

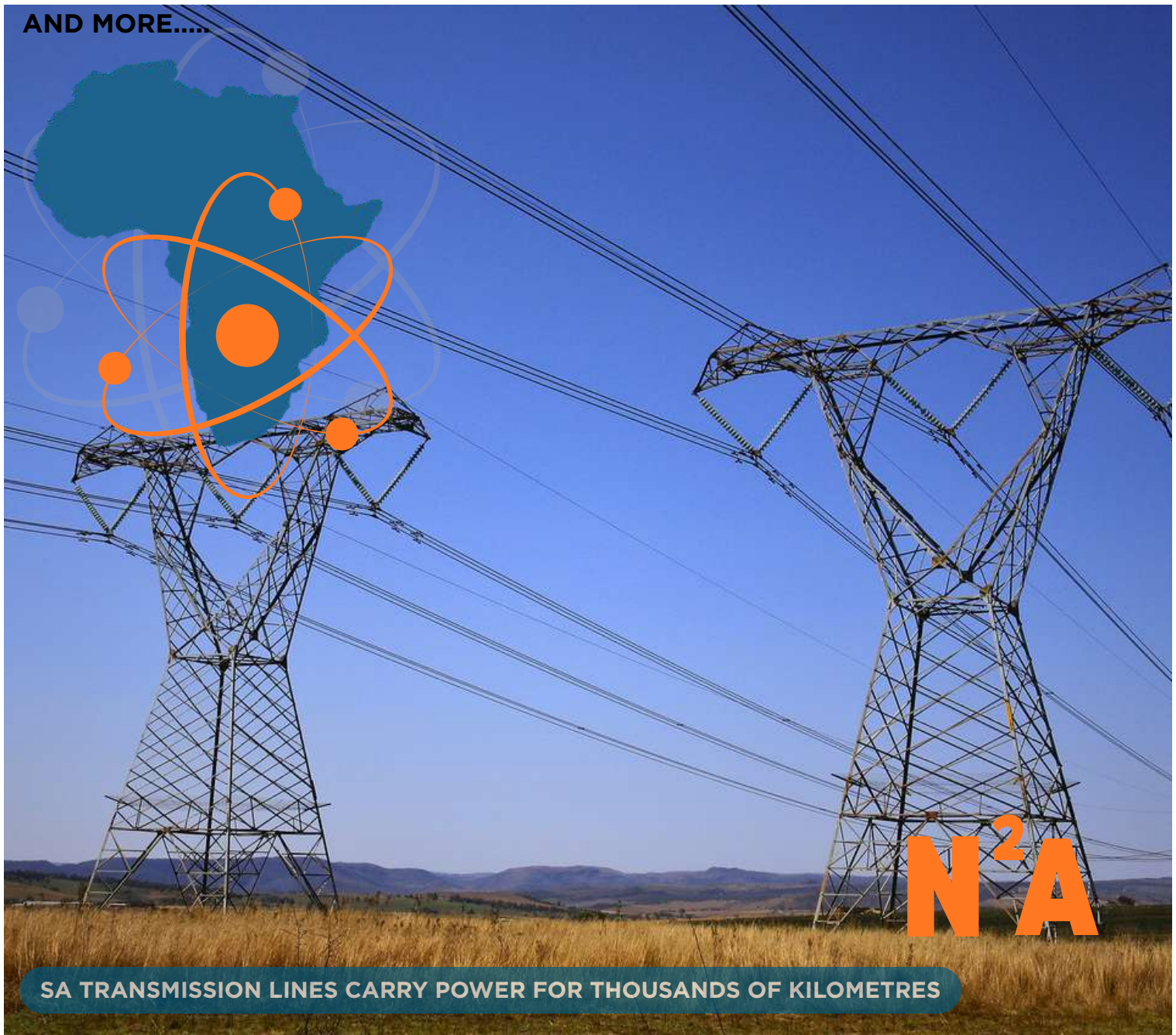
NUCLEAR NETWORK AFRICA

THE WORLD OF NUCLEAR

LONG RANGE ELECTRICITY TRANSMISSION: CONSIDERATIONS IN WIND, SOLAR, AND SMALL NUCLEAR

RADIATION: WHEN REALITY AND REPORTING DISAGREE DR JOHN RANDALL

AND MORE.....



SA TRANSMISSION LINES CARRY POWER FOR THOUSANDS OF KILOMETRES

N²A HIGHLIGHTS



04 LONG RANGE ELECTRICITY TRANSMISSION: CONSIDERATIONS IN WIND, SOLAR, AND SMALL NUCLEAR
HEIN VOSLOO AND CO-AUTHORS



11 WOMEN POWERING THE FUTURE IN SOUTH AFRICA'S ENERGY JOURNEY
MAMIKI MATLAWA

08 NUCLEAR SECTOR NEEDS AN AI DECISION TRACE
DR GLEB TSIPURSKY



13 RADIATION: WHEN REALITY AND REPORTING DISAGREE
DR JOHN RANDALL

FROM THE EDITOR

Navigating Energy's Future: Evidence, Innovation and People

As South Africa and the wider African continent navigate an increasingly complex energy landscape, the need for informed, balanced and forward-looking discussion has never been greater.

This August edition of N²A brings together four perspectives that, while different in subject, share a common thread: building a more resilient energy future requires sound evidence, responsible decision-making and people who are prepared to lead it.

Hein Vosloo and co-authors, in Long Range Electricity Transmission: Considerations in Wind, Solar, and Small Nuclear, examine the infrastructure required to connect diverse generation technologies to where electricity is needed. Their contribution reminds us that the energy transition is not simply about how we generate power, but how we move it reliably and efficiently.

Dr Gleb Tshipursky, in Nuclear Sector Needs an AI Decision Trace, turns our attention to the rapidly emerging role of artificial intelligence. As AI becomes increasingly influential in complex decision-making, transparency, accountability and the ability to understand how decisions are reached become essential, particularly in the nuclear sector.

In Women Powering the Future in South Africa's Energy Journey, Mamiki Matlawa highlights another critical dimension: the people behind the energy transition, and the growing contribution of women in shaping South Africa's energy future.

Heather Veldhuis
HEATHER VELDHUIS
EDITOR



Finally, Dr John Randall, in Radiation: When Reality and Reporting Disagree, challenges us to distinguish scientific reality from perception and reporting, reminding us of the importance of accurate, responsible communication.

Together, these articles reflect what N²A strives to achieve: creating an accessible platform for informed conversation about nuclear energy, technology and the broader energy landscape. Our purpose is not simply to advocate, but to inform, question, connect and educate.

As always, we invite our readers to engage with these perspectives, challenge assumptions and join the conversation about the energy future we are building together.



Eskom's transmission network spans approximately 33 000 kilometres, moving electricity across the country.



***From power lines stretching far and wide,
To AI decisions we must trace and guide.
Women lead forward, with vision and might,
While radiation brings facts into sight.
Four voices, one future, informed and clear,
N²A brings the energy conversation here.***

LONG RANGE ELECTRICITY TRANSMISSION.

CONSIDERATIONS IN WIND, SOLAR, AND SMALL NUCLEAR

HEIN VOSLOO

& CO-AUTHORS

Over the past three decades, the global structure of electricity institutions has undergone major changes. Traditionally, integrated companies managed generation, transmission, and distribution, primarily led by engineers. These have now been replaced by specialised entities for each function. The main reason for this transition was to promote private-sector involvement in the electricity sector. Since transmission is a natural monopoly, its crucial role is to ensure equal grid access for all generators. This shift was mainly motivated by political, strategic, managerial, and economic factors rather than engineering or technical considerations.

Simultaneously, the portrayal of CO₂ and hydrocarbon emissions as contributors to global warming led to a rapid reorganisation of power generation, shifting the focus from fossil fuels and diesel to renewable energy sources such as solar and wind. In certain countries, political factors and unfortunate nuclear accidents, such as Chernobyl and Fukushima, rather than technical and economic factors, influenced decisions to close and phase out nuclear plants. In others, coal reserves were exported rather than used domestically. Many countries experienced similar consequences: rising electricity prices and power outages..



Hein Vosloo (above), Ernest Grunewald, David Tunnicliff, David Nicholls and their co-authors bring decades of combined expertise to bear in surveying, land rights, servitudes, transmission infrastructure, nuclear engineering and energy development. Their extensive Eskom experience spans nuclear new build, power transmission, environmental considerations, land acquisition and infrastructure development, providing valuable practical insight into South Africa's energy sector.

CONTINUED ON PG 05

Large coal power amongst the maize, with a traditional wind pump in the field.



The 1998 South African White Paper on Energy Policy sought to increase private-sector involvement in South Africa's electricity sector. However, after extensive efforts, no private investors were found, prompting Eskom to proceed with building two of the world's largest coal power stations: Medupi, followed by Kusile, and then Ingula, a pumped-storage facility. Eskom was authorised to start Medupi in 2005, with construction beginning in 2007. The delayed start led to a shortfall in power generation, and, as forecast by Eskom planners, the first blackouts occurred in 2007.

Full Cost Reality

In South Africa, power outages prompted investment in renewable systems, such as wind and solar. In 2026, private, "behind-the-meter" solar systems were estimated to generate about 9 GW at midday on a clear, sunny day.

When promoting the "best and cheapest" power sources, the full costs of specific technologies are rarely considered, particularly their life-cycle costs and carbon footprint, as typically assessed in a Life Cycle Assessment. Factors such as lithium mining, transportation to manufacturing and installation sites, and the decommissioning and long-term waste management for lithium batteries, solar panels, and wind turbines are often overlooked. These waste streams will be substantial.

South Africa's primary coal deposits are in the north, where coal-fired power stations have operated for over a century. This electricity is transmitted to the country over roughly 32 000 km of power lines. Voltage levels range from 765 kV to 400 kV.

