Comments to NERSA on the ministerial determination of October 2020 regarding the commencement of a process to procure 2 500MW of new nuclear generation capacity

3 February 2021

1. Introduction

This submission has been prepared in response to an invitation for comment, issued by the National Energy Regulator of South Africa ("**NERSA**") in respect of a determination by the Minister of Mineral Resources and Energy ("**the ministerial determination**"), to commence the process to procure new nuclear energy with a generating capacity of 2 500MW, in accordance with Decision 8 of the Integrated Resource Plan for Electricity 2019, promulgated in October 2019 ("**IRP2019**"). The ministerial determination was made in terms of section 34 of the Electricity Regulation Act, 2006 ("**the Act**").

This submission by the Helen Suzman Foundation ("**HSF**") has been prepared in order to assist NERSA in fulfilling its consultative obligations in terms of ministerial determinations, as set out in the Act.

The HSF, as a non-governmental organisation, has been an active participant in a variety of public interest areas in South Africa over many years. Its essential aim is to promote constitutional democracy in South Africa, with a focus on good governance, transparency and accountability. The HSF views the electricity sector as extremely important for the economic and social development of South Africa and regards it as fundamental that any governmental or regulatory activity in this sector takes place in keeping with the principles of South Africa's constitutional and legal framework.

2. The ministerial determination suffers from serious defects

This submission emphasises the crucial importance of a rational process in arriving at decisions of Government, such as that of the ministerial determination. For the HSF, it is not a question of adopting a pro- or anti-nuclear stance on this particular issue, but rather of ensuring that a logical and rational process is followed, leading to a justifiable, rational and reasonable conclusion.

2.1 The so-called "no-regret option"

The IRP2019 states that "[t]aking into account the capacity from coal to be decommissioned post 2030 and the end of design life of [the] Koeberg nuclear power plant, additional nuclear capacity at a pace and scale the country can afford is a no regret option."[1] Decision 8 of the IRP2019, which follows that statement, reads as follows: "Commence preparations for a nuclear build programme to the extent of 2 500MW at a pace and scale that the country can afford because it is a no-regret option in the long term."[2]

However, the IRP2019 deals with the 2019 to 2030 timeframe, and only makes provision for 1 860MW of nuclear power, representing the existing Koeberg nuclear plant and extensions to its design life. In spite of the IRP2019's scenario up to 2030 not including any new nuclear capacity, Decision 8, as quoted above, does exactly that for the period after 2030 - and uses what it calls the "no-regret option" as the sole justification for its approach.

The concept of a no-regret option is not defined in the IRP2019, but NERSA states, in its Consultation Paper of 23 November 2020, that "it is assumed to mean those options that generate net social or economic benefits irrespective of whether or not climate change occurs, as well as a range of possible climate futures. They build resilience to future climate shocks while also delivering near term benefits." It is logically assumed that this definition of the options should also include options such as wind and photo-voltaic ("**PV**") solar generated power, but Decision 8 of the IRP2019 specifically only addresses additional nuclear capacity, without providing any reasons for the exclusion of such other options.

2.2 Artificial limits on new renewable energy

The approach by Government of severely limiting the future application of renewable energy such as wind and PV solar power, is consistent with the artificial annual limits that were placed by the IRP2019 on the building of new wind and PV solar energy plants. Referring to these annual build limits, the IRP2019 states that "[t]his provides for [a] smooth roll out of Renewable Energy, which will help sustain the industry."[3] However, this statement, standing on its own, is meaningless. No rational explanation for applying annual limits on new renewable power is provided in the IRP2019 (or in any other Government statements). As a result, it is impossible to avoid the impression of an arbitrary decision-making process on this issue. The practical consequence of this arbitrary process is that a place is created for the much more expensive option of nuclear power, for reasons that are never explained.

The IRP2019 itself even concedes this in its discussion[4] of the Draft IRP2018's analysis, stating that "[d]rawing from the conclusions of the scenarios analysed, the scenario of Renewable Energy without annual build limits provides the least cost path up to 2050." This latter comment is completely in line with the findings of a working group of the Ministerial Advisory Council on Energy ("**MACE**"), which found in 2016 that a least cost IRP model, free of any artificial constraints and before any policy adjustments, does not include any new nuclear power generators. It found that the optimal least cost mix is one of solar PV, wind and flexible power generators (with relatively low utilisation). MACE recommended to the then Minister of Energy

[1] IRP 2019, page 48.
[2] Integrated Resource Plan (IRP2019), page 48.
[3] IRP 2019, page 93.
[4] IRP2019, page 92.

Affairs that the base case IRP should be without artificial constraints and least cost.[5] This advice was not followed by the then Minister and her Department, without any reasons being provided.

2.3 Cost implications of new nuclear capacity

As far as the cost implications of any additional nuclear power is concerned, reference can be made to the IRP2019 itself, where it discusses the tariff path comparison of the Draft IRP2018.[6] In this context, tariff path is taken to mean the aggregate cost to be borne by the consumer in a particular scenario of future electricity generation. Of particular importance is the comparison between the IRP1 scenario (which is the least cost scenario, with no limits on renewables, no new coal power projects and no additional nuclear) and the IRP6 scenario (named "carbon budget", which has constrained the annual build of renewables, and assumes an increase in nuclear capacity up to 6 000MW in 2040 and 7 000MW in 2050).

The comparison of the cumulative tariff paths of the two scenarios (ie. those of IRP1 and IRP6) shows a marginal difference up to 2030, but for the period beyond 2030, the difference is staggering: IRP6, with its additional new nuclear content, is by 2040 higher than IRP1 by R200 000 million, on a cumulative basis. By 2050, this rises to R500 000 million. However, there is no evidence that the ministerial determination has considered the implications of these massive additional costs, over and above those of the least cost option, consisting of wind, PV solar and flexible power. Even if the IRP6 scenario is amended to provide for a lesser nuclear capacity level of 2 500MW (in line with the ministerial determination), it is clear that the cumulative tariff path of this option with its nuclear content, still runs into huge numbers. The difference between the IRP1 and IRP6 tariff paths is of such massive proportions that any decision that does not take it into account, in the absence of very clear and convincing reasons, cannot be viewed as being rational.

In its comment on the implications of these contrasting tariff paths, the IRP2019 itself states that "the huge difference in the scenario beyond 2030 will, however, make it necessary to undertake a detailed energy path study that will inform a next update of the IRP."[7]

It is to be noted that no mention is made in the ministerial determination of any such updated detailed energy path study - in fact, the ministerial determination makes no mention of the research on which it is based. It provides no background at all as to why a decision was reached on the appropriateness of additional nuclear power after 2030, or on the reasons for the apparent exclusion of cheaper options, such as renewable energy. The so-called long term "no-regret option" on which the ministerial determination is based, in reality leads to a tariff path which is hundreds of billions of Rands in excess of the lowest cost option in the long term.

3. The issue of base load capacity

Mention is made in the NERSA Consultation Paper[8] of the decrease in base load capacity, as a consequence of the decommissioning of coal power plants. The inference is that an ensuing gap in base load will have negative consequences for the system's stability. The IRP2019[9] states that a detailed analysis of the appropriate level of penetration of renewable energy in the South

[5] https://www.ee.co.za/wp-content/uploads/2016/12/311016-MACE-WG-note-on-IRP-2016-FINAL.pdf
[6] IRP2019, pages 96 to 98.
[7] IRP2019, page 98.
[8] Page 12.
[9] Page 92.

African national grid is required, in order to better understand the technical risks and mitigations required to ensure security of supply is maintained during the transition to a low-carbon future. Further work is obviously required on this subject. However, NERSA's Consultation Paper creates the impression that only nuclear power can deal with any decrease in base load levels, without dealing with the subject in appropriate detail.

