ANNEXURE B to SAFCEI and ELA-JHB's comments on NERSA on s34 concurrence

Responses to NERSA's consultation paper questions

NERSA's consultation document asks for comments on 33 questions. In some cases, the questions have already been dealt with in SAFCEI and ELA-JHB's comments and in the submissions by Prof. Thomas (Annexure A), and where relevant we paraphrase these comments and/or refer to the relevant paragraphs thereof. In other cases, the questions relate (among other things) to how a nuclear programme might be procured and operated. While SAFCEI and ELA-JHB are of the view that the nuclear procurement should not proceed, in the event that it does go ahead (notwithstanding the legal issues and relevant considerations raised in SAFCEI and ELA-JHB's comments and Prof. Thomas's submission) we provide what answers we can (notwithstanding the inadequate information provided by NERSA – see section B of SAFCEI and ELA-JHB's comments).

Question 1:

Is this 2 500MW of nuclear capacity section 34 determination compliant with the IRP 2019 as gazetted by the Minister of Mineral Resources and Energy?

Before addressing the question of whether the s34 determination is compliant with the IRP2019, it is relevant to note that the determination (which the Minister has asked NERSA to concur in) does not comply with s34(1) of the ERA given that it does not contain any determination that new electricity generation capacity is needed and that a percentage of that new capacity is to be generated from nuclear power. This is a significant concern given that our Courts have held that s34(1) of the ERA operates as the legislative framework by which any decision that new electricity generation capacity is required is made. The failure to determine that new electricity generation capacity is needed and that a percentage of that new capacity is to be generated from nuclear power effectively precludes NERSA from independently applying its mind to this critical preliminary aspect (whether 2 500 MW of new generation capacity from nuclear power is needed), and also precludes the public from making meaningful representations on this issue. Section 34(1)(a) and (b) of the ERA are the critical decision points relating to decisions regarding the need for new electricity generation capacity, and the Minister has failed or elected not to exercise this power in making the

determination. In the absence of the Minister exercising this power, and NERSA thereafter concurring in the exercise of that power, no lawful determination has been made that 2 500MW of new nuclear electricity generating capacity is needed. Therefore, the basis for making further determinations relating to (among other things) procurement of this new generation capacity is absent. The Minister's determination decision skips this material and significant decision point, and is therefore fatally defective. See section C1 of SAFCEI and ELA-JHB's comments for details.

With regard to whether the Minister's 2 500MW nuclear capacity section 34 determination is compliant with the IRP2019 as gazetted, we say that it is not.

Firstly, the decision to commence the process to procure new nuclear energy generation capacity of 2 500MW 'as per decision 8' of the IRP2019 appears to misinterpret the IRP2019 decision to commence preparations for a nuclear new build programme to the extent of 2 500 MW at a pace and scale the country can afford. This high-level policy 'decision' contained in the IRP2019 does not state that a process for the procurement of 2 500MW of new nuclear energy generation should commence, nor does it allocate 2 500MW of new electricity generation capacity to nuclear. The IRP2019 simply includes a policy decision that preparations for a new nuclear build programme to the extent of 2 500MW should commence, and at a pace and scale that the country can afford. If the Minister was going to base his determination on a consideration of this policy decision, that policy decision required him to first satisfy himself (before making any s34 determination to commence procurement) that procurement of 2 500MW of new nuclear generation capacity was at a pace, scale and cost affordable to the country. There is no indication that the Minister has provided any information or reasons in this respect to NERSA, and certainly no such information has been provided to SAFCEI and ELA-JHB (and other I&APs). See section C2 of SAFCEI and ELA-JHB's comments for details.

Secondly, based on a correct understanding of the IRP2019, decision 8 sets out a policy decision (made by way of a policy 'adjustment' by government and not generated as a 'least cost' option by the IRP process) indicating that the DMRE would commence preparations for (not procurement of) a nuclear build programme. In light of the above, it is submitted that

the IRP2019 only commits (on a policy level) to commencing preparations for a nuclear build programme to the extent of 2 500MW at a pace and scale that the country can afford, and does not commit to a new nuclear build programme itself. Notwithstanding the above, it is submitted that whatever policy decision may have been made and recorded in the IRP2019 is not binding on NERSA's concurrence decision (which should not be fettered by the IRP2019). While the IRP2019 and other government policy decisions are relevant considerations that NERSA may take into account, NERSA's concurrence decision also requires the consideration and balancing of a number of other relevant considerations. Indeed, in terms of section 10 of NERA, which is applicable to NERSA's decision whether or not to approve the Minister's s34 determination, NERSA's decision must be based on "*facts and evidence*", which together with the reasons for its decision must be summarised in a written document. See section C3 of SAFCEI and ELA-JHB's comments for details.

