CHAPTER 5

POLITICS OF ENERGY TRANSITIONS: A DECADE AFTER NIGERIA’S BIOFUELS CRUSADE, A TALE OF NON-COMMERCIALISATION AND LOST OPPORTUNITIES

“The growing use of biofuel will be an inestimable contribution to the generation of income, social inclusion and reduction of poverty in many poor countries of the world.”

Luiz Inacio Lula da Silva

12. This chapter is based on: Osunmuyiwa, O. Politics of Energy Transitions: A decade after Nigeria’s Biofuels Crusade, A tale of non-commercialisation and lost opportunities. Journal of Environmental Policy and Governance (under review)
ABSTRACT

There is a growing literature on the politics of sustainability transitions and its relationship with policy changes at the national or local levels. In this regard, this chapter contributes to this debate by analysing energy transition in Nigeria with a focus on the biofuels sector. Importantly, the study examines what conditions or socio-economic externalities influenced policy changes leading to the development of biofuels, how this policy process was negotiated on the political agenda, and why it led to the non-commercialisation of the biofuels sector. Based on expert interviews and document analysis, findings suggest that drop in oil production, the need to diversify the petroleum industry combined with the urge to boost GDP created a favourable condition for the development of biofuels in 2005. Nevertheless, biofuels as an alternative solution to the above-identified problems were insufficiently articulated when the window of opportunity opened. Importantly, in the last ten years, fluctuations in oil prices and new changes in government have closed the window of opportunity for biofuels development. As such, the study concludes that for biofuels to feature prominently as a post-oil transition policy in Nigeria, it must be sufficiently articulated and positioned as a national strategy by the government.
5.1 INTRODUCTION

Recent global biofuels development can be largely traced to the increasing demand for energy and the simultaneous call for a reduction in the use of fossil fuel resources as a solution for climate change (Li, Bluemling, Mol, & Herzfeld, 2014; Nilsson, Hillman, & Magnusson, 2012; Resch et al., 2008). The development of biofuels has been situated within the sustainability transitions debate, hinged on two pedestals; the diffusion of clean energy in the transport sector and the development of agro-allied industries (Di Lucia, 2013; Favretto, Stringer, & Dougill, 2015; Ponte & Daugbjerg, 2014; Schleifer, 2013). In 2013, biofuels contributed an estimated 2.3% to global fuel transport demand (REN21, 2014b) and is further estimated to contribute about 11% by 2050 (European Commission, 2010). In-fact sustainability transitions of this nature will require enormous changes in industrial cultures, structures, and practices that are likely to result in resistance by incumbent regimes (i.e. existing organisations and structures within the dominant system). Motivations for resistance have varied from industry concerns, such as impacts on organisational stability, threat to profit streams, technological feasibility and costs (Smink et al., 2015) to social concerns like impacts on food security (Escobar et al., 2009; Scarlat & Dallemand, 2011), water/land use (Schut & Florin, 2015), socio-economic wellbeing of farmers, loss of socio-cultural ecosystem services (Fritsche, Hennenberg, Hünecke, Herrera, & Wiegmann, 2010) as well as displacement of communities within developing countries like Nigeria.

Despite the above concerns, countries like Brazil, and India to an extent have successfully commercialised biofuels while others like Nigeria have seriously lagged behind due to regime and agency dynamics (Fatimah et al., 2015; Janssen & Rutz, 2012; Sheng Goh & Teong Lee, 2010). Based on this, it is argued that these policy and technology failures are better understood when the political processes surrounding the adoption of such policies (biofuels) and technologies are considered (Elzen et al., 2011; Markard, Suter, & Ingold, 2015). In fact, there is a broader recognition that, at the heart of these “political nuances” is the role of government in catalysing long-term policy changes towards the desired transitions trajectory (Kern et al., 2016).

To understand the extent to which this long-term policy catalysation is possible, there is a need to explore how actors’ influence policy ideas and how such policy processes are negotiated (Kern et al., 2016; Meadowcroft, 2011) in the political arena. Taking this approach, provides insights on whether sustainability transition policies can be implemented and if so, under which conditions these become achievable. In light of the above, this study explores the role of politics in Nigeria’s biofuels transitions attempts by analysing the political processes, institutions, actors and policy streams exerting influence on the sector.
Nigeria, despite its economic and social similarities to emerging economies, with successful biofuel industries like Brazil and India, has been unable to create a commercially viable domestic biofuels sector. The development of biofuels in Nigeria can be mainly attributed to the country's desire to improve energy services, especially in the transport sector. Linking the agricultural and oil sector has been seen by some policy makers and scholars alike as a driver for GDP growth (BP, 2014) in particular, since 83% of the country's primary energy consumption in 2010 came from traditional biomass like saw mill waste, charcoal, animal dung and palm kernel shells (EIA, 2011). Despite Nigeria's huge fossil resources with an estimated daily production capacity of 2.5 million barrels per day and crude reserve of 37.1 billion barrels (BP, 2014); Nigeria is still unable to meet its energy needs (Osunmuyiwa & Kalfagianni, 2016). This is partly due to the country's low refining capacity (IEA, 2014). Today, the transport sector consumes 25% of domestic energy and this significantly competes with other sectors such as industry, household and other services (NNPC, 2013). These numerous energy needs, spurred the Federal Governments' Automotive Biomass Programme in 2005 (Ohimain, 2013). The Nigerian government in 2005 projected investment in biofuels as an opportunity to promote the use of renewable energy, reduce domestic dependence on fossil fuels, reduce greenhouse gas emissions and increase energy access to the population (NNPC, 2007). Despite initial commitments towards the development of the biofuels sector in 2005, more than ten years later, Nigeria has not been able to produce biofuels commercially.

The empirical analysis presented in this article seeks to understand how biofuels became a prominent policy on the agenda in Nigeria and why the policy and commercial aspirations for biofuels development have not materialised ten years later. The study moves the discussion beyond the potentialities of biofuels in Nigeria to the political processes and actors that influenced or engineered its failure. This presents a research opportunity as previous studies on biofuels development in emerging economies or low-income countries have focused on success stories (Bastos Lima, 2012; Schut & Florin, 2015), with little or no research on failed cases. As research in multiple fields has shown, negative results often reveal lessons that can foster the success of future programs. These findings will, in turn, lead to an array of wider implications for other countries like South Africa and Mozambique with difficulties in successfully engineering a transition to biofuels (Di Lucia, 2010; Schut, Cunha Soares, van de Ven, & Slingerland, 2014; Schut & Florin, 2015).

To explain the reasons for the observed failure in Nigeria's biofuels sector, the study draws on two strands of literature. The first consists of the multi-level perspective on socio-technical transitions (MLP), which is part of a broader tradition of sustainability transitions studies that have emerged in recent decades, dedicated to the explanation of socio-technical transitions. Using this theory, the study examines how transitions occur at three different
levels; identifies actors or prime movers involved in the transition trajectory, and explores the role of external factors in shaping transitions at the sub-national level.

By exploring the above, the study shows how actors try to change perceptions by using cognitive, regulative or normative frames to lobby and compete while engaging in power struggles (Geels & Schot, 2007). As Farla et al., (2012) suggest, if we understand the struggles of actors with conflicting interests, we will be able to assess the conditions, that trigger or prevent the realisation of sustainability transitions. The article will identify actors’ policy preferences and the ways in which these are situated within the sphere of politics. By analysing how actors interact in the policy space, we are able to observe how actors set policy agendas and how this affects the trajectory of policy changes. This study adopts the agenda setting model, which argues that the subject of politics and policy changes revolves around the allocation of scarce attention to one policy sphere over another (Pollack, 1997). Therefore, this study adopts this model in order to enrich the MLP and thereby help to understand how political actors’ aggregate scarce attention to their preferred policy issues during transition processes. Against this background, Section 5.2 provides a review of the conceptual framework and methodology. Section 5.3 gives a historical overview of biofuels development in Nigeria and examines actors’ responses towards the development of the sector. Section 5.4 concludes.

5.2 ANALYTICAL FRAMEWORK

5.2.1 MULTI-LEVEL PERSPECTIVE

The MLP distinguishes three levels of structuration: a backdrop of landscape developments, a protective hive of technological niches and an embedded level of socio-technical regimes providing rules, structures and practices for a given system. Accordingly, the interaction between these three levels can lead to long-term and complex processes of transitions (Geels, 2014). A central element in this interaction is the niche-regime interface as this is where structural, institutional and socio-technical changes occur. The regime is pivotal in that it represents everything “ancient” “stiff” and “sturdy” (Geels, 2011).

While a number of studies have acknowledged the role of incumbent regime actors in the transition process, they nevertheless all agree that under specific conditions (timing and nature of interaction) niches can systematically subvert the regime (Geels & Schot, 2007; Rauschmayer, Bauler, & Schäpke, 2013; Rohracher & Späth, 2013). Timing and nature of interactions are quite critical in the multi-level interactions. Importantly, if landscape pressures emerge as “disruptive” rather than “reinforcing” when niches are yet to mature, the transition trajectory will produce a different outcome than when niches
are fully developed (Geels & Schot, 2007). Put differently, niches have a better chance of “articulately infiltrating” the regime if they have been “cultured”, “sheltered” or if they have gone through a process of “innovation accumulation” and are sufficiently developed to grab “windows of opportunities” provided by external pressure (Raven et al., 2015). Importantly this regime destabilisation creates an avenue for niches to influence the policy sphere and path (Normann, 2015). While the regime (institutions and agency) can defend itself against niche “invasion” via the co-option of niche technologies, the implementation of incremental changes to its technologies or the use of normative, cognitive or regulative rules (Geels, 2011; Geels & Schot, 2007), it is not really clear how these actors create, negotiate or shut down “windows of opportunities” or why certain innovation policy entrepreneurs win over others in the political arena (Normann, 2015).

To deal with what is perceived as a source of conceptual ambiguity in the categorisation of actors in the sustainability transitions research, scholars have argued for a shift in the current conceptualisation of actors. The special issue by Farla et al., (2012) provides an overview of the different roles actors play in the transformation process and how they align their strategies to accomplish such targets. Farla et al., (2012) conceptualises actors within the “quadruple helix” i.e. the state, market, society and civil society. Following this, they identify strategies adopted by actors in shaping sustainability transitions, while also focusing on resources mobilised in the realisation of these strategies. As an example, Penna and Geels, (2012) highlights how members of the civil society and other social movements tried to place the issue of air pollution on the political agenda in the US and how this was slowly removed from the agenda by the auto industry through the provision of evidence suggesting incremental changes. Common to all these studies Bakker et al., (2012); Budde et al., (2012); Konrad et al., (2012); Musiolik et al., (2012) and Schuitmaker, (2012) is that actors adopt strategies that might rely on the use of existing rules, transformative planning, construction of expectations and future visions, dialectic or discursive capabilities, organisational resources, structural and relational resources (networks) as well as political and financial contacts in changing expectations and narratives around transitions.

More recently, Avelino & Wittmayer, (2015) introduced a multi-actor perspective (MAP) which argues that there is a tendency in transition studies to ascribe power or regime capabilities to a particular set of actors (i.e. policy- makers and industry) at the expense of others (civil society, consumers and the third sector). They argued that while some actors might have power over others in vertical terms, i.e. political resources to control the actions of others, some exercise different kinds of power horizontally (Avelino & Wittmayer, 2015). For example, firms and industry actors use corporate political power such as lobbying, agenda-setting or even institutional strategies in exercising their influence on government to resist transitions.
Based on the above, studies in the transitions literature have advocated for more politically cognisant analyses of socio-technical transitions, including low carbon transitions (Meadowcroft, 2011; Power et al., 2016; A. Smith & Stirling, 2010; Stirling, 2014). For instance, Smink et al., (2015) advocate an analysis of institutional strategies adopted by incumbent regime members, while Markard et al., (2015) examine regime work through the advocacy coalition framework. Nonetheless, as Normann (2015) shows in the case of Norway, there is little attention in the sustainability transitions literature on how niche solutions are attached to different problems, translated into policies, and more importantly, how this affects the position of such policies on the political agenda. Even more importantly, there is little analysis on why this process of policy positioning fails. Therefore, understanding the processes for policy change is a critical component of an all-inclusive perspective on the politics of sustainability transitions (Kern, 2012; Markard et al., 2015). Building on these insights, this study adopts the agenda-setting model in seeking to understand how policies on transitions evolve and are placed on the political agenda.

5.2.2 POLICY CHANGE AND AGENDA SETTING

In policy analysis, policy change is seen to occur through an interaction between cognition (ideas), framing (discourses), technological innovation, and institutional and societal needs (Elzen et al., 2011; Markard et al., 2015). However, ideas and discourses do not emanate on their own. Scholars have argued that it is important to understand three main factors:

(a) the context in which these ideas emerge (problem identification, “stirring interest” and conditions for agenda setting), (b) the competencies of actors who generate these ideas and discourses (problem solution, articulation, “venue shopping” “marshalling support” and the structure of agenda setters), and (c) how these are positioned to coincide with windows of opportunities (politics) (Normann, 2015; Vanhoonacker & Pomorska, 2013).

The agenda-setting literature emphasises the fact that at certain periods within the policy sphere there is a hierarchy of problems, to which policy entrepreneurs and actors must pay attention to (Green-Pedersen & Mortensen, 2010). An agenda is a structural phenomenon, which constrains agents and policy making at different points in time. While these actors must address problems according to their place on the political agenda, they also compete to sway the content of the agenda through the investment of resources, reputation, time and energy to gain a favourable position (Vanhoonacker & Pomorska, 2013).

Kingdon, (2011) articulates the agenda setting process by arguing that there are three major separate streams by which critical policy changes occur. These are the problem, politics and policy stream. Although independent and dynamic, the alignment of the problem, politics and solution stream offer a window into understanding political decision-making process.
5.2.3 COUPLING THE MLP WITH THE AGENDA-SETTING MODEL

Kingdon's agenda setting model provides a non-linear perspective for understanding how policies emerge and remain on political agendas. As such, it complements and enriches the MLP perspective on the role of agency in transitions. The agenda-setting model offers insights into how landscape factors create windows of opportunities, and how policy entrepreneurs within the regime are able to tap into these opportunities by using their competencies (i.e. finding venues where sectoral problems are discussed while marshalling political resources to place their solutions on the agenda) in order to keep windows of opportunities open for niches to influence the regime. While the MLP talks about the conditions/problems (referred to above as landscape issues) that create a need for the agenda, the agenda-setting model provides the process by which such problems are attached to a solution. Although both approaches help to identify the importance of landscape and niche developments, they also highlight the importance of actors and policy entrepreneurs within the regime (Normann, 2015). As such, while the MLP helps to understand how windows of opportunity open up, the agenda-setting model allows a more detailed analysis of the conditions that open these windows of opportunities and the factors that close them down.

5.2.4 METHODS

This research is mainly qualitative and employs a process tracing methodology, as the agenda-setting model requires a detailed tracing of historical events, problems, solutions
and the politics involved. Process tracing method is suitable for explaining policy changes and outcomes, in particular because it allows the researcher to identify how structural relationships between actors influence policy outcomes (George & Bennett, 2005).

Data was collected from interviews and documents. In order to gain a variety of perspectives on the politics of energy transitions in Nigeria, semi-structured interviews were conducted with ten experts, ranging from senior policy makers to top government officials in the oil and gas sector. These were carried out in the second quarter of 2014. The interviews were conducted in person and documented with permission allowed on anonymity. The interviewees were asked questions concerning the reception of biofuel policies by the incumbent actors and the barriers experienced. Interviewees were questioned about the contributions of actors to policy designs, actors’ development of structures and competences and their effect on the implementation of the biofuels policy. Secondary sources include a lengthy review of the available scholarly literature, Internet sources and conference proceedings. All interviews were fully transcribed and compiled in a database together with other documents (e.g. newsletters, information from websites, news- paper articles). To operationalise the analytical framework, the study examines key landscape factors (considering nature and timing), policy entrepreneur(s) that were instrumental in identifying the problem, political and organisational actors involved in the articulation of the problem and the development of competencies, responses of incumbent actors, and lastly, explore how windows of opportunities in Nigeria’s biofuels crusade were shut down and why.

<table>
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<tr>
<th>TABLE 5.1 Phases of Biofuels Development in Nigeria since 2007</th>
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<td>Bio-Diesel</td>
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<td>Bio-ethanol</td>
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Source: NNPC (2014 Interview), Ohimain, 2013
FIGURE 5.1 Schematic representation of analytical framework
Source: Author’s compilation
5.3 HISTORICAL OVERVIEW OF BIOFUELS DEVELOPMENT IN NIGERIA

This section provides a brief overview of niches in Nigeria’s biofuels sector, the transport regime, followed by a summary on how biofuels emerged in Nigeria. The niche level in Nigeria’s biofuels sector is an assemblage of feedstock farmers, biofuels technological companies, networks and agricultural research institutes (Osunmuyiwa & Kalfagianni, 2016). These actors were not involved in the biofuels policy process, and of these actors, only agricultural research institutes made an observable contribution to the biofuels sector. As such, this study will not be focusing on the niche-regime interactions, but rather on the landscape-regime interactions on biofuels in Nigeria. Nigeria’s transport regime is strongly inter-linked with the energy regime and its members include land, air and water governmental organisations, policy makers, institutional bodies with established structures, cultures and practices which govern industries in this sector, technological organisations as well as consumers. These groups of actors ensure and maintain stability within the regime through the use of cognitive, normative and regulative structures. By the end of Nigeria’s military era in 1999, these regime actors had become prominent as the burden of steering the industrial and institutional structures fell on them (Edomah, Foulds, & Jones, 2016).

Following the booming industrialisation, economic and population growth witnessed in the early 2000s, there was a significant rise in the demand for energy in Nigeria (Dayo, 2008). The growing demand spurred the deregulation of the energy sector in 2001, as the existing energy infrastructure was unable to respond to the country’s energy demands. As part of the deregulation process, the government also commissioned the Ministry of Power to develop practical strategies centred on the exploitation of Nigeria’s renewable and non-renewable energy resources. The finalisation of the deregulation process in 2005 culminated in the enactment of the Electric Power Sector Reforms Act (EPSRA) and the creation of the National Energy Master Plan. The National Energy Master Plan served as a platform by which the government’s intentions to mainstream renewable energy became prominent. Therefore, the government’s decision to invest in biofuels as an alternative response to transport fuel demands in 2005 was not entirely surprising.

5.3.1 THE PROBLEM IDENTIFICATION STREAM: THE TRILEMMA OF ENERGY SECURITY, GDP GROWTH AND CRASH IN INTERNATIONAL OIL PRICES OPENS THE WINDOW ON BIOFUELS (2005-2007)

Several disruptive landscape factors spurred the development of a national biofuels sector in 2005 and led to the eventual development of a biofuel policy in 2007. Almost at the same time in 2005, there was a decline in GDP growth, a reduction in oil exports due to oil militancy in the Niger Delta (i.e. bombing of oil pipelines) and an increasing scale of fuel
import. Although there was a hike in international oil prices, which meant more income for an oil producing state like Nigeria, however, with the insurgency in the Niger-Delta, it was difficult for Nigeria to meet up with its export demand. This led to a decline in oil revenues consequently having severe effects on the economy. To deal with these issues, Former President Obasanjo at a Federal Executive Council sought advice from his ministers. At the end of this meeting, as described by one of the participants

“We came up with the idea of developing the biofuels sector as a solution to the problem. By investing in this sector, we aimed to manage the energy deficits, reduce fuel imports and domestic fossil fuel consumption in the transport sector, while freeing up crude oil for energy exports” By the end of this meeting, the development of biofuels had become the president’s personal project. (Extract from Interview)\(^{13}\)

Interestingly, this suggestion coincided in time with a growing environmental awareness of the effects of fossil fuels, giving rise to significant interests in biofuels. Furthermore, Nigeria’s investment in biofuels was pre-empted by its comparative advantage in the production of food, fibre and energy crops. Policy makers constructed expectations which suggested that government investment in biofuels would reduce net oil imports, stimulate rural employments, technological transfer while also creating domestic markets for agricultural farms. For actors in these sectors, the objective of creating a national economic value by substituting the importation of refined petroleum products with biofuels was of crucial concern. By strategically linking ecological discourses with those referring to economic development, these actors were able to position the biofuels on the policy agenda as a national priority. Nonetheless, food security experts in Nigeria remained sceptical, and expressed doubts on the choice of adopted feedstock (cassava, maize and sugarcane) particularly since these were traditional basic staples consumed by Nigerians (Agboola, Agboola, & Egelioglu, 2011). Although Nigeria is the world’s largest cassava producer, 80% of cassava is consumed domestically (Federal Ministry of Agriculture Nigeria, 2014). Also, there were fears that farmers who had traditionally grown cassava for consumption would divert their produce towards biofuels, hence leading to food shortages and hike in prices (Agboola et al., 2011). In the end, the attempted commercialisation of first generation feedstock exposed the biofuels sector to two main criticisms.

1) An underdeveloped agricultural sector. Prior to the discovery of oil in Nigeria, agriculture was the mainstay of the Nigerian economy. This industry was estimated to have provided 70% of national income in the early post-independence years. However, by the late 1960s, there was a decline in agricultural production. National efforts were redirected towards

\(^{13}\) Former Policymaker
crude oil exploration, leading to the redistribution of the economy to survive mainly on crude oil exports. In recent years, several policies have been implemented to revamp the agricultural sector including the creation of vision 20:202014 in 2008. In the last ten years, the agricultural sector is estimated to have contributed 70% of the new employment in Nigeria (World Bank, 2014). Nevertheless, the agricultural system in Nigeria still mainly consists of small-scale farmers practising rain-fed agriculture with little or no expertise with cutting-edge agricultural tools, storage facilities and fertilisers to increase their yields.

Despite Nigeria's significant crude oil reserves, small-scale farmers have been affected by high oil prices thus inhibiting the production and transportation of their products from the farm to markets. Big agricultural farms in the country are few and mostly owned by ex-military leaders or past politicians giving them a monopoly over the market and the reallocation of prices.15 Most small-scale farmers in Nigeria therefore, practice subsistence agriculture, which leaves only a small fraction of farm produce for market purposes (Akinsanmi & Doppler, 2005). Therefore, the creation of a biofuels industry based on an underdeveloped agricultural sector posed a policy problem.

II) Non-Affordability of food and poor access to food. As part of a broader response to questions on food security, food experts in Nigeria created scenarios showing that food scarcity was likely to arise due to the conversion of basic staples into biofuels feedstock. Available statistics indicate that over 40% of households in Nigeria are food insecure (Ike, 2012), while projections suggest that small-scale farmers would preferably sell their farm products to biofuel investors that offer a better price for the produce than local markets. While would boost household farm income, it would also increase the vulnerability of the agricultural sector to shocks, such as increases in domestic food prices and international biofuel prices. With a population of over 180 million people, of which 62.2% live below the poverty line, (BBC Africa, 2012; Country Meters, 2017) converting cassava from domestic consumption to energy purposes would considerably increase the likelihood of shortages (Sanusi, Badejo, & Yusuf, 2006). Currently, 45% of the population live with less than one dollar per day; conversion of food for energy purposes will increase poverty and hunger in the country.16 Rather than transforming the economy as projected, this would be a setback for the government in achieving a sustainable and resilient economy. As a result of the above concerns, a more articulated approach that considered the risk of food security was adopted in addressing the biofuels sector.

14. A vision of the Nigerian government to be among the top twenty industrialised countries
16. Nigeria ranks 152 out of 186 countries in 2014's human development index
5.3.2 PROBLEM ARTICULATION AND SOLUTION STREAM: AGENDA SETTERS
KEEPING THE WINDOW OPEN

In response to academic and public concerns on food security, former President Obasanjo launched an inter-ministerial taskforce on biofuels involving seven key ministries; Agriculture, Petroleum, Power and Energy Resources, Environment, Finance, Industry and Commerce and Science and Technology. Two subgroups were formed; an experts group and a technical group, which together drew up a National Biofuel Policy in 2007 (NNPC, 2007). The policy identified first generation biofuel feedstock such as cassava, sugar, sorghum, maize, sugarcane and palm oil as materials needed for the development of the sector.

The policy described the industry as agro-allied (i.e. mainly agricultural, but supported by other sectors), conferred pioneer status to companies investing in the sector and exempted them from value added taxes and import duty taxes for a ten-year period. The policy included the creation of a biofuel energy commission to enable market entry by investors and provide regulatory services within the industry. Other elements of this policy include; a mandatory blend of twenty percent bio-diesel (E20) with fossil diesel and ten percent blend of ethanol with gasoline (E10); the creation of an out-growers company- (i.e. subsidiary companies that buy feedstock from small-scale farmers) that will pay farmers for their crops, and the provision of subsidies, licences and loan schemes to promote the investments in the biofