AN EVALUATION OF THE ENVIRONMENTAL REGULATIONS FOR THE PROTECTION OF AVIFAUNAL BIODIVERSITY IN LIGHT OF SOLAR ENERGY DEVELOPMENT

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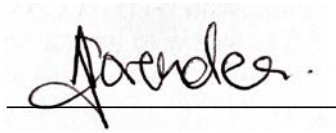
Declaration

I, Alicia Govender, do hereby declare that this dissertation consists of my own work and that all sources have been accurately reported and acknowledged, and that this document has not been submitted to any other university in full or partial fulfilment of the academic requirement of any other degree or qualification.



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Abstract

The socio-economic benefits associated with solar energy facilities considering the energy crisis, coupled with its positive impacts of a reduced carbon footprint provide the case for solar energy. The inarguable need for solar energy in South Africa is further supported by the latest Integrated Resource Plan (2019). Solar energy is still, however, an emerging energy technology in South Africa, and comes with associated negative impacts, many of which are still unknown, and pose a serious threat to avifauna, directly, indirectly and cumulatively. The South African Constitution, along with other supporting legal framework currently in place, is recognised for its fundamental environmental right offering protection to biodiversity which encompasses avifauna as part of wildlife to be protected. The state is obligated to fulfil its Constitutional responsibility to adequately assess every environmental application for construction and operation of solar energy facilities to minimise potential harm to avifauna through sustainable development mechanisms. Lastly, this paper highlights the importance and practical relevance of the principle of sustainable development, and provides recommendations that can guide developers to sustainably develop solar energy facilities in assisting South Africa in striking a proper balance in its transition to a low-carbon society while protecting and conserving avifauna.

List of Abbreviations

BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CDM	Clean Development Mechanism
EA	Environmental Authorisation
ECA	Environmental Conservation Act 73 of 1989
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme
EU	European Union
GHG	Greenhouse gas
IBA	Important Bird Area
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
MW	megawatt
NEMA	National Environmental Management Act 107 of 1998
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
PPP	Public participation process
RE	Renewable Energy
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
REDZ	Renewable Energy Development Zones
SA	South Africa

SEF	Solar Energy Facility
SID	Strategic Important Development
UNFCCC	United Nations Framework Convention on Climate Change

Table of Contents

Chapter 1
Background to the Study

1.1 Introduction

South Africa (SA) is currently in need of an energy injection as an estimated 9% of its citizens (~1.5 million households) do not have access to electricity.[1] This is despite its development and growth of energy generating/generation plants to strengthen the electricity grid, as well as its abundance of coal.[2] Renewable energy (RE), as a non-depleting energy source i.e., not a fossil fuel, offers a sustainable solution to provide electricity to South African households.[3] Solar energy[4] is a form of RE that is well suited to the South African climate and terrain.[5] Solar energy facilities (SEFs), however, pose threat to avifauna. The dangers posed to avifauna, as well as the need to balance the sustainable development of SEFs and ensure the protection of avifauna having regard to the principle of sustainable development will be further explored in this paper.

The study realised in this paper is carried out in two directions. Firstly, there is the question as to red tape solar energy developers may face from an environmental sector regarding the protection of avifauna, which may hinder the roll out of construction and operation of SEFs. Secondly, there is need for sustainable solar energy development within a South African context, which assists in the offset of climate change amongst other benefits, resulting in a positive environmental impact on a global scale.

1.2 Research Question

The key focus of this dissertation is the broad question of how South African environmental legislation and policy is used to protect avifauna within its borders, particularly from the development of SEFs. This paper seeks to understand how developers of utility-scale SEFs are

[1] GN 1360 of GG 42784, 18/10/2019; 8 [IRP].
[2] DB Baruah & CC Enweremadu 'Prospects of decentralized renewable energy to improve energy access: A resource-inventory-based analysis of South Africa' (2019) 103 *Renewable and Sustainable Energy Reviews* 328.
[3] C Frewin, 'Renewable Energy' available at *https://www.studentenergy.org/topics/renewable-energy*, accessed on 9 December 2019.
[4] Solar energy will be discussed in detail as a renewable energy source as a focus point of this paper.
[5] Independent Power Producer Office 'Renewable IPP Procurement Programme' available at *https://www.ipp-renewables.co.za/*, accessed 26 February 2019 [IPP].

governed by legislation protecting avifauna. We will also look at the mechanisms that promote the development of solar energy in SA and analyse the relationship between solar development and the opposition it can face in terms of avifaunal protection. Finally, this dissertation will provide rationale to construct sustainably designed SEFs with the aim to mitigate avifaunal impact and enhance protection within a South African context, considering the current legal framework.

1.3 Solar energy: need and desirability

There are two basic categories of SEFs, namely Photovoltaic solar cells (PV) and Concentrated Solar Power (CSP) technologies.[6] PV uses cells to turn sunlight into electric energy and CSP uses mirrors to concentrate sunlight onto a receiver.[7] Fahrenbruch and Bube, as far back as 1983, identified PV as one of the most promising forms of meeting projected energy demands, and referred to it as an inexpensive, consistent (as the sun's lifespan according to science is infinite), and an environmentally safe form of energy.[8] PV cells can in fact be traced back to 1839.[9] In today's scenario, solar energy has added advantages with storage, and reduced costs, thanks to technological advancements, and has since evolved to be established into SEFs, which can power thousands of households. A typical 75MW PV plant can power approximately 65 000 homes[10] and requires 120-150 hectares of land.[11]

South Africa is a country rich in solar resources, with high daily solar radiation levels ranging between 4.5-6.5kWh/m^2 [12] across the country,[13] in comparison with the United States[14] (3.6kWh/m^2) and Europe (2.5kWh/m^2).[15] Its location, abundance of flat terrain and high irradiation

[6] R Allessandra 'Concentrated Solar Power (CSP) Vs Photovoltaic (PV): An In-depth Comparison' (23 May 2019) available at *https://solarfeeds.com/csp-and-pv-differences-comparison/*, accessed on 08 January 2020.
[7] L Walston, KE Rollins, KE LaGory, KP Smith, SA Meyers 'A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States' (2016) 92 *Renewable Energy* 405 [Walston].
[8] AL Fahrenbruch & R H Bube *Fundamentals of Solar Cells* (1983) 1.
[9] Ibid at 9.
[10] Lesedi Solar Plant 'Project Facts' available at *https://www.solarreserve.com/en/global-projects/pv/lesedi/*, accessed 11 May 2019.
[11] 'Area Required for Solar PV Power Plants' available at *http://www.suncyclopedia.com/en/area-required-for-solar-pv-power-plants/*, (accessed 11 May 2019).
[12] Department of Energy 'Renewable energy- solar power' available at *http://www.energy.gov.za/files/esources/renewables/r_solar.html*, accessed on 8 July 2019.
[13] South Africa Government *Official guide to South Africa 2017/2018 - Energy and Water* 6.
[14] M Kidd *Environmental Law* 2 ed (2011) 313 [Kidd].
[15] World Bank Group 'Global Solar Atlas' available at *https://globalsolaratlas.info/?c=-29.557338,24.03662,5&s=-32.799822,20.906867*, accessed on 9 July 2019.

are on their own key attractive factors for solar energy to be included into the South African electricity generation mix, in line with the country's national commitment to a low carbon economy, through a 'just transition' from coal to RE.[16] Favourable conditions allow for an untapped abundance of solar resources to be exploited, allowing for the potential to generate electricity for in country use, and export as well to neighbouring countries.[17]

1.4 Potential impacts on Avifauna

Solar Power is considered a form of RE that offers electricity generation at a fraction of the environmental costs of carbon-based energy technology types.[18] Visser states that SEFs limit the reliance on fossil fuel technology that is believed to have a positive influence on climate change, indirectly limiting impact on avifauna populations.[19] PV technology now contributes to a third of RE in SA. The rapid development of SEFs in SA however raises concerns about the potential related impacts on avifauna populations as there are still many unknowns regarding the development.[20]

Associated environmental impacts must be considered for the sustainable development of SEFs, in support of SA moving towards a cleaner energy future. Avifauna can be significantly impacted by SEFs through habitat loss or fragmentation, as large footprints are cleared as required for the laydown of infrastructure. Risk of collision and electrocution is also a concern when it comes to associated infrastructure, especially if the SEF is located in undisturbed areas. Solar flux from areas of concentrated solar energy from a CSP facility can impact on birds by burning them.[21] Water use required for cleaning and cooling purposes can also significantly impact avifauna on a

[16] IPP op cit note 5.
[17] Department of Energy *State of Renewable Energy in South Africa* (2015) 46 available at *http://www.energy.gov.za/files/media/Pub/State-of-Renewable-Energy-in-South-Africa.pdf*, accessed 9 May 2019 [DOE].
[18] International Finance Corporation *Utility-Scale Solar Photovoltaic Power Plants* (unpublished Guideline document, International Finance Corporation, 2015) 174 [IFC].
[19] Visser, E., The impact of South Africa's largest photovoltaic solar energy facility on birds in the Northern Cape, South Africa (Unpublished mini masters dissertation, University of Cape Town, 2016) 32.
[20] E Visser, V Perold, S Ralston-Paton, AC Cardenal, PG Ryan 'Assessing the impacts of a utility-scale photovoltaic solar energy facility on birds in the Northern Cape, South Africa' (2019) 133 Renewable Energy 1285 [Visser].
[21] CBC, 'BrightSource solar plant sets birds on fire as they fly overhead' (18 August 2014) available at *https://www.cbc.ca/news/technology/brightsource-solar-plant-sets-birds-on-fire-as-they-fly-overhead-1.2739512*, accessed on 10 July 2020.

local and even regional scale depending on the hydrology of the area and the constraints placed on water as a resource. Avifauna can also face impacts from pollution from the spillage of chemicals that can lead to the contamination of land and water resources.[22] Despite SEFs utilising less water than conventional coal fired power stations, an SEF located in a dry habitat may deplete local reserves. Some SEFS can also produce a large amount of wastewater, which must be managed and treated, as these may attract certain bird species to these unnatural bodies of water.

Governing environmental and avifauna protection bodies both locally and internationally are rallying for the protection of avifauna from developments. BirdLife South Africa (BirdLife) and the Western Cape Birding Forum are two examples of key stakeholders locally involved in raising concerns and potentially opposing RE development with the intention to reasonably protect avifauna. They acknowledge the need for RE developments as one of the main climate change mitigation interventions for SA, but make it clear that they stand for the establishment of responsible RE development.[23] BirdLife has appealed numerous RE projects in the past, with one of their South African wind appeals recently upheld.[24] SEF developers are now facing similar opposition as more SEFs are being challenged by conservation groups, "regardless of the environmental benefits of solar power".[25] A magnitude of avifauna fatalities is reported from international SEF projects, stirring conservation concerns.[26] CSP technology has been heavily criticised for killing birds such as in the case of the landmark Ivanpah CSP project.[27] The Palen solar farm in California faced opposition, the main complaint being that the SEF will kill birds,[28]

[22] BirdLife International, 'Solar Energy' available at *http://migratorysoaringbirds.undp.birdlife.org/en/sectors/energy/solar-energy-toc*, accessed on 19 December 2019.
[23] Western Cape Birding Forum 'Minutes of the meeting held at the Kristo Pienaar Environmental Centre' (27 September 2014) 3 available at *https://www.capebirdclub.org.za/wp-content/uploads/2017/10/wcbf-minutes-sept-2014.pdf*, accessed on 19 December 2019 [WC Birding Forum].
[24] BirdLife International 'Great news: BirdLife South Africa halts plans for dangerous wind farm' (20 May 2019), available at *https://www.birdlife.org/worldwide/news/great-news-birdlife-south-africa-halts-plans-dangerous-wind-farm*, accessed 19 December 2019.
[25] J Upton 'Solar Farms Threaten Birds'(27 August 2014) available at *https://www.scientificamerican.com/article/solar-farms-threaten-birds/*, accessed on 05 January 2020 [Upton].
[26] Ibid.
[27] J Deign 'Concentrated Solar Power Quietly Makes a Comeback' (24 June 2019), available at *https://www.greentechmedia.com/articles/read/concentrated-solar-power-quietly-makes-a-comeback*, accessed 19 December 2019.
[28] S Roth 'How many birds are killed by solar farms?' (17 August 2017) available at *https://www.desertsun.com/story/tech/science/energy/2016/08/17/how-many-birds-killed-solar-farms/88868372/*, accessed on 19 December 2019.

where 3,545 mortalities from 183 avifauna species were recorded between 2012 and April 2016, emphasising risk to birds of conservation concern.[29]

Permitting and licencing requirements for an SEF must be established with the appropriate planning or governmental authority in relevance to a country's laws and regulations. These requirements may change between countries, but a developer must ensure that these requirements are fulfilled prior to the undertaking of any construction activities.[30] One such permitting authorisation required is the Environmental Authorisation (EA) that may be awarded by the National or Provincial Environment Departments (competent authority[31]) depending on project requirements as per the EIA regulations.[32] A developer of a SEF is required to undertake an Environmental Impact Assessment (EIA) process to ensure that adequate environmental studies are concluded before construction as governed by legislation.[33] A SEF and associated infrastructure could typically and potentially trigger Listing Notice 1[34], Activity 1; 11; 12; 19; 24; 26; 27; 28; 30; 32; 35; 36; 47; 48; 54; 55; 56; 65; 67[35] which entails an environmental assessment through a Basic Assessment Report (BAR). A Scoping and Environmental Impact Report (S&EIR) can alternately be triggered should one or more of the activities of Listing Notice 2[36] be triggered via activities 1; 9; 14; 15; 23; 24; 26[37] in addition to any triggered activities from Listing Notice 1. Listing Notice 3[38] can also be possibly triggered contributing to the environmental study in the form of a BAR should Activities 1; 4; 7; 12; 14; 15; 18; 19; and/or 26 be triggered[39].

The EIA covers a spectrum of potential impacts identified and assessed through the process. Mitigation measures are proposed to counter identified negative impacts to an acceptable standard. Requirements per environmental study may vary by country, and it is in the best interest of the developer to seek advice from the competent authority (CA) at an early stage of the EIA process

[29] T Dietsch 'Update on Solar-Avian Interactions in Southern California' (Presentation as part of a Multiagency Avian-Solar Collaborative Working Group: Stakeholder Workshop) (10 May 2016), available at *http://blmsolar.anl.gov/program/avian-solar/docs/Avian-Solar_CWG_May_2016_Workshop_Slides.pdf*, accessed 19 December 2019.
[30] IFC op cit 18 at 94.
[31] National Environmental Management Act, Act no. 107 of 1998, Republic of South Africa. [NEMA], Section 1.
[32] IFC op cit 18 at 94.
[33] *NEMA* supra note 31 at Section 24.
[34] GN 983 as amended in GN. R 327 of GG 40772, Activity 1 [Listing Notice 1].
[35] Department of Environment Affairs, EIA Guideline for Renewable Energy Projects, 2015, 31 [EIA guideline].
[36] GN 984 as amended in GN. R 325 of GG 40772 [Listing Notice 2].
[37] EIA guideline op cit 35 at 44.
[38] GN 985 as amended in GN. R 324 of GG 40772 [Listing Notice 3].
[39] EIA guideline op cit 35 at 46.

to ascertain the primary specialist studies that need to be undertaken for a SEF.[40] It is South African best practice as per previous investigations to include ecological assessments that incorporate a further detailed focus on avifaunal impacts.[41] This is however not a requirement. BirdLife suggests that it is best practice for the appointment of an avifaunal specialist to identify potential impacts on birds,[42] and recommend mitigation measures to limit the impacts on birds during all phases of a proposed SEF development i.e., pre-construction, construction, operational and maintenance, as well as the decommissioning phases. Avifaunal protection is a major component of the EIA for a SEF due to the displacement or exclusion amongst bird species, especially threatened, endemic and range-restricted species.[43] Should a project receive a negative comment or appeal in terms of avifaunal impact, this could result in serious time delays and unplanned costs. A significantly high negative impact rating with inadequate mitigation measures can lead to a fatal flaw.[44]

1.5 The value in avifauna

SA is home to about 24 000 species of fauna, making it a country rich in biodiversity, ranking 5th and 24th in biodiversity richness in Africa and in the world, respectively.[45] Avifauna forms a fundamental part of biodiversity.[46] All living creatures have a right to live as a valuable part of our functioning ecosystem as biodiversity sustains all life, irrespective of their direct value to mankind.[47] The main components of biodiversity relevant to avifauna include, genes, species and ecosystems. This can be expanded to the protection of endangered species and those at risk of extinction, as well as sustaining and conserving the natural habitats of avifauna for sustainable development.[48]

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[40] IFC op cit 18 at 95.
[41] J Rudman, P Gauché, KJ Esler 'Direct environmental impacts of solar power in two arid biomes: An initial investigation' (2017) 113(11/12) *South African Journal of Science* 1 [Rudman].
[42] HA Smit 'Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa' 1 available at *http://www.the-eis.com/data/literature/Solar%20guidelines_version2.pdf*, accessed 10 June 2019.
[43] Ibid
[44] AR Jenkins, S Ralston-Paton, HA Smit-Robinson *Best Practice Guidelines- Birds and Solar Energy* (unpublished Guideline document, BirdLife SA, January 2017) at 5 available at http://www.birdlife.org.za/wp-content/uploads/2018/06/Birds-and-Solar-Energy.pdf, accessed 16 July 2019 [Jenkins]
[45] South Africa Government *Official guide to South Africa 2017/2018 - Environment* 10.
[46] H Komen 'Wildlife' (2010) *The Enviropaedia*, Ecological Edition, 270 [Komen].
[47] Ibid.
[48] Kidd op cit note 14 at 97.

1.6 Conclusion

The aim of an IPP is to generate electricity, and in line with best practice, to do so in a sustainable manner to avoid co-lateral damage, such as harm to avifauna. SA must factor in several legal elements to ensure adequate mitigation measures are implementable per development, while transitioning to a low-carbon future. As such, avifauna specific guideline documents and policy should be enforceable by law so as to ensure that solar energy development is sustainably erected while specifically protecting avifaunal biodiversity within the borders of the country.

1.7 Scope of the Dissertation

Although solar power is necessary as part of the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) and future energy planning, the roll out of solar power within SA can be short lived if sustainable development is not achievable as governed by legislation. This paper will explore relevant international and South African legislation governing avifaunal protection in terms of the development of SEFs and interrogate scientific literature for evidence of any impact that SEFs may have on avifauna. This paper will also summarise the guidance, opinion and involvement of governmental authorities in the authorisation of sustainably developed SEFs, while highlighting how an SEF can be constructed and operated with adequate and transparent planning and expertise.

1.8 Outline of the Dissertation

Chapter One introduces the topic and provides background to the research and topic selection.

Chapter Two focuses on the potential threats that the development of SEFs pose to avifauna during the construction and operational phases.

Chapter Three will detail and consider the existing legal protection of avifauna within a South African context, and endeavor to rationalise its adequacy.

Chapter Four will provide a discussion on the importance and practical relevance of the principle of sustainable development. The protection of avifauna is an important objective while developing SEFs, but the development of solar energy may also be important from a socio-economic perspective and could provide a better alternative to coal-based energy.

Chapter Five will conclude the dissertation and propose a reasonable way forward. Chapter Five will thereafter seek to provide recommendations for improvement of policy in support of sustainably developed SEFs.

Chapter 2
Solar Energy Facilities threaten Avifauna

2.1. Introduction

The 2019 Integrated Resource Plan (IRP) includes an additional allocation of 6,000MW for the installation of PV facilities, taking the total installed capacity of PV to 8,288MW with a constant pipeline of projects up until 2030.[49] No additional allocation has, however, been made for CSP in the latest IRP, leaving CSP with a total installed capacity of 600MW to 2030.[50] Further investigations and information sharing is therefore necessary in support of sustainable development, particularly for PV at this stage.

The sustainable development of SEFs and associated infrastructure remain a major global concern, with the potential to impact directly or indirectly on avifauna.[51] Direct impacts resulting from solar flux or collision with components of a SEF or associated infrastructure i.e., power lines and fences, as well and indirect impact from the alteration of avifauna communities through habitat loss, transformation or fragmentation,[52] both resulting in possible injuries to avifauna or even fatalities.[53] Decision-makers face challenges as they try to balance the benefits of RE in terms of access and affordability of reliable and clean energy which is of global significance, with poorly located RE generating facilities, such as SEFs and auxiliary infrastructure. SEFs are known to potentially cause significant harm to nomadic species, including avifauna while they roost and forage.[54]

Since solar energy generation is still in its infancy in South Africa, with only 33 PV and 4 CSP facilities operational at present in SA[55], our understanding of their impact on a South African context is quite limited. In addition, not all developers who undertake monitoring willingly share

[49] *IRP* supra note 1 at 42.
[50] Ibid.
[51] Upton op cit note 25.
[52] Visser op cit note 20 at 1285.
[53] IFC op cit note18 at 99.
[54] BirdLife South Africa 'Migratory species and climate change' (23 May 2018) available at *https://www.birdlife.org.za/migratory-species-and-climate-change/,* accessed on 15 July 2019 [BirdLife].
[55] Department of Energy, Department of National Treasury, Development Bank of Southern Africa Independent Power Producers Procurement Programme (IPPPP) An Overview (31 March 2019) at 27.

their data, limiting access to information, particularly on the subject of mortality statistics.[56] This highlights the concern regarding the lack of avifaunal specific regulations promoting their protection within a South African context.

2.2. Direct adverse avifaunal impacts

Up to 138,600 avifaunal deaths are projected yearly from utility scale SEFs based on 14GW of solar plants currently in its operational and construction phases in the United States of America.[57] This indicates a potentially huge loss for avifauna. Both CSP and PV technologies have been recorded to have a collision risk, resulting in bird strikes[58] from direct contact of birds with solar project infrastructure i.e. panels and mirrors.[59] Associated infrastructure of SEFs, that is, overhead transmission power lines and fences, also pose a collision and/or electrocution risk, especially if they lie in flight paths between resting areas or feeding grounds.[60] Birds flying at night are at a higher collision risk.[61] Distribution power line poles can be attractive perching, roosting and even nesting sites for some birds increasing potential electrocution statistics.[62] There is, additionally, a risk of toxicity to avifauna from incorrectly disposed thermal oil used in CSP plants or related contamination resulting in pollution to the detriment of birds in the area.[63] Power towers of CSP facilities have also been noted to singe the feathers of birds flying through the zone of concentrated solar energy, where solar flux mortality can occur during the operational life of a CSP plant from exposure to concentrated sunlight as feathers are burnt, resulting in loss of flight and probable death.[64]

The Percy FitzPatrick Institute of African Ornithology refers to evidence collected from CSP plants in the United States to indicate that SEFs mainly impact nomadic avifauna as opposed to

[56] Visser op cit note 20 at 1285.
[57] Walston op cit note 7 at 411.
[58] Rudman op cit note 41 at 4.
[59] Walston op cit note 7 at 406.
[60] M Malafry *Biodiversity Protection in an Aspiring Carbon-Neutral Society: A Legal Study on the Relationship between Renewable Energy and Biodiversity in a European Union Context* (unpublished Doctoral dissertation, Department of Law, Uppsala University, 2016) 22 [Malafry].
[61] Ibid.
[62] Ibid.
[63] Rudman op cit note 41 at 4.
[64] Ibid at 8.

resident species from direct collision with infrastructure.[65] Local specialist observations were made, noting bird activity within or near SEF site footprints in SA. Birds were noted to be nesting in solar power infrastructure, as well as flight paths recorded around evaporation ponds of CSP facilities.[66] Khi Solar One, a CSP facility in the Northern Cape of SA was one of the first CSP developments from which many lessons have been learnt to date.[67]

2.3. Indirect adverse avifaunal impacts

The size of a SEF (megawatts) is usually proportional to the size of its footprint, such that a bigger footprint is anticipated to have a larger avian impact.[68] The construction of a SEF can result in the alteration or clearing of existing sensitive habitats causing disturbances to fauna (animal) and flora as a result of a poorly assessed and authorised development footprint.[69] Loss of habitat with relevance specifically to plant and vegetation clearance and habitat transformation can impact negatively on most avifaunal species.[70] SEFs have the potential to impact on the dynamics between biological and physical elements, which may impact negatively on the local ecology.[71] Fauna numbers in a specific site footprint may, therefore decrease, as a result of environmental degradation and habitat destruction, which can quickly lower the numbers of a bird population within a region due to a diminishing food supply and a loss of suitable breeding habitat, where large trees serve as nesting substrate.[72]

The decrease in bird numbers in an area that was once avifaunal breeding grounds, serves as an alert of environmental degradation.[73] Biodiversity refers to the variability in living organisms and the complex ecosystems of which they form a constituent element.[74] Biological diversity is important to conserve due to its intrinsic value from genetic, social, aesthetic, to educational and

[65] Walston op cit note 7 at 405-406.
[66] Rudman op cit note 41 at 8.
[67] Ibid at 6.
[68] Walston op cit note 7 at 406.
[69] IFC op cit note 18 at 61.
[70] Rudman op cit note 41 at 4.
[71] Ibid.
[72] Ibid.
[73] Komen op cit note 46 at 270.
[74] Kidd op cit note 14 at 97.

economical value.[75] Natural ecosystems need protecting against fragmentation, which has the potential to lead to the loss of biodiversity. Habitat destruction can result in pockets of communities not being able to interact on a natural level leading to loss of avifauna.

2.4. Cumulative impact

Impacts from a single SEF may not necessarily in itself be significant, whereas cumulative impacts from several SEFs or even from a single SEF with combined impacts from other similar or diverse developments relating to location can significantly affect a species, ecosystems or resources.[76] Cumulative impacts could result from actions performed in the past, present, and reasonably foreseeable future in its entirety.[77]

Cumulative impacts from PV installations have more than doubled in the United States in 2013.[78] Developers often cluster SEFs together, possibly due to the attractiveness of a location, where a particular area could have viable irradiation, flat terrain, and available grid connection infrastructure etc.,[79] all of which have potential project benefits, but may not necessarily be the best option to sustain the land itself. The consideration of cumulative impact is important, where numerous developments, or numerous phases of a development are proposed.[80] Cumulative impact can additionally result from avifauna fatality risk factors.[81] A cluster of SEFs can potentially act as a barrier for movement of certain bird species. The amount of effort it would take for a bird to avoid large expanses of development can amount to a huge energy cost in exchange to the detriment of some species.[82]

Some protected areas having been identified for the establishment of SEFs may, however, not be large enough to support the biodiversity required to maintain healthy population numbers to sustain

[75] Ibid.
[76] GN 982 as amended in GN. 326 of GG 40772; 07/04/2017) [EIA Regulations].
[77] Jenkins op cit note 44 at 4.
[78] Walston op cit note 7 at 405.
[79] 'SOUTH AFRICA: Renewable Electricity Potential' available at https://www.get-invest.eu/market-information/south-africa/renewable-electricity-potential/, accessed on 28 December 2019.
[80] Jenkins op cit note 44 at 28.
[81] Walston op cit note 7 at 413.
[82] Malafry op cit note 60 at 22.

a particular species of avifauna. This may result in a loss of a living organism, which can negatively impact the ecosystem.[83]

2.5. Conclusion

SEFs have the potential to directly and indirectly impact on avifauna. Small scale SEFs do not always trigger environmental regulations, and are therefore not necessarily required to undergo rigorous environmental assessments e.g., a proposed PV facility under 10 megawatts located within an urban area does not automatically trigger an environmental assessment process.[84] Despite avifaunal impacts being more concerning for Red List species, several small-scale SEFs developed in areas where Red List species are unlikely to feature could still significantly impact even the more common avifaunal species through displacement, causing cumulative impacts. Birdlife identified Important Bird Areas (IBA) by classifying areas as respectively 'unprotected', 'partially protected', or 'fully protected' based on three factors i.e., a site that holds a substantial number of one or more internationally threatened bird species; a site as part of a set of sites holding a suite of restricted species or having biome limitations; or a site through which an unusually high number migratory or congregatory species of avifauna pass.[85] These sites may be small enough to be conserved in their entirety and are often already part of a protected-area network. It is unlikely that an EA for development of a SEF would be granted for a site in a fully/ partially protected IBA.[86] It does, however, mean that development can still occur in IBAs that are not formally protected, which is a concern for the protection of avifauna more generally.

[83] ARE Sinclair, SAR Mduma & P Arcese 'Protected areas as biodiversity benchmarks for human impact: agriculture and the Serengeti avifauna' (2002) 269(1508) *Proceedings: Biological Sciences 2401*, available at http://www.jstor.org/stable/3558670, accessed on 05 May 2019.
[84] *Listing Notice 1* supra note 34 at Activity No.1.
[85] JV Wells *Boreal Birds of North America: Studies in Avian Biology* (2011) 96.
[86] Rudman op cit note 41 at 9.

Chapter 3
Legislation protecting avifauna in South Africa

3.1. Introduction

A developing economy has led to the transformation of the natural environment as human induced activities have the potential to cause significant harm to the environment[87], potentially impacting on avifauna. Avifauna as a component of wildlife is not specifically protected in South Africa in its own capacity, as opposed to mediums such as air and water, as examples.[88] It however forms a fundamental part of wildlife,[89] which is covered under the term "environment" as defined in NEMA,[90] falling under statutory law.

The environment is protected via three different legislative mechanisms, namely through a rights-based approach protecting against environmental issues regulated by the Constitution,[91] which gives rise to a better coordinated and integrated approach regarding environmental protection at a national level. Secondly, through framework legislation protecting the environment, i.e. NEMA., for which the Constitution acted as a catalyst, and thirdly, through legislation specific to environmental issues that cover various environmental aspects.[92] The most practical form of environmental management is to use all three mechanisms to give effect of the fundamental human right in terms of protecting the environment as per the Bill of Rights.[93] Avifauna is protected under international policies and conventions, as well as through legislation in SA.[94]

[87] A Blackmore 'The Relationship between the NEMA and the Public Trust Doctrine: The Importance of the NEMA Principles in Safeguarding South Africa's Biodiversity' (2015) 20(2) *SAJELP* 89.
[88] Kidd op cit note 14 at 20.
[89] Komen op cit note 46 at 270.
[90] *NEMA* supra note 31 at Section 1.
[91] The Constitution of South Africa, 1996 [The Constitution].
[92] M Oosthuizen, M van der Linde and E Basson 'National Environmental Management Act 107 of 1998 (NEMA)' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 127-128.
[93] Ibid at 128.
[94] Kidd op cit note 14 at 20.

3.2. International legal framework protecting avifauna

3.2.1 Rio Declaration

The Rio Declaration is recognised as an economic international instrument encompassing the 'polluter pays principle'.[95] The Rio Declaration falls under a non-binding instrument i.e. Agenda 21, which is a political plan used to drive equitable partnerships in protecting the environment toward the goal of sustainable development.[96] States are urged to develop their National legislation to ensure that the polluter pays for environmental damages. The Principle is aimed at reducing pollution and environmental damages, and can be used to encourage a SEF developer to compensate for any loss or damage suffered by the environment or humans by being responsible for any environmental degradation caused, as opposed to the State or the consumer bearing the responsibility.[97] The Rio Declaration also encompasses the precautionary approach under Principle 15, indicating that a lack of scientific certainty is no reason to postpone actions in the prevention of serious or irreversible damage to the environment.[98] A lot of research is still to go into SEFs and their potential impacts on avifauna, and a cautious approach must therefore be undertaken.

3.2.2 The Convention on Biological Diversity

The Convention on Biological Diversity 1992 (CBD) is an international convention, to which SA is a Party and is bound by the CBD.[99] The CBD is a binding international law to maintain biodiversity global commitment through sustainable development by encompassing the conservation of biological diversity, and the sustainable use of its components.[100]

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[95] Ibid at 8.
[96] HA Strydom 'Essentialia of International Environmental Law' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 60 [Strydom].
[97] F Oosthuizen 'The Polluter pays principle: Just a buzz word of environmental policy?' (1998) 5(2) *SAJELP* 356.
[98] United Nations *Rio Declaration on Environment and Development* (1992) Principle 15.
[99] Department of Environment, Forestry and Fisheries ' South Africa becomes the twelfth country to ratify the Nagoya Protocol' available at https://www.environment.gov.za/content/sabecomes_12thcountry_ratify_nagoyaprotocol#:~:text=South%20Africa%20became%20Party%20to,benefits%20derived%2C%20will%20be%20shared. accessed on 22 July 2020.
[100] 'Convention on Biological Diversity' available at *https://www.cbd.int/intro/*, accessed on 11 December 2019.

Contracting State parties must develop national strategies, plans or programmes in support of conservation and sustainable use of biological diversity, or integrate appropriate conservation measures into existing ones.[101] Each contracting party must appropriately establish a system of protected areas, where mitigation measures can be implemented for the conservation of biological diversity,[102] and which can promote the protection of natural habitats of viable populations of species.[103] The CBD supports impact assessments and minimising adverse impacts through appropriate procedures i.e., Strategic Environmental Assessments (SEAs) and Environmental Impact Assessments (EIA), such that parties might adequately plan when undertaking any activity that could result with negative impacts on biodiversity.[104] The CBD is relevant in the development of SEFs and the protection and conserve avifauna through all project phases, including planning, construction and operation. The incorporation of mitigation measures into an activity in support of sustainably developed SEFs is encouraged.

3.2.3 The Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (CMS) is an intergovernmental treaty to which SA is a signatory. CMS is used to address the conservation of terrestrial, aquatic and avian migratory species as it recognises the irreplaceable value of wild animals as part of the earth's natural system that requires conservation effort from the State.[105] The CMS includes policy and guideline to protect against impacts from man-made infrastructure such as SEFs and related infrastructure, so as to avoid a species becoming endangered or threatened. CMS requires preventative measures for appropriate actions to be undertaken in support of conservation of migratory species.[106] Every effort must be undertaken by a party to prevent adverse impacts on a migratory species as a result of activities or infrastructure that impede the migratory path or prevent migration of a given species.[107] It was decided at the CMS COP7

[101] Convention on Biological Diversity (1992), Article 6.
[102] Ibid at Article 8a.
[103] Ibid at Article 8d.
[104] Ibid at Article 14.
[105] Convention on the Conservation of Migratory Species of Wild Animals (1979) [CMS].
[106] Ibid at Article II, par 1 and 2.
[107] Ibid at Article III, par 4b and 4c.

(Resolution 7.2), that migratory species are to be considered in impact assessments through EIAs and SEAs, thereby assisting SA to minimise impact on avifauna.[108]

3.2.4 The Agreement on the Conservation of African-Eurasian Migratory Water Birds

The Agreement on the Conservation of African-Eurasian Migratory Water birds (AEWA) is an intergovernmental treaty developed under the framework of CMS, dedicated to the coordinated conservation of migratory waterbirds and their habitats[109] across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago.[110] The AWEA Action Plan is legally binding for participating countries, and details measures for Contracting Parties to undertake in terms of species and habitat protection from human activities with the aim to maintain favourable conservation status of migratory waterbirds within a country's borders. South Africa has been a Contracting Party since 2002.[111]

AEWA Conservation Guideline No. 11[112] is the most relevant guideline for migratory birds and SEF infrastructure, as it outlines the SEA and EIA procedure to avoid, minimise or mitigate impact of infrastructural developments and related disturbance affecting waterbirds as key decision-making steps. The mitigation hierarchy is followed to firstly avoid negative impacts (or enhance positive impacts) from taking place as a first resort i.e., change location of a proposed project if effect on waterbirds is significant. Secondly, through mitigation, by reducing impacts to an acceptable risk to allow for on-site restoration, or thirdly, to compensate or offset for any impact on waterbirds in a case where infrastructure is required, and impacts cannot be avoided. The developer must create an alternate habitat on another site to compensate for habitat loss.[113]

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[108] UNEP 'Convention of the Conservation of Migratory Species of Wild Animals' (2004) available at *https://www.cms.int/sites/default/files/document/Doc_08_EIA_Combined_E_0.pdf*, accessed on 16 December 2019.
[109] 'Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) Agreement Text and Annexes as amended by MOP7' (2018) Article II, available at *https://www.unep-aewa.org/sites/default/files/instrument/agreement_text_english_final.pdf*, accessed on 16 December 2019.
[110] 'AEWA' available at *https://www.unep-aewa.org/en/legalinstrument/aewa*, accessed on 16 December 2019.
[111] Ibid.
[112] G Tucker, J Treweek 'AEWA Conservation Guidelines No. 11Guidelines on how to avoid, minimise or mitigate the impact of infrastructure developments and related disturbance affecting waterbirds' (September 2008) available at *https://www.unep-aewa.org/sites/default/files/publication/cg_11_0.pdf*, accessed on 15 December 2019 [Tucker].
[113] Ibid at 9.

3.3 South African legal framework protecting avifauna

3.3.1 The Constitution

The Constitution acts as framework legislation for which the environment must operate. It protects biodiversity, inclusive of avifauna, as it contains environmental rights, under which the environment itself is protected against degradation.[114] The Constitution also stipulates the various responsibilities amongst the different governmental spheres. There are administrative responsibilities between different levels of government,[115] i.e., National (authority vested in Parliament), Provincial (authority vested in provincial legislation), and Local (authority vested in Municipal councils). The division amongst these three spheres limits the powers of each sphere to pass legislation based on their authoritative mandate, as one sphere cannot make a judgement on a matter that falls outside of its jurisdiction, making a piece of legislation invalid should it fall outside of the competence of the decision maker of a particular sphere.[116] These tiers do not necessarily operate as a hierarchy, but have different roles and operate separately, having a distinctive, interdependent, and interrelated legislative power over a medium.[117]

An environmental right encompasses both a fundamental human right, as well as the protection of the natural environment. Green rights, also known as 'people's' or 'solidarity' rights[118] implicate environmental and public rights, which are embedded into the Constitution.[119] Formal policies and legislation are formulated to protect such rights.[120] Section 24 of The Constitution states, that everyone has the right to a sustainably clean and healthy environment, one that is not harmful to their health and wellbeing, granting everyone access to a healthy and safe living environment.[121] The Constitution therefore plays a pivotal part as the underlying framework to avoid harm to the environment. Animals are protected under the Constitution through the protection of human rights

[114] Kidd op cit note 14 at 21.
[115] *The Constitution* supra note 91 at s43.
[116] W Freedman, 'The legislative authority of the local sphere of government to conserve and protect the environment: a critical analysis of Le Sueur v Ethekwini Municipality [2013] ZAKZPHC 6 (30 January 2013)' (2014) 17(1) *PELJ* 567.
[117] *The Constitution* supra note 91 at s40.
[118] Kidd op cit note 14 at 21.
[119] *The Constitution* supra note 91 at s24.
[120] Kidd op cit note 14 at 21.
[121] *The Constitution* supra note 91 at s24.

in terms of the environmental right outlined in s24(b)[122] through concepts such as 'conservation' and sustainable use' for the mutual respect of animals, inclusive of wild birds, despite there being no mention of non-human animals in the Constitution.[123] The survival of a species is critical for sustainable development in the form of biodiversity conservation.[124]

As expressed in the case of *Director: Mineral Development, Gauteng Region, v Save the Vaal Environment,*[125] environmental rights fall under the ambit of fundamental human rights. It concludes that the legal process according to which a development is approved, is to consider environmental concerns highlighting the principle of sustainable development.[126] A concerned civilian can oppose a development that is already authorised by a Competent Authority (CA) based on their Constitutional rights in support of sustainable development i.e., through an appeal process.[127] The general application of the *audi alteram partem* rule applies under the Constitution,[128] granting a fairness or duty to act in response to a given administrative decision.[129]

The argument of *Save the Vaal Environment v Sasol Mining* was primarily based on environmental concerns, namely the threat of the mining in an environmentally sensitive area impacting on fauna and flora, including red data species.[130] The court granted *Save the Vaal Environment* a right to be heard through an appeal. Similarly, SEFs can threaten flora and fauna, specifically impacting avifauna, through direct, indirect and cumulative impact. The construction and operation of an SEF can be opposed by concerned parties through an appeals process in line with Section 43 of NEMA should they believe an authorisation was inadequately granted to a developer where the impacts of a SEF could impact negatively on a sensitive receiving environment[131].

[122] *The Constitution* supra note 91 at s24(b).
[123] D Bilchitz 'Exploring the Relationship Between the Environmental Right in The South African Constitution and Protection for the Interests of Animals' (2017) 134 *The South African Law Journal* at 741.
[124] Ibid at 742.
[125] *Director: Mineral Development, Gauteng Region, v Save the Vaal Environment* 1999 (2) SA 709 (SCA) at para 20 [Vaal].
[126] Ibid at para 20.
[127] Ibid at para 4.
[128] *The Constitution* supra note 91 at s33.
[129] VL Peach *The Application of The Audi Alteram Partem Rule to the Proceedings of Commissions of Inquiry (*unpublished LLM Dissertation, Potchefstroom University, 2003) 23.
[130] *Vaal* supra note 125 at para 6b.
[131] *NEMA* supra note 31 at s43.

Environmental degradation is often the cause of non-governmental bodies. Section 24 of the Constitution gives responsibility to natural and juristic persons, as well as the State.[132] It can then be argued that it is the responsibility of all to conserve and protect avifauna for the sake of current and future generations through the implementation of sustainable development measures. Section 8(2) of the Constitution makes provision for binding a natural or a juristic person within reason of the nature of the right, and the nature of any duty imposed by the right as provided for in the Bill of Rights.[133]

Citizens have a duty to protect and conserve the country's natural environment, which is supported by section 24b of the Constitution,[134] through the utilisation of the environment in a morally and ethically acceptable manner in preserving environmental integrity.[135] In fulfilling Section 24b, as outlined by the Constitutional Court, the case of *Government of the Republic of South Africa v Grootboom*[136] indicates that the State has a responsibility to ensure compliance to Section 24a for protection of people's human rights to have a health environmental conducive to their wellbeing[137]. 'Mere legislation is not enough'.[138] The State is required to develop well thought out legislative measures i.e., through plans and policies, as well as to ensure they are implementable within reason.[139]

In the case of *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province, and Others*[140], the practical relevance of the principle of sustainable development is highlighted in line with the Constitution s24b(iii)[141]. The case notes sustainable development, sustainable use and exploitation of natural resources to be at the core of environmental protection, and concluded that it is a duty of the court to ensure that development is sustainably carried out for future generations

[132] Kidd op cit note 14 at 24.
[133] *The Constitution* supra note 91 at s8(2).
[134] Ibid at s24b.
[135] Kidd op cit note 14 at 23.
[136] *Government of the Republic of South Africa v Grootboom* 2001 (1) SA 46 (CC).
[137] W Beata, 'Environmental Right in Terms of the Constitution' (14 February 2018) available at *https://www.polity.org.za/article/environmental-right-in-terms-of-the-constitution-2018-02-14*, accessed on 24 July 2020.
[138] Ibid at para 42.
[139] Ibid.
[140] *Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province, and Others* 2007 (6) SA 4 (CC) [Fuel Retailers].
[141] Ibid at para 45.

not to suffer as a result of present-day actions from development.[142] The court therefore has a crucial role to play in protecting avifauna through environmental protection, while promoting the interrelated economic benefits associated with the development of SEFs.[143]

SEFs are governed by their potential to impact on the natural environment with the aim to prevent pollution and ecological degradation.[144] Adequate planning and investigation must be undertaken for SEFs to promote conservation of protection of avifauna[145] through sustainable development,[146] which is at the core of the protection of the environment.[147]

3.3.2 Environmental Conservation Act

The Environmental Conservation Act 73 of 1989 (ECA) was one of the first Acts promoting environmental protection, but was limited to scenarios of significant and detrimental environmental damage.[148] The development of SEFs is governed by Section 31A of ECA, mainly outlining mechanisms limiting detrimental environmental impact through the powers of the Minister, CA, local authority, or government institutions ,based on their opinion of such development and associated impacts.[149] Such authorities can cease the construction or operation of an SEF, or take the necessary steps as they deem fit, to oppose detrimental and harmful damage to the natural environment. A SEF developer, to the satisfaction of authoritative powers may be responsible to financially counter or compensate for damages should they be found guilty of causing detrimental impacts to avifauna.[150] The authoritative powers can also remedy the damage should they not find the responsible person fit to carry out such a task and can thereafter recover any expenses incurred.[151]

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[142] Ibid at para 102.
[143] Ibid at 104.
[144] *The Constitution* supra note 91 at s24 b(i).
[145] Ibid at s24 b(ii).
[146] Ibid s24 b(iii).
[147] I Cox, I Lax and P Britz 'Biodiversity law and the weeding out of alien species' (29 July 2015) available at *http://www.derebus.org.za/biodiversity-law-and-the-weeding-out-of-alien-species/*, accessed on 15 July 2019 [Cox].
[148]Environmental Conservation Act No.73 of 1989 at s31A.
[149] Ibid at s31A (1).
[150] Ibid at s31A (2).
[151] Ibid at s31A (3,4).

Certain parts of the ECA have since been repealed by NEMA to ensure a more conducive environmental protection strategy through integrated environmental governance. The ECA was limited as it only made provision to stop an activity/ development, prosecute the offender and stipulate restoration of the environment, and did not make adequate provision on how to deal with listed activities that had commenced without the necessary authorisations.[152]

3.3.3 The National Environmental Management Act

The National Environmental Management Act 107 of 1998 (NEMA) acts as an overarching human rights-based legislative framework for the protection of the natural environment in SA. It enables sustainable development to be undertaken for activities in compliance with the Constitution, through the implementation of environmental principles as set out in Section 2 of NEMA.[153] Planning law inclusive of regulations and policies have been developed, and is constantly evolving, so as to protect land across all realms inclusive of the natural environmental, socio-economic conditions and cultural heritage, which allows for stakeholder engagement on all levels.[154] A series of fundamental guiding principles are set out under NEMA for cooperative governance in line with NEMA Section 24 so as to protect the environment from significant damages.

(i) Environmental Impact Assessment Regulations (2014 as amended)

Planning laws are developed to limit and protect the environment and assist in sustainable development.[155] NEMA Chapter 5, Section 24 outlines the requirements for Integrated Environmental Management (IEM) as a planning tool used in development and conservation that binds government across all tiers, i.e. national, provincial and municipal levels. It is in line with the EIA regulations, NEMA Chapter 5, Section 24 states that an EA must first be issued through the undertaking of an EIA process prior to the construction of any construction activities that may

[152] Erasmus *An Analysis of Section 24G of the National Environmental Management Act* (unpublished thesis 2011 at 4) available at *http://pmg-assets.s3-website-eu-west-1.amazonaws.com/docs/120828analysis_0.pdf*, accessed on 6 November 2019 [Erasmus].
[153] Cox op cit note 147.
[154] *NEMA* supra note 31 at s24(1).
[155] R Paschke & J Glazewski 'Ex Post Facto Authorisation in South African Environmental Assessment Legislation: A Critical Review' (2006) 9(1) *PELJ*, 120 [Paschke].

trigger a listed activity.[156] A favourable EA outlining conditions to construct, operate and manage, and decommission an SEF is ideally sought after by a SEF developer.

The proposed activity must be investigated and assessed, and findings reported to the CA to decide on the relevant course of action.[157] SEFs are considered 'Strategic Important Development' (SID) and therefore environmental applications are directed to the National Department of Environmental Affairs as the CA for authorisation.[158] This in line with section 24(2) of NEMA for activities relating to the IRP 2010-2030 inclusive of associated amendments which are now considered as activities implicated to having international commitments or relations.[159] The National Department of Environment Affairs is the competent authority for triggered listed activities for renewable energy projects.[160]

Included as part of an EIA is the value-added tool of an Environmental Management Programme (EMPr),[161] through which impact management outcomes are described and appropriate mitigation measures proposed to counter avifaunal impacts (amongst other aspects of an EIA)[162] to a minimum during the various phases of a SEF.[163] Content presented through an EIA process is considered public information, and an adequate public participation process must be undertaken to give reasonable opportunity for the public and organs of state to participate and raise concerns or provide support to a proposed SEF.[164]

The IFC recommends that an EIA process is undertaken by an experienced Independent Environmental Assessment Practitioner (EAP) and specialists.[165] This is in line with EIA regulations section 13, which further stipulates that an EAP and specialists must be knowledgeable of NEMA and the EIA regulations and guidelines required to undertake a specific activity to ensure compliance as such. The EAP must run a transparent process and disclose all findings of the study

[156] *EIA Regulations* supra note 76 at s2.
[157] *NEMA* supra note 31 at s24 (1).
[158] DOE op cit note 17 at 36.
[159] DEA GN 779 of GG 40110; 01/07/2016.
[160] EIA guideline op cit 35 at 30.
[161] *NEMA* supra note 31 at s24 (1)(d).
[162] Ibid s24 (4)(b)(ii).
[163] *EIA Regulations* supra note 76 at Appendix 4.
[164] *NEMA* supra note 31 at s24 (4)(a)(v).
[165] IFC op cit note 18 at 98.

to the proponent, registered interested and affected parties (I&APs) and the CA of the proposed development.[166]

Three (3) listing notices were promulgated in 2014[167] and amended in 2017.[168] The listing notices are differentiated by the level of impact of a listed activity and its geographical location. Listing Notice 1[169] was developed for modest activities that have a low-to-moderate impact category rating. Listing Notice 2[170] was developed for moderate-to-high impact activities that may potentially have a detrimental impact on the environment if not managed and evaluated for its impacts. Lastly, Listing Notice 3[171] was developed to list all activities in sensitive locations, seen as having low-to-high impact on a specific environment. Various criteria can trigger different environmental assessment processes i.e., a Basic Assessment (BA) as per Listing Notice 1 and/or Listing Notice 3, or alternatively an EIA process, as per Listing Notice 2. In terms of the listing notices, one or two or even all three of the Listing Notices could be triggered simultaneously, dependent on project-specific information received for an SEF. Each project is to be assessed uniquely and within its own capacity, taking into consideration cumulative impacts.[172]

Typical activities for an SEF, i.e., should a proposed SEF be more than 10 Megawatts (MW), but less than 20MW relevant to the stipulated exclusions,[173] and the clearance of indigenous vegetation of 1 hectare (ha) but less than 20 ha,[174] may trigger a BA[175] through the development of

[166] *EIA Regulations* supra note 76 at s13.
[167] GN 983; GN 984; GN 985 of GG 38282; 04/12/2014.
[168] GN 327, GN 325, GN 324 of GG 40772; 07/04/2017.
[169] *Listing Notice 1* supra note 34.
[170] *Listing Notice 2* supra note 36.
[171] *Listing Notice 3* supra note 38.
[172] *EIA Regulations* supra note 76 at Appendix 3 3(j).
[173] *Listing Notice 1* supra note 34 at Activity No.1.
[174] *Listing Notice 1* supra note 34 at Activity No.27.
[175] A BA process is a shortened process in comparison to that of an EIA. The BA is governed by strict timelines and entails the submission of a final Basic Assessment Report (BAR) inclusive of specialist reports; and a final EMPr to the CA for decision making purposes within 90 days of submission of an application. All draft documentation is to undergo a minimum 30-day public participation process (PPP) as part of the public review within the allocated 90-day period. Once the documentation has undergone public review, any changes to the documents as a result of comments received will be evaluated and deemed significant or insignificant. If a significant change to the initial documentation and application is necessary, the amended documentation will need once again to be available for public review. In addition to an extended public participation period, a notification and motivation in writing will need to be submitted to the CA requesting an additional 50-day extension from the initial application date if required. The CA must, within 107 days of receipt of the final BAR and EMPr in writing, either grant or refuse an EA for the construction and operation of a SEF and provide reasons for the decision and conditions if applicable (GN 326 in GG 40772; 07/04/2017 s19, 20). A total of 197 days is required for a typical BA process, where alternatively, 247 days should significant changes or new information be presented.

infrastructure required for the generation of electricity from a renewable resource if Listing Notice 1 is triggered. Alternatively, an EIA process[176] is required to be undertaken if Listing Notice 2 is triggered, should a typically proposed SEF have a generation capacity greater than 20MW[177] and/or require the clearance of more than 20 ha of indigenous vegetation.[178]

It must be noted that if one listed activity from Listing Notice 2 is triggered, irrespective if all other triggered activities fall within Listing Notice 1, then a full EIA process must be undertaken. The construction of ancillary infrastructure of a SEF can also trigger an EIA or a BAR, including but not limited to transmission lines,[179] roads,[180] and water pipelines,[181] all of which have the potential to negatively impact on avifauna; and which will ideally require avifaunal specialist input to assess level of impact with adequate mitigation measures proposed. Avifaunal specific specialist input is, however, not a legislated prerequisite for a SEF environmental assessment and is under the discretion of the CA and the EAP to decide on the inclusion of such specialist input. In general, under NEMA, specialist input is a general requirement where applicable,[182] but avifauna input is often subsumed under the terrestrial ecology study or a general biodiversity study inclusive of fauna and flora. A standalone avifaunal impact assessment is ideal, but not necessarily the current practice.

Red listed and priority species should be recorded in and around in surrounding SEF footprints during an EIA process, inclusive of critically endangered and endangered species. All potential impacts need to be considered from infrastructure collisions to avifaunal species displacement. An avifaunal specialist should include recommendations and mitigation measures as part of an

[176] A scoping report that has been subjected to a PPP (a minimum of 30 days) must submitted to the department within 44 days from date of submission of an application to the CA. The CA must within 43 days of receipt of the scoping report either accept the report or refuse it. Post acceptance of the scoping report, an EAP must within 106 days submit an Environmental Impact Assessment Report (EIAR) inclusive of any specialist reports and an EMPr that has undergone a minimum 30-day PPP review process to a CA. There is the possibility that that the EIAR and EMPr will require an additional 50 days (granted be submitted within 156 days of acceptance of the scoping report) should significant changes or new information be added to the document. This would require revision and is subjected to an additional 30 days of PPP. The competent authority must within 107 days of receipt of the EIAR and EMPr, in writing either grant environmental authorisation or refuse authorisation (GN 326 in GG 40772; 07/04/2017 s21, 22, 23, 24). A total of 300 days is required for a typical EIA process that follows stringent timelines, or alternatively 350 days should significant changes or new information be presented.
[177] *Listing Notice 2* supra note 36 at Activity No.1.
[178] *Listing Notice 2* supra note 36 at Activity No.15.
[179] *Listing Notice 1* supra note 34 at Activity No.11; and *Listing Notice 2* supra note 36 at Activity No.9.
[180] *Listing Notice 1* supra note 34 at Activity No.24; and *Listing Notice 2* supra note 36 at Activity No.27.
[181] *Listing Notice 1* supra note 34 at No.10.
[182] *NEMA* supra note 31 at s24 (1)(f).

avifaunal study and monitoring programme to advise an EAP and the CA whether a proposed development should be granted an EA or not. Continued direct and indirect impacts can significantly reduce avifauna population sizes driving a species toward becoming a Red list species.[183]

There is a need to protect the environment while promoting socio-economic development to aid in sustainable development.[184] The *Fuel Retailers* judgment discusses the obligations of environmental authorities to integrate socio-economic considerations when deciding the outcome of an EIA application in line with the Constitution s24b(iii).[185] There are a number of socio-economic considerations surrounding the development of SEFs. The National Integrated Energy Plan (IEP), Government Gazette 2016, recognises RE as a potential for the generation of electricity. The IEP lists eight key objectives for energy planning in SA, all of which can be met by solar energy within reason, and needs to be taken into consideration through a secure energy supply; minimising the cost of energy; increasing the access to energy; diversification of energy sources; minimising emissions from energy sources; promoting energy efficiency; promoting the localisation and job creation; and the promotion of the conservation of water.[186]

(ii) Duty of Care

Section 28(1) of NEMA provides for the protection of the environment and of civil responsibility to mitigate environmental degradation to promote the protection of social and natural environmental factors.[187] It places a duty of care on every citizen responsible for actual or potential environmental degradation to rectify such harm, provides guidance in undertaking a cautious approach to any activity or development impacting on the environment.[188] It confers power to an environmental authority on either a national or provincial level to make a decision regarding the development of a project based on the information presented through an EIA process.[189] Reference can be made to NEMA Section 28 within a s24G application, as a duty of care is placed on the

[183] Jenkins op cit note 44 at 4, 45.
[184] Kidd op cit note 14 at 25.
[185] *Fuel Retailers* supra note 140.
[186] Department of Energy *Integrated Energy Plan* (GN 1430 of GG 40445 of 25/11/2016) at 11.
[187] *NEMA* supra note 31 at s28.
[188] Kidd op cit note 14 at 10.
[189] *NEMA* supra note 31 at s28(4).

applicant to rectify or mitigate harm initially caused to the environment both individually and through subsequent cumulative impacts.[190]

The general duty of care is outlined in the Act for the prevention, control and rehabilitation of environmental degradation. A duty of care is placed on SEF developers to undertake development in the interest of the environment in support of sustainable development.

(iii) Precautionary Principle

NEMA Section 2(4)(a)(vii)) outlines a cautious approach in support of sustainable development. Since 1992, the precautionary principle is applied to conditions where there is uncertainty due to a lack of scientific evidence in almost all international environmental protection instruments.[191] Where an action is questioned as it could result in irreversible or costly harm to the environment, it is best to proceed with caution to avoid such damage.[192] A risk assessment is advisable in such cases to assume the degree of damage expected from a proposed development through an impact assessment process. Necessary mitigation measures or project viability can be determined. Treaties for the management of living resources often include the application of the precautionary principle, i.e., the CBD is based upon the precautionary principle.[193] The precautionary principle must be applied to the construction and operation of an SEF as there are several unknowns that each SEF can unlock. Each SEF is unique to its desired location and must each be assessed in its own capacity, to establish foreseeable impacts through an EIA, and determine whether such impacts can be mitigated to acceptable avifaunal impact levels or avoided should irreversible associated damage be anticipated through a cautious approach.

Similarly, the preventative principle and the Principle of Integration can be applied to the protection of avifauna in a South African context against the development of SEFs. Sands (cited in Kidd, 2011) in the context of international agreements has noted that "the need to ensure that environmental considerations are integrated into economic and other development plans,

[190] Erasmus op cit note 152 at 20,24.
[191] L Shelton & A Kiss 'Guide to International Environmental Law' (2007) *Martinus Nijhoff Publishers* at 94, available at *https://scholarship.law.gwu.edu/faculty_publications/1050/*, accessed 25 September 2019 [Shelton].
[192] Kidd op cit note 14 at 9.
[193] Shelton op cit note 191 at 94.

programmes and projects, and that development needs are taken into account in applying environmental objectives (the principle of integration)".[194] The precautionary principle in general can be considered the most preventative measure in environmental law.[195]

(iv) Polluter Pays Principle

The polluter pays principle is deeply entrenched in South African law through NEMA Section 2(4)(p) and is interpreted as assigning responsibility to the agent causing environmental pollution or environmental degradation to bear the costs through means of economic consequences.[196] It stimulates a person or entity intending to carry out an activity that could potentially cause harm to the environment to think of more rational ways to utilise scarce environmental sources, and to reduce possibilities of pollution through various activities.[197] While cutting carbon, pollution is essential to mitigating the negative impacts on avifauna,[198] where SEFs could also be seen to cause "avifauna pollution" through habitat destruction and direct collision of infrastructure causing a negative impact on species numbers. An SEF developer will be accountable and responsible for the remedial costs related to any "avifauna pollution" (harm) caused by their power plant and will be required to offset related environmental damages if negligence is proven.

3.3.4 The National Environmental Management Biodiversity Act

The National Environmental Management: Biodiversity Act[199] (NEMBA) is a piece of South African legislation built around the framework of NEMA, and is formed under the CBD, the Biodiversity White Paper, and the Constitution.[200] NEMBA makes provision for the consolidated management and conservation of biodiversity in the country through the protection of species[201]

[194] Kidd op cit note 14 at 17.
[195] Shelton op cit note 191 at 95.
[196] Strydom op cit note 96 at 80.
[197] Ibid.
[198] L Smithson-Stanley and L Bergstorm ;Why Solar Power is good for birds' available at *https://www.audubon.org/news/why-solar-power-good-birds*, accessed on 17 December 2019.
[199] National Environmental Management: Biodiversity Act 10 of 2004 [NEMBA].
[200] Cox op cit note 147.
[201] GN 214 of GG 31968; 03/03/2009.

and ecosystems[202], inclusive of avifauna (through wildlife management)[203]that require national protection by the different management authorities across the three spheres of government.[204] The State is entrusted with the responsibility to manage, conserve and sustain biodiversity in South Africa.[205]

It is a criminal offence for a SEF developer to intentionally develop a SEF in a sensitive location i.e., a threatened ecosystem, National Protected Area or National Protected Area Expansion Strategy Focus Area, failing to undertake adequate biodiversity planning in line with NEMA section 24F which refers to offences relating to the commencement or continuation of a listed activity[206]. The said developer can face severe penalties for the non-compliance[207] of NEMBA in the form of a fine not exceeding five million rand, or imprisonment for a period not exceeding five years, where second time or subsequent offenders can face up to R10 million fines, up to ten years imprisonment, or both.[208] A developer must take care during the planning phase to ensure that a proposed SEF footprint does not impact on threatened biomes or ecosystems of avifauna that could lead to the threat or extinction of a species of any kind.[209] NEMBA Section 2 has been amended to include principle (iA), which aims to "protect the ecosystem as a whole".[210] Avifaunal biodiversity inclusive of habitat is protected against the development of SEFs through environmental rights, which are at the forefront of development planning in line with the Constitution.

[202] GN 83 of GG 37302; 07/02/2014.
[203] AB Rumsey 'Terrestrial Wild Animals' in HA Strydom & ND King (ed), *Fuggle & Rabie's Environmental Management in South Africa* (2009) 400 [Rumsey].
[204] A Paterson 'Biological Diversity' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 540, 547 [Paterson].
[205] *NEMBA* supra note 199 at Section 3.
[206] *NEMA* supra note 31 at s24F.
[207] Cox op cit note 147.
[208] *NEMBA* supra note 199 at s98(2)a & b amended by s31(b) of Act 14 of 2013.
[209] National Department of Environmental Affairs 'Action Plan for Implementing the Convention on Biological Diversity's - Programme of Work on Protected Areas' (2012) available at *https://www.cbd.int/doc/world/za/za-nbsap-powpa-en.pdf*, accessed on 12 December 2019.
[210] National Environmental Management Laws Amendment Act 14 of 2013, Section 2 Amendment of Section 2 of Act 10 of 2004.

(i) Threatened or Protected Species Regulations

Threatened or Protected Species Regulations (TOPS)[211] was implemented in 2007 as a national standard to conserve protected or threatened species in SA through permitting in line with Chapter 4 of NEMBA.[212] Provision is made to protect critically endangered, endangered, vulnerable, or protected species so as to ensure survival in natural habitats,[213] irrespective of where they are in SA in line with the TOPS list published by the Minister of Environmental Affairs.[214] A person may not carry out a restricted activity that may impact on a species listed under TOPS without a permit.[215] Development of a SEF can be prohibited by a national authority in the absence of the an issued TOPS permit in line with s88(1) of NEMBA[216] should a listed species of avifauna be potentially impacted under TOPS regulations.[217]

3.3.5 The National Environmental Management: Protected Areas Act

Provision is made for the declaration and management of protected areas under the National Environmental Management: Protected Areas Act 57 of 2003 (NEMPA). Avifauna as a component of biodiversity is protected under NEMBA, with further protection under NEMPA should it fall within a protected area in the country[218] as defined under section 9.[219] The reasoning behind declaring protected areas is to preserve ecological integrity[220], conserve biodiversity[221], protect areas representative of all ecosystems, habitats and species occurring naturally[222], as well as to protect rare or threatened species.[223] Because sensitive species of avifauna may not necessarily fall within a network of formally protected areas, NEMPA Section 17 makes provision for the declaration of a protected environment outside of a formally demarcated protected area, subject to

[211] *Threatened or protected species regulations and lists* (GN R 151 and 152 in GG 29657 of 23 February 2007).
[212] Rumsey op cit note 203 at 405.
[213] Ibid at 401.
[214] Paterson op cit note 204 at 553-554.
[215] *NEMBA* supra note 199 at Section 57 (1).
[216] Ibid at Section 88(1).
[217] Paterson op cit note 204 at 553.
[218] Kidd op cit note 14 at 125.
[219] National Environmental Management: Protected Areas Act 57 of 2003, S9.
[220] Ibid at S17(b).
[221] Ibid at S17(c).
[222] Ibid at S17(d).
[223] Ibid at S17(e).

special conservation measures,[224] which offer additional protection to avifauna against development.