Question 2:

In light of the decommissioning of a significant amount of base load capacity by 2030, and South Africa's reliance on natural resources extraction and beneficiation as significant drivers of economic development, should this base load capacity be added post 2030 and why? Is this an important consideration in the broader integrated industrial policy and why?

SAFCEI and ELA-JHB are of the view that present and future demand for electricity (for whatever purposes) can be met by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management.

Nuclear cannot replace the electricity generation capacity that will be lost due to decommissioning by 2030 given that nuclear power plants take more than 10 years from placement of an order to generation of first power, and no new nuclear will be complete by 2030 (see Annexure A to SAFCEI and ELA-JHB's comments, section 5.1).

However, beyond 2030 a further 24,000MW of coal plant is expected to be decommissioned by 2050. Prof. Thomas advises that this raises two issues: is there a need for base-load generation; and, if we assume base-load capacity is needed, can nuclear play an important

role in achieving this? Prof. Thomas points out that the idea of a need for base-load capacity is a misunderstanding. While acknowledging that there clearly is a base load demand (namely a level of demand below which demand never goes), Prof. Thomas states that it is a *non sequitur*[1] to assume that base load can only be met by base load plants. He points out that it makes no more sense than assuming a factory operating round the clock seven days a week requires a set of workers who will also work round the clock every day, and that what is required is that generation resources are available when needed. While in the past 'peaking capacity' (the plant that operates relatively infrequently and only to meet demand peaks) were typically oil-fired gas turbines or diesel plant, in the future (if fossil fuels are to be phased out) these are most likely to be replaced by a combination of resources such as batteries, demand side response (consumers reducing demand at peak times) and peaking plant using non-fossil fuels. Prof. Thomas points out that peaking plant will be required whether nuclear or renewables are pursued, and that these will fill in when the sun does not shine or the wind does not blow in the renewables case or when demand is more than base load in the nuclear case (in practice, all the time). See Annexure A to SAFCEI and ELA-JHB's comments, section 5.2.

Question 3:

What other base load options are available that the country could invest in? Justify the preferred option?

As explained above, the assumption that base load capacity is needed is false. SAFCEI and ELA-JHB are of the view that present and future demand for electricity (for whatever purposes) can be met by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management. See Annexure A to SAFCEI and ELA-JHB's comments, section 5.2.

[1] i.e. an inference that does not follow from the premises; specifically: a fallacy resulting from a simple conversion of a universal affirmative proposition or from the transposition of a condition and its consequent. Source: https://www.merriam-webster.com/dictionary/non sequitur

Question 4:

Comment on the type of technology in the determination in line with the following:

i. Energy security considering both security of supply and security of demand.

SAFCEI and ELA-JHB are of the view that present and future demand for electricity (for whatever purposes) can be met by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management.

Prof. Thomas points out that the most unreliable power station is the one that that was planned to operate but has been delayed and is still under construction. Citing EPR reactors under construction in Finland and France, Prof. Thomas advises that if power systems planners in those countries were relying on the EPRs under construction to ensure reliable operation to be on-line by 2009 and 2012 respectively, the systems in those countries would be suffering the sort of power cuts that South Africa has for nearly a decade. Prof. Thomas points to the long delays and inability to operate at their design output levels experienced with South Africa coal-fired stations (a technology that typically does not suffer from major construction delays and technology problems) at Kusile and Medupi, and states that this must have contributed to power shortages. He also points to failed attempts to launch nuclear power programmes through the PBMR programme, the unsuccessful 2009 tender for new nuclear and fruitless previous versions of the IRP (all having a 9600MW nuclear programme imposed on them by the government) as consistently diverting attention over more than two decades from [renewable energy] options that are cheaper and would have had a much higher chance of bearing fruit. See Annexure A to SAFCEI and ELA-JHB's comments, sections 3, 4 and 5.2.

ii. Efficient, effective, sustainable and orderly development and operation of the electricity supply industry from production through to consumption.

SAFCEI and ELA-JHB are of the view that present and future demand for electricity (for whatever purposes) can be met by an appropriate mix of least-cost renewable energy

technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management.

Furthermore, SAFCEI and ELA-JHB are of the view that nuclear is not sustainable, suffering as it does from excessive costs (including cost escalations), complex and high risk technology, and long lead-in times (exacerbated by construction delays).

Prof. Thomas outlines some of the common problems that beset the construction and financing of large nuclear reactors of this type, which can be summarised as follows:

- Significant construction delays resulting from various factors, including fundamental design problems (such as poor quality control of work on-site, sub-standard components and design safety issues);
- Significant cost increases (for example the Hinkley Point project in the UK increased from £14 billion to £19.6 billion even before construction started, and have since increased to £25.5-27.5 billion in 2020 prices);[2]
- Some nuclear vendors have suffered financial collapse due to fixed-price deals based on huge cost underestimates (such as Areva which contracted to build the Olkiluoto plant in Finland on a fixed-price basis, with losses contributing significantly to its financial collapse in 2016; and Westinghouse which suffered financial collapse due to losses on sales of its AP1000 reactor design, and in particular losses on the Summer and Vogtle orders which were also on a fixed-price basis).

Having regard to these problems, SAFCEI and ELA-JHB are of the view that nuclear does not contribute positively to the efficient, effective, sustainable and orderly development and operation of the electricity supply industry from production through to consumption.

See Annexure A to SAFCEI and ELA-JHB's comments, sections 3, 4 and 5 for further details.

[2] According to media reports, the developer (EDF Energy) of the Hinkley Point C nuclear reactor has stated that the COVID-19 pandemic could delay construction of the Hinkley Point C nuclear reactor by six months and raise its costs by £500 million, and that the '…fresh delays are expected to take the cost of the UK's first nuclear power plant in a generation to £23bn… and put back its launch to the summer of 2026'. See: https://www.theguardian.com/uk-news/2021/jan/27/hinkley-point-c-costs-may-rise-by-500m-covid-crisis-nuclear-power-plant

iii. The interest of present and future electricity customers is safeguarded against, inter alia, stranded assets, environmental impact and energy security.

SAFCEI and ELA-JHB are of the view that energy security can best be met by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management.

Given its long lead-in time, construction delays and high costs, procuring new nuclear power now (during an economic crisis exacerbated by the COVID-19 pandemic) poses a high risk that present and future generations will be locked into the most expensive form of electricity producing technology that is on decline worldwide. As is explained in section C3 of SAFCEI and ELA-JHB's comments, rather than committing (even on a policy level) to a new nuclear programme post-2030, the IRP2019 takes a far more cautious approach. It recognizes the existence of uncertainty relating to the impact of rapidly evolving technology on the energy system, cautions against making assumptions and commitments for the future in a rapidly changing environment, and indicates that long-range commitments are to be avoided as much as possible to eliminate the risk that they might prove costly and ill-advised. While also recognising that 'some level of long-range decisions are required' having regard to technologies with long lead-in times (such as nuclear), the IRP2019 simply indicates (somewhat inelegantly) that such technologies will 'require more consideration of [sic] future developments' and that 'upfront planning is requisite'. The IRP2019 reiterates that any additional capacity should be done at a scale and pace that flexibly responds to the economy and electricity demand, but in a manner that avoids tariff shocks in particular (having regard to the user of electricity who ultimately bears the burden of increased electricity prices and tariff shocks). Referring to the Draft IRP2018, the IRP2019 indicates that it was recommended that 'the post 2030 path not be confirmed, but that detailed studies be undertaken to inform the future update of the IRP.'[3]

Nuclear power also suffers from a number of environmental drawbacks that have significant

[3] IRP2019, p92.

implications for future generations of South Africans. Apart from the risk of a catastrophic nuclear accident, no final solutions to the disposal of high level radioactive waste have yet been proven. In addition, nuclear power is not carbon neutral. While the routine operation of a nuclear reactor does not directly produce CO_2, emissions do occur in the fuel cycle (the various steps from mining of uranium to disposal of spent nuclear fuel), as well as emissions from the construction phase. See Annexure A to SAFCEI and ELA-JHB's comments, section 6 for details.

iv. Use of diverse energy sources and energy efficiency.

SAFCEI and ELA-JHB are of the view that an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management (which necessarily includes energy efficiency measures) meets the objective of using diverse energy sources and achieving energy efficiency. Promotion of the use of diverse energy sources and energy efficiency (as stated in s2(e) of the ERA) does not mean that all energy sources should be used.

v. International best practices.

Recent international experience relating to the construction of large nuclear reactors is discussed in section 3 of Annexure A to SAFCEI and ELA-JHB's comments. Construction of large nuclear reactors suffers from (among other things) high construction costs (typically with significant cost escalations due to delays), while the issue of financing remains one of the biggest barriers to nuclear investment (section 4 of Annexure A to SAFCEI and ELA-JHB's these comments).

International experience with SMRs is discussed in section 3.2 of Annexure A to these comments. There are no small modular reactor (SMR) options currently available that have good prospects of being ready for commercialisation by 2030 (see Annexure A to SAFCEI and ELA-JHB's comments, section 3.2).

vi. Mitigation of climate change by the reduction of greenhouse gasses and other environmental imperatives.

As stated above, nuclear power is not carbon neutral. While the routine operation of a nuclear reactor does not directly produce CO2, emissions do occur in the fuel cycle (the various steps from mining of uranium to disposal of spent nuclear fuel), as well as emissions from the construction phase. See Annexure A to SAFCEI and ELA-JHB's comments, section 6 for details.

SAFCEI and ELA-JHB are of the view that mitigation of climate change is best served by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management.

Question 5:

Provide what you consider to be the risks and challenges associated with the allocated capacity in terms of the objects of the Electricity Regulation Act mentioned in question 3 above.

It is assumed that this question is a reference to question 4 and not question 3 above. We also point out that the question 4 does not match all the objects set out in s2 of ERA.

As explained in section C of these comments, neither the Minister's determination nor the IRP2019 makes a capacity allocation for nuclear. The Minister makes a determination to commence the process to procure new nuclear energy generation capacity of 2 500MW, while the IRP2019 decision 8 is a policy decision to commence preparations for a nuclear new build programme to the extent of 2 500MW at a pace and scale that the country can afford. See section C of SAFCEI and ELA-JHB's comments for details.

Notwithstanding the above, some of the risks and challenges associated with procuring 2 500MW of new nuclear electricity generation capacity areas are as follows:

- Based on realistic estimates,[4] the procurement of 2 500MW of new capacity from nuclear is likely to cost about R330 billion (excluding costs of finance and end-of-life decommissioning costs).
- Large reactor technologies are available, but experience shows that in addition to huge construction costs (as well as costs of finance and decommissioning costs), large nuclear reactor projects typically suffer from significant construction delays and significant cost increases. With some nuclear vendors having suffered financial collapse due to fixed-price deals as a result of huge cost underestimates, South African electricity users and taxpayers are likely to ultimately bear the financial burden and cost escalation risk should new nuclear energy capacity (by far the 'most-cost' new electricity generation capacity option) be procured.
- South Africa has no realistic prospects of developing a nuclear industry through export sales.
- Nuclear power is costly to generate due to high construction costs and the cost of financing nuclear builds (which can be as high as the construction costs). Despite the IRP2019 basing its cost assumptions on a 2013 Ingerop report (which is outdated and reliant on data of questionable quality), new nuclear generation capacity has never been part of the 'least cost' solution generated in various versions of the IRP. Unlike renewable energy sources, nuclear costs seem to be rising. Given that recent experience shows that fixed-price deals have resulted in the financial collapse of some nuclear vendors, it is likely that both construction and finance costs (including the risk of probable cost escalations) will be borne by current and future generations of South African electricity consumers and/or taxpayers, regardless of the financing model used.
- Significant delays in nuclear power station builds impact negatively on electricity capacity planning ('the most unreliable power station is the one that was planned to operate but has been delayed and is still under construction'), and divert attention away

[4] According to Prof Thomas '[i]f we discount abandoned projects, projects using old technology, and projects where up to date cost estimates are not available, for the ones where construction has actually started, the average is about US$8800/kW, 75% higher than the Ingerop estimate. These four projects are still at least 1-6 years from completion and all experience suggests final costs will be even higher.' (Annexure A, section 4.1). Applying a cost of US$8,800/kW to 2 500MW of new nuclear electricity generation capacity at a 15 to 1 exchange rate, the proposed new nuclear programme will cost approximately R330 billion (excluding unanticipated cost escalations, costs of finance and decommissioning costs).

from cheaper options with higher chances of successfully generating power on time. Experience shows that in addition to construction delays, nuclear power typically suffers from significant delays between a government decision to launch new nuclear orders and 'first power'.

- Nuclear proponents often cite the need for base-load capacity to justify building new nuclear plants. Thomas advises that the idea of a need for base-load capacity is based on a misunderstanding, and that what is required is generation resources that are available when needed (i.e. that peaking plants are required regardless of whether nuclear or renewables is pursued, and that in the future peaking requirements will most likely be met by a combination of resources such as batteries, demand-side response and non-fossil fuel fired peaking plants).

See section D of SAFCEI and ELA-JHB's comments and sections 3, 4 and 5 of Annexure A to SAFCEI and ELA-JHB's comments.

Question 6:

Comment on the lead time for the deployment of nuclear power plant of circa 10 years, from design, licensing, construction and commissioning.

i. Considering the lead time above, what would be the most suitable time to commence preparations if nuclear was to be a no-regret option to replace the base load capacity to be decommissioned post 2030?

The long lead-in time associated with nuclear power plants is discussed in response to questions 4(ii) and (iii) above.

SAFCEI and ELA-JHB are of the view that present and future demand for electricity (for whatever purposes) can be met by an appropriate mix of least-cost renewable energy technologies (which excludes nuclear as the most expensive form of electricity generation), storage and demand-side management. Nuclear power is unable to address the short to medium term electricity crisis due to its long lead-in times, and risks locking South Africa into an unaffordable programme based on a technology that will not be able to compete with

least-cost, rapidly evolving renewable energy technologies that also take much less time to construct and deliver first power.

SAFCEI and ELA-JHB are of the view that preparations for a new nuclear build programme as referred to in the IRP2019 require the Minister to first satisfy himself - before making any s34 determination to commence procurement - that procurement of 2 500MW of new nuclear generation capacity would be at a pace, scale and cost affordable to the country. As indicated in SAFCEI and ELA-JHB's comments, there is no indication that the Minister has provided any information or reasons in this respect to NERSA, and certainly no such information has been provided to I&APs or the public.[5] Once these preparatory steps have been completed, the Minister would be in a position to consider relevant information and make a determination (in consultation with NERSA) regarding new electricity generation capacity needed after 2030 (preferably guided by a future revision of the IRP that includes capacity allocations post-2030), and how much of this need should be met by nuclear technology (if any).

See sections C and D of SAFCEI and ELA-JHB's comments, and sections 3.1 and 5.1 of Annexure A to of SAFCEI and ELA-JHB's comments for further details.

Question 7:

What would be the advantages brought about by SMRs, and is it possible for these to complement intermittent technologies such as renewables?

There are no small modular reactor (SMR) options currently available that have good prospects of being ready for commercialisation by 2030 (see Annexure A to SAFCEI and ELA-JHB's comments, section 3.2).

The notion that nuclear complements various renewable power options is wrong. Both

[5] In December 2020, SAFCEI lodged requests for information with the DMRE requesting (among other things) a copy of any feasibility, business case or research study report pertaining to SMRs and PMBRs relevant to the proposed 2 500MW nuclear new build programme, as well as a closing list of suppliers who responded to the Request for Information (RFI) issued by the DMRE relating to the proposed 2 500MW nuclear new build programme. At the time of finalising these comments no information had been provided in response to these requests.

nuclear and renewable power sources are inflexible. Nuclear cannot vary its output on an hour-by-hour basis, and suggestions that nuclear can 'load-follow' make no sense from either an economic or technical viewpoint (see Annexure A to SAFCEI and ELA-JHB's comments, section 5.3).

Question 8:

Comment on the impact of nuclear technology on the electricity tariff and how this may affect demand for electricity in the longer term, and how this may affect future investment decisions and how long the investment cycle is, where applicable.

As mentioned above, nuclear is the most expensive form of electricity generation technology, and will inevitably result in more expensive electricity. Regardless of the financial model adopted, present and future generations of South African electricity users and/or taxpayers will have to carry the financial risk and cost of a new nuclear build programme. Given that South Africa's economic woes have been further exacerbated by the impacts of the COVID-19 pandemic, the provision of affordable (i.e. least cost) electricity is imperative.

See Annexure A to SAFCEI and ELA-JHB's comments, section 4.

Question 9:

Comment on the costs of mature and commercially available nuclear power generation technologies. Provide your comments in line with a mandate to ensure that: i. investment in the electricity supply industry is facilitated; ii. universal access to electricity is facilitated; and iii. competitiveness, customer and end-user choice are promoted. Comments on costs should incorporate overall cost of the technology and must not be limited to overnight cost.

As has been pointed out above, based on realistic estimates the procurement of 2 500MW of new capacity from nuclear is likely to cost about R330 billion (excluding costs of finance and end-of-life decommissioning costs). The cost and financing of large nuclear reactors of this type is also affected by significant cost increases resulting from construction delays common to nuclear new builds. For example, the cost of the Hinkley Point project in the UK increased from £14 billion to £19.6 billion even before construction started and have since increased

more. Given that fixed price arrangements have already resulted in the financial collapse of at least two nuclear vendors, it is highly likely that the South African electricity user (rather than nuclear vendors) will ultimately bear the financial burden and risk.

See Annexure A to SAFCEI and ELA-JHB's comments, sections 3.1 and 4 for further detail.

The IRP2019 demonstrates clearly that new nuclear power is not the least-cost option. Imposing new nuclear on the IRP by way of a policy 'adjustment' appears to be anti-competitive.

Increases to electricity prices as a result of using expensive nuclear technology will ultimately be borne by current and future generations of South African electricity users and/or taxpayers, which will impact most heavily on poor and vulnerable communities, thereby limiting universal access to affordable electricity.

Having regard to the current centralised electricity generation and distribution system in South Africa, electricity users have no choice regarding where or from whom electricity is accessed (unless they are sufficiently privileged to afford to invest in their own electricity generation).

Question 10:

What would constitute modular scale and at what cost would it be affordable for the South African economy?

Modular reactors are not an economically viable option for South Africa (see Annexure A to SAFCEI and ELA-JHB's comments, section 3.2).

Question 11:

Comment on the cost of other suitable base load technology options the country can consider – whether referenced in the IRP 2019.

As has been pointed out in responses to questions 2 and 3 above, the idea of a need for base-load capacity is a misunderstanding. See Annexure A to SAFCEI and ELA-JHB's comments, section 5.2.

Question 12:

Comment on the most suitable pace (timing between power units) at which South Africa should implement the nuclear build programme.

In the absence of adequate information relating to proposed pace and scale (and what pace and scale is affordable to South Africa, if any) being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 13:

Comment on the procurement of this capacity now for build beyond 2030.

The procurement of 2 500MW of new nuclear electricity generation capacity now for a build beyond 2030 presents significant risk, and in particular the risk of locking South Africa into an unaffordable programme based on a technology that will not be able to compete with least cost, rapidly evolving renewable energy technologies that also take much less time to construct and deliver first power.

In addition, the Minister's determination to commence the process to procure 2 500MW of new nuclear electricity generating capacity is fatally defective (as explained above and as set out in more detail in section C1 of SAFCEI and ELA-JHB's comments).

Question 14:

Provide your comments on Eskom or any future entity of the unbundled Eskom as the generator of the new generation capacity. Provide your comments under the following three scenarios: a) Status quo remains, that is, Eskom is not unbundled and remains a state-owned vertically integrated utility. b) Eskom being unbundled and Generation,

Transmission and Distribution are separate state-owned entities. c) Eskom is not viable and privatised, but as outlined in (a) or (b) above.

Prof. Thomas states that under any of these scenarios, it is highly unlikely that a nuclear programme would be any more feasible than the repeated attempts to order nuclear capacity in the period since the request for tenders of 2009.

Having regard to Eskom's poor balance sheet (including its debt arising from the construction of the Medupi and Kusile power stations), SAFCEI and ELA-JHB are of the view that Eskom as the generator of any new nuclear generation capacity will increase the already significant financial risk that Eskom (and the South African State) is exposed to.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide a more informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question15:

Comment on the feasibility of a partnership between Eskom and other juristic person in view of Eskom's current balance sheet. What would the risks to electricity customers associated with this arrangement be?

Prof. Thomas states that Eskom's poor credit-worthiness makes it an unsuitable partner for nuclear investment.

Without information on other juristic persons that Eskom may partner with, or what the contractual arrangements may be (including who will bear the financial risk), SAFCEI and ELA-JHB are unable to comment further.

Question 16:

Give your comments with regard to the ownership model: a) IPP owned; b) joint venture (RSA & IPP); c) state utility owned; or d) any other applicable model.

Given that the s34 determination does not indicate what ownership models are under consideration, and in the absence of adequate information being provided to the public relating to such ownership models, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 17:

Provide your comments on the chosen buyer for the capacity. Provide your comments under the following three scenarios: a) Status quo remains, that is, Eskom is not unbundled and remains a vertically integrated utility, with the Single Buyer situated within the System Operator. b) Eskom being unbundled and Generation, Transmission (Wires and System Operator that includes Single Buyer Office) and Distribution are separate entities. c) Eskom being unbundled and Generation, Transmission (Wires) and Distribution are separate entities. A form of ISMO is instituted, with the System Operator also encompassing a Single Buyer Office. d) Eskom is not viable and privatised, but as outlined in (a) to (c) above.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 18:

How should the cost recovery be handled to ensure that the generator earns its revenue. The response should be in terms of the ownership models outlined in question 15 above.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 19:

Provide what you consider to be the risk associated with the chosen buyer.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

In general terms, there would appear to be a risk that Eskom (whether alone or in partnership) will be locked into high electricity prices through any power purchase agreements entered into with the generator (whether Eskom or some other entity). As mentioned above, current and future generations of South African electricity users and taxpayers will ultimately have to bear the full costs of the nuclear programme, including any cost increases due to construction delays. This will impact most severely on poor and vulnerable communities that are least able to absorb an increase in electricity prices. Depending on the repayment terms of any financing arrangement entered into, repayments may well commence before first power is delivered to the grid.

Question 20:

Must the buyer be paid only for power required by the system, i.e. the generator takes the risk for reduction in demand?

In general terms, this question seems irrelevant given that Eskom (alone or in partnership) is both the generator and buyer of the electricity. Given that Eskom is a state-owned entity, current and future generations of electricity users and taxpayers will ultimately have to shoulder the burden of any risk for reduction in demand.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 21:

In the event that Eskom as an organ of state is designated as generator and buyer, how will this arrangement affect the fairness, transparency, competitiveness and cost effectiveness of nuclear procurement as far as electricity customers are concerned? Should this

arrangement be encouraged?

Current and future generations of South African electricity users and taxpayers will ultimately have to bear the full costs of the nuclear programme, including any cost increases due to construction delays. This will impact most severely on poor and vulnerable communities that are least able to absorb an increase in electricity prices, and who cannot afford to invest in off-grid electricity generation option and have no choice but to source electricity generated, distributed and supplied by Eskom.

Question 22:

Provide your comments on the DMRE as the designated procurer of this capacity.

Given that various options for the procurer are indicated in the s34 determination, and in the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question23:

Which other organ of state is best positioned to be the procurer of this capacity and why?

In the absence of adequate information being provided to the public regarding what other organs of state are under consideration, SAFCEI and ELA-JHB are unable to provide further informed comment in response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 24:

Provide your comments in respect of juristic persons that may partner with the state or the nature of the partnership for purposes of this procurement.

In the absence of adequate information being provided to the public regarding the juristic persons who may be under consideration to partner with the state or what the nature of such

partnership may be, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 25:

Which funding model would be suitable for this capacity to ensure a lowest price for the consumer?

Given that the s34 determination does not indicate what funding models are under consideration, and in the absence of adequate information being provided to the public regarding any such financial models, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See Section B of SAFCEI and ELA-JHB's comments.

SAFCEI and ELA-JHB are of the view that the new electricity generation capacity from nuclear is not needed and should not be procured, especially given the high costs associated with nuclear and the availability of least cost alternatives. With regard to construction costs and cost of capital, see section D of SAFCEI and ELA-JHB's comments, and section 4 of Annexure A to SAFCEI and ELA-JHB's comments.

Question 26:

What is the most cost-effective model of plant construction (e.g. turnkey approach, split package approach and multi-contract approach) to avoid excessive cost overruns, noting that the recent Eskom new build was a multiple EPC contract approach, managed by Eskom. To what extent should Eskom be involved in the actual construction management of the build programme?

Prof. Thomas states that given that losses from offering genuine turnkey, fixed price, contracts was a major factor in the effective bankruptcy of two of the largest reactor vendors, Areva and Westinghouse, it is highly unlikely that a turnkey approach would be offered. See Annexure A to SAFCEI and ELA-JHB's comments, sections 3.1.1 and 3.1.2.

Question 27:

In the event a non-turnkey solution is preferred, how should the nuclear build work under

construction (WUC) be dealt with in the future Multi-Year Price Determinations (MYPDs), given the long lead times of the technology?

In the absence of adequate information being provided to the public regarding what non-turnkey solutions are under consideration, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 28:

In the event the generator is in partnership with Eskom and another juristic person, should this jointly operated asset qualify under Eskom RAB when considering the MYPD application?

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Prof. Thomas points out that the United Kingdom is investigating using a Regulated Asset Base (RAB) model for the next UK nuclear project, under which the owners of the plant would be guaranteed to recover their costs and make a guaranteed rate of return on the money they invested. Prof. Thomas states that the risks that this imposes on consumers have made this model highly controversial as consumers would be required to pay a surcharge on their electricity bill during construction of a new nuclear power plant to part-fund it. Prof. Thomas advises that this is against a basic principle of regulation, that 'consumers should only start paying for a facility when it is operating and when it has been established that it was needed, was the cheapest way of meeting the need and that its costs were well-managed. If it fails these tests, the consequences should fall on the company. Consumers should not be made to pay for bad decisions by the company building the facility'. Prof. Thomas points out that in a 9 December 2015 presentation to cabinet (declassified as part of the Zondo Commission hearings), the DMRE proposed that the cost of building new nuclear plants could be part-funded by consumers, stating that: 'We estimate that 60% of the total investment cost could be funded through the regulated revenue generated during construction' and that 'NERSA support will be required.' Prof. Thomas is of the view that this support should not be given,

and points out that while a variant of the RAB model could be proposed for South Africa, the risks it imposes on consumers are unjustifiable. See Annexure A to SAFCEI and ELA-JHB's comments, section 4.2.

Question 29:

Provide your view on the method chosen for the procurement of the new generation capacity.

Item 5 of the Minister's determination indicates that the designated procurer will be responsible for determining the procurement process.

No method for the procurement appears to have has been chosen, and SAFCEI and ELA-JHB are thus unable to comment on the 'method chosen for procurement'.

Question 30:

State how the procurement process proposed can be reconciled with Eskom being the designated generator of this power.

Given that the s34 determination states that the procurer will be responsible for determining the procurement process, and in the absence of adequate information being provided to the public regarding any proposed procurement process, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

Question 31:

Provide what you consider to be the procurement-related risks associated with the capacity in this determination.

In the absence of adequate information being provided to the public, SAFCEI and ELA-JHB are unable to provide an informed response to this question. See section B of SAFCEI and ELA-JHB's comments.

In general terms, any major infrastructure development project is vulnerable to corrupt practices at various levels. International experience of new nuclear builds also shows that these builds typically suffer from significant cost escalations and delays, increasing the financial risk associated with any procurement.

Question 32:

Comment on the socio-economic impact of nuclear new build programme on South Africa (e.g. job opportunities and localisation).

As mentioned above, current and future generations of South African electricity users and taxpayers will ultimately have to bear the full costs of the nuclear programme, including any cost escalations resulting from construction delays. This will impact most severely on poor and vulnerable communities that are least able to absorb an increase in electricity prices, but increased electricity prices will also have a knock-on effect where commercial and industrial users source their electricity from the national grid. See Annexure A to SAFCEI and ELA-JHB's comments, section 4.

In addition, in SAFCEI and ELA-JHB's view a nuclear build programme would require niche skills. These are not low-skilled jobs and are more likely to involve foreign technical skills entering the country rather than resulting in massive job creation for South Africans. Also, localisation may only happen at the construction phase of a project, creating migration of labour who are left without jobs thereafter.

Question 33:

Do you agree with the determination as provided by the Minister?

No.