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Nuclear Energy: A new threat to South Africa's Heritage? The Case of Public Participation and Heritage Protection at Thyspunt, Eastern Cape, South Africa.

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A minor dissertation submitted in partial fulfilment of the degree of Master of Science Archaeological Heritage Management in the Faculty of Science

DIVISION OF ARCHAEOLOGY
SCHOOL OF GEOGRAPHY, ARCHAEOLOGY AND ENVIRONMENTAL STUDIES.

Declaration

I declare this dissertation titled: “Nuclear Energy: A new threat to South Africa's Heritage? The Case of Public Participation and Heritage Protection at Thyspunt, Eastern Cape, South Africa” is my unaided work. It is being submitted in partial fulfilment of the degree of Master of Science Archaeological Heritage Management in the Faculty of Science, University of the Witwatersrand Johannesburg. South Africa. It has not been submitted in the University before for any degree or examination.



Signed:

Mfundo Hlangani (838223)

Date: 4 November 2019

Abstract

This study focuses on Thyspunt area in the Eastern Cape Province where an extensive Environmental Impact Assessment (EIA) was conducted for over 5 years. The Heritage Impact Assessment (HIA) revealed that Thyspunt contains extensive heritage resources that will be destroyed as result of a Nuclear Power Station (NPS) development. Therefore this study investigates the role played by Interested and Affected Parties (I&APs) during the EIA Public Participation Process (PPP) as a tool for heritage protection. A thematic analysis of the comments submitted by I&APs during the various stages of the EIA reveal five central themes that center around the importance of heritage to the I&APs' concerns with nuclear safety, lack of access to information, the participant's mistrust in the EIA process and technical procedure, and recommendations for the use of cleaner and renewable energy. The study reveals the effectiveness of the EIA public participation process as a vehicle for resistance and tool for local communities to participate in a decision-making process and heritage management in South Africa. Also, it reveals how heritage can give a voice to groups and communities. Although heritage may have multiple or different meanings and communities may have differing agendas, the PPP contributed in halting the development at Thyspunt.

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Abbreviations and Acronyms

The list below is an alphabetical order of abbreviations and acronyms in this document.

ANC - African National Congress

AU – African Union

ACO – Archaeology Contracts Office

AIA – Archaeological Impact Association

BID - Background Information Document

BRICS - Brazil, Russia, India, China and South Africa.

CANE - Coalition against Nuclear Energy

CDC – Culture and Development Conference

CNPS - Conventional Nuclear Power Station

CNEPP - Consultative National Environmental Policy Process

CMMH - Commission on Museums, Monuments, and Heraldry

BA – Basic Assessment

BWR - Boiling Water Reactor

DAC - Department of Arts and Culture

DACST - The Department of Arts, Culture, Science, and Technology

DEA - Department of Environmental Affairs

DEAT - Department of Environmental Affairs and Tourism

DoE - Department of Energy

DLPG - Department of Provincial and Local Government

ECA – Environmental Conservation Act

ECB - Electricity Control Board

EIA - Environmental Impact Assessment

EIR - Environmental Impact Report

ESA – Early Stone Age

EAP - Environmental Assessment Practitioner

EAPASA - Environmental Assessment Practitioner Association of South Africa

EMP – Environmental Management Plan

EPZ – Emergency Planning Zone

ESCOM - Electricity Supply Commission

ESR & POS - Environmental Scoping Report and Plan of Study

EVKOM - Elektrisiteitsvoorsieningskommissie

FBR - Fast Breeder Reactor

FEIR – Final Environmental Impact Report

FOSTER - Friends of the St. Francis Nature Areas

GDP - Gross Domestic Product

GW - Gigawatt

GWh - Gigawatt hours

GKC – Gamtkwa Khoisan Council

HWC – Heritage Western Cape

HIA – Heritage Impact Assessment

ICPRCP - International Centre for the Study of the Preservation and Restoration of Cultural Property

IRP - Integrated Resource Plan

INES - International Nuclear Event Scale

IAEA - International Atomic Energy Agency

IEA - International Energy Agency

I&APs - Interested and Affected Parties

Km - Kilometer

LSA - Later Stone Age

MSA – Middle Stone Age

MW - Megawatt

MWe - Megawatt electrical

NEMA - National Environmental Management Act

NHRA - National Heritage Resources Act

NHA – National Heritage Agency

NECSA - Nuclear Energy Corporation of South Africa

NNR - National Nuclear Regulator

NGO - Non-governmental organization

NSIP – Nuclear Siting Investigation Programme

NWA – National Water Act

PWR - Pressurized Water Reactor

PWHR - Pressurized Heavy Water Reactor

PHRA – Provincial Heritage Resources Authority

PBMR - Pebble Bed Modular Reactor

PV - Photovoltaics

PAIA - Promotion of Access to Information Act

PAJA - Promotion of Administrative Justice Act

PPP – Public Participation Process

SACGS - South African Council for Geoscience

SAHRA - South African Heritage Resources Agency

SANS - South African National Society

StatsSA - Statistics South Africa

SEA - Strategic Environmental Assessment

SOE - State-Owned Enterprise

UCT – University of Cape Town

USA – United States of America

UNSCEAR - United Nations Scientific Committee on the Effects of Atomic Radiation

UNESCO - United Nations Educational, Scientific and Cultural Organization

WANO - World Association of Nuclear Operators

Chapter 1 - Introduction

The management and protection of heritage is one on the most important aspects of environmental management in South Africa. Heritage is significant for the formation of identity, nationhood, culture and sustainable development (Arazi 2009). However, its use and preservation are often threatened by mega projects and developments. The heritage at Thyspunt, in the Eastern Cape Province likewise was faced with a threat of destruction during the controversial Nuclear-1 project by ESKOM from early 2006. With regards to threats facing heritage in South Africa, Thyspunt was one of the sites threatened by the electricity-generating industry.

1.1 Power supply in South Africa

South Africa, like other countries, relies heavily on non-renewable energy and has also experienced increasing demand of energy due to increasing population, energy-demanding economic activities and development as well decaying old infrastructure (Van Wyk 2013). In the past six years, the country has been faced with a slacking power supply and this has caused industries and large-scale infrastructural projects to struggle (Van Wyk 2013). Although South Africa has been, in the past, among the cheapest electricity suppliers because of sufficient generating capacity, most of these were coal power stations built around the 1950s and have been operational ever since. Additional power stations, including a nuclear power station at Koeberg, Western Cape, have since been built along with the installation of alternative sources in order to diversify the so-called 'energy mix' which is a combination of primary sources of energy for generating electricity (Van Wyk 2013). ESKOM purchases some of the electricity generated from renewables, however, this is a costly process and is likely to affect the price of electricity (Van Wyk 2013).

Nuclear energy has been proposed to form an increasing part of South Africa's energy mix (Van Wyk 2013) and as a result, ESKOM selected five sites for construction of new nuclear power stations in the early 2000s. The five sites were initially selected during the 1980s, a program called the Nuclear Siting Investigation

Program (NSIP) selected fives sites to construct a new power station in the three provinces, namely Eastern Cape, Northern Cape and Western Cape. In 2006 ESKOM announced the Nuclear-1 project and plans to build a nuclear power station at the sites Bantamsklip, Duynefontein, Schulpfontein, Thyspunt and Brazil. Thyspunt in Eastern Cape was one of the sites selected by ESKOM. Thyspunt is located between St. Francis and Oyster Bay in the Eastern Cape south coast. This area was selected as one of the sites for a proposed nuclear Power Station Project by ESKOM, termed Nuclear-1. The scoping phase took place in September 2006 until November 2008. The Environmental Impact Assessment (EIA) phase commenced thereafter, including the Scoping and EIA Phases (Revised Draft EIR 2015).

This project is aimed at investigating the public participation process that was undertaken for Nuclear-1 in the area. The role the public participants played during the public participation process (PPP) has not been investigated, and the themes that emerged during the process. This dissertation utilizes a thematic analysis analytic tool (Braun and Clarke 2006) to investigate the prominent themes that emerged during the EIA PPP. The sources used include comments received during the EIA process submitted by the Interested and Affected Parties (I&APs).

1.2 Rationale

South Africa's heritage constantly faces potential threats due to expanding development, modernization and lack of compliance with legislation (Arazi 2009). Large scale activities such as mining, and electricity generation have vast environmental, social and heritage impacts. A study conducted by Leonard and Lebogang (2018) for example revealed that mining activities have negative impacts on heritage and the environment; Chirikure (2013) in a similar discussion noted that the government has put less priority on heritage by granting mining licenses on protected areas and heritage sites such as Mapungubwe, the Eastern Cape coast, Blyde River and the KwaZulu-Natal coastal areas (see also Leonard and Lebogang 2018). In comparison, there are relatively fewer studies focused on the impact of the electricity generating industry on heritage even though its impact on heritage can be

as destructive as mining developments. The EIA process for Thyspunt was undertaken between 2006 and 2008 (Revised Draft EIR 2015). According to the Heritage Impact Assessment (HIA) that formed part of the EIA, the Thyspunt area proposed for the nuclear development contains many significant heritage sites across the landscape (Hart 2010). Following the approval of a Scoping Report, which is the initial phase of an EIA, the appointed specialist conducted field surveys and research to produce an HIA report. In the report, the findings and mitigation strategies were proposed.

It seems that for the immediate future, plans have been abandoned to build the nuclear station in this area and the released Record of Decision (ROD) by the Department of Environmental Affairs (DEA) mentioned that nuclear development has been delayed for years. A PPP was carried out as part of the EIA process, but it is not clear to which extent this was instrumental in the outcome of no development in the immediate future. This case study provides the ideal opportunity to analyze and evaluate the public participation and the role that it might have played in the protection of heritage within the EIA process in the context of the electricity generating industry.

1.3 Research question:

How did the Public Participation Process undertaken through the Environmental Impact Assessment (EIA) process affect the plans for the establishment of a nuclear energy facility at Thyspunt?

1.4 Aims of the project

The project aims to:

- Document the public participation process followed for the Thyspunt Nuclear-1 site using the EIA guidelines.
- Describe themes that emerged during the Public Participation Process.

- Comment on the public participation process in terms of its procedures and inclusivity in the EIA process for the Thyspunt Nuclear-1 site.

1.5 Dissertation Structure

Chapter 1 introduces the Nuclear-1 project and the subsequent EIA public participation process that was undertaken thereafter. It introduces the gap that the dissertation will fill and communicates the importance of the study. The case of public participation at Thyspunt is presented in the context of environmental and heritage management in South Africa under the electricity generating industry. This chapter also provides the research question the dissertation intends to answer, the aims of the study including the methods used to answer the research question.

Chapter 2 and Chapter 3 form part of the literature review. Chapter 2 focuses first on the meaning and definition of heritage and the understandings of heritage by various researchers from around the world. The following subsections study ways in which heritage has been managed in South Africa during precolonial and postcolonial periods. Also, the role of development on the management of heritage, local communities and the application of legislation in heritage management are considered. The second part of Chapter 2 examines the environmental management landscape in South Africa through the lens of the EIA tool. The history and role of, as well as the loopholes in the National Environmental Management Act (NEMA) are also discussed. Public participation, an important component of the EIA process is examined and its role in environmental management examined.

Chapter 3 is the second part of the literature review and background study of the Nuclear-1 project. The first half is concerned with the electricity generating industry in South Africa. The roots and recent developments of electricity generation in South Africa are examined, as well as the origins of the Nuclear-1 project. A review on nuclear technology use, advantages and disadvantages including its reception by the South African public, are among the subsections of this chapter. The second half

of Chapter 3 introduces Thyspunt, the study area and the Public Participation Process (PPP) that was carried out. The findings of the HIA are presented and the key participants who were part of the I&APs are introduced.

Chapter 4 presents the methodological approach employed by the paper to answer the research question. A step-by-step presentation of how the method was employed is presented. This also includes data collection.

Chapter 5 is a presentation of results obtained from the data collected. This chapter includes tabulated comments from I&APs organized in themes that were identified during the methodology stage. A summary of the results is provided afterward.

Chapter 6 includes a discussion of each of the themes that emerged during the EIA PPP. The role of each theme is considered, and the results are analyzed with respect to the research question. This is the last chapter of the dissertation and presents a conclusion of the study.

Chapter 2 - Review of Previous Literature: Heritage and Environmental Management in South Africa

2.1 Introduction

This chapter reviews the current literature that exists in heritage and public participation in the context of Environmental Impact Assessment (EIA) in South Africa. The research area of Thyspunt is described and the controversial project, Nuclear-1 is investigated in relation to electricity generation and sustainable development. To begin with, the chapter discusses what is understood as heritage and its complex relationship with development in Southern Africa. The discussion draws from literature on heritage management, environmental impact assessment and generation of electricity.

2.2 The Meaning and Importance of Heritage

Heritage researchers understand heritage as a modern-day use of the past by humans for sociocultural, political and economic purposes (Lowenthal 1996; Graham *et al*. 2000, Olsen and Timothy 2002). Heritage consists of inherited elements from ancestors whether it be physical or non-physical or part of the natural environment. Olsen and Timothy (2002:7) claim that those who inherit these elements are selective of which values to inherit from their ancestors and thus "Heritage is a selective re-creation and re-interpretation of the past based upon contemporary values and ideas the inheritor feels should be passed on to the present generation". This in turn, reinforces the selected values and amplifies their level of importance to be elements of memory and celebration (Olsen and Timothy 2002). Some of these inherited elements include cultural resources or materials that are used by living and forthcoming generations (Lippe 1977). Notably, these resources have kinds of value that are either symbolic or associative, economic or aesthetic or informational. Lippe (1977) terms this 'resource-ness' and argues that it is part of a 'material cultural environment' that is an essential aspect for the continuity of cultures and understanding, thus connecting the past to the present. This continuity process is

carried out through tradition and belief systems as well as the sharing of values, ideas and heritage resources among the community.

Heritage is a very important part of human lives, Chirikure (2013:12) characterizes it as 'public good' that plays a pivotal role in nation building, the construction of identity, social cohesion and in the strengthening of religious values. Individuals often find belonging and identity in heritage and consider it a very important aspect of their lives (Ndlovu 2014). Heritage has different meanings to diverse peoples and cultures, and its level of importance is often influenced by social power relationships within communities. It can be manipulated or misused to suit certain agendas, often nationalist and personal agendas (Marmion 2012). In the current post-apartheid South Africa, conventional understandings of heritage have challenged and redefined terms of meaning-making, knowledge production and heritage constructions that were conducted in the colonial past (Corsane 2004). 'Heritage is about meaning making' (Smith 2006:87) - as a discourse, heritage is used by nations, communities, groups, individuals, and institutions to create social meaning, define identity in and about the present (Smith 2006). Heritage is also a process of remembering, a moment of experience and meaning-making that may occur in physical spaces. Although heritage is not strictly confined in physical environments, the places of heritage add significance and authority to heritage (Smith 2006).

Timothy (2007:2) mentions that "heritage is a highly politicized and contested social phenomenon". It can be misused or employed to suit various agendas (Timothy 2007). This is because it has disputed layers of meaning and understanding, the resources and artifacts associated with it often have contested values and meanings to different people and are susceptible to political manipulation (Timothy 2002; Ashworth 2003; Hall and Tucker 2004; Timothy and Boyd 2003; Allen and Brennan 2004). The contestation of the definition of heritage and its meaning stems from its relationship with history. History is a contested social issue (Timothy 2002) and does not have a singular narrative neither does

heritage. The perceptions and presentations of the past are often subject to lack of agreement (Ashworth 1999; Olsen and Timothy 2002). Olsen and Timothy (2002) recognized three ways in which heritage can be contested; the first way is the contestation of a single heritage site, artifacts or historical event by various groups who have divergent goals and understanding of the past. The authors add that each group provides its own version of the historical 'events and truth' while dismissing the opinions of the other group (Olsen and Timothy 2002). The different priorities and conceptual understandings of heritage are examples of this (Connolly 2017).

The second form of contestation includes different understandings and interpretation of history and heritage within a single community. This is a diverse interpretation of common heritage (Olsen and Timothy 2002). Because each person in a community has various or different socio-political, economic and cultural backgrounds, this shapes how they perceive and understand what they consider heritage (Apaydin 2015). This is one of the causes of diverse voices in the process of valuing heritage (Apaydin 2015). The World Heritage Sites in Turkey studied by Apaydin (2015) called Çatalhöyük and Hattuşa are examples of instances were locals within a community understood and valued heritage in multiple and diverse voices.

The third form and perhaps the most relevant to South Africa is the occurrence of multiple histories concurrently, creating a manner of contestation different from the two. Because of the multiplicity of the histories, the groups that are in a power position tend to represent and emphasize their history and heritage more while the heritage of the other group is represented less. The heritage policies, educational curriculum, tourism, and national identity are set to represent the group in power. Olsen and Timothy (2002) use colonial relationships as examples where the heritage of the colonized was largely ignored and not protected, and the ownership and custodianship of heritage was transferred to the state and the local people were forcibly moved from their lands (Corsane 2004). The ways in which heritage is contested has implications for heritage management and conservation as dissonance about whose heritage should be protected, interpreted and represented arise,

including whose identity should be celebrated (Timothy 2002). The introduction of Christianity in Southern Africa is one example where Africans had to change their cultural values and over time, to abandon their traditional and religious beliefs (Ndoro and Pwiti 2001).

2.3 The definition of heritage

Heritage is a social phenomenon that is ambiguous, elusive and without a unanimous definition (Marmion 2012). Heritage is very difficult to define in some instances it is understood as tied with history and for some there is no difference between heritage and history (Merriman 2004). Other definitions describe it as more of a state of mind and meaning that is attributed to objects, places, and monuments of the past. Merriman (2004:381) describes heritage to have "both an empirical and a transcendental meaning". The current literature is full examples of the continuous pursuit for a common definition and theory that underpins heritage. Hence, academics have long debated the definition and theoretical framework for heritage (Hewison, 1987; Lowenthal 1991; Brett 1996; Jamal and Kim 2005). So far, heritage can be cultural and natural (Lowenthal 2005:57), authentic and inauthentic (Hall 2007:15), formal and informal (Barrere 2016), collective and negative (Bohman and Sigvardsson 1980; Meskell 2002), tangible and intangible heritage (Bouchenaki 2003; Munjeri 2004; Ahmad 2006; Vecco 2010).

Vecco (2010) studied the evolution of the definition of heritage in France and globally. The author reflected on the definitions that have been provided by charters, researchers and international conferences in an attempt to provide a global meaning of heritage (Vecco 2010). The study investigated objects that evoke meanings and are valuable in communities and societies and thus considered heritage. Vecco (2010) set out to understand heritage as a phenomenon that is not confined to physical objects and materials. The definitions and meanings of heritage began around early 1950 where concepts around the conservation of sites and objects of value were being explored. The idea of cultural property and its protection for humanity during an armed conflict of the second world war came

about in The Hague Convention of 1954, in 1956. The "*United Nations Educational, Scientific and Cultural Organization"* (UNESCO) issued recommendations for the preservation of archaeological remains and objects of historical and artistic significance (Vecco 2010).

The following UNESCO recommendations of 1962 emphasized the importance of protecting natural and human-made environments and landscapes that have aesthetic or cultural importance. An attempt to attain a broad definition for heritage and the scope of its understanding emerged in the Venice Charter in 1964 (Vecco 2010) which defined heritage as: "Imbued with a message from the past, the historic monuments of generations of people remain to the present day as living witnesses of their age-old traditions. People are becoming more and more conscious of the unity of human values and regard ancient monuments as a common heritage. The common responsibility to safeguard them for future generations is recognized. It is our duty to hand them on in the full richness of their authenticity".

By the 1970s, the definition involved the term cultural heritage which included sites and monuments of universal, artistic, scientific and historic value. Cultural heritage also featured in the document released from the "*European Charter of Architectural Heritage of Amsterdam"* (1975) and the "*Grenada Convention for the Protection of European Architectural Heritage"* (1985). Similarly, the protection of valuable sites and historic building is included in the Washington Charter of 1987 and "*The International Council on Monuments and Sites"* (ICOMOS) hence there is a realization of both the spiritual and material aspects of heritage and their connection to the environment (Vecco 2010). Clearly, the scope of understanding heritage has moved from simplistic protection of memorials and sites towards the inclusion of social aspects, historical sites, the environment, towns and cities and the intangible aspects of heritage. These include oral traditions and performing arts (Ahmad 2006). Despite the ambiguity in the definition and theory of heritage, it is at least understood as an interpretation of the past since it is used as a reflection or an approach to the past and a representation of narratives and understandings of the

past (Ahmad 2006). This is what enlightens the public and local communities leading to a deeper understanding of the past (ICOMOS 2008).

Nevertheless, the lack of a universal definition of heritage has had a significant impact on how academics debate the concept, some definitions are inadequate and some are able to reconcile the inadequacies, but in varying degrees (Marmion 2012). These definitions are unable to clarify the contextual forces that form heritage and its broader implications on society, even though they provide an understanding of the core of heritage. Another significant problem is the changing frame of reference which limits knowledge production, transparency and sharing in the heritage discipline because authors define their own frames (Wheeller 2009; Marmion 2012). This problem is not confined to the academic space but also in professional heritage management world as well. Because of the ambiguity of the definitions or lack of an appropriate definition the common definitions often cause misunderstandings that have serious repercussions for decision-making in heritage management (Catsadorakis 2007; Marmion 2012). Of course, national and cultural diversity intensifies the discrepancies in the way heritage is understood from a management perspective (Ahmad 2006).

Although the values and importance of heritage are recognized, this acknowledgment is often not incorporated into the process of heritage management (Carter and Bramley 2002). This suggests that the heritage practitioners and those involved in heritage management often disregard the efforts to theoretically understand heritage and therefore do not integrate this understating in their management process. The inherently biased nature of heritage can also be the cause of fragmented heritage management among practitioners and organizations (Marmion 2012). Although efforts to define and understand heritage have been attempted over the past 50 years by various organizations and charters, clear strategies that address divergent views, the multiplicity of cultures and environments and their relation to heritage have to be conceived (Donaghey 2001). This would be valuable both for academic understanding and the management of

heritage. To improve on this Howard (2003) and Dicks (2007) proposed the inclusion of multiple voices and individuals in the understanding of heritage and its values since people relate to it and the past in diverse ways. This allows for shared views and speaks directly to the inherent multiplicity of the social process of heritage and its meaning (Shepard 2002).

Other authors such as Smith and Waterton (2008) suggested a meaning of heritage that goes beyond just the tangible and intangible facets of heritage but the one that also recognizes the use of heritage in the present day. Smith and Waterton (2008:292) termed this "the performance and negotiation of identity, values and a sense of place". While the meaning of a sense of place may differ, it is commonly understood as a place where people find a great sense of belonging and attachment. Personal experience and interpretation of heritage in the place and the sense of familiarity with it are among the key elements of a sense of place. This was a significant contribution in the understanding of heritage and has certainly improved the conservation of heritage; this term is also widely used in cases of heritage protection by the public (Dameria *et al*. 2018), during the PP at Thyspunt, the term was commonly used by the public.

Recently, the understanding of a sense of place was investigated by the University of Liverpool where Armitage (2013) documented how the level of importance of heritage had social implications that go beyond protection and preservation (Armitage 2013; Armitage *et al*. 2014). The investigation explored the relationship between the heritage of a building and a sense of place. The findings of the study indicated that people who lived in buildings of historical value had a stronger sense of place and put a considerable amount of value on the buildings. The study, however, failed to investigate how the condition of the buildings be it re-use, under-use or neglect and the various meanings of heritage impacts people's perception of a sense of place (Armitage 2013).

An attempt to reconcile the dissonances in heritage studies was made by the contributors of the *"Cottbus Declaration on Heritage Studies: The Need for a Holistic Understanding of Heritage"* which was ratified during the International Summer Academy: Constructing Heritage in the Light of Sustainable Development between the 9- 21 of July in 2012 (Albert *et al*. 2013). In part, this declaration was recognition and celebration of UNESCO's part in the field of heritage and its attempts to educate and inform the world on the subject through its use of charters, conventions and other international strategies (Albert *et al.* 2013). Nonetheless, this was established to gain common ground and express the need for the transformation of heritage and research and raise awareness about the emerging threat that is increasing globalization. Although globalization is increasing interaction and sharing of cultures, the resultant migration, urbanization, and development are threats to heritage (Albert *et al*. 2013). Therefore, the participants called for an establishment of educational heritage programs, dialogue between researchers, practitioners, the global community and any interested or concerned parties or stakeholders. They also encourage interaction and discourse between various cultures and communities because such discourse is a significant aspect of the formation of identities, human development and because global communities are an essential part of heritage (Albert *et al.* 2013).

The theoretical definition and understanding of heritage have undergone a number of changes: the notions have moved from simplistic conservation of heritage resources to a wider approach that includes intangible elements to the environment. This scope has become more inclusive for communities and individuals as well as their relationship with the physical and intangible aspects of heritage. The literature has certainly moved towards understanding multiplicity, individual and communal heritage, including other factors that affect their relationship with heritage such as political power, values, interests, and class (Dameria *et al.* 2018). The discourse of heritage moved towards an interdisciplinary and holistic approach that recognizes the role of heritage in a global and connected world (West 2010). Perhaps it can be

suggested that “there is a spectrum of people’s engagement with the historic environment” (Dameria *et al.* 2018:3).

The understanding of heritage as a concept with social and cultural features has been improved by developments in the discourse through conventions and academic publications from authors such as Ashworth (1999), Howard and Ashworth (1999), Harvey (2001), Alpin (2002) and Smith (2006). They layered the foundation of understanding heritage from a holistic point of view. Likewise, the use of case studies and publication journals such as the *“Journal of Cultural Heritage* and the *International Journal of Heritage Studies”* to name a few proved to be an important part in shaping the discourse of heritage and knowledge production and sharing (Albert *et al*. 2013). Evidently, “a complex understanding of heritage could be disseminated through various topics such as Heritage and Identity, Heritage and Multiculturalism, Expressions of Intangible Heritage, Tangible Heritage and Spaces, Legal Aspects of Heritage or Heritage and Local Communities as well as Management of Heritage” (Albert *et al*. 2013:11). Conversely, this endeavor was not without its flaws and the researchers did not always have common theoretical positions: the early discourse was largely Eurocentric and focused on heritage as a commodity and more importance was placed on the physical aspects Albert *et al*. 2013). This led to the idea of ‘commons’ by Gardner *et al*. (1990) that called for heritage to be understood as a scarce resource that has to be readily available to the public as a common public good such as air and water and has to be used sustainably. This is a valuable idea.