4. NERSA's consultative role

NERSA has a clear consultative role to perform in the case of ministerial determinations of this nature, as set out in section 34 of the Act. The Minister may only make certain determinations "in consultation with" NERSA. This effectively means that the Minister cannot make a determination without NERSA's approval.[10]

5. Aspects which need to be addressed

The ministerial determination is clearly based on insufficient justification for such a major undertaking. Using the "no-regret" rationale on its own is patently inadequate, unsatisfactory and cannot be taken seriously, for the reasons set out above. Extensive research is required, with subsequent reasoned and rational conclusions for the period beyond 2030.

5.1 The comparative cost of the different options

The principal issue to be investigated, is the estimated cost of the nuclear option, including a clear comparison with the cost of other alternatives which are consistent with South Africa's emissions policy and commitments. A least cost option needs to be established in a credible manner. Arbitrary limits cannot be applied to new renewable energy options, as such conduct provides not only clear evidence of an irrational approach, but also leads to the inevitable perception of a process that has been intentionally manipulated for undisclosed purposes. Any financial assessment must also include the cost implications of the extensive lead times required for the build of new nuclear power plants (assumed to be in excess of 10 years), coupled with the additional financial risk of any potential delays. Experience has shown that the long lead times (compared to alternative power options) have an important effect on the aggregate cost of nuclear power plants, especially in relation to the cost of financing.

Additional aspects to be dealt with, would need to include the following:

5.2 System stability

The question to be addressed here is whether acceptable alternative mechanisms can be implemented to deal with system stability in the absence of traditional "base load" availability, as provided by coal and nuclear power plants. Given the increasing share of renewable energy in national electricity systems globally, it is assumed that the answer is in the affirmative, but this requires further research and a reasoned conclusion. The cost of developing and implementing such mechanisms need to be included in costing comparisons between different options.

[10] *Earthlife Africa, Johannesburg v Minister of Energy* [2017] 3 All SA 187 (WCC) at para 24 (*Earthlife Africa*). The Western Cape High Court held that any decision taken by the Minister regarding new electricity generation capacity "has no force and effect unless and until NERSA agrees with the Minister's decision".

5.3 Nuclear decommissioning costs

Estimates of the decommissioning costs for a nuclear plant are rarely addressed up-front. It is assumed that the reason for this is the fear that they could have a negative effect on any decision-making process where nuclear power is concerned, since the costs are so substantial. To provide an impression of the *quantum* involved, we can refer to the Department of Mineral Resources and Energy's own research paper, which puts it as follows: "The European Commission has indicated that France estimates that it will cost €300 million per gigawatt (GW) of generating capacity to decommission a nuclear reactor, whereas Germany's assumption is at €1.4 billion per GW, and the UK at €2.7 billion per GW. In France, the EDF's decommissioning cost estimates for its 58-reactor fleet have been reported to appear too low, with 350 million euros per reactor, compared to European operators which range between 900 million and 1.3 billion euros per reactor."[11]

5.4 Spent nuclear fuel

What is to be done with spent nuclear fuel from the plant? This issue is also usually avoided in presentations promoting nuclear power, simply because there is no permanent solution. Temporary storage facilities around the world have in effect become the permanent solution, in the absence of any other option. The Koeberg storage facility was expected to be full in April 2020,[12] and we are not aware of what decisions may have been taken to deal with this situation. Public statements on the resolution of this issue do not seem to be available.

5.5 Recommendation

The HSF recommends that NERSA includes the above aspects in its consultations relating to the ministerial determination. If these issues are not dealt with in a credible and thorough manner, the possibility of legal challenges against any finally approved determination arises, on the grounds of unreasonableness and/or irrationality. These aspects are dealt with in more detail in the next paragraph.

