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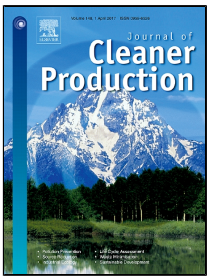

Participatory Governance in the Transformation of the South African Energy Sector: Critical Success Factors for Environmental Leadership

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Socio-economic development and economic growth is connected with the intensive use of energy resources, which poses also risks to long-term viability of the biosphere by causing natural resource depletion and environmental degradation. One of the options to reduce Human and environmental risks from extensive energy generation are renewable energy sources. However, there are several barriers for transformation of energy sector towards a greater share of renewable energies. Human factors such as social support or opposition are crucial drivers for this transition.This paper examines the state of infrastructure projects in South Africa and assesses how lessons from these projects can contribute to improve development of energy transformation in the country. It analyses the challenges of applying participatory governance in the energy transition in South Africa, as a critical component of successful infrastructure project implementation, and of insights into fostering environmental leadership. The paper is based on the case studies analysis of ten large infrastructure projects in South Africa and focuses on public participation in these projects, its effects and challenges by applying the ladder of public participation methodology. Findings from the study support the scientific arguments that public participation in decision-making regarding deployment infrastructure projects creates an enabling environment for successful implementation. In conclusion public participation was only in the context of environmental impact assessment which is a mandatory requirement for infrastructure projects in South Africa. Currently public participation is manly regarded as a reactive measure to conflict resolution. It is organized to provide feedback on the results of environmental impact assessment, mainly as a way to address conflict, which has already emerged. Our results show that provision of information and consultation are the two most frequent levels of public participation. Land use issues and questions about benefits and impacts from infrastructure projects on local communities are the most frequent concerns.

Participatory Governance in the Transformation of the South African Energy Sector: Critical Success Factors for Environmental Leadership

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Key words: Participatory governance, energy sector transformation, environmental leadership, environmental stewardship

1. Introduction

The dominating source of energy in the world is based on fossil fuels, accounting for around 80% of the total primary energy supply and of the electricity generation (Jacobsson and Bergek, 2004; Jacobsson and Lauber, 2004). In the last four decades there has been a widespread assumption that greenhouse gas (GHG) emissions are a product of industrialized countries and their concern alone. However, studies in recent years show that developing countries are making an increased contribution to emissions (Pegels and Stamm, 2011). For instance, in 2000 developing countries accounted for 55% of annual global GHG emissions (Oliver, 2013). High economic growth in these countries has led to an increase in energy demand, which has led to an increase in GHG emissions (World Resources Institute, 2009). A transformation of the energy system, particularly of electricity generation systems, mainly through a conversion to low-carbon technologies, is therefore required.

Globally, the energy sector has been undergoing reform and transformation in response to natural resource depletion and environmental degradation (Pegels, 2010). A clean, sustainable energy supply would reduce the negative impact on the environment and on human health. Although GHG and climate change are one of the 21st century's most serious challenges, the parties to the climate change negotiation process under the United Nations Framework Convention on Climate Change are still struggling to reach an agreement to prevent dangerous climate change (Pegels, 2010). It is widely agreed that the way the world produces, distributes, and uses energy globally needs to be transformed.

South Africa is part of the BRICS (Brazil, Russia, India, China, and South Africa) geo-political formation, which is characterized by high energy-intensive use for infrastructure development, industry, and electrification (Gerasimchuk, 2010). South Africa ranks highly in energy consumption because its economy is based on heavy and extraction industries. It has the highest net import to total consumption ratio in the bloc. In fact, in 2009 South Africa had a share of net imports of 26%, against 3.8% for Brazil, 1.8% for Russia, and 12.7% for China (BRICS Joint Statistical Publication, 2013). The BRICS grouping also accounts for high GHG emissions, almost as much as the share of all 27 high-income

countries (Gerasimchuk, 2010). South Africa is still among a small number of countries on the African continent that emits disproportionately high levels of GHG, mainly due to high energy intensity per unit of GDP and continued reliance on heavily polluting ‘‘minerals energy’’ (Nel, 2010). South Africa is responsible for 1% of global GHGs and for 18% of the Sub-Saharan share (Pegels and Stamm, 2011). Therefore, a profound transformation of the way energy is produced, distributed, used, and managed in South Africa is required to achieve sustainable development.

Leadership is important for transformation of any system, with environmental leadership being particularly key to success (. The question therefore appears: “How energy transformation and transition towards low-carbon technologies can be governed without significant conflict in society, with the greatest benefits for local communities?” The central assumption of this paper is that participatory governance could be a tool for improving transformation of the energy sector in South Africa, through astute environmental leadership. For this, we draw lessons and recommendations from analysis of large-scale infrastructure projects within and outside the energy sector in South Africa. We provide a stakeholder analysis of the main actors in selected infrastructure projects, and we look at their participation level using the Arnstein (1969) ladder of participation. With the help of this methodology we map the level of public participation by key stakeholders in ten infrastructure case studies within the transport, built environment, and energy sectors in South Africa. We choose these three different sectors to have an opportunity to compare different stages and patterns of public participation.

Socio-economic development and economic growth is connected with the intensive use of energy resources, which consequently poses risks to the long-term viability of the biosphere by causing natural resource depletion and environmental degradation. Concerns of climate change mitigation, energy security and environmental protection are driving the transformation agenda of the energy sector in several countries of the world. One of the options to reduce environmental risks from extensive energy generation, such as negative impact on human health and environment, is for countries to embrace renewable energy as part of the ‘energy-mix’. However, there are several barriers for transformation of energy sector towards a greater share of renewable energy. Amongst the barriers, human factors such as social support or opposition are drivers for the transition from fossil to renewable sources. Scientific evidence shows that public

participation in decision making regarding deployment of infrastructure projects creates an enabling environment for the successful implementation of embracing renewable energy. This paper focuses on a qualitative analysis of ten participatory projects that were undertaken in South Africa, and lessons learnt from these projects will be drawn to strengthen the transition towards embracing renewable energy. Furthermore, this paper contributes to understanding of the challenges of participatory governance in energy transition in South Africa, as a critical component of successful infrastructure project implementation, and of insights into fostering environmental leadership.

2. Background

2.1. Theoretical background

If the world is to achieve energy security and meet climate change and other environmental objectives, reforming energy institutions and energy governance processes is critical. Hence implementing transparent and participatory governance processes in making energy decisions is of paramount importance (Lariña, Dulce and Saño, 2011).

Development of effective participatory mechanisms within infrastructure planning governance has been dependent on how far the outputs of participatory processes have an impact upon strategic policy priorities (Groves, Munday and Yakovleva, 2013).

Participatory processes in the transformation of energy sector may prompt a more comprehensive and inclusive evidence base including local knowledge (Blackmore, 2008; Groves, Munday and Yakovleva, 2013), thus it has been argued that it may improve decision making with regard to the potential social and environmental impacts of infrastructure development (Groves, Munday and Yakovleva, 2013).

The question of good governance needed for energy transition in the world towards low-carbon energy generation, should be premised on the following theories on governance namely, i) participatory governance; ii) the new ecological paradigm; iii) environmental leadership, and iv) stewardship, which are described in detail in the following paragraphs.