As an alternative to building the 14 000 km of new lines to bring solar power from far away, Small Modular Reactors (SMRs) should be sited at existing power plant locations. The benefits are twofold: first, these SMRs will supply base-load, firm dispatchable electricity. This means the electricity is available 24/7/365. This contrasts with solar energy, which is available only during daylight hours unless supplemented by battery storage. This type of energy is termed unfirm or intermittent.

Build Small Nuclear

The existing power lines have the capacity to transmit all the power from the existing power stations. A typical 3 600 MW coal power station consists of 6 x 600 MW units. If SMRs (say 100 MW each) are built sequentially, the commissioned units can be synchronised with the decommissioning of the coal-fired units, and it won't be necessary to build any new power lines at all.

The use of SMR power generation is, of course, not without its constraints, and many factors could negatively affect it, for example: international political pressure, environmental issues, public acceptability, "Greenpeace," and obtaining nuclear licences and other regulatory approvals.

The use of solar and wind faces serious challenges, mainly because transmitting this energy requires a vast number of expensive power lines. SMRs are an alternative in which large numbers of power lines will not be necessary if SMRs are built on or near an existing power plant that uses existing transmission infrastructure. **CONTINUED ON PG 06**

Huge tunnel under construction at the Ingula pumped storage scheme



The grid includes 54 substations that transform voltage. Cape Town is home to Koeberg, and Eskom also connects to a hydro source at Cahora Bassa in Mozambique via an 1 800 km, 550 kV DC line. Additionally, five hydro-power peaking stations, Gariepdam (320 MW), Drakensberg (250 MW), Ingula (1 332 MW), Palmiet (400 MW), and Van der Kloof (220 MW), meet morning and evening peak demands.

South Africa's abundant sunshine in the Northern Cape makes it well suited for solar systems. The Eastern Cape coast also offers winds suitable for wind turbines. To connect these large renewable energy sources to the country's main load centers, the existing transmission grid will need to be expanded to enable the use of this energy. It must be remembered, though, that this energy is intermittent unless supported by enormous batteries, whose useful life has not yet been determined. During long periods of cloud cover, these plants' ability to generate electricity will be minimal. In 2024 the total installed capacity of these renewables was about 6 GW. Although reference is made to the Eastern and Northern Cape, market forces have dictated that wind farms are no longer in the Eastern Cape alone but have moved closer to points of grid connection, and can be seen in the vicinity of Sutherland. Similarly, solar farms are being established in the northern Free State.

Transmission challenge

The main challenge for the recently independent National Transmission Company of South Africa (NTCSA) is to provide a transmission grid to carry the projected 56 GW of generation capacity expected between 2025 and 2034.

This will require 14 500 km of new transmission lines and 210 transformers, providing 133 000 MVA of capacity, at a cost of R440b. This effort is essentially focused on servicing the renewable energy sources.

Under a new program, six international companies are slated to design and construct these lines, and own and operate them for twenty years, after which they will be handed back to the NTCSA.

Senior, experienced negotiators widely agree that securing these rights within the current timeline is impractical. If negotiations break down, NTCSA must pursue time-consuming expropriation of these servitudes through the Courts.



The Oryx Design HTMR-100 is a compact Generation IV high-temperature modular reactor delivering 35 MWe from 100 MW thermal power. Helium-cooled and graphite-moderated, it offers passive safety, no large-scale cooling water requirement, modular deployment, and reliable 24/7 baseload power.



AFRICA'S NUCLEAR POWER LANDSCAPE.



TOP HIGHLIGHTS AUGUST 2026

Who will Collaborate with South Africa's Next Nuclear Build?

South Africa has reopened the nuclear conversation with plans for 5 200 MW of new nuclear capacity, representing two large new power stations on the coast and SMR Development. The technology race could determine the country's nuclear future.

Africa's Nuclear Workforce: The Hidden Challenge

Africa can procure reactors and secure financing, but who will regulate, build, operate and maintain them? A major US-Africa summit in Accra has placed skills, institutions and workforce development firmly under the spotlight.

The SMR Race Has Begun: Is Africa Ready?

Small modular reactors are rapidly moving from policy discussions towards active programmes across Africa. South Africa, Ghana, Kenya, Rwanda, Ethiopia and Nigeria are developing pathways that could reshape the continent's nuclear landscape.

Kenya Raises the Nuclear Stakes to 2 000 MW

Kenya has dramatically expanded its nuclear ambition, targeting 2 000 MW of nuclear generation. But with high electricity costs and grid challenges already evident, can ambitious generation targets translate into affordable power?

Koeberg's Next Generation: Lessons Beyond the Headlines

Koeberg remains a critical reference point for Africa's nuclear newcomers. Recent operational events and the licensing of new reactor operators highlight the importance of safety culture, skills and institutional experience.

NUCLEAR SECTOR NEEDS AN AI DECISION TRACE

-TO ESTABLISH PRACTICAL CONTROLS

DR GLEB TSIPURSKY



The nuclear sector has always understood a principle that many other industries are only beginning to learn: a decision must remain explainable after the moment has passed. Operators continuously document what happened, engineers preserve the evidence behind a judgment, and regulators expect organisations to show who had authority to act. Artificial Intelligence creates useful new capabilities, but it can also weaken that chain of accountability, unless leaders design traceability into the workflow, from the start.

That issue matters now, because South Africa is updating its nuclear governance framework while considering the sector's future role in the energy system. In May, the Cabinet approved the draft Nuclear Energy Amendment Bill for public consultation, including proposed changes to institutional roles and nuclear-energy governance. As policy develops, the industry has an opportunity to establish practical AI controls before automated systems become embedded in consequential work.

The need for clear records extends beyond regulatory compliance. In July, Eskom reported a Level 0 maintenance event at Koeberg Unit 2 and confirmed that no radiation leak occurred. That event does not suggest that AI played any role. But it did show why the public expects nuclear organisations to reconstruct events quickly, distinguish a technical issue from a safety threat, and communicate the evidence with precision to both the authorities and the public. Trust depends on an auditable explanation.

The same discipline should govern AI-assisted work. Nuclear organisations should require an AI decision trace whenever a system influences a consequential recommendation, classification, escalation, or action. The trace should remain short enough for routine use and detailed enough for an independent reviewer to understand the judgment later.

Dr Gleb Tsipursky is a behavioural scientist, CEO of Disaster Avoidance Experts, and author of The Psychology of AI Adoption at Work: From Resistance to Results (Georgetown University Press, 2026). His expertise and commentary have featured in The New York Times, Toronto Star, New York Daily News, and The Plain Dealer.

A useful trace begins with the task and its boundary. What was the system asked to do, and what remained outside its authority? An AI tool that summarizes maintenance records has a different risk profile from one that prioritizes anomalies, recommends an inspection sequence, or triggers a workflow. Organisations should define those boundaries in operational language, rather than broad statements about “human oversight.”

The trace should then preserve the evidence presented to the system. That includes the source, date, relevant sensor or document context, and any known gaps. AI outputs can appear confident even when the input is incomplete or outdated. Recording the evidence allows a reviewer to separate a weak model response from a weak information environment.

The third element is system identity. The record should show the model, version, configuration, and any connected tools used for the task. This matters because performance can change after an update.

CONTINUED ON PG 09

CONT.... FROM PG 08

The US federal agency, the National Institute of Standards and Technology (NIST), has produced the AI Agent Standards Initiative, which emphasises secure, interoperable adoption of systems that can act across digital environments. In a nuclear context, knowing which system acted, with which permissions, and under which configuration should be a basic operational requirement.

Fourth, the trace should name the human reviewer and the reviewer's authority. "A person checked it" provides little protection. The record should show whether the reviewer could approve, modify, reject, pause, or escalate the recommendation. It should also capture the reviewer's independent judgment, especially when that judgment differs from the system's output.

Fifth, the record should capture uncertainty and exceptions. Did the tool encounter missing data, conflicting readings, unusual operating conditions, or a case outside its validated range? Teams often learn the most from these edge cases. Without a common record, the same exception can reappear across shifts, sites, contractors, or systems without becoming organizational knowledge.

Finally, the trace should document the action taken, the escalation or rollback path, and any later correction. NIST has also argued for a continuous-monitor-and-update security model for AI systems. Nuclear organisations can apply the same logic operationally: every significant exception, correction, or near miss should inform the next control, test, training module, or system configuration.

This approach does not require a new bureaucracy. A one-page digital form can support maintenance triage, inspection-image review, supply-chain screening, training content, document checks, and other bounded uses. The fields should integrate with existing quality, safety, and shift-handover processes rather than create a separate AI reporting system.



Leaders can start with a thirty-day pilot in one workflow. Select a use case where AI already influences judgment but does not control a safety-critical action. Require the decision trace for every consequential output. Review the records weekly with operations, engineering, safety, cybersecurity, quality, and workforce representatives. Then ask three questions: Which exceptions repeat? Where do reviewers routinely override the system? Which controls reduce uncertainty without slowing useful work?

The result will give management better evidence than an adoption dashboard. Usage rates show that people opened a tool. A decision trace shows whether the organisation can understand, challenge, and improve the work performed with it.

Africa's nuclear future will depend on engineering capability, institutional credibility, industrial participation, and public confidence. AI can support that future, but only when organizations preserve the human and technical reasoning behind consequential decisions.

In a sector built on disciplined records, the standard should be straightforward: no important AI-assisted judgment without a trace that another qualified person can follow.

CONTINUED ON PG 10



NUCLEAR SECTOR NEEDS AN AI DECISION TRACE

TO ESTABLISH PRACTICAL CONTROLS

AI can enhance nuclear work.
A trace makes it accountable.



CONTEXT



South Africa is updating its nuclear governance framework. Cabinet approved the draft Nuclear Energy Amendment Bill for public consultation.



In July, Eskom reported a Level 0 maintenance event at Koeberg Unit 2. No radiation leak occurred. The event showed the public expects fast, accurate, evidence-based explanations.

WHY IT MATTERS



Trust depends on an auditable explanation.



Regulators expect organizations to show who had authority to act.



