'NO PARAFFIN! CAMPAIGN'

National Roundtable Discussion Webinar Series

FEBRUARY/MARCH 2021

science & innovation

Department:
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REPUBLIC OF SOUTH AFRICA

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The Academy of Science of South Africa (ASSAf) was inaugurated in May 1996. It was formed in response to the need for an Academy of Science consonant with the dawn of democracy in South Africa: activist in its mission of using science and scholarship for the benefit of society, with a mandate encompassing all scholarly disciplines that use an open-minded and evidence-based approach to build knowledge. ASSAf thus, adopted in its name the term 'science' in the singular as reflecting a common way of enquiring rather than an aggregation of different disciplines. Its Members are elected based on a combination of two principal criteria, academic excellence and significant contributions to society. The Parliament of South Africa passed the Academy of Science of South Africa Act (No 67 of 2001), which came into force on 15 May 2002. This made ASSAf the only academy of science in South Africa officially recognised by government and representing the country in the international community of science academies and elsewhere.

This report reflects the proceedings of 'NO PARAFFIN! CAMPAIGN' National Roundtable Discussion Webinar Series. Views expressed are those of the individuals and not necessarily those of the Academy nor a consensus view of the Academy based on an in-depth evidence-based study.

ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
ASSAf	Academy of Science of South Africa
ATM	Automated teller machines
CoGTA	Department of Cooperative Governance and Traditional Affairs
COVID-19	Coronavirus Disease
DDM	District Development Model
DMRE	Department of Mineral Resources and Energy
FCTC	Framework Convention of Tobacco Control
HIV	Human Immunodeficiency Virus
LED	Light-emitting diode
LPG	Liquefied Petroleum Gas
NGO	Non-governmental organisation
NPO	Non-profit organisation
NRCS	National Regulator for Compulsory Specifications
NWU	North-West University
PV	Solar photovoltaic
SABS	South African Bureau of Standards
SAMRC	South African Medical Research Council
SDG	Sustainable Development Goal
TEPRASM	Tshwarisanang Environmental Pro-Reactive Safety Mentors
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
Unisa	University of South Africa
USD	United States Dollars
WHO	World Health Organisation

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The Academy of Science of South Africa (ASSAf) would thus like to acknowledge Unisa, NWU, SAMRC and all the speakers in the webinars that were held. Prof Ashley van Niekerk, Dr David Kimemia and Prof Harold Annegarn, who is also an ASSAf member, represented the three organisations that worked in partnership with the Academy. The participants from various sectors including public and private sector, NGO's, academia, media as well as students from universities and young aspiring innovators are greatly acknowledged individually and collectively.

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Prof Himla Soodyall

ASSAf Executive Officer

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Webinar 1: South Africa's Inequalities in Risk: The Case for the No Paraffin! Campaign

18 FEBRUARY 2021

Welcome and Introduction (Professor Mohamed Seedat, University of South Africa (Unisa))

Prof Seedat welcomed everyone to the webinar, the first in a series addressing the No Paraffin! Campaign. A particular thanks to Prof Thenjiwe Meyiwa for her presence and for agreeing to set the scene for this webinar.

The matter of paraffin use and the campaign raises the question of energy justice and energy transitions. The webinar series aimed to engage with energy justice and the intersection between energy justice and social justice, and a wide range of issues in support of an inclusive and safe energy transition. This webinar focussed on the empirical and social case for such a campaign, and at what is known from the science base and the social mandate about the use of paraffin and energy justice. It is evident that this is a matter of broad base public involvement and that multi-sectorial participation is key. An important component of the campaign is to build alliances and collaborations across multiple platforms and different parts of society, the continent and beyond, and consider how to connect with regional and international agencies. Energy poverty is an urgent matter for the poor in this country and significantly impacts on millions of people's everyday lives.

Prof Seedat acknowledged the partnership between the Unisa Institute for Social and Health Sciences, the South African Medical Research Council (SAMRC), the North-West University (NWU) and ASSAf in hosting this national roundtable.

Setting the Scene: Energy Justice is a Prerogative for South Africa (Professor Thenjiwe Meyiwa, Vice Principal Research Postgraduate Studies, Innovation and Commercialisation, Unisa)

Prof Meyiwa welcomed those who joined the first webinar in the national roundtable series, which would launch the national No Paraffin! Campaign. The roundtable and the campaign serve as a response to the accumulation of evidence of the devastating and widespread health, social and economic impacts of domestic paraffin use. The campaign has been launched to advocate for a clean and safe energy substitute for household paraffin based on best practice, local experiences as well as recommendations from health and energy authorities. South Africa requires an energy solution that must be inclusive and that focuses on the needs of the country's energy-poor communities as well as individuals.

There are some serious concerns about the domestic use of paraffin in the country. It is estimated that illuminating paraffin remains the primary cooking fuel for up to 3.6% of South African households

(or around 2 million people) concentrated in impoverished and under resourced communities and is mainly used by women. This fuel is often burnt in poorly made stoves that are prone to malfunction, and are associated with damaging fires, burn injuries, poison and chronic health conditions. The scale of the problem is significant and for the affected families it is devastating. Every year, emergency services respond to over 5000 shack fires that leave a trail of destruction and destitution across settlements. Paraffin use is implicated in many devastating incidents. The economic impact has been recorded as huge, with significant costs with regard to resources, burns and treatment, long-term care for the disabled, and replacement of raised structures. The cost of the latter has been estimated at R180 million annually.

Despite the regularity of these incidents and the extent of their adverse effects, the fuel continues to be widely used and remains available across the country, partly because it is viewed as affordable by many energy impoverished communities. At the centre of the challenge is that its continuous use exacerbates gender inequality. A variety of studies have for over a decade emphasised that poverty reduction, shared prosperity and growth cannot be achieved without universal access to reliable modern energy such as clean energy for cooking, and household access to electricity. The studies assert that the lack of energy limits opportunities, job creation, business development and access to health and education. Furthermore, the studies tell us that there are considerable gaps in energy access worldwide.

Energy provision affects men and women differently. Modernised forms of energy can improve women's security and opportunities. Programmes that boost household energy access and promote modernised cooking practices help women, specifically in terms of improved quality of life, and could lead to better access to income generating opportunities. Safer, cost-effective energy alternatives with benefits that reduce health incidents, injuries and property losses, must receive urgent attention. It is incumbent upon all of us to commit to the call of safe energy for all.

This roundtable provides decision-makers, civil society activists, researchers, industry and worker union representatives, and local and international experts a platform to deliberate on the worthy cause of transformative energy solutions for impoverished communities. It is anticipated that the discussions at this and subsequent roundtables will reconnect advocates of energy access with the sole purpose of improving access to clean and safe energy for cooking, heating and lighting, and the quality of life for all.

It is necessary to weigh up the impact of the consequences of domestic paraffin use and the health and economic benefits of alternative energy. The campaign is based on the principles and aspirations of the better life for all as expressed in the African Union's Agenda 2063, Sustainable Development Goal (SDG) no. 7, National Development Plan (NDP) and Unisa's 2030 strategy, which focusses on ensuring that universal access to affordable, reliable and modern energy services is a reality by 2030.

Prof Meyiwa appealed to participants to join her in urging the South African government and all partnering organisations to commit to and expedite the formulation and implementation of a sustainable energy solution for South Africans, especially those who are currently dependent on domestic paraffin.

Science and Society: What and Who is Needed for the 2030 Energy Agenda (Prof Stuart Piketh, NWU and ASSAf)

The presentation focussed on the implications of the use of various energy forms on air quality and the implications for society, which relate closely to the aim of the No Paraffin! Campaign.

The 2030 Energy Agenda relates to United Nations' (UN) SDG 7 that addresses universal access to affordable and clean energy by 2030 and is closely linked to several of the other SDGs, specifically those that address:

- Poverty eradication: In South Africa, the lack of access to clean and reliable energy is closely linked to poverty.
- Good health and wellbeing: Households that rely on combustion of solid or liquid fuels for heating, lighting and cooking are very vulnerable to the impacts of air pollution on their health as well as accidents.
- Decent work and economic growth: As households' economic welfare improves due to stable employment opportunities, their demands and preferences for energy change.
- Industry, innovation and infrastructure: There is an opportunity to use innovation through partnerships with industry to find solutions that are appropriate to the South African situation. Infrastructure is needed in order to provide clean energy to communities.
- Sustainable cities and communities: This is closely linked to what people have, where they live and the services they have access to.
- Climate action: Climate change cannot be divorced from air pollution, gas emissions and other pollutants. This is critically important where most of the carbon dioxide comes from energy production.
- Life on land: Energy poor communities rely on fuel sources taken from the environment and, when not properly planned and managed, this has implications for the environment.

Around 3 million households (or 15 million people) in South Africa do not currently have access to grid electricity. A significant number of those households utilise alternative energy sources for space heating and cooking. Although it is acknowledged, this energy production is not accounted for in the 2019 Integrated Resource Plan (IRP).

Solid (including liquid) fuel combustion has the following consequences:

- The impacts of domestic fuel combustion (health risks – both direct and from air pollution – as well as environmental and climate consequences of energy production) are seldom recognised
- Government released a strategy document in 2019 to address air pollution in dense low-income settlements, which clearly acknowledges the impact of domestic burning as a source of household air pollution, with domestic fuel burning counts for significant quantities, notably with regards to Particulate Matter (PM). It is not obvious that the strategy is being implemented.
- An increasing focus on trying to solve air quality problems by only looking at the impacts of big industry, and misleading media reporting in this regard.
- Instead of the matter never being mentioned, there should be outrage at the exposure of the population in townships throughout the country to unimaginably high levels of household air pollution.

The study looked at an extensive group of areas and households across the country and found that the air quality exceeds the standard inside houses almost everywhere, particularly in winter. The exposure levels, of those who do the cooking for example, are extreme and reach levels that are unthinkable in the rest of the world.

In terms of what and who is needed for the 2030 Energy Agenda, it is important to acknowledge that there is science available and that the focus needs to be on that science, and that policy and prioritisation of action needs to be based on science. It is necessary to understand that the biggest air pollution (ambient and household) is undeniably linked to poverty, unemployment and service delivery. Energy choices at a household level are linked to economic health. Domestic solid fuel combustion practices are associated with vegetation health, which requires integrated systems science and policy to be managed. Climate change agendas and air pollution are closely coupled and solutions for both need integrated planning, and there should be no hidden agendas.

Energy Policy Initiatives for the Poor in South Africa (Mr Tseliso Maqubela, DDG Minerals and Petroleum Regulation, Department of Mineral Resources and Energy (DMRE))

The growing defiance of the law is of deep concern to those involved in regulation, with substantial illegal activity in the minerals and petroleum space that equates to outright criminality and deprives citizens of the necessary benefits.

When it comes to energy policy initiatives for the poor in South Africa, it is important to reflect on the broader continent. As much as there has been economic growth in Sub-Saharan Africa, the continent remains bedevilled by energy poverty. Even though there have been a number of policy interventions, energy poverty remains a problem in South Africa.

A recent study shows that only 290 million people in Sub-Saharan Africa have access to electricity and the number of those without access continues to rise. Energy poverty cannot be dealt with if there is no access to modern forms of energy. Efforts to electrify have been gaining momentum and although much has been done in South Africa, there is much more still to be done.