6. Potential legal consequences if the above recommendation is not heeded

The National Energy Regulator Act[13] – NERSA's empowering statute – provides that decisions by NERSA must be consistent with the Constitution and all applicable law, in the public interest and based on reasons, facts and evidence.[14] This extends to decisions taken by NERSA in the performance of its consultative role regarding new generation capacity in terms of section 34 of the Act.

In addition, a decision by NERSA concerning a ministerial determination for new generation capacity constitutes administrative action reviewable under the Promotion of Administrative

[11] Discussion Paper on National Decommissioning Policy for Nuclear Facilities, Department of Mineral Resources and Energy, 20 July 2020, page 13 to 14. See http://www.energy.gov.za/nuclear/Discussion-Paper-on-National-Decommissioning-Policy.pdf.
[12] *Waste Storage at Africa's only nuclear plant brimming*, Reuters, 25 November 2019.
[13] 40 of 2004.
[14] Section 10 of the National Energy Regulator Act.

Justice Act[15] – the legislation that gives effect to the constitutional right to just administrative action.[16] This means that any decision in this regard must be both rational and reasonable.[17] In any event, a decision by NERSA approving a ministerial determination is an exercise of public power or a performance of a public function, which is reviewable under the principle of legality[18] and must *at least* be rational.[19]

6.1 The ground of rationality

A decision is reviewable under PAJA if it is not "rationally connected" to the purpose for which it was taken, the purpose of the empowering provision, the information before the decision-maker or the reasons given for it by the administrator.[20] Rationality is concerned with the connection between the means chosen to achieve an end and the end itself.[21] PAJA does not establish a new test for rationality, but merely clarifies the connection between the means chosen and the end sought.

The ministerial determination is tainted with irrationality because the Minister failed to consider crucial relevant factors. The factors listed in paragraph 5 above are relevant in the process of determining whether to approve new generation capacity from nuclear energy – these factors are central to any determination on the subject of sources from which electricity are to be generated. The failure to consider these factors clearly renders the ministerial determination irrational. A similar failure by NERSA to take these material factors sufficiently into account will taint the entire process with irrationality.[22]

The purpose for which the power to approve new generation capacity was conferred on NERSA must be understood in light of section 2 of the Act, which sets out the objects of the Act. Section 2 provides that the objects of the Act are, among others, to "achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa", "ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry" and "facilitate universal access to electricity".

It is not possible to determine whether approving new generation capacity from nuclear energy is reasonably capable of achieving these purposes without careful consideration of the factors listed in paragraph 5 above. In particular, consideration must be given to the high cost of nuclear energy in comparison with other renewable energy sources to determine whether the approval is reasonably capable of ensuring the continued supply of electricity in a cost-effective and sustainable manner, whilst also expanding access to electricity.

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[15] 3 of 2000 (PAJA). *Earthlife Africa* above n 10 at paras 32-40.
[16] Section 33 of the Constitution.
[17] Section 6(2)(f)(ii) and 6(2)(h) of PAJA.
[18] *Earthlife Africa* above n 10 at para 47.
[19] *Pharmaceutical Manufacturers Association of South Africa: In re Ex Parte President of the Republic of South Africa* [2000] ZACC 1; 2000 (2) SA 674; 2000 (3) BCLR 241 at para 90.
[20] Section 6(2)(f)(ii) of PAJA.
[21] See Democratic Alliance v President of South Africa [2012] ZACC 24; 2012 (12) BCLR 1297 (CC); 2013 (1) SA 248 (CC) at paras 27-32.
[22] See *National Energy Regulator of South Africa v PG Group (Pty) Limited* [2019] ZACC 28; 2019 (10) BCLR 1185 (CC); 2020 (1) SA 450 (CC) at para 63.

6.2 Conclusion on the legal consequences

The HSF submits that a decision by NERSA approving the ministerial determination will be viewed as irrational, unless the defects in the ministerial determination identified above are addressed in a satisfactory manner.

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