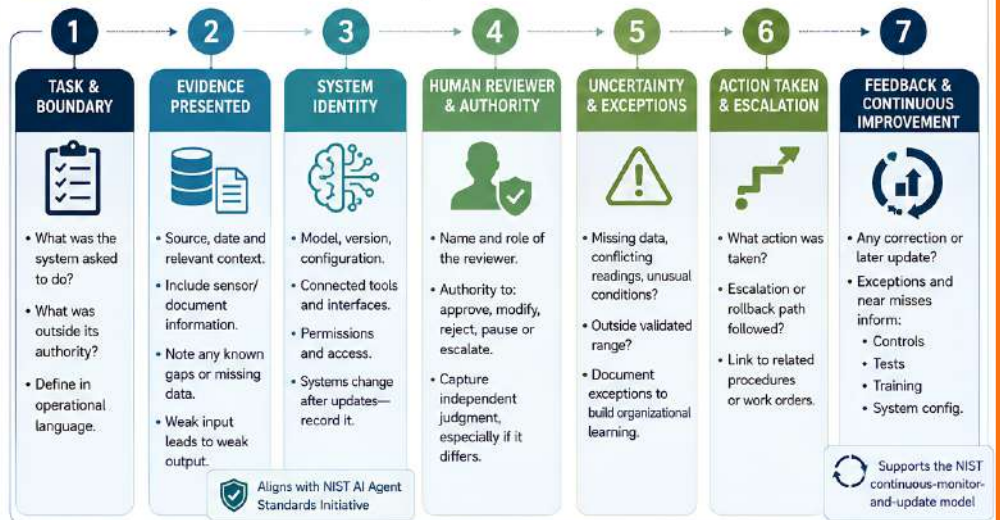
AI use must strengthen—never weaken—accountability, safety and public confidence.



USAGE RATES SHOW A TOOL WAS OPENED. A DECISION TRACE SHOWS THE WORK CAN BE UNDERSTOOD, CHALLENGED AND IMPROVED.

THE AI DECISION TRACE: 7 ESSENTIAL ELEMENTS

Every time AI influences a consequential recommendation, classification, escalation or action, create a trace that another qualified person can follow.



PUTTING IT INTO PRACTICE



AFRICA'S NUCLEAR FUTURE DEPENDS ON TRUST, COMPETENCE AND ACCOUNTABILITY. No important AI-assisted judgment without a trace that another qualified person can follow.



STRATEK
HOLDINGS

POWERING A SUSTAINABLE FUTURE

Stratek Holdings delivers innovative nuclear solutions that power progress, strengthen infrastructure, and create a cleaner, more secure tomorrow.

- Nuclear Power Technology
- SMR Development & Manufacture
- Nuclear Energy Grid Assessments
- Nuclear Power Consulting
- Nuclear Power Communications and Training



083 625 0316



info@stratek.co.za



www.stratek.co.za

INNOVATION | INTEGRITY | EXCELLENCE | COLLABORATION

WOMEN POWERING THE FUTURE IN SOUTH AFRICA'S ENERGY JOURNEY

MAMIKI MATLAWA

While South Africa's transition to a more reliable, inclusive and sustainable energy sector is too often viewed through the lens of infrastructure and technology, the critical role of women in this shift is often overlooked.

Women – long sidelined in the country's energy institutions – are stepping into roles that are reshaping how the country thinks about power, access and resilience. Their influence is no longer a footnote in the energy debate; it is fast becoming one of its most decisive forces.

The energy sector is one of the country's fastest-growing, with the Integrated Resource Plan (IRP) 2025 and the Transmission Development Plan signalling billions in new investment and years of sustained job creation. The IRP 2025 alone represents a R2.23 trillion investment that will define South Africa's future energy mix.

At the same time, women remain disproportionately affected by unemployment – the official unemployment rate for women in South Africa is 36.6%, according to Stats SA. Expanding their role in the energy economy is therefore not only a matter of fairness but a practical lever for reducing inequality and ensuring that the benefits of this transition are more widely shared. If the sector is to meet its ambitions, women must be able to claim meaningful space within it.

Not an abstract ambition

Building that space is not an abstract ambition; it is already taking shape on the ground. Women are entering the sector in growing numbers, from engineering graduates stepping into Engineer-in-Training (EIT) programmes to apprentices and artisans being equipped with the technical skills the transition demands.

Women are moving into procurement, project management and reconstruction roles, and increasingly into leadership positions where strategic decisions about investment, innovation and grid reform are made. These shifts may still be emerging, but they signal a sector beginning to recognise that its future strength depends on drawing on the full breadth of South Africa's talent and ensuring women are not just present but influential.



Yet despite this momentum, obstacles remain. Women still face assumptions about their capabilities, often before competence is even considered. However, some institutions, including Eskom, have elevated women into senior and technical roles, showing that transformation is both possible and beneficial.

But across much of the private sector, the pace lags, and women are still told, implicitly or explicitly, that the environment is “too tough”, “too technical” or “not for them”. These barriers may be subtle, but they remain powerful and dismantling them is essential if South Africa's energy transition is to be genuinely inclusive and future-fit.

Policies to drive transformation

Government, industry and educators will need to move in step if this shift is to accelerate. With major energy investment on the horizon, transformation policies must be enforced not as formalities but as conditions for participation, including the active inclusion of women in technical and leadership roles.

Companies cannot justify high female unemployment while benefiting from a booming energy economy, and universities must help bring more young women into engineering, artisanship and project management. When women have access to stable, skilled employment, the benefits extend beyond the individual to families, communities, and the broader economy. If South Africa is to grow and reduce unemployment, women must be part of the energy sector driving its next phase of development.

CONTINUED ON PG 12



Another powerful lever is sponsorship. Mentorship can offer guidance, but it rarely shifts the structural barriers that keep women from real opportunity. Sponsorship puts someone with influence in a woman's corner, advocating for her, naming her for roles, and opening doors she might never reach alone. Widening that practice could rapidly close gender gaps and pull more women into the spaces where South Africa's energy future is being shaped.

Change must be intentional

Real change also requires intention. Companies need to set clear targets, diversify their workforces and build environments where women can thrive – from providing appropriate PPE to making practical accommodations on factory floors. Eskom's early drive to recruit black female engineers worked because leadership made a conscious decision to open doors and then support those women once inside.

That is the formula. Sponsorship brings women into the room; mentoring helps them grow once they're there. Without that intentional push, the sector will struggle to deliver the inclusive transition it promises.

Diversity is an economic imperative, and South Africa cannot grow while shutting women out of the very sectors capable of lifting households into stability and expanding the middle class.

When women access skilled, secure work, communities strengthen, demand rises, and the economy gains the broad base it needs to thrive. But this requires intention; leaders must set targets, open doors, and actively sponsor women into real opportunity. A country that sidelines half its talent limits its own future.



Mamiki has over 30 years of working experience, 15 years of which have been in Senior Management/Executive and Board positions. Her experience has been gained in the Engineering Consulting, Petrochemical, Energy, NPO, Development Finance and Business Services sectors, the majority of which has been in the Energy Sector. She holds a BTech Degree in Chemical Engineering, an MBA degree, and is currently studying towards a BSc Honours Degree in Energy Studies.

Mamiki is also currently the Group Business Development Executive of ACTOM, where she is responsible for overall group business development of 13 Divisions, marketing of the group, and managing stakeholders, with a Group Turnover of R13bn. She is a Certified Director with the Institute of Directors Southern Africa (IODSA) and serves as a Non-Executive Director in private companies.





HARDWARE

REMOTE

ON-SITE

WEBSITE

IT

DESIGN

DOMAIN HOSTING

DISASTER RECOVERY

EMAIL

BACKUPS

SUPPORT

HOME AUTOMATION

Contact Us

082 800 1725

www.buzzgroup.co.za

RADIATION - WHEN REALITY AND REPORTING DISAGREE

DR JOHN RANDALL

Twenty years ago, when I first became interested in nuclear technology, one of the first things I learned was that popular reporting is not to be trusted. We live in a time when expert knowledge is available as close as at the nearest keyboard, yet the news outlets which I encounter daily almost all present nuclear technologies in a manner at odds with professional guidance.

A recent example illustrates. In July 2026, there was, in the judgement of local and international professionals, a non-event at Koeberg. Instead of consulting experts, media articles were published with titles such as:

“Radiation alarm at Koeberg panic - Eskom scrambles to quash Koeberg contamination reports.”

“Transparency trial - Four radioactive incidents, one question: What do Koeberg’s maintenance failures reveal?”

Words such as “alarm”, “panic”, “contamination”, and phrases such as “scrambles to quash” and “Koeberg’s maintenance failures” need to be weighed against my assessment of “non-event”.

The report with the third title contained a clue, which the report ignored. In reference to the dose of radiation, which any worker may have received, it said: “the largest dose recorded during the incidents was 20 microsieverts”.

Twenty microsieverts. What does that measure? To answer questions like this one, I consult experts and people who’ve consulted experts. The following is what I’ve learned, tinged by my professional expertise. The radiation chart shows the complexity of radiation dose and why news outlets should not make simplistic claims.

The Sievert (Sv) is a unit quantifying radiation dose. According to Google, it measures the biological effect and health risk of ionizing radiation on human tissue. The unit is useful because it is known that a dose between 2 and 8 Sv will, at the lower level, hurt a



John Randall, son of a Poultry farmer, trained to become a Poultry breeder, but discovered Biometry in this training and was a Biometrician (a Statistician specialising in designing experiments) for 26 years. Then, when the compulsory retirement age of 60 loomed, he exploited his expertise in computers to be a Systems designer for the remaining 20 years of his working career.

human very badly and at a higher level, will kill a person. Bluntly, the lethal dose of radiation is somewhere between 2 and 8 Sv. It also depends on other factors such as the age of the person and their general health, so you can’t establish an exact figure. Note that another major factor is whether you get a dose like this all at once, or whether you get the same dose spread over a couple of years. If it is spread over years, it won’t kill you, but it will increase your cancer risk.

What if a person received a dose of 1 Sv? In short, the experience will be exceptionally uncomfortable – but almost certainly not immediately lethal. I say “immediately” because the radiation places the person in danger of developing cancer – which could be lethal.

CONTINUED ON PG 14

Radiation is known to be a carcinogen, and scientific studies suggest a linear relationship between dose and the occurrence of a lethal cancer. The International Commission on Radiological Protection (ICRP) declared that every increase of 1 Sv in dose is associated with an increase of about 5.5% in the incidence (occurrence) of cancer – with a fatality of between 4.1 and 4.8% per Sv. It is convenient to round all these percentages to 5 and to limit discussion to lethal cancers. So, a convenient simplification all discussion about radiation should keep in mind is that the additional risk of a lethal cancer from a once-off whole-body dose of 1 Sv is 5% and every additional dose of 1 Sv increases that risk by 5%.

To avoid fractions, one-thousandth of a Sv is called a millisievert (mSv) and one-millionth of a Sv is called a microsievert (μ Sv). So, given the linearity, we might calculate that a dose of 1mSv is associated with 0.005% and a dose of 1 μ Sv is associated with 0.000005% - so a dose of 20 μ Sv has an additional risk of 0.0001%. (Radiation is one of many carcinogens, hence “additional”).

Now, let us pretend that we are allowed to perform an experiment in which we expose a million people to a dose of 20 μ Sv. Since 0.0001% is 1 in a million, we realize that we can expect only one extra death. If we'd prefer an experiment large enough for, say, an extra 100 people to die of cancer, we'd need to dose 100 million people.

It is incredibly important to understand that even if experiments on people were permitted, we would not be able to conduct such experiments because of the numbers required to expose the low risks associated with low doses. Indeed, science has only been able to establish the relationship between dose and cancer lethality for doses of 100 mSv and more. (This knowledge comes from the likes of studies of survivors of Hiroshima and Nagasaki.)

We have two facts in front of us: In the first place, at high doses there appears to be a linear relationship between dose and response which can lead to a lethal cancer. Secondly, because investigation of the effect of low doses is precluded by the large numbers required, humanity will probably never be able to say if the relationship observed at high doses is maintained at low doses. Scientists had little choice - they simply agreed to extend the established knowledge for high doses down to low doses.

We are now able to evaluate the Koeberg incident. A dose of 20 μ Sv is approximately equal to spending two days in the natural background radiation of Johannesburg, or taking a flight from Cape Town to Johannesburg.



Radiation Dose Chart

This is a chart of the ionizing radiation dose a person can absorb from various sources. The unit for absorbed dose is "sievert" (Sv), and measures the effect a dose of radiation will have on the cells of the body. One sievert (all at once) will make you sick, and too many more will kill you, but we safely absorb small amounts of natural radiation daily. Note: The same number of sieverts absorbed in a shorter time will generally cause more damage, but your cumulative long-term dose plays a big role in things like cancer risk.

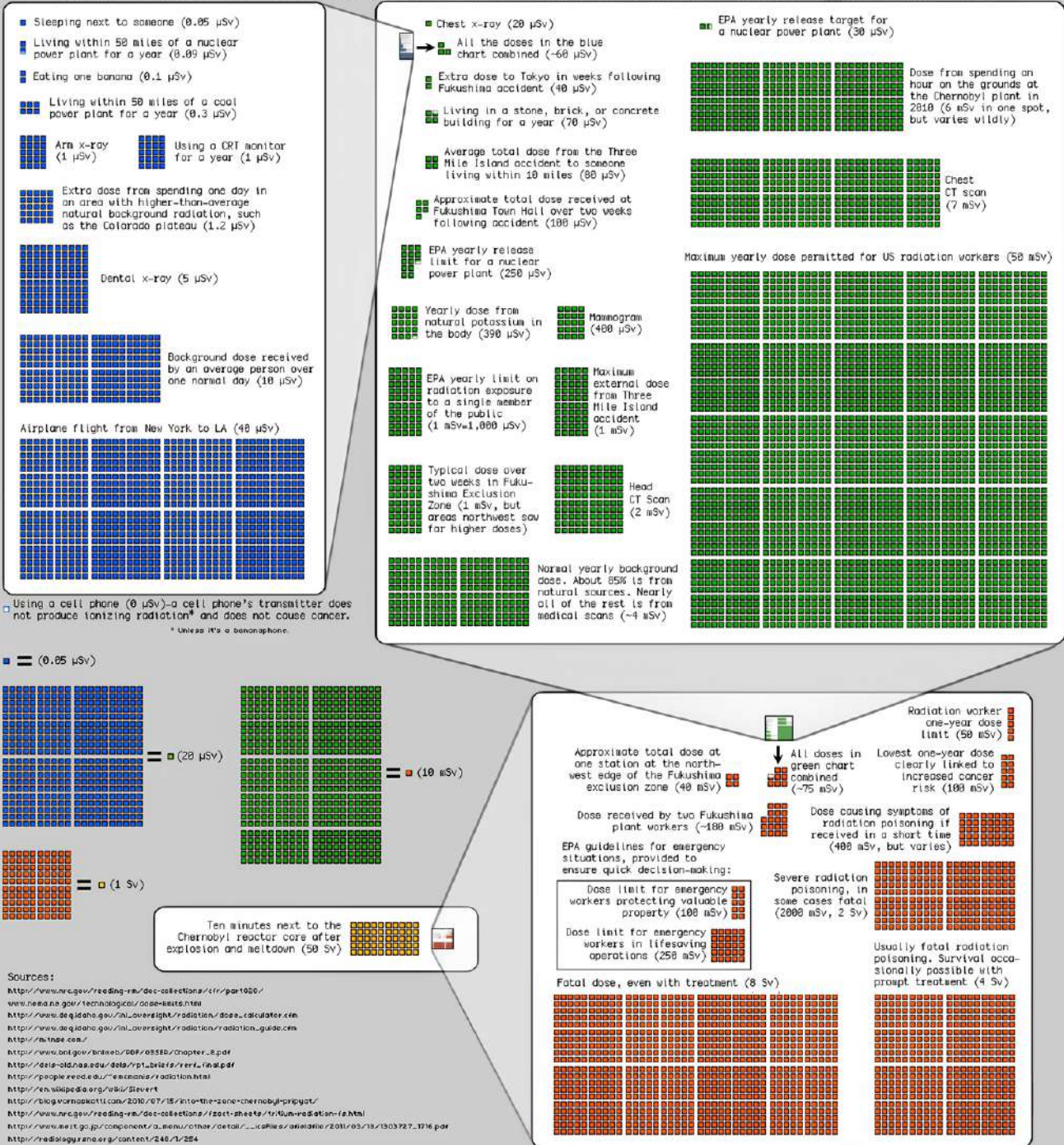
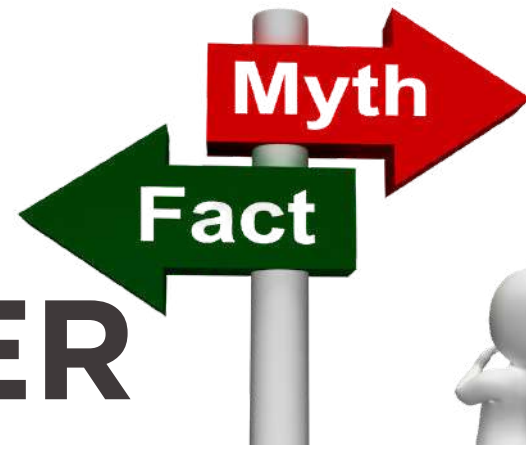


Chart by Randall Munroe, with help from Elliott, Senior Reactor Operator at the Reed Research Reactor, who suggested the idea and provided many of the sources. I'm sure I've added in lots of mistakes; it's for general education only. If you're basing radiation safety procedures on an Internet PNG image and things go wrong, you have no one to blame but yourself.

Source: <https://xkcd.com/radiation>





MYTH BUSTER



MYTH:

If we build more solar panels, the electricity problem is solved.

FACT:

Not quite. You can have enough solar panels to cover Gauteng in shiny blue rectangles, but you still need transmission lines to get that electricity to where people live and work, and there is no solar at night.

N²A VERDICT

More generation is only useful if the grid can move it, and it functions 24/7.

MYTH:

AI knows what it's doing, so we can just trust it.

FACT:

If your teenager says, "Trust me, I Googled it," you probably ask a few more questions.

We should do the same with AI.

AI can analyse mountains of information and make impressive recommendations, but in critical industries such as nuclear, we need to know how it reached its conclusion.

N²A VERDICT

Smart isn't enough. We need decisions we can understand, check and explain.



WWW.N2A.CO.ZA

IS LIVE!!!
VISIT OUR WEBSITE



**BECOME PART OF THE NUCLEAR CONVERSATION
DON'T BE LEFT OUT!**

NUCLEAR NETWORK AFRICA

THE WORLD OF NUCLEAR

Any person who has influence and a role to play in representing any Nuclear-Related Developments to advance nuclear power in Africa. or in any international entity, which can contribute to the development of Africa's nuclear energy capability is encouraged to be part of this great journey.

Any company, ranging in capability from a nut and bolt to the most sophisticated piece of equipment, should join the journey now.

N²A IS AN INDEPENDANT PUBLICATION

Editor: Heather Veldhuis

Email: heather@n2a.co.za

Cell: +27 (0)83 625 0316

Web: www.n2a.co.za

**Submit your article or topic for
consideration in our next N²A edition.**

heather@n2a.co.za



N²A Advertising Solutions

**Maximise your exposure and
build your nuclear
reputation.**

Rachel Gitari

Sales and Marketing

Email: boselemedia@outlook.com

Cell: +27 (0)72 651 9541



**Rachel has been involved with our
nuclear projects for over 10 years. She
handles sales and marketing functions
related to conferences, meetings,
brochures, and publications like N²A**