Participatory governance, involves not only state but also civil society. It is believed not only to improve the outcomes of development activities, but also to contribute to good governance, which is the cornerstone of the democratic process (Weiss, 2010; Veltmeyer,

2004). Civil society is made up of the "economic and social actors, community-based institutions and unstructured groups and the media at the local, national, regional and global levels" (Weiss, 2000). According to Coelho and Favareto (2006), participatory governance will lead to improvement of governance systems and provide an impetus to development. Moreover, participatory governance increases circulation of information, transparency and accountability. Thus, participatory governance together with decentralization are key elements to improve governance systems and to stimulate overall development (Coelho and Favareto, 2006). However, Jordhus-Lier and de Wet (2013) argue that participation language is easy to use, but difficult to translate into practice. Arnstein (1969) also concludes that there are different levels of participation, from substantial delegation of decision-making power to outright manipulation.

The ***New Ecological Paradigm*** differs from the current social paradigm in that the assumptions made in the New Ecological Paradigm (NEP) focuses on a shift towards sustainability of the earth's resources and ecosystems. NEP further stresses that the natural balance of the earth's ecosystem is at a tipping-point and that alternatives have to be found to sustain future generations (Macdonald and Patterson 2007).

Environmental leadership is the "ability to influence individuals and mobilize organisations to realize a vision of long-term ecological sustainability" (Egri and Herman, 2000). Leadership plays a key role in any transformation process and the main features of environmental leadership are the ability to deal with the complexity of environmental issues; to integrate seemingly contradictory outlooks; to understand and address the expectations of a wide range of actors and to profoundly change organizational practices (Borial, 2007). In energy sector transformation, an environmental leader can influence changes in a top-down, usually formal way, or using a bottom-up, usually emergent and informal approach involving a network of leaders and change agents (Taylor, 2011). Influence is an important factor in the context of relationships between leaders and their collaborators. Conventional leaders, typically managers and executives, operate within formal role descriptions; emerging leaders, who voluntarily and sometimes spontaneously arise from the population to take on extra roles as behavioural models, so-called champions (Taylor, 2011) are also particularly important in terms of triggering and driving environmental change. Hence, to address the complexity of environmental issues, their interdisciplinary and global nature, the societal pressures that surround them, and also

internal transformation, managers and leaders need to develop specific skill sets and approaches (Borial et al., 2008).

Scholars and practitioners use the term "***stewardship***" more commonly to mean that those charged with the control and responsible use of natural resources, in the decisions they make, take account of the interests of society, future generations, and individual needs, as well as the rights of other species (Gjesdal, 1981; Worrel, and Appleby, 2000). Today, stewardship translates into creating accountable and committed workplaces without resorting to governing by increased control or compliance. Stewardship is the intention to distribute power widely, especially to those at the lowest levels of the organization (Block 2013). It is a call for a purpose greater than today's drive for material gain, and it pays attention to supporting the common good of our communities, the Earth, and people outside the usual cast of stakeholders. For Block (2013), stewardship is an even more urgent form of governance. A stewardship theory has been developed and is being adapted to different fields. The theory explains processes such as participative strategy, organizational performance, and control concentration (Eddleston and Kemermanns, 2010). Worrell and Appleby (2000) note, stewardship is applicable to the widest range of fields of resources use and also is relevant to aspects of land tenure and property rights that are very important for renewable sources of energy use.

2.2. Background to the case study

Currently most energy generation in South Africa comes from non-renewable sources. Coal is the main energy source (92%), nuclear accounts for 5%, and the rest comes from gas and renewable sources such as hydropower (SARi, 2011). In fact, renewable energy generation in South Africa represents less than 2% of total electricity generation (Musango and Brent 2011). It has to be noted that South Africa has abundant renewable energy sources (RES) potential. Solar is by far the most abundant energy source in the country. The total estimated potential of solar power for the country is around 8,500,000 PJ/yr (Winkler, 2005), while the potential for other renewable energy sources varies between 21-50 PJ/Yr for wind, 18-49 PJ/Yr for biogas, 20-36 PJ/Yr for hydro, 200-220 PJ/Yr for wood, and 20 PJ/Yr for agricultural waste (Winkler, 2010).

ESKOM operates the national power transmission system in South Africa and produces almost all the electricity in the country, with 27 power stations and a total production of

40.7 GW. ESKOM is also the sole transmission licensee responsible for all electricity in the country (Pickering, 2010). However, currently the electricity subsector is undergoing transformation in terms of the monopolistic approach of ESKOM to a free-market base and a move from conventional to cleaner sources renewable energy.

During the last 40 years energy supply and demand in South Africa were balanced. However, growing electricity demand resulted in supply deficit in the last years. For example, in June 2013 energy demand was greater than energy supply by almost 1GW (ESKOM, 2013). The infrastructure of ESKOM is also aging and by 2028 about a quarter of ESKOM's coal-fired power plants will need to be replaced (Dames, 2011).

The South African government recognizes the need for transformation of energy system. Currently, the country is undergoing policy reform to diversify its energy mix through expanded use of RES. The need for a shift in mind-set and for new approaches to developing and upgrading national capabilities to enable sustainable and inclusive development is recognized in the National Development Plan 2010-2030.

The government has committed to supply 3.7GW of energy from RES by 2016 under the Integrated Resources Plan 2010-2030 (IRP, 2010). The IRP sets a target to provide 42% of energy supply from RES by 2030. In the updated IRP version there are targets for 4.7 GW of concentrated solar power by 2030 and of 10 GW by 2050, 16 GW of wind generated energy by 2050, 1.4 GW of photovoltaic by 2029 and of 25 GW by 2050 (IRP, 2013). As part of the Industrial Policy Action Plan, the South African Renewable Initiative (SARi) of the Department of Trade and Industry is one of the policy responses of the South African government to the challenge of creating firstly an enabling environment to secure international investments; and secondly creating a set of policies to facilitate investment in the transformation of the energy sector.

Although the potential of RES is recognized in South Africa, the deployment thereof is very slow. In fact, only two major wind projects had been installed in South Africa by 2010 with total capacity of 8.4MW (Winkler, 2010). Moreover, changing the South African fuel mix, which is highly dependent on coal, will be a medium-term challenge at the very least. The minerals-energy complex is so central to the economy that it will likely take decades to change it dramatically (Winkler et al., 2010).

Transformation of the energy sector in South Africa is a complex endeavour, given the different levels and categories of transformation within the sector, ranging from transforming the way energy is produced, distributed, and used, to how it is managed, including the market structure (Winkler, 2005; Inglesi, 2009). To be able to transform the energy sector, South Africa needs a sector-wide change. The key changes required are in leadership, decision-making and good governance processes. Governance is the complex set of values, norms, processes, and institutions by which society manages its development and through which it is able, both formally and informally, to resolve conflicts.