It is important to realise that a lack of access to energy, especially modern forms of energy, is a major challenge for the country and the rest of the continent and has a direct correlation with poverty. The department believes that an integrated approach, including forms of energy other than electricity, is needed. Scaling up is essential and there needs to be a clear programme of action for the implementation of the numerous policies that are already in place in order to accelerate the efforts towards making progress towards eradicating poverty. Focussing on implementation will produce the necessary results in terms of the electrification programme.

The department has the constitutional mandate to formulate and exercise oversight in the implementation of energy policy to ensure affordable and reliable energy to all South Africans. Affordability and reliability of energy is becoming a challenge given the generation challenges and the electricity tariffs, which are unsustainable and will have to change in order to deal with poverty alleviation. Sustainability of energy supply must include a diversified mix of energies. The current growth of renewable energy will also contribute towards the alleviation of poverty being properly implemented.

The electrification programme started with 34% coverage in 1994 and currently stands at 87% of all households. The department aims to increase the electrification of households, noting that the number of households is increasing rapidly. Electrification does not mean that energy poverty is being addressed. The tariffs discourage those whose homes have been electrified from using the electricity due to affordability.

One of the interventions announced by the Minister talks to the use of paraffin in the country. The department aspires to double the use of Liquefied Petroleum Gas (LPG), from 400 000 tons to 800 000 tons per annum, and believes that this is achievable. There has been investment in infrastructure for LPG and cylinders are being locally produced. LPG can replace paraffin and begin to respond to the tragedies seen in informal settlements. Campaigns on the safe use of LPG and programmes to educate citizens on the benefits of using LPG have been launched. The model that is being implemented will assist in the alleviation of energy poverty as it allows for smaller quantities of LPG to be purchased, making it more affordable. Policy interventions to make the cost of LPG competitive were being considered. The uptake in certain areas of the Western Cape of LPG has been quite high because of the model that improves access and deals with energy poverty.

South Africa is capable of eradicating the use of paraffin by households due to the safety issues and danger to health. This will help prepare the country for a future of natural gas and renewable energy, particularly solar energy, for household use.

No Paraffin! Campaign: Aim and Expectations (Prof Ashley Van Niekerk, Unisa)

Energy justice is a fundamental principle and a departure point for the No Paraffin! Campaign. The campaign and this roundtable are primarily about the promotion of universal access to safe, affordable, sustainable and modern energy.

Although progress has been made in South Africa in terms of electrification, major challenges remain when it comes to access to energy for all, especially in relation to those who live on the economic margins and are considered energy impoverished. These communities survive by burning solid fuels and hydrocarbons in unsafe and inefficient combustion technology and spend a disproportionate part of their incomes on securing such energy sources. This energy poverty is pervasive in low-income settlements and exposes those communities to high levels of air pollution and open flames that have significant, often dire health, injury, social and economic outcomes. Thus, energy justice is rightly considered a core dimension of social justice and is within and aligned with the country's constitutional recognition of the fundamental rights to life, dignity, equality, freedom and safety for all people. Energy justice has been recognised by the United Nations (UN) General Assembly through SDG 7, which aims to ensure access to affordable, reliable, sustainable and modern energy for all. The access to modern energy is considered a fundamental pillar of the wellbeing for all, economic opportunity and development, and poverty alleviation. The importance of significant progress being made on SDG 7 has been emphasised by a number of international agencies. The consequences of ignoring this SDG and energy poverty have been amplified by other agencies that have argued that if nothing is done to address energy poverty, by 2030 nearly 4000 people per day will die due to toxic smoke and indoor fires in unsafe primitive cooking stoves. This is more than the premature death estimates for Malaria, Tuberculosis or Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome (HIV/AIDS).

Much has to be done in South Africa, to ensure universal access to modern energy. More than two million people still use paraffin and flawed technology for heating and cooking. Paraffin has been criticised for flammability and toxicity, with these dangers amplified by the poorly constructed stoves that are widely used and easily available. The current technology is prone to malfunction and associated with usage accidents, household air pollution and fires with consequent burn injuries, illness and property losses that intensify the poverty experienced by those affected. It is anticipated that the Coronavirus Disease (COVID-19) pandemic will further aggravate this exposure due to enforced home congestion and heightened exposure to hazardous energy sources during lockdowns.

It is recognised that energy transitions are usually slow processes, but governments must catalyse and direct these processes to achieve the desired ends. In this case, universal access to modern energy must be expedited by 2030. In the interim, the relevant government departments are called on to improve their measures to protect those in effected communities. A number of interventions have been flagged. These include the strengthened enforcement of stove regulations and regulations to curtail the use of impaired appliances; consideration of the subsidisation of the roll-out of modern energy interventions in the most affected communities; greater enforcement of consumer protection measures; and greater roll-out of safety education campaigns around energy usage and alternatives to the current portfolio of energy sources.

There may be further interventions proposed through this campaign, but it is proposed that the campaign be directed at the formulation of recommendations for action to enable paraffin substitution with safe modern energy. It is hoped that the campaign will mobilise public, professional and government interest towards the development and enactment of substantive policy for modern energy and energy plans for the energy poor. The campaign and the roundtable have been set up to support and give effect to this ultimate objective. The roundtable will pay attention to the following:

- The social and economic impacts of the use of paraffin and the state of evidence of the impact of paraffin usage.
- The emerging and established cost effective, healthy and safe energy alternatives in South Africa and internationally.
- The multi-sectoral roles and partnerships required for an inclusive South African energy platform.
- The requirements for public mobilisation, awareness and interest generation for safe energy use.
- The requirements for targeted and efficient energy distribution networks and ready access.
- The commitments and financial support required for this transition from energy impoverishment.

The three webinars in the roundtable are structured in response to these areas of concern. This first focusses on South Africa's inequalities in risk - the case for the No Paraffin! Campaign - and highlights the evidence on paraffin usage and its disproportionate health, safety and economic impacts. The second will focus on the lessons for South Africa, from successful campaigns for energy migration, best and emerging practices and experiences from South Africa and further afield, specifically from settings that have reported both challenges and successes in their energy transitions from paraffin. The third will focus on institutional arrangements, evidence and policy pathways to safe domestic energy. It will provide a platform to reflect on public, professional and policy requirements to enable the envisaged transition.

The panellists and attendees are thanked for sharing their work, expertise and experiences in this field, as well as their solidarity with the campaign.

Paraffin Consumption Usage Patterns and Needs in South Africa: Past to Present (Mr Joe Baleka, Tshwarisanang Environmental Pro-Reactive Safety Mentors (TEPRASM))

The country faces a huge challenge with regards to indoor air pollution due to the kinds of energy sources being used because people cannot afford to buy clean energy. Government needs to note that it is unfair to have to wait until 2030 for a cleaner energy solution to become available. Currently, many are dying due to COVID-19, but many of those have respiratory problems caused by indoor air pollution. This is a primary concern of the non-profit organisations (NPOs) that deal with energy poverty.

The No Paraffin! Campaign is a very good initiative, but it should not only look to phase out paraffin as this could negatively affect other sectors that rely on paraffin. Paraffin is widely used by poor and vulnerable communities because it is easily accessible and sold in small quantities at low cost, which is still a pipedream when it comes to LPG. The dangers of using paraffin for cooking and heating, as well as candles for lighting) in households are well understood. Shack fires are mostly caused by the combined use of paraffin and candles and tend to spread rapidly to neighbouring shacks.

Although 50 kilowatts of electricity are provided for free to those living in government subsidised housing, the poor and vulnerable in informal settlements are overlooked when it comes to free alternative energy sources. More needs to be done to promote solar as a source of energy. It could be used beneficially in most areas of South Africa, but government has not been supportive in educating people about the safety and uses of solar energy in order to allay any fears people have in this regard.

Most communities are not taking ownership of the safe use of illuminating paraffin. The majority of Panda paraffin stoves, which have been endorsed by government as safe, are substandard in terms of quality and unsafe. It is necessary to understand the main cause of the problem by ascertaining whether it is the paraffin, or the technology used to burn it, that is problematic. From the research done, it appears that the use of faulty, inferior and substandard appliances is the main cause of the problem.

The introduction of LPG is welcomed but raises questions about what would happen if a fire broke out in a settlement. Careful consideration is necessary before promoting the use of alternatives such as LPG, particularly in informal settlements. It should be noted that Emergency Response units will not enter an area where there is fire as well as LPG. Although LPG is a cheap source of energy, communities are reluctant to use LPG and view it as volatile and deadly. New technologies cannot be introduced unless communities are educated about their use, benefits and dangers.

NPOs are doing the work of educating communities because they care about them. Institutions participating in this roundtable should pressurise government to educate the end-users.

In conclusion, it is important to understand the context on the ground and to look at paraffin safety, test the new appliances approved by government, and have them approved by the South African Bureau of Standards (SABS) and the National Regulator for Compulsory Specifications (NRCS) for manufacture.

Paraffin Burns, Health and Social Impacts (Dr David Kimemia, Unisa Institute for Social and Health Sciences)

Illuminating paraffin is highly flammable, but is also toxic, which means that it needs to be used in specialised appliances and in a careful manner. The main risks relate especially to inefficient and leaking appliances and are associated with accidental fires, burns and household air pollution. Work on the development of better paraffin stoves has been ongoing for some time, but even the new appliances that are SABS approved continue to fail. People suffer from the persistent use of paraffin, which takes a toll on their health and socioeconomic situation. This is the basis for advocating for a transition to safer household energy technology.

Paraffin stove failures that are regularly reported include flare-ups and explosions, which are the common cause of hospitalised burns. The risks of injury are compounded by user negligence and congested and constrained spaces where these stoves are used. Around 100 000 burn injuries occur each year in South Africa, most of which are caused by paraffin, and about 2 500 of those injured succumb to their injuries. Children are the main victims of poisoning that occurs in around 3.6% of paraffin-using households as a result of accidentally drinking paraffin that is packaged in cold drink bottles. Paraffin use causes air pollution that can impair lung function, which in turn increases susceptibility to numerous diseases. In addition, incomplete kerosene combustion emits black carbon (soot) amplifies global warming. Social impacts of accidents due to the use of paraffin in households include deepening impoverishment through the loss of homes and goods as well as burn injuries due to fires started by paraffin, and the related financial costs; prolonged care for disabilities and emotional trauma, the loss of livelihoods and schooling, and the weakened self-esteem of those affected. It is a social injustice that millions of people remain trapped in the poverty cycle due to reliance on paraffin.

In conclusion, paraffin use has devastating health and social impacts. The solution is to transition away from paraffin to safer energy forms. The transition should be led by government as an inclusive process with enabling policies and requisite budgets. In addition, energy planning should reconnect with its social purpose by ensuring safe cooking, heating and lighting to prevent injuries and loss of life.

The Direct and Indirect Costs of Paraffin Fires (Dr Ethel Andrews, South Africa Burns Association)

Paraffin is a 'burning issue' for the economically vulnerable who continue to use paraffin as their source of energy because it literally burns a hole into the country's budget, and the casualties are the burn survivors. Burns caused by paraffin fires impact not only the patient but also the entire community.

