.

"Effective net tenant" model

- Each class of tenant is measured – day students, residence students, academic staff, support staff, maintenance and cleaning staff
- Each of the tenants can be benchmarked (from international and own data) – e.g. based on a 250 working day year:
    - electricity per
        - office & academic employee = 1 250 kWh/a
        - cleaners & maintenance = 1 500 kWh/a
        - day student = 750 kWh/a
        - residence student = 2 250 kWh/a (10kWh/m2/a)
    - water per
        - office & academic = 1 250 l/a
        - cleaners & maintenance = 1 750 l/a
        - day student = 1 000 l/a
        - residence student = 2 250 l/a
    - waste produced per
        - office & academic = 0.75 t/a
        - cleaners & maintenance = 0.65 t/a
        - day student = 0.25 t/a
        - residence student = 2.5 t/a

The annual demographics for UJ then together with the above make it possible to determine targets that will grow/shrink with UJ as it evolves. The above target can then easily be adapted in years where the campuses are not fully utilized by particular groups, as was the case for 2020 and Covid-19. Also, importantly the targets can be ratcheted to account for actual measurable performance by even individual groups over time. For instance since UJ measures actual residence water and power consumption and knows the exact number of students in a residence it is possible to determine a true net residence student water consumption figure (averaged across all residences) and then follow up on residences where per student consumption exceeds the average by some defining percentage.

4.6 Strategies

UJ Facilities Management as an entity will endeavor at all times to abide by the following strategies – which could also act as guides for other UJ departments considering moving to a more environmentally sound approach to all service delivery.

1. Define internally how sustainability impacts on your department's service delivery
2. Request that workplaces be transformed to greener workplaces over a defined period – including a defined timeline for achieving a given sustainability goal in step wise improvements that can be measured and reported against
3. Look to certification processes to document improvements
4. Have a *new* net zero attitude – old facilities may need substantial effort to be transformed but new facilities should be designed for net zero construction (implementation) and operation
5. At all design stages compare materials / techniques / processes and wherever possible decide to reduce all environmental costs
6. Make environmental rehabilitation costs part of the development cost equation
7. Involve stakeholders early and often

4.7 Reporting Standards

There are a growing number of reporting standards for sustainability reporting that are either industry, auditing firm aligned or nationally determined. UJ has elected after serious consideration to rather make use of an agnostic reporting standard – the Global Reporting Initiative with its homepage at *https://www.globalreporting.org/*.

From their website:

> *Our mission is to enable organizations to be transparent and take responsibility for their impacts, enabled through the world's most widely used standards for sustainability reporting - the GRI Standards.*

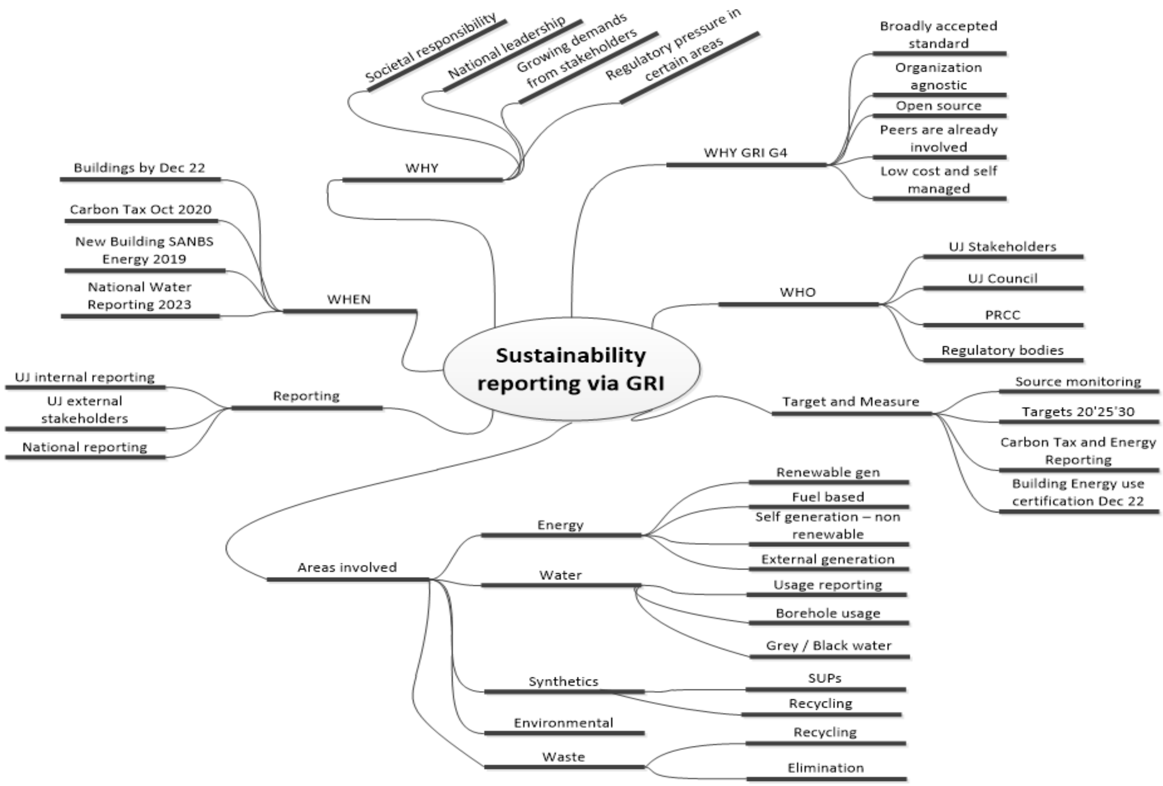
Also from their website is an explanation of the why, what and how of the GRI as a reporting standards organization:

> ***WHY***
>
> GRI exists to help organizations be transparent and take responsibility for their impacts so that we can create a sustainable future.
>
> ***HOW***
>
> GRI creates the global common language for organizations to report their impacts. This enables informed dialogue and decision making around those impacts.
>
> ***WHAT***
>
> We are the global standard setter for impact reporting.
> We follow an independent, multi-stakeholder process.
> We maintain the world's most comprehensive sustainability reporting standards
> Our Standards are available as a free public good.

While UJ will not become a corporate member of the GRI at present the reporting standards of the GRI are as they note “a free public good” that UJ will aspire to implement fully over a period of years. The full set of GRI standards are:

- **GRI 101: Foundation 2016**
- **GRI 102: General Disclosures 2016**
- **GRI 103: Management Approach 2016**
- GRI 201: Economic Performance 2016
- GRI 202: Market Presence 2016
- GRI 203: Indirect Economic Impacts 2016
- GRI 204: Procurement Practices 2016
- GRI 205: Anti-corruption 2016
- GRI 206: Anti-competitive Behavior 2016
- GRI 207: Tax 2019
- **GRI 301: Materials 2016**
- **GRI 302: Energy 2016**
- **GRI 303: Water and Effluents 2018**
- **GRI 304: Biodiversity 2016**
- **GRI 305: Emissions 2016**
- **GRI 306: Waste 2020**
- **GRI 307: Environmental Compliance 2016**
- GRI 308: Supplier Environmental Assessment 2016
- GRI 401: Employment 2016
- GRI 402: Labor/Management Relations 2016
- **GRI 403: Occupational Health and Safety 2018**
- GRI 404: Training and Education 2016
- GRI 405: Diversity and Equal Opportunity 2016
- GRI 406: Non-discrimination 2016
- GRI 407: Freedom of Association and Collective Bargaining 2016

Some of these are not relevant to the UJ ERW Policy document but those that are envisaged to be fully implemented in the near future are highlighted in the above list. Note that GRI 100 series documents are a requirement for use of any of the higher series reporting since these capture organizational information that is required in common for all the other series reports.


Sustainability reporting via GRI
WHY
Societal responsibility
National leadership
Growing demands from stakeholders
Regulatory pressure in certain areas
WHY GRI G4
Broadly accepted standard
Organization agnostic
Open source
Peers are already involved
Low cost and self managed
WHEN
Buildings by Dec 22
Carbon Tax Oct 2020
New Building SANBS Energy 2019
National Water Reporting 2023
WHO
UJ Stakeholders
UJ Council
PRCC
Regulatory bodies
Reporting
UJ internal reporting
UJ external stakeholders
National reporting
Target and Measure
Source monitoring
Targets 20'25'30
Carbon Tax and Energy Reporting
Building Energy use certification Dec 22
Areas involved
Energy
Renewable gen
Fuel based
Self generation – non renewable
External generation
Water
Usage reporting
Borehole usage
Grey / Black water
Synthetics
SUPs
Recycling
Environmental
Waste
Recycling
Elimination

5. UN SDGs

Sustainability in its broadest sense is about the reality of living on a resource constrained planet with a growing and increasingly split population. The politics of inequality are not at the bar here – what is, is the need to address the disproportionate nature of the manner in which resources are exploited and used on the planet. The UN has as part of its new millennium aims, the 2030 Agenda for Sustainable Development, developed a comprehensive set of goals that, if achieved, may provide the basis for a more equitable and sustainable place for all on our planet based on seventeen SGDs described in chapter 1 that together define the UN's vision for the development of a fully sustainable future. Not all of the full set of SGDs are relevant to UJ and the subset of fourteen SDGs that UJ could technically be involved in can be listed as:

1. No poverty (SGD #1)
2. Zero hunger (SGD #2)
3. Good health and well-being (SGD #3)
4. Quality education (SGD #4)
5. Gender equality (SGD #5)
6. Clean water and sanitation (SGD #6)
7. Affordable and clean energy (SGD #7)
8. Decent work and economic growth (SGD #8)
9. Industry innovation and infrastructure (SGD #9)
10. Sustainable cities and communities (SGD #11)
11. Responsible consumption and production (SGD #12)
12. Climate action (SGD #13)
13. Life on land (SGD #15)
14. Peace, justice and strong institutions (SGD #16)

Furthermore, not all of the above are necessary to report on within the Energy, Resource and Waste portfolio area. This further reduced subset – that dovetail into the GRI standards referred to in the section on Reporting Standards – can be delimited as:

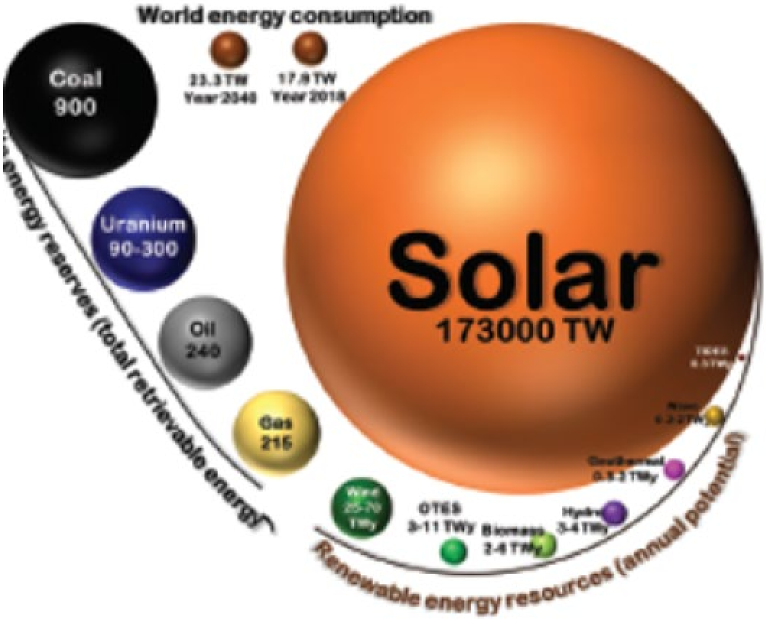
1. Good health and well-being (SGD #3)
2. Clean water and sanitation (SGD #6)
3. Affordable and clean energy (SGD #7)
4. Industry innovation and infrastructure (SGD #9)
5. Sustainable cities and communities (SGD #11)
6. Responsible consumption and production (SGD #12)
7. Climate action (SGD #13)
8. Life on land (SGD #15)

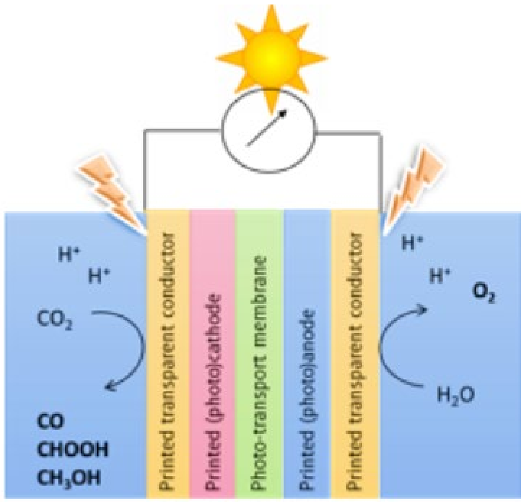
Finally, it is perhaps relevant to indicate a UJ prioritization of the above based on the pragmatic nature of certain of the SDGs and the ability of UJ, and specifically its Facilities Management department to introduce change into UJ's own, local, national and global footprint.

1. Affordable and clean energy (SGD #7)
2. Clean water and sanitation (SGD #6)
3. Sustainable cities and communities (SGD #11)
4. Climate action (SGD #13)
5. Good health and well-being (SGD #3)
6. Responsible consumption and production (SGD #12)
7. Industry innovation and infrastructure (SGD #9)
8. Life on land (SGD #15)

So Facilities Management should immediately concentrate on items 1-5 on the above list (SDGs #7, #6, #11, #13, #3) while expanding its efforts on the remaining 3 SDGs. Other UJ departments / divisions may, within their purview, consider other of the SDGs important to focus on. For instance, the Procurement Department may be able to focus efforts on SDG #9 and SDG #12 when it comes to allocating purchases to specific suppliers / contractors.

It is expected that all new work, refurbishments, extensive backlog maintenance projects will accord some effort to reporting on the manner in which the project affects the highlighted UN SDGs in their execution and that where relevant (e.g. in the development of completely new space) that full disclosure of the costs, efforts and design decisions that influence the reporting against the SDGs for the new facility will be made available for annual reporting purposes. As mentioned earlier for instance, new building development should be guided by the Green Star Certification process and existing building upgrades and renovations should always at least include reviews of the building potential certification level as well as the maximum level that the building could achieve. Where buildings or other infrastructure is purchased part of the normal due diligence process should be at the minimum a consideration of the existing building Green Star Certification (or if too old what it potentially could achieve if formally rated) and preferably estimates of costs to renew the building to at least a minimum Green Star Certification level 4.





6. ENERGY

6.1 Present usage

UJ already has developed a strong capability of tracking existing energy usage – but this has developed piecemeal over the past eight years as various targets have been added to the Sustainability menu. As a result some specific electricity consumption figures date from 2011 – but these are not directly comparable to numbers collected today and it is therefore unreasonable to take the 2011 data as the ideal electricity consumption baseline. Student numbers, student residences, numbers of buildings, academic staff and the introduction of student bussing have positively increased electricity and utilities consumption while the Covid-19 pandemic and the development of work from home and hot desk space models of work have reduced it.

However as discussed in the New Tenant model section the rather extensive growth in various of UJ's domains make any direct comparison between 2011 and 2019 almost impossible to defend. Thus, a normalized and growing accuracy requires, that as put in the GRI documents, that a baseline is selected and that while it may not be a constant it should aim to incrementally be more accurate and inclusive of all energy sources used.

6.2 Electricity

As discussed in the Section (Tenant) the rather extensive growth in various of UJ's domains makes any direct comparison between 2011 and 2019 electricity consumption almost impossible to defend or reconcile. Aims for achieving a proper reporting and management of the electricity related sustainability goals requires:

- Improving power quality being used – reducing inductive loads using active and passive methods to keep the overall power factor close 0.99 (UJ already completed this on all campuses by 2010)

- Reduced power – energy efficiency impact
    - lighting (3 campuses completed – 1 campus still being implement in 2021)
    - HVAC (busy testing automatic switching such as for lighting in offices and other venues)
    - tenancy linked usage (awaiting tool from ICS about campus related numbers)
- Eliminated power – removal of certain loads completely (ideas include removal of geysers in public toilets in all buildings except residences)
- Substituted power – simply changing from one source to another source (eg gas for electricity replacement in residence water heating) – specifically if the new source is more efficient in the application but as a redundancy backup nonetheless
- Electricity power funding – percentage savings on usage should be allocated to the Facilities Management department to allow for continued implementation projects

Most importantly is that fossil fuel generated electricity should be reduced either via mitigation (a move to gas replacement for say heating) or via reduction (the use of more efficient HVAC systems) or via elimination (with the elimination of say lighting in areas without individuals using sensor technologies).

Absolute values of electrical energy consumed can be expected to rise, if anything, as we transition many processes to electrical energy from solar or other sources. The demand for electrical energy will also rise as UJ replaces petroleum fueled vehicles for electrical vehicles – whether these are the student intercampus buses or on-campus battery driven support vehicles used by maintenance – all charged from specific SPV charging stations in the future with battery storage only for very specific use cases.

6.3 Solar Photovoltaic

At present UJ already has four operating solar photovoltaic (SPV) plants that together can generate 2.0 MWp at peak irradiance. This already therefore reduces dependence on purchased power by about 4.75% and allows for a certain reduction in implied carbon generation as indicated in the UJ Sustainability Statement for 2020 for the first time.

Future development of SPV plants to reduce dependence on Eskom fossil fuel generated electricity will depend critically on:

- Available space for further SPVs – UJ is not blessed with unlimited space and this must be appropriated in the most efficient manner possible for additional SPVs.
- Loan financing for additional development to prevent time delays due to the infrequent ability to access national grant based funding. For instance the development of an electricity power funding cost centre where a percentage of the proven savings on usage should be allocated to the Facilities Management department to allow for continued implementation projects.
- Development of suitable energy storage solutions to allow for certain loadshed or non-solar power usage. Solutions to investigate include hydraulic, compressed gas, residual thermal or battery storage.
- Non grid tied solar PV system developments in the near future.
- The reduction in cost of energy storage to the point where these types of system become feasible for high-value UJ infrastructure segments.

6.4 Gas

UJ has started to migrate as fast as possible away from Eskom fossil fuel generated electricity towards alternative energy sources. Given that Egoli Gas (Sasol Gas or sometimes called town gas) is available on three of the UJ campuses UJ has started to transition certain types of energy use to Egoli gas. Such uses are typically related to cooking, heating and water heating. This can be summarized in terms of:

- Increased gas use – transition to more efficient gas devices – change in gas water heating at student residences for instance
- Eliminated gas – removal of gas usage for certain applications (and not installing more in certain areas)
- Substituted gas – moving from gas to another source (eg solar for gas for water heating at residences where the residence design and placement make this possible)

So while Egoli Gas is not yet a green energy source it does reduce UJ's dependence on fossil fuel based energy / electricity production and is therefore considered a reasonable mitigation process / product in the short to medium term.

6.5 Fuels

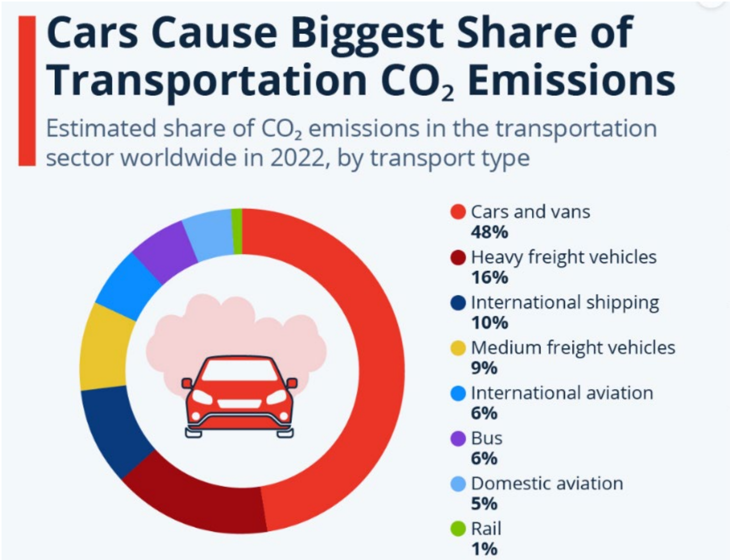
Diesel and petrol are used for direct UJ owned vehicle use. These are already tracked accurately and reported on as required by national legislation. Further diesel fuel is used extensively for backup generator use as a replacement power source during load-shedding events that result from Eskom or City Power's decisions to shed areas that include UJ campuses.

At present UJ however does not yet directly measure diesel / petrol usage on vehicle hire from its vehicle hire contracts with rental companies. This is an area to include in future, as is fuel usage by suppliers such as the intercampus package delivery service which UJ has contracted to a private supplier.

An area that is commonly measured at international peers is in-bound and out-bound commuter traffic carbon generation at UJ we are not yet at the point where we measure or report on this due to UJ stakeholders commuting to and from campuses on a daily basis in personal vehicles because of a lack of a secure public transport system and the long distance that some staff commute. This is estimated so that the impact of off-setting activities such as park and ride or ride-sharing by UJ stakeholders can be encouraged and measured. While UJ's campuses do not make cycling and walking to work very easy the reduction in per stakeholder fuel usage should be an important goal.

6.6 Transportation

Internationally transportation accounts for the second largest carbon dioxide and GHG source behind power generation. Within the transportation sector the estimated carbon generation can be represented as follows:



As can be seen cars and buses together account for more than 54% of transportation carbon generation. At UJ these terms are related to intercampus bussing, the UJ vehicle fleet as well as the commuter related activities of staff and students coming to and leaving the university.

UJ presently only reports on two specific transport related sustainability areas – the international and national flights of staff and students (on official business) and the intercampus student bus transport contract. These are large carbon generation items in the non-pandemic years and deserve more attention in terms of mitigation and off-setting activities.

From the broadest possible discussion of sustainability and transport for a large distributed campus such as UJ, the total in- and out-traffic related to stakeholder commuting to and from the campuses (as discussed in the previous section) should also be reported on. By increasing student residences for students studying at a distance this can be seen as an area that should be reported on actively in the future.

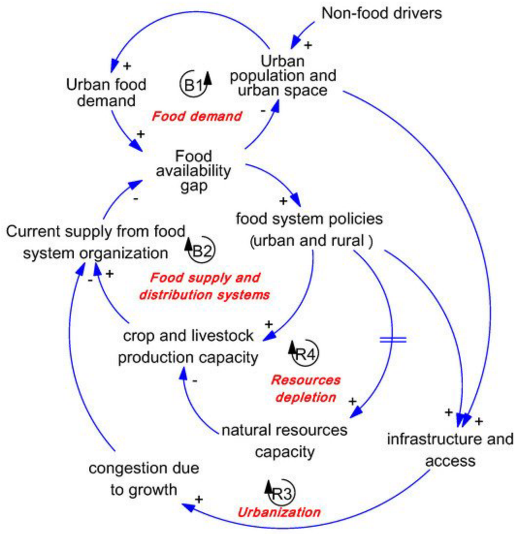
Other transportation related activities that are not yet measured but which should be considered relates to contractor, supplier and supply chain transport carbon generation.

6.7 Mitigation and Reduction Strategies

While UJ has already developed some capability of tracking existing energy usage –this has developed piecemeal over the past eight years as various targets have been added to the sustainability menu. As a result, specific energy consumption per tenant figures dating from 2011 are not accurate and it would be necessary to consider an alternative year as the specific energy consumption baseline.

Mitigation strategies are only decidable once the accurate specific energy consumption is known and the same value for proposed mitigation strategies can be accurately estimated prior to implementation. For instance, the replacement of diesel buses with electric buses for use on the student intercampus service would appear to be a certain beneficial strategy – but this depends very directly on the estimated life of the battery packs in the electric buses. If the battery packs only have a 250 000 km estimated life then some detractors consider the environmental harm of the lithium mining required for the batteries to negate any reduction in fossil fuels for the diesel buses. Similarly taking the full life cycle costs / carbon generation into account for so-called “green” hydrogen fuel cell vehicles also makes the decision to transition much less certain from a simple sustainability perspective.

The best strategy in carbon reduction is the elimination of processes / systems that generate carbon at source by effecting improved/ revised operational processes. For example, ride-sharing by a significant percentage of the UJ’s in- and out-bound commuting traffic is a reduction strategy without any downside environmental risks involved.



7. RESOURCES

7.1 Present usage

UJ has developed the capability of tracking existing resource usage in all the major categories of water, paper, food distribution to students, ground usage but has lacked the will to measure other resource intensive products such as plastics, gases, chemical usage etc.

7.2 Water

UJ's water consumption has been an issue of some concern for a decade already. UJ's campuses are located in a water-scarce environment – the South Africa Highveld. Johannesburg already depends for water on the re-piping of water via the Lesotho Highlands Water Scheme to meet its demand profile. Some estimates indicate that Johannesburg will see its first "Day Zero[8]" within the next decade.

- Improved water usage – reducing water wastage (online real-time water flow tracking – expensive but we are discussing with 2 possible external suppliers for this service)
- Reduced water usage – water efficiency impact – testing of grey water again in Thomas Sankara with FEBE in second semester 2019 and first semester 2020
- Eliminated water usage – complete removal of usage (discussing with Garden and Auxiliary Services to transition gardens to low water usage plants)
- Water supplementation as a partial mitigation strategy while understanding the ground water depletion is difficult to monitor and likely to be strongly correlated to rainfall changes as climate change becomes more apparent
- Water usage planning – make targets linked to national standards and provide live feedback via video monitors in individual buildings

UJ must as a matter of urgency consider water re-use / supplementation on a larger scale for areas such as:

[8] The City of Cape Town has introduced the idea of Day Zero to focus everyone's attention on managing water consumption as tightly as possible by cajoling water consumers into reducing usage. Day Zero is when most of the city's taps will be switched off – literally (20/2/2018)

- Gardening and auxiliary system use
- Sewer water supplementation
- Ground water re-seeding using grey water reverse boreholes

7.3 Plastics

Plastics are considered one of the most insidious man-made products from a sustainability perspective. Plastic packaging accounts for nearly half of all plastic waste globally, and much of it is thrown away within just a few minutes of its first use. Much plastic may be single-use, but that does not mean it is easily disposable. When discarded in landfills or in the environment, plastics can take up to a thousand years to decompose.

The benefits of plastic are undeniable. The material is cheap, lightweight and easy to make. These qualities have led to a boom in the production of plastic over the past century. This trend will continue as global plastic production skyrockets over the next 10 to 15 years. We are already unable to cope with the amount of plastic waste we generate, unless we rethink the way we manufacture, use and manage plastics. Ultimately, tackling one of the biggest environmental scourges of our time will require governments to regulate, businesses to innovate and individuals to act.

So for UJ to become involved in this we must recognize that:

- Almost 50% by mass of plastics are used as Single Use Plastics (SUPs) in packaging, food distribution, and disposable cutlery
- Plastics in general derive from fossil fuel feedstocks (coal / oil / gas) reformed using energy that is also generally fossil fuel based
- The average life of an SUP product is measurable in minutes to hours but destruction of the waste can take millennia
- Almost all SUP products have an acceptable – if slightly less convenient – alternative product that if not cheaper and more robust is at least fully recyclable (in the case of paper alternatives) or at least almost completely recyclable (in the case of new generation plant based plastic alternatives)

For UJ to be successful in the elimination of SUPs it must:

- Itself commit to the complete elimination of plastic packaging for items distributed to students / staff
- Obtain buy-in from all tenants (especially food suppliers) within the UJ Student Centres to start to reduce the use of SUPs for food packaging – this may be most difficult for tenants that are chain based and rely on centrally sourced packaging
- Remove all SUP based cutlery from Student Centres and replace with biodegradable alternatives – from plastic straws, through plastic knives and forks
- Request all suppliers to UJ of large procurement items – such as toilet paper deliveries Plastics in general derive from fossil fuel feedstocks (coal / oil / gas) reformed using energy that is also generally fossil fuel based

7.4 Paper

UJ as educational facility has always been a major user of various grades of paper for printing, copying, supplying printed teaching materials and using pre-printed assessment papers. In 2019 UJ used approximately 145 million pages of printer and copier paper – and another 20-30 million pages of assessment and preprinted teaching materials. During 2020 with the Covid-19 restrictions this reduce to almost 50% and it is therefore clear that paper use can be reduced substantially without major hardships. Paper, although recyclable, has a real and substantial carbon generation in the original production and secondary recycling processes. It is this associated carbon generation that must be reduced via the elimination of paper use where it serves no special purpose. Present UJ carbon generation as a result of bond paper usage is about 3.5% of the total UJ carbon footprint.

7.5 Ground

UJ has a very limited amount of physical ground available for development. While this is not normally a resource that is seen to have climate or sustainability impacts in UJ's case it certainly does. The conversion of green spaces into further built-up spaces reduces UJ's ability to provide some small carbon capture via plants and temperature reduction via reduction in paving related local heat capacity production.

New developments in the UJ SDF should report on impacts related to the projected planned space development as well as ways in which some form of carbon and temperature mitigation can be implemented in the design and build programme.

7.6 Reduction Strategies

Resources are different to other sustainability items such as energy. In effect there is an almost unlimited supply of energy via solar, wind and wave energy – all that determines use is the efficiency of recovery / harvesting and cost to the consumer. This is patently not true for resources which are finite and ever-increasingly difficult to produce. As the world population grows ground, water, air and especially food will no longer be as abundant or low-cost as is the case in 2021.

UJ must highlight this difference in attitude to resources more clearly for all stakeholders to appreciate as a pre-requisite for any reduction or mitigation strategies to be effective. In fact while mitigation is a possibility in other areas no strategy but a reductive one can be considered to be of value in the case of natural resources. Recycling and reduction of all naturally based resource intensive products must be the goal of any resource sustainability strategy that UJ develops.

8. WASTE

By reducing waste of any form, recycling conserves natural resources, protects natural ecosystems, and encourages biological diversity, all of which enhance the long run sustainability of the planet. Waste is simply energy (or a resource) that has been transformed, but not used, in the process of doing something useful. Further the remainder of a product after use which can still be reclaimed but which is not is wasteful in the extreme.

The City of Johannesburg (CoJ) experiences the same challenges as other cities in developing countries regarding waste management. Finding suitable land for new landfill sites is increasingly difficult as competition for land is high in Gauteng, where the CoJ is located. It is therefore important to find ways of extending the life spans of existing landfill sites. Any deviation of waste away from landfills will extend the life span of these sites from reaching full capacity. The simplest way of extending the lifespan of landfill sites is to divert waste away from the landfill, and for Gauteng and the CoJ, particularly to increase the amount of waste that is recycled and re-used.

In 2015, it was estimated that the CoJ has only 8.5 years of landfill space left. The amount of waste generated in the CoJ is expected to increase by 13% annually with only 7% of waste generated diverted through recycling and composting. The situation regarding waste management is dire and the Member of Mayoral Committee for Infrastructure and Environment announced that from 1 July 2018, it will be compulsory for Johannesburg residents to recycle in their households.

UJ management will adopt a holistic approach which will ensure that waste is dealt with in an environmentally responsible and health and safety manner from its generation at source through to its ultimate disposal

The paper industry's recycling success leads the way for most countries' recycling efforts. In the USA for instance the paper industry's recycling success leads with 65.9% of paper being recycled in 2017 while only 32.7% of steel, 26.6% of glass, 16.2% of aluminum and 8.4% of plastics being recovered from municipal waste streams.

UJ can improve on its present waste management via:

- Improved recycling – achieving greater recycling efficiency (already excellent)
- Increased recycling – more recycling without an increase in absolute waste increase
- Eliminated waste – reduction of material usage to zero (eg paper usage is still increasing – with the exception of the Covid-19 period – but should in the modern electronic era become very much less)
- Substituted materials – changing material usage from unrecyclable to materials with limited ability to be recycled (inefficient recycling) to one that can be completely recycled (e.g. replacing even the plant based plastics used for packaging with paper based packaging materials improves in 2 different ways – both of which are highly desirable)
- Overall material usage planning – pressure on all UJ stakeholders to reduce material used (paper, plastics, cardboard etc)
- Planning at residences – need to reduce unnecessary waste generation – and improve recycling bin usage
- Awareness campaigns within the UJ community (one week recycling from home)

8.1 UJ Recycling

UJ already has over the past decade developed a relatively good track record in waste management and recycling. UJ can improve on its present waste management via:

- Improved recycling – achieving greater recycling efficiency (already excellent)
- Increased recycling – more recycling without an increase in absolute waste increase
- Eliminated waste – reduction of material usage to zero (eg paper usage is still increasing – with the exception of the Covid-19 period – but should in the modern electronic era become very much less)
- Substituted materials – changing material usage from unrecyclable to materials with limited ability to be recycled (inefficient recycling) to one that can be completely recycled (e.g. replacing even the plant based plastics used for packaging with paper based packaging materials improves in 2 different ways – both of which are highly desirable)
- Overall material usage planning – pressure on all UJ stakeholders to reduce material used (paper, plastics, cardboard etc)
- Planning at residences – need to reduce unnecessary waste generation – and improve recycling bin usage

8.2 Plastics

Plastic waste is already being recycled at UJ as far as general waste handling is happening. The most problematic issue remains that especially food packaging used at the various Student Centre suppliers. An incentivization process is needed to encourage the replacement of especially SUP type plastics with more environmentally friendly solutions such as paper packaging or if not at least recyclable plastics.

Refining the reporting on the use and recycling of plastics on all campuses will be an ongoing activity going forward. In 2019 an estimated 649200 plastic SUP straws had been used at the various UJ Student Centres.

8.3 Paper

A report by the US Environmental Protection Agency states that paper mills are among the worst polluters of any industry in the US. Recycling causes 35% less water pollution and 74% less air pollution than making new paper. Recycling a ton of newspaper also eliminates $3m^3$ of landfill. UJ already tracks paper usage and also measures its paper recycling. There is however a significant difference in the tonnages involved – most of which it is theorized is carried off-campus via students receiving study guides and other teaching materials and also by staff and students making copies of journal articles etc. in the various libraries.

Refining the reporting on the use and recycling of paper (and cardboard) on all campuses will be an ongoing activity going forward. But the single most important issue remains that UJ staff and students should be disabused of the notion that because paper is supposedly recyclable that it can be used without any consideration to its suitability. While it may be recyclable the impact on the environment of the chemicals used for paper production as well as the carbon released in the process of paper production requires us to consider the importance of reducing our overall paper consumption.

8.4 Organic Waste

Organic waste is presently already adequately catered for in terms of collection and recycling and composting off-site by an appointed service provider. The possibility of using this potential energy resource in the future should be considered. Especially as small scale food gardening efforts (such as already being done at the Coffin Building on DFC) develop further this composting should be relocated to the campuses for use by gardening projects.

The reclamation of other organic waste – such as sewerage and other non-hazardous organic waste – will require that UJ consider the recycling of grey water and black water resources using appropriate technologies. The use of methane produced from organic waste fermentation could be a valuable heating input resource if this were to be found to be an economically viable volume. Grey water filtration and reuse for gardening and non-potable water – e.g., supplementation of fire water reserves must certainly be considered and reported on in the near future.

8.5 Refrigerant Gases

Gases used in the various air-conditioning and refrigeration plants on the UJ campuses must be exchanged for latest generation refrigerants so that leaks – which are inevitable in mechanical plants – result in minimal damage to the ozone layer. UJ refrigeration plants should be migrated to, in order of preference:

1. Hydro-fluoro olefins (HFOs): HFOs are a type of fluorocarbon, but they do not contain chlorine or bromine and are therefore much less damaging to the environment. A few of the most common HFOs include R449A and R454C.
2. R410A: This has much lower global warming potential than other refrigerants, making it more environmentally friendly. This means that it has a smaller impact on the environment when used in air conditioning systems and heat pumps. Finally, its

compatibility with existing systems makes it a cost-effective option for many applications.

3. Carbon dioxide (CO_2): CO_2 is a naturally occurring gas used as a refrigerant for many years. It is non-toxic and does not contribute to ozone depletion but it is of course a GHG but one with a low GHG multiple. CO_2 is a very efficient refrigerant, but it can only be used in applications where the temperature is below 30degrees Celsius.
4. Ammonia (NH_3): Ammonia has been a refrigerant for over 100 years and is still used today. It is very efficient and has a very low impact on the environment. However, its flammability limits its widespread use.
5. Isobutane (C_4H_{10}): Isobutane, which is stable and comparable to its predecessors in performance and environmental effect, has a very low GWP value of just 3.
6. Isopropane: This is evolving into a common refrigerant for commercial and industrial refrigeration and specialized applications for camping, recreational vehicles, laboratory, and medical refrigeration. It combines Isobutane and well-known, affordable, and easily accessible propane.
7. Organic waste is presently already adequately catered for in terms of collection and recycling and composting off-site by an appointed service provider. The possibility of using this potential energy resource in the future should be considered. Especially as small scale food gardening efforts (such as already being done at the Coffin Building on DFC) develop further this composting should be relocated to the campuses for use by gardening projects.

9. CARBON

Global fossil energy amounts that have been broadly estimated to be available in various deposits, without an assessment of technical or economic feasibility of extraction, comprises more than 21 000 Gtce[9]. Of this amount, coal constitutes 78.5%, natural gas 18.6% and oil 2.9%. The total world energy reserves comprise an estimated 1 400 Gtce. The 2012 annual usage rate was estimated to be of the order of 16-17 Gtce. Fossil fuels are readily available, especially coal in South Africa and many nations see coal fired energy production as an essential means to ensure their country's overall energy generation allowing for sustained economic development. Consequently, major infrastructure has, and will apparently continue to be established to develop the production, transport and utilisation of fossil fuels on a global basis for economic development – especially in the developing economies. Simultaneously, there is a growing recognition that fossil fuel users must meet tighter environmental management targets to limit conventional SO_2, NO_x and fine particulate emissions while acknowledging the growing concerns regarding general anthropogenic atmospheric GHGs intensities by limiting emissions of CO_2 from combustion and chemical reforming sources.

In South Africa, UJ's local concern, Eskom based coal-fired power generation emits high levels of CO_2 for each unit of power generated and in order to counter this potentially adverse impact, there are several options, which include:

- reducing the demand for electricity so that less power needs to be generated
- improving the efficiency of electricity generation so more power is generated for each unit of coal that is burned

[9] Gigatons coal equivalent

- making better overall use of the energy released through combustion by providing lower grade energy as heat to end-users
- applying Carbon Capture Storage type systems so that the CO_2 is captured and stored rather than released to atmosphere
- switching to a fossil fuel with a lower carbon content such as natural gas
- switching to an alternative power generation process with near to zero carbon emissions

9.1 UJ Idealized Carbon Mitigation

While each of the options referred to in the previous section is potentially attractive, all have some issues that must be taken into account and most are, while important, not directly accessible to UJ in its drive to reduce carbon generation by its stakeholders. The UJ accessible mitigation strategies can perhaps be summarized as:

- Absolute reduction in electricity consumption – switch off of devices when not used. For instance switching off all UJ PCs at night for 6-8 hours could save 3 000 kWh per day! This is almost equal to the smallest UJ solar PV systems daily energy production!
- Relative reduction in electricity consumption – by replacing old electrical fitting with new high performance / low energy units. For instance replacing all UJ lighting with low power LED lighting and enabling occupancy switching could save 4 000 kWh per day.
- Complete elimination – replacement of all electrical resistance water heating with either solar thermal or Egoli gas based heating.
- Substitution of source – replacement of Eskom supply with SPV or biogas generated power.
- Perhaps most importantly to address the carbon inefficiency of existing UJ buildings since it is estimated that 40% of CO_2 generation can be traced directly, or indirectly, back to buildings, the construction, operation and maintenance. So new building design must incorporate green building

9.2 UJ Practical Mitigation

Given the possible list of idealistic mitigation strategies above it is useful to provide at least a partial list of more practical carbon generation mitigation projects as a guideline to future development and operational upgrades.

1. Electricity consumption – implement occupancy switching on all service equipment (lights, HVAC, computing devices) as soon as possible
2. Electricity consumption – implement low power devices on a scheduled basis (LED lights, GHG free HVAC equipment, reduced power computing devices)
3. SPV – increase generation capacity as soon as possible within the limits of easily available deployment space
4. Energy storage – consider the development of energy storage to even out peak load costing and make use of lower baseline fossil fuel generated cost electricity at off peak periods

5. Fuels – reduced reliance on diesel for transport and backup power generation (e.g. replacement of diesel backup generators at end-of-life with gas fed backup generators)
6. Mobility modification –support for multi-person vehicle use
7. Intercampus transport – fleet development to transition to SPV based feedin
8. Virtualization – consider the move of all services (e.g. ICS servers, fuel storage) that can be transferred to cloud / off-site supported locations – improved up-times and possible direct cost benefits
9. Identity virtuality – continued support for remote / virtual work that reduces total carbon – not just transferring carbon to the employee
10. Resource efficiencies – paper, water and plastics and their reduced consumption should be incentivized
11. Capture projects – these can be as simplistic as tree plantings, involved investment in carbon capture off-sets of a sustainable nature, and developmental in terms of environmental space rehabilitation.

9.3 UJ Reporting on Actual Mitigation

It is proposed that every PRCC final review of the performance against the Annual Targets be accompanied by a review of activities such as those listed in the previous section. This is to prevent a purely incrementalist approach to the sustainability targets as a whole. By reporting against idealized and practical mitigation projects on an ongoing basis the pressure will remain on the Facilities Management department to continually consider alternatives that will provide the next gains required to achieve the ultimate aim of not just being carbon neutral but also sustainability positive in terms of the extensive list of the UN SDGs.

10. TARGETS

UJ should aim to not only be sustainable but to take a leading role in advocating for a more sustainable future and do this via the production of high quality, publishable research outcomes that can be used by the University community and its stakeholders, to contribute to the global sustainability body of knowledge. Research areas can include but are not limited to the following:

1. Energy monitoring, management and optimization with specific focus on:
   - Energy demand reduction
   - Reduction of Carbon emissions
   - Diversification of energy sources

2. Water management, with specific focus on:
   - Reduction of water usage
   - Reduction of waste
   - Diversification of water sources

3. Waste management, with specific focus on:
   - Effective waste management techniques
   - Development of waste management monitoring strategies and models
   - Waste treatment (Thermal, biological etc.)
   - Behavioural pattern research, with specific focus on:
   - Student response to Awareness Campaigns
   - Effective interventions to promote sustainability best practices

Overall targets and annual specifics are recommended to the PRCC for approval and forwarding to the UJ Council for notification. These targets may, depending on type and baseline, be either in relative or absolute terms. The proposal for targets is generally negotiated over longer terms with Facilities Management, Faculties and Campuses to ensure buy-in of specific targets that may impact on the various UJ stakeholders.

10.1 TENANT Electricity

Reporting will be:

1. By gross amount as required by legislation for buildings in excess of 1 000m^2
2. By specific area
3. Based on nominal tenant numbers
4. Aggregated per campus
5. Aggregated across all properties

10.2 TENANT Resources

Water, plastics, ground and other resources will all be reported on separately but as far as possible in a consistent manner. Reporting will be per resource type linked to the following report outcomes:

1. By gross amount as required by legislation for buildings in excess of 1 000m^2
2. By specific area
3. Based on nominal tenant numbers
4. Aggregated per campus
5. Aggregated across all properties

10.3 TENANT Waste

Waste, recycling, organic and wet waste management must be tracked in accordance with the various categories in the PRCC Annual Targets list and baselined from at least 2015. All will be reported on separately but as far as possible in a consistent manner. Reporting will be per resource type linked to the following report outcomes:

1. By specific waste type
2. Based on recycled vs landfill consigned values
3. Aggregated per campus
4. Aggregated across all properties
5. In the case of hazardous waste that the waste was earmarked for a designated disposal site with the correct licensing. Safe disposal certificates in line with all hazardous waste disposed of from UJ campuses.

10.4 Remediation and Renewal

UJ should consider an overall campus audit of asset sustainability which could be used as a list of desired changes based on solid evidence of poor performance in terms of either energy efficiency, carbon generation or non-adherence to the UN SDGs in some other way.

In cases of really poor performance proposals for remediation and renewal would then be linked to both economic RoIs as well as improvements in overall sustainability targets.

10.5 Carbon Off-sets

UJ should as far as possible refrain from off-setting carbon credit purchases as these types of processes / markets have dubious impacts on actual reductions and have been for far too often misused[10].

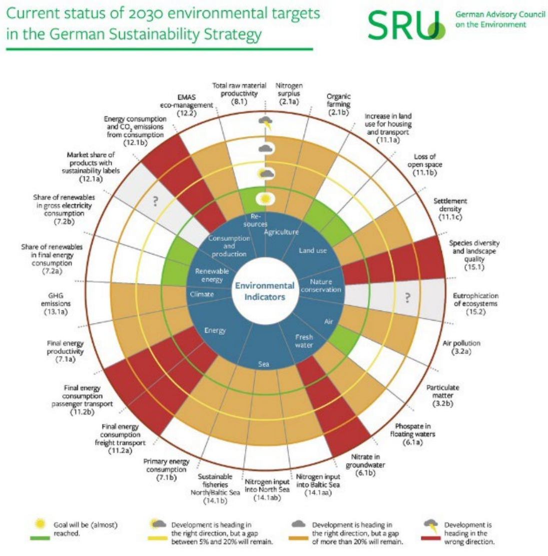
There should only be limited places in the UJ ERW environment that would be allowed to (or in some cases required to) make use of carbon off-set credits. These could be for instance:

- Carbon credits purchases to off-set international flights by UJ staff and student on university business – as flights were low in the pandemic era this may have seemed to be less of a problem – but as the world returns to a pre-pandemic type of phase this will become increasingly important

[10] *https://www.technologyreview.com/2021/04/29/1017811/california-climate-policy-carbon-credits-cause-co2-pollution/* The climate solution actually adding millions of tons of CO2 into the atmosphere

- Carbon credit purchases to off-set new build projects that do not meet Green Building Level 4 (as a minimum) standards because of design requirements – e.g. a building with specific HVAC requirements for say storage of sensitive materials
- Continued use of GHGs in certain categories after a negotiated phase out date – e.g. certain chlorofluorocarbon refrigerants – this may require some off-setting in the short term – it is not expected that this should be a long term process
- Research projects that as a by-product generate carbon rich outputs – e.g. mining related projects for certain primary raw materials such as vanadium or coal.

Given the very real problems around carbon off-set projects – e.g. the logging of forests that have been recognized previously as a carbon off-set – the desirability of using any carbon off-set that is not permanently under UJ control is questionable.



The graph shows the environmental indicators of the German Sustainability Strategy and the 2030 targets set by the German government. The SRU holds the view that some of the targets are not sufficiently ambitious.

11. THE FUTURE – ASPIRATIONAL versus APPLICABLE

UJ desires to be a responsible local and global citizen where it relates to amongst others the UN SDGs but more specifically all reasonable sensible sustainability targets. It is in the context of the particular KPIs and targets that the initiation of any particular target must ideally be aligned with the GRI reporting and approved by the PRCC in terms of the Annual Targets mandated by the PRCC.

As can be seen in the figure at the head of the page it is almost certain that any organization will outperform certain targets (perhaps due to insufficiently challenging target levels) while not nearly meeting (or actually performing worse because of targets and off-sets allowing for trade-offs that may actually increase environmental harm).

If UJ is to make a real difference a holistic reporting via GRI must become more important and must be as inclusive as is possible and should be extended at least annually to take into account changes to reporting standards and goals that move from aspirational to applicable and measurable (SMART).

It must also be recognised that all sustainability / green discussions and / or targets are contextually defined and what may appear aspirational at one time may become either applicable or in some cases due to regulatory change mandatory. UJ should be adaptable and ready for any or all of its measurement reporting and targeting to change at any time.

Examples of aspirational as opposed to pragmatic or applicable goals for UJ in their quest form improved sustainability are typically items such as:

1. Considering the "externalities" for power / water / waste. *Externalities* in this case having the standard economic meaning – i.e. where ESKOM (or other off-campus power producer's output) power has not just a direct carbon generation value – often easily determined, but also an indirect (and often unrecognized) environmental / sustainability cost such as water consumed per kWh generated. This is especially

important for UJ since it resides in an area known for recurring droughts and the continued need for water supplementation from the Lesotho Highlands Water system.

2. UJ should update all targets to include externalities such as mentioned in #1 above so that a more thorough representation of environmental impact is measured and reported. For instance, estimations of in and outbound commuter traffic should be considered a first ranked element to add to existing reporting.
3. Waste treatment and energy generation from wet / organic waste is no longer science fiction but readily available technology – but implementing and receiving operating licenses may require substantial effort.
4. Thermal geothermal storage / extraction as well as integration into general HVAC systems to reduce power required to achieve HVAC set limits must be considered.
5. Vertical turbines for power production using unused natural draft cooling towers – e.g. in the SWC campus area – should be considered in the near future for small generation system inputs on a distributed manner.
6. Forced flow evening cooling and heating of buildings as a storage mechanism should also be considered and where possible implemented for closed buildings such as EU on Empire or The Atrium.

12. ACTUAL 2022 PERFORMANCE DATA

As an indication of the base from which UJ will be measuring ongoing changes the following tables and graphs are provided to present a permanent baseline. Some items should however be noted:

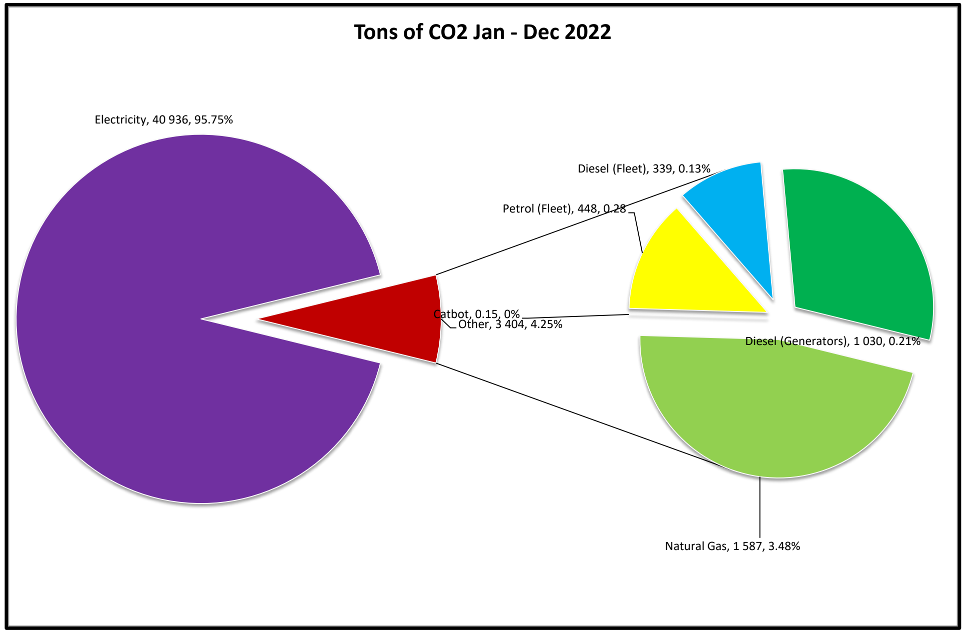
1. The data is unaudited but was repeatedly checked against collated data from the various sources.
2. The inputs for calculating all metrics are as per the 2022 reporting period – this implies that the baseline data shown from 2015 does not directly compare to the latest – 2022 – data since items have been added to all metrics in the interim – an example being the inclusion in 2018 of the carbon generation due to paper usage at UJ.
3. Also worth noting is that – in case it is forgotten or overlooked – the Covid-19 lockdown affected years, 2020-2021, has resulted in carbon and other data that is not directly comparable to other years. Since in 2020 all the UJ campuses were almost totally unoccupied from 26 March until 31 December and in 2021 there were partial lockdown periods as well as periods in which only very low numbers of staff and students were on the four campuses usage remained exceedingly.
4. Data for off campus housing and other buildings were only estimated from 2020 onwards using per square meter and occupancy data rather than the more correct billing methods – this may result in over- or under-statement of carbon generation but was necessitated by available resources to capture and analyse the data.

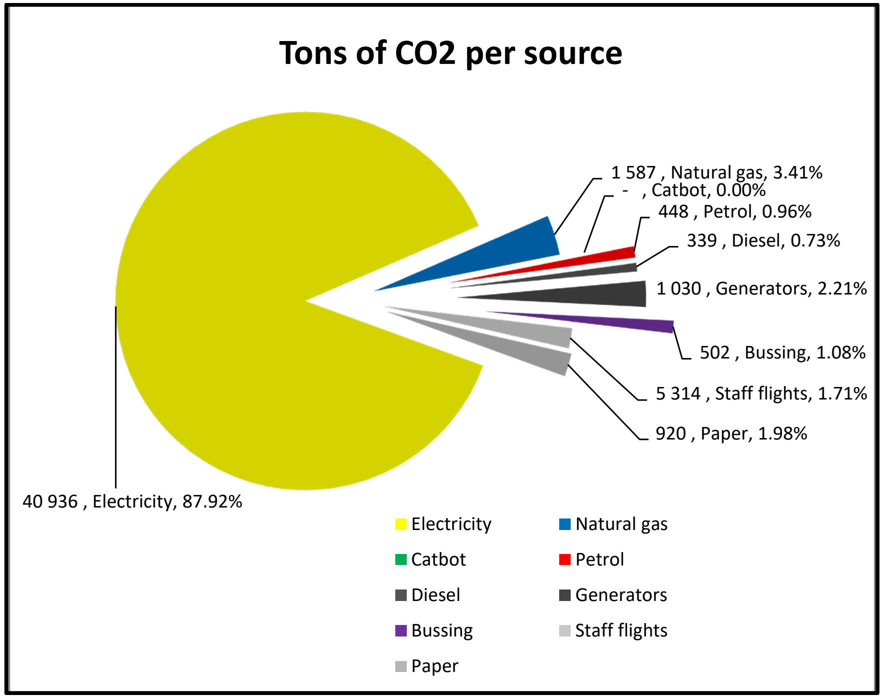
Energy Sources 2022 Data

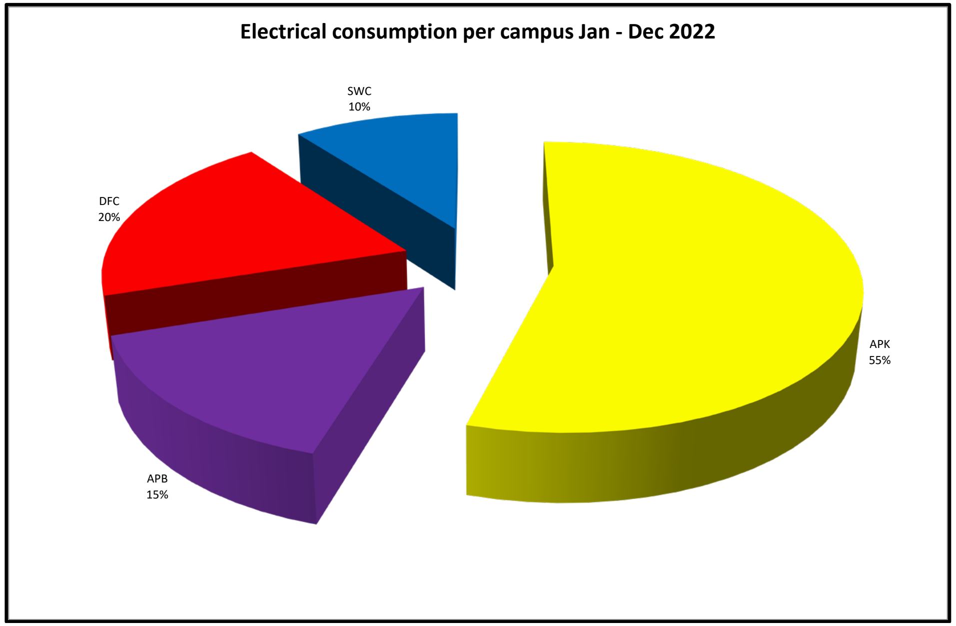
Emmission Source	Kingsway Campus (APK)	Bunting Road Campus (APB)	Doornfontein Campus (DFC)	Soweto Campus (SWC)	Totals
Electricity (kWh)	21 927 624	6 007 548	7 907 801	3 901 036	39 744 009
Natural Gas (GJ)	17 699.64	7 278.50	2 875.20		27 853.34
Natural Gas (kWhr)	4 916 566.48	2 021 805.50	798 667.12		7 737 039.10
Catbot (l)	-				-
Petrol (l)	80 584.54	27 985.36	47 116.28	38 875.45	194 561.63
Diesel Fleet (l)	45 242.23	21 977.41	24 240.26	36 710.37	128 170.27
Diesel generators(l)	116 915.40	89 593.38	61 160.17	122 462.11	390 131.06

Carbon Generation 2022 Data

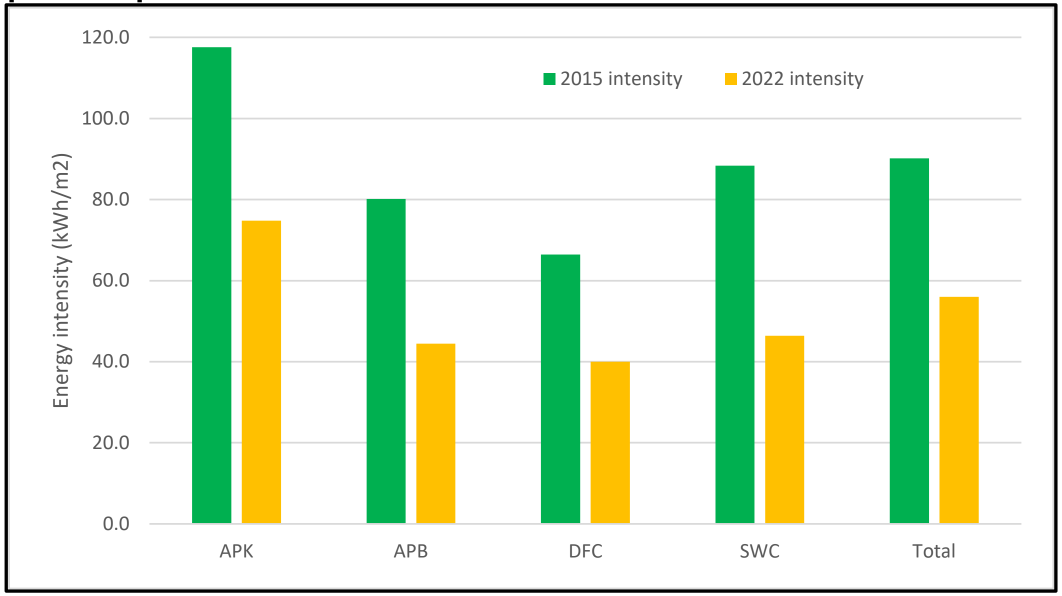
Emission Source	Kingsway Campus (APK)	Bunting Road Campus (APB)	Doornfontein Campus (DFC)	Soweto Campus (SWC)	Total CO2	Total tons of CO2
Electricity (kWh)	22 585 452.72	6 187 774.44	8 145 035.03	4 018 067.08	40 936 329.27	40 936.33
Natural Gas(GJ)	1 008 633.61	414 773.40	163 846.56	-	1 587 253.57	1 587.25
Catbot	-	-	-	-	-	-
Petrol (Fleet)	185 489.49	64 416.70	108 452.25	89 483.51	447 841.96	447.84
Diesel Fleet	119 498.30	58 048.93	64 025.80	96 963.10	338 536.13	338.54
Diesel generators	308 808.65	236 642.99	161 542.36	323 459.17	1 030 453.17	1 030.45
Intercampus Bus and Staff flights	1 054 371.00	218 831.72	477 451.02	238 725.51	1 989 379.25	1 989.38
Paper used by UJ / KMSA sites	504 231.87	98 242.49	216 080.42	101 937.96	920 492.75	920.49
Total kg of CO2	25 766 485.65	7 278 730.68	9 336 433.44	4 868 636.33	47 250 286.10	47 250.29
Total Tons of CO2	25 766.49	7 278.73	9 336.43	4 868.64	47 250.29	reduction of Electrical Power
Solar PV generation (tonnes CO2)	1 035.10	406.00	426.82	396.43	2 264.35	**5.53%**
					Total tons of CO2	44 986