2.3. Research problem

There is recognition among scholars and practitioners worldwide that it is no longer the technical potential of renewable sources of energy that is the real problem today, but rather how that potential can be realized in a sustainable and feasible manner (Jacobsson and Lauber 2004; Jacobsson and Bergek 2004; Krupa and Burch 2011; Komendantova et al, 2012; Nel, 2013). Scientific evidence recognizes that for the energy system to transform, a technological approach needs to emerge covering a range of new technologies (Jacobsson and Carlsson, 1997; Jacobsson and Bergek, 2004). Before new technology can reach a critical mass for scaling -up into the broader market, it needs to diffuse through a series of exploratory niches and stages. Deployment of new technology from exploration process to scaling -up depends on its legitimacy access to resources and formation of markets, which, depends on the underlying institutional framework (Jacobsson and Begek, 2005). Wapner (1997) describes the important role of civil society in economic transformation which ultimately leads to a green economy. Often being outside the power dynamics and commercial pressure of government and business, civil society can be in a better position to “shift codes of good conduct, influence economic calculation and the dynamic of commercial life” (Wapner, 1997). Within the South African energy sector participation of all stakeholders in policy and decision making increases the likelihoods to achieve acceptance, appropriate decisions and policy choices, and is a key to foster efficient infrastructure development for transformation of the country’s energy system.

Energy system in South Africa needs to transform so as to address the issues of ageing infrastructure, energy demand, growth and diversification of energy mix. Currently, South Africa has one of the lowest prices for electricity in the world, which comes from coal, and the successful deployment of renewable energy sources is far from certain (Winkler, 2005). Public participation is thus essential for dealing with issues such as conflict resolution, public acceptance of energy-transition and technological choices. However, scientific evidence of public participation in renewable energy projects, to our knowledge, is limited.

Learning from other infrastructure development projects, implemented or under implementation in South Africa, is essential to understand how public participation works in South Africa and to formulate recommendations about how public participation might shape deployment of renewable energy sources. This leads to three research questions:

i) ***What are participatory governance concerns and gaps in infrastructure projects in South Africa?***
ii) ***What has, or has not, worked in terms of governance of infrastructure projects in South Africa?***
iii) ***What can be used to inform development of infrastructure projects for transformation of energy system in South Africa?***

Answers to these research questions allowed us to identify concerns and gaps related to decision-making, governance, and public participation in infrastructure projects. The findings informed our recommendations for the policymaking process for sustainable transformation of the energy systems in South Africa, which appears at the end of this paper.

The major scope of this work is to understand patters of engagement into infrastructure projects in Africa. Connected to this scope we identified two major research questions:

- What was the most frequent level of participation, which was achieved in infrastructure projects in South Africa?
- What were the successful practices of stakeholder's engagement and addressing concerns?

Based on the results on these two research questions we plan to derive recommendations for engagement practices, which would be possible in South Africa taken into reference experience from other infrastructure projects, and which were successful in other sectors. Our results will provide direction to development of possible patterns for stakeholders' engagement into energy transition projects. These recommendations could be then further evaluated as with the current work we can provide suggestions on the possible engagement into energy transition but it lays out of the scope of current paper to evaluate if these suggestions would lead to successful outcomes.

3. Methods

3.1. General methods

We apply a case study approach of ten selected infrastructure projects in South Africa, between 2005 and 2013. Case study methods are used in many fields of enquiry, especially in evaluation research, in which the researcher engages in an in-depth analysis of a case (cases). Case study research is bound by time, activity and a variety of data collection procedures over a given period of time (Cresswell, 2014). In this article the case studies run over a period of seven years.

In order to evaluate the outcomes of the participatory process, it is necessary to evaluate the process itself and its characteristics which might have influence on effectiveness of stakeholder's engagement (Smith et al., 1997). One of the most well-known and frequently applied methodologies to evaluate the participatory process was developed by Arnstein in 1969 and adapted by Rau in 2012. The methodology was applied for evaluation of outcome of participatory processes in several infrastructure cases, like deployment of energy generation capacities or electricity transmission infrastructure (Komendantova et al., 2016).

The theoretical aspect related to public participation is highlighted in the work of Arnstein's 'ladder of citizen participation'. Arnstein's theory focuses on the meaning and purpose of public participation, and consists of eight rungs, with two levels of non-participation (Manipulation and Therapy), three degrees of tokenism, (Informing, Consultation, and Placation) and three degrees of citizen power (Partnership, Delegated Power and Citizen Control). Arnstein illustrated the characteristics of each type with examples from well-

known federal programs. As a theoretical framework, we apply the concept of participation, as developed by Arnstein (1969) to map and assess the different levels of participation in infrastructure projects, as well as to analyse the role of participatory governance as a tool for transforming the South Africa energy sector and how environmental leadership considerations can foster public acceptance by minimizing conflicts and maximizing efficiency of infrastructure development in the energy sector transformation. Below we describe Arnstein's ladder of citizen participation in detail.

In Arnstein's "ladder of citizen participation" (Figure 1) eight levels of participation are grouped into the following main patterns.

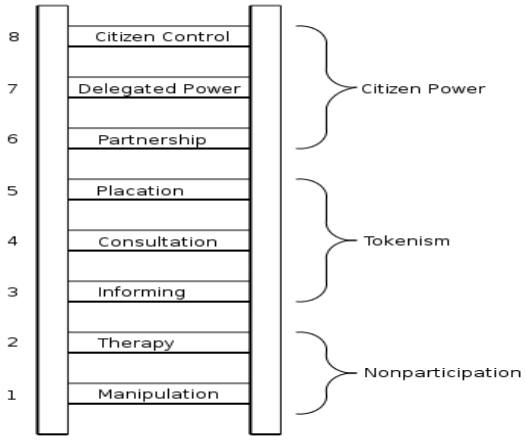

Figure 1. Ladder of citizen participation

Source: Arnstein (1969)

The first five levels represent what Arnstein called "tokenism", where people can hear and be heard, but still lack power to make their points considered by the powerful and by decision makers. Therefore, at these levels of participation, there is no assurance that the *status quo* of policies, laws, or programs will be changed. Participation that is restricted to these five levels does not lead to any change in *status quo* and hence would not bring about meaningful participation. As such, the powerless can achieve a certain level of advising (placation), but the power holders remain the ones who decide what can be done and how. The three last levels of participation represent the most balanced and effective concept of genuine participation.

Arnstein (1969) points out some limitations to this conceptual framework. First, although this definition of participation shows that citizen participation is uneven and follows steps/levels or gradations, it is clearly limited because it is a simplification. Second, this conceptual framework considers "have-not" citizens and "power- holders" as two homogeneous groups, undermining all differences, cleavages and competing interests that each group encompasses, including subgroups that emerge in the process. Third, Francisco and Matter (2007) highlight the bottlenecks that exist in the process of participation. They note that this process does not include an analysis of the most significant roadblocks to achieving genuine levels of participation on both sides. On the "power-holders'" side, these include racism, paternalism, nepotism, and resistance to power redistribution. Finally, in the real world, people and programs are more heterogeneous; there will thus be much more than eight levels of participation without clear sharp and distinctions among them. Many of the characteristics used by Arnstein to illustrate each of the eight levels could be applicable to other levels.

In this paper, qualitative analysis of ten infrastructure projects supplemented by Arnstein's Ladder of Public Participation is performed as case study. According to Cresswell (2014:14) case studies allow researchers to gather an in-depth analyses of a case, where researchers use this information to enrich an understanding of a phenomena. Furthermore, the most seminal theoretical work on public participation, which has received considerable academic attention, was developed by Sherry R Arnstein (1969). It stems from the recognition that there is a sequence of participation, ranging from therapy or manipulation of citizens, through to consultation and to what is viewed as genuine participation, or not.

The strategic objectives of all selected infrastructure projects analysed, are aligned with the key regulatory framework on the National Development Plan (NDP) and the New Growth Path (NGP), namely, i) the creation of jobs and livelihoods; ii) expansion of infrastructure; and iii) transformation to a low-carbon economy. All projects aim to contribute to the achievement of the key objectives of the National Infrastructure Plan (NIP) and are also integrated into the Strategic Infrastructure Projects (SIPs) program, which has the core functions of unlocking opportunities, transforming the economic landscape, creating new jobs, strengthening the delivery of basic services, and integrating

African economies. All projects are aligned with the approved Integrated Resources Plan 2010 (IRP 2010).

We chose each infrastructure case study based on the following criteria:

i) It is a medium- or large-scale project in terms of coverage and budget,
ii) It responds to the National Development Plan 2010/2030, and
iii) It began after 2005 and is either ongoing or completed.

We analysed infrastructure projects by following the three-step logic approach, namely:

i) Review of the project, including details such as financing of the project, its goals, experience of problems,
ii) Issues of public acceptance, including reaction of the public and concerns of different stakeholders, and,
iii) How the project addressed public concerns, how the public was involved in decision making, and what the outcomes were of the actions to deal with public acceptance issues.

In this study we operationalise Arnstein's 'ladder of citizen participation' was developed in the table below:

Table 1: Adaptation and operationalization of Arnstein's 'ladder of citizen participation'

Manipulation **Therapy**	**Information**	**Consultation** **Placation**	**Partnership**	**Delegation**	**Control**
Press releases	Surveys	Key contacts	Advisory	Public inquiries	Referenda
Advertising	Toll-free phones	Interest groups	Committees	Impact assessment	-
-	Public information	Meetings	Policy	Citizens' forums	-
-	Campaign	Focus groups	Communities	-	

-	Meetings	Public hearings	-	-	-
-	Circulation of proposals	-	-	-	-

Case studies of ten ongoing or completed infrastructure projects in South Africa were undertaken by mapping out who the main stakeholders in each project were, and by assessing their level of participation using the classification suggested by Arnstein (1969). We looked at the ways and means project managers involved the public in the project and how they addressed public concerns. This allowed us to gauge and classify the levels of public involvement and to further analyse which of the project managers addressed public concerns. In analysing the public participation level for these 10 infrastructure cases, we provide a consideration of the differentiated stages of participation. In so doing, we address the critics of the Arnstein ladder of participation, considering that the groups to be heterogeneous in their composition and interests and the projects implementations also to be differentiated in terms of the intensity of involvement of different stakeholders.

3.2. Cases

Based on Manzungu's (2004) assertion, namely, that "improved infrastructure governance rather than only stakeholder's participation should be an indicator for democratic infrastructure development and effective stakeholders' participation depends on a conducive governance regime at national level. Stakeholder participation without significant restructuring of ownership and access rights as well as true and genuine decision making sharing, runs the risk of tokenism" and the operationalization of Arnstein ladder of participation we assessed the following 10 cases were assessed. By laying out what has worked and what has not worked in the past infrastructure projects in South Africa we are better positioned to identify critical issues and challenges of public participation and acceptance to inform the development of future energy projects.

a. The Gauteng Freeway Improvement Project (GFIP)—The e-toll system

Gauteng is the economic heartland of South Africa, within its geographical location lies the country's largest city, Johannesburg, and its administrative capital, Pretoria. The Gauteng Freeway Improvement Project (GFIP) aimed to upgrade the freeway system and the construction of new freeways and roads in Gauteng. The overall objectives of GFIP were to improve living conditions, ensure sustainable economic growth, and reduce traffic congestion. GFIP was a public-private partnership approach and initial capital costs and loans were supported by an Open Road Tolling (ORT) system with a full electronic toll (e-toll) collection system (based on the "user Gauteng is the economic heartland of South Africa, within its geographical location lies the country's largest city, Johannesburg, and its administrative capital, Pretoria. The Gauteng Freeway Improvement Project (GFIP) aimed to upgrade the freeway system and the construction of new freeways and roads in Gauteng. The overall objectives of GFIP were to improve living conditions, ensure sustainable economic growth, and reduce traffic congestion. GFIP was a public-private partnership approach -pay" principle).

Stakeholder engagement and public consultation came mainly through media coverage of the key events since 2006. Letters of notification were sent to affected organizations. The public and interested parties were given a certain period of time to express their views through specific mechanisms. All representations received written responses. Public engagement and participation in the design phase, which was limited, was increased because of the rise in the public dissatisfaction rate and the outcry over the e-tolling system at the development and implementation stage. At this stage other means and mechanisms for public participation were started, such as establishing a postal address, email account, and fax number for public inputs. Four public meetings were organized in 2011. However, demonstrations, strikes, and boycotts of the e-toll system continued in an organized and sometimes *ad hoc* manner.

Issues of concern mainly revolved around the cost of the e-tolling for the commuters, including drivers of private taxis and citizens driving private vehicles, as well as the fact that e-tolling was only taking place in Gauteng. A report from the civic action group of business associations and individuals, the Opposition to Urban Tolling Alliance (OUTA), illustrates why there was strong opposition to the e-tolling system: "The more we engaged, the more we realized that this plan of SANRAL's did not attract the necessary

levels of engagement and planning that a process of this magnitude required. We also learned that SANRAL had taken on something far more complex than they could handle and that it was fraught with inefficiencies, was extremely costly and they ignored far simpler methods, which exist within Government policy to collect revenue for this project" (OUTA, 2013).[2]

At first, court orders were granted to stop citizens and their organizations from boycotting the implementation of the e-tolling system. The start date for the operation was postponed. Extra channels of communication and engagement were opened. More open dialog with representatives of different sections of society was initiated. However, SANRAL had misjudged public opposition. After more than two years of delays and legal challenges to the system posed by popular dissent and civil disobedience from opponents, including the Congress of South African Trade Unions (COSATU), a political ally of South Africa's governing party the African Nation Congress (ANC), the government, which was still under pressure, finally started e-tolling on Gauteng's freeways to prove its ability to enforce unpopular policies. Commuters had no choice but to pay e-tolls (COSATU, 2013). The e-toll debate is still currently unresolved with a task team being set-up for further consultation with all stakeholders. It has to be borne in mind that a large portion of the e-toll road users still do not pay their bills.

However, some studies argued that the public's negative reaction would probably be temporary, as its dissatisfaction was linked to the additional real expense, which would be incurred and that the benefits were not immediately perceptible (OUTA, 2013). There are several lessons to be learned for other similar infrastructure project, including those within the energy sector, namely, that there needs to be meaningful involvement of the public from the outset, from the policy decision making through to implementation and monitoring, and that public power and influence should not be underestimated by governments and public bodies, if effective outcomes are to be reached.

[2] See OUTA (Opposition to Urban Tolling Alternative) website on http://www.outa.co.za/site/about-outa/why-we-oppose-e-tolling/#sthash.Z8Cev8g3.dpuf

b. 2010 World Cup soccer stadiums

A Memorandum of Understanding (MoU) between the government of South Africa and the management of the International Federation of Football Associations (FIFA) was drawn up in 2004 after South Africa was awarded the right to host the 2010 FIFA World Cup. The MoU sought to create an enabling environment for World Cup. The 2010 World Cup megaproject was a public activity divided among 24 projects. The main objective of this first project was to build five new stadiums and upgrade five more to meet FIFA's requirements. Thirteen cities tendered to host the event, of which nine were selected. Ten stadiums were built and/or upgraded, one each in Port Elizabeth, Durban, Pretoria, Nelspruit, Polokwane, Cape Town, Bloemfontein, and Rustenburg, and two in Johannesburg. The duration of the project was 2006–2010. Some stadiums were completed in 2009 to accommodate the 2009 FIFA Confederations Cup and others in 2010 on time to host the main event.

The construction and upgrading reportedly did not take into consideration inputs from involved parties including the public. The media was used mainly to publicize the World Cup events and the socio-economic gains for both South Africa and the African continent. However, very little attention was devoted to public engagement. Public dissatisfaction was recorded, mainly related to land-use development and working conditions for the skilled and non-skilled workers involved in the construction. For instance, around 70,000 workers were on strike for better wages in 2009. There was a lack of consideration for client requirements and no involvement on the part of the general public and potential users regarding project specifications (Bond et al., 2011).

c. Karoo: Fracking using groundwater to explore shale gas

Fracking is a new technology proposed to address the need for alternative sources of energy in South Africa. By definition, hydraulic fracturing is the fracturing of rock using a pressurized liquid. Induced hydraulic fracturing or hydro-fracturing, commonly known as fracking, is a technique in which typically water is mixed with sand and chemicals, and the mixture is injected at high pressure into a wellbore to create small fractures, along which fluids such as gas, petroleum, uranium-bearing solution, and brine water then migrate to the well (Little, 2014). For shale gas, the extraction process requires deep drilling into the earth for about 4 to 6 km, an enormous amount (99%) of water, mixed with

sand and about 1% of toxic chemicals, being pumped into the rocks causing them to fracture and release shale gas.

The Karoo, a semi-desert natural region on the west coast of South Africa close to the Namibian border, can be home to an estimated 390 trillion cubic feet of shale gas (Mantshantsha, 2013). This prospect has given rise to one of most controversial debates ever around a new technology in South Africa. Multinational oil and gas industries are bidding to get licenses for prospecting and exploitation; a number have been granted permission for preliminary technical studies in different parts of the country, three of them in the Eastern Cape Province area of the Karoo. Amid protests and regulatory constraints, the government was forced to issue a moratorium in 2011 until legislation was drafted.

No public participation has been recorded in this government–multinational debate. Thus fracking is the latest example of a new technology that is being introduced in South Africa without public debate (Fig, 2013). The project caused massive protests from anti-fracking organizations at local and national levels. One of the protests marched toward the parliament in Cape Town and the offices of the multinational Shell, to pressure the government into refraining from authorizing fracking in the Karoo, as the fracking process uses too much water (about two million litres of water for drilling a single well) and has a high potential risk of water contamination in a region with scarce water resources (Prinsloo, 2013).

The process of granting rights for exploration to interested and bidding companies does not provide for any open public hearing, and the public can have an input only when the companies apply for the exploration right and submit an environmental management report on which the public can comment as interested and affected parties. In South Africa, exploration rights are usually automatically converted into production rights, leaving no room for any other opportunity in the process for the public to voice their concerns. As Fig (2013) noted, most of the questions around water contamination, waste management, climate change, employment, and social impacts have not been discussed and the government is moving fast to authorize studies and exploration, which in real terms means authorizing production. The government has not provided real spaces for transparent public policy discussions in this matter, restricting the debate to a mere administrative process where the public is completely ignored. An amendment to the Minerals and Petroleum Resources Development Bill is currently under consideration by

parliament making provision for the state to take shares of up to 50% in gas companies, which is believed to be an addition economic reason for the government to ignore protest from the public (Prinsloo, 2013).

d. Rea Vaya Bus Rapid Transport network

The Rea Vaya Bus Rapid Transport (BRT) system is an infrastructure project servicing certain routes in the City of Johannesburg. It has 22 median stations no more than 1.3 kilometres apart; two depots in Tembisa and Vosloorus; a bus holding area in Kempton Park; and a state of the art transport command centre to monitor bus operations. The project aims to address the growing number of commuters facing gridlock, pollution, and frustration with traffic congestion in Gauteng. Its objective in phase 1A from February 2001 to February 2011 was to provide 41 articulated buses and 102 standard buses, 25 km of dedicated routes, 76 km of feeder and complementary routes, and 30 operating stations. In its phase 1B, completed in 2013, it added 17 km of track, 17 stations, and 134 buses. After completion of the final phase in 2015, there will be a total of 65 km of BRT track, 67 stations, and 253 BRT buses. President Zuma noted that this project is now used by more than 100,000 Gauteng residents. Similar systems are being built in Cape Town, Tshwane, Nelson Mandela Bay, Buffalo City, eThekwini, and Rustenburg (State of Nation Address, 2014).

A consultation mechanism was established with privately owned taxi operators to negotiate the replacement of taxis with energy-efficient buses; this reduced carbon consumption by 20,000 tonnes of carbon dioxide a year in the first phase and 60,000 tonnes a year thereafter (Ekhuruleni Municipality-MC, 2007). No concerns were reported from the public, perhaps due to the scheme's positive direct impact on the public; the buses proved to be cheaper, more reliable, and user-friendly facilities for people with special needs, providing, for instance, easy access for the elderly, children, and people with disabilities, in addition to stations with weather-proof roofing.

e. The Gautrain Rapid Rail Link

The Gautrain Rapid Rail Link (GRRL) is a public transport project of the Gauteng provincial government integrated within the Spatial Development Initiatives (SDIs),

otherwise known as Blue IQ.[3] The private sector was called upon to partially fund, design, build, and operate the rail system under a 15-year concession with the Gauteng provincial government.

The GRRL aims to stimulate development, for instance, job creation, in specific areas of the province with high potential for economic growth. It also aims to create a sustainable and much more integrated public transport system that optimizes land use. Other objectives are to minimize traffic congestion on main roads, reduce the number of vehicular accidents, and decrease levels of traffic pollution.

In the first phase, 20-25 trains would link the Pretoria CBD–JIA–Johannesburg CBD triangle, with intermediary stations being built in Rosebank, Malboro, Midrand, Centurion, and Hatfield. From these stations a network-dedicated road-based feeder bus network will supplement the existing public transport feed.

According to the Gautrain Alternative Alignment (GAA, 2002) consultation was undertaken from the outset with all key authorities. Public participation was incorporated into the conceptual project for the Gautrain, and mechanisms for consultation were implemented in all phases of the project, including an environmental impact assessment (EIA), where the public and interested and affected parties (I&APs) were informed about the purpose and aims of the Gautrain project, issues of concern and needs were elicited, and IAP requirements were sought. These platforms served as data gathering and facilitation tools for project implementation. On their basis, specialist studies, and development of mitigation measures for identified risks and opportunities were carried out.

Public concerns were continuously captured in regular reports and the drafts made public through, for instance, libraries, local information centers, the project website, and at the consultants' office. As a result of such public participation processes, some routes or sections of the original project route were changed to benefit all parties concerned, which improved land-use management and prevented conflicts (Gautrain, 2013).

[3] A partnership with business and government departments to promote strategic private sector investment in key growth sectors of the regional economy.

f. Medupi Power Station

According to ESKOM (2014), Medupi is a Greenfield coal-fired power plant project located west of Lephalale Municipality in the Limpopo Province, South Africa. Medupi is the fourth dry-cooled, baseload station built in 20 years by Eskom after the Kendal, Majuba, and Matimba power stations. The planned operational life of the station is 50 years. The name "Medupi" is a Sepedi word which means "rain that soaks parched lands, giving economic relief"[4] (ESKOM, 2013). It was a public project initiated in response to the growing demand for electricity in the country by the state-owned ESKOM.

As there is no specific mention of public participation mechanism in the project proposal, we considered the practice of environmental impact assessment as a public input mechanism. For the EIA landowners within the area affected by the project were directly consulted. Although the Medupi was a complex coal-fired project, the decision to undertake its construction was not participatory. Thus public concerns about the impact of such power plants and the need for more clean and sustainable energy sources were not timely addressed. The following statement by WWF-SA's Living Planet Unit Head, Mr Saliem Fakir, mirrors and illustrates the disappointment felt by the public at the construction of Medupi: "*As this shift in the energy sector grows there is a strong likelihood that further large-scale coal-fired power stations, like Medupi, will turn out to be unnecessary and expensive options in a world that is moving to more modular and distributed options"* (WWF, 2013).

As the recurring concerns of the general public and specialized environmental organizations were not addressed, there is a feeling that the government, through Eskom, responded only to selected concerns through the establishment of the so- called Medupi Legacy Programme. According to the Eskom Website, the Medupi Legacy Programme aims "to ensure that the immediate socio-economic concerns of the local community are addressed, these being health, education, infrastructure development, employment creation and procurement opportunities."[5] However, key national and global concerns with respect to energy sustainability, environmental impacts, and governance were not addressed by the Medupi Legacy Programme (ESKOM, 2013).

[4] ESKOM website 15.02.2013 http://www.eskom.co.za/NewBuild/MedupiPowerStation

[5] http://www.eskom.co.za/Whatweredoing/NewBuild/MedupiPowerStation/Pages/Medupi_Legacy_Programme.aspx

g. The Mangaung Intermodal Public Transport Facility

The Mangaung Intermodal project was a public project undertaken in preparation for the 2010 Soccer World Cup. This was a multi–story facility consisting of a spacious ground floor, plus three more floors offering space for over 800 mini-bus taxis and 150 long-distance taxis. The project had a series of dedicated pedestrian links connecting the centre of Mangaung to the Bloemfontein train station and Central Park bus station in the heart of the Bloemfontein Central Business District. Retail areas were also incorporated into the centre. The income from the retail areas was to be used by the local municipality to provide management, maintenance, and cleaning services to the new centre (IMIESA, 2011).

There were no mechanisms for public participation built in to the project and thus no consultation either in its conception and implementation phase. From the start of operations, there was public denunciation of the facility, mainly related to poor flow of buses and minibuses. Commuters and transport operators collectively boycotted the use of this facility.

After abandoning the facility in 2009, the public transporters have still not agreed to use the terminal. Mr Butana Khompela, member of the provincial Executive Council for police of the Free State, said that he could be forced to revoke licences of operators refusing to relocate to the terminal, adding that “the pick-up point is the official taxi rank and those refusing to adhere to that stipulation will have their licenses revoked.” This has triggered confrontation between the authorities and the transporters, several of whom vowed that they would not be “intimidated” or ordered around to the terminal “like kids” (Free State Times, 25.10.2013).

As public concerns were not addressed, all operations are still being conducted at the previous facility, in spite of an investment of more than R400 million having been made in the new centre. The FIFA world cup project left unmet pressing concerns on infrastructure development (PCTE, 2010).

h. The Spring Grove Dam Water Resource project

The Spring Grove Dam, situated on the Mooi River, KwaZulu-Natal coastal metropolis, is the main component of Phase 2 of the Mooi-Mgeni Transfer Scheme. It is a public initiative that aims to boost water resource development and bring additional water to the KwaZulu-Natal metropolitan costal region Spring Grove, built with R1 billions of state funding, created more than 960 jobs and will supply water from the Kamberg catchment area of the Drakensberg to six KwaZulu-Natal local and district municipalities, including Durban and Pietermaritzburg (City Press, 2013).

The public and other interested parties have reportedly been widely consulted, and an Environmental Monitoring Committee was established to check environmental compliance of activities on site (The Trans Caledon Tunnel Authority- TCTA, 2013)[6]. Land owners were compensated for loss of land and income. Moreover, several resident labourers were found suitable alternative accommodation and given full title over the new their living spaces, which left a positive legacy. More than 180 graves were identified, exhumed, and relocated after family permission was obtained and suitable reburial locations found (TCTA, 2013).

i. New Multi Product Pipeline (NMPP)

The New Multi Product Pipeline (NMPP) is a 705-km, state-owned pipeline being built to replace the Durban to Johannesburg Pipeline (DJP); the original pipeline was built in 1965 and has been operating at capacity, but is nearing the end of its design life. According to Transnet[7] the NMPP transports refined petroleum products (petrol, diesel, and jet fuel) from the two refineries in Durban as well as importing refined petroleum products from the storage facilities at Island View, in the Port of Durban. Additionally, it is built to ensure security of petroleum products transport to the market at Gauteng and to reduce the deterioration of the road network, road maintenance costs, and congestion on the roads, thus enabling economic growth and lower carbon emissions associated with road transport in the country.

[6] See the Water Research Commission at Trans Caledon Tunnel Authority TCTA World Annual Report 2013/2014
[7] See Transnet on http://www.transnet.net/AboutUs/Pages/NMPP.aspx

The NMPP is also improving the capacity of the Inland Network (IN) which services the Alrode, Tarlton, Rustenburg, Witbank, Pretoria, Kroonstad, and Klerksdorp regions, resulting from the increased demand requirements in these regions. Although not publicised it involved land use concerns throughout the trace line of the pipeline (IMANI & Haskoning DHV, 2013)[8]. Concerns from the public affected were addressed, and affected people were resettled and or compensated.

j. Informal Settlement Upgrading

The City of Cape Town states that its informal settlement upgrading is based on active participation, dialogue, and continual engagement with communities. The innovative pilot program for the *in situ* upgrade of five informal settlements in Cape Town, namely, Monwabisi Park in Khayelitsha, TR Section, BM Section and Lotus Park in Gugulethu, aimed to improve infrastructure (such as roads, electricity, and water and sanitation) and thereby the living conditions of the inhabitants.