Paraffin continues to be widely used because it is viewed as an affordable and cheap source of energy. The price of paraffin varies between R7.10 and R25 per litre, while according to a study done in 2011, the cost of treating a burn patient with 20% burns varies between R103 000 (receiving advanced care) and R154 000 (receiving conservative care). The indirect costs are four times the direct costs, which include fixed costs and variable costs. The latter comprise costs of items such as dressings and medication, equipment such as splints and walkers, disposable items necessary to prevent infection, nutrition and supplementation, and laboratory tests and investigations. All in all, treating a patient with

burns is a very costly process. Indirect costs (hidden costs) include costs to society and for prolonged care in terms of disabilities of burn survivors, as well as costs relating to psychological disorders, as well as loss of income, and adaptation to life after discharge from hospital. The biggest cost of treating a burn patient with 20% of their body burnt is the length of stay in hospital. A patient with 20% burns receiving conservative care would spend 68 days in hospital on average, whereas advanced care would shorten their stay to 21 days on average. Other substantive costs relate to dressings, operations done in theatre and analgesia.

Given the very high indirect and hidden costs associated with the treatment of burn patients and noting that the current cost of treating burn patients is significantly higher than in 2011, is it realistic to state that paraffin is a cheap source of household energy?

Open Discussion: Further Health, Social and Economic Research for an Effective Campaign (Moderator: Prof Harold Annegarn, NWU)

Question: What kinds of community networks have been drawn on in communicating the message of the campaign?

Response, Prof Ashley Van Niekerk: The discussions in this series of webinars are intended to be open in terms of invitations to various organisations that work in the field, but the focus of the following session (on the lessons for South Africa with regard to successful campaigns for energy migration) will have a specific panel discussion that brings in a range of non-governmental organisations (NGOs) and other interest groups in the field. A wider, more diverse set of inputs is expected from this session. There will have to be a public discussion over and above the roundtable discussions. This is the second arm of the campaign and is crucial.

Question: From the presentations, it appears that it is not specifically the fuel that is the primary cause of the fire hazard but the devices that burn it. If so, should the campaign not be about devices instead of paraffin?

Response, Dr David Kimemia: The biggest problem arises from impaired devices used to burn paraffin. Any fuel is only as good as the technology used to burn it. Both aspects are important and cannot be divorced from each other. Efforts are being made to get safe burning paraffin stoves, but an alternative option has not been found. Global best practice has shown that it is better to replace paraffin entirely with cleaner, safer energy technology.

Response, Prof Ashley van Niekerk: In terms of the investment in improving the nature of the fuel itself, it is unclear whether there is evidence that the flammability and toxicity of the fuel can be amended for safe domestic use.

Question: Why is ethanol denatured so that children cannot drink it, but paraffin is not? Adding a bitterant to paraffin could help prevent children swallowing the liquid. Why is paraffin not sold in child-proof containers?

Response, Prof Harold Annegarn: The ingestion problem is related to the distribution model of the liquid. While all other domestic liquids such as turpentine and methanol are now provided for retail use with child proof caps. Only paraffin can be sold in bulk for dispensing in own containers. This is an unsafe practice. A paediatrician might be able to explain the behaviour of toddlers and bottles of liquid in order to get a sense of how much is ingested on the first gulp.

Response, Mr Joe Baleka: One of the primary issues relating to the danger of paraffin is that it is not pre-packed and passes through many hands before it reaches its final destination and can get contaminated in the process which can lead to challenges that are still unknown. The Paraffin Safety Association suggested that the colour of paraffin should be changed, but this was not found to be a deterrent. A child resistant cap is the solution. The older the child, the more could be ingested despite the bitterant.

Response, Prof Ashley van Niekerk: As long as paraffin is circulating, the practices and regulations around its distribution and provision have to be tightened, and more effort is needed around changing the practices for how the fuel is made available. This series of roundtable will have to make recommendations at a number of levels. The kind of detailed changes to the system for the energy that exists will have to be a priority, taking into account that the timeframes for the changes will not be immediate and the need for interim measures to ensure better and safer usage of the fuels. This group has a lot of work to do in terms of the Ministry's plans from now to the 2030 target. Its recommendations would have to address the matter of fuel distribution and user education, as well as the nature of the fuels that are eventually adopted.

Comment, Prof Harold Annegarn: There is a compulsory specification standard from SABS for the safety and performance of wick paraffin stoves, but these are not widely enforced. Stoves that are sold are nominally compliant, but this is failing. Transferring the cost of paraffin burns (one burn costs R100 000) would provide sufficient funding to cover the cost of employing inspectors devoted to inspecting paraffin stoves and selling points. As an interim measure towards reaching 2030 targets, a rational, equity-based redistribution of the costs (as opposed to the price) of fuels use to enforce the current safety regulations and administration should be considered. This issue should be taken up in the discussion on policy.

CONCLUDING REMARKS

Prof Stuart Piketh:

- The issue around combustion in households requires an integrated approach (including environmental, socio-economic and social justice perspectives)
- The issue cannot be handled by one ministry and government needs to take a cross-ministerial approach.

Prof Thenji Meyiwa:

- The important journey to address inequalities has begun. Solving the paraffin problem will lead to tackling gender-based violence.
- Thank you to the participants and organisers of this roundtable.

Dr Ethel Andrews: Burns are one of the worst types of traumas that a person can experience. The sad reality is that much of what happens is avoidable and preventable. These types of injuries can be prevented by creating awareness of where the problems are.

Mr Joe Baleka

- Institutions and government need to work together to ensure that more safety education is delivered to the vulnerable users of paraffin so that they can be informed how to deal with the challenges.
- Action must be taken with regard to the manufacturers who continue producing sub-standard paraffin appliances.

Dr David Kimemia: The DMRE is commended for the initiative to provide households with better energy. However, this needs to be supported by timelines and the necessary policy to ensure implementation.

Prof Annegarn thanked participants for their comments and questions, noting that the topics of those not responded to would be part of the discussions at the following two webinars.

CLOSURE

Prof Seedat highlighted the following issues:

- Energy poverty and energy transition are social justice issues and cannot be divorced from poverty, employment and access to services (affordability).
- There is an important conversation to be had around the economics of energy. There are competing interests that contest the energy transition regimes that are being proposed. How we think about the economy as a country and how it is structured going forward especially under COVID-19 conditions would have serious consequences for the interventions on energy. Economists and social scientists should be included in the next seminars to enhance the discussions and provide a broader view on the matter.

Prof Seedat thanked participants for the rich and nuanced discussions. It became clear that there are many complex issues that require deliberation and the need for consensus on what the campaign will be called and what it will focus on.

Webinar 2: Lessons for South Africa: Successful Campaigns for Energy Migration

25 FEBRUARY 2021

Welcome and Introduction (Prof Kopano Ratele, Unisa and SAMRC)

Prof Ratele extended a warm welcome to all participants and presenters on behalf of Unisa, the SAMRC, the Department of Science and Innovation (DSI), NWU and ASSAf. He introduced the speakers who would make presentations in the first session.

India's Journey towards Universal Electrification and Clean Cooking (Dr Debajit Palit, The Energy and Resources Institute, India)

The blueprint for electrification of India dates back to the 1940s, before the country's independence. Since then, the electrification of rural areas was taken up in different political processes, and the electrification moved ahead despite different views on the matter. However, in early 2000, around 43% of the population (or roughly 80 million households) were without access to electricity and used subsidised paraffin (referred to as 'kerosene' in India) primarily for lighting. At the time, the monthly consumption of a kerosene lamp was about 7 to 9 litres per household at a cost of between 5 and 15 United States Dollars (USD). The government in India used to provide a monthly subsidy for 2 to 3 litres per household in the rural areas. Kerosene is not only an unclean fuel, but the light output from lamps is very low in comparison to standard light-emitting diode (LED) lamps, which were not available in India in the early 2000s. This resulted in a very high cost per Watt. The poor were paying a premium for using the unclean fuel. The Electricity Act was passed in 2003 and brought about a structural change in the way the electricity sector was looked upon. This helped to take forward the electrification agenda as both the national and provincial government were made responsible to take forward the task of electrification.

The Lighting a Billion Lights Campaign was initiated in 2007 by the Energy and Resources Institute (TERI) at a time when almost 1.6 billion people across the world were without electricity access. Thus, TERI took up the challenge to make a change for the good of the country. The government also started its electrification initiative in around 2005 and villages began to be electrified. Until then, electrification was happening at a very slow pace because people could not afford to pay for an electricity connection, there was a lack of electricity networks and power generation was problematic. With the launch of the Electricity Act in 2003, more than 400 million people were connected to electricity (mostly from the centralised grid) between 2005 and 2015. Some NGOs helped government in its efforts to electrify the country by providing clean lighting solutions (solar based LED lamps) in villages. The Federal Government started providing grants to all provincial governments to expand electrification and also involved the public sector enterprises in the rural electrification projects for better project delivery. A three-stage system to monitor implementation at the federal, provincial and agency levels was made mandatory. This resulted in the electrification of 108 thousand villages (and around 24 million underprivileged households) in less than a decade.

However, most of the houses in villages were found to not take electricity connections and this meant that around 30 million households were still not electrified in 2016. The national Government thus launched a programme dedicated to connecting households to electricity by 2019, irrespective of their income. This led to more than 150 million people gaining access to electricity between 2017 and 2019. Electricity subsidies were expanded to also include households above the poverty line, which were earlier not being connected under the government programme, by paying a nominal amount for the connection. The programme also made provision for solar home systems for households in extremely remote areas. Within 15 years, India has achieved an almost universal access to electricity. To date, around 99.5% of households in India have been provided with electricity connection. Around 1 million households who had chosen not to have electricity for various reasons, have also been connected by March 2021. The current focus of government is to ensure that all households will have a reliable, around the clock power supply in the most affordable manner by 2022.

Most of the population had been using biomass, not paraffin, for cooking. A programme aimed at safeguarding the health of women and children, and providing clean cooking fuel, was launched in May 2016. The target to provide 50 million LPG connections by 2018/19 was achieved in good time and then extended to 80 million by September 2019. The programme helped to increase LPG coverage in households from 55% to 97% by end of 2019. However, many households in rural areas have not transitioned fully to LPG especially because of income inelasticity and continue to partly use biomass for cooking. With all households being provided the electricity connection and LPG connection, government has now completely eliminated the subsidy on paraffin and the price of paraffin has been increasing. The fuel now sold through the public distribution system is at market-based prices.

Beyond Kerosene and Dirty Fuels in Africa: Enabling Elements of a Successful Ethanol Distribution Model (Mr Greg Murray, KOKO Networks)

Cooking fuel is a very large market across Sub-Saharan Africa, but it is dominated by dirty fuels, with terrible social and environmental impacts.

While kerosene is still used in about two million households in South Africa, the bulk of the urban African market outside South Africa is still dominated by biomass, particularly deforestation-based charcoal, with LPG taking a small part of the market given that upfront and ongoing consumer costs are high, while the large infrastructure costs associated with a compressed gas mean that most of Sub-Saharan Africa does not have the capital to subsidise LPG distribution and retail costs in the way that somewhere like India does.

KOKO has built technology that enables existing liquid fuels infrastructure to be leveraged for the distribution of renewable bioethanol cooking fuel, enabling this proven clean fuel to scale at comparatively very low cost (without requiring government subsidies). Its partner in Kenya (Vivo Energy) licenses the Shell brand across Africa and is responsible for the bulk distribution of liquid bioethanol fuel to petrol stations in the target town/city (midstream storage points).

Cooking fuel needs to be available locally. Therefore, small tanker trucks (fitted with KOKO's IoT tech to control the flow of fuel across the last mile) carry out the last-mile fuel distribution from these Shell-branded stations to a network of around 700 KOKO Points across Nairobi. KOKO Points are automated fuel dispensers with safe docking mechanisms that are located inside local mini-marts and shops. This focus on proximity to customers is in principle the same model that paraffin uses, but this is for clean fuel and international standards for health and safety (including safe storage and distribution) are applied.

KOKO's focus on safety has also seen the company develop customised consumer hardware in the form of SMART refillable canisters that cannot be accidentally drunk from (due to a docking and twisting system) and a modern two-burner ethanol cooker, as well as the software that controls the flow of money, fuel and safety data of appliances across the value chain. This model is currently working and scaling in Kenya, where [KOKO serves more than 200,000 customers in Nairobi alone](#) (as at mid-August 2021) and is preparing to expand across the country and beyond.

It is important that the fuel retail price is comparative with that of paraffin. Costs are significantly impacted by taxes and tariffs –rolling out KOKO's solution has to be something that a national government wants and is willing to legislate around – not through offering subsidies, but simply by ensuring that there are no tollgate taxes that artificially inflate the price for the consumer. This point is very important.

KOKO's consumer hardware is manufactured at a wholly-owned facility in India, which currently produces 20,000 units a months, but which is currently scaling production up to around [60,000 a month](#). The technical hardware for fuel distribution is currently put together in Kenya using an international supply chain that includes Kenyan-sourced parts. The network is actively managed through a Network Operations Centre, which controls a dedicated customer call centre, distribution trucks and warranties, as well as the technical performance of the Network via a range of software and IoT-enabled hardware. Safety measures built into the fuel dispensers include numerous sensors to constantly monitor for ethanol vapour and other safety and performance issues.

This is the world's first SMART fuel ATM network, live in Nairobi and growing fast. Unlike the high capital expenditure (infrastructure including cylinders) required for LPG, an analysis has shown that the KOKO ethanol system costs one-eighteenth of the overall supply side investment required because uncompressed liquids (that have a natural cost advantage over compressed gas) are being used, particularly in environments where it is difficult to consider reticulated gas networks. KOKO's solution also enables the production and trade of carbon credits into global markets, which are used to significantly lower consumer prices and make this solution affordable to even the poorest households.

KOKO is looking at the South African market opportunity. It is not as interesting commercially as other countries because the bulk of South African households are already on gas or electricity, but KOKO can certainly play a role in transitioning all households to modern, clean energy. The approach KOKO is taking to new markets is to supply technology and services to suitable partners through licensing and Joint Ventures.

The alternative energy carriers include:

- Modern energy carriers – electricity, LPG, ethanol, methanol
- Traditional energy carriers – paraffin, coal, wood, charcoal, dung, agricultural residue.

Methanol is the only new fuel as a domestic energy carrier and is available at a relatively low cost as a by-product of the chemical processing done by Sasol. The SABS currently has a working group developing a methanol stove standard. A number of manufacturers have methanol stoves in the market. NWU and the University of Johannesburg (UJ) both have stove testing laboratories and have been assisting in evaluating and improving methanol stove designs. There has been considerable success with regard to improving the baseline models, and the possibilities for optimising the burning of methanol have not been exhausted. The research done on improving methanol combustion would apply to ethanol.

The only innovative stove technology (other than the methanol specific stoves) is the KOKO concept and implementation, as described in Mr Murray's presentation. Having the fuel supplied in canisters separate from the stove body and combining modern Information Technologies into the fuel distribution system, from a systems perspective, represents a disruptive innovation into the stove-fuel market. Numerous other so-called "improved stoves" represent incremental rather than innovative modification of existing designs, including variants of the many rocket stove designs.

The above remarks do not address the central hypothesis implied by the title of these seminars – the No Paraffin! Campaign. As several of the previous speakers have already opined, the ills associated with the use of paraffin as a domestic fuel are not necessarily or exclusively due to the fuel itself. The stove design, the packaging, the fuel distribution system, the social milieu of poverty, crowded informal settlements and unaffordable and unreliable electricity, and social misperceptions are all contributing factors.

A basic systems analysis involves a process with inputs, outputs (or products), by-products or waste. Affecting the process are the control or operating constraints. When applying this to paraffin use as a domestic fuel within a household:

- Outputs will include the risks of ingestion, conflagration and accidental fire, and malodours and emissions.
- Factors contributing to the waste stream will include the direct costs relating to burn injuries and the loss of income and homes; misunderstanding of the hazards of paraffin stoves; poorly designed stoves; and the lack of enforcement of standards.

There is a system failure in that individuals, communities, emergency response, the medical system, larger economy and human settlements bear the costs of the use of paraffin as a domestic fuel instead of the stove manufacturers and fuel suppliers. Costs are not fairly apportioned and until a detailed financial analysis of who bears the costs is done, the correct solution will not be found.

In conclusion, the theme of the campaign should be changed to the 'No Paraffin Accident' campaign. It is not paraffin itself that is the problem, but the accidents it causes in the home.

Recommendations are:

- A comprehensive benefit-cost economic analysis on the domestic use of paraffin, including who/where the externality costs are incurred in the larger economy needs to be commissioned.
- There needs to be investment in research for the development of safer paraffin stoves and support industry (current and new players) to adopt the improved designs.
- A vigorous programme to add bitterants and colorants to the domestic paraffin supply, supported by appropriate regulations for enforcement must be initiated.
- The regulations for the packaging and supply chain for domestic use paraffin will have to be revisited.
- In the long-term, it is necessary to reduce the cost of electricity, by revisiting the country's energy economy to provide safe, reliable and affordable electricity for all, as the foundation on which to stimulate economic growth and investment, create jobs and enable the reduction of endemic poverty.

Policy Imperatives, System Dynamics and Challenges to Household Energy Transition (Dr Shonali Pachauri, International Institute for Applied Systems Analysis (IIASA), Austria)

SDG 7 (affordable and clean energy) has three sub-targets: universal access to modern energy services; increase the share of renewable energy; and double the rate of energy efficiency improvement. In reality, these targets are far away from being reached by 2030 as close to 3 billion people are without clean cooking, 789 million are without electricity, over four billion continue to stack solid fuels (even if they report primary reliance on clean cooking) and 3.5 billion are without access to reliable electricity. In the absence of reliable electricity and clean cooking, households rely primarily, or as a back-up, on kerosene, candles, biomass and other 'fuel-based' lighting sources. Kerosene is among the most common lighting source and biomass is among the most common cooking source.

Kerosene lamps and biomass burning are a major source of black carbon (BC). Household air pollution is responsible for 4% of the global disease burden and is the number 1 global environmental risk factor. Kerosene and biomass burning is the major contributor of short-lived climate forcers and of household burns, scalds and poisonings, which lead to high costs that are carried by the health system.

A study undertaken in India prior to electrification being achieved in that country looked at the impacts of kerosene lighting in terms of consumption, emissions and health, and provides important insights, such as:

- 65% of the consumption of kerosene (in 2005/2006) was by those who had electricity access but used kerosene as a back-up. This highlights the importance of reliability of electricity supply.
- Emissions of BC were proportionately higher in groups of households that were electrified but used kerosene as a back-up.

An assessment was done to see how this could change if universal connections were provided and reliability of electricity supply was increased, and to assess and quantify the economic benefits. This

analysis found that the deadweight loss associated with kerosene subsidies could be as high as close to 1 million USD, with three quarters attributable to supplemental kerosene lighting, and the social cost of emissions from kerosene lighting was estimated at \$70 million under an assumed 30 USD per ton carbon price.

The large programme, currently being implemented in India to provide LPG for cooking as an alternative to biomass and other dirty fuels, is ambitious and unprecedented in scale. In a short space of time, 80 million households received an LPG connection. However, there is still very limited use of LPG in rural areas with access to free firewood. A study looked at the changes that occurred as a consequence of the LPG programme in a Southern region in India and found that:

- 25% of users did not purchase a single refill cylinder after enrolling in the LPG programme.
- Most households used less than 25% of what is needed for exclusive use of LPG.
- With regard to monthly LPG sales, much of the variation over a period of 3 years was due to the location of distributors and seasonal effects (such as Monsoon season).

Recommendations for the LPG programme going forward include the need for greater focus on refills to encourage regular use of LPG and for data to be available in order to do objective assessments of the programme to be able to inform how the policy can be improved.

Key takeaway messages are that there is a need to:

- Fill the gaps for better data, metrics and measurements
- Quantify the welfare benefits and impacts of alternatives
- Identify potential barriers and ways of overcoming these.

Open Discussion: Implications for the South African Energy Transition (Moderator: Prof Diane Hildebrandt, Unisa)

Question: Does what Prof Annegarn is proposing address the flammability risk related to paraffin?

Response, Prof Harold Annegarn: It is not possible to extinguish a paraffin fire with water as this will exacerbate the fire hazard. Intervention in the stove itself will not change this fact. This inherent risk factor is mitigated by a better design of a stove and educating the user about the dangers of leaving the cap of the paraffin container off combined with the fuel reservoir of the stove heating up after prolonged use. Contributing factors to reduce the overall risk of conflagration can be distinguished from fire accidents caused by fuel spilled from the stove reservoir.

Question: What happens with the KOKO stove tipping over and is it a fire hazard?

Response, Mr Greg Murray: Unlike paraffin, methanol mixes easily with water and a methanol fire can be distinguished by water. For a fire to happen the KOKO canister would have to be hacked open and the contents spilled and lit. The challenge with all these approaches is about safety of fuel handling. Designs must take into account the natural lack of caution that children have. The KOKO canister has a safety valve so that the fuel cannot be taken out of the canister. There is no leakage if the stove is tipped over because there is a mineral fibre sponge that absorbs the methanol. Most of the slum fires are from paraffin and they spread fast. This scenario is not possible with methanol because of its fundamental nature. It is super safe.

Response, Prof Harold Annegarn: The safety standards being designed for methanol stoves include a feature that the hose can withstand a direct flame for a limited period without melting or burning.

Question: Should the campaign consider a phased approach in ensuring energy justice for the poor? If so, what would the phases be?

Response, Dr Debajit Palit: Based on experience in India, it is important to achieve the outcome in phases. In the electrification programme, India first expanded the current grid line, then we worked to connect households (prioritising the underprivileged) and then we focussed on the reliability aspect. With regard to the LPG programme, tax paying citizens were requested to give-up their LPG subsidy voluntarily. This money was used to provide connections in rural areas where people needed LPG connections. Underprivileged were given priority. A phased approach has advantages in that you can learn and improve as the programme advances.

Comment, Dr David Kimemia: It is important to clarify that the No Paraffin! Campaign proposes doing away with paraffin as a domestic fuel and not for its industrial and other uses where it is used efficiently and there are not safety problems. Paraffin standards in South Africa, especially for non-pressurised stoves, have been around for about 25 years, yet the negative health and safety consequences of using paraffin as a domestic fuel continue unabated. Poor people bear the brunt of this. How long must they wait before proven technologies that are safe to use in the domestic environment come to market?

Comment, Dr Debajit Palit: It is important to shift from paraffin as a domestic fuel because it is costly compared to the other fuel options.

Question: Is the Kenyan government making more or less revenue from the use of (KOKO) technology?

Response, Mr Greg Murray: The bulk of the cooking fuel market is in the informal economy, which means that government does not earn revenue from it. It is about an 800-million-dollar environment in Kenya. The formalisation of the sector definitely leads to greater revenue. The Kenyan government recently co-developed the Kenyan Ethanol Cooking Fuel Industry master plan, with the objective of unlocking climate change finance to build a significant expansion of the sugar ethanol industry in that country in order to supply the fuel. Currently, five-times the amount of the local production of ethanol is imported. It is a huge opportunity to have the spend from urban households going into the pockets of farmers with taxes along that supply chain. This is what the Kenyan government wants. It is a long-term plan, but a huge opportunity for Treasury to grow incremental tax revenues. We think that there is a similar opportunity within the South African context of the replacement of paraffin as a domestic fuel, done in a manner that does not hurt government revenues, does not require subsidies and can be done commercially. The existing economic actors in the paraffin chain could adjust their business to make ethanol/methanol available as a domestic fuel. This could be done with the involvement of local companies that produce methanol, petrol companies that already store liquid fuels, the existing paraffin distributors, and by installing safe, hi-tec fuel ATMs in spaza shops. The government would need to want this and there would have to be high standards around handling ethanol/methanol. This is very important.

Question: How has Kenya dealt with the issue of improper use of the alcohol fuel, available in bulk, as an alcoholic beverage?

Response, Mr Greg Murray: The Kenyan government formally recognised the product category, denatured technology cooking alcohol, that is exempt for the excise tax applied to beverage alcohol, on condition that the ethanol is denatured (bitterant and colourant) so it cannot be ingested. This requirement is audited by the tax office. The KOKO system allows for every litre to be traced.

Question: Can Dr Palit clarify the case that was made for LPG as a supplementary fuel to the electricity roll-out as opposed to others, and comment on costs involved and infrastructure required and the safety and storage of the fuel?

Response, Dr Debajit Palit: Mostly biomass was being used and government felt that LPG was the available alternative. However, as around 70% is imported, from an energy security point of view, I do not think the LPG is the best alternative in India. Government is thinking of promoting electricity for cooking. In the short- to medium-term, LPG is being used to bring women and children out of the smoky kitchen environment. In the medium- to long-term, I think we will have a mix of fuel and technologies for cooking, including LPG, piped natural gas, electricity, methanol stoves and modern biomass stoves.

Question: From a technical point of view, trying to change the energy sources is difficult but it seems to me that it is even more difficult to change people's attitudes and the cultural and social drivers to cook differently and use different cooking fuels and stoves. What should one be doing in parallel to ensure that there is uptake of new energy vectors?

Response, Dr Shonali Pachauri: This is linked to the issue of phasing of these kinds of transitions. In the case of India, under the LPG programme providing a huge number of new connections was only the first step in the process of household energy transition. We are undertaking an evaluation of a second phase of this in one state of India where efforts have been made to overcome cultural and social barriers to the uptake and regular use of LPG through a campaign to educate and urge people to use LPG more regularly and educate people (especially in the rural areas) about the negative aspects of biomass consumption. Biomass is available for free and therefore popular among poor households. A variety of efforts need to be made, including education and making the fuels available in small quantities and easily accessible. The impacts of cleaner fuels need to be factored into the economic cost benefit analysis.

Comment: A competition to design a safe stove was held in South Africa some years ago.

Comment, Ms Teri Kruger: The competition (which was under the Paraffin Safety Association that has since closed) produced a lot of very innovative stove ideas.

Panel Discussion: Voices on the Ground: Paraffin Lived Experiences and Aspirations for Alternative Energy (Moderator: Prof Shahnaaz Suffla, Unisa and Psychological Society of South Africa)

Ms Sibongile Zenzile (Community Burn Safety Champion)

"I am a burn survivor having survived burns from a fire caused by a paraffin stove. Life has not been easy after the accident, and it is difficult to accept the way I look. This is a big challenge, but the support of the family and my husband helped me pull through and to gain my self-esteem by attending counselling sessions. I worked for Paraffin Safety educating communities about burns and fires, and I learnt a lot from that experience. I also volunteered at the Red Cross ChildSafe programme and at the Friends of the Tygerberg Hospital, in the burns ward, supporting and reassuring patients and their parents, particularly with regard to dealing with changed physical appearances due to the scars left by burn injuries.

People need to know about the dangers of using paraffin stoves. From working in communities that people want to do things their own way and they do not think about safety. Although children are the most vulnerable to paraffin related accidents, many parents do not consider the extent to which their actions can impact their children. Schools should teach the children about the facts relating to fires and burns caused by paraffin, about how to prevent these, what to do in the case of a fire, when and how.

I noticed that if communities do not have information, they will do what they want to do. People do not have the information they need. The best way to approach this is to give people the information and educate them about the dangers of using paraffin in the home. They also need to be educated about how the fires spread from shack to shack and leave gaps between the shacks when erecting them. In addition, space must be made between the shacks for fire trucks to get access to a house on fire. They need to know what to do when a person gets burnt, and how to treat the burns immediately. Some are still using soap to treat the burns and believe that a teaspoon of paraffin will resolve a child's cough. Education is crucial. Schools should have ongoing programmes to teach children (and through them, their parents) about the dangers of paraffin use as well as the preventive measures and treatment of burns. This is an easy way to ensure that the information is disseminated as widely as possible."

Mr Joe Baleka (TEPRASM)

In terms of the role that communities can and need to play in the No Paraffin! Campaign, TERPASM has identified that most of the challenges with regard to paraffin usage come from middle income households that use paraffin as a back-up for electricity (sometimes gas too) and are unfamiliar with how to use it and there are many misconceptions. More education is required irrespective of which source of energy is being used. Introducing any energy source must go hand-in-hand with educational interventions. The DMRE needs to drive these processes with urgency. Several years ago, we did a study in one of the townships where there was a gas roll-out and found that most people still had misconceptions about the use of gas. They were being given gas without the proper instruction about its safe use. Most people do not use the gas, especially inside the homes. They do not know how to extinguish gas fires, nor do they know how to detect gas leakages. There were some fatalities. These are some of the primary concerns.

Mr Thapelo Mohapi (Abahlali baseMjondolo Movement SA)

The Movement represents shack dwellers and aims to prevent evictions of and realise the dignity of the poor and marginalised, especially those in informal settlements.

"I have personal experience of living in informal settlements and the dangers of paraffin. In 2009, there was an incident where a paraffin stove tipped over and I lost everything. I realised then how dangerous paraffin is. Fortunately, no-one was injured. In my work I have seen people being burnt as a result of paraffin lamps and stoves. Sometimes there are misleading media reports that refer to 'the unattended paraffin stove causing the fire'. One kind of stove used in the informal settlements requires a wick to light it and is switched off by blowing out the flame. Sometimes the flame is not extinguished properly and if the stove is knocked over accidentally, the flame will set off a fire. Sometimes fires are started because the person who is cooking and using the paraffin stove is inebriated. This may be true but dwellings in informal settlements are made of flammable material and the area is congested, which means that any accident will cause a devastating fire that spreads fast. It is far less dangerous to live in a brick-and-mortar house. Fires are sometimes caused by illegal electricity connections. However, the bigger issue is that people are forced to find a way to connect to the electricity supply that is essential for everyday living.

The issue of paraffin stoves, lamps or storage containers causing fires in informal settlements is ongoing. Government is spending a lot of money on disaster recovery and the health sector, which could be better used in the prevention of paraffin fires. Civil society can play an important role in working with communities towards preventing fires from paraffin as well burn injuries occurring."

Wrap-up

Prof. Suffla highlighted the following points raised by the panellists:

- More needs to be done to educate and inform communities about the risks of using paraffin, how to use it safely, how to prevent fires, what to do if there is a fire and how to treat burn injuries.
- The importance of education and dissemination of information about the uses and risks of paraffin as a domestic fuel (as well as other forms of domestic fuel that are introduced) is crucial.
- The need for structural interventions that take into account issues of poverty and disadvantage, and for leadership in terms of who drives the intervention campaigns.
- The personal cannot be disentangled from the political and the structural.
- Everyday conditions interact with risk of using paraffin, and this is accompanied by trauma and loss.
- The accountability and responsibility of the media in reporting incidents relating to paraffin use in informal settlements is important. Dominant narratives can be constructed in ways that skew and distort representation of community experiences.

Discussion

Questions:

- Please comment on the extent to which there is a local grassroots mobilisation for safe energy, how organised is it at the moment, and what could support such mobilisation?
- What specific recommendations do you have for safe energy?

Question: What are the preferred energy sources in communities impacted by paraffin incidences?

Response, Mr Thapelo Mohapi: People on the ground are organised. It is important to work with them. We have been mobilised for many years and in Durban we have been campaigning for the electrification of informal settlements. The City had made it illegal for informal settlements to be electrified, but two years ago agreed that electrification is necessary. The other panellists have spoken about educating people on the ground, but government must be on board. These issues need to be raised directly with the DMRE. I appeal to the academics that are part of the campaign that this conversation cannot end here. It needs to connect with us in order to reach those on the ground. Give us your knowledge so that we can share it with the thousands of dwellers in informal settlements.

Response, Mr Joe Baleka: My recommendation for safe energy has to do with the way new forms of domestic energy are introduced to the end users, which includes people with varying economic status and levels of education. A new alternative, safe energy for domestic use has to be introduced through educating the end users on the basis of door-to-door interventions, supported primarily by the institutions of higher education that do their research in our communities. Once the studies have been done, the communities do not get any feedback on the lessons learnt. Knowledge needs to be shared with communities and the DMRE.

Questions:

- What is the role of industry and government on the safe use of stoves?
- How could this campaign begin to formulate messages to address structural conditions that increase the risk of fires?

Response, Mr Thapelo Mohapi: A lot has been done with regard to safe stoves. One of the stoves worked with a type of gel but the fuel did not last long, and people could not afford it. It was the cause of fires because it was silent. You could not hear whether the stove was on or off. We continue to invite people to come up with new ideas for safe stoves. Gas is a bit safer but very expensive for people in informal settlements and the canisters have to be refilled. People also do not know how to use gas and tend to avoid using it instead of learning how to work with it properly and safely. The solar panels (an informal structure) that are being used in the Western Cape are a good idea as they allow people to connect appliances and provide lighting, which is important for security purposes. Solar systems would be a good alternative form of energy for domestic use.

Prof Suffla assured the panellists that there would be ongoing communication with them and that the issues they raised would be pursued in the remaining conversations in this series of webinars.

Lessons from HIV for the No Paraffin Campaign (Prof Quarraisha Abdool Karim, Associate Scientific Director, Centre for the AIDS Programme of Research in South Africa (CAPRISA))

Lessons from HIV for the No Paraffin! Campaign:

- A global pandemic was being dealt with in HIV yet there is diversity within and between countries. Seventy percent of the burden of infection is within Sub-Saharan Africa. Despite the introduction

of retroviral treatment that has changed AIDS from an inevitably fatal condition to one that is chronic and manageable, and the use of antiretroviral treatment that has reduced mother to child transmission from 30 to 40%, there were 38 million people living with HIV, 690,000 HIV deaths and 1.7million new infections worldwide in 2019. However, the biggest challenges faced are still the prevention of new infections and balancing treatment and prevention. Initially, the response was viewed as a health problem and very quickly based in the World Health Organisation (WHO) within the UN system. In 1995, the Joint United Nations Programme on HIV/AIDS (UNAIDS) was established and brought about global unity of purpose in the response to the epidemic.

- Scientists have a role to play in terms of knowledge generation and are responsible to provide evidence for policy, practice and programming, and to communicate data with the public. In order to know the epidemic and to know the response, it is important to have good data and to consolidate that data.
- Centrality of scientific evidence and regular updates thereof in terms of the response to an epidemic is crucial. For example, UNAIDS produces an annual report that draws from country reports and is highly regarded. It informs on progress in relation to goals and allows for better and more informed decisions to be made about the status of an epidemic at a local level.
- Consistent political leadership and commitment to driving the campaign are necessary.
- The capacity to deliver affordable, accessible and acceptable prevention practices requires an enabling environment provided by a 'toolbox' including a convergence of evolving scientific knowledge, combinations of strategies and testing appropriate to the situation.
- The challenge of behaviour change has to be addressed when other types of changes are introduced. Knowing is one thing but acting is another. There are many factors that are not necessarily dependent on the individual to bridge this gap. The use of scare tactics or blaming has been found to be counterproductive in changing behaviour. Supporting behaviour change is central to changing behaviour.
- Community engagement and partnership with communities are central to changing behaviour. The nexus between community advocacy and science has shown to be crucial. From the outset, advocacy has pushed the scientific agenda and new science investments and developments.
- Gender inequity it is a key part of development of society and achieving gender equity. Bridging gender gaps benefits children and society. In the context of the SDGs, within HIV there are huge gender disparities and, in the context of the SDGs, not much success has been made in this regard as one out of four HIV infections in Africa still occur in young women between 15 and 24 years of age.
- The importance of mutual interdependence needs to be recognised. The HIV movement has seen how global solidarity has helped in terms of providing access to lifesaving medication through multiple mechanisms. A shared vision, shared responsibility and global solidarity and leadership have demonstrated that people living with HIV, affected communities and individual actions have been able to change the course of history. The HIV struggle is not over, but enormous progress has been made. The concept of Ubuntu is critical as it moves us away from individual thinking to collective action. Introducing change often brings anxiety and moving from anxiety to agency comes with giving individuals power (such as public health interventions and other enablers), which leads to self-efficacy where motivated individuals are able to act on the knowledge and information on what needs to be implemented, and ultimately to collective action.

With regard to the No Paraffin! Campaign:

- What are the safe and reliable options in terms of sources of energy for heating, lighting and cooking and how could the SDG space be used towards ensuring safe and sustainable access as these are fundamentally linked with poverty?

- The key challenge for many people is one of limited choices, affordability and access. Even when electricity connections are made available, people still use paraffin. This behaviour needs to be better understood.
- • South Africa has two million users of paraffin and around 700 million litres of paraffin are utilised every year. Paraffin is perceived as an affordable form of domestic energy, but the cost of losses in terms of lives, injury and property is 50 times higher than the R2.1 million turnover in paraffin sales. Is there a possible role for subsidies for alternative energy sources, for example the Sin Tax?
- • Some of the poor health outcomes are a result of inadequate and inappropriate storage of paraffin and the poor design of stoves.
- • Attention needs to be given to the combination of impact of health and the environment (for example, the link between the use of paraffin in the household and Tuberculosis) particularly where multiple ministries are involved. Perhaps there is a need to begin with some aspirational goals that can be realised progressively without focussing too much on the detail. The moment is now and needs to be seized.

Socio-economic Considerations to Domestic Fuel Switching (Ms Teri Kruger, Synergetics Sustainable Solutions)

Ms Kruger showed a short video that had been made as part of the Paraffin Safety Association's efforts to prove what happens inside a shack when a paraffin stove causes a fire and how rapidly the shack is completely engulfed in flames, in order to improve the situation. The problem is less about the paraffin fuel and more about the fact that there is a flame.

Ms Kruger's work over several years with the Paraffin Safety Association included running the Safer Systems Project, which had two objectives: to come up with the safest stove and to come up with safer packaging. The project won the National Science and Technology Forum (NSTF) Award for the outstanding contribution to Science, Engineering and Technology in 2006. The project committee comprised 22 people with a wide range of competencies and representatives of communities, NPOs as well as Panda, the paraffin appliance manufacturer, as a means to bring them on board in accelerating the manufacture and acceptance of new stoves. A competition was run to encourage all engineers to come forward with safer stoves. The committee deliberated on the standards for safe stoves in the context of the new ideas that emerged. Although the committee approved a few new models of stoves on the basis of their safety, the problem was that there was no enforcement of the regulations. This problem persists today.

Recently, the DMRE suggested the reintroduction of gas to informal settlements. This was tried in 2005 when Eskom's power outages first started and unfortunately worsened the situation because when fires started, the gas canisters became missiles and prevented firefighters from dowsing the fire. It is proposed to move beyond any kind of flame-based situation to electricity. Besides cooking, heating and lighting, electricity has many other uses including accessing the internet and information, benefits such as promoting gender equality and reducing carbon emissions. From an energy perspective SDG 7 (affordable and clean energy) is closely tied to achieving several other goals in South Africa and would offer a multiplicity of benefits.

The reality is that Eskom is unable to guarantee the stability of the national power system and has failed in its mandate to provide the country with electricity. There has been an enormous amount of load shedding at an astronomical cost. The possibility of connecting the remaining 23% of households to electricity is less than zero. In addition, there have been massive cost increases in terms of the price of electricity, which has increased by over 446% in the last two decades particularly due to the underinvestment in new technology and new power stations. In contrast, the cost of solar power has reduced by 73% since the introduction of the renewable energy independent producer programme. The cost of batteries has come down drastically and there is a producer of very high-quality batteries in South Africa. Globally, there has been a huge uptake in renewable energy power, both solar and wind power.

A few years ago, government had a campaign on solar for hot water heating, but this should be distinguished from solar photovoltaic (PV), which generates electricity. Seeing that Eskom cannot be relied on to supply electricity in a way that is helpful for indigent communities, Ms Kruger proposed a mini-grid system comprising solar panels, battery storage and hybrid inverters so that power can be sourced from either the grid or solar panels or batteries. A pilot study should be done by installing mini-grids in some informal settlements. This would be a way to offset the very high costs of reacting to the problems caused by paraffin incidents (poisoning, fires, burns, air pollution) and the devastation they bring. The mini-grid would have the multiplicity effect including job creation, skills development, education, access to market and the internet. It would also reduce the amount of carbon emissions. On purchasing a system of solar panels and battery storage, electricity would become freely available for 20 to 25 years after the pay-back period.

Lessons Learned from the Struggle to Reduce Lead Exposure in South Africa (Prof Angela Mathee, SAMRC)

Although lead is found in thousands of products, it is highly toxic, targeting the brain in particular and virtually all organ systems of the body. It therefore has major implications for environmental quality, health and society. As with the No Paraffin! Campaign, the transition to 'no lead' often felt like an overwhelming challenge, but looking back 30 years later, much has been achieved. The research has contributed to the phasing out of lead in petrol and the regulation of the use of lead in paint, as well as international lead poisoning prevention policy that has made a difference globally. Multiple lead hazard awareness campaigns across sectors have contributed to a significant decline in children's blood lead concentrations, with over 40 publications produced on lead poisoning in children. Successful lobbying of the Department of Health has led to the adoption of an integrated approach to lead exposure reduction.

Tackling the issue of lead in paint has brought awareness to sources of lead in the home and schools, in toys and educational equipment, which in turn has been beneficial to society and made a major contribution to reducing children's blood lead concentrations. The research showed that in the pristine and apparently pollution free villages on the South Africa coast, 75% of children had lead poisoning, which was due to the practice of melting lead to make the sinkers used in fishing. The research found that blood lead levels of people who handle guns and bullets is four times higher than that of archers. The SAMRC worked with multiple partners to make sure that everyone involved in handling guns and bullets is educated about the risks. Another finding was that lead, arsenic and other toxic substances are emitted when using pots made from scrap metal to cook food.

Over the past 30 years, the lead campaign adopted a cyclical approach that was derived from the WHO Healthy Cities process, Local Agenda 21 and UN Model Communities Programme and adapted to the South Africa context. The cycle would be adopted every time a new source of lead was identified and was fundamental to the campaign's successes. The first step in the cycle was to understand the issue and the problem and this meant endless reading and conversation with various stakeholders. The next steps were to clearly define objectives and indicators, while remaining adaptable, and then to identify stakeholders (and find synergies among them) and build partnerships towards becoming a movement. These are essential in addressing complex issues. Next is to develop an action plan, taking into account the importance of clarity and agility, implementation, then research and evaluation. Systems thinking is important as it helps to think as broadly as possible, remove obstacles and identify resources. Structured reflection and scheduling time to reflect on progress are crucial.

Personal traits and character strengths that are often neglected in these kinds of large shifts and research translation goals include courage, perseverance, agility, humour, creativity, curiosity and the love of learning. One of the lessons learnt during the course of this campaign concerned the power of emotion in research translation. Telling a meaningful story is more impactful than relating facts. Changing policy is a difficult and arduous journey that is straddled with red tape and requires strong connections and good relationships. Success of a campaign depends on the relationships that are built and the power of the stories that are told. In addition, synergy between personal and institutional values generates passion and perseverance and it is wonderful platform for success when tackling important societal change goals.

Lessons from Tobacco Control Campaigns: Implications for Universal Energy Mobilisation (Dr Yussuf Saloojee, National Council Against Smoking)

The story of tobacco starts in the 1950s when two publications in the Journal of the American Medical Association and the British Medical Journal that showed that there was a link between tobacco use or smoking and lung cancer, after a massive increase in lung cancer had been evident. At the time, it was thought that the way to change behaviour was to be through health education. It was soon realised that this model was too simplistic. Between 1950 and 2010, global tobacco use increased particularly in the developing countries. The fact is that globally, the industry has been better at recruiting new customers than any campaign has been at discouraging tobacco use. From 1960 to 1991, South Africa's tobacco use increased rapidly. The change in the political climate in the mid-1990s sparked a massive decrease in tobacco consumption that continued for around 10 years, followed by a small stabilisation before it continued decreasing. The 'decrease' in the last few years is actually due to the increase in the illicit trade in tobacco. There is a strong correlation between the price of cigarettes and consumption. As the price went down, consumption went up and as the price went up, consumption went down. Nevertheless, the tools are in place to quickly and substantially reduce consumption.

Education is necessary but not sufficient to change behaviour. Behavioural choices are not made in a societal void as many things influence behaviour such as political, economic, social, cultural, environmental, behavioural and biological factors, which can either favour health or be harmful to 'good health'. The new model moves away from health education to health promotion. Social

norms, economics and the influence of government policy can influence behaviour. It is necessary to know how important the problem is, what works in solving it and what it would cost (in monetary and political terms).

The agents of change are political will, NGO activism and public support. A 'lack of political will' is often given as the main reason for lack of progress and the government is considered to be insufficiently motivated or lacking the capacity to prioritise and implement healthy policies and programmes. The key realisation is that political decisions are made in a socio-political environment and bureaucrats can influence the decisions politicians make. Policy making is an ad hoc process and a product of pressure from several opposing groups. The tobacco industry exerts enormous pressure on government not to enact policies while public health sector tries to put pressure for government to enact health policies. What is needed is an environment in which politicians can make the right decisions. The role of NGOs is to make space for politicians to make the right decisions. An issue becomes a political "must" as a result of scientific evidence, public pressure and citizen engagement, a politician's personal sense of civic duty, or the global environment, including international conventions (such as the Framework Convention of Tobacco Control (FCTC)) and national legislative initiatives.

The key issue to bring change is advocacy. What is required is a communication strategy that helps society to understand the real issues, confront the conflicting values or interests, and details effective actions. The task of activists is to counter the arguments brought by the industry.

The WHO has realised that the main impediment to successful policy implementation is the tobacco industry and industrial self-interest. Countering the industry requires increased awareness among all government departments about industry interference, limited interactions with the industry and ensured transparency of interactions, rejecting partnerships with the industry and voluntary agreements.

'The better we understand history, the faster history alters its course.'

Open Discussion, Closure and Thanks (Prof Kopano Ratele, Unisa and SAMRC)

Question: The ultimate target is safe/clean energy. However, the challenges on effective access call for safe alternative energy. Thus, the need for well-resolved flame-based heating and cooking technology in the interim.

Response, Ms Teri Kruger: I disagree with this. We have been pursuing this problem for decades and still do not have a solution. Why continue on this path? Why not reinvest our efforts in giving electricity to communities? This can happen in three to six months depending on the funding. The technology is available and is being rolled out all over the world. We need to move straight on to electrification. A cost benefit analysis needs to be done. I am happy to be part of that. Electrification is the quickest, safest way to accelerate the process and communities will benefit in that they can access education and markets, instead of only focussing on cooking and lighting and the devastation of their homes.

Question: How do we create consensus on campaigns when there are competing interests and different science-based perspectives on priorities and what may work?

Response, Prof Angela Mathee: It is ideal to have consensus, but when dealing with complex policy change such as with paraffin, consensus might not be possible and not too much energy should be invested in it. This is where the research evidence helps inform a decision and a pathway for action. Sometimes there will not be agreement. This is where societal and institutional values come into play. It is not critical to have consensus.

Response, Dr Yussuf Saloojee: Diversity is important and forces us to rethink our own issues and priorities. For a long time, we thought about what we should do and the rights and wrongs with regard to tobacco control, but leadership was taken by the International Union Against Cancer. It brought together a group of people that looked at what the priorities for the tobacco control movement should be and published the reasoning behind those priorities, which have been accepted by the WHO's FCTC. Diversity is a good thing, but we need people to come together to deliberate on the priorities and justify the outcome.

Prof Ashley van Niekerk thanked the presenters, the panel, the facilitators and attendees from all around the world for their contributions to this webinar - the second in the series. It can be said that the situation is complex. There is a diverse group of partners and interests that need to be managed. A number of pathways for the campaign have been detected and some of them will be formulated before the third seminar. The campaign will need all the support it can muster.

Webinar 3: Institutional Arrangements, Evidence and Policy Pathways to Safe Domestic Energy

4 MARCH 2021

Welcome (Prof Stuart Piketh, NWU and ASSAf)

Prof Piketh welcomed everyone to the third webinar of the roundtable.

Evidence and Reflections on a Safe Domestic Energy Campaign: Pathways for Transitions Away from Paraffin as a Domestic Fuel (Prof Ashley van Niekerk, Dr David Kimemia, Prof Mohamed Seedat and Prof Harold Annegarn)

The synthesis that was presented was based on published work in the field, as well as the experiences shared and the work shared in the last two roundtable discussions, and would capture the findings as the evidence that has been established, as well as the thinking around what constitutes an innovative way forward for the campaign.

The work that proceeded provided clear indications of the challenge facing the energy sector. In terms of the nature and magnitude of the problem, what is known is that illuminating paraffin is a highly flammable substance that is also noted for its toxicity and the vapour and air mixtures it makes are potentially explosive. It is used by about 600 000 South African households and remains the primary fuel source for about 2 million people in the country. It is perceived as affordable and is widely available in informal settlements where it is easily decanted, and therefore mobile and convenient in terms of use and storage. A number of outcomes have been noted with respect to usage of the fuel.

A burden of disease study indicated that 100 000 burn injuries (of which paraffin is an important cause) are reported in South Africa every year and households that use paraffin have substantially higher risks of injury. Paraffin is an important cause of 2 000 deaths per year and the 5 500 informal dwelling fires that are responded to by emergency services every year. Beyond the issue of fires, there is the issue of paraffin poisoning that affects 3.6% of paraffin-using households (21 600 households) every year, with children as the main victims. Risks relate to paraffin's resemblance to water and sale or storage in beverage bottles without child-resistant caps. About 40% of ingestion victims develop chemical pneumonitis due to aspiration, and severe cases tend to be fatal. Although there does not appear to be any South African research on the mental health consequences of paraffin usage, research from the UK shows that as regards acute and chronic exposure, there are central nervous system effects including irritability, restlessness, ataxia, drowsiness, convulsions, coma and even death. The proportional contribution of paraffin to the injury burden requires clarification. There are no disaggregated statistics in South Africa, but paraffin is commonly indicated as leading cause in South Africa, Kenya, Egypt, Nigeria and India. The need for good, disaggregated data and greater in-depth forensic studies remains a South African priority.

It is important to reflect on the context of paraffin burns and poisoning in South Africa. The events typically take place in energy impoverished households, characterised by extreme energy poverty where paraffin is often the only available 'cheap' energy source. The majority of these households are in informal settlements which are congested environments where dwellings are constructed very close to each other and made of combustible materials, amplifying the risk of severe community-wide fires. The burden of paraffin in society is not equally distributed. Research has shown that important gendered elements need to be considered in that female headed households tend to have higher levels of energy poverty and therefore a greater reliance on fuels such as paraffin, and male-headed households have a relative lower risk. More work is required with regard to the gendered risk distribution.

There has also been very poor enforcement of the fuel distribution systems. The SABS standard for the safety and performance of pressurised and non-pressurised paraffin stoves has not been enforced and there is an absence of regulations for safe fuel packaging and paraffin labelling as poisonous.

The consequences of paraffin usage relate to:

- Immediate and long-term health effects: Morbidity and mortality from burns and poisonings, impaired lung function and increased susceptibility to respiratory illnesses.
- Entrenched poverty: Properties razed in fires, loss of income, meagre resources spent on treatment, and the loss of vital documents.
- Occupational impacts: Loss of jobs or future prospects due to physical and emotional trauma and the care required for disabilities.
- Educational impacts: Children's schooling disrupted with vital resources like books lost in the fires.
- Climate impact: Black carbon emissions from paraffin stoves and lamps amplify global warming.

Direct costs relating to burn injuries caused by paraffin fires have to do with hospitalisation and treatment, which are estimated at between R103 000 and R154 000 per patient. The WHO (2018) indicated that caring for paraffin burns in South Africa costs R490 million per year. Indirect costs are incurred due to the diversion of family resources, prolonged care and health care, loss of income, and the loss of structures and possessions. It is estimated that R180 million is lost in terms of structures alone.

The review of the existing evidence took cognisance of the strong social justice movement in South Africa as well as globally that recognise the challenges faced as a result of impoverishment and energy impoverishment in particular and called for greater equity and fairness in the provision of energy resources to the communities affected. One of the definitions of energy justice is that it is about the efforts that are required to ensure safe, healthy, sustainable and modern energy for everyone in South Africa, especially those in the lower economic spectrum. It was noted that the aspiration has been met in many societies and South Africa has made progress but there is still the matter of 600 000 households that require a better response to their energy needs. The movement recognises the accumulation of evidence on the impact of paraffin. It was also noted that allied to this is the UN declaration, SDG 7, around energy justice and South Africa is committed to the SDGs. SDG 7 has been indicated by some as a prerequisite for many of the other SDGs, and required for poverty eradication, good health and well-being, education, gender equality and sustainable cities and communities.

There is also an emergence of modern energy alternatives, with good accounts from India, Indonesia and a number of other countries where there have been massive migrations in a short time, to the tune of 50 to 80 million connections just in Indonesia. These experiences have shown that it is feasible to provide safe, cost effective and healthy alternative fuels and stove technologies, many of which have been tested as effective in South Africa and internationally. There is a constitutional imperative that access to modern energy is a key aspect of social justice, which is recognised within the Constitution of the Republic of South Africa.

The main modern energy alternatives that have emerged in recent years and discussed in the roundtables are:

- Electrification featured as the ultimate preferred choice for safe and clean domestic energy. The Indian experience shows it is possible to leapfrog households to electricity. However, challenges of load shedding and high tariffs may necessitate a diversified approach in South Africa.
- LPG, which is globally regarded as the gold standard for clean and safe cooking and heating especially in settings with constrained electricity access. LPG offers a clean and scalable energy option in the transition towards modern energy, with health and environmental benefits.
- Solar is a sustainable source of energy; it can be quickly installed and is appealing due to its low running costs.

Other energy alternatives that have been discussed are:

- Methanol, which is a new entrant in the South African energy market, but not yet diffused nationally. Issues concerning safe fuel packaging in child-proof containers still have to be addressed. Draft standards on stove manufacture have been completed recently.
- Ethanol is another clean fuel and is used in KOKO technology, which offers a safe fuel distribution and handling system, backed with well-resolved appliances. However, it is not currently available in South Africa but may be worth consideration.
- Paraffin's continued use has been proposed by some despite the noted dangers, but would require a comprehensive cost-benefit analysis, investment in development of safer stoves, the addition of bitterants and colorants to the fuel and greater enforcement of regulations for fuel packaging and stove manufacture.

Based on the evidence, a case was made for a feasible alternative energy that could be adopted in South Africa. International best practice recommends electricity and LPG in combination. Its diffusion is supported by WHO, the United Nations Development Programme (UNDP), World Bank and major Global South economies with similar energy experiences (such as Indonesia, India). In terms of feasibility for the South African system at the moment, a case was made for electricity in combination with feasible clean fuels technologies (such as LPG, ethanol and methanol), taking consideration of affordability, reliability and safe/efficient performance.

Factors that still have to be determined include:

- A cost benefit analysis of modern energy and its adoption in energy impoverished communities in South Africa.
- Specification of co-benefits for jobs, poverty reduction, education, economic activity.
- Ongoing and disaggregated field measurements of the impact of energy use as regards emissions and exposures.

- A careful examination of systemic requirements, including distribution and packaging requirements for energy alternatives, as well as the identification of issues of affordability and reliability.
- Mobilisation of public and community receptivity to enable both early and sustained adoption of modern energies.

The team called for a national campaign (No Paraffin! Campaign) and the rationale for the campaign was published recently in the South African Medical Journal. Most of the elements proposed by the team are drawn from this rationale. The presentation was adapted to take into account the views shared in the series of webinars as well as the ongoing emergence of other evidence that is important to consider for such a campaign. There has been some discussion around the title of the campaign so that it is inclusive and signals the aspiration of the campaign, and the recognition that there might be multiple pathways that are possible in this transition. The need to move away from paraffin was flagged as it is not suitable as a domestic fuel, more so in the light of the emergence of alternatives which have been demonstrated to be feasible in other similar contexts. It is anticipated that the campaign could be implemented over a three-year period. The proposal for its implementation is through two substantive phases and a third preparatory phase.

The substantive phases are structured around the key interventions that will need to be implemented in and through the campaign. The first set of measures deals with:

- Strengthened design of stoves: The compulsory paraffin stove standard (SANS1906:2012 Ed3.1) should be urgently reviewed and directed towards enhanced performance of critical safety features.
- Strict enforcement of consumer protection measures: The NRCS to rigorously enforce the compulsory paraffin safety standards to curtail manufacture, distribution, and use of sub-standard stoves; standards for the compulsory addition of bitterants and child-resistant packaging should be promulgated as required for relevant liquid fuels such as paraffin and methanol.
- Safety educational campaigns: Public awareness campaigns are necessary to disseminate information on the safe use of appliances, including not refilling lit stoves or operating without fuel caps, not leaving lit stoves unattended, and storing fuel out of reach in marked child-proof containers. The campaign will require a communication strategy that highlights current energy information, but also motivates for modern energy adoption and energy usage requirements going forward.

The second set of measures includes:

- Paraffin substitution with safer energy: Government is called on to develop and enact a substantive policy for the phase-out and substitution of illuminating paraffin as a household fuel.
- Key elements of the policy: Specify the safe energies, set up distribution networks, impart awareness education on safe use, specify the financial support for energy adoption (for example, subsidy for kits and monthly consumption).
- Paraffin especially in a context of the limited measures to protect users, should at the end of this medium-term not be considered amongst the list of suitable off-grid energy sources supported by government.

Anticipated institutional requirements and blockages include:

- The need for strong implementation partners: The campaign requires multi-stakeholder involvement, including not just government, but academia, civil society, private sector and representatives of affected communities.
- Government is an important partner in terms of enabling legislation and the implementation of energy transition measures, which need to be clarified. It is proposed that energy system changes that have minimal systemic demands be prioritised.
- Monitoring, costing and evaluation systems will be required to enable ongoing evaluation of the energy migration, changing household energy usage patterns and safety, health and cost outcomes of the campaign.

Funding for the proposed Near-Term Interim and Short-to Medium-Term Measures of the campaign could be expedited through various mechanisms including a specific ring-fenced allocation in the DMRE budget, the reallocation of resources from emergency response budgets to safe energy provision, or the use of 'sin' taxes. Models for funding incentives for preferred energy and de-incentives for phasing out older energies have been applied elsewhere (such as India) and may be considered for the South African campaign.

Before launching the campaign, it is noted that key ongoing activities will need support and formalisation. The team has been involved with the preparation of this for the last six months and identified the need for:

- Scientific support for the campaign, formalised through a consensus study to synthesise current evidence for the proposed energy migration pathways.
- Societal mobilisation based on recent experience with key public health challenges, including HIV, tobacco and lead use prevention emphasising the role of strong social partners to mobilise for and even give effect to policy and social change.
- Political custodianship, with government leadership, involving clear plans, strategies, budgets and timelines will require an explicit and high-level focal point from within the relevant departments.

Prof Annegarn emphasised the importance of disaggregating the data and the relevance of that to obtaining the political commitment. It is necessary to emphasise that in order for policy to change, there has to be motivation. In the absence of a compelling cost benefit analysis, it becomes difficult to move government especially when it comes to a multifaceted problem that falls between the jurisdictions of several departments. In order to build a compelling case on where the interventions are needed, a source apportionment is needed with regard to how many accidents are caused by which aspects of the paraffin cycle, what the full externality costs of each are and which departments are currently paying for that.

Panel Discussion: Government Leadership, Strategies and Processes Towards Safe Domestic Energy (Moderator: Prof Jimi Adesina, Unisa)

Dr Moses Khangale, Director: Fire Services, National Disaster Centre, Department of Cooperative Governance and Traditional Affairs (CoGTA)

CoGTA and the disaster management fraternity recognise that an energy transition is fundamental to reducing fire risks and losses, particularly in informal settlements, and appreciate that the struggle to reduce risks in this environment can be supported by the elimination of paraffin as a source of domestic energy. Partnerships are critical for the successful elimination of paraffin usage and reinforcement of

alternative and safer forms of energy require partnerships, not only between government agencies but also with the private sector, civil society and the research and academic community.

During 2016/17, CoGTA ran a campaign with the Department of Trade and Industry and two of its agencies - the National Regulator for Compulsory Specification and the National Consumer Commission. The campaign aimed to remove unsafe and illegal stoves from communities and was conducted in five provinces. A widespread prevalence of illegally imported, unsafe stoves was identified in most informal settlements, where 10 000 unsafe stoves were removed and replaced by safe stoves. Community outreach events under the campaign and led by the Ministers of Trade and Industry and of Economic Development, helped mobilise communities. The importance of political capital in mobilising communities to support such campaigns cannot be over-emphasised. Equally important, is the need to mobilise local political leaders wherever programmes are being implemented and to ensure sustainability of initiatives and programmes. During the period of transition from paraffin to alternative energy sources, government and law enforcement agencies need to enhance enforcement of compliance with the applicable regulations with regard to the use of paraffin appliances. The human settlement department is also a critical role player as most problems with paraffin usage find expression in informal settlements, and to facilitate the transition away from paraffin to cleaner forms of energy.

In terms of stakeholders and the interventions foreseen as part of the No Paraffin! Campaign, municipalities should be central as they are in a position to integrate some of the measures and policy prescripts into their by-laws as a means to institutionalise some of the interventions to ensure their sustainability beyond the campaign.

CoGTA supports the No Paraffin! Campaign initiative and remains open to partnerships that could address this problem and serve its broad goal of reducing fire risks and losses in South Africa. At a technical level, CoGTA undertakes to do whatever possible, including mobilising all its fire departments and disaster management centres, and engaging the ministry in support of the campaign.

Discussion

Comment: The poison information centre at the Red Cross Children's Hospital collects information on children presenting with paraffin ingestion. ChildSafe has trauma related information and data on paraffin related burns, which could add to the scientific body of evidence.

Question: It is not only illegal stoves that are problematic but also the SABS approved stoves. Are these paraffin related or appliance related incidents?

Response, Dr Moses Khangale: The problem is not only illegal stoves, but also the legally approved stoves that are used, which are failing. Over and above the stoves, the ingestion of paraffin by children is a problem. Our emergency services receive a lot of calls relating to this. The stoves sometimes explode when they are being used for cooking and the fires spread fast. This compounds the problem. In order to eliminate the problem, it is necessary to consider the full extent of paraffin use in the home. There are no such problems in areas where the homes are electrified, and paraffin is not used. We need to work towards this being the norm.

Question: Did CoGTA conduct a study after its campaign?

Response, Dr Moses Khangale: As an agency that responds to problems, CoGTA came into this as implementation partner and did not document in a formal study the results of what we found, but we generated reports on the matter, and we have a sense of what the issues are in the informal settlements across five of the provinces. This has motivated us to tackle the problem. The DMRE and others need to take the necessary steps necessary to transition the country to a cleaner form of energy. This would reduce the burden of response by fire departments to the many fires caused by paraffin.

Question, Prof Ashley van Niekerk: The focus on the municipal level is noted. How will these levels be engaged? The team has proposed focal points in key departments to enable them to campaign.

Response, Dr Moses Khangale: Government has adopted a District Development Model (DDM), which involves 52 district spaces. Expression can be found in engaging these spaces. The campaign and programmes could be embedded in the DDM programme. If the campaign is specifically targeting high risk areas, CoGTA could facilitate engagement in those areas, and in the specific municipalities. Sustainability is important. Anchoring the campaign around municipalities would ensure sustainability.

Question: What has CoGTA done with respect to community education awareness in the past three years?

Response, Dr Moses Khangale: CoGTA does a lot of community education awareness, but not only about paraffin. We are responsible to educate communities about all kinds of hazards that the country is exposed to. Municipalities are the primary role players in community education awareness. CoGTA's role is to support them, but we do run campaigns targeted at particular hazards.

Question: How feasible is the idea of enforcing safe stove standards? Is there capacity to do this?

Response, Dr Moses Khangale: What we did with the programme we ran, was to utilise municipal fire safety officials because they are trained to know how to differentiate a compliant stove from a non-compliant stove. Feasibility is relative to the capacity available. Enforcement of standards could be the responsibility of fire safety officers at municipalities, depending on available capacity.

Question: Has there been a decline in incidents in the communities where non-compliant stoves were removed?

Response, Dr Moses Khangale: Reports from the provinces indicate a decline of incidents and provide concrete information in this regard.

Question: Is solar energy an option for government?

Response, Dr Moses Khangale: This is largely an energy issue. We agree that solar is also a viable option and encourage fire departments to build fire smart fire stations, including the use of solar technologies.

Way Forward and Closure (Prof Himla Soodyall, ASSAf)

It is a pleasure for the Academy to work in partnership with Unisa Institute for Social and Health Sciences, the SAMRC and NWU on this very important topic. The three roundtables sought to bring together key stakeholders - experts, NGOs, business and policymakers - in what the Academy does best namely playing the role of neutral broker, bringing together multiple stakeholders to have an open, transparent and engaging discussion on issues of national relevance using evidence.

These roundtable discussions have been enlightening in terms of the intersection of the complexities of society resulting from the burden of inequalities of the past. Numerous poignant matters were raised in bringing awareness of the risks of paraffin as well as the consequences of the problems associated with paraffin use. This series, brought together by the union of the various stakeholders, is a very important component that resonates with the Academy.

Prof Soodyall proposed that the DDM, mentioned by Dr Khangale, could be a possible way to work jointly together as a team, to lead the No Paraffin! Campaign as this would open doors to the local municipalities, which are the first line of engagement between communities and government. As part of stakeholder involvement in these roundtables, there has been engagement with various government departments. A powerful, meaningful and strategic campaign will require working together, bringing the respective roles together to create a clearer picture where there will be accountability and outcomes from this.

One of the outcomes of this series would be conference proceedings and a list of recommendations, which could possibly be delivered to the various departments for action.

There have been discussions about Just Transition. The Academy is in discussion with some key stakeholders to start discussions that will be inclusive of all stakeholders towards providing cleaner energy resources and so on. This is work in progress, but there is already the foundation of a knowledge base from which to apply minds to transform the unequal society for the betterment of all going into the future.

Prof Soodyall thanked all the presenters, panellists and all the other participants for being part of the roundtable and extended her sincere gratitude to Prof Ashley van Niekerk, and Dr David Kimemia for being part of the organisation team, and to the staff of the Academy for their role in making this roundtable a success.

Notes

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