3.3.6 Provincial nature conservation legislation

SA has several provincial nature conservation ordinances or biodiversity legislation. These have been in place prior to the enactment of NEMBA since the responsibility of preservation of flora and fauna was initially vested in provincial authorities.[225] Conservation authorities are challenged regarding the outdated concepts and approaches that remain applicable, as boundaries for example of the old provinces overlap and do not match the country's current nine provinces.[226] Where there is a lack of uniformity and clarity in provincial legislation, the National legislation, i.e. NEMBA and NEMA will prevail in most cases to provide for the protection of avifauna.[227]

Provincial ordinances[228] of relevance to nature conservation encompassing the protection of avifauna including, but not limited to, the Eastern Cape: *Nature and Environmental Conservation Ordinance 19 of 1974* and *Ciskei Nature Conservation Act 10 of 1987*; Free State: *Nature Conservation Ordinance 8 of 1969*, *QwaQwa Nature Conservation Act 5 of 1976*, *Bophuthatswana Nature Conservation Act 3 of 1973* and *Bophuthatswana Protected Areas Act 24 of 1987*; Gauteng: *Nature Conservation Ordinance 12 of 1983*; KwaZulu-Natal: *Nature Conservation Ordinance 15 of 1974*, Kwa-Zulu Nature Conservation Act 29 of 1992, and *Kwa-Zulu Nature Conservation Management Act 9 of 1997*; Limpopo: Nature Conservation Ordinance 12 of 1983, *Limpopo Environmental Management Act 7 of 2003*; Mpumalanga: *Mpumalanga Nature Conservation Act 10 of 1998*; Northern Cape: Northern Cape Nature Conservation Act 9 of 2009; *Nature Conservation Ordinance 19 of 1974*; *Northwest: Bophuthatswana Nature Conservation Act 3 of 1973, Nature Conservation Ordinance 19 of 1974, Nature Conservation Ordinance 12 of 1983, Bophuthatswana Protected Areas Act 24 of 1987*, Western Cape: *Nature and Environmental Conservation Ordinance 19 of 1974*, *Western Cape Nature Conservation Board Act 15 of 1998*,

[224] JC Knobel 'The Conservation Status of Eagles in South African Law' (2013) 16(4) *PER/PELJ*, 179.
[225] Kidd op cit note 14 at 100.
[226] Paterson op cit note 204 at 542.
[227] *The Constitution* supra note 91 at Section 146 (2).
[228] Environmental Affairs Provincial offices available at *https://www.environment.gov.za/contacts/provincial_offices*, accessed on 09 January 2020.

Western Cape Constitution, Act 1 of 1998.[229] Listing Notice 3 of the EIA regulations further encompass provincial protection through streamlined listed activities province specific.[230]

3.4 Conclusion

There are no policies enacted specifically for the protection of avifauna in SA, but we can conclude that there is a range of legal instruments protecting avifauna in SA against irreversible impact from the construction and operation of a SEF as well as against cumulative impacts of similar developments. The legal framework is complex, and environmental issues i.e., protection of avifauna, cannot be dealt with in isolation. Laws frequently intersect other regulatory matters, such as land use planning, protected areas, infrastructure development, and environmental management to name a few, broadening the protection of avifauna against the development of SEFs.[231]

The current legal instruments in place safeguarding against significant potential harm to avifauna *prior* to construction and operation of a SEF seem adequate. The EIA regulations are detailed to a point that allows for sustainable development to be undertaken through careful planning and design. Impact mitigation takes precedence in SA, and CAs take their duty to protect the environment seriously when assessing and awarding EAs as they are confined to the Constitution and supporting framework legislation to ensure the environment is sustainably developed for current and future generations. The development of SEFs in SA is therefore governed by law and avifauna is protected against unforeseeable harm through rigid impact assessment processes.

National, provincial and local authorities must fulfil their duty under the Constitution by undertaking measures to prevent and address ecological degradation and promote wildlife, habitat and biodiversity conservation to secure ecologically sustainable development.[232] NEMA is a strong framework legislation developed to guide environmental management in SA and is a crucial planning tool set out to identify and mitigate all potential impacts prior to the undertaking of an activity.[233]

[229] M Van der Linde & L Feris *Compendium of South African Environmental Legislation* 2nd ed. (2010) 20-30.
[230] Listing Notice 3 supra 38.
[231] Paterson op cit note 204 at 542.
[232] Paterson op cit note 204 at 541.
[233] Paschke op cit note 155 at 124.

Non-compliance of legislated planning mechanisms or failure to undertake the necessary biodiversity planning can result in severe fines and/or imprisonment as governed by NEMBA. A duty of care is placed on developers to rectify or mitigate subsequent and cumulative harm to avifauna from harmful impacts posed *post* construction and operation of an SEF.[234] Through NEMA, several principles underpin environmental management in SA, covering accountability, remediation, and mitigation of negative impacts against activities impacting on the environment. A section 24 G application is one way of rectifying environmental harm under NEMA. The Constitution further makes provision for a right to a healthy living environment giving individuals and organisations a right to be heard through an appeal to stop activity causing significant environmental degradation.

[234] Erasmus op cit note 152 at 24.

Chapter 4
Enabling legislation making provision for Solar Energy Facilities

4.1 Introduction

SA as a middle-income country is one of the highest carbon intensive economies,[235] stemming from its reliance on high energy mining for coal,[236] and is globally responsible for 1.6% of greenhouse gas (GHG) emissions.[237] An SEF has a smaller carbon footprint in comparison to non-renewable technologies. A PV facility for example has a significantly favourable carbon footprint of 20–81 g CO^2-eq/kWh in comparison to the same electricity generation capacity of coal, lignite, oil, or natural gas with carbon footprints of 1079, 1231, 885, and 642 g CO^2-eq/kWh, respectively.[238] According to the International Institute for Sustainable Development, the world is moving toward a 'just transition' in energy.[239] SA needs to keep up with the trend to a post carbon society.[240] Several factors contribute to the significant increase in SA's renewable industry, the one of relevance to this paper is the "Proactive government policy in procuring RE capacity".[241]

From Chapter 3, we acknowledge that the increase in development can pose a threat to the environment,[242] where the construction and operation of SEFs may potentially impact on avifauna. Climate change, which results from continued GHG emissions into the earth's atmosphere, also accounts for one of the largest threats to biodiversity. The use of non-renewables for the generation of electricity poses a larger potential risk to biodiversity in comparison to natural RE sources.[243] Furthermore, a just transition to an RE source such as solar can assist in combatting acid rain and

[235] Strydom op cit note at 96 at 459.
[236] T Alton, A Channing, R Davies, F Hartley, K Makrelov, J Thurlow & D Ubogu 'Introducing carbon taxes in South Africa' (2014) 116 *Applied Energy* 344 [Alton].
[237] DOE op cit note 17 at 14.
[238] M J de Wild-Scholten 'Energy payback time and carbon footprint of commercial photovoltaic Systems' (2013) 119 *Solar Energy Materials and Solar* Cells 305.
[239] P Gass 'In Search of Just Transition: Examples From Around the World' (8 April 2019 available at https://www.iisd.org/blog/just-transition-examples) accessed on 8 July 2019 [Gass].
[240] AB Rumsey & ND King 'Climate Change: Impacts, Adaptation, and Mitigation; Threats and Opportunities' in HA Strydom & ND King ND (ed), *Fuggle & Rabie's Environmental Management in South Africa* (2009)1049 [King].
[241] GreenCape *Utility – scale renewable energy – 2019 Market Intelligence Report* (2019) 6.
[242] 'Fuel Retailers vs Environmental Management' (2013) available at *https://www.environment.co.za/environmental-laws-and-legislation-in-south-africa/fuel-retailers-vs-environmental-management.html*, accessed 29 December 2019.
[243] Malafry op cit note 60 at 17.

associated ecological damage.[244] The sustainable development of SEFs therefore needs to strike a balance between potential direct and indirect avifaunal impacts as opposed to the biodiversity benefits to avifauna from its reduced carbon footprints from the use of RE sources.

4.2 Need and desirability for SEFs: International multilateral climate change negotiations

Global climate change refers to an increase in temperature which affects ocean levels among other impacts,[245] which are possibly more pertinent to avifauna, having a domino effect on species diversity. Climate change is a "global problem requiring a global solution through the concerted and cooperative efforts of all countries".[246] It requires a collective global response to combat the common consolidated environmental threat, but is often not easily dealt with under public international law as emissions are not always apparent for each province or state.[247] The European Union (EU) has shifted its focus to climate change mitigation policies within their energy sector due to an estimated 80% of GHG arising from fossil fuel related energy sources.[248] Multilateral Treaty arrangements are adopted in climate change matters as the common principle of responsibility and balance with social and economic conditions are governed by the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto protocol, and the Paris Agreement.[249]

4.2.1 The United Nations Framework Convention on Climate Change

The UNFCCC came into force on 21 March 1994 as a result of acknowledgement of the worldwide crisis and evidence of global warming.[250] The UNFCCC was negotiated as a framework by several

[244] D Driesen, 'Renewable Energy under the Kyoto Protocol: The Case for Mixing Instruments' 3, *file:///C:/Users/agovender/Dropbox%20(SolarReserve)/Downloads/SSRN-id1030018.pdf*, accessed 30 December 2019 [Driesen].
[245] 'Causes of climate change and sea-level rise' available at *https://coastadapt.com.au/causes-of-climate-change-and-sea-level-rise*, accessed 30 December 2019.
[246] Department of Environmental Affairs *White Paper: National Climate Change Response* (2012) 9 [NCCR].
[247] Malafry op cit note 60 at 45.
[248] Ibid at 13.
[249] Strydom op cit note at 96 at 74.
[250] A Gilder and E Swanepoel 'Climate Change' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 746 [Gilder].

nations as intergovernmental efforts to combat the challenge of global warming, CO_2 being one the six main target gas emissions identified for reduction.[251] SA ratified the UNFCCC in 1997, thereby adopting and endorsing the Convention as a formal sanction on the Country.[252]

The aim of the UNFCCC is to reduce human-induced climate system interference by alleviating GHG concentrations in the earth's atmosphere, and in so doing, be part of the solution to promote the sustainable development of SEFs to reduce impact on avifauna as one specialist area. One of the reasons identified is for ecosystems to adapt naturally to climate change within a specific timeframe.[253] Should global warming not be controlled within a suitable timeframe, it could have fatal impacts on avifaunal biodiversity. Article 2 provides the objective of the Convention, which aims to stabilise concentrations of GHG to levels that would avert unsafe anthropogenic interference with the climate system.[254]

The UNFCCC recognises a globally shared climate system, which can be impacted majorly by industrial CO_2 emitters.[255] The UNFCCC takes into consideration that the EU has transitioned to set high targets to incorporate carbon neutral energy as a priority, inclusive of energy infrastructure and grid strengthening infrastructure which impacts on loss of land and habitat transformation. At the same time, EU policy also aims to stop the loss of biodiversity, and to restore it where feasible. An assessment was made to consider climatic objectives by the implementation of large-scale renewable energy while aiming to achieve the objective of the protection of biodiversity.[256]

4.2.2 The Kyoto Protocol

The Kyoto Protocol is a legal instrument adopted by the Conference of Parties (COP) in 1997 intended to therefore strengthen the UNFCCC[257]. Roles and responsibilities termed "common but differentiated responsibility" were defined in a binary system through the Kyoto Protocol in a global climate change response to stabilise the inadequacy of the UNFCCC. Flaws, however,

[251] 'United Nations, Kyoto Protocol - Targets for the first commitment period' available at https://unfccc.int/process/the-kyoto-protocol, accessed on 2 May 2019.
[252] King op cit note 240 at 1052.
[253] Ibid at 1053.
[254] United Nations *Framework Convention on Climate Change*, 1992, 4.
[255] King op cit note 240 at 1052.
[256] Malafry op cit note 60 at 26.
[257] Gilder op cit note 250 at 748.

began to show in the binary system as GHG emissions and economies of developing countries began to peak in the 21st century.[258] Developed countries have potential to access more advance technologies and are therefore expected to aid in substantially reducing carbon emissions to collectively make a global difference in climate change.[259] SA therefore has a role to play in incorporating and promoting the development of sustainably developed SEFs toward responsibly reducing carbon emissions.

Article 2 outlines how each party is to implement policies and measures to reduce the national climate circumstance, through the incorporation of technologically sound renewable forms of energy.[260] The Clean Development Mechanism (CDM) is incorporated into the Protocol which allows South Africa as a developing country to reduce their air emissions toward meeting the Kyoto targets.[261] The establishment of a SEF can contribute as being a part of a CDM project in stimulating sustainable development that could indirectly aid in the protection of avifauna.[262]

4.2.3 The Paris Agreement

The responsibility to minimise climate change has become that of many nations.[263] The Paris Agreement was adopted in 2015 at the COP 21[264] sustainable development summit to offset carbon emissions by promoting global cooperation,[265] which effectively replaced the Kyoto Protocol. The Paris Agreement was signed by all UNFCCC participants, who are all pursuant of climate change goals.[266] The Paris Agreement allows for nationally determined contribution (NDC) through a common global framework for self- differentiating states parties.[267] SA only ratified the Paris Agreement on 1 November 2016, but communicated its intended NDC to the UNFCCC on 25

[258] Gilder op cit note 250 at 746.
[259] Driesen op cit note 244.
[260] United Nations *Kyoto Protocol*, 1998, Article 2, 1(a)(iv) [Kyoto Protocol].
[261] Ibid at Article 12.
[262] 'The Clean Development Mechanism' available at *https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism*, accessed on 30 December 2019.
[263] BirdLife op cit note 54.
[264] Gilder op cit note 250 at 744.
[265] BirdLife op cit note 54.
[266] CNN 'Kyoto Protocol Fast Facts' available at *https://edition.cnn.com/2013/07/26/world/kyoto-protocol-fast-facts/index.html*, accessed on 1 July 2019.
[267] HA Strydom and E Cairncorss 'Energy' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 489.

September 2015, maximising its mitigation commitment from a relative deviation from 'business as usual' to an 'absolute peak, plateau and decline greenhouse gas emission trajectory range'.[268]

South Africa's main contributor to climate change is its reliance on cheap low-grade coal to support energy demands. SA as a developing country should be no exception in pursuing climate change goals, due to increasingly harmful atmospheric emitters to aid the relief of carbon change. This Agreement is a key driving force of SEFs in support of renewable energy as parties to the UNFCCC acknowledge the need for sustainable energy in developing countries, particularly Africa, through the deployment of RE.[269] The Paris Agreement recognises the importance of protecting biodiversity to ensure ecological integrity.[270] Article 7 highlights the need for sustainable management of natural resources to protect ecological systems through which avifauna will benefit.[271] Cleaner energy is necessary to meet Paris Agreement goals[272] so as to achieve decarbonisation and consequent well-being improvements,[273] which includes the well-being of avifauna as covered by the Constitution (refer to Chapter 3 for detail).

4.3 South African drivers to reduce carbon emissions

The South African goal coupled with its own challenges is to achieve a good balance between "energy, development and environmental goals".[274] A just transition to the RE sector will assist SA in remaining competitive in international markets. In 2008, SA adopted policy in the form of the National Energy Act,[275] with one of its objectives being to diversify the mix of power,[276] while promoting contributions from RE sources to meet national energy demands.[277] In 2009-2010 the IRP was drafted and adopted with significant RE investment. Additionally, the South African government through the National Department of Environment Affairs has set up a green fund to

[268] Ibid.
[269] Ibid.
[270] United Nations *Paris Agreement*, 2015, 2.
[271] Ibid at Article 7 (9)(e).
[272] Gass op cit note 239 at 224.
[273] I Aucamp, F Retief and N King 'The Social Dimension of Environmental Management' in ND King, HA Strydom & FP Retief (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2018) 1210.
[274] Alton op cit note 236 at 344.
[275] National Energy Act, No. 34 of 2008.
[276] Ibid at Section 2 (b).
[277] Ibid at Section 19 (d).

promote and create support for the private sector to transition to a low carbon society through innovative projects.[278]

The South African government must implement a mechanism to replace reliance on fossil fuels across all sectors.[279] The IRP is a good starting point to focus on renewable energy, considering its benefits in comparison to coal as a non-renewable energy source. Visser et al. have noted that "A target of 17 800MW of new generation capacity from renewable sources was set for 2030".[280] The REIPPP has already contributed to a reduction of 25,3 mega tonnes of carbon emissions.[281] The development of solar energy is a key component in assisting South Africa to reach its carbon emission pledge.

The South African government has committed to a reduction of GHG by 34% and 42% by 2020 and 2025 respectively, in terms of the Copenhagen Accord, [282] backed by the Paris Agreement committing South Africa to a 42% reduction over 'business as usual' by the year 2025.[283] The primary objective of carbon tax is to reduce GHG emissions in a manner that is cost effective, affordable and sustainable.[284] Tax incentives are being used to combat climate change through the enactment of the Carbon Tax Act 15 of 2019[285] e.g., a SEF as a RE facility will receive a rebate.[286] Avifaunal benefits will therefore be afforded as an indirect climate change benefit.

The National Climate Change Response Strategy for South Africa[287] contains strategies to enable South African national government departments to address climate change issues. The protection of animal biodiversity is one of its objectives to offset South African vulnerability to climate

[278] Department of Environment Affairs 'Green Fund' (2019) available at *https://www.environment.gov.za/projectsprogrammes/greenfund*, accessed on 10 July 2019.
[279] King op cit note 240 at 1049.
[280] Visser op cit note 20 at 1285.
[281] 'Statement By Mr Derek Hanekom, Minister Of Tourism Of South Africa, High-Level Segment Of The Katowice Climate Change Conference (Cop24/Cmp14/Cma1-3), Katowice, Poland' (12 December 2018) available at *https://unfccc.int/sites/default/files/resource/SOUTHAFRICA_cop24cmp14cma1-3.pdf*, accessed on 2 May 2019.
[282] Visser op cit note 20 at 1285.
[283] J Grist, 'Analysis: The Significance of The Paris Agreement' (3 July 2017) available at https://www.accountancysa.org.za/analysis-the-significance-of-the-paris-agreement/, accessed on 25 July 2020.
[284] 'President Cyril Ramaphosa signs 2019 Carbon Tax Act into law' (26 May 2019) available at *https://www.gov.za/sites/default/files/gcis_document/201905/4248323-5act15of2019carbontaxact.pdf*, accessed on 01 July 2019.
[285] Carbon Tax Act 15 of 2019 (GN 647 in GG 42483, 23/05/2019).
[286] Gilder op cit note 250 at 784.
[287] Department of Environmental Affairs and Tourism *A National Climate Change Response Strategy for South Africa* (2004).

change.[288] The strategy refers to an intervention to establish procedures for CDM projects, making use of RE resources in support of the establishment of SEFs.[289]

The National Climate Change Response: White Paper presents the vision of SA to transition to a "climate – resilient and lower carbon economy and society".[290] The White Paper aims to stabilise atmospheric GHG concentrations within specific timeframes to reduce climate change interference, in line with Article 2 of the UNFCCC.[291] It further sees the protection of biodiversity habitats and ecosystems as critical for the functioning of important services for societal functions despite the compromising climate change and therefore supports sustainable development,[292] as well as the RE flagship programme for South Africa.[293]

The Renewable Energy Development Zones (REDZ)[294] was compiled under NEMA Section 24(3) to facilitate the authorisation of large-scale wind and solar PV energy development. Proposed projects identified for development in a REDZ will be subject to a BA procedure[295] as 8 strategic zones were identified located outside of areas of geographic importance[296]. The REDZ acts as an attractive incentive to expand the electricity grid with the aim to reduce negative environmental consequences by concentrating development areas[297].

[288] Ibid at 21.
[289] Ibid at 16.
[290] *NCCR* supra note 246 at 5.
[291] Gilder op cit note 250 at 762.
[292] *NCCR* supra note 246 at 10.
[293] Ibid at 31.
[294] Department of Environmental Affairs *Notice of Identification in Terms of Section 24(5)(a) and (b) of the National Environmental Management Act, 1998, of the Procedure to be followed in applying for Environmental Authorisation for Large Scale Wind and Solar Photovoltaic Energy Development Activities Identified in Terms of Section 24(2)(a) of the National Environmental Management Act, 1998, When Occurring in Geographic Areas of Strategic Importance* (GN 113 and GN 114 of GG 41445; 16/02/2018) [REDZ].
[295]CDH 'Renewable Energy Development Zones' available at *https://www.cliffedekkerhofmeyr.com/en/news/publications/2016/projects/projects-and-infrastructure-alert-25-february-renewable-energy-development-zones.html*, accessed on 19 January 2020 [CDH].
[296] 'REDZs and Transmission Corridors' available at *https://egis.environment.gov.za/redz*, accessed on 19 January 2020.
[297] CDH op cit note 295.

4.4 Conclusion

The need for the proposed installation of SEFs is demonstrated and justified in this chapter. There is a need for SEFs to be accelerated to achieve cleaner energy production mechanisms.[298] A country needs a good energy policy in order to aid in economic development, which is basically linked to Gross Domestic Product.[299] The South African IRP aims to achieve efficient and reliable energy supply by 2030 with added benefits of low tariffs and reduced environmental impact.[300] There is a need to increase carbon neutral RE sources i.e., SEFs, considering there are climate change objectives that need to be fulfilled,[301] with the aim to reach a climate neutral society within the context of environmental law.[302]

All associated environmental impacts, positive and negative, must be considered for the sustainable development of SEFs, in support of SA moving towards a cleaner energy future.[303] Environmental legal and procedural requirements must be met to ensure the sustainable development of SEFs. The adoption of international and local policies, influential climate change laws; and the circumvention of the use of coal must be increased to promote benefits from RE.[304]

South Africa has a need for additional RE toward a carbon neutral energy system, which encompasses the establishment of more utility scale SEFs.[305] Despite its benefits from reduced carbon emissions, SEFs are still governed by potential negative harmful impacts on avifauna.[306] While the protection of avifauna is an important objective, the development of solar energy may also be important from a socio-economic perspective and could provide a better alternative to coal-

[298] 'Green Climate Fund' available at *https://www.greenclimate.fund/what-we-do/portfolio-dashboard*, accessed on 18 April 2019.
[299] G Soava, A Mehedintu, M Sterpu & M Raduteanu 'Impact of Renewable Energy Consumption on Economic Growth: Evidence From European Union Countries' (2018) 24(3) *Technological and Economic Development of Economy* 915.
[300] *IRP* supra note 1 at 8.
[301] Malafry op cit note 60 at 14.
[302] Ibid at 15.
[303] Union of Concerned Scientists 'Environmental Impacts of Solar Power available at *http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/environmental-impacts-solar-power.html#.WOd1PfmGODI* accessed 16 July 2019.
[304] IRP 2018: Too little, too slowly for energy transition? *https://www.fin24.com/Opinion/irp-2018-too-little-too-slowly-for-energy-transition-20181113* (Accessed 17 April 2019).
[305] Malafry op cit note 60 at 17.
[306] Walston op cit note 7 at 406.

based energy. A careful balance must exist to manage development while protecting avifauna within environmental law.[307]

[307] Malafry op cit note 60 at 17.

Chapter 5
Conclusion and Recommendations

5.1 Conclusion

5.1.1 Introduction

South Africa has a high 'green fuel' potential and needs to act quickly so as to alleviate the current energy crisis while the country strives for economic growth and stability.[308] Sustainably developed SEFs offer a viable solution in contributing to meet these energy demands. The need for SEFs and socio-economic benefits in a developing country is, however, complicated, as the conundrum of solar power versus nature conservation can be a stumbling block in the road to clean energy.

The rapid development of SEFs in SA raises concerns regarding the potential related impacts on avifauna populations as there are still many unknowns regarding the development.[309] Avifauna runs the risk of direct, indirect, and cumulative impacts, through collision, singeing or electrocution with infrastructure; toxicity through contamination of land and water; habitat loss, transformation or fragmentation; or as a result of water resource shortages in arid environments.[310] Control measures therefore need to be put in place from a planning stage to account for and counter these impacts. Small scale SEFs do not necessarily trigger environmental regulations, and can easily avoid evaluation through rigorous environmental assessments, where a proposed PV facility under 10 megawatts located within an urban area does not automatically trigger an environmental assessment process.[311] Despite avifaunal impacts being more of a concern for Red List species, several small-scale SEFs in areas where such species are unlikely to feature could still significantly impact on even the more common avifaunal species, potentially resulting in cumulative impacts through displacement. This contribution to research is an attempt to organise the compendium of legal instruments encompassing the protection of avifauna from well desired SEFs in SA.

[308] 'Eskom crisis, jobs top ANC's priority list, Ramaphosa vows' (11 January 2020) available at https://www.fin24.com/News/eskom-crisis-jobs-top-ancs-priority-list-ramaphosa-vows-20200111, accessed 11 January 2020.
[309] Visser op cit note 20 at 1285.
[310] BirdLife International op cit note 22.
[311] *Listing Notice 1* supra note 34 at Activity 1.

5.1.2 Opposition SEF developers may face

International and local environmental stakeholder groups governing the protection of avifauna, where BirdLife are involved in rallying against developments that pose a threat.[312] While acknowledging the need for RE as an intervention to alleviate climate change and reach clean energy targets, they support responsible and sustainable development,[313] and are not shy to oppose development that significantly threaten avifauna. Development that has already been authorised can face opposition based on Constitutional rights in support of sustainable development, as is reflected in the case of *Save the Vaal.* [314]

5.1.3 How SA laws and policies govern the development of SEFs while protecting avifauna

Current laws promoting the protection of the natural environment aim to regulate the environment and promote sustainable development.[315] SA lacks avifauna specific legislation, although birds are covered under statutory law and protected under the medium of 'environment' under nature conservation. The 'environment' is protected at a national level under Section 24 of The Constitution through a rights-based approach,[316] giving responsibility to natural and juristic persons as well as the State to endeavour toward environmental protection.[317] Adequate planning and investigation must therefore be undertaken prior to any construction phases of SEFs to promote conservation and sustainable development.[318]

Framework legislation formed under the Constitution binds government across all tiers, i.e. national, provincial. and municipal levels for conservation efforts. NEMA acts as an umbrella coverage for environmental protection.[319] NEMA Section 24 and 28, and Section 31A of ECA as read with supporting environmental and nature conservation Acts, regulations, and principles:

[312]Upton op cit note 25.
[313] WC Birding Forum op cit note 23 at 3.
[314] *Vaal* supra note 125 at para 4.
[315] M Van der Linde 'National Environmental Management Act 107 of 1998 (NEMA)' in HA Strydom & ND King (ed), Fuggle & Rabie's *Environmental Management in South Africa*, (2009) 193.
[316] *The Constitution* supra note 91.
[317] Kidd op cit note 14 at 24.
[318] *The Constitution* supra note 91 at s24 b(ii).
[319] Kidd op cit note 14 at 20.

NEMBA; NEMPA; EIA Regulations; Duty of Care; Precautionary Principles; Polluter Pays Principle; TOPS, etc. as well as provincial Ordinances, which all seem to collaboratively offer adequate protection to avifauna for a sustainable future. The State is entrusted with the responsibility to manage, conserve and sustain biodiversity (which includes avifauna) in the country through the implementation of principles and good governance.[320]

SEFs are also governed by international economic instruments imposing a duty and responsibility on the developer to develop sustainably under governing principles through a cautious approach as per the Rio Declaration. The integration of conservation measures into new and existing plans and policies through the CBD promote the protection of avifaunal natural habitats and species conservation. CMS and AEWA are additional international tools governing the protection of avifauna in SA through conservation efforts of migratory species placing onus on the State and involved party to avoid a species becoming endangered or threatened against man made infrastructure.[321] The undertaking of appropriate EIAs and SEAs as planning tools are encouraged to incorporate mitigation measures and follow the mitigation hierarchy to further support and promote sustainable developments.[322]

5.1.4 Rationale promoting the construction of sustainably developed SEFs

The sustainable development of SEFs needs to strike a balance between potential avifaunal impacts as opposed to the biodiversity benefits from its reduced carbon footprints using RE sources. SA needs to keep up with the trend to a post carbon society.[323] Multilateral Treaty arrangements have been adopted by SA with the common principle of responsibility and balance with social and economic conditions governed by the UNFCCC (Article 2); the Kyoto Protocol (Article 2); and the Paris Agreement (Article 7).[324] The aim is to stabilise concentrations of GHG to levels from human induced climatic system interference (inclusive of energy infrastructure and grid strengthening infrastructure) while achieving the objective of the protection of biodiversity.[325]

[320] *NEMBA* supra note 199 at Section 3.
[321] *CMS* supra note 105.
[322] Tucker op cit note 112 at 9.
[323] King op cit note 240 at 1049.
[324] Strydom op cit note at 96 at 74.
[325] Malafry op cit note 60 at 26.

Local drivers promoting RE include the National Energy Act, the IRP, make a considerable allocation for solar power until 2030, assisting South Africa in reaching its carbon emission pledge. Carbon Tax incentives, the National Climate Change Response Strategy for South Africa and the National Climate Change Response enable South African national government departments to address climate change issues. There is a definite need for the proposed installation of SEFs as outlined in Chapter 4. Sustainably developed utility scale SEFs can assist government in reducing climate change and minimise impacts on avifauna through adequate planning and the implementation of suitable mitigation measures. SEFs alone act as a form of RE may not be the solution to global warming, but can serve as a cogent solution to make a difference[326] in reducing GHG and protecting avifauna through biodiversity objectives. The sustainable development of SEFs can assist to combat acid rain and associated ecological damage.[327]

5.2 Recommendations

5.2.1 Planning

Scientists have an important role to play in the protection of the environment. Policy makers and decision makers rely on scientific/specialist input for them to make informed decisions benefitting environmental protection.[328] SA has an advanced legislative framework protecting biodiversity through nature and environmental conservation laws and regulations, which appear to offer adequate avifaunal protection.

An EIA is as a planning tool under NEMA, providing the opportunity to predict and identify potential environmental impacts prior to the construction and operation of a SEF.[329] Avifaunal species, especially those listed under the TOPS list appear to be protected adequately through the enforcement of sustainable development. Non-compliance to NEMA is still however problematic as it is difficult to control and ensure that each triggered development activity as per the EIA regulations, is adequately assessed so as to minimise and avoid significant environmental damage

[326] Driesen op cit note 244.
[327] Ibid.
[328] Shelton op cit note 191 at 95.
[329] Paschke op cit note 155 at 124.

unless reported by a whistle blower.[330] Cumulative as well as small scale SEF development not triggering the EIA regulation, can also be difficult to track and control, leaving a window for significant environmental degradation inclusive of avifaunal impact. Legislation needs to enforce more stringent control measures in support of protecting South Africa's avifaunal resources for the sake of future generations. Developers attempting to fast track a SEF triggering an EIA should only receive leniency if backed by law, i.e. REDZ.[331] A full impact assessment must be undertaken despite needs and desirability in the middle of an energy crisis to avoid and mitigate environmental harm, for the protection of avifauna and their ecosystems, in upholding sustainable development in South Africa.

While the protection of avifauna is an important objective, the development of SEFs may also be highlighted from a socio-economic perspective in line with local planning tools i.e. the IRP, Spatial Development Frameworks and Integrated Development Plans. Developers need to strike a proper balance to integrate sustainable development and socio-economic benefits so as to motivate for the approval of an SEF through a well undertaken EIA process in providing for a better solution alternative to coal-based energy to resolve the energy crisis. Guidelines documents should be taken more seriously and promulgated for enforcement for each developer to face more stringent requirements. The EIA guidelines for Renewable Energy Projects,[332] as an example, offers solutions toward better management of environmental impacts, yet it is not enforceable.

Avifaunal specialist input into EIA studies is critical to ensuring that site specific mitigation measures can be implemented for the protection of avifaunal resources in support of sustainable development. Avifaunal specialists should be consulted before an SEF is authorised by a CA to obtain an expert opinion on the development footprint and affected surrounding ecological environment to provide for adequate environmental protection.[333]

Most of South African legislation is centered around mitigation in line with the EIA process, but new legislation should focus on the mitigation hierarchy, where avoidance at the outset of planning

[330] L September *Critical analysis of the application of s24G provisions of NEMA- the Gauteng Province experience* (unpublished dissertation, Potchefstroom: North-West University, 2012) 7.
[331] REDZ op cit note 294.
[332] Department of Environment Affairs 'Guidelines for Renewable Energy Projects' (2015) available at https://www.environment.gov.za/sites/default/files/legislations/EIA_guidelineforrenewableenergyprojects_0.pdf, accessed on 14 January 2020.
[333] Jenkins op cit note 44 at 9.

is key to protecting avifauna specifically as per international agreements, such as AEWA. Placement of infrastructure must be governed more strictly in order to completely avoid certain avifaunal impacts and components of biodiversity, particularly for species not yet on the TOPS and red listed priority species as identified by avifaunal specialists. Areas of high biodiversity value, or protected areas and sensitive habitats supporting endangered/critically endangered biodiversity, must be avoided and excluded from a development footprint, and potential impacts considered for ancillary infrastructure.[334]

5.2.2 Guidance from the European Union

The EU today plays a key role in environmental law and policy, as the European Community is considered to have a sophisticated and constantly evolving body of law, having a big influence on international law.[335] Today, there are a number of EU Treaty provisions that are dedicated to the environment.[336]' Recognising a conservation threat to their environment, the EU has established a Birds Directive amongst other biodiversity legislative protective measures to protect their birds in an attempt to balance biological threats,[337] having over 500 naturally occurring wild bird species.[338] This Directive is one of their oldest pieces of legislation, having been first enacted in 1979. Their Birds Directive was subsequently amended in 2009 to promote sustainable development.

The EU recognises habitat loss and degradation as one of the highest impacts on their bird species. Mitigation measures must be applied to various man-made activities to counter associated destruction and pollution of habitats that could impact on the number of birds.[339] The Birds Directive focuses on the protection of avifaunal habitats for endangered and migratory species.[340] Solar development in the EU can benefit from the governance of the bird Directive, through the

[334] IFC op cit 18 at 61.
[335] O Nablieyo *The Polluter pays Principle and Environmental Liability in South Africa* (unpublished mini-dissertation, North-West University 2009) 19.
[336] Malafry op cit note 60 at 91.
[337] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the *conservation of wild birds* OJ L 20, 26.1.(2010) [Wild Birds Directive].
[338] European Commission 'The Birds Directive' (30 April 2019) available at http://ec.europa.eu/environment/nature/legislation/birdsdirective/index_en.htm, accessed on 17 July 2019 [Birds Directive].
[339] *Wild Birds Directive* supra note 337 at Objective 6 (1).
[340] Birds Directive op cit note 338.

incorporation of appropriate mitigation measures to protect avifaunal specific habitats and counter direct impact from SEF infrastructure identified from the development of SEFs.

The EU recognises the issue with migratory species and the difficulties around protection. Similarly to South Africa, the EU requires scientific research specific to member countries (Article 20) so as to ensure effectiveness of mitigation measures proposed.[341] Annexure 1 as referenced in Article 4, contains a list of avifaunal species subject to special conservation measures in support of survival and reproduction as per their area of distribution. Similar to SA TOPS Regulations, the list of 194 bird represents species in danger of extinction, vulnerable due to habitat changes, rare or those with small population numbers and those requiring special attention.[342] The European Commission has stated that "Member States must designate Special Protection Areas (SPAs) for their survival and all migratory bird species".[343] All member states are to submit reports in accordance with Article 12 on status and trends to reflect bird populations and derogations as per Article 9 in support of sustainable development. Special Protective Areas are established for species of concern.

SEF related activities may conflict with the Habitat Directive[344] of the EU which regulates the conservation of natural habitats for habitat protection. 18%[345] of the EU is deemed a protected area through the protection of their 7th Environmental Action Programme to 2020.[346]

Both the Birds Directive and the Habitat Directive are relevant for the protection of birds against habitat loss, infrastructure development and obstruction of migration paths in the EU that could occur from the construction and operation of SEFs. SA can learn from both Directives providing protection of special importance areas and SPAs, as well as special areas of conservation (Natura 2000 sites found across the EU).[347]

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[341] *Wild Birds Directive* supra note 337 at Objective 13 (1).
[342] Ibid at Article 4 (1) a-d).
[343] Birds Directive op cit note 338.
[344] European Communities 'Council Directive 92/43/EEC on the *conservation of natural habitats and of wild fauna and flora* 21 May 1992.
[345] European Union Decision No 1386/2013/Eu of the European Parliament and of the Council of 20 November 2013 on a General Union Environment Action Programme to 2020 'Living well, within the limits of our planet' at *Annex* available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013D1386&from=EN, accessed 19 October 2019.
[346] EU 'Environmental Action Programme to 2020' available at *http://ec.europa.eu/environment/action-programme/*, accessed on 17 July 2019.
[347] Malafry op cit note 60 at 103.

Plans and policies of a county need to be adequately aligned and authorities need to communicate with each other and set out realistic objectives. A good example of such is the Swedish Ministry of the Environment that is responsible for Sweden's environmental and climate policy dealing with energy together with environmental issues.[348] Swedish law under the EU aims to incorporate biodiversity objectives into the target of reducing the impact of climate change.[349]

5.2.3 Overall recommendations

South African law does not clearly establish how socio-economic benefits and avifaunal protection can be balanced, as this lies in the opinion of a decision maker through an EIA. The following recommendations are to be considered in contribution to a holistic planning approach in support of the sustainable development of SEFs while mitigating significant impacts and enhancing the protection of avifauna in SA:

- avifaunal specific policies should be developed backed by scientific resources to grow protection of avifauna as an environmental medium, consistent with the objectives of current policy to avoid fragmentation;
- new legislation promoting the development of SEFs (and RE) must be in line with nature conservation requirements;
- an EIA for a new SEF (or RE facility) should appropriately assess the effect on climate change as part of the study to better evaluate and balance total conservation efforts;[350] and
- commitment and transparency are required from all players, i.e. developers, decision makers, and government to play their part in delivering an environmentally sustainably safe and secure energy sector.

[348] Government Offices of Sweden, available at*: https://www.government.se/government-of-sweden/ministry-of-the-environment/*, accessed 29 December 2019.
[349] Malafry op cit note 60 at 26.
[350] Malafry op cit note 60 at 276.

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