2.4 Postcolonialism and heritage

The response to Eurocentrism both theoretically and practically in the field of heritage management was countered by the ideas of postcolonialism and the decolonization movement. Among many developments in critical heritage dialogue, notable is the one that came about as a result of colonialism and postcolonial responses to them. This relevant input has not only been a key factor in former

colonies but also in the nature and global politics of heritage (Harrison and Hughes 2010:15). Before we delve into the postcolonial theory within heritage studies, it is significant to briefly point out that this came as a result of postcolonies trying to create new identities nationally in the context of decolonization.

Between the eighteenth and twentieth centuries, many colonies in the Americas and Africa were involved in a process of decolonization through gaining their independence from Europe. But, another process of colonization occurred in African counties like South Africa and in South – East Asia in the early ninetieth century and late twentieth centuries (Harrison and Hughes 2010). Later, some Asian and African countries gained their independence through military resistance as well as non-violent means; also following World War Two a rigorous process of colonial independence occurred in the two continents. In the mid-twentieth century, a literary and theoretical body developed and was focused on the aftermath of colonialism (Harrison and Hughes 2010). This discipline developed from a post-modernism and is concerned with the legacy of imperialism in former colonies. The oppression of native peoples, their rights and connection to land and resources, political and social relations are among the key focus areas (Patterson 2008). Postcolonialism is a process to reimage and rethink culture, to define postcolonial identities and intellectual discourse for the subaltern to have dialogue among them and 'speak in their own voices' (Spivak 1988). This was an important development in restoring the dignity of the colonized peoples, reclaiming their land, history and heritage Ashcroft *et al.* (2003).

Notable scholars of postcolonial movement are Siva Kumar, Edward Said, Gayatri Spivak, Frantz Fanon, Homi K. Bhabha, and Michael Foucault. The works of Fanon (1961) entitled *The Wretched of the Earth* and Said (1978) *Orientalism* are regarded as the early foundations of the postcolonial movement. The following works by Spivak (1988) *Can the Subaltern Speak?* and Bhabha (1994) *The Location of Culture* were responsible for the spread of postcolonial thought throughout the world. These texts presented ideas of multiplicity, hybridity, the complex

relationships that took place during colonization and the agency of the colonized. They actively challenged colonial ideologies and rejected polarized understandings of society (Harrison and Hughes 2010). Postcolonial thought has influenced heritage writings and located the subjugated as active agents and complex role players in the study of heritage in the postcolonies (Godsen 2001; Schmidt 2005; Ndlovu 2009; Robertson 2016). Consequently, we see government s in the postcolonies engaged in a process of repossessions of the past, culture, new identities and heritage in a post-conflict world (Ndlovu 2014; Schmidt and Pikirayi 2016).

2.5 The management of heritage in South Africa

It is clear that humans have long recognized the genuine need for the conservation of heritage in its multiple forms and understandings (Ndlovu 2012). The significance that is placed on heritage also originates from the knowledge of the development of humankind's societies that is essential in the making of cultural and social roots that the heritage record carries in the form of archaeological, cultural or natural heritage (ICOMOS 1990). The knowledge that is preserved and inherited from heritage is not only vital for academic research but also for human societies and needs to be conserved for use in the present and by future generations (ICOMOS 1990; Ndlovu 2012). Because of changing environments and landscapes, the increasing rate of development and destruction, heritage often finds itself under threat from human and natural causes (Cleere 1984). This, of course, threatens sustainable conservation of heritage and raises concerns with regards to the "loss of cultural continuity and the destruction of tangible links with the past for each kind of group" (Lippe 1977:1).The management of heritage consists of actively taking care of a site or heritage resource in a manner that will sustain it for the future regardless of development that might take place (Ndoro and Pwiti 2001).

The management of heritage in South Africa is largely connected to archaeology since archaeology is the primary discipline that is concerned with the understanding of the precolonial and colonial past and preservation of heritage. Heritage

management thus expects archaeologists to be major role players in the protection of heritage and to conduct archaeological practice that is thoughtful to the public (Ndoro and Pwiti 2001). Theoretically and practically, archaeology is central to heritage management (Ndoro and Pwiti 2001).

African states have different levels of effective heritage management and are faced with many challenges (Ndoro 2008). Nevertheless, there are some useful aspects of heritage management that are notable in Africa and the rest of the world. In South Africa, for example, there are heritage management bodies that are responsible for the identification, administration, and preservation of heritage from local to national level. The national and provincial agencies, South African Heritage Resources Agency (SAHRA) and Heritage Western Cape (HWC) are notable examples and these agencies have archaeologists undertaking these duties (Chirikure *et al*. 2010; Chirikure 2013). Heritage has proved to be profitable for some counties and has played a role in poverty alleviation in southern Africa, the use of heritage sites for tourism is one example. Heritage authorities, archaeologists and various associations and the public have been good advocates for the promotion of heritage and nomination of sites for heritage protection (Chirikure 2013).

Heritage has also contributed to the tourism industry attracting visitors from around the world to South African sites such as the Cradle of Humankind and Robben Island (Chirikure 2013). Also, very important are the various workshops, conferences, and training programmes that are held to create awareness about heritage. More so the partnership between African antiquities organizations, the African World Heritage Fund and international organizations like the "*International Council on Monuments and Sites"* (ICOMOS), UNESCO, the African Union (AU) and the "*International Centre for the Study of the Preservation and Restoration of Cultural Property"* (ICCROM) have had a remarkable contribution in the management and conservation of South African heritage (Chirikure 2013). This according to Chirikure (2013) proves that effective and collaborative heritage

management is important for the sustainable preservation of heritage in South Africa.

2.6 Local communities and heritage management

Heritage management in South Africa went through various stages, from the colonial period to present-day post-apartheid. Until the end of apartheid, the course of heritage management in South Africa was largely driven by western notions which overlooked the indigenous population, rather than the recognition of values and ideals of the local population (Pwiti and Ndoro 1999; Ucko 2003). This is why there is a trend towards thinking that the management of heritage in this part of the world began with colonization. Upon the arrival of colonists in Southern Africa, they came across heritage sites. Also, this was accompanied by colonial settler narratives that attributed the African monuments to exotic authors. These sites include rock art shelters and monuments like the Great Zimbabwe.

Meaning that the sites were preserved through a system of heritage management that was undertaken by the local communities (Ndoro and Pwiti 2001). Precolonial and colonial era communities had their own methods for heritage preservation derived from their ancient past, although they also could be subject to political bias. Literature indicates that sites that were used daily and religious sites received the most consideration; South Africa and Zimbabwe today, for example, are full of ritual sites, rainmaking sites such as Great Zimbabwe, Khami, Silozwane, Mapungubwe and Domboshava (Ndoro and Pwiti 2001). Many of these monuments were regarded as sacred and protected by local communities and community leaders through restrictions and a series of ritualistic values. The leader of the Ndebele King Lobengula protected Khami which was a rainmaking site and even had soldiers at the monument guarding the site while it was being used by Matopo residents for ritual purposes (Summers 1967). In other parts of Southern Africa, heritage protection methods included the custodianship of sites that were used for initiation, rainmaking and spiritual purposes by local leaders and permission was acquired from them to use the sites (Taruvinga and Ndoro 2003).

Leaders such as King Mzilikazi also had a significant part in the use and protection of the Khami site but the efforts of the local people have largely been ignored (Jopela 2011), hence, later when the site was acknowledged as a National Park the use of the area for rituals and ceremonies was restricted (Ndoro and Pwiti 2001). This trend occurred not only in Zimbabwe but also in South Africa as well, in areas such as Ukhahlamba Drakensberg at the Didima rock art cave, Domboshava, and Thulamela where communities were restricted from visiting or using the sites to perform rituals or consume the heritage because of heritage legislation and westernized heritage management (Pwiti and Mvenge 1996; Ndlovu 2014). The mass occupation of South Africa by Europeans indeed left a colonial legacy that regarded heritage as a scientific and academic matter that should be for the benefit of a minority and not for the public majority (Ndoro and Pwiti 2001).

The colonial version of the management of heritage in Southern Africa was a secondary product of colonization and thus the system of heritage management represented the values and interests of the colonists and disregarded those of the colonized (Ndoro and Pwiti 2001). This is why even present the legacy of colonialism is still evident in heritage management since the local communities are still largely excluded or restricted from accessing heritage sites even after independence of Southern African countries (Ndoro and Pwiti 2001). Moreover, with the increasing scientific interest, many sites became accessible to large groups and audiences thus potentially leading to their destruction (Taruvinga and Ndoro 2003). The protective legislation that was enacted at the time has remnants today since many local communities are isolated from their heritage in the interest of scientific study or preservation of sites (Taruvinga and Ndoro 2003).

A classic example of the poor and aggressive relationship between official heritage protection bodies and the alienated local communities is the Domboshava heritage site. Because the protection and use of the site did not recognize the interest of the local community, the site was vandalized by the locals to whom the site was very

important (Taruvinga and Ndoro 2003). This was an example that showed that there is a need to consider the value of heritage and representation of interests of all concerned stakeholders, including the contested nature of heritage that is linked to individuals (Taruvinga and Ndoro 2003).

In the past, local communities were rarely granted an opportunity to take part in the management of heritage sites and resources, this stems from a poor understanding and acknowledgment of the level of significance of heritage among locals (Taruvinga and Ndoro 2003). Although recently there has been an increase in the participatory involvement of local communities see (Chitty 2016). Somewhat poor considering the removal of colonial legislation and regulations, local communities are disregarded and seen as vandals and an annoyance in the protection, management and use of heritage that they have a connection with (Taruvinga and Ndoro 2003). Such conditions are what led to the need for reformed management strategies and the inclusion of local groups in research conducted for archaeological purposes as well as heritage management (Ndoro and Pwiti 2001). Local communities must be empowered and allowed to play a key role in heritage management although recognizing the controversial nature of heritage. Such recognition allows the communities to consume the heritage while also actively protecting them and recognizing their value and importance (Ndoro and Pwiti 2001). The use of protest by local communities is also one of the key ways for local communities to empower themselves and to actively advocate for the protection of their heritage.

2.7 Development and Heritage Management

Like many developing countries in Southern Africa, South Africa struggles to effectively manage preserve and protect heritage. A number of theoretical, historical and financial reasons are the cause of this (Arazi 2009). Mass development projects, illegal trading of artifacts, poor management, poor application of legislation and little efforts to educate and make heritage engaging are the major threats to South Africa's heritage (Ndoro and Pwiti 2001; Arazi 2009). The lack of financial

resources, political manipulation and poor administration are other issues that hinder effective heritage management in South Africa. The rhetoric behind the destruction of heritage is mostly centered on the need for development and creation of jobs and the expansion of poor underdeveloped areas (Ndoro and Pwiti 2001; Chirikure 2013). Heritage experts and other groups have raised issues with the governments such as corruption, poor administration, and justification of heritage destruction for development in sites such as Mapungubwe, a World Heritage Site that has been under threat because of a mining project (Chirikure 2013). In other African countries such as Sudan, a heritage site is threatened by the construction of a dam (Kleinitz and Näser 2011), and the site known as Ngwenya in Swaziland was withdrawn from UNESCO's World Heritage Site nomination to pursue an iron ore mining project in the area (Chirikure 2013).

Nevertheless, governments in return also blame heritage experts and stakeholders of opposing development and refusing to let Africa play a role in the global market. However, this does not mean that there have to be two opposite sides, governments can still provide for citizens and expand development while balancing heritage conservation as well (Ndlovu 2014). The separation of opinions is the root cause of fragmented heritage management; thus, heritage is underfunded and does not receive an amount of consideration as health or defence (Chirikure 2013). Therefore, heritage branches are understaffed and headed by inexperienced employees (Chirikure *et al.* 2010; Mokoena 2017). There is a genuine problem of poverty, disease, and joblessness in Southern African countries (Chirikure 2013; Mokoena 2017) and Africa is labouring for economic development and placing focus on activities like mining, oil and gas extraction (Chirikure 2013) and electricity generation. Activities that cause major impacts and damage to the environment can cause irreversible damage to heritage (Chirikure 2013; Ndlovu 2014). Also, these projects have the potential to improve knowledge since they present a survey and 'rescue' opportunities to heritage site that were not known previously (Chirikure 2013). The archaeological work done by Arthur and Mitchell (2010) in Lesotho before the construction of the Metolong Dam is one example

where previously understudied sites were excavated and studied before development took place.

For effective heritage management in Southern Africa there needs to be participation from all relevant stakeholders, given the context of each heritage site (Chirikure *et al*. 2010; Chitty 2016). Although this is not disputed, there is still a disparity between its theoretic and practical use. The idea of community participation in heritage studies is still partly exaggerated and practically difficult to implement effectively (Chirikure *et al*. 2010). This occurs as a result of the heterogeneity of communities and the contested nature of heritage, heritage experts and local communities often have diverging goals and values for heritage and governments and authorities often make unfulfilled promises when it comes to participation (Chirikure *et al*. 2010; Nwauche 2017). Because the contexts of heritage management differ and the heritage in site varies, the strategies of engagement should be local and contextual since socio-political and historic conditions vary as well (Chirikure *et al*. 2010; Chitty 2016; Nwauche 2017).

Lastly, institutions of higher learning also have a role to play by teaching and training professionals in heritage management, more research in the field has to be conducted and heritage researchers have to draw knowledge from other relevant disciplines. The introduction heritage training courses in universities is one example, the training and public awareness programs such as the South Africa's underwater cultural heritage (UCH) maritime archaeology program is another, see Sharfman *et al*. (2012). The role of indigenous conservation methods has to be recognized also while archaeological research methods and ethics are well-regulated and implemented by respective bodies (Chirikure 2013). These recommendations are a step closer towards the sustainable use and conservation of heritage in Southern Africa.

2.8 South African Heritage Protection Legislation

Heritage legislation is fundamental for heritage management and South African heritage is governed by these laws. At the core of legislation is the identification of heritage sites, the protection and the use of the heritage by the public and the scientific academic community (Ndoro and Pwiti 2001). South Africa's heritage legislation is similar to that of other African countries and likewise, the regulations, definitions and its objectives have a similar focus. The legislation that governs heritage today went through a significant amount of changes from when South Africa was the Union, Apartheid and till present day democracy (Corsane 2004). The progression of heritage legislation in South Africa occurred through the introduction of various pieces of legislation, notably from the Bushman Relics Protection Act, the following amendments and to slowly moving towards inclusivity, recognition, consultation of local communities and public participation (Corsane 2004).

These are the various legislations that have passed throughout the history of South Africa for the management of heritage.

- *"The Bushman Relics Protection Act No. 22 of 1911"*
- *"National and Historic Monuments Act of 1923"*
- *"Monuments, Relics and Antiquities Act (Act 4 of 1934)"*
- *"National Monuments Act (Act no. 28 of 1969)"*
- *"National Heritage Resources Bill [B 139—98] (1998")*
- *"National Heritage Resources Act (Act 25 of 1999)"*
- *"Monuments and Relics Act No. 12 of 2001"*

At the top of the list is the "Bushman Relics Protection Act of 1911". The South African National Society (SANS) was the key role player that led to the passing of this legislation (Ndlovu 2011). This Act would then be adopted in counties such as Zimbabwe and Botswana, its sole purpose was the protection of rock art and the control of the trading of the paintings (Woodhouse 1988; Rudner 1989; Deacon

1993; Campbell 1998; Ndlovu 2011). After a decade the *"Natural, Historical and Monuments Act of 1923 (no. 6 of 1923)"* was passed and implemented concurrently with the Bushmen Relics Protection Act, for the protection of sites that had archaeological significance (Kotze and Van Rensburg 2002; Whitelaw 2005; Ndlovu 2011). This was a step towards the establishment of the *"Protection of Natural and Historical Monuments of the Union of South Africa"* which was later named the *"Protection of Natural and Historical Monument, Relics and Antiques"* under the *"Natural and Historical Monument, Relics and Antiques by Act no. 4 of 1934"*. This structure was assigned with the compilation a database of heritage sites that it considered worthy of protection (Ndlovu 2011).

The "*Natural and Historical Monument, Relics and Antiques Act no. 4 of 1934"* was subsequently amended twice - in 1937 (Act no. 9 of 1937) and 1967 - to allow for the first time the declaration of sites as national monuments (Rudner 1989; Ndlovu 2014). Seven rock art sites were declared as monuments under this Act, however, this was alleged to have caused more harm than intended since many people flocked to the rock art sites thereafter, posing a threat to them. The *"Commission for the Protection of Natural and Historical Monuments, Relics and Antiques"* halted the declaration of rock art sites (Deacon 1991; Ndlovu 2011). The *"National Monuments Act (Act no. 28 of 1969)"* replaced the 1967 amendment and itself was amended seven times up until 1986 (Rudner 1989; Deacon 1991; Ndlovu 2011) and under this Act, some sites were declared as monuments and it was illegal to cause destruction, removal, trade or modification to them without authorization (Blundell 1996). Another piece of legislation that was for the prevention of damage to monuments was the Environmental Conservation Act of 1989 (Deacon 1991; Ndlovu 2011).

A year later, the African National Congress (ANC) was permitted to operate in 1990. The party continued with the work of dealing with policy formulation and reconstruction issues that were being carried out by the "*Department of Arts and*

Culture" (DAC) that was formed in 1985 in exile (Corsane 2004). Within this department, the party started the "*Commission on Museums, Monuments, and Heraldry"* (CMMH) in order to liaise with the government and "push for the democratization of the country's cultural institutions" (Corsane 2004:15). Between 1992 and 1993 the CMMH organized talks and consultations nationally with the state, the public, and museums, assembled an international conference called the "*Culture and Development Conference*" (CDC) in Gauteng to present a report on heritage and a cultural framework (Corsane 2004). The "*Department of Arts, Culture, Science, and Technology"* (DACST) (1996) in 1996 released an outlined policy and legislation for heritage on the "*White Paper on Arts, Culture and. Heritage: All Our Legacies, Our Common Future"* document. This was followed by the formation of the National Heritage Council (NHC) by the Ministry of Arts and Culture and the National Heritage Bill (RSA 1998): passed to lay a foundation for an inclusive national to local heritage management (Corsane 2004). The National Heritage Bill accounted for material and non-material heritage resources and 'living heritage' that is defined as non-physical features of culture that are passed down to the present and include oral history, popular memory, cultural tradition, ritual, and performance to name a few (Corsane 2004). This Bill was enacted to be implemented along with the activities of all heritage bodies in the country including the National Heritage Council, more so to lay the groundwork for the foundation of the South African Heritage Resources Agency (SAHRA) and Provincial Heritage Authorities (PHRA) in the place of the *"National Monuments Council"* (Corsane 2004).

The "*National Heritage Bill"* was split to form the *"National Heritage Council Bill"* and the "*National Heritage Resources Bill"*, the "*National Heritage Resources Act, 1999 (No. 25 of 1999")* was passed to form South African Heritage Resources Agency (SAHRA) (Corsane 2004). The South African Heritage Resources Agency (SAHRA) is the current national heritage administration agency and has broader responsibilities than its predecessor, this agency identifies, assesses, grades and manages heritage in South Africa at a national, provincial and local level

(Meskell and Scheermeyer 2008; Esterhuysen 2009). SAHRA has a set of minimum standards set out by the National Heritage Resources Act (NHRA Act) that provides a framework for definition, identification, assessment and management of heritage (NHRA 1999:25), the standards help coordinate and maintain governance and compliance from national to local level; they also assist professionals in heritage, environmental practitioners and state departments with effective communication channels (Fourie 2013).

The NHRA Act is under the national environmental legislation called the "*National Environmental Management Act no. 107 of 1998* (NEMA)*"* under the "*Department of Arts and Culture"* (DAC) and is today the pillar of heritage management in South Africa and the main law for heritage (Fourie 2008). This act defines what is 'heritage', 'heritage resource' and other important facets of heritage management in South Africa (Hall 2009). Section 8 of the NHRA Act provides for a three-tier system for heritage resource management because South Africa has three levels of government, namely national government, provincial and local, all of which spheres have separate functions and responsibilities. Constitutionally, the spheres function as a single system of cooperative government that are different, and interconnected according to the Department of Provincial and Local Government (DLPG) (2016). Each of the spheres has its own area of operation, they cooperate and operate within their areas of jurisdiction and uphold intergovernmental relations among them (DPLG 2016).

The heritage authorities in South Africa operate under this system. There is a shared level of administration between the national, provincial and local spheres. The national authority, South African Heritage Resources Agency (SAHRA) is the administrative body that protects the Grade I heritage resources (NHRA 1999). It is the largest of all the heritage authorities in the country. Only two provincial heritage authorities are currently operational. These Provincial Heritage Resources Authorities (PHRA) are Heritage Western Cape (HWC) and Amafa aKwa-Zulu Natal which are at the provincial level and are responsible for provincial heritage

management of Grade II heritage resources. Grade III heritage is managed by local municipal authorities (DPLG 2016). The NHRA also makes provisions for the production of basic documentation to evaluate the impacts of development on the environment and heritage resources (Fourie 2013).

The regulations require the completion of specific report types for different activities. These reports are the "*Environmental Scoping Report and Plan of Study"* (ESR&POS), Environmental Impacts Assessment (EIA) and Environmental Management Plan (EMP). These reports are each addressed in the relevant section of the EIA in South Africa below and provide regulatory mechanisms to undertake Archaeological Impact Assessment (AIA) and Heritage Impact Assessment (HIA) (Arazi 2009). The AIA focusing on the identification, assessment and mitigation archaeology of the location during a survey of excavation and an HIA focusing on cultural heritage, property and other heritage resources. The reports evaluate the likely impacts of a planned project on the heritage resource and recommend mitigation strategies to minimize probable negative impacts. This technique is most widely used by specialists from different fields and disciplines for heritage resource protection and planning (Mlilo 2016).

Clearly, a number of developments and new understandings of heritage brought about a significant amount of improvement in legislation and policy making. The legislation that governs heritage was then restructured for a postcolonial setting that is democratic, one that recognizes the community, physical and non-physical aspects of heritage and sustainable development – theoretically and practically contrary to the colonial era legislation (Corsane 2004). South African heritage management is now unified, with interdepartmental working relationships between the national, provincial and local structures (Corsane 2004). The current operational network of heritage management in South Africa has come a long way since the earliest legislation in the early 1900s (Ndlovu 2011).

While acknowledging these changes, Ndlovu (2011) points out the inadequacies in the current legislation and that there are reactive tendencies rather than proactive strategies from heritage managers. But most importantly from the legislation is the framework of guidelines that direct each agency and department of their institutional duties (Corsane 2004; Ndlovu 2011). The NHRA Act has penalties for those who violate the law and damage heritage. The Act also defines what is heritage and what constitutes value and significance, more so it lays the foundation for a system of grading that categorizes the type of heritage and determines the level of mitigation required (Ndlovu 2011).

The legislation on its own is not enough to protect heritage, however (Strecker and Taboada 1999), it needs to be backed by proper implementation. Delmont (2004) and Cairncross (2011) support this and Dian and Abdullah (2013) also emphasize the importance of public participation in heritage management. But with the obscured roles of resource management, policy and administration this causes shortfalls in heritage management in South Africa (Ndlovu 2011; Odak 1991). The move from the Bushman Relics Act to the NHRA Act cannot be dismissed, but it has not played a sufficient role to surpass most of the challenges facing heritage management (Ndlovu 2011). Researchers such as Lippe (1977) maintain that if only legislation was required for heritage management then it would be properly managed, therefore, there is a genuine need to be proactive, inclusive and effective implementation of the law (Mazel 1989; Eboreime 2009; Ndlovu 2011).

2.9 Environmental Management and Environmental Impact Assessment (EIA) in South Africa

The Environmental Impact Assessment (EIA) that was undertaken for the Nuclear-1 project at Thyspunt is the central focus of this study. To understand the concept and practical application, this section reviews a part of literature of EIA in South Africa. The definition of the environment differs on many occasions. “The *White Paper on Environmental Management Policy Department of Environment Affairs and*

Tourism" published in (1997:3) defined the environment as "the conditions and influences under which any individual or thing exists, lives or develops. These conditions and influences include: the natural environment including renewable and nonrenewable natural resources such as air, water, land and all forms of life the social, political, cultural, economic, working and other factors that determine people's place in and influence on the environment natural and constructed spatial surroundings, including urban and rural landscapes and places of cultural significance, ecosystems and the qualities that contribute to their value". The NEMA Act (1998:10) defines the environment as "the surroundings within which humans exist and that are made up of -

(i) the land, water, and atmosphere of the earth;

(ii) micro-organisms, plant and animal life;

(iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and

(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being".

Strydom and King (2009) argue that this legal definition is inadequate and suggest a possible definition. According to Strydom and King (2009), the NEMA Act definition is unclear whether it relates only to the human-made or natural environment, whether cultural issues are relevant to it or whether there is value in living environments. From the viewpoint of Strydom and King (2009), the environment can be understood to have green and brown aspects. The features of the earth that consist of living and non-living things are considered the green aspect of the environment and the brown is made up of the cultural, social and economic features in relation with the green. Strydom and King (2009) also maintain that humans are an important part of the environment and their relationship with it is inseparable. More so, any definition of the environment in South Africa should embrace ideals a democracy, accessibility, and respect for dignity, freedom, and equality for everyone (Strydom and King 2009).

This means that essentially the management of the environment is the controlling and regulation of the interaction between human actions and the natural and built environment (White Paper on Environmental Management Policy Department of Environment Affairs and Tourism 1996). Environmental management is notionally about the management of common pool resources through the application of regulatory tools such as policy, planning strategies, permits, exemption and a number of enforcement strategies such as transparency, administration, and volunteering (Ostrom 1998; Humby 2015).

The term of 'commons' was popularized by the prominent Hardin's (1968) the 'tragedy of the commons' publication, a metaphorical representation of the consequences of resource exploitation and the overuse use of natural resources (Ostrom 2015). Subsequently, many researchers, analysts, and professionals concur with Hardin's (1968) analysis that humans who exploit their own natural resources will ultimately find themselves in an inescapable situation which is they caused themselves: the attenuation of natural resources and degradation of the natural environment (Ostrom *et al*. 1994). The common pool resources are essential goods like forests, rivers, air or computers that are made of human or natural resource systems and their use is hard to limit (Ostrom *et al*. 1994; Ostrom 2015). From the theoretical research on common pools resources, the consensus on their regulation and governance increased among researchers and governments. Also, many policy analysts agree unanimously on the view of devising tools and strategies for the management of these resources sustainably, thus inviting states to regulate natural resources (Ostrom *et al*. 1994).

Strydom and King (2009) note that in the case of environmental management in South Africa, the most influential writings on the subject were "*Environmental concerns in South Africa"* (1983) and "*Environmental Management in South Africa"* (1992) by Fuggle and Rabie (1983; 1992). The publications would proceed to be useful for professionals, students, governance bodies and organizations in the field of environmental law. Progress in the field was also achieved when the

"*Millennium Declaration"* was settled by many countries on the basis of common international treaties for the management of common pool resources under the blanket term of sustainable development. These agreements were committed to reducing pollution, waste of water, deforestation and the implementation of the Kyoto Protocol (Strydom and King 2009). The term sustainable development plays a major role in environmental law and management in South Africa. Although its meaning is mostly ambiguous, fundamentally it means the improvement of economies and development without negatively impacting the environment to a point that is not justifiable in the long term (Emas 2015). The definition that most scholars and professionals are familiar with is the one provided by the "*Brundtland Commission"* report "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland *et al*. 1987; United Nations General Assembly 1987:43).

The "*World Summit on Sustainable Development"* (2002) suggested that sustainable development is a controversial subject in environmental management since it was the core of the discussions in the conference. This was hosted in Johannesburg and it is where the Agenda 21 framework was endorsed, the countries in attendance pledged to apply the three major features of sustainable development which are the improvement of societies and economies as well the protection the environment within the main goal of the alleviation of poverty (Strydom and King 2009; Hammill and McLeman 2007). Strydom and King (2009) commend the output of the summit and note that the Plan of Implementation that was devised in the summit was a commitment by the governments present to implement effective governance, social policies, and reduction of corruption and the use of democratic process at a local and international scale. But, Africa was the continent that was struggling to meet many of these goals by the year 2007 (Strydom and King 2009).

The management of the environment in South Africa had been a product of racial discrimination and exclusion during apartheid (Rossouw and Wiseman 2004). Many people were evicted from their lands and homes for developments such as game

parks that were sanctioned by the state and they had little or no input or opinion on the matter: biodiversity was prioritized more than people's environmental rights (Rossouw and Wiseman 2004). The distribution of wealth and development was also uneven since the country was racially divided. The systems of governance at the time were centralized by the government, largely technocratic, consultation and public participation was an exclusive privilege for specialist and experts, the public and society excluded (Rossouw and Wiseman 2004). A major shift occurred during the transition period towards the establishment of South Africa as a democratic country in the early 1990s. The field of environmental management also changed towards the democratization of policies and the inclusion of public participation and environmental justice (Rossouw and Wiseman 2004, McDonald 2002).

A ground-breaking approach that was also adopted during this period and post-apartheid was the recognition of and enactment of environmental rights and sustainable development in *"The Constitution"* (Rossouw and Wiseman 2004; Strydom and King 2009). This occurred along with the introduction of the "*Consultative National Environmental Policy Process"* (CONEPP) in 1995 and the "*White Paper on Environmental Management Policy"* (1997) by the "*Department of Environment Affairs and Tourism"* (DEAT) to share with the South African public the new government's environmental policy plans, goals and approaches to environmental regulation. The success of the conference, however, was downplayed by its inadequate engagement with local government and councils including civil society (Rossouw and Wiseman 2004). These events led to the proclamation of *"National Environmental Management Act of 1998"*, replacing the *"Environmental Conservation Act of 1989"*, other related rights included right to healthcare, food, life, access to information, freedom of security, administrative justice, protest and public participation (Rossouw and Wiseman 2004; Strydom and King 2009).

Since the adoption of the new Constitution, environmental and human rights were redefined and ascribed new values (Rossouw and Wiseman 2004). This new Constitution was a great contribution to South African society because it

restructured the national and environmental governance of systems and valued ethics and accountability (Republic of South Africa 1996). "*The Constitution of the Republic of South Africa"* is the basis and highest law that oversees environmental governance in South Africa (Feris 2014). Under Section 24 of "*The Constitution"* "Everyone has the right – (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – (i) prevent pollution and ecological degradation (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development" (The Constitution 1996:55). This section of the constitution tasks the national government with the protection of the environment; it is the main law for environmental management and was enacted to improve governance and good environmental management (Feris and Kotze 2008). Because of Section 24, potential negative impacts on the environment have to be prevented through decision making that reduces or prevents damage and is guided by sustainable development goals (Feris and Kotze 2008).

Citizens are granted environmental rights and any decision-making with regards to activities that are potentially damaging to the environment has to be carried out in reference to Section 24. This means the government is directed thence to "prevent pollution, promote conservation, and secure the ecologically sustainable development and use of natural resources while promoting justifiable economic and social development" (The Constitution 1996:56). Significantly, South African citizens are granted an opportunity to contest developments that may infringe on their environmental rights through litigation and public participation; also, it offers grounds for transparency, accountability, freedom of speech, the respect of environmental rights, a safe and clean environment and effective environmental governance (Feris and Kotze 2008). From Section 24 of *"The Constitution"* comes the *"National Environmental Management Act 107, of 1998"* (NEMA) which drives the EIA process. Without meeting the requirements of NEMA, Section 24 and standards of sustainable development, the projects do not receive authorization

from the Competent Authority which is the State, to commence (Glazewski 2005; Paschke and Glazewski 2006). NEMA is the umbrella legislation of environmental management in South Africa that is guided by Section 24 right to environment.

This legislation is directed by these values:

"(1.) The principles set out in this section apply throughout the Republic to the actions of all organs of state that may significantly affect the environment and—
(a) - shall apply alongside all other appropriate and relevant considerations, including the State's responsibility to respect, protect, promote and fulfil the social and economic rights in Chapter 2 of the Constitution and in particular the basic needs of categories of persons disadvantaged by unfair discrimination; (b) serve as the general framework within which environmental management and implementation plans must be formulated:
(c) serve as guidelines by reference to which any organ of state must exercise any function when taking any decision in terms of this Act or any statutory provision concerning the protection of the environment;
(d) serve as principles by reference to which a conciliator appointed under this Act must make recommendations; and
(e) guide the interpretation. administration and implementation of this Act, and any other law concerned with the protection or management of the environment"
(2) Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
(3) Development must be socially, environmentally and economically sustainable". (NEMA 1998:10).

From the principles of NEMA, the foundation and directive for EIA implementation and legal action are provided: sustainability is also recognized as well "the protection of the environment for present and future generations" (Paschke and Glazewski 2006:9). Presently this is the principal legislation for

environmental management of South Africa, imbued with features of democratic values of participation, sustainability and cooperative governance across the three tiers of governance (Rossouw and Wiseman 2004).

From Section 24 and NEMA followed a new and innovative relationship between the state and industries. More legislation and policy were passed in sectors such as Minerals, Waste Management, Biodiversity, Water and Air Quality, Marine Resources, Energy and many more (Rossouw and Wiseman 2004). The diagram below shows the current make up of South African environmental legislation:

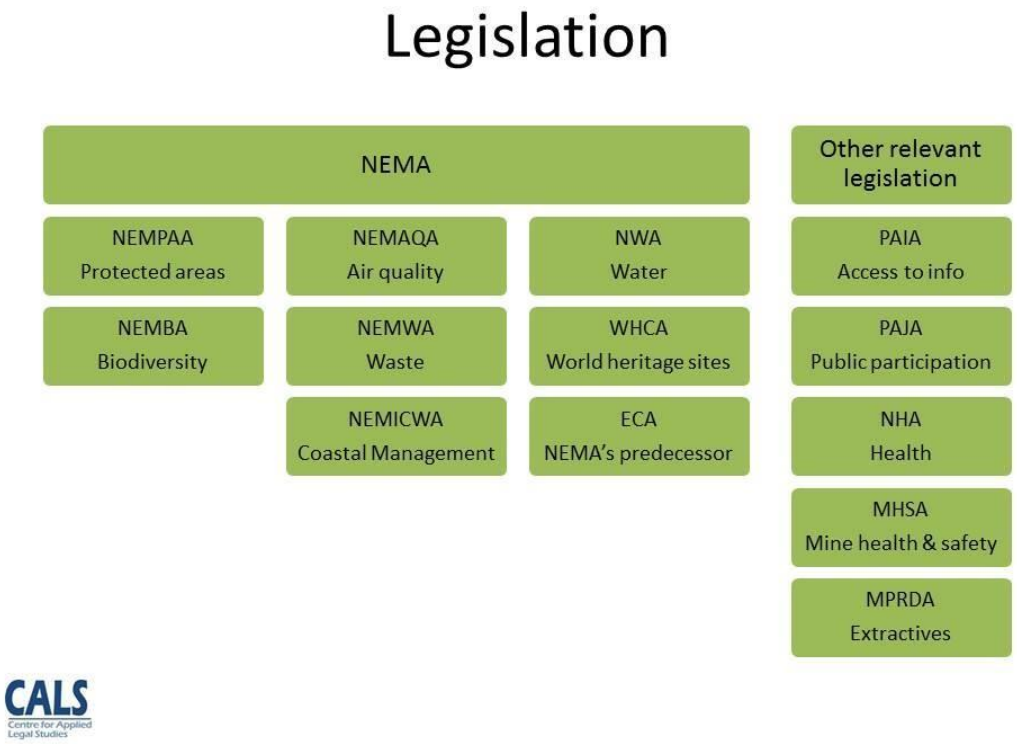


Figure 1. A diagram showing the current make up of South African Environmental Legislation (Centre of Applied Legal Studies – Wits Winter School – Human Rights in the Market Place: The Environmental Sector (2017) by Tracy Humby.

The socio-political restructuring and improvement of legislation by the government to repair previous inequalities encountered new problems. The discourse and practice of environmental management faced emerging questions on the meaning of

effectiveness and the ability to serve the public and fulfill implementation strategies and compliance while at the same time fulfilling obligations of ever-changing international treaties (Rossouw and Wiseman 2004). Also, these changes presented opportunities for a number of judicial, administrative and legislative ways to improve enforcement, policy, and legal tools to achieve effectiveness (Rossouw and Wiseman 2004). Like the management of heritage, despite the innovativeness of the legislation, its enforcement and implementation are the key challenges: often times there are inadequacies in the judicial system and the implementation of the NEMA Act across the three levels of governance (Humby 2013). The environmental right enshrined in the Constitution is most times used insufficiently; its potential recognized only when it is threatened or violated also, the translation of NEMA Act principles practically is also lacking (Humby 2013).

2.10 Environmental Impact Assessment (EIA)

The use of EIA began in the United States of America (USA) around the 1970s as a development, assessment and decision-making tool; it then since spread throughout the world (Morrison-Saunders and Fischer 2006). Although it was initially meant for assessing the impact on the natural environment, EIAs today are conducted for Traffic, Health, Social and Health Impacts (Barker and Wood 1999; Morrison-Saunders and Fischer 2006). From 1990 EIA played a major role in very important decision-making sectors of environmental management, South Africa was part of the early developing nations to adopt the use of EIA in environmental management (Morrison-Saunders and Fischer 2006).

To regulate development and rectify the inadequacies of the "*Environment Conservation Act 1989"* (amended by section 8 of Act 94 of 1993) (ECA), the regulations for EIA were passed in 2006, this was a significant step towards effective governance and sustainable development (Glazewski 2005; Paschke and Glazewski 2006). The process of the EIA is a long collaborative one that requires input from specialists, the public and various stakeholders in order to weigh all the impacts of the proposed development and to take into account the views of the

participants. This is a strict process that has to be conducted before the development commences, and after authorization for EIA is approved (Nel and Du Plessis 2001).

Due to the implementation of the EIA regulation, the state is able to put in effect proper mitigation and monitoring measures for the environment (Nel and Du Plessis 2001). The "*Environmental Impact Assessment"* (EIA) consists of a "*Basic Assessment Report"* (BA) and an "*Environmental Impact Assessment Report"* (EIR) (NEMA 2014). A BA report is meant for projects that will consist of activities that are denoted as Listing 1 Activities, this is a relatively simplified application process (NEMA 2014). The impacts in a BA Report are easily identifiable and easy to mitigate, therefore a full EIA assessment is not required (NEMA 2014). An EIA report is more complicated than the BA report, this stage is required if the development contains Listings 2 Activities (NEMA 2014). The project is likely to cause major environmental damage in the different stages of the development: because the impacts are difficult to understand a full EIA assessment is therefore required (NEMA 2014). A full EIA consists of a *Scoping Report*, report of the *Proposed Activity*, *Reasonable Alternatives*, *Methodology* and *Specialist Studies* to conduct studies to investigate and propose mitigation strategies. The EIA is conducted by an "*Environmental Assessment Practitioner"* (EAP) guided by "*Regulation 18 of GN R385"*, who guides the Applicant for the development who applies for Authorization from a Competent Authority (The Government) (Kidd and Retief 2009). See EIA Application for Authorization timeline on (https://projects.gibb.co.za/).

EAPs are coordinators of the EIA process and are mandated to keep the environment as the primary concern throughout the EIA: they are supposed to be independent and not have interest in the Project or connected to the Applicant, EAPs are regulated by "*Environmental Assessment Practitioner Association of South Africa"* (EAPASA) which was established in 2011 (Humby 2013). Public participation is also a compulsory part of the EIA: this process is conducted by Consultants who play a mediatory role between the client and Interested and

Affected Parties (I&APs). Consultants are also required to be independent because they are guided by legislation and can be prosecuted in court see *State v Frylinck and Mpofu Environmental Solutions CC* (2010) court case in (https://cer.org.za/wp-content/uploads/2011/04/S-v-Stefan-Frylinck-2011.pdf).

2.11 Public Participation

Public participation is a form of a participatory democracy that is governed by administrative law and because of this; it is expected to accede to administrative justice, procedural fairness and decision-making that is reasonable (Hilliard and Kemp 1999; Hamann and Acutt 2003). Public participation has various roles to different stakeholder and participants and these are not always mutual (O'Faircheallaigh 2010). The normal disagreements that are usually part of public participation are exaggerated in South Africa because of a racially divided past and cultural and economic diversity, this also includes an increasing need for employment, infrastructure, and development (Hilliard and Kemp 1999). Public participation originates from *Government Policy, The Constitution*, "*Promotion of Administrative Justice Act" (Act 3 of 2000)* (PAJA) and other sector-specific legislation such as *"The Promotion of Access to Information Act. 2000"* (PAIA), NEMA Act and NHRA Act (Hilliard and Kemp 1999).

The process of public participation is a constitutional right and foundation of democracy and development (Maphazi *et al.* 2013). It has become a noticeable feature in South Africa along with the growing need for more involvement and participation in the process of project development and decision making (Lindeque and Cloete 2005). This is a significant process that gives people the right to be informed, the Interested and Affected Parties (I&APs) are given an opportunity to influence the decision about development and raise any grievances, opinions, and concerns that they may have regarding decision-making or development in their area (Kleynhans 2018).

Public participation is very complicated, more so considering the various cultural and political differences and contradictions in South Africa. However, if the process is not inclusive and participatory, it fails to provide long-term solutions (Lindeque and Cloete 2005). The concept of public participation has been studied by many researchers (Kapoor 2001; Lockie 2001; Hartley and Wood 2005; Doelle and Sinclair 2006; O'Faircheallaigh 2010). Other researchers examined the development of public participation such as Loveday (1972), Fagence (1977), Kaufman (1981), Atkinson (1992), Botes (1999), Botes and Van Rensburg (2000), assessing its historical development, guidelines and application in counties such as Malawi, United States of America, England and South Africa. Their assessment also included the advantages of the advancement of environmental justice and sustainability. Atkinson (1992), Botes (1999) and Botes and Van Rensburg (2000), Lindeque and Cloete (2005) discussed public participation in South Africa. Public participation has come under criticism by Cooke and Kothari (2001); notably criticizing the inconsistencies between the legislation and the expected advantages of the process to what actually happens in practice. This means there is often a gap between what the legislation is expected to achieve and how it is applied in practice.

This is supported widely by Botes and Van Rensburg (2000), Chinsinga (2003), Mansuri and Rao (2004), in relation to South Africa. Authors such as Brisbane (2005) and Murombo (2008) contributed to the literature by emphasizing the role of community inclusion and participation in the process as well as linking it to the concept of sustainable development (Lindeque and Cloete 2005). The process of public participation is linked to sustainable development because it legitimizes decision-making and support for projects as well as builds trust in government. Public participation leads to a transparent decision-making process that identifies and includes those who have interests or are affected by a project (Geczi 2007).

South Africa is among other countries that have moved towards the implementation of sustainable development in all of its development activities. Legislation that has been enacted is aimed at the sustainable use of resources and the protection of the

natural environment (Murombo 2008). The key piece of legislation that ties directly to this concept is the *National "Environmental Management Act of 1998"* (NEMA) that provided policies for the "*Environment Impact Assessment"* (EIA) procedure. The EIA regulations were enacted in 2006 and to amend the past regulation to allow improved and effective participation by the public in EIA processes. (Murombo 2008: 12).

The EIA regulations provide a legal obligation for assessment of potential impacts prior to development and also for public participation to be undertaken and promoted during various phases of development (McDaid and Kruger 2009). Although the EIA process is holistic and integrative, intended to address social, economic and environmental concerns simultaneously (Murombo 2008; McDaid and Kruger 2009) counter by stating that it is filled with inadequate consultation, bias, and conflict. This makes it difficult to address all sides of an activity although the process is designed to assist the government with monitoring activities that have potential impacts and mitigation (Murombo 2008). Furthermore, Sections 59, s72, s118 and s195 of The Constitution obligate the national, provincial and local government to facilitate public participation and encourage the public to take part in this process of decision-making that is related to economic, social and environmental considerations (Kleynhans 2018).

2.12 Protest and Public Participation

Protest often occurs during EIA public participation as a way for I&APs to voice their opinions and frustrations with regards to the development and or Public Participation Process (PPP). Some problems that often emerge during public participation may include the exclusion or elimination of certain languages, conducting the PPP with only one language and not recognizing the local languages for example (in the EIA documentation and meetings), lack education on the development or the specialist studies may consist of very complicated scientific data that the public may find difficult to understand (Scott and Oelofse 2005; Eden 2016). Consultation and access to information are one of the key factors of public

participation, poor or lack of consultation and of access to information are indications of a poor PPP (Barrow 2006). Also, the lack of transparency and poor communication between the consultants and I&APs creates suspicion of corruption, bias and lack of independence of the EAP (Selman 2004; Aregbeshola 2009). Many of the public participation protests in South Africa have been conducted by non-government organizations (NGO), environmental activist groups, communities, I&APs, and many others. Research shows that these protests were a key effort by the public to take part in a decision-making process and for inclusion (Bohler-Muller *et al*. 2017).

2.13 Section 24 (g), EIA, Public Participation and Sustainable Development

Section 24(g) amendment of NEMA is the major threat to the effectiveness of the EIA process as a whole and currently undermines public participation and sustainable development (Glazewski 2005). The amendment is titled: "*Rectification of unlawful commencement or continuation of listed activity*" with section "(a) the Minister is authorized to identify "listed activities", (b) the statutes require that before a proponent may begin a listed activity they must first acquire an environmental authorization issued by a competent authority and (c) it is an offence to commence a listed activity without an environmental authorization" (NEMA 2014:56). This creates a difficult situation because s24(g) allows a developer that commenced with Listed Activities without obtaining authorization to be granted an opportunity for an application (Glazewski 2005). It becomes a challenge for the competent authority to discern whether the developer was unaware of the EIA procedure or they disregarded the process entirely, thus becoming even more difficult to permit or reject an *ex post facto* authorization for the development (Glazewski 2005).

This amendment encourages non-compliance through the promotion of *ex post facto* authorization, undermining the entire EIA procedure and has the potential to deteriorate the effort to govern and manage resources in a sustainable manner (Paschke and Glazewski 2006). This is a loophole in the legislation that developers

will continue to use as an excuse for noncompliance and the evasion of the EIA process and for assuring that the development occurs (Kohn 2012). There are major consequences that will also affect the environment as a result of s24(g) because the developers will commence Listed Activities that have permanent damage to the environment and the scale of the impact not understood because no specialist studies were undertaken (Kohn 2012). S24(g) *ex post facto* authorization deteriorates the Section 24 right to environment and the core NEMA Act principles of "*Section 2(4)(a)(viii)"* and "*Section 2(4)(i)"* that are meant to be "*precautionary principles*" to prevent damage, reduce and recover impacts that occur on the environment and stimulate sustainable development through the application of cautious approaches (Kohn 2012). The ability for the EIA as a proactive and avoidance tool becomes nullified and so Section 24 G and *ex post facto* authorization are unconstitutional (Nel and Wessels 2010).

Although the commencement of development without authorization is a prosecutable crime (Kohn 2012) many large companies can afford the fine and because *ex post facto,* they are afforded flexibility. This leads to a terrible legal practice that does not bring environmental management any closer to sustainable development, rather it is used as a solution to offenders who have damaged the environment and undermined environmental legislation (Kotze and Du Plessis 2014). In order for the government to have a thorough, transparent, precautionary and integrated effort towards sustainability, this amendment needs to be rectified, the "*Fuel Retailers Association of Southern Africa v Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province 2007 (6) SA 4 (CC)"* court case includes these propositions (Kohn 2012:21).

The precautionary and preventative process of EIA will continue to be ineffective if 'temporary' solutions are applied for environmental management problems, therefore putting at risk the role of public participation. This will continue to set a bad legal example where developers rush the listed activities while also avoiding

EIA study and public participation (Kohn 2012). The rights of many I&APs will continue to be at risks also considering that the NEMA legislation is vague on how EAPs are supposed to conduct the Public Participation Process (PPP) (Kakonge 1996; Murombo 2008). This is why members of the public are often excluded through various stages of the EIA including scoping and project design phases (Murombo 2008). An effort to properly define, approach and implement public participation practically is needed; this includes reconciling the discrepancy between theory and practice (Mnengwane 2014). This will consequently place the public and I&APs in a position where they play an important role in a participatory decision-making process that embraces environmental justice and democracy (Mnengwane 2014).

Chapter 3 – Background to the Study Area: Thyspunt and Electricity in South Africa

3.1 Electricity Generation and need for Electricity in South Africa

Electricity is a very important part of the livelihood of humans today around the world and is necessary for the sustenance and growth of world economies (Zakariya and Kahn 2014). Upon its wide use, humans have developed a complete dependency on electricity for sociological and economic reasons (Pollet *et al.* 2015). When the supply of electricity is compromised, development and growth become threatened. Majority of counties are faced with this crisis and their ability to drive development and the economy is insufficient (Oyedepo 2012). Traditionally, the world has always relied heavily on non-renewable sources of energy and fossil fuels. With growing demand and increasing debate on anthropogenic climate change or global warming, these forms of energy generation have come under immense scrutiny with regard to their environmental impacts (Oyedepo 2012). This has also led to increasing development of renewable energy generation which has also faced considerable scrutiny. Due to the key role of energy in progress and poverty removal, its consistent and prolonged availability of energy is vital along with its affordability, accessibility and environmental safety (Zakariya and Kahn 2014).

Consequently, South Africa also relies heavily on non-renewable energy and electricity although it is still far from meeting its electricity demands. In 2012 and 2015 Statistics South Africa (Statistics South Africa 2012, 2015) revealed that between 2002 and 2015 many households in South Africa were without electricity and this was around 1.5 million households, 0.6 million were able to access electricity through illicit connections and 73.1% accessing electricity through sharing with a neighbour that pays for electricity. South Africa has a fast-growing economy and an increasing demand for energy due to increasing population,

energy-demanding economic activities and development as well decaying outdated infrastructure (Van Wyk 2013). South Africa is a part of the partnership between "*Brazil, Russia, India and South Africa"* called (BRICS), and out of all the countries has the lowest national Gross Domestic Product (GDP). To stimulate its economic growth through meeting energy demands, South Africa would need to meet a projected growth of 250 GW of energy generation by the year 2030 (Pollet *et al.* 2015).

South Africa has experienced a lessening power supply, and this forced industries and large-scale infrastructural projects to struggle (Van Wyk 2013). Although South Africa has been, in the past among the cheapest electricity suppliers because of sufficient generating capacity, most of these power stations were coal power stations built from the late 1950s into the 1970s many situated in South Africa's north-eastern regions because of its rich coal deposits and proximity to coal mines (Van Wyk 2013; Pollet *et al.* 2015). Others were constructed recently including a nuclear power station at Koeberg, Western Cape (Van Wyk 2013). South Africa's consumption of electricity has been on the rise from the beginning of the 1980s and South Africa has since joined the "*Southern African Power Pool"* (SAPP), with widespread interconnections. In 2016 the total installed electricity generation capability in the SAPP areas is close to 60 Gigawatt electrical (GWe), and above 80% of it in in South Africa is derived from coal (Southern African Power Pool 2016). Because of this energy crisis, the state formed an emergency 'Energy War Room' that had a 9-Point Plan strategy in order to strategically and systematically address the problem. This was achieved through the formation of co-generation partnerships with the private sector to financially bailout ESKOM – the state-owned electricity generating entity, introduce gas-to energy technology and to boost generation from coal (Pollet *et al.* 2015).

In 2016 it was estimated that coal power stations supply approximately 85% of all South Africa's energy and around 230 000 GWh of electricity per year (ESKOM COP 17 2017). Energy from nuclear accounts for around 5% and renewable energy

such as Solar, Wind, Hydroelectricity and others like natural gas make up 5% (Statistics South Africa 2016) see Figure 2. Most of this energy is consumed locally and a portion exported and imported from adjacent countries such as Lesotho, Mozambique, Zimbabwe and Namibia (ESKOM COP 17 2017).

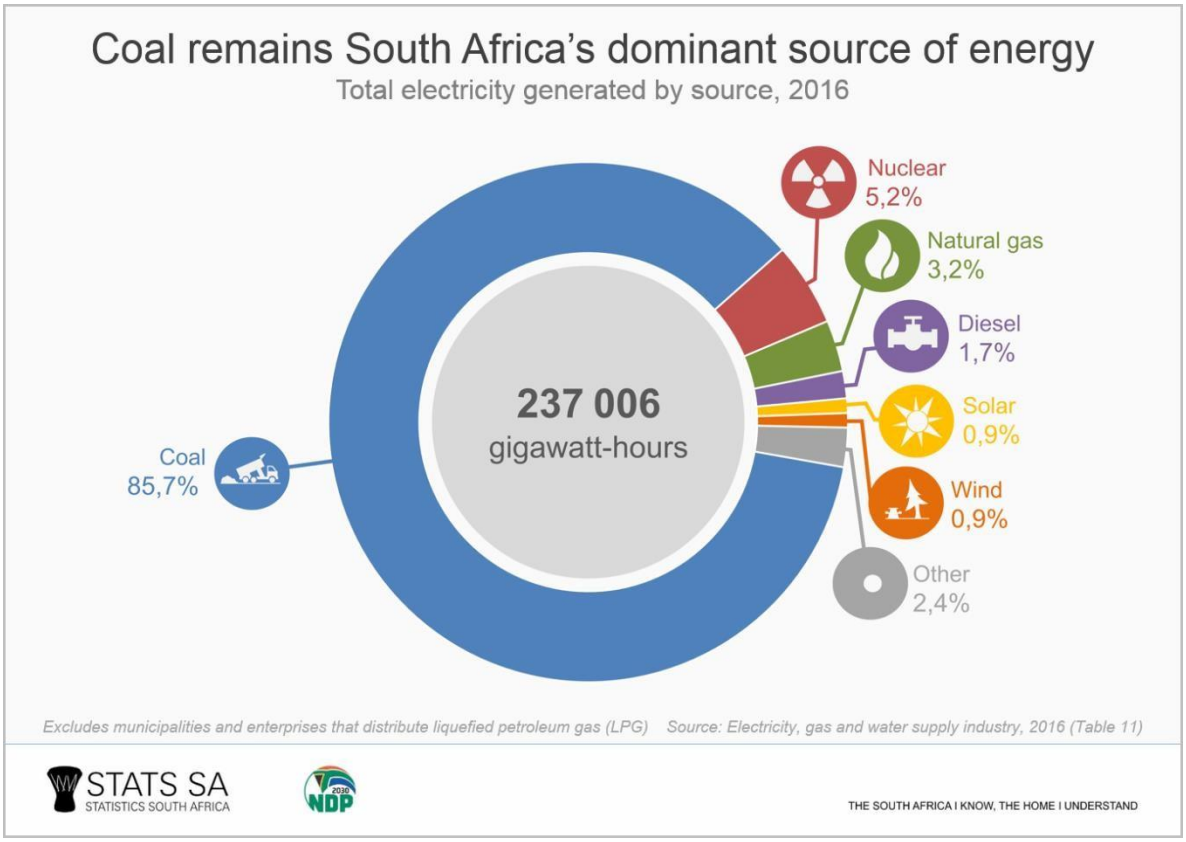


Figure 2**.** **"**Total Electricity Generated by Source 2016" - Source: "Electricity, Gas and Water Supply Industry, Table 11" (2016).

Subsequent "*Integrated Resource Plans*" (IRP) by the "*Department of Energy"* (DoE) have since moved towards cleaner ways to produce electricity. However, South Africa continued to face spiking energy demands, experiencing high electricity rates, power outages, blackouts as well as planned and unplanned outages (Pollet *et al.* 2015). This forced ESKOM and the government to address the poor investment in energy production and initiate renewable energy and nuclear energy programmes and solutions (Pollet *et al*. 2015). This move towards nuclear and mostly renewable energy is an attempt to lead up to an industrialized

development of a clean and environmentally friendly economy that has the potential of meeting energy demands (Pollet *et al.* 2015), however this is a costly process and is likely to affect the price of electricity (Van Wyk 2013). Moreover, although ESKOM is trying reduce the use of coal, it is very difficult considering that it is the most consistent and affordable energy source for base-load and peak electricity, and the country has rich coal reserves estimated at 256 years (Statistics South Africa 2016).

3.2 The History of Electricity Supply in South Africa and ESKOM

The earliest record of the use of electricity in South Africa goes as far as the 1860s where an electronic telegraph system was used in Cape Town. South Africa had its first lights over a year following the invention of the lamp by Thomas Edison in 1879 (Christie 1984). By 1881 Port Elizabeth and Cape Town had the very first telephonic connection in the country while Cape Town would later light the Table Bay docks and railway stations by May of 1882 (Christie 1984). In the same year the diamond mining city of Kimberly would illuminate its streets with electric lights, being the first city in Africa to be lit this way. Before the first power station would be built, between 1884 and 1890 there would be a widespread use of electric lights in mines, electric motors, the electric tram and private electricity use (Christie 1984).

The installation of electric lights in the city of Cape Town and the use of electricity in the country spread wide, shaping the mining industries in Kimberly and the Transvaal after the discovery of gold in Witwatersrand region in 1886 (Eberhard 2004). By 1897 the first electricity generation power station was built to supply mines around Johannesburg by the Rand Central Electric Works and later numerous mines in the mining industry built commercial power stations to supply the mines and adjacent towns (Eberhard 2004). Majority of the power stations generated power using gas engines although hydroelectricity is estimated to have been also used from 1892; an electricity network followed where municipalities supplied power in Cape Town City Centre, Durban, Rondebosch, Port Elizabeth, East

London, Pietermaritzburg, Kimberly and Bloemfontein between the years 1891 and 1906 (Christie 1984).

The electricity generation industry continued to grow, after the formation of the Union of South Africa. The Union was the amalgamation of Natal and Cape Colony that were controlled by the British and the Transvaal and Orange Free State territories of the Boer Republic and the Transvaal Power Act of 1910 came to fruition as a result (National Electricity Regulator 2001; Eberhard 2004; Lloyd 2012). This paved the way for the formation of the Power Undertakings Board that licensed power generators and distributors, continuing up to the 1920s were the concept of an interconnected national electricity grid was conceived and the state was supporting coal and iron industries to necessitate the growth of the industrialization of South Africa (National Electricity Regulator 2001).

Two years later the "*Electricity Supply Commission"* called ESCOM was established through the "*Electricity Act, No. 42 of 1922"* that enabled it to create electricity generation and supply networks at low costs (Lloyd 2012). The commission was called Elektrisiteitsvoorsieningskommissie (EVKOM) in Afrikaans (Conradie and Messerschmidt 2000). From the 1922 Electricity Act, the Electricity Control Board (ECB) was also established in order to regulate ESCOM's electricity supply role. The board also collaborated with ESCOM through licensing private electricity generation operations while ESCOM permitted their rates (Eberhard 2004). ESCOM then became the power supplier for cities such as Cape Town, Durban and Johannesburg, later limiting the widespread of private power producers, thus leaning towards a concentrated ownership of power stations. ESCOM was determined to exploit the massive low-grade coal deposits found in the country and around the 1930s the Witbank Power Station was generating 100MW and was one of the world's top producers of low-priced electricity (Eberhard 2004).

ESCOM continued to consume the private power producers and in 1948 they bought the Victoria Falls Power Company, and this made them the major electricity generator in the country (Eberhard 2004). From 1950 South Africa began to interconnect the stations and by 1973 the country had a national interconnected electricity grid, which was convenient for ESCOM since they could centralize the operations involved in power supply (Lloyd 2012). With the growing demand for power, more power stations were constructed nearby to coal mines and when the oil crisis occurred in the 1970s, the South African economy depended mostly on electricity and by 1983 ESCOM had a generating capacity over 20 000 MW (Lloyd 2012; Eberhard 2004). In 1985 the Electricity Act of 1985 was passed to form the ESKOM and Electricity Act of 1987 therefore the two names (EVKOM and ESCOM) were merged in 1986 into what is today called ESKOM, responsible for generation, transmission and distribution of electricity about 95% in the South Africa (Conradie and Messerschmidt 2000). Also, there was a restructuring of ESKOM to a three-tier governance structure but remained as a non-profit state-owned enterprise (SOE) (Salakhetdinova and Sidorov 2018). ESKOM established a diverse electricity distribution network that not only supplied power to the cities but also provided electricity to rural areas through municipalities (Eberhard 2004).

3.3 Nuclear Energy and the Generation of Electricity

With growing demand for electricity, ESKOM began to explore plans to build a new nuclear power station in South Africa in 2007. Nuclear energy is very controversial and is used around the world for weaponry and generation of electricity (Breeze 2017). It has its positive and negative aspects and has been the transition from polluting electricity generation methods to environmentally friendly technologies (Hore-Lacy 2007) due to its lower operational costs (although it has high construction and technology cost), few competitors and does not emit Green House Gases (GHGs) (Salakhetdinova and Sidorov 2018). However, it produces dangerous radioactive waste material that has dangerous effects if not properly handled or disposed of (Breeze 2017). This means safety is a very important factor in the use of nuclear energy since the generation of electricity is based on the use of

nuclear reactions (Breeze 2017). A crucial nuclear reaction in the process of generating electricity is nuclear fission that involves the splitting and reconfiguration of atomic nuclei into smaller atoms inside the nuclear reactor (Breeze 2017; US-EIA 2018). The process releases a great amount of energy because the mass is converted to energy, the kinetic energy from the particles in converted to heat energy that is used to heat water, thus producing steam that has enough energy to spin a turbine – the spinning turbines thus generate electricity (Breeze 2017; US-EIA 2018).

The process of generating electricity from nuclear energy is achieved through the use of different fuels and reactors (Hore-Lacy 2007), for example Uranium is the basic fuel for nuclear and is converted into uranium pellets that form fuel assemblies. The atoms of Uranium that undergo fission are called fissile species. The most used reactor around the world is the *"Pressurized Water Reactor"* (PWR) that was first used to power submarines; this reactor uses regular water for cooling and moderation (World Nuclear Association 2014). The reactors are cooled in cooling towers or nearby water sources such as rivers or the sea for re-use (World Nuclear Association 2014). The components of a nuclear reactor are made up of a moderator, coolant, control rods, fuel, pressure tubes, a steam generator and containment (Hore-Lacy 2007). Other kinds of nuclear reactors are the *"Pressurized Heavy Water Reactor* (PHWR), *Light Water Graphite Nuclear Reactor* (RMBK), *Boiling Water Reactor* (BWR), *Fast Neutron Reactor* (FBR) and the *Gas-cooled Reactor"* (Hore-Lacy 2007:25). See Figure 3. For the process electricity generation from nuclear energy.

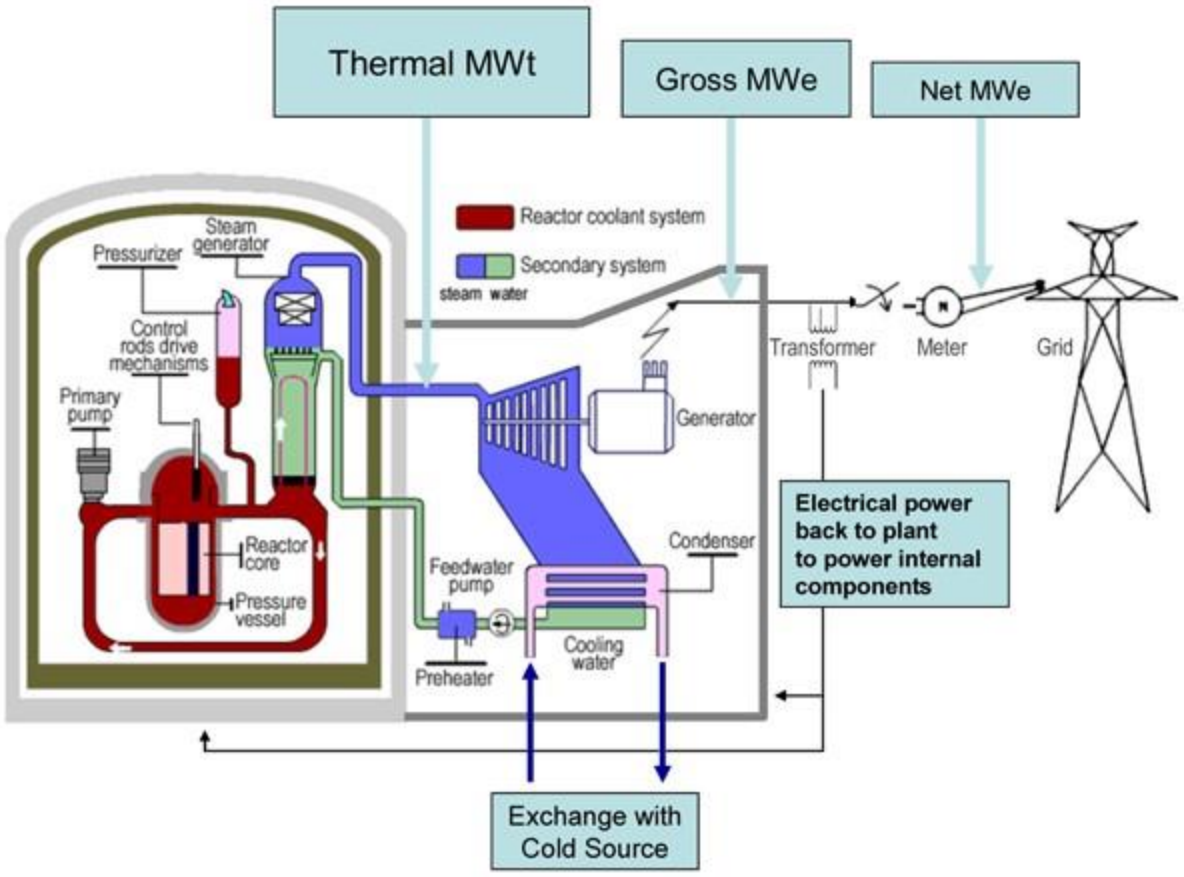


Figure 3**.** Electricity generation from nuclear energy. Source: World Nuclear Association 2014 (Accessed May 2018).

The knowledge about nuclear physics, nuclear fission, atoms, atomic change and radiation was developed from the beginning and middle of the 20th century where most of the development focused on atomic bombs (Breeze 2017; World Nuclear Association 2014). It was only after 1945 that most of its development was directed towards electricity generation and from around the 1950s the first commercial nuclear power stations were constructed and operated. This came of out the understanding that mass can be converted to energy through nuclear fission (Hore-Lacy 2007). Many experimental reactors and plants were thus developed using a variety of fuels, coolants and moderators (Hore-Lacy 2007), today there are around 440 nuclear reactors operating in 331 counties and producing above 380 000 MWe of energy per year. “There are around 65 more reactors are under construction and

they provide over 11% of the world's electricity as continuous, reliable base-load power, without carbon dioxide emissions" (World Nuclear Association 2014:2).

The only African state with an operational nuclear power plant is South Africa and it produces nearly 5% of the electricity for South Africa and about 50% of Western Cape's electricity demand (ESKOM COP 17 2017). The Koeberg Nuclear Power Station is in the Western Cape, at Duynefontein roughly 30km from Cape Town. This location was selected in the 1960s due to the region's increasing electricity demands and its proximity to sea water that would be used for cooling the steam produced during generation; nuclear energy was selected in an attempt to reduce dependence on coal-fired power stations located in Mpumalanga over 1000 km away (ESKOM COP 17 2017). Construction of the power station began in 1976, and it became fully operational from 1984 and has been running for over a 27-year period with no major incidents and has remained the longest continuous electricity generating unit with no interruption at ESKOM: 454 days. Koeberg remains an example of the successful use of nuclear energy in South Africa and Africa and is closely monitored, reviewed and regulated by the "*National Nuclear Regulator"* (NNR), "*World Association of Nuclear Operators"* (WANO) and the "*International Atomic Energy Agency"* (IAEA), and is licensed by the "*Nuclear Installation License"* (ESKOM COP 17 2017).

3.4 The Downside of Nuclear Energy

Although nuclear energy has a relatively low footprint compared to coal and renewables, there are a plethora of concerns that are attached to it (Hannah 2015; Breeze 2017). At first, nuclear requires complex planning and access routes to the station, land clearing is done to build the reactors and emergency planning zones are required. However, most important concerns are surrounding its potential use for developing nuclear weapons, the occurrence of a nuclear accident or even disaster and the storage of radioactive waste (Hannah 2015). These concerns have influenced and questioned recent developments relating to nuclear use around the world (Death 2006). The disasters can cause large-scale devastating health and

environmental impacts and the uncertainties around the storage of highly radioactive material have damaged public perception about the technology although it is a legitimate carbon-free alternative to coal (Breeze 2017). Provided that proper planning and engineering methods are undertaken, a nuclear power plant provides low land use impacts, environmental and biodiversity impacts as compared to coal and is a huge contribution to the reduction of impacts leading to climate change (Hannah 2015). Moreover, nuclear power has the potential to provide electricity at relatively low prices while meeting growing energy demands (Breeze 2017). This makes nuclear a divisive and contradictory source of energy environmentally (Hannah 2015).

Since the occurrence of the three major nuclear disasters in history, Three Mile Island in 1979, Chernobyl (1986) and Fukushima (2011), society's perception and confidence in nuclear decreased dramatically. The attempts to construct nuclear facilities have since been met with public backlash, lack of support and media outrage (Rypkema 2018). Following the Fukushima incident there was vast amount of media reporting and availability of information surrounding the incident than the prior two; also there was increased public participation through the use of online services such as Twitter, Facebook and YouTube establishing conversations and information sharing (Friedman 2011). "Many questions continued to be raised around the world about the safety and future of nuclear power. International support for nuclear power seems to have decreased in the aftermath of those events, despite the nuclear renaissance of renewed interest in nuclear power that had been evident for some time prior to it" (Van Wyk 2013:26). These disasters have had a considerable impact in public participation process and raise questions about nuclear safety. This is because the facilities are vulnerable to natural and nuclear disasters, because of incompetent management or unforeseen circumstances (Rypkema 2018).

3.5 Three Mile Island Disaster 1979

This disaster occurred in the United States of America (USA) in 1979 when the plant had a fault in its cooling system. This caused the reactor to overheat and melt into the second reactor thus destroying the two reactors (Ramana 2011; Rypkema 2018; World Nuclear Association 2014). Amounts of radiation and radioactive gas were released to the atmosphere but no major health impacts, injuries or death were reported that were the direct result of the accident (World Nuclear Association 2018). The power plant resumed operations in 1982 at improved levels of safety and production through the rectification of the problems that caused the incident, by 1997 it was regarded as the longest running water reactor in the world (World Nuclear Association 2018; Grady 2011).

3.6 Chernobyl disaster 1986

The Chernobyl nuclear disaster was the second major nuclear accident in the world and took place in 1986 in Pripyat, Ukraine of the Soviet Union (World Nuclear Association 2018). A combination of issues led to the disaster, first the design of the reactor was flawed and secondly an inadequately trained staff was operating the power plant. Two workers died during the accident and 28 people more in the following weeks due to radiation exposure and poisoning (World Nuclear Association 2018). The blasts and fires released radiative material to the atmosphere that is likely to cause health and environmental impacts over a period of time; the "*United Nations Scientific Committee on the Effects of Atomic Radiation"* (UNSCEAR) has been conducting research to investigate this (Friedman 2011; Rypkema 2018).

3.7 Fukushima Disaster 2011

This accident took place on the March11 in 2011, this was during the EIA process for the Nuclear-1 ESKOM project in South Africa. The Fukushima Daiichi reactor's power supply was disrupted by an earthquake that caused a tsunami and was later damaged. A total of four nuclear reactors were damaged and for weeks an effort was undertaken to stop leakages of radioactive material and contaminated water to

the environment (Kaku 2011; Grady 2011; World Nuclear Association 2018). The incident was rated number 7 on the "*International Nuclear Event Scale"* (INES) because of high releases of radioactive material over one week. Over 100 000 people were evacuated from the region to protect them from radiation exposure, although no direct death of health cases have been found, many people possibly over 1000 died due to issues related to the evacuation (Rypkema 2018).

Following these three incidents, support for nuclear has dramatically decreased worldwide because of perceptions pertaining accidents and hazardous nuclear technology (Ramana 2011). Communities that live near these sites often face criticism and rarely share their support for nuclear during public participation (Ramana 2011). Following extensive media coverage of the accidents, the public has lost trust in the states' capabilities to operate nuclear technology and to ensure the safety of their citizens (Ramana 2011; Rypkema 2018). Although there have been education and risk campaigns to promote public opinion into understanding and supporting nuclear as an alternative to fossil fuels, these efforts have not been effective since the public has doubts about the nuclear industry (Ramana 2011). This has been a huge setback for the nuclear industry and an ironic position in the combat of climate change because; the world has an effective alternative that is effective as fossil fuels and has far less impacts however, it is dangerous and unwanted due to its potential risks (Hannah 2015; Ramana 2011). More so, some researchers argue that nuclear is in fact not the solution to climate change since it is susceptible to economic, social, environmental and infrastructural issues (Sovacool and Cooper 2008). Also, reactor safety technology, storage, proliferation and the plants' susceptibility to attack remain as major questions that need to be addressed by the nuclear industry (Sovacool and Cooper 2008).

3.8 Nuclear Energy in South Africa

According to Harris *et al.* (2004), the use of nuclear in South Africa has always been controversial and very secretive. Some of the laws during apartheid allowed the government to withhold information about nuclear proliferation and some of the records are today missing. When a *1975 Defence Force Memorandum* was

declassified, the country was able to learn about South Africa's use of nuclear weapons and its relationship with Israel in which South Africa was offered nuclear warheads by the Israeli state (Death 2006). In 1993 the former President FW de Klerk in fact confessed that the country had six nuclear missiles throughout the apartheid administration and these weapons were later destroyed (Death 2006). Since the construction of the Koeberg power station and the destruction of the apartheid nuclear weapons, it seemed that the new democratic South Africa would not have to deal with nuclear.

This of course changed when ESKOM developed nuclear technology with safety mechanisms that would limit accident and fault called the Pebble Bed Modular Reactor (PBMR) technology late 1990 (Lakhani 2001; Death 2006). This technology was to be assessed and tested at the Koeberg power station. Many environmental groups including the Non-Government Organisation (NGO) Earthlife Africa opposed the tests and voiced their suspicions of the re-introduction of nuclear technology in South Africa as well with the nuclear technology as whole. The public also opposed the test since it contradicted South Africa's plans to be a major role player environmental sustainability in Southern Africa (Death 2006). Additionally, the public also proclaimed that this test was a gross misuse of public funds. Others however, have argued that nuclear proliferation and the use of nuclear power for electricity generation are two separate issues and that nuclear proliferation is but a political problem (Salakhetdinova and Sidorov 2018).

The democratic government's shift toward nuclear power was a step towards meeting energy demands and a leap away from the use of coal. A profitable investment for the country since nuclear power development has little competition world-wide. In comparison to renewable energy, nuclear power is able to produce and provide stable energy constantly without interruption. Renewables are only effective when they supplement power demand but not effective enough to provide both base-load and peak energy demands nationally, consistently (Salakhetdinova and Sidorov 2018). This is why South Africa planned to make large investments into nuclear to meet energy demands and improve the economy.

The Department of Energy of South Africa (DOE) released a long-term energy plan document called the "*Integrated Resource Plan"* (IRP) for 2010–2030 which was revised numerous times till 2016. The document detailed South Africa's plans to construct new power stations and improve power generation capacity to 125 GW, and the generation would be achieved through an energy mix of nuclear, solar, wind, gas, hydro and other sources (Salakhetdinova and Sidorov 2018). Nuclear power was projected to generate at least 20.4 GW by the year 2050 and ESKOM selected five potential sites to construct the power stations: Thyspunt, Duynefontein, Bantamsklip, Brazil and Schulpfontein (Salakhetdinova and Sidorov 2018). Subsequent to the scoping phase, Schulpfontein and Brazil were removed from further assessment and the three remaining sites were studied for potential development (Salakhetdinova and Sidorov 2018). Russian technology was considered and planned for use during the nuclear expansion project. This created an opportunity for Russia and South Africa to form a technological relationship and for Russia to enter into African markets (Salakhetdinova and Sidorov 2018). However, political and economic conditions constrained the relationship between two countries regarding the project (Salakhetdinova and Sidorov 2018).

3.9 The South African Public and Nuclear

According to the Human Sciences Research Council, South Africans are not well-informed on nuclear and its technology and few of them approve of its use in the country (Nkosi and Dikgang 2018). Nuclear safety is the major concern for South Africans such as risks for accidents and waste disposal. A smaller portion of them truly understand its advantages and disadvantages (Van Wyk 2013). There a few anti-nuclear groups such as Save Bantamsklip, Earthlife Africa, Coalition against Nuclear Energy (CANE), the Thyspunt Allaince, and Greenpeace South Africa that have been opposing the use of nuclear energy in South Africa through protests and public participation (Van Wyk 2013). The government however, has made some efforts to improve public opinion on nuclear through nuclear education and public hearings on nuclear technology, safety and communication. Some efforts by the government included the awareness campaigns headed by "*Nuclear Energy*

Corporation of South Africa" (NECSA), the opening of a visitor center at Pelindaba and use of social media, print, theatre and many channels to communicate and promote nuclear (Van Wyk 2013).

3.10 The Nuclear-1 Project Planning

It was announced by the South African government in 2006 that plans to construct a nuclear power station in the Western Cape in Koeberg were underway. A year later, the ESKOM board sanctioned a plan that would reduce the generation of energy from coal that was 87% to 70% and double energy generation to 80GWe in 18 years' time. In 2008 a selection of five sites and technology for the project would follow resulting in the Nuclear-1 project (Van Wyk 2013). The EIA for the development began in 2006 and a draft *"Environmental Impact Report"* (EIR) was issued in 2010 March suggesting Thyspunt as a suitable location. By 2011 a final EIR was submitted to the *"Department of Environmental Affairs"* (DEA), an application for a site license for the construction and operation of nuclear stations at Duynfontein and Thyspunt was sent by ESKOM to the "*National Nuclear Regulator"* (NNR) (Van Wyk 2013). The *"South African Council for Geoscience"* approved the geology of Thyspunt as suitable for a nuclear installation; this was followed by an authorization to construct a 4000 MW nuclear reactor to any of the two sites by the DEA.

3.11 Nuclear Siting Investigation Program (NSIP)

ESKOM's recognition of the importance of the coast for nuclear power plants was recognized as early as the 1980s. ESKOM undertook a study termed the Nuclear Sites Investigation Program (NSIP) in selected coastal areas to ascertain the ones suitable to build nuclear power plants using a PWR (ESKOM 2011). The coastal areas were an advantage since the sea water would be used for cooling instead of inland water resources that are already scarce. The specialists were employed by ESKOM to study the geology, seismic and wave activity, population densities, and the sensitivity of the environments and other features in the regions (ESKOM 2011). The NSIP (1994) results for Eastern Cape show that the detailed

investigation was undertaken between 1984 and 1987. Two sites were selected in the region, an area in Alexandria on the east of Port Elizabeth and Thyspunt near St Francis. The area in Alexandria was later removed following findings from the site investigations, these were low suitability and high sensitivity of the region (NSIP 1994). Regional suitability factors that were studied were seismology, geology and geohydrology, regional sensitivity studies that were carried out included an impact assessment with site specific suitability studies such as demography, physiography, water supply, access routes and terrain cost comparison (NSIP 1994).

The findings for all the sites were as follows:

- The Kwa Zulu Natal east coast region had no suitable sites for a potential nuclear facility because of population density and activity related to tremors in the region.
- The Koeberg region was part of the selection since a nuclear facility already existed in the area and the region was already impacted.
- A site was selected between the towns of St Francis Bay and Oyster Bay in the Eastern Cape Province, called Thyspunt.
- A suitable site found on the southern cape coast is located between Quoin and Danger Point near Gansbaai, called Bantamsklip.
- Schulpfontein and Brazil were two suitable sites situated in the Northern Cape.

See figure 4 that shows the map location of the selected sites

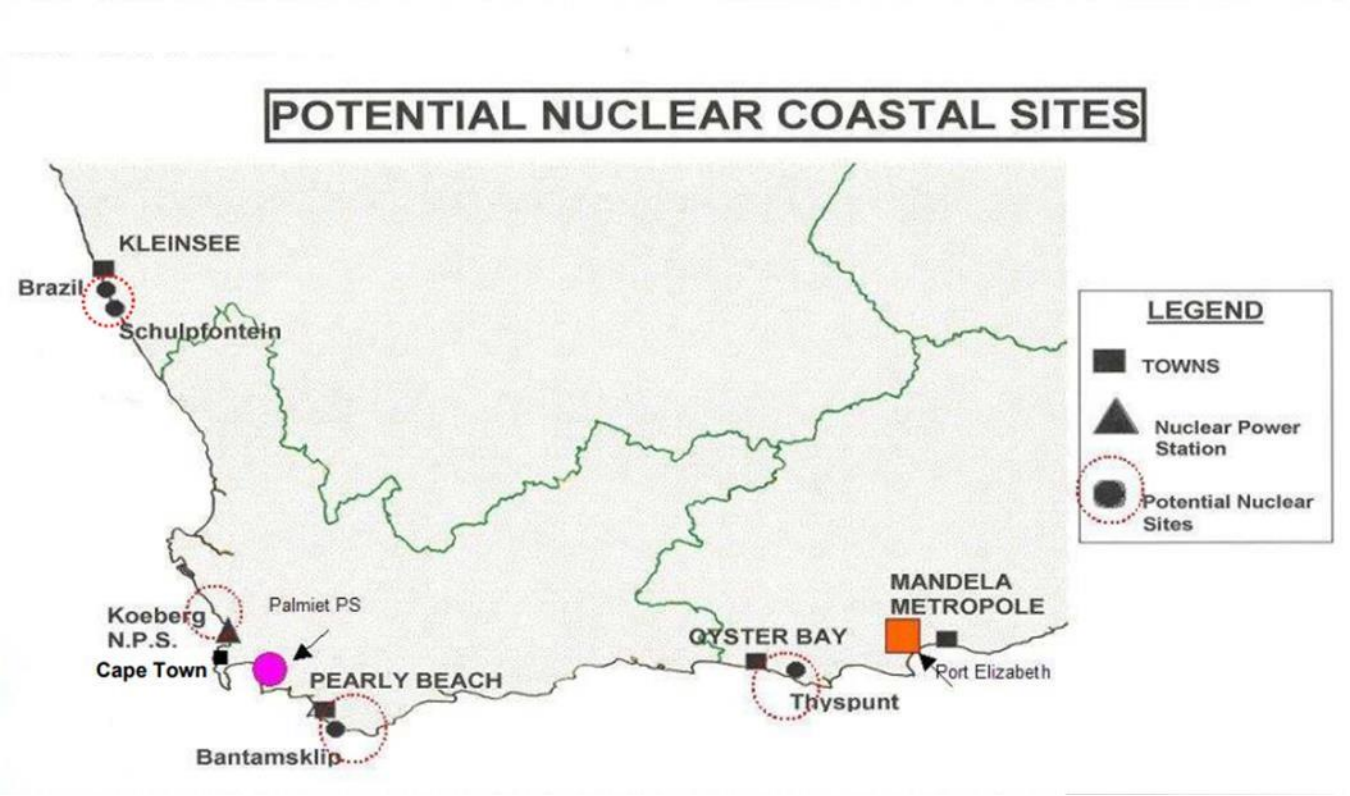


Figure 4**.** Map Location of Potential Nuclear Sites. Source: Arcus Gibb Website https://projects.gibb.co.za/

3.12 The Nuclear-1 Project

In 2006, South Africa's government pronounced plans to build another nuclear plant in Koeberg, Western Cape in order to improve energy generation capacity in the country (World Nuclear Association 2018). This plan was designed to reduce power generation from coal to below 70% and increase nuclear to above 25% according to ESKOM and by the beginning of 2007, they approved a double power generation capacity plan of 80GWe by 2025 (World Nuclear Association 2018). Arcus Gibb evaluated the 1980s NISP investigation and conceded that they were undertaken in a systematic and satisfactory manner. An EIA process was introduced in 2006 and included details pertaining the construction and operation of a "*Conventional Nuclear Power Station"* (CNPS) in the Western Cape, Northern or Eastern Cape Provinces (EIA - Background Information Document (BID) 2012). The original NISP studies five sites were selected from the three provinces and were to be

investigated during the EIA process (EIA - Background Information Document (BID 2012).

ESKOM submitted an application for authorization to the "*Department for Environmental Affairs and Tourism*" (DEAT) in 2006 initially for the five sites but amended the application in 2008 to build a nuclear plant in one of the three sites (1) Thyspunt, (2) Bantamsklip and (3) Koeberg. Removing the two sites in Northern Cape from further assessment following a Scoping Phase and Plan of Study undertaken in 2007 and the three remaining sites were studied for potential development (Salakhetdinova and Sidorov 2018). ESKOM selected Arcus Gibb to be the EAP for the entirety of the "*Nuclear -1 and Associated Infrastructure"* project and the selection of technology was expected to commence in 2008 (Van Wyk 2013). Arcus Gibb represented their reports to the South African *"Department for Environmental Affairs and Tourism"* (DEAT) and later DEA for final approval.

In 2009 a revised Scoping Phase was undertaken along with a public participation process (PPP) and in 2010 a full EIA investigation commenced that included a total of 28 detailed specialist studies such as geology, heritage, social, marine and hydrology. See (https://projects.gibb.co.za/for the full list of specialist studies. A "*Draft Environmental Impact Report*" (DEIR) was published and open for comment from the public and stakeholders. Between 2010 and 2016 the EAP published reports titled the *Draft EIA Report* (2010), *Revised Draft EIA Report Version 1* (2011), *Revised Draft EIA Report Version 2* (2015) and *Final EIA Report* (2016). In March of 2016 ESKOM submitted a license application to the "*National Nuclear Regulator"* (NNR) for Thyspunt and the Duynefontein sites (World Nuclear Association 2018). ESKOM planned to construct and operate power reactors and other nuclear installations on either site and around the same time the "*South African Council for Geoscience"* (SACGS) confirmed that Thyspunt had the geology that would support nuclear energy reactors (Salakhetdinova and Sidorov 2018). The final Record of Decision for the entire Nuclear-1 project was released in 2017 by the DEA; see Figure 5 for the Nuclear-1 Project and EIA Process timeline.

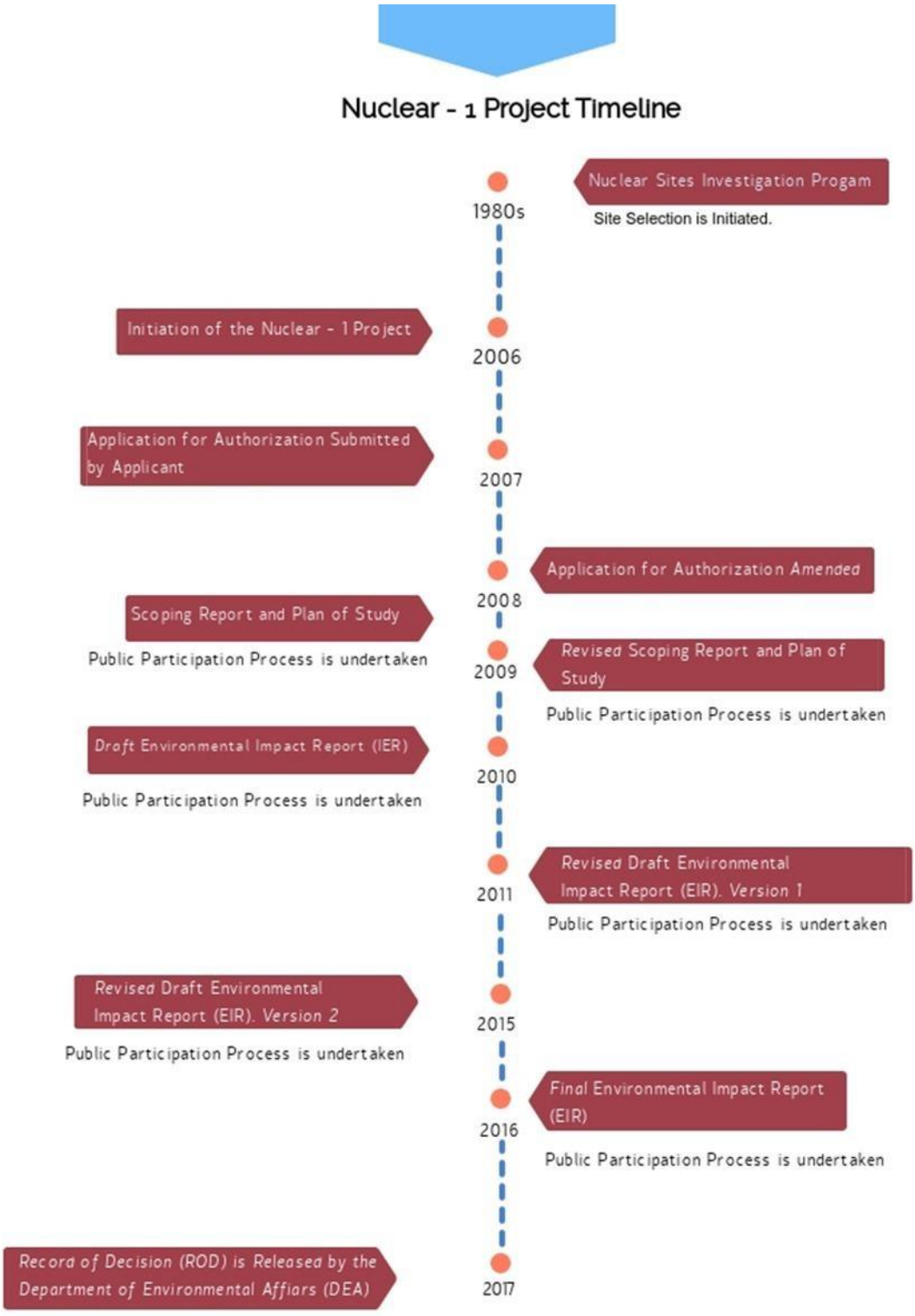


Figure 5**.** Timeline of Nuclear-1 Project and EIA Process

3.13 Thyspunt – Study Area

Thyspunt is a coastal site that is known for its unique natural and heritage occurrences, the area is rural in character but has some economic activities such as dairy farming and fishing (Hart 2010). “The site earmarked for the proposed nuclear development is currently Eskom-owned, but there are a number of houses on the adjacent properties, outside the proposed nuclear power station’s Emergency Planning Zones (EPZs)” (Revised Draft EIR 2015:15). The Thyspunt area is in the Kouga Local Municipality in the province of the Eastern Cape (Maasdorp 2010). The province itself in 2010 was estimated to have a population of about 6,6 million and has had increasing growth of coastal towns such as Jeffreys Bay since 2005 (Dippenaar 2010). About 58% of the populace are unemployed or not active economically and 42% is economically active according to the 2010 economic assessment study by Dippenaar in (2010). The Thyspunt region has a population of people around 28, 000 that are engaged in economically diverse ventures such as tourism, fishing, agriculture and businesses (Maasdorp 2010). Near Thyspunt are the Tsitsikamma and Kouga districts in which Humansdorp is part of and Humansdorp is the biggest dairy farming region in South Africa. Tourist areas around the region are Oyster and St Francis Bay with activities such as hiking, golf and sporting activities and fishing is done predominantly around Plettenberg Bay and Port Alfred using the Port St. Francis and Port Elizabeth harbors (Maasdorp 2010).

3.14 Nuclear -1- Background information and Technology

The EAP Arcus Gibb (2007) published a Background Information Document (BID) in May 2007 detailing the Nuclear – 1 project and inviting I&APs to participate. They explained the varying energy demands over a 24-hour and weekly period in South Africa. With demand more during the week than in weekends and high in winter and low in summer during base-load thus highlighting the importance and the need to have a stable base-load and peak-load energy supply through the use of various technology and sources. The ability to meet base-load electricity demands means the ability for a power station to use its technology to continuously generate

electricity for all hours, while peak-load means power station technology that produces energy during periods of high demand. Few sources of energy are able to optimally meet these demands, coal and uranium are readily available sources that can reach a 40 000MW generating capacity for the next two decades. This means a new and sustainable power station is needed and nuclear power is preferred since it expands the use of natural resources for energy production, has little environmental impacts when maintained safely and has a potential to increase human capital. Additionally, South Africa has abundant resources of Uranium and its use will be valuable for energy production through the *"Nuclear Power Station"* (NPS).

The NPS will be located near the coast because South Africa is water stressed and a Pressurized Water Reactor (PWR) technology will be used and the sea water for cooling. Emergency planning, safety, geological and environmental conditions and licensing have been considered. It is estimated that the NPS along with additional infrastructure will need about 31 ha of land, the NPS will include a reactor, facilities to store fuel, a turbine, handle waste and spent fuel, an intake and outfit basin, and other additional infrastructure. Other activities may include excavation, removal of top soil, transformation of undeveloped land, recycling of objects and many others.

3.15 Nuclear -1 Specialist Studies: Heritage

A Heritage Impact Assessment was undertaken at Thyspunt in 2010 by the Archaeology Contracts Office (ACO) selected by *"Arcus Gibb (Pty) Ltd"* for of ESKOM Holdings. This was following the approval of the *"Draft Scoping Report and Plan of Study"* (2008), the project proceeded to the full EIA site investigations. The HIA was done by Timothy Hart, a University of Cape Town (UCT) researcher in 2010. Hart (2010) established that Thyspunt has a diverse and rich archaeological and paleontological heritage. Thyspunt has heritage of great importance for Middle Stone Age, Late Stone Age, and colonial archaeology, this is according to the Heritage Impact Assessment (HIA), literature research and public participation that has been conducted at Thyspunt (Hart 2010).

Pre-colonial archaeology in the area includes the Middle Stone Age (MSA) material, numerous bone fragments and Later Stone Age (LSA) material such as shell middens and vegetated mounds (Hart 2010).The ESA and MSA archaeology that is present at Thyspunt has a potential for human remains since there were fragmentary human remains uncovered by Hillary Deacon around 1970 and 1980 (Deacon and Deacon 1999; Deacon 1995) at Klasies River, a site close to Thyspunt. Other materials that were discovered are fossil dunes and paleosoils (The Heritage Portal 2016) and there is a well-preserved pre-colonial complex of fish traps as well (Hart 2010:44). The LSA material is linked to the present-day communities, especially the middens that are less than 2000 years old. The middens, along with the pottery and other material, relate to the Khoekhoen herders that were dominant in the region in the last 1000 years (Hart 2010). The degree of preservation of the middens varies, however, their presence is a significant record of southern African identities and how pre-colonial people lived and behaved across the landscape (Hart 2010).

Colonial period heritage at Thyspunt is limited, however, there is an abandoned farmhouse located on a farm that is possibly over 60 years old, therefore protected by the "*National Heritage Resources Act No. 25 of 1999 (NHRA)"* (Hart 2010). The farmhouse is called St Andrews Cottage and dates from the 19th to early 20th century. It is currently associated with living heritage and lasting traditional use by the local communities and a school for various purposes (Hart 2010). Another old farmhouse is situated at Welgelegen however, due to its dilapidated condition; it does not have high architectural and heritage significance (The Heritage Portal 2016). Moreover, according to the National Shipwreck Register in the South African Heritage Resources Authority (SAHRA), there were three shipwrecks that occurred at Thysbaai in the 19th century. The limitations that were faced during the HIA process were uncertainty about the heritage sites in the central portion of the power station footprint at this site, due to the density of vegetation that prevented access to the majority of this portion of the site. However, the presence of open dune fields and other archaeological material was visible. A number of trial

excavations were carried out at 113 areas throughout the proposed development areas to combat this, during the HIA by Hart (2010).

The HIA specialist report concluded that it is possible to completely avoid impacts to tangible heritage resources; location alternatives can position the development footprint in a way that minimizes physical impacts to heritage and archaeological sites (Revised Draft EIR 2015). Furthermore, the overall cultural landscape will be altered by the development including unmitigatable cultural landscape impacts; other mitigation measures will include ‘rescue' excavation which is also destructive (Hart 2010).

The HIA report concluded that Thyspunt is a Cultural Landscape and a Natural Heritage Site as defined by the “*United Nations Educational Scientific and Cultural Organization”* (UNESCO) “*World Heritage Convention”*. However, it has no official conservation status in terms of protected areas legislation (Revised Draft EIR 2015). The Gamtkwa Khoisan Council (GKC) and the rest of the community were concerned about the handling of the heritage resources and artefacts that are part of their heritage (Revised Draft EIR 2015). Thyspunt is one of the sites listed by the Heritage Monitoring Project (HMP), an organization that seeks to promote public awareness around heritage-related issues around South Africa as well enforcing the NHRA, as one of the endangered heritage sites in South Africa (The Heritage Portal 2016). Therefore, mitigation will be very difficult at Thyspunt considering the heritage-laden landscape and critical nature of mitigation that would have to take place (Hart 2010). However, it was maintained that the site would be viable for nuclear development (Hart 2010:78), a recommendation not approved by SAHRA (ESKOM EIA 2011:5).

3.16 Nuclear -1 Public Participation

Participation in the project began in May 2007 when Arcus Gibb distributed a BID in Xhosa, English and Afrikaans providing the public information about the project and inviting them to participate. The BID detailed the I&APs procedure for

registration, assisted the I&APs with understanding of the project and the environmental authorization process in accordance with NEMA 1998 Regulations (Act no. 107 of 1998). The I&APs were invited to comment and contribute through completing the comment sheets provided during public meetings, workshops and focus group meetings. To return these either by mail, e-mail or fax to the public participation consultant. The I&APs were also advised to communicate with the Public Participation Office for further information or concerns throughout the PPP. The comments would then compiled to an Issues and Response Report that is accompanied by the various impact reports and would all be submitted to the decision-making authority for review. Advertisement for meetings and workshops were advertised by the EAP in the above-mentioned languages.

From the initial scoping phase to the final EIA phase, the EAP published public comments on five reports titled "*Scoping Report and Plan of Study"* (2008), "*Revised Scoping Report and Plan of Study"* (2009), "*Draft EIA Report"* (2010), "*Revised Draft EIA Report Version 1"* (2011), "*Revised Draft EIA Report Version 2"* (2015) and Final EIA Report. These also include letters and submissions by various I&APs and stakeholders such SAHRA, the Thyspunt Alliance, Gamtkwa Khoisan Council, Francis Kromme Trust, Friends of the St. Francis Nature Areas (FOSTER), and Greenpeace Africa and the Coalition Against Nuclear Energy (CANE) and St Francis Bay Resident's Association. These groups are anti-nuclear groups that were established to oppose the Nuclear-1 development at Thyspunt (Fin News 24 2017).

Because Nuclear-1 was a massive project and the PPP involved hundreds of I&APs from different backgrounds and expertise. Some of the comments received from the I&APs were:

- Outside the scope of the EIA tool and its purpose
- Others were not relevant to the project
- Included personal remarks and attacks
- Included misinformation, scientifically flawed and false assumptions

- Biased perceptions
- Some points were based on personal perceptions and not scientific information Some people were grandstanding and not pushing the PPP forward

3.17 The Gamtkwa Khoisan Council

The Gamtkwa Khoisan Council is a registered Non-profit Organization (NPO) that represents the indigenous local Khoisan people of the Eastern Cape in Kouga. The Gamtobakwa people (Gamtkwa is the abbreviation), or the "Gamtousch nation". The organization protects, promote and develop heritage of the Khoisan people in the region. The organization has been involved in cultural activities, projects and EIAs as active participants to protect and preserve their heritage (Gamtkwa Official Website 2018). Their members provided comments throughout the EIA and submitted the following letter to the EAP detailing their objections to the Nuclear-1 project as well as the findings of the Specialist. Greenpeace Africa, Earthlife Africa also protested on August 26, 2015 in the Eastern Cape on and handed over a memorandum to the Department of Energy in Port Elizabeth.

The PPP for Nuclear-1 was massive and detailed particularly because it was the first of its nature to be undertaken in South Africa. Also, nuclear is a very controversial issue therefore a larger and rigorous approach was required. Nationally, the meetings were held in over 22 venues and in three different languages and arrangements for marginalized groups were also undertaken. Participation was achieved through commenting, workshops and also protesting. There were about 7000 I&APs were registered and meetings, focus groups and workshops were held in various locations throughout Eastern Cape, Western Cape and Northern Cape. For Thyspunt, the meetings were held at, Humansdorp, Oyster Bay, St Francis bay, Jeffreys bay and Sea Vista. This explains why the PPP was undertaken for a period of years and was very complex. The following chapter presents the methodological approach that was applied in order to analyze data.

Chapter 4 - Methodology

4.1 Introduction

In this dissertation the primary sources of data that were used to answer the research question are published literature on the subject matter, relevant Impact Assessment documents, reports and comments released by the heritage authorities and the government related articles and newspaper articles. Public participation documents that include comments and submissions were accessed from the Arcus GIBB website (https://projects.gibb.co.za/) since they are made available to the public.

4.2 Thematic analysis

A thematic analysis approach was used to analyze the data in this research. This is a qualitative method extensively used in research (e.g. Divan *et al.* 2017). Thematic analysis has been applied in fields such as psychology (Braun and Clarke 2006) science and social studies research. These methods have been applied to analyze interview data, questionnaires and case studies (for example Riessman 1993; Murray 2003). Thematic analysis is used in the identification, analysis and reporting of patterns within data, highlighting significant aspect of the research subject (Braun and Clarke 2006). This flexible qualitative analytic method is a useful tool to elucidate interpretations because it provides a systematic way of analyzing data (Alhojailan 2012; Marks and Yardley 2004). Further, it is not limited to one theoretical standpoint and this provides a valuable advantage to research (Maguire and Delahunt 2017). According to Alhojailan (2012) and Javadi and Zarea (2016) thematic analysis, can be used in a number of ways, although advantageous, it can cause some misunderstandings in terms of its use.

This study followed the common 6-Step approach presented by Braun and Clarke (2006). This approach as stated in the research aims, involves the identification of themes in the data in order to understand an issue, not to merely summarize the data (Maguire and Delahunt 2017). The identified themes in the data can be both latent and semantic levels according to Braun and Clarke (2006). Semantic themes being the ones that are at “the explicit or surface meanings of the data and the analyst is

not looking for anything beyond what a participant has said or what has been written" and latent themes "identify or examine the underlying ideas, assumptions, and conceptualizations and ideologies that are theorized as shaping or informing the semantic content of the data" (Braun and Clarke 2006:84).

This methodological approach, a thematic analysis, is important for the identification, analysis, and reporting of patterns in the data (Braun and Clarke 2006) and was selected for its flexible qualitative analytic characteristics (Marks and Yardley 2004; Alhojailan 2012). Since public participation is a participatory planning tool, a key feature that is recurring in all of its four sources, as discussed in Chapter 2, section 2.4 is consultation under the notion of procedural fairness. Consultation is important for informing the public and encouraging the involvement of the I&APs in the development (Abelson 2006). Consultation along with heritage and environmental protection, nuclear safety, EIA technical procedures, and accountability are among the prominent issues submitted by the IAPs in the context of heritage protection. These prominent issues from the I&APs' submissions provide a valuable opportunity to understand the role of public involvement by the participants.

4.3 Technique

The technique of "reading against the grain" (for example Rizzo 2017) was applied in this study and it assisted the researcher in interpreting and analyzing the sources of information such as media coverage and government and EIA documents; it allowed the researcher to interrogate biases from these documents for example. Most importantly, this technique when used with thematic analyses had the potential of positioning the I&APs at Thyspunt at the center of heritage protection and EIA PP in South Africa. This positioned the I&APs at Thyspunt not simply as anti-nuclear power or anti-development groups but as active agents who are protecting their heritage that forms part of their identity.

4.4 The Data and the Research Question

The data used to answer the research question were acquired from Issues and Responses Reports, Public Meeting Comments, Stakeholder Feedback Meetings, Key Focus Group Meetings, Letters Submitted to the EAP and Mass Media reporting of protest action that took place during the EIA PPP at Thyspunt (see *Appendix 1*). The documents were produced from the scoping phase until the full EIA phase of the project was completed. Responses to the reports published by the EAP "Scoping Report and Plan of Study" (2008), "Revised Scoping Report and Plan of Study"(2009),"Draft EIA Report" (2010), "Revised Draft EIA Report Version 1" (2011), "Revised Draft EIA Report Version 2" (2015) and "Final EIA Report" (2016) were analyzed. The I&APs commented on the project itself, the findings of the specialist investigations and expressed their views on the technology and the EIA procedure. They provided feedback on how the PPP was conducted and what the project meant to them and their communities. All the Thyspunt public participation documents were consulted, and the ones with the most relevant data were selected and analyzed. The I&APs were the Gamtkwa Khoisan Council, St Francis Bay Resident's Association St and Francis Kromme Trust, the South African Heritage Resources Agency (SAHRA), Thyspunt Alliance, Friends of the St. Francis Nature Areas (FOSTER), Greenpeace Africa and the Coalition Against Nuclear Energy (CANE) and members of the public

The I&APs had various levels of literacies. Some possessed university qualifications, some were specialists and informed about a variety of issues while others possessed medium to low levels of education. The I&APs registered in large numbers from the beginning of the project and continued throughout the EIA. They collaborated to exercise their participatory rights for Nuclear-1, they formed alliance groups to oppose the development claiming it will negatively affect their environment, destroy heritage and sense of place, affect tourism and other business in the areas as well the risks that nuclear technology will pose.

The research question is focused on the themes that emerged from the I&APs responses. This might have influenced a course of action or actions during the EIA of the project. Between the top-down and bottom-up approach of thematic analysis

(Maguire and Delahunt 2017), this study utilized the top-down approach since it was determined by the research question instead of the data. The limitations are that there was no field data collection or direct observation of the meetings, protests and workshops by the researcher, instead the data was already collected and collated by the EAP. Also, no ethnomethodological experimentation was undertaken or interviews of the I&APs. These aspects are useful, but beyond the scope of this dissertation.

4.5 Data Analysis

The analysis of the data was achieved through the application of Braun and Clarke's (2006) six steps of thematic analysis. The steps are a guiding framework with no linear application and can be applied flexibly depending on the data and research question according to Braun and Clarke 2006. The steps are as follows (Braun and Clarke 2006:30):

1. "The researcher must familiarize themselves with the data
2. Generate initial codes
3. Begin to search for themes
4. Review themes
5. Define and name themes
6. Produce the research report"

Step 1. The researcher must familiarize themselves with the data

This first step allows the researcher to be familiar with the data they are to analyse through repetitive reading and note-taking (Braun and Clarke 2006). In this step, I began searching for initial patterns and meaningful input from I&APs by reading all the available public participation documents on Thypunt Nuclear-1 project. I repeatedly read the text, took notes and marked ideas and possible themes. There was no need to transcribe the data because the data was already in a text and not in a verbal form.

Here is an example of notes made during this step:

The I&APs from come from different educational, economic and social backgrounds. During the Scoping Phase, they are concerned mostly with the use of nuclear technology and would prefer the natural landscape left undisturbed. Unique to this phase, is the interest to be well informed about the specialists and times the field work will be conducted during the EIA phase.

Step 2. Generate initial codes

After becoming familiarized with the data and having gone through the documents, I generated a few ideas and began to organize the data systematically. This stage requires the creation of initial codes, these are generated from parts of the data that are interesting and relevant enough to be the basis of recurring themes on the dataset (Braun and Clarke 2006). This is imperative because it allowed me to reduce a larger dataset into small meaningful portions. I identified parts of the data that were likely to be repeated through the dataset. I coded using different coloured highlighters to identify possible themes then assembled the data within each code.

Step 3. Begin to search for themes

Following the sorting and organization of the coded data, the analyses were now focused a larger scale; the identification of themes. From step 2, I had generated a colour-coded list with initial codes and now had to sort them into larger themes. In this step, I examined the codes that can be placed on one large group based on their similarity. The primary themes were selected based on their relevance and significance to the research question. I used a table to represent the themes and the I&AP who provided the input. For example, Table 1 is a collection of codes that were grouped to form an early theme - Heritage.

Table 1. A collection of codes that were grouped to form an early theme - Heritage

I&AP	Comments
A Stakeholder	Conservation areas will be affected by the development

Mr Mias Strydom OBC Properties	There will be a destruction of Khoi heritage sites.
Gamtwa Khoisan Council	Thyspunt is a cultural landscape and will be destroyed by the project.

Step 4. Review themes

Following the identification of potential themes, I began modifying and removing irrelevant themes and sometimes merging separate but similar themes. This was all determined by whether there were sufficient data for a pattern to be categorized as a theme and if it had relevance to the research question. I examined the themes in the context of the data and collated them. This assisted in categorizing patterns that were coherent and group initial themes. The final step of this stage was devising a thematic representation of the data in a table format. Following this stage, I had a clear idea of the different kinds of themes that emerged in the data and their significance to the research question.

Step 5. Define and name themes

Braun and Clarke (2006) refer to this stage as the stage where the researcher identifies the crux of each theme, the meaning and the relationship between the themes. After having produced a moderate thematic representation of the initial themes, I defined and refined the themes examining their meaning and role in the dataset. I did not simply paraphrase the inputs of the I&APs, but I also identified and organized their comments into well-defined themes and examined their meaning through a detailed analysis. In total I identified five recurring themes that were in relation to each other and relevant to the research question and are coded in the following way:

1. Heritage
2. Nuclear Safety
3. Access to Information/Consultation
4. EIA Process/ Technical Procedure
5. Alternative Sources of Energy Generation

Step 6. Produce the research report

This is the last step and goal of the research, which is producing a research report. This is a detailed report and analysis of data that is clear, concise and non-repetitive and details what the results mean. This is also to answer the research question posed at the beginning of the report and goes beyond a simple description of data, the analysis has to be enclosed within a critical account (Braun and Clarke 2006).

Chapter 5 - Results

5.1 Introduction

Generally, South Africa's heritage is under constant threat from developments and non- effective or fragmented public participation that is carried out by the Environmental Assessment
Practitioners (EAPs) (Arazi 2009). Although the country's heritage and EIA legislation are progressive theoretically, the nature of the development and the characteristic gap between theory and implementation (Murombo 2008) often further complicate the Public Participation Process (PPP). Considering the controversial nature of nuclear energy and the importance of heritage in South Africa, Thyspunt is not exempt from issues that engulf public participation and heritage protection in South Africa.

In democratic theory, it is a unanimous view that public participation is undertaken for varying purposes and different underlying goals. It can be a tool representative of a successful democratic effort or as the means to achieve the desired outcome, be it decision-making, informing the public, information sharing and education or accountability (Abelson 2006). The main question is how do we know the extent to which these goals are achieved or shared by all parties involved in the project? While being aware of public participation as a contextual, political and social process (Contandriopoulos 2004; Gold *et al.* 2005; Abelson 2006) it is important to distinguish evaluation from an assessment. Evaluation establishes successful public participation against predetermined criteria whereas assessment is an unstructured analysis of a case study without a predetermined criterion (Abelson 2006). In the context of Nuclear-1, this project is concerned with the assessment.

A Scoping and full EIA was conducted on ESKOM's application to build three Nuclear Power Stations at Western Cape, Eastern Cape and Northern Cape. The appointed EAP was Arcus Gibb, employed by ESKOM who then represented their reports to the South African "*Department for Environmental Affairs and Tourism"*

(DEAT) and later "*Department of Environmental Affairs"* (DEA) for final approval. ESKOM applied to the DEAT in 2007, the initial Scoping Phase began in 2008 and the "*final Environmental Impact Report"* (Final EIR) submitted in 2016. The Record of Decision (ROD) from the DEA was released in 2017.

This study used thematic analysis to locate themes that were prominent during the public participation and helped understand the role of the I&APs during the Nuclear-1 project. The focus themes were centered on the protection of heritage, nuclear safety, the use of alternative sources of energy and the EIA public participation procedures. Comments on the Heritage Impact Assessment (HIA) specialists report, public and stakeholder meetings were also analyzed.
The data also include letters and submissions by various I&APs and stakeholders such as SAHRA, the Thyspunt Alliance and the Gamtkwa Khoisan Council.

5.2 Data analyzed

The themes were extracted from comments and submissions that were recorded during three stages of the EIA, namely the scoping phase, the draft EIA phase and the revision and final EIA phase (Table 2). The minutes of the comments are part of the public record and were compiled by ACER (Africa) Environmental Management Consultants. The I&APs were made up of environmental authorities, provincial and local government, environmental conservation and interest groups, associations for farmers and tourism, the media landowners and nongovernmental organizations (NGO), and individuals who were not representing any group or organization.

Table 2. Reports from Nuclear-1 EIA phases and location of documents in the research project. See (https://projects.gibb.co.za/) for further information.

Document number	Chapter and Sections of Project	Nuclear-1 Environmental Impact Assessment Phase	Title of the report
1	Chapter 5, Section 5.3	Scoping Phase, Section 5.3	"Environmental Impact Assessment (EIA: 12/12/20/944) Draft Environmental Impact Report (EIR) Issues Report: Issues Report 10 February 2010".
2	Chapter 5, Section 5.3	Scoping Phase, Section 5.3	"Environmental Impact Assessment (EIA: 12/12/20/944) For the Proposed Eskom Nuclear Power Station and Associated Infrastructure Record of Public Meetings" (06 June – August 2007).
3	Chapter 5, Section 5.3	Scoping Phase, Section 5.3	"Summary of Issues Raised from the Period of Submission of the Final Scoping Report to the relevant Authority to December 2014".
4	Chapter 5, Section 5.4	Draft Environmental Impact Assessment Phase	"Environmental Impact Assessment (EIA) EIA: 12/12/20/944 for the Proposed Eskom Nuclear Power Station and Associated Infrastructure – Draft Environmental Impact Assessment Report – Key Stakeholder Feedback Meeting – Cape St. Francis (16 April 2010)".

5	Chapter 5, Section 5.4	Draft Environmental Impact Assessment Phase	"Environmental Impact Assessment (EIA: 12/12/20/944) Comments on Draft Environmental Impact Assessment Report (Volume 23 RDEIR IRR 12 July 2011 – St. Francis Bay Minutes)".
6	Chapter 5, Section 5.4	Draft Environmental Impact Assessment Phase	"Environmental Impact Assessment (EIA) EIA: 12/12/20/944 for the Proposed Eskom Nuclear Power Station and Associated Infrastructure – Draft Environmental Impact Assessment Report – Key Focus Group Meeting - Gamtkwa Khoisan Council 27 July 2010 11h00 – 13h00".
7	Chapter 5, Section 5.5	Revision Phase: volume 1 and volume 2 & Final Environmental Impact Assessment	"South African Heritage Resources Agency – Review Comment on Archaeological/Paleontological Impact Assessment by Archaeology/Paleontology and Meteorite Unit of the Heritage Resources Agency – March 2010 (Arcus Gibb Response February 2011)".
8	Chapter 5, Section 5.5	Revision Phase: volume 1 and volume 2 & Final Environmental Impact Assessment	"Gamtkwa Khoisan Council - Draft Environmental Impact Assessment Report for Three Proposed Nuclear Power Station Sites and Associated Infrastructure 7 Augusts 2011".

9	Chapter 5, Section 5.5	Revision Phase: volume 1 and volume 2 & Final Environmental Impact Assessment	"Gamtkwa Khoisan Council – Draft Environmental Impact Assessment for Three Proposed Nuclear Power Station Sites and Associated Infrastructure 7 August 2011".
10	Chapter 5, Section 5.5	Revision Phase: volume 1 and volume 2 & Final Environmental Impact Assessment	"Thyspunt Alliance, St Francis Bay Resident's Association & St Francis Kromme Trust - Comments on the Second Draft of the Environmental Impact Assessment Report 7 August 2011"
11	Chapter 5, Section 5.5	Revision Phase: volume 1 and volume 2 & Final Environmental Impact Assessment	"Response to Nuclear-1 Draft Environmental Report – Thyspunt Alliance 30 June 2010".

The results discussed in section 5.3 to 5.5 are from the scoping phase, draft EIA phase and revision & final EIA phase of the EIA public participation process (PPP) (see table 2). Five themes have been identified: The importance of Heritage to the I&APs at Thyspunt, I&APs concerns with nuclear safety, I&APs concerns regarding lack of access to information, I&APs mistrust in the EIA process and Technical procedure and I&APs recommend using Alternative Sources of Energy Generation. In the themes discussed below a few comments of the I&APs are highlighted but the full list of comments is in *Appendix 1*.

5.3 A thematic discussion of PPP comments of the Scoping Phase of the Environmental impact Assessment process at Thyspunt

The comments and responses are from the following documents of the "Scoping Report and Plan of Study" (2008) & "Revised Scoping Report and Plan of Study Comments by I&APs" (2010) (Table 2). These Issues and Response documents were produced during the first half of the "Environmental Impact Assessment" (EIA) and had inputs from I&APs that were relevant to the study and the research question. Every comment and response document published for Nuclear-1 Thyspunt PPP was assessed and analyzed for themes. Five themes that occur during the three phases of the EIA process are discussed in relation to the research question and topic.

5.3.1 Theme 1: The importance of Heritage to the I&APs at Thyspunt

The comments from the I&APs during this stage of the PPP indicate a clear concern for heritage resources that are found in the area. Nine I&APs submitted comments related to heritage at Thyspunt. Likewise, the I&APs are knowledgeable about Thyspunt heritage, its character, location and level of importance in their communities. Various I&APs expressed their concerns about the destruction of heritage as result of the project. Mr Mias Strydom for example informed the EAP of a heritage site at Tony's Bay as well as contact details of a local specialist and museum and Mr Kobus Reichert from the Gamtkwa Khoisan Council requested to access sites where test drilling had occurred to determine if damage had occurred. Also, he proposed an archaeologist to be present to monitor the initial operations ESKOM was conducting in the area. Another concern was the potential impact the project could pose on the tourism industry of Thyspunt. Evidently, the I&APs made attempts to inform the EAP and communicated their opinions with regards to heritage during the first stage of the EIA.

5.3.2 Theme 2: I&APs concerns with nuclear safety

The controversial nature of nuclear energy and its associated problems formed part of the Thyspunt PPP. Specific examples include a comment by Avril Nunn who opposed the Nuclear-1 project because of the dangers posed by the use of nuclear technology. Waste production, storage and management was also highlighted by the I&APs. Some felt that the Scoping Report that was presented did not adequately address the selection of nuclear technology for the Thyspunt power station, did not sufficiently elucidate safety and emergency measures. Mike Kantey from Watercourse cc for example explained that the Scoping report did not adequately address the 'worst-case scenario' that could occur as the result of the nuclear power station. The uncertainty around Nuclear power generation technology, waste and emergency measures elevated the safety concerns of the I&APs. Ryan Donnelly from the non-government origination "For A Safe Tomorrow" (F.A.S.T) requested data on radioactive emissions emitted from Nuclear Power Generation be made available to I&APs and Ms. Angela Andrews from Legal Resources Centre sought clarity on which reports will address catastrophic incidents that may occur due to the construction of the nuclear plant. With these concerns evident, other I&APs requested information about operation and waste management of facilities such as Koeberg power station and requested a location alternative. The role of natural disasters and technology errors was also a concern raised in the comments

5.3.3 Theme 3: I&APs concerns regarding lack of access to information

An outstanding pattern within this theme is the lack of information on nuclear energy and knowledge on how nuclear technology operates, by the I&APs. The participants informed the EAP on how this limits their level of participation and requested that the EAP provide participants with the education campaign. For example, Dereck Cook informed the EAP that some communities in Sea Vista near St Francis Bay were not well informed about nuclear power and were likely to not participate due to lack of information. A stakeholder during a Humansdorp public meeting asked about the possibility for a nuclear awareness campaign. Some had difficulty accessing the website to access important documents, other expressed

dissatisfaction at the EAP for poor recording of minutes, inadequate and misleading responses. Notably, some I&APs enquired about the possibility to qualify as local experts in the following stage of EIA specialist investigations.

5.3.4 Theme 4: I&APs mistrust in the EIA process and Technical procedure

A combination of issues seems to have possibly led to the I&APs' mistrust of the EIA procedure. From the first stage of the PPP, there were clear signs of perception of bias from the participants. Firstly, they questioned the state of independence of the EAP, then the peer review process for specialist reports and that of the "National Nuclear Regulator" (NNR). According to the "National Environmental Management" (NEMA) Act the Applicant, in this case ESKOM, is responsible for appointing and paying the EAP. This creates a conundrum and puts in question the independent status of the EAP. Secondly, the EAP is responsible for the selection of peer reviewers to assess the specialists reports produced during the second phase of the EIA. The I&APs challenged this, claiming that the EAP is biased towards ESKOM and that the selected reviewers will not be impartial. The "Coalition Against Nuclear Energy" (CANE) group requested to appoint the peer reviewers on behalf of the EAP.

Some I&APs questioned their role in the PPP and sought to know if their inputs were being seriously considered. They wanted to be assured that the EAP will conduct the PPP in a manner that is neutral, one that is responsible and in the best interests of the public. One I&AP claimed to be concerned that the entire EIA could be politically influenced or subject to corruption. Mr and Mrs Christine and Robert Garbett demanded written assurance from the EAP that the EIA process will be undertaken in a statutory and procedurally fair manner.

5.3.5 Theme 5: I&APs recommend using Alternative Sources of Energy Generation.

The last theme to emerge from the analysis was the I&APs recommendations for the use of alternative sources of energy generation. Some comments opposed the

development because of the use of nuclear energy, others believed that not enough investigation had been conducted to justify the use of nuclear energy. Other inputs believed that there are safer and cheaper options available for electricity generation other than nuclear. The uncertainty surrounding nuclear waste continued to be another factor diminishing support for the Nucler-1 project. Mr and Mrs. Sally and Bowen believed that the ESKOM should seek renewable sources of energy and proposed to share lengthy research reports on renewables derived from their research on nuclear energy with the EAP. They rejected the Nuclear-1 proposed development based on its costs, its production of dangerous waste, potential security and environmental threats. The I&APs proposed that ESKOM focuses on renewable energy generation because of their affordability, less environmental impacts and short construction period. Location alternatives were also proposed and that the Eastern Cape Province can provide solar, wind and wave energy. However, Ms Kayla Kuczynski's input suggested that if renewable sources of energy were perused, then the EIA process is not required. This was a misunderstanding of the NEMA projects require an EIA.

5.4 Draft Environmental Impact Report (DEIR) Phase

The Draft Environmental Impact Report phase was the second phase of the Nuclear-1 EIA and included specialists' studies following the approval of the Final Draft Scoping Report and Plan of Study. The DEIR documented the EIA process for environmental impacts for Nuclear-1 on all three sites including Thyspunt. The report was made available to the public for comment on 8 March 2010 and the comment period extended further to 30 August 2010. The following summaries consists of comments and submissions from I&APs during this period and phase of the EIA. The comments were obtained from documents found in Table 2.

5.4.1 Theme 1: The importance of Heritage to the I& AP's at Thyspunt

The second phase of the EIA PPP was focused on the specialist reports. From the comments, there was a dispute over the findings of the HIA. Some I&APs were not

pleased with the proposed mitigation strategies and felt that the HIA was inadequate. Others felt that the EIA as whole was not giving enough attention to heritage. Key take away points from the Gamtkwa Khoisan Council meeting were that the community members are passionate about their heritage and have strong sense of place. They articulated the need to preserve the heritage that lies in the Thyspunt cultural landscape. They demonstrated their commitment to leaving a social and cultural legacy in the form of heritage resources for future generations. Also, they proposed the no-go alternative to be considered for Thyspunt and would not accept any mitigation measures proposed in the HIA report. They were disappointed with the lack of communication between the EAP and the South African Heritage Resources Agency (SAHRA) and requested this to be rectified. They also requested the National Khoisan Facilitating Agency, National Khoisan Council to be included in the EIA proceedings.

5.4.2 Theme 2: I&APs concerns with nuclear safety

The 2011 Fukushima nuclear accident (see Guardian News 2011) occurred while the Nuclear-1 EIA public participation was taking place, and this influenced the course of the PPP. Considering the lack of nuclear education voiced by the I&APs during the initial scoping phase and the mass media coverage of the Fukushima incident, the I&APs grew more suspicious of nuclear technology. The comments in response to the DEIR had multiple references to the incident, dismissing its use and demanding safety assurances from the applicant should the power station be built. Also, during this stage there are comments that suggest that the I&APs were familiarizing themselves with nuclear energy. For example, Hilton Thorp, Bridget Elton and Randall Arnolds began to question the role of nuclear disasters and human error on nuclear plants, citing the Fukushima and Chernobyl nuclear tragedies. They revealed a history of earthquake incidents in the area and criticized the lack of information addressing this. Likewise, the Sea Vista community expressed dismay at the lack of information on safety and evacuation measures and had concerns on how a nuclear plant can affect their community during an accident.

5.4.3 Theme 3: I&APs concerns regarding lack of access to information

Claims of false and misleading information continued to manifest in this stage as well. This also includes complaints about poor advertising of meetings and the exclusion of non-English speaking communities. The Sea Vista community members and other I&APs complained about not receiving EIA documentation translated in Xhosa and Afrikaans to accommodate those who cannot speak or read English. They noted a poor organization and deliberations within meetings. In addition, they also noted a disadvantage for I&APs since they were provided dense documentation and a short comment period. They requested an extension of the comment period pleaded for improved correspondence and effective communication from the ACER consultants.

5.4.4 Theme 4: I&APs mistrust in the EIA process and Technical procedure

The "National Environmental Management Act" (NEMA) clause that designates the Applicant to appoint the EAP continued to cause controversy. There were multiple comments directed at this and how it compromises the independency of the EAP and the consultants. Some I&APs felt that the meetings were biased and in favour of ESKOM. There was dissatisfaction with the comment periods considering that I&APs had to navigate dense documents with scientific information. Others dissatisfied with the lack of transparency and poor communication felt that the "Department of Environmental Affairs" (DEA) should have not authorized the Scoping Report in the first place while other participants belied that a Strategic Environmental Assessment (SEA) was required before the EIA.

5.4.5 Theme 5: I&APs recommend using Alternative Sources of Energy Generation.

In response to the DEIR I&APs continued to claim that the EIA for Nuclear-1 had been rushed and that other alternative sources of energy that are safer and cheaper should be considered. One I&AP also questioned the extent or efforts that ESKOM had made to consider solar and wind power before committing to nuclear.

5.5 Revision phase: Submissions recorded on the Revised DEIR volume 1 (2011) and volume 2 (2015) and Final Environmental Impact Assessment (2016)

The Revised DEIR documented the EIA process as well; its previous version was distributed to the public for comment and responses for 116 days. The revised version 1 was placed on the public domain for 45 days beginning in May 2011 to August 2011; in January 2013 the National Department of Environmental Affairs submitted its comments. These comments, as well as those received from I&APs in the previous draft, resulted in the undertaking of further specialist studies. The Revised DEIR (Version 1) was updated and made public for comment from 21 September 2015 to 23 November 2015. That document was updated to the Revised DEIR (Version 2). A number of letters were received by Arcus GIBB from SAHRA, the Gamtkwa Khoisan Council and the Thyspunt Alliance. Others were submitted by the St Francis Bay Resident's Association St and Francis Kromme Trust as well as Thyspunt Alliance and Friends of the St Francis Nature Areas (FOSTER) in response to the RDEIR and Final EIR. These groups are anti-nuclear groups that were established to oppose the Nuclear-1 development at Thyspunt (Fin News 24 website 2017). Themes 2 and theme 5 were not addressed by the letters. These letters were responses to the DEIR and the Revised DEIRs including the *DEIR – Heritage* Impact Assessment: Archaeological Component. The documents are tabulated in Table 2 (Chapter 5, section 5.2).

5.5.1 Theme 1: The importance of Heritage to the I& APs at Thyspunt

SAHRA noted the following and then provided a final statement on the Nuclear-1 project: Research conducted by archaeologist and surveys indicates that Thyspunt and St. Francis possess a rich and dense record of archaeology in South Africa. The impact of the NPS and its associated infrastructure on heritage will be irreversible and heritage is nonrenewable. The HIA indicated that mitigation strategies proposed could be the biggest archaeological rescue operation ever carried out in the country. This concerns SAHRA since this will have major effects on heritage and will result in cumulative impacts that are currently not well understood. This will also destroy

the sense of place of the area and transform its unique character from natural pristine to an industrial area.

In summary, SAHRA (2011: 3) did not approve of the project for many reasons and the following: Thyspunt has a high density of heritage, SAHRA does not accept the high rate of heritage destruction that will occur including and the mitigation strategies will also be difficult to achieve. Since less than 20% of the study area was surveyed, not the majority of the site, if more area is covered and surveyed more archaeological sites will be found. Any mitigation will be extremely costly and the amount of material that will be unearthed will put a strain on the country's heritage storage institutions. SAHRA's mandate is to protect heritage for the present and future, therefore the agency cannot endorse a development that will pose severe destruction to the cultural landscape and heritage of Thyspunt.

The Gamtkwa Khoisan Council (GKC) members provided comments throughout the EIA and submitted a letter to the EAP detailing their objections to the Nuclear-1 project as well as the findings of the Specialist. The letter explained that GKC had examined the HIA, the DEIRs and the responses they had received from the ARCUS GIBB. The letter had the following objections and submissions: The outline and description of the regional heritage present at Thyspunt are poor as well as the synopsis of the Khoisan people and Gamktwa Khoisan Council. The author's synopsis is insufficient and seems to not entirely state that the heritage belongs to the Khoikhoi people. Thorough research on the presence of the Khoi people in the Eastern Cape is needed considering the scarcity of such literature and to also fill gaps on the existing one. This should include investigation on the living heritage present in the area as well. They added that the HIA should also address the land dispossession of the Khoi people due to colonization. The mitigation measures proposed are unacceptable and their destructive nature threatens the preservation of the heritage. With regard to the archaeological rescue operation, it will only benefit the scientific community and strain the heritage institutions that will store the resources. Unfortunately, through this, the heritage will be permanently destroyed.

Alternatively, the heritage has to be preserved on site for upcoming generations and as heritage site.

The Gamtkwa Khoisan Council welcomes SAHRA's submission and fully supports it. They mention that the final Record of Decision (ROD) for the development should not grant authorization for the development since the archaeological surveying for the HIA was inadequate, the project failed to meet SAHRA minimum standards and the mitigation strategies proposed are destructive. ESKOM needs to recognize the rights of the indigenous people. In terms of UNESCO's definition, Thypsunt is a cultural landscape that needs to be preserved.

The Thyspunt Alliance documents (10) and (11) revealed dissatisfaction in the fact that the local heritage specialist was not selected to conduct the HIA; however, the information on the HIA was satisfactory. They found it unacceptable that no specialist from the Eastern Cape was consulted and had notified the relevant I&APs in protests of academics to making decisions for the local people. They felt that the continued afforded to develop the Nuclear Power Station (NPS) in this area is evidence that there is no regard for the importance and complexity if heritage that goes beyond electricity generation. The San and the Khoi people attribute a considerable amount of value and respect to heritage and archaeological objects of spiritual significance therefore Thyspunt must be given a National Heritage site status and declared a Coastal Cradle of Humankind Centre that is part of the Khoisan Heritage Route. They concluded by stating that Thyspunt has international heritage value and should be treated as such, mitigation is not a viable option since it is destructive, and the area is sensitive.

5.5.2 Theme 3: I&APs concerns regarding lack of access to information

SAHRA acknowledged they were not informed during the scoping phase of the project and received the Draft Scoping Report (DSR) when the comment period was terminated.

The Gamtkwa Khoisan Council asked for minutes from past meetings be amended and corrected because they have errors. The combined Thyspunt alliance documents

(10) and (11) submitted that the Revised DEIR did not address the previous submission sufficiently and the specialist report still contains errors and uncertainties. Also, some minutes from meetings are biased, omitted and have errors. The I&APs struggled to access information and complete documentation throughout the EIA PPP and the consultants denied access to a certain document under the Public Access to Information Act (PAIA) according to the Thyspunt Alliance. They added that the reports lack key project details and have confusing statements.

5.5.3 Theme 4: I&APs mistrust in the EIA process and Technical procedure

The letter from SAHRA claimed that: The Nuclear-1 EIA is fragmented since it does not include an EIA for transmission lines that will form part of the Nuclear power Station (NPS). This is a legitimate concern since the construction of the transmission lines will also affect the overall quality of heritage in the area. The Gamtkwa Khoisan Council urged the specialist and the EAP to consider the information provided by the I&APs during the PPP meetings. The specialist, however, failed to consult multiple available sources on the Khoi History. In addition, the Environmental Impact Report (EIR) lacks objectivity as some information about the destruction that occurred during the Scoping Phase has been omitted and legislation violated. The PPP is flawed and is lacking, the Albany Museum and National Khoisan structures that represent Khoi groups nationally in South Africa were not consulted as part of this process.

Another point made by the Gamtkwa Khoisan Council was: The heritage aspect of this EIA has not given enough attention to heritage; SAHRA's submission is omitted in the Executive Summary of the RDEIR. ESKOM should consider an alternative location because the selection of Thyspunt was flawed from the start. The continued effort by ESKOM to build the NPS at Thyspunt is an insult to the Khoi people who have long suffered in this country.

The combined Thyspunt alliance documents (10) and (11) claimed that site selection for Nuclear-1 was flawed in the first place since the NISP was conducted three decades ago when there was no regard for the environment or the public. The EAP conducted the PPP in a way that stifled constructive engagement notably the Revised DEIR. This is because according to the Thyspunt Alliance, ESKOM appeared to have leverage on the EAP over the I&APs since they are the ones paying for the EIA. The EAP, therefore, is not independent.
They also supported SAHRA in saying the EIA is fragmented and should include the EIA for transmission lines.

5.6 Conclusion

This chapter presented EIA PPP data that was produced during the scoping phase, draft EIA and revision & final EIA stage for Nuclear-1. The secondary data was paraphrased, summarized and presented thematically. The different groups and I&APs voiced their concerns and issues with the EAP with regards to the five recurring themes that were identified during the thematic analysis: The importance of Heritage to the I& APs at Thyspunt, I&APs concerns with nuclear safety, I&APs concerns regarding lack of access to information, I&APs mistrust in the EIA process and Technical procedure and I&APs recommendations to use Alternative Sources of Energy Generation. The data revealed views held by the I&APs, active participation from the communities at Thyspunt, and the conflicts and problems that arise during an EIA PPP.

Chapter 6 – Discussion and Conclusion

6.1 Introduction

The Environmental Impact Assessment (EIA) Public Participation Process (PPP) for the entire Nuclear-1 development had more than four thousand registered participants and took place for close to ten years. This is because it was the first of its kind and because the generation of electricity, nuclear and generation of electricity from nuclear are complex, controversial and contested issues. At Thyspunt, there was a great deliberation about a range of issues that have been discussed in relation to the importance of heritage, concerns over nuclear safety, access to information, alternative sources of energy and the mistrust in the EIA process.

According to the Interested and Affected Parties (I&APs) the PPP had technical errors, bias and procedural unfairness and little effort was made to educate the public about nuclear technology and safety. This includes the consultation of local specialists and national Khoisan heritage groups.

This chapter encompasses a summary of the issues raised by the I&APs and a discussion of the five themes identified in Chapter 5 Section 5.3.1.

6.2 Summary of Issues/ Comments submitted by the I&APs during the Scoping Phase of the Nuclear-1 EIA.

At the outset, the development had conflicting support (Draft Scoping Report 2008). Those who opposed the development provided various reasons ranging from safety and health concerns, the location of the development, its visual impact and a potential threat to the heritage and environment of Thyspunt. From the analysis in Chapter 5 there is evidence of clear concerns and active participation to protect heritage, particularly of the Khoisan people. The I&APs wanted the heritage to remain undisturbed and needed to be informed about the times and kind of work the specialists would be engaged in on the heritage locations. The no-go and location alternatives are prominent throughout the five themes identified, particularly on nuclear safety as it is replete with words such as accident, safety, disaster, catastrophic incidents and concerns over emergency planning. The two alternatives

continue to manifest as many I&APs propose alternative sources of power generation that are renewable and environmentally friendly. The benefits of alternatives such as solar, wind and tidal energy are proposed by the I&APs to outweigh those of nuclear and to be beneficial to sustainable development. Additionally, the I&APs expressed their distrust and criticism over the EIA technical procedure as relayed by the NEMA Act and how it is implemented by the EAP. Criticism over access to information, the exclusion of other language groups and the illiterate as well as calls for nuclear education were among the submissions.

6.3 Summary of DEIR issues

The draft EIA phase produced specialists' reports that include the HIA, Marine Impact Assessment, Ecological Impact Assessment and many more. This study was concerned with the HIA and the responses of the I&APs to it. From the meetings held, the five themes continued to manifest. The Gamtkwa Khoisan Council and other I&AP were clear on their stance to leave their heritage untouched for the purposes of preservation and use by current and future generations. The proposed heritage mitigation strategies proposed in the HIA were disputed by the I&APs due to their inconclusiveness and destructive nature, the intervention and input of the national heritage authority SAHRA was also called upon. With reference to the Fukushima incident that occurred on 11 March 2011, the I&APs comments show a further suspicion of ESKOM's ability to handle nuclear energy and guarantee safety to citizens. Fueling the suspicions was also the lack of nuclear education, unavailability of information on time and the uncertainty around the storage of nuclear waste; the I&APs began to propose regular seismic monitoring and alternative sources of energy generation. The I&APs exhibited concern about their meaningful role in the EIA PPP in light of procedural unfairness and NEMA Act violations they felt the EAP and ESKOM were involved in.

6.4 Summary of Revision phase: Revised DEIR volume 1 (2011) and volume 2 (2015) and Final Environmental Impact Assessment (2016)

The revision and final EIA phase were characterized by the submissions from the South African Heritage Resources Agency (SAHRA), the Gamtkwa Khoisan Council (GKC) and the Thyspunt Alliance. The three groups articulated their disapproval of the Nuclear-1 development and support for the protection of the heritage of Thyspunt. SAHRA did not approve of the proposed Nuclear-1 development on grounds that it will potentially destroy heritage resources permanently. The GKC disputed the HIA, described their ties to the heritage resources at Thyspunt through claims of connection to the land and heritage that is found in the region and expressed the cost of heritage loss that would occur as a result of Nuclear-1. The GKC endorsed SAHRA's final decision.

6.5 Protest action as a form of public participation.

There were protests around the country throughout the Nuclear-1 EIA process. People protested during the EIA at Thyspunt to mobilize against Nuclear-1 in July 2010 and handed over a memorandum to local municipal offices. According to the Coalition Against Nuclear Energy (CANE) website (2017), JBay news (2010) and IOL News articles (2010), around 2000 people at Jeffrey's bay were part of a protest that took place organized by the Thyspunt Alliance. The protests were joined by local people, surfers, fishermen and many other members of the community. The protest was about issues concerning heritage destruction, nuclear waste, the potential environmental and health dangers that will occur as a result of the development. A threat to the marine life, surfing and fishing economy of the area, flaws of the EIA, failure of the EIA to address biophysical and the threats to economies that depend on the ocean.

Greenpeace Africa also protested on August 26, 2015, in the Eastern Cape on and handed over a memorandum to the Department of Energy in Port Elizabeth. The organization protested the department's plan to build a Nuclear Power Station (NPS) at Thyspunt and also the failure of the department to disclose pertinent information

around costs and nuclear safety. In support of Greenpeace were No Nukes PE, Mlibo Environmental Organization and the Thyspunt Alliance (News24 2015, 2017).

Earthlife supported by Greenpeace and other organization protested on the 11th of November in Johannesburg against the development. The protest took place the same day United Nations Climate negotiations were held in Germany where proposals for nuclear energy as a probable solution to climate change were presented. Earthlife Africa vehemently opposed this view and urged the South African government to abandon Nuclear-1 due to costs and environmental implications (News24 2017). From the point of view of environmental activists these protests were justified, however taking into consideration the need for electricity in South Africa, global climate change and the advantages of nuclear technology, nuclear energy is the probable alternative for electricity generation.

See *Appendix 1* for images showing the protests and newspaper headlines of the protests.

6.6 The role played by I&APs during the Public Participation Process

It was clear from the HIA and PPP comments that the heritage of Thypunt was under threat of permanent destruction by the Nuclear-1 development. This was going to create devastating changes to the cultural landscape and the sense of place since Thyspunt has diverse archaeological and paleontological heritage from the MSA to the colonial period. Also, the area possesses a living heritage that is currently used by the locals. These unmitigable cultural impacts were going to impact the landscape permanently and the rescue attempts were likely to put a strain on the facilities of SAHRA. Hence, the Heritage Monitoring Project listed Thyspunt as an endangered heritage site in 2016.

The I&APs played a crucial role in during the PPP in voicing out their opinions but also continually attempting to influence decision making. Here, in point form are some of the outstanding highlights from the PPP.

The I&APs:

- Used the PPP as a tool to resist the development
- Used the EIA PPP to force accountability of ESKOM and the Government Offered citizen assistantship – the EIA PPP was not simply a consultation and feedback process but an educational platform among I&APs and forced the recognition of indigenous knowledge systems (IKS). The I&APs continually offered assistance in EIA investigations
- Provided alternatives for locations, technology and in specialists reports They used the EIA as a tool of empowerment – the Gamktwa and Earthlife Africa groups mobilized the public to participate in the PPP and be involved in public and online demonstrations
- Contributed to government decision making
- Exercised public agency
- Used the PPP not only as their constitutional right but as a platform to air their grievances, provide input and influence decision-making.

Some issues that emerged throughout the PPP were not only the personal biases or assumptions of the I&APs but were also created by the flaws of the PPP carried out by the EAP. This includes ineffective advertising of meetings, poor communication and delayed responses. Nuclear safety information was difficult to access, poor consultation and access to informational created an impression of secrecy which reinforced public distrust (Abelson 2006). Lack of safety information brewed fear among participants and vulnerability to scare tactics. The I&APs pointed out that the PPP was biased for the benefit of the Applicant, they believed some facts and mitigation strategies were distorted. More so, people who have experience in living in proximity to nuclear facilities or knowledgeable on the technology were not vocal during the PPP.

6.6.1 Heritage protection efforts by I&APs

The Thyspunt I&APs made many efforts to protect their own heritage throughout the EIA PPP. From the early stages of the PPP, they requested an archaeologist to be present and monitor test drilling operations that were taking place on site. They also demanded access to the site in order to determine whether any damage had been done during these operations and thereafter ordered the operations to be halted in order to prevent further damage. In exercising their agency as the public, they challenged the findings of the survey and the HIA, as well as the mitigation strategies proposed by Hart (2010).

They continually informed the EAP to make efforts to contact local heritage specialists and consulted other sources of knowledge in the area in order to fill literature and knowledge gaps in the HIA report. Participants like Trudy Malan opted for location alternatives in order to protect the landscape and tourism industry. Dr Yvette Abrahams offered her expertise in Khoisan history to address the inadequacies of the HIA report. Many I&APs availed themselves in the meetings, workshops and stakeholder meetings and challenged the specialists and consultants. Members of groups such as the Thyspunt Alliance raised viable opinions such as the consultation and involvement of SAHRA by the EAP, the proposal for Thyspunt to be formally recognized as a natural heritage site, a coastal 'Cradle of Humankind' and for it to be part of the Khoisan Heritage Route.

The protest organized by the Thyspunt Alliance, Greenpeace and various I&APs led to the handing over of a memorandum of demands to government departments and municipalities in the Eastern Cape and in Gauteng. Most importantly was the response submitted by SAHRA challenging the survey and mitigation strategies proposed in the HIA. SAHRA vehemently pointed out inadequacies of the HIA and the fragmentary nature of the Nuclear-1 EIA. In the end, SAHRA did not endorse the development of the grounds that it will permanently damage the landscape and sense of place and archaeological rescue operations would potentially strain SAHRA's resources.

Pivotal to the heritage aspect of Nuclear-1 PPP at Thyspunt is the role played by the Gamktwa Khoisan Council (GKC) and its members to protect their heritage and the heritage that belongs in the area for the present and for the future. They continually submitted inputs throughout the PPP including a letter that articulated disappointment with the HIA report. Pointing out that it was unsatisfactory and lacking some information. They expressed that national Khoisan organizations should be consulted and included in the PPP and that heritage must be given more attention during the EIA PPP.

The efforts from the GKC and other I&APs to protect heritage are testimony of the local communities' ability to have meaningful input in heritage management. Also, the PPP provided researchers and the heritage management world a platform to understand the ideas of local Thyspunt communities on heritage, its importance and how it should be managed. The Thyspunt Nuclear-1 case study demonstrated the perpetual need for the preservation and management of heritage in South Africa (e.g Cleere 1989) and the recognition of participation efforts of communities (Schmidt 2017). The recognition of the views and ideas of local communities is a step closer towards a reformation of heritage management and archaeological research (Ndoro and Pwiti 2001).

6.4.2 Concerns around Nuclear Safety

Another important consequence of the I&APs' participation was highlighting the importance of the public safety aspects of nuclear technology. The EAP did a poor job in educating and providing nuclear information to the public and thus, most I&APs were unclear about how the technology functions, what waste management and disposal strategies will be implemented. In addition, there was no specific report to address nuclear safety, some emergency planning zones (EPZ) were had errors or not mapped correctly. With the operation and safety of nuclear technology not clearly communicated and the lack of information around nuclear technology, this had terrible implications for the PPP because it left the I&APs confused and uninformed. This had the potential to tamper the community's understanding and

perceptions on nuclear technology leading to a possible lack of confidence and support on the technology (Rypkema 2018).

In addition, information about the functioning of the Koeberg nuclear power station which is already functioning, its successes and failures were not shared with the I&APs which would have been beneficial. Potential health impacts, evacuation, emergency, management, disasters and accident scenarios were unclear to the I&APs and, as a result, some expressed their displeasure and non-support for the development. Safety and management strategies were the most crucial parts of the EIA that the EAP was supposed to articulate to the public from the initial stages of the PPP. This along with nuclear education and clarification on the previous nuclear disasters – how the technology generates electricity, safety, emergency planning, waste management, risks and benefits and what caused previous nuclear disasters and the mitigation approaches. This had to be addressed by the EAP considering the post-Fukushima effect that led to mass fears about the use of nuclear technology and the role of climate and natural disasters on nuclear facilities. The lack of education has led to the vulnerability of the I&APs to misconceptions and fear mongering.

6.4.3 Access to Information and Consultation

Consultation and access to information during the PPP was one of the patterns that emerged during the thematic analysis, valuable insight was gained from them. Communication and advertising during an EIA are legislated and regulated by the NEMA Act (Murombo 2008). Common to any major EIA PPP, Thyspunt I&APs complained about ineffective advertising of meetings, delayed and insufficient responses. Despite these, they made valuable efforts and contributions to seek information and to remain informed. From the early stages, they requested to be notified about specialists' surveys and investigations in order to provide input, enquired about possibilities to be local experts and most importantly, repeatedly requested to be educated about nuclear technology.

Although the NEMA Act informs the EAP on how to conduct the PPP, it has instances where it is inadequate. For example, it does not specify which language(s)

must be used to conduct the PPP, notice periods are not regulated by the law and the stipulated methods of communication are simply vague. This has major implications in the overall process because some language groups end up being excluded, for example, an I&AP at Thyspunt noted that some documents were only in English and not translated to other languages spoken in the region. Ineffective communication during a PPP impacts directly the willingness and the participation of the public (Sebola 2017). Inadequate forms of notice, language barriers, location and time of meetings, the scientific nature of the material and disputed community dynamics are some of the key factors that threaten the effectiveness of a PPP (Humby 2015).

Because of these, although the public may be willing to partake in the EIA, they may be hindered by the lack and poor communication, location or language. This may distance the I&AP and create mistrust or loss interest in participatory decision-making (Sebola 2017). Sometimes the information may only reach a small demographic or advertised in small newspapers. The available communication tools must be used effectively not only as consultative methods bit tools to inform and invite the public to be role players and decision-makers. New tools such as social media and online platforms also must be used alongside print media to reach a wide variety of citizens. Sebola (2017) argues that it does not entirely depend on the type of communication method rather how the methods are used effectively to communicate to the public during a PPP.

6.4.4 EIA Process or Technical Procedure

Typically, the EIA PPP consist of conflict between the consultants, stakeholders, I&APS and organizations. This is because of the differing roles, goals and agendas each participant has during the PPP. Also, this is because there is no universal definition and procedural guide of public participation. Similarly, the technical way in which the EIA PPP was conducted influenced the level of consensus reached by the participants (McDaid and Kruger 2004). From the results, it is evident that the ethics and agendas of the consultants were brought into question, there were disagreements about the findings of the specialists, concerns over political

interference and lack of public education on nuclear technology. Also, the independence of the EAP was also brought into question. This is because according to NEMA regulations, the Applicant is responsible for paying the EAP. This, of course, creates a perception of bias from the point of view of the public. Also, the continuous disregard of some inputs from I&AP, confusion over technical reports, and language barriers lead the participants into frustration (McDaid and Kruger 2004).

However, Thyspunt I&APs participated throughout the EIA and continued to raise technical obstacles such as short periods allowed to comment and the partial manner in which the meetings were conducted. They disputed the credibility of the NSIP program since it was conducted during apartheid and without an EIA PPP and proposed a Strategic Environmental Assessment (SEA) to have been conducted to aid the EIA investigations. The frustrations of the I&APs during this process were evidenced by the protests that took place thereafter. PPP needs to be conducted in a manner that corresponds with the conditions of the I&APs and the nature of the project (McDaid and Kruger 2004).

6.4.5 Alternative Sources of Energy Generation

Those who were opposed to nuclear energy or the project in its entirety proposed alternative sources of generating energy. These I&APs believed that ESKOM has renewable energy options that they could exploit in order to reach their energy generation capacity goals instead of utilizing nuclear power. Some inputs from the I&APs were opposed to nuclear because of its potential dangers, lack of information regarding a plant management strategy, confidence that renewables are cheaper, safer and more sustainable. However, some inputs had clear misinterpretations of the NEMA legislation such as claims that renewable energy projects are not subjected to EIA and thus are the best option. However, some had credence since they argued that they are cleaner, do not need fuel and have no waste management problems. There was a clear perception that the consultants do not care about the environment and sustainable development according to the I&APs.

The arguments for alternative sources of energy by the I&APs stem from the clean energy vs nuclear energy arguments with those in favour of renewable energy claiming they are much safer, affordable, fast and cleaner than nuclear (Sovacool and Cooper 2008; Rypkema 2018). Also, renewable technologies pose far less safety, health and security risks than the use of nuclear technology (Bruno and Ewing 2006). However, the conundrum is presented by the generating capacity since nuclear is far more capable than renewables although there have been improvements in their technology than ten years ago when the Nuclear-1 project began (Rypkema 2018).

Remarkably, was the provision of information and findings from studies that suggest that the Eastern Cape coast is well suited for solar, wind and wave energy. This also includes another suggestion for ESKOM to explore clean coal initiatives. The public demonstrations that were held also claimed that solar and other renewable forms of energy were the solution. But, the participants failed to also highlight some of the issues associated with renewables such as energy storage and energy generation that fluctuates because of time of day, weather or seasonal changes (Dostál and Ladányi 2018). But this does not discount the great potential for renewables to boost the energy supply mix although the will be increased demands for storage (Miller and Carriveau 2018). The PPP for Nuclear-1 at Thyspunt was filled with many conflicts and problems typical of any major EIA PPP in South Africa. But, based on the nature of the development that was proposed, this occurred at a larger and wider scale. The continued and participatory contribution of the I&APs in this area is evidence of active citizen participation and a bold display of environmental and heritage protection by citizens. This is because they outright voiced their non-support of the project based on a variety of opinions and because of outstanding and unsatisfactory plans and responses from the consultants. The use of other forms of participation such as online platforms and protests managed to mobilize even those who do not have ties to the heritage or environment of Thyspunt.

6.5 The Record of Decision (ROD) released by the Department of Environmental Affairs for Nuclear-1

The outcome of the EIA Process for Nuclear-1 saw in 18 October 2017 the Department of Environmental Affairs (DEA) granting ESKOM authorization to build a Nuclear Power Station at Duynefontein, thereby allowing for convenient logistical and operational collaborations between the two (Department of Environmental Affairs 2018). The Chief Director responsible for Integrated Environmental Authorizations (IEA) stated that the DEA accept as true that:

- the overall impacts at Duynefontein site are tolerable and substantially lower than the impacts projected at Thyspunt
- Duynefontein is closer to the existing Koeberg station, therefore, this will provide operational and logistical collaboration and advantages
- The environmental impacts at Duynefontein are lower than the ones at Thyspunt

The ROD was released after the DEA had assessed the Final Environmental Impact Assessment Report (FEIR) and the (2010) Integrated Resource Plan (IRP). It also stated that the decision to grant authorization was reached after the DEA was convinced that:

- NEMA guidelines, public participation ant other pertinent legislations were met
- The specialists' investigations were of high quality and satisfactory
- Input and recommendations from external advisers were considered during the process of making decisions.

Department of Environmental Affairs (DEA) mentioned that nuclear development at Thyspunt has been delayed for years. This news was well received by the Thyspunt Alliance, I&APs including the Gamtkwa Khoisan Council, remarking that their heritage would have been affected and that for over six years they have been battling the nuclear development (Matavire 2017).

They also regard Thyspunt as one of South Africa's important cultural landscapes. However, in May 2018, it has been reported that ESKOM plans to pay an R16M

installation license application fee for Thyspunt, thus, keeping alive the potential to build a nuclear plant in the area. The National Nuclear Regulator (NNR) explained that this fee does not guarantee nuclear authorization, but the four remaining sites can still be used in the future (De Wet 2018.

The Eastern Cape residents who were opposed to the project breathed a well-deserved sigh of relief following the release of the ROD. Their efforts to protect their heritage and environment were met. Although this was a tremendous victory, the possibility of Thyspunt still being usable in the future is a worrying factor. Also, considering the loopholes in the legislation such as section 24(g) of NEMA. On the brighter side, however, was the release of the 2018 IRP, updating many facts from the 2010 version. The IRP (2018) released by the Department of Energy (DoE) highlighted that the plans for nuclear energy have been halted and renewables are to be added to the energy mix.

6.6 Conclusion

Clearly, heritage and environmental management in South Africa is still in the developing stages and is far from effective. From the Thyspunt case study we are able to learn more about the symbolic relationship that exists between environmental information, environmental education, public participation and active citizenship in the process of decision-making. Also, this study provided the opportunity to understand the importance of heritage and the practical steps to those who are tied or related to it would take to protect it. Notably, we also learned that the public regard the need for sustainable electricity generation as very important. This study also brought into light issues pertaining constitutional rights, local communities and social justice that are an integral part of heritage and public archaeology (Little and Shackel 2016).

The study was concerned with understanding the role played by the public in an environmental management process for the protection of their heritage and exercise of their environmental rights. Also, it highlighted the importance of access to information as well as nuclear education. The participatory efforts of local

communities, their ability to organize and mobilize in defence of their ideas and resources was also revealed. The use of a thematic analysis methodology revealed relevant patterns that were pivotal in the public participation process. This painted a broader and clear picture of the process and the active role played by I&APs. Although heritage may have multiple or different meanings and communities may have differing agendas, the I&APs were able to collaborate for the protection of resources they deem as heritage. Considering the large scale of the project and the controversial nature of nuclear, flaws and conflicts were bound to occur during the EIA. Despite this, the continuous voluntary and active participation in various forms contributed in halting the development at Thyspunt.

Lastly, education and access to information are also very important elements of environmental and heritage management as well as the recognition of citizens as viable sources of information. The EIA process needs to be more inclusive and transparent in order for the citizens to play a more meaningful role in decision-making. The submissions from the I&APs should be regarded as meaningful input that provide decisions in line with their wishes. It has to be recognized that development at the expense of heritage and cultural resources is unacceptable, however the need for electricity and development including climate change in South Africa has to be equally recognized. South Africa needs to seek safe and clean nuclear technology if it is committed to producing electricity for its citizens and reducing its carbon output from coal power stations but this should not be at the expense of the environment and heritage.

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Appendix 1

*1. **Tables***

Tables representing themes during the **EIA PPP phases – the number in brackets refer to the document referred to in chapter 5, Table 1.**

Table 3**.** Theme 1: The importance of Heritage to the I& AP's at Thyspunt

I&AP /Participant	**Issue: The importance of Heritage to the I& AP's at Thyspunt**
"Mr Kobus Reichert from the Gamtkwa Khoisan Council" (1)	• Requested access to the Thyspunt site to ascertain if no damage has been done to Khoisan heritage resources due to test drilling and site clearing activities for geological and geo-hydrological purposes. • Also requested that a qualified archaeologist be present to monitor these activities and request all activities to be halted until a Phase 1 HIA has been completed.
"Ms. Elisabeth Rautenbach from the St Francis Conservancy" (3)	Claimed that the surveys conducted during the scoping phase were inadequate and that the Applicant did not specify the level and time frames for surveying and mitigation for the archaeological sites at Thyspunt.
"A Stakeholder" at Meeting (2)	Submitted a concern with regards to the conservation of the areas where the proposed sites are located.
"A Stakeholder" Oyster Bay Public Meeting (2)	From the sites identified, it must be noted that Thypunt is a Natural Heritage Site. Thyspunt is a very sensitive site to have a nuclear plant and the Minister of Environmental Affairs and Tourism Mr Marthinus van Schalkwyk is encouraging world heritage.
"Mr. Roedolf Gerber Farmer" (2)	Thyspunt is a conservation area
"Mr. Mias Strydom OBC Properties" (3)	There are Khoi heritage sites at Tony's Bay in the form of fishing traps. Mr. Strydom made the suggestion that Nuclear-1 development specialists contact the local heritage specialists with regards to this site and contact this email

	emias@netactive.co.za or Tommy Bohrman from Nelson Mandela University and Mr. Binneman from Albany Museum for more details.
"Ms. Trudi Malan Ajubatus Marine" (3)	Why is Schulpfontein and Brazil scoped out of the project as sensitive sites whereas at Thypunt the transmission lines will run over Baviaanskloof heritage site? Environmentally, Schulpfontein and Brazil are more suitable than Thypunt.
"I&AP" (2)	• Thyspunt is not suitable because of the presence of archaeological sites and the visual impact it will pose on the region. The endangered flora and fauna species will also be threatened as well as tourism growth. • This development does not fall within the regions' various tourism plans and strategies.

Table 4**.** Theme 2: I&APs concerns with nuclear safety

"Mr. Mike Kantey from Watercourse cc" (1)	The Scoping report did not adequately address the 'worst-case scenario' that could occur as the result of the nuclear power station.
"Ryan Donnelly For A Safe Tomorrow F.A.S.T (NGO)" (2)	Data on radioactive emissions emitted from Nuclear Power Generation must be made available to I&APs.
"Avril Nunn" (1)	Nuclear Waste is dangerous and thus the development must not proceed.
"Mr. Mike Kantey from Watercourse cc"	The uncertainty around Nuclear power generation technology for Nuclear1 raises safety concerns to I&APs.

(1)	
“Ms. Angela Andrews from Legal Resources Centre” (1)	Sought clarity on which reports will address catastrophic incidents that may occur as a result of the construction and operation of the Power Station.
“Mr. Hilton Thorpe St Francis Bay Resident’s Association & I&AP” (1)	There are incorrectly mapped Emergency Planning Zones (EPZ) for Thyspunt in the Draft Scoping Report and what is the disaster management plan for evacuation and who is responsible for emergency planning?
“Mr. Werner Kurt Illenberger Illenberger & Associates” (1)	The Applicant must seek an alternative location for the development. Airborne hazardous material will be blown to the areas at St Francis bay.
“Mr. Dereck Cook The Dunes Guest Farm” (2)	What will happen if climate change occurs? Changes in climate can cause earthquakes and what happens in an event that there is an earthquake?
“Mr. Ryan Donnelly For A Clean Tomorrow” (2)	Asked where is the Koeberg radioactive waste currently stored?
“Mr. Rudi Dahlhauser Local Resident” (2)	Where will the used fuel go? The report makes no mention of safety and emergency with regards to uranium transportation to the PowerStation. How are these safety issues going to be addressed for the Power Station?
“Mr. Monier Local Resident” (2)	It is guaranteed that no accident will occur during an instance of evacuation?
“Mr. Guy Rogers The Herald” (2)	What is the level of safety of the technology? And if it is safe, then why are there exclusion zones?

"Mr. Koos Mans" (3)	In the case of a nuclear accident, would people be evacuated in time? What would be the extent of damage, how far would the plume travel and how long would it take to reach Port Elizabeth? In general, people are ignorant and live in dangerous places unknowingly. Even a silo could create a huge bomb-like explosion and decimate anything in the area.

Table 5**.** Theme 3: I&AP's concerns regarding lack of access to information.

"A Stakeholder Humansdorp Public Meeting" (2)	Some I&APs do not have access to the Eskom website and would like to know the specialists who will be undertaking the specialists' studies?
"Mr. Rudi Dahlhauser Local Resident" (2)	How are people expected to participate and comment when they do not know what nuclear power is and have no information about nuclear power?
"Mr. Dereck Cook The Dunes Guest Farm" (2)	Informed the EAP that some communities in Sea Vista near St Francis Bay were are not well informed about nuclear power and are likely to not participate due to lack of information.
"Mr. and Mrs. Christine Garbett & Robert Garbett representing: Pelindaba Working Group (members of CANE)" (2)	• Requested a response to a letter they sent to the EAP 14 days ago regarding the peer review process of reports. • Noted that the responses received do not supply the requested information, they are misleading and do answer questions adequately.

"Ryan Donnelly For A Safe Tomorrow F.A.S.T (NGO)"	• During the comment period, he had not yet received the information requested from various public hearings held at St. Francis Bay and Sea Vista regarding the independence of the EAP. • The minutes received were incomplete and have misleading statements

(1) (2)	regarding nuclear power.
"St Francis Bay Resident's Association" (1) (3)	Submitted additional information and corrections to the EAP to assist the Specialist Reports and request them to be addressed before submission of the Draft Environmental report. They also requested that public and local residents should be notified when specialist are conducting surveys and fieldwork investigations in order to provide inputs. They asked whether it is possible to qualify local experts as specialists because specialists will have limited time in the area and locals have known the area for more than 30 years. The question of whether the Applicant has informed the public on how generating electricity from nuclear power actually works was asked.
"Mr. Robbie Louw" (1)	Commented that he had gone through the Nuclear-1 EIA documents listed on the Eskom website www.eskom.co.za/EIA and found no reference or response to his submissions. He requested that his submissions be taken into account and if they have been noted, he should be directed to them.
"Mrs. Sara Stevenson" (1)	Noted on the *Revised* Draft Scoping Report that none of her comments from the initial report had been noted, and also St Francis Bay was not even included on the maps of some of the reports.
"A Stakeholder Humansdorp Public Meeting" (2)	Is it possible that the "nuclear awareness process" will not provide information to the public that is in favor of the Eskom project? How are you going to ensure that people are educated on both the advantages and disadvantages of the Nuclear Power Station?

“Mr. Keenan van Wyk Earthlife Africa” (2)	There is a need for more representation going to the next stage of the EIA. The people present in the meetings do not represent the entire communities.
“Mr. Lifa Mbombiya Sea Vista Resident” (3)	Requested Eskom to take Sea Vista representatives to the Koeberg Nuclear Power station as a form of nuclear education and awareness.
“Mr. Ryan Donnelly For A Safe Tomorrow” (1) (2)	The EAP should represent the comments accurately. Some submissions are missing and others differ from the actual comments submitted by the I&APs.
“Ms. Trudi Malan Ajubatus Marine” (1)	There is a concern over the EAP's failure to use local expertise. Although the appointed specialists' expertise is undoubted, a local specialist can also add valuable contributions.

Table 6**.** Theme 4: I&AP’s mistrust in the EIA process and Technical procedure

“Coalition Against Nuclear Energy (CANE), Wat Props and Karee Trust Aviation” (1)	Were suspicious of the legitimacy of the peer review process for the EIA reports since the peer reviewers are selected by the EAP. The I&APs requested the EAP to allow them to appoint their own qualified peer reviewers at the expense of the Applicant.

"Mr. and Mrs. Christine & Robert Garbett The Karee Trust Wat Props Pty Ltd, Pelindaba Working Group" (1)	• Requested the EAP to be responsible and conduct the EIA in the best interests of the public. • Demanded the EAP to assure accountability to the public through a written assurance that the EIA process will be undertaken in a statutory and procedurally fair manner. • Because the EAP is accountable to the public, the PPP meetings need to be transparent and informative, revealing any safety concerns or risks related with the development and the EAP must stop publishing misleading and false claims. • The PPP conducted by the EAP is unfair and biased and is done in favour of Eskom.
"I&AP" (2)	• There is a concern for corruption and political influence
"Mrs. Sara Stevenson" (1)	• Claimed the specialist reports were partial and proposed the assessment be undertaken by EAPs that are independent and not paid by Eskom. She explained that a full assessment is needed and has to be done for power lines, the disposal of waste and an independent National Nuclear Regulator (NNR).
"A Stakeholder Jeffery's Bay Public Meeting" (2)	• The five sites that were selected during the initial Nuclear Site Investigation Programme (NSIP) may need to be revisited and investigated since there have been significant changes to their social, political and economic environments over the past five years.
"A Stakeholder Jeffery's Bay Public Meeting" (2)	• The consulting firm is paid by Eskom, the applicant: how can the consultant not have interests since they are paid by the applicant?
"A Stakeholder Jeffery's Bay Public Meeting" (2)	• If the Kouga community does not support the Nuclear-1 development, will their opinions have an influence? Suppose the community has a totally different opinion regarding the project, can petitions work?

"Ms. Liesbeth Verstrate Oyster Bay Lodge" (2)	Wanted to know if objections to the project can affect authorization and if the number of objections influences the decision?
"Ms. Andrea von Holdt Coega Development Corporation" (2)	The participation of I&APs is permitted by the EIA legislation, but what happens to their role when the project is authorized? Even if the project is authorized, the public would like to be identified and recognized as 'watchdogs' of the environment even if the project is authorized.
"Mr. Arthur J Perold Melkbosstrand Ratepayers" (2)	The meeting times are during the day when most people are unavailable, the meetings should be held in the evenings.
"Mr. Robin Simpson St Francis/Kromme Trust" (3)	The National Nuclear Regulator (NNR) is not independent since it is appointed by the government and reports to the Department of Minerals and Energy. There is also a concern over political interference on Nuclear-1 decision-making.
"Ryan Donnelly For A Safe Tomorrow F.A.S.T (NGO)" (1)	The I&AP was disappointed by the use of public meetings by the EAP to promote nuclear power instead of engaging in a neutral manner.
(2)	

Table 7. Theme 5: I&AP's recommend using Alternative Sources of Energy Generation.

"Ms. Vera Le Blanc Smith" (1)	The chosen source of power generation will ruin the country, and therefore alternative sources should be sourced.

"Mr. and Mrs. Christine & Robert Garbett On behalf of The Karee Trust Wat Props Pty Ltd Pelindaba Working Group" (1)	• The EIA report should address alternative sources of energy such as solar and compare these with Nuclear energy. • We continue to oppose the implementation of nuclear power mainly on grounds of nuclear waste and the numbers of alternative Energy sources available to South Africa
"Mr. John Edward Thorne" (1)	• There should be an amount of effort put forward for renewables such as Solar and Wind power to benefit the country. With enough support from the government, this could be good for the country and the environment.
"Mr. & Mrs. Sally and Bowen (sic)" (1)	• The jobs that will be provided by the development are not sustainable, the Applicant should seek renewables. proposed to share lengthy research reports on renewables derived from their research on nuclear energy with the EAP. They rejected the Nuclear-1 proposed development based on its costs, its production of dangerous waste, potential security and environmental threats. • The I&APs proposed that Eskom focuses on renewable energy generation because of their affordability, less environmental impacts and short construction period.

"Mr. Willy & Mrs. Mieke Vanderhoeven" (1)	• Made a series of points, claiming that the EAP was providing them with lots of information in order to drown them and also if the EAP had opted for green power they would not need to undertake an EIA since it is not life threatening and damaging as nuclear power.

	• They did not understand why the Applicant would still be perusing nuclear power in 2009 instead of green renewable energy that is readily available. This is because nuclear power is very dangerous and life-threatening whereas renewable alternative sources of energy generation are cheaper and sustainable. Perhaps the lack of political will might be the cause since "the rest of the world has finally understood that there's only one future: GREEN!" they claimed (page 59). • Despite the costs for clean energy, as compared to nuclear energy it does not produce nuclear waste which currently has no safe disposal methods. • Nuclear requires uranium as fuel which its future costs are unpredictable, on the other hand, renewable energy like solar, wind and water will be free for the next 10 to 500 years. • What other reasons does Eskom need to start developing large-scale power generating plants from wind and solar? • Renewables provide another advantage which is saving money on the EIA studies because they hardly pose any negative impact, this, of course, does not serve the purpose of the environmental consultants.
"Ms. Kayla Kuczynski" (1)	• Explained that she is not a scientist or botanists but a concerned I&AP about the environment and future generations that will inhabit the environment. She explained how she does not support nuclear due to the safety and environmental threats it poses. • Since the power station is to be built on the coast, it would be fitting for the Applicant to generate power using Wave Energy instead to reduce the potential environmental impacts that would occur. More so, wave energy has no environmental impacts and will create employment without the risk of damage or loss of life.

	• In her last point, she urged the EAP to consider more than the profits they are to receive as a result of the project but rather the future descendants and generations that will live in this world.
"Ryan Donnelly For A Safe Tomorrow F.A.S.T (NGO)" (1)	• The applicant should build the nuclear power station on another site because the one proposed will compromise their orchard farm and healing business. Alternatively, they could seek environmentally friendly power generation technology.
"Dr. J Cawood St Francis Bay Disaster Management" (1)	• The Eastern Cape coastline has been understood as one of the windiest parts of South Africa by various research studies including the Council for Scientific and Industrial Research (CSIR). This presents an opportunity for electricity generation from wind, why is Eskom not considering this?
"Ms. Cheryl Gibson-Dicks WESSA Eastern Cape" (2)	• Are renewables being considered?
"Ms. Ann Knight Chas Everitt International" (2)	• There has been a development of clean coal technology, why is Eskom not considering coal as an alternative to nuclear technology?
"Mr. Bryn Davies Evans Geelhout River Landowner" (3)	• Eskom should be considering generating electricity from Tidal Wave.

Draft Environmental Impact Report (DEIR) Phase

Table 8. Table representing themes from the Draft Environmental Impact Report (DEIR) Phase

I&AP /Participant	**Issue**
	Theme 1: The importance of Heritage to the I& AP's at Thyspunt
"Ms. Kaylene Levack Joshua Heritage" (4)	Has a Heritage Impact Assessment been carried out, if so what was the level of participation when it was being undertaken? According to Section 25 of the Act Cultural Heritage has to be taken into consideration. Was Cultural heritage considered as part of the EIA?
"Mr. Hilton Thorpe St Francis Bay Residents Assoc and St Francis Kromme Trust" (4)	On page 15 of the Executive Summary of the EIR a passage read, "Mitigation of Heritage Impacts particularly requires the work of a science-specific team dedicated to excavation over a period of several years prior to the onset of construction". How is ESKOM going to commence construction by 2011 during this short time period?
"Mr. Graham Moolah St Andrews College" (4)	The proposed site consists of a number of pre-historic shell middens as well as fish trap kraals. Heritage belongs to a race that is no longer living and what measures are to be taken to preserve it in the future? For hundreds of years, these heritage objects have remained untouched and not ruined. The construction of the nuclear site will bring about the permanent destruction of the wealth of our middens on the site.
"Dr. Yvette Abrahams Commissioner for	Has a PhD in Khoisan history and has over 150 issues with HIA for the Draft EIA and will supply them to the EAP.

Gender Equality" (5)	
"Summary of submissions from the meeting with the Gamtwa Khoisan Council" (6)	• The participants of the focus group meeting exhibited a passionate and strong sense of place and need to preserve the heritage that lies in the Thyspunt cultural landscape. They demonstrated their commitment to leaving a social and cultural legacy in the form of heritage resources for future generations. • They proposed the no-go alternative to be considered for Thyspunt and would not accept any mitigation measures proposed in the HIA report. • With regards to consultation and access to information, the participants had issues and requested that the National Khoisan Council and the National Khoisan Facilitating Agency be consulted as part of the EIA process. • Information concerning the level of involvement of SAHRA and official comments from the authority about Thyspunt was requested.
	Theme 2: I&APs concerns with nuclear safety
"Bridget Elton Interested and Affected Party" (5)	The area has a history of earthquakes and felt on the morning of the meeting. Is Eskom aware of the Fukushima incident? These events should be taken into consideration and recorded before the development commences.
"Dr. Fred Ellery Rhodes University" (4)	EIA studies do not address risks such as natural disasters. In an event of a debris-flow similar to the one that occurred in 2007, this can affect roads and transportation and can have major implication for the transportation of nuclear waste. The omission of the occurrence of debris-flow is a flaw in the EIA.

“Mr. Petrus Leen Sea Vista	If the nuclear power station development takes place what safety measures will ESKOM take? What are assurances can they give to the residence of Sea Vista with regards to safety?

Forum (4) and Mr Alwin Malgas Sea Vista Forum” (4)	Sea Vista consists of a population approximately 5000; would there be enough time to evacuate all of them?
“Mr. Chris Barratt St Francis Kromme Trust” (4)	Provide correct maps, distances and Emergency Planning Zones (EPZ), errors from previous documents must be rectified.
“Mike Kantey Coalition Against Nuclear Energy” (5)	The EIA has failed to assess the health impacts of nuclear on humans. The incidents that occurred at Chernobyl and Fukushima were disastrous and caused vast health impacts.
“Riaana Tolan Greenpeace Africa” (5)	Considering the Fukushima incident and the uncertainty around waste storage, how can you guarantee safety if spent fuel is kept on site?
“Randall Arnolds Interested and Affected Party” (5)	Informed the EAP about a previous earthquake that once occurred in the area that was measured 5 on the Richter scale. When a question was posed to the EAP with regards to the earthquake resistance of the plant, the EAP did not provide a sufficient answer.

"Hylton Thorpe Thyspunt Alliance and St Francis Bay Residents Association" (5)	Eskom is proposing to use similar technology as Fukushima, can they guarantee safety?

	Theme 3: I&APs concerns regarding lack of access to information
"Mr. Helmie Tilders FOSTER" (4)	The EAP has to effectively advertise meetings; areas such as Sea Vista did not receive consistent advertising.
"Ms. Francis Becker" (4)	Is a concerned stakeholder and has not received any communication from ACER.
"Mr. Alwin Malgas Sea Vista Forum" (4)	The previously held meeting seemed to be poorly organized and the text was sent out in English. The majority of community members are illiterate and he struggled with the text although he possesses a Matric qualification.
"Mr. Chris Barratt, Mr Paddy Oosthuizen and Mr Donnelly" (4)	The Draft EIA Report comment period should be extended with another 90 days since Xhosa and Afrikaans members have not received translated reports for comment. They will not comment until they have received these reports.
"Mr Alwin Malgas Sea Vista Forum" (4)	The Xhosa and the Afrikaans speakers from the Sea Vista community feel excluded since the documents are in English. It the democratic right of the community to receive this information in its own language.

"Mr. Petrus Leen Sea Vista Forum" (4)	Needed clarity on whether there were indeed 24 specialists and wanted to be granted access to their findings before the Environmental Impact Report (EIR) was compiled. Moreover, what would be the resolution if the findings of the specialist differ from the knowledge of local communities?
"Chris Barrett Thyspunt Alliance and St. Francis Kromme Trust" (5)	We have been waiting for 15 months for proof of correspondence between the EAP and the NNR.
"Kobus Reichert Heritage Representative for the Gamtkwa Khoisan Council" (5)	There have been misleading information published by the EAP with regards to correspondence between the Heritage Specialist and the Gamtkwa Khoisan Council. This has to come to a stop and contravenes NEMA regulations.
	Theme 4: I&APs mistrust in the EIA Process and Technical Procedure
"Mr. Chris Barratt St Francis Kromme Trust" (4)	Have any of the specialists visited the area? A schedule of when and how long they will visit the area has to be provided.

I&AP (4)	Concerned about the transparency of the EIA process. Should the specialist outcomes from various investigations not be favourable to Eskom, will this information be made available to the public?
"Mr. Andrew Muir Wilderness Foundation of SA" (4)	The proposed development lies on the boundary of a World Heritage Site which is the Baviaanskloof Nature Reserve, and this has not been taken into consideration since it lies outside the boundary of the scope of the EIA. The Nature Reserve lies under international legislation in terms of world heritage.
"Mr. Hilton Thorpe St Francis Bay Residents	Detailed submissions about nuclear waste have been largely ignored by the EIA. Other cases from around the world such as in England show that no country wants nuclear waste. South Africa has not sited suitable for nuclear storage. The uncertainty around the storage location for

Association St Francis Kromme Trust" (4)	nuclear waste is a flaw in the EIA and end up leading to Thyspunt and any other possible Nuclear-1 site as a permanent storage location which will be unacceptable to affected communities.
"Mr. Derek Cook Macohy Investments" (4)	Are the specialist and the EAP employed by ESKOM? This might create a perception that they are biased towards ESKOM.
"Mr. Andrew Muir Wilderness Foundation of SA"	A Strategic Impact Assessment (SEA) was supposed to be done before the EIA. The specialists report use the term "overall" to account for impacts over large areas at St Francis, this is inaccurate. If a SEA was undertaken the impacts over large areas were going to be well understood.

"Mr. Ryan Donnelly FAST"	▯ There is dissatisfaction with the way the meetings are handled by the EAP. ESKOM seems to have too much involvement and influence on the EAP.
I&AP	▯ A public education process on nuclear should be undertaken concurrently with the EIA process.
"Mr. Hilton Thorpe St Francis Bay Residents Association St Francis Kromme Trust" (4)	▯ DEA should have not approved the Scoping Report, the way the EAP has conducted the EIA is discredited. There many ways the community has been excluded.
"I&AP PE Key Stakeholder	▯ It would be helpful to the EAP to conduct a fair EIA process in order to have everyone entirely behind the project even before the PowerStation is even constructed.

Feedback Meeting" (4)	▯ What are the main objections from other proposed sites? Are they all around safety? Do fears being expressed by I&APs carry any weight in the EIA process?
"Chris Barrett Thyspunt Alliance and St. Francis Kromme Trust" (5)	• The EIA process lacks independence which is a violation of NEMA. The submissions that have been put forward by the I&APs have been largely ignored. • We were not given enough time to engage with the material and comment on the issues.

"Dr. Yvette Abrahams Commissioner for Gender Equality" (5)	Pointed out that constitutionally national interests do not supersede local interest. In reference to the Promotion of Administrative Justice Act (PAJA) principles, this EIA is deemed illegal since information regarding costs has been hidden.
"Unidentified Interested and Affected Party" (5)	The consultants are biased.
"Chris Barrett Thyspunt Alliance and St. Francis Kromme Trust" (5)	Wants to put on record the concern of the falsification of information on the EIA report.
	Theme 5: Alternative Sources of Energy Generation
"Hylton Thorpe Thyspunt	Nuclear power is more expensive than any other form of energy. This EIA process appears to be fast-tracked. If not, Eskom should properly investigate all options in detail prior to engaging in the current process.
Alliance and St. Francis Bay Residents Association" (5)	

"Interested and Affected Party" (5)	▯ What is being done in terms of researching wind and solar as alternative energy sources? To what extent is Eskom interested in looking at alternative power generation options?

2. Images

Images showing the protests and newspaper headlines of the Nuclear-1 Thyspunt protests.



Figure 6**.** IOL News Headline - Nuclear-1 Protest at Thyspunt.

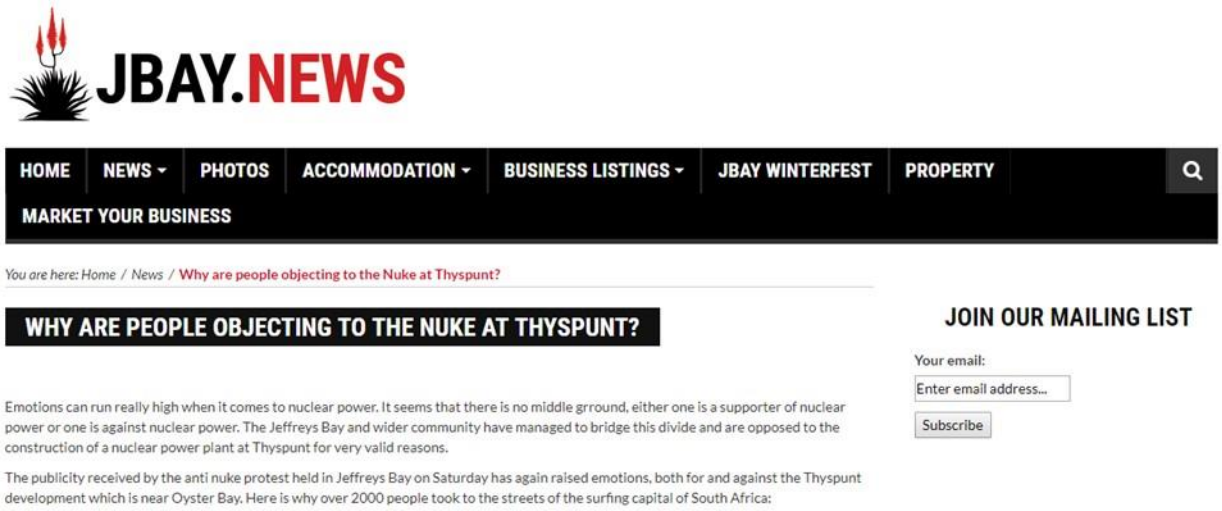


Figure 7**.** News Headline - Nuclear-1 Protest at Thyspunt.



Figure 8**.** March against nuclear in JHB today. Picture supplied via Earthlife Africa JHB twitter account @Earthlife_JHB. Source News24.



Figure 9**.** March against nuclear in JHB today. Picture supplied via Earthlife Africa JHB twitter account @Earthlife_JHB.



Figure 10**.** Greenpeace Africa protests against Nuclear-1 in Pretoria. Source: Rnews.co.za.



Figure 11**.** Thyspunt Alliance protests against Nuclear-1 at Thyspunt. Source: JBay News.

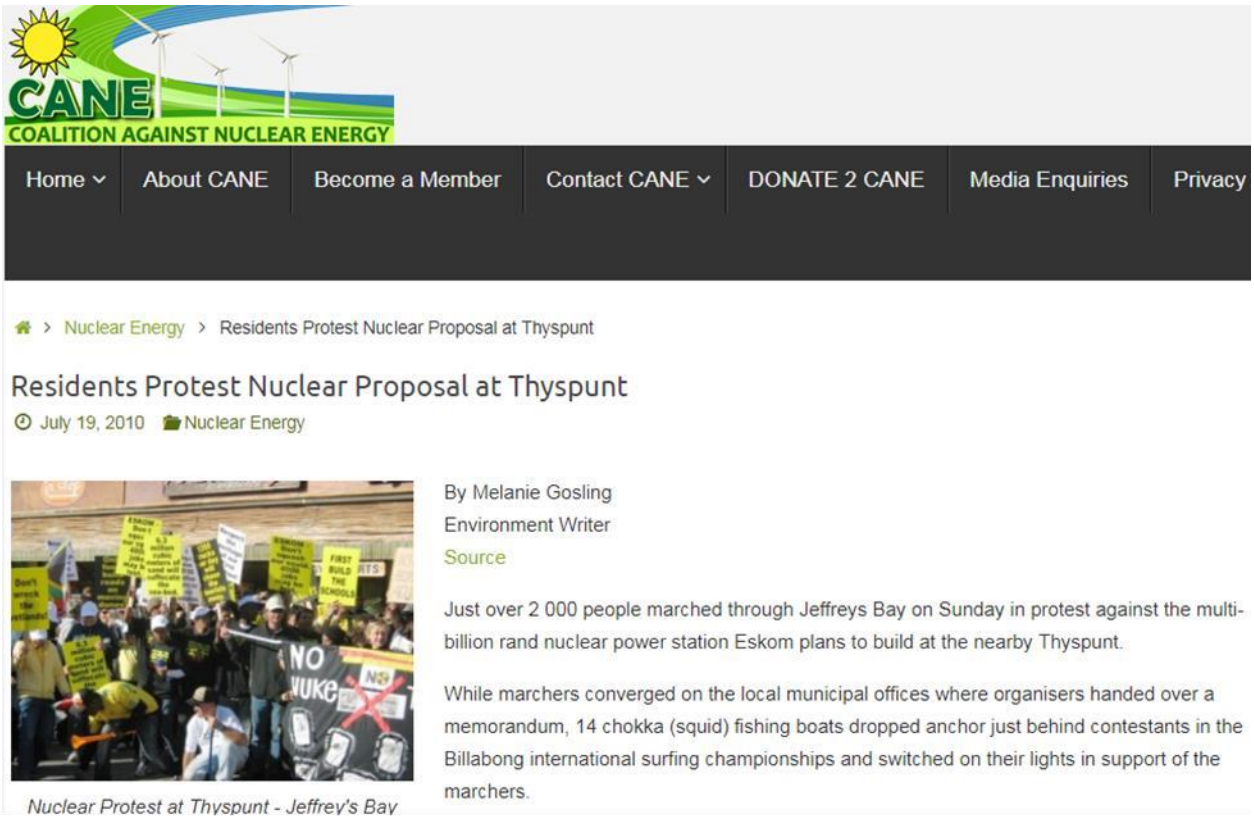


Figure 12**.** CANE News Headline - Nuclear-1 Protest at Thyspunt.



Figure 13**.** News24 News Headline - Nuclear-1 Protest at Thyspunt.133