Tons of CO2 Jan - Dec 2022
Electricity, 40 936, 95.75%
Diesel (Fleet), 339, 0.13%
Petrol (Fleet), 448, 0.28
Catbot, 0.15, 0%
Other, 3 404, 4.25%
Diesel (Generators), 1 030, 0.21%
Natural Gas, 1 587, 3.48%

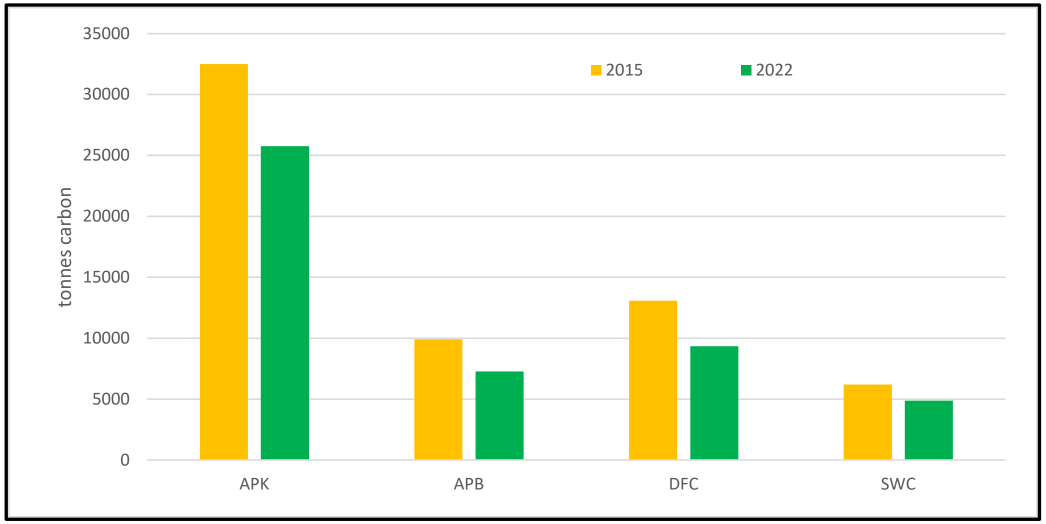

Tons of CO2 per source
1 587 , Natural gas, 3.41%
- , Catbot, 0.00%
448 , Petrol, 0.96%
339 , Diesel, 0.73%
1 030 , Generators, 2.21%
502 , Bussing, 1.08%
5 314 , Staff flights, 1.71%
920 , Paper, 1.98%
40 936 , Electricity, 87.92%
Electricity
Natural gas
Catbot
Petrol
Diesel
Generators
Bussing
Staff flights
Paper


Electrical consumption per campus Jan - Dec 2022
SWC
10%
DFC
20%
APK
55%
APB
15%

2015 – 2022 Energy Intensity per Campus



2015 – 2022 Carbon Production per Campus



Intercampus Bus Service Data 2022

Stabus 2022 Usage data	Number of buses used per month	Km's per bus per month	Total km's per month (?? x buses operated)	Diesel usage per bus per (liters)	Total Diesel usage per month (Liters x buses operated)	Passengers transported per month
January	6	305	2 439	83	661	6 123
February	6 (15)	2 776	41 638	1 345	20 179	110 912
March	15	5 659	84 883	2 074	31 115	202 871
April	15	2 896	43 433	940	14 104	108 148
May	15	4 484	67 260	1 437	21 559	166 430
June	15	2 811	42 160	984	14 756	81 824
July	15	2 288	34 313	791	11 871	92 093
August	15	3 934	59 011	1 368	20 514	182 363
September	15	3 385	50 775	1 122	16 833	138 761
October	15	4 149	62 238	1 459	21 891	149 301
November	15	3 017	45 259	1 031	15 466	66 109
December	15	179	2 682	62	936	1 640
Combined Total	**156.00**	**35 881.68**	**536 091.10**	**12 697.56**	**189 885.00**	**1 306 575.00**

Solar PV Production Data 2022

Size (nominal kWp)	818	308	300	282	
Month	**APK(MWh)**	**APB(MWh)**	**DFC(MWh)**	**SWC(MWh)**	**Total(MWh)**
Jan-22	45.885	46.079	40.842	41.248	174.054
Feb-22	61.722	12.066	32.770	39.901	146.459
Mar-22	101.875	22.960	37.355	38.643	200.833
Apr-22	80.583	32.016	30.414	5.337	148.350
May-22	93.005	37.710	35.954	19.493	186.162
Jun-22	81.950	33.407	29.220	32.700	177.277
Jul-22	75.490	32.390	32.510	32.660	173.050
Aug-22	103.250	32.442	42.250	38.160	216.102
Sep-22	96.510	35.876	36.000	42.550	210.936
Oct-22	102.860	37.643	38.830	42.020	221.353
Nov-22	89.960	36.098	28.080	38.380	192.518
Dec-22	71.860	35.490	30.160	13.790	151.300
Totals	**1 004.95**	**394.18**	**414.38**	**384.88**	**2 198.39**

Waste Data

Month	Com Paper	White Paper	Plastic	Cans	E Waste / F tubes	Card Boxes	Glass	Scrap Metal	Wet Waste	Garden Refuse	TOTAL	%
Total 2011	22.452T	26.934T	26.689T	13.742T	0.14T	37.427T	28.74T	29.803T	0	0	188.71T	3,9%
Total 2012	42.385T	41.505T	18.797T	9.45T	1.7T	56.417T	30.38T	11.108T	7.671T	0	288.27T	8,1%
Total 2013	39.46T	40.142T	18.028T	10.005T	1.21T	37.805T	18.793T	7.364T	14.2T	136.5T	416.63T	17,64%
Total 2014	40.088T	36.855T	19.615T	9.964T	1.44T	48.274T	13.93T	6.768T	36.22T	325.5T	538.7T	34,75%
Total 2015	31.579T	51.725T	20.335T	7.117T	0.17T	63.932T	31.521T	4.071T	15.16T	329.14T	506.51T	28,55%
Total 2016	53.681T	21.877T	34.056T	6.347T	0.11T	52.574T	16.218T	17.048T	18.68T	293T	513.6T	28,89%
Total 2017	40.667T	17.526T	42.149T	8.189T	6.08T	59.824T	27.062T	0.552T	4.61T	250.98T	456.66T	19,56%
Total 2018	37.016T	45.997T	44.592T	5.5515T	1.91T	40.346T	5.102T	1.34T	8.82T	263.14T	521.48T	22,54%
Total 2019	32.614T	43.121T	25.062T	5.908T	3.385T	41.16T	47.057T	4.051T	15.23T	407T	625.33T	33,65%
Total 2020	21.63T	17.98T	12.68T	2.58T	2.72T	31.58T	19.77T	10.26T	30.66T	524T	673.86T	47.81%
Total 2021	13.952T	17.34T	6.31T	1.408T	3.112T	23.877T	22.317T	14.194T	12.506T	780T	895.016T	51.16%
Total 2022	32.158T	16.746T	13.811T	2.728T	2.862T	29.423T	19.771T	5.03T	2.629T	719.2T	844.33T	40.25%

Waste Data 2022 Per month

Month	Com paper	White Paper	Plastic	Cans	Fluor tubes and batteries	Card Boxes	Glass	Scrap Metal	Wet waste/Fat waste	Garden refuse	TOTAL (kg)	Percentage recycled (%)
Jan-20	5 074	**5 206**	2 618	810	-	8 274	8 313	2 160	17 500	67 000	116 955	43.92%
Feb-20	3 109	**4 940**	2 590	-	-	5 707	-	1 462	8 658	56 000	82 466	37.08%
Mar-20	3 174	**2 120**	2 369	793	1 511	5 650	5 100	1 000	-	42 000	63 717	38.95%
Apr-20	-	-	-	-	-	-	-	-	-	-	-	
May-20	-	-	-	-	-	-	-	-	-	-	-	
Jun-20	80	-	16	-	840	2 540	1 444	440	-	48 000	53 360	42.40%
Jul-20	148	**282**	87	402	-	1 160	-	520	-	66 000	68 599	61.36%
Aug-20	945	**256**	840	-	-	923	-	1 080	-	48 000	52 044	59.89%
Sep-20	604	**260**	627	-	366	1 899	-	1 140	4 500	76 000	85 396	54.45%
Oct-20	2 669	**1 857**	1 669	570	-	3 965	4 914	1 460	-	66 000	83 104	60.08%
Nov-20	5 827	**3 060**	1 868	-	-	1 464	-	1 000	-	55 000	68 219	49.66%
TOTAL	**21 630**	**17 981**	**12 684**	**2 575**	**2 717**	**31 582**	**19 771**	**10 262**	**30 658**	**524 000**	**673 860**	**47.81%**

13. DEFINITIONS

a) Energy: Fuel and other resources used for the operation of facilities, infrastructure, machinery and vehicles.

b) Sources of energy: The energy and natural resources currently available to the university include electricity, solar voltaic, solar thermal, natural and liquefied petroleum gas, various specialised gasses typically for laboratory purposes, fuels typically to power vehicles and heating plant and water.

c) UJ: University of Johannesburg

d) Policy: Sustainability Policy

e) Energy Management (EM): The strategy of adjusting and optimizing energy, using systems and procedures so as to reduce energy requirements while holding constant or reducing total costs of operating the University. The objective of Energy Management is to achieve and maintain optimum energy procurement and utilisation throughout the organization and:

- to minimise energy costs and waste without affecting facility operations and the quality of work and learning environments; and
- to minimize environmental impacts of all natures.

f) Energy Efficiency (EE): Energy efficiency improvements refer to a reduction in the energy used for a given service, examples include heating and lighting, or level of activity.

g) Demand Side Management (DSM): Demand Side Management refers to actions taken on the customer's side of the meter (university premises) to change the amount or timing of energy demand.

h) Energy baseline: Measured and verified demand and consumption of electricity and associated cost in 2015 for the four campuses bulk electricity supply and the facilities and infrastructure configuration at that year. (Previously this was 2011 but with significant changes in consumption patterns and populations this requires re-baselining.)

i) Sustainability Policy: A policy that embraces a social-ecological interpretation of sustainability where practices and actions are viewed in terms of their benefit with regard to protecting and improving the well-being of interacting social elements – including quality of life as well as cultural, economic and political concerns – and biophysical elements of the environment – including natural resource conservation and waste emission minimization.

j) Carbon footprint: An overall measure of the impact of operational activities on climate change. It relates to the quantity of greenhouse gases produced through burning fossil fuels for electricity and travel, and through use of carbon products such as paper. The carbon footprint is a measure of all greenhouse gases produced and is expressed as tons of CO_2 equivalents per annum (abbreviated as CO_2-e). This is further defined and clarified in the Carbon Tax Act.

k) Water footprint: The total volume of water consumed in running the university.

l) Waste footprint: A measure of the amount of waste generated, including packaging materials and food waste, in terms of left over items that are not reused, recovered or recycled.

m) NERSA: National Energy Regulator of South Africa

n) NEMA: The National Environmental Management Act – Environmental Laws Amendment – No 14 of 2009. This act mandates the reporting of certain environmentally related items such as the use of backup generator sets, the use of photovoltaic power generation beyond certain sizes as well as defining waste management aims.

o) Carbon Tax: The imposition of a consumption based tax on organizations related to their direct carbon generation. As defined in the Act this comprises three phases starting in 2019 and reaching full implementation in 2023.

14. TYPICAL PRCC ANNUAL TARGETS

The table below is from a 2021 PRCC Annual Targets that was approved – as such it is only meant as an example since on a yearly basis the targets are updated and new targets are added as they are considered appropriate for UJ to strive towards and in limited cases targets are removed when they are no longer relevant to the operations of the UJ.

PROJECTS AND RESOURCING COMMITTEE OF COUNCIL (PRCC) ANNUAL PERFORMANCE PLAN

2021

(FACILITIES MANAGEMENT AND CAMPUSES)

Key Performance Area	Key Performance Indicator	Audited/Actual performance					2021 Target Actual	Strategic Initiatives	Responsibility
		2014	2015	2016 (Baseline)	2019 act 2019 target	2020 act 2020 target			
Responsible stewardship of the environment	ESKOM energy reduction (excludes benefit from Solar!)	7.40%	1.30%	1.31%	4.25% 2.75%	3.75% **33.7%**	5.75%	Developing. implementing and maintaining effective energy management programs	Central Technical Services ED: Facilities Management Campus Directors
	Annual electricity bill	R79.9m	R86.6m	R84.6m	R82.7m R82.62m	R82.62m **(Est: R64.9)**	R82.62m	Limit the real increase in electricity energy cost below the legislated electricity tariff increases.	
(Energy consumption / Water consumption Carbon footprint / Waste management)	Total annual energy consumption – inc ESKOM and generated	53.6GWh	57.2GWh	56.2GWh	49.28 GWh 50.0 GWh	47.5GWh **37.88GWh**	47.5GWh	Diversify the energy supply mix towards renewable and lower greenhouse gas emission energy source.	
	% of self- generated power	0.00%	0.00%	0.00%	1.08 % 1.5% 0.53GWh	2.95% **2.36%**	2.95%	Due to 2020 PV system on 3 UJ campus rooftops and carparks	
	% of power purchased in long-term supply contracts	0.00%	0.00%	0.00%	0.00%	0.00% **0.0%**	0.00%		
	% of energy used from renewable sources ("green energy").	0.00%	0.00%	0.00%	1.08 % 1.5% 0.55GWh	2.95% **2.68%**	3.75%		

Note that all target for 2021 are based on an escalated 2019 figure as base since the 2020 figures achieved are distorted by the complete closure of campuses for an extended period due to Covid-19 lockdown limitations.

Key Performance Area	Key Performance Indicator	Audited/Actual performance					2021 Target ACTUAL	Strategic Initiatives	Responsibility
		2014	2015	2016 (Baseline)	2019 act 2019 target	2020 act 2020 targe			
	Water use reduction	-	-	-14.30% (vs 2015)	+12.26% -5.00%	-35% **-8.43%**	-7.5%		
	Percentage of buildings with access to water	100.00%	100.00%	100.00%	100.00%	100.00% **100%**	100.00%		
		693.078kl	947.068kl	828.599kl	930.121 kl 650.000kl	839.78l **-9.71%**	883.0 kl	UJ Sustainability policy	
	Average water usage per campus				APB – 200.1 kl (+9.5%)	APB – 124.98 kl -37.54%	APB – 190.0 kll		ED: Facilities Management Utilities / Sustainability Unit
					APK - 530.4 kl (+94.3%)	APK - 517.6 kl -2.41%	APK - 504.0 kl		
					DFC - 171.9 k (+3.3%)l	DFC - 172.5 k +0.37%	DFC - 163.0 kl		
					SWC – 37.6 kl (-50.4%)	SWC – 24.6 kl -34.4%	SWC – 35.0kl	Establish and operate economically viable green-rated buildings	
	Current carbon footprint (Total tons of CO2)	55 872	61 679	56 637	54 156 53 250	52 250 **40 887**	49 200		ED Facilities Management
	Reduction in Carbon footprint	4.00%	7.00%	3.04%	4.38% 4.15%	4.75% **-21.75%**	5.75%	Net Effective Tenant	

Key Performance Area		Key Performance Indicator	Audited/Actual performance					2021 Target	Strategic Initiatives	Responsibility
			2014	2015	2016 (Baseline)	2019 act 2019 target	2020 act 2020 target			
		Waste recycled (Tons)	538T	506T	513.6T	625.3T 475T	675T **673.9T**	725T	Placement of recycling stations	Occupational Safety ED: Facilities Management
		Waste Generated Total	1551T	1773T	1818T	1 858T 2 500T	2 500T **1409.3T**	1 875T	Recycling week in September	
		Waste Recycled	34.75%	28.55%	28.23%	33.65% 25%	35% **47.81%**	38.5%	New Bulkmatech compactor	
		Revenue earned from recycling	R165 038	R156 944	N/A	R160 946 R200 000	R220k **Not yet**	R275k	Recycling of hazardous waste	
		% of hazardous operational waste generated	1.31%	2.07%	N/A	67% (175T) Not spec'd	70% (200T) **49.46%** 33.3T	72.5% (210T)	Disposal of hazardous waste at Dolphin site in KZN	
		Gas delivery	-	33.7TJ	31.7TJ	32.2TJ 35TJ	35.0TJ **42.4TJ** **+17.46%**	42.5GJ	Egoli Gas Bio Gas initiative	Utilities
		Satisfaction with support divisions		3	3.5	3.4 4.0	4.0 **Not yet available**	4.0	Maintenance support	Sen Campus Dir
		Cash flow management	(new target)			(-)	Achieve +/- 10% **-22%**	Achieve +/- 10% on target cashflow	Review Facilities Management / Finance interaction to achieve	ED: Facilities Management
	Cash Flow and Resource Spending	Maintenance spending Residences	(new target)			(-)	R19.0m **R14.8m**	R37.5m	DHET Residence Maintenance	ED: Facilities Management
		Maintenance spending General	(new target)			(-)	R20.0m **R16.5m**	R28.0m	DHET Backlog Maintenance	ED: Facilities Management

		All property related agreements to be approved by Corporate Governance	-	-	-	84% 100%	100% **100%**	100%	Property and Title Deed register Document	Property Man Sen Campus
	Legal Compliance	UJ Property and Title deed register updated All original signed agreements. legal documents. title deeds. etc to be submitted to Corporate Governance for safekeeping and archiving	-	-	-	84% 100%	100% **100%**	100%	Legal Compliance	Property Man Sen Campus Director Legal ED: Facilities Manageme

Key Performance Area	Key Performance Indicator	Audited/Actual performance					2021 Target	Strategic Initiatives	Responsibility
		2014	2015	2016 (Baseline)	2019 act 2019 target	2020 act 2020 target			
Regulatory compliance	% Regulations met by required date	-	-	85%	100% 100%	100% **100%**	100%	OHS act Compliance audit NOSA Audit Develop a guideline on the management of new and existing policies and contracts Effective financial governance. internal controls and risk management Reduce internal and external audit findings. Implement risk management strategies and promote compliance. management	UJ General Counsel Property Man Sen Campus Dir ED: Facilities Management
	% of neglected compliance issues	-	-	-	0% 0%	0% **0%**	0%		
	% Non-compliant buildings (OHS act)	-	-	-	0% 0%	0% **3%**	0%		
	Compliance with insurance requirements	-	-	-	90% 50%	95% **100%**	100%		
	% of compliant policies. procedures & contracts	-	-	40%	90% 90%	100% **95%**	100%		

Key Performance Area		Key Performance Indicator	Audited/Actual performance					2021 Target	Strategic Initiatives	Responsibility
			2014	2015	2016 (Baseline)	2019 act 2019 target	2020 act 2020 target			
	Risk Management	No. of risks over 16 (Residual risks)	-	2	2	3 1	1 **2**	1		ED: Facilities Management
		No. of internal audits with recurring findings over a three year period	-	-	-	3 Major 1 Major	1 **2**	1		ED: Facilities Management
		% of staff trained in critical risk management techniques	-	-	30%	100% 100%	100% **100%**	100%	Risk Management Training Establishment of a Project Management Office PMO responsible for business case development. project prioritisation and project management	ED: Facilities Management
	Capital Projects	Value of failed projects due to risk issues not identified during the decision-making process	-	-	R77m	Nil Nil	Nil **Nil**	Nil		ED: Facilities Management

15. SELECTED REFERENCES

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