Mechanisms for public participation consisted of a Steering Committee (SC) comprising community stakeholders, that is, representatives of various community structures. The SC is responsible for identifying community assets and issues. Community members are trained to conduct participatory surveys to gather data on basic service delivery, safety, and status quo, and also identify possible community contributions to facilitate development. The results are then analysed and a community action plan drafted for each settlement. These plans contain short-, medium-, and long-term initiatives in areas such as sociocultural, institutional, safety and security, and economic development.[9] A Monitoring and Evaluation (M&E) intervention is being undertaken by both the community and the municipality (Integrated Development Plan, 2011). Issues of concern raised by the communities are addressed in a timely way in each municipality within the annual M&E and action plan revision process.

[8] See the IMANI & Haskoning Status Quo Report: Development of anti-integrated freight and logistics framework and action

[9] City of Cape Town: "Pilot in-situ upgrade of informal settlements reaps benefits".
Accessed from www.capetown.gov.za /14 February 2014.

4. Results and Discussion — Exploring and Discussing the main findings with other international similar works

The level of public participation across all the projects analysed is uneven, with some projects showing complete lack of public involvement and some participation being only at the first stage of a project. Moreover, most public involvement is concentrated at the stage of information, consultation, and placation, (tokenism). It is shown that communities and citizens are not homogeneous and they have different vested interests in participating, at the same time decision makers are also heterogeneous in their vested interests and political openness for public participation (Arnstein1969; Blackmore 2008; Coelho and Favareto 2006; Francisco and Matter 2007; Groves, Munday and Yakovleva 2013; Weiss 2000).

Some projects are at the initial stage of partnership and very few at the citizen control stage. Thus most of the cases analysed show a weak approach to participation, with less attention being given to technical and management aspects. Most of the project reports do not consider public participation at all, focusing their analysis on the economic gains and results without looking at the governance aspects and the socio-political contribution to citizen empowerment.

Table 2: Summary of findings for 10 infrastructure projects

Title	Key Concerns and Protest	Concerns addressed
The Gauteng Freeway Improvement Project (GFIP)— The e-toll system	Costs for commuters and taxi owners Issues of fairness	Court cases improve channels of communication, engaging key stakeholders
2010 World Cup soccer stadium	Land use development Improve working conditions	Negotiation for compensations Conditions not improved until the end of project
Karoo: Fracking using groundwater to explore shale gas	Water usage Water contamination	Delay licensing Enact legislation Not addressed directly

Title	Key Concerns and Protest	Concerns addressed
Rea Vaya Bus Rapid Transport network	Owned taxi operators: lose business Taxi drivers fear lose work	Negotiation mechanism with taxi owners Incorporation of the tax drivers in the work force
The Gautrain Rapid Rail Link	Land use development	Clear communication / participation mechanism Change of initial route/Continuous communication
Medupi Power Station	Land use development Use of non-clean sources of energy Working conditions	Land owners compensated
The Mangaung Intermodal Public Transport Facility	Circulation of buses and minibuses	Concern not address
The Spring Grove Dam Water Resource project	Land use development Land owners: lose their farm Farm workers lose jobs and residential Burial sites exhumation and relocation	Land use development: land owners compensated and workers resettled Burial sites exhumed and relocated
New Multi Product Pipeline (NMPP)	Land use development Need for settlement	Affected households resettled Land owners compensated
Informal Settlement Upgrading – Cape Town	Basic service infrastructures	Community committees Continuous dialogue with public

Infrastructure projects, in general terms, imply huge investment and affect people in terms of land use, physical spaces, economic opportunities or challenges, social and

environmental impacts on individuals and communities. However, all ten projects analysed seem to have five areas of commonality:

i) Economic impact, for instance, job creation or losses, business creation or losses, and land use or exploration
ii) Environmental impact, such as land use development and water contamination
iii) Social impact, such as resettlement of people living in the affected project areas, relocation of graves, animals, and vegetation
iv) Political impact, including the right of the public to be heard and to participate in decision making regarding infrastructure planning
v) Impacts on human health, mainly in terms of availability of potable water for the community; however, only primary health issues were considered and critical human health issues, such as environmental and pollution-related diseases were not considered.

In addition, in almost all projects, public participation was only undertaken within the context of environmental impact assessment which is a mandatory requirement for any infrastructure project in South Africa.

Table 3: Level of participation in all ten projects according to the ladder of participation

Participation / **Project**	**Manipulation** / **Therapy**	**Information**	**Consultation** / **Placation**	**Partnership**	**Delegation**
The Gauteng Freeway Improvement Project (GFIP)—The e-toll system	Press releases media coverage Letters of notification	Surveys Toll-free phones	Key contacts Environmental impact assessment	No	No
2010 World Cup soccer stadiums	Advertising Press releases Media coverage	Toll-free phones	Environmental impact assessment	No	No

Participation / Project	Manipulation / Therapy	Information	Consultation / Placation	Partnership	Delegation
Karoo: Fracking using groundwater to explore shale gas	Press releases Media coverage	Public information	Environmental impact assessment	No	No
Rea Vaya Bus Rapid Transport network	Advertising Media coverage	Campaign	Focus groups Environmental impact assessment	Communities	No
The Gautrain Rapid Rail Link	Advertising Press releases Media coverage	Meetings Public information Campaign Circulation of proposals	Public hearings Environmental impact assessment	Communities	Impact assessment
Medupi Power Station	Advertising Press releases Media coverage	Meetings Public information Campaign	Public hearings Environmental impact assessment	No	No
The Mangaung Intermodal Public Transport Facility	Advertising Press releases Media coverage	Meetings Public information	Environmental impact assessment	No	No
The Spring Grove Dam Water Resource project	Advertising Press releases Media coverage	Meetings Public information	Environmental impact assessment	No	No

Participation / Project	Manipulation / Therapy	Information	Consultation / Placation	Partnership	Delegation
New Multi Product Pipeline (NMPP)	Advertising Press releases Media coverage	Meetings Public information	Environmental impact assessment	No	No
Informal Settlement Upgrading– Cape Town	Advertising Press releases Media coverage	Meetings Public information Campaign Circulation of proposals	Environmental impact assessment	Communities Advisory committees	Impact assessment

One of the major features of the projects analysed indicate that public acceptance or participation was of a reactive nature of project managers to participation. In fact, there was no preventive and holistic participatory awareness and no mechanisms for participation in the majority of the projects. Therefore, projects managers usually only reacted to concerns; thus there were strikes and riots which aimed to pressurise decision-makers into listening to, and addressing public concerns and grievances. This, in turn, incurred extra cost, time, and efforts in completing projects and getting back on track.

Where concerns were not addressed at all, or addressed partially, or in an unsatisfactory manner, the overall project was unsuccessful in gaining public acceptance, meaning that project managers sometimes had to struggle against the public will. This proved to be very costly and caused negative reactions on the part of the public. Examples are the e-tolling system in Gauteng, which is still contested by the general public and direct users of the system, and the Mangaung Intermodal Transport centre, which was abandoned with millions of Rands in public funds being wasted.

Where there was a consistent, well planned, and well implemented approach to public participation and acceptance, project results tend to be positive with fewer conflict and greater cost-effectiveness and sustainability over time. Project analyses showed

evidence that stakeholder participation and involvement in decision-making processes led to better management and improved performance (Schinke and Klawiter 2015; Weiss 2010; Veltmeyer 2004). The projects that managed to build trust and some degree of citizen control resulted in a better management of conflicts and more effective financing. Examples of successful projects, were the municipal upgrading in townships in Cape Town and the Gautrain system in Gauteng province, where public participation was extended to the level of citizen control and incorporated into the project cycle.

The majority of the projects lack clear institutional settings for public participation, except for the Gautrain project and the Municipal Township upgrading in the Western Cape. Analysis also showed recurrent weak consideration of project governance and accountability with respect to all stakeholders, including the general public. In fact, in almost all project designs analysed and conception documents there is no provision for public participation strategy or mechanisms; nor is there a participatory communication strategy, which makes it difficult to implement participatory governance and accountability, thus making it difficult to implement the project with public participation in a consistent and thought manner.

However, as the review of the projects indicates, participatory governance has cost and time implications, and it needs to be considered in the project design. Participatory governance also needs commitment at all levels of governance. To drive participatory governance processes, leadership requires a change in mindset, and the entire process needs to be institutionalized through the setting up of clear and specific mechanisms for participation that can be monitored and evaluated (Veltmeyer 2004; Browining-Aikein et al 2014; Schinke and Klawiter 2015). Moreover, clear information is needed for all interested stakeholders about what possibilities are available for participation at different levels and phases of project decision making: planning, implementation, monitoring, and evaluation (Weiss, 2010; Coelho and Favareto 2006; Newig and Fritsch 2009). Decision making with genuine participation and public acceptance are key factors for successful and effective project implementation of infrastructure initiatives.

In summary, our results resemble similar patterns to the research conducted in several public and private investments in the energy sector in Europe where stakeholders' engagement is crucial. Additionally, public participation and acceptance require a fundamental and deliberate transparent mechanism which enables access to decision-

making processes. Furthermore, there are some similarities such as seeing participation as an uneven and levelled process where different interests and stakeholders come to play which is translated in the differentiated level of engagement from interested parties. Finally there is a similarity of the key finding that the absence of public participation and acceptance can cause unnecessary delays and eruption of conflicts. However, our results show some specific differences such as that public participation shall include inhabitants of local affected communities for effective energy project deployment and that stakeholders' engagement might still be a tool for conflict resolution which can minimize the severity of conflicts in situation where conflicts erupted before public participation was promoted or as a cause of lack of stakeholders' engagement, increasing the likelihood for public acceptance of infrastructure project deployment.

5. Conclusions and recommendations

The results of our study allow us to make the following set of conclusions. First, that the process of infrastructure deployment in South Africa still lacks consistent institutional mechanism for stakeholders' engagement and public participation. Review of infrastructure projects showed that stakeholders' engagement and public participation is organized to provide feedback on the results of environmental impact assessment, mainly. It also often takes place on ad hoc basis as a way to address conflict, which has already emerged, hence in a reactive in opposition to preventive and proactive manner. Most of the projects showed lacking institutional structure for public participation.

Second, even being organized at the time when conflict already emerged, public participation still helps to address concerns and to make conflicts less dramatic, helping to achieve a compromise and acceptance of the project. Energy transition is an area which is prone to conflicts as there are many concerns among organized stakeholders and inhabitants of affected communities. Most of these concerns are about the need for the project to take into account different available electricity generation technologies, transparency of decision-making processes at national and regional level, which then are impacting local governance level and communities. The need to also take into consideration the impacts from electricity infrastructure projects on local communities, such as visibility impacts, impacts on human health from different electricity generation technologies, like coal, oil, gas or even nuclear, impacts on local environment and destruction of local landscape.

At the same time there is also vivid discussion about benefits from energy transition, such as mitigation of climate change or energy security, which are usually perceived at the global or national level; and risks and costs of infrastructure deployment for local communities, which are usually perceived at the local level. Therefore, public participation involving inhabitants of affected communities is essential for deployment of electricity infrastructure. For instance, example of Europe shows that public opposition might delay deployment of electricity infrastructure projects for several years or even lead to their cancellation. Furthermore, participation showed itself to be one of the most efficient ways to address concerns about deployment of new electricity infrastructure projects and upgrading of the existing infrastructure.

Third, the level of provision of information and consultation are the two most frequent levels of public participation. Usually they include public consultations on environmental impact assessment, public information meetings and providing materials. This is the level, which is also most frequently observed in planning of electricity generation and transmission projects in Europe and is even higher than the most frequent level of participation in other regions, like the Middle East and North African region. As most of the concerns during the process of deployment of electricity infrastructure projects appear on the need of the project, the lack of information about planning criteria of the projects or outcomes of the results of environmental impact assessment, we might conclude that such level might be also sufficient for planning of electricity infrastructure projects in South Africa.

Forth, the results show that land use issues and questions about benefits and impacts from projects on local communities are the most frequent concerns. This is an important conclusion for energy transition as renewable energy installations, like concentrating solar power or photovoltaic, require significant land resources for their deployment. Without being addressed, the land use issues might lead to further conflicts during deployment of renewable energy installations and can become a barrier for further deployment of the projects.

The overreaching conclusion is that developing an effective participatory mechanisms into infrastructure projects has an impact in the way they are perceived and accepted by the communities and end-users. Hence, the authors recommend the implementation of participatory governance principles for infrastructure projects aimed at transformation of the South African energy system. Institutionalization of clear public participation

mechanisms for decision making should be included from the conception and planning of infrastructure projects through to project end, and there needs to be clear allocation of funding to foster public involvement in all phases of the project cycle. The public should have the chance to buy-in into the project, be provided the space to participate in decision making and to enjoy its subsequent benefits.

Different levels and stages of the project require differentiated levels of participation bearing in mind the ladder of citizen participation. Fostering public participation requires skilled leadership equipped with a new mindset based on the ecological paradigm, mentioned earlier. Environmental leadership should be capable of inspiring effective and efficient infrastructure projects aiming to transform the way energy is produced, transformed, distributed, used, and managed.

Taking the above recommendations into account while developing and implementing infrastructure projects in the transformation of South African energy sector towards renewable energy will lead to effective participation and improve pro-activeness to deal with the emergence of conflicts, costly delays, as well as to manage public expectations, foster public acceptance and support, build good will and spirit of collaboration and trust, and increase the likelihood for effective energy infrastructure project development.

To deepen our understanding of public perception to public participation in specific energy infrastructure projects and assess the level of environmental leadership and participation within the sector, more research needs to be undertaken. This would involve in-depth interviews with the major actors and stakeholders of the energy sector, including consumers and the general public. This may allow the development of a model for public participation in the governance of the transformation of South African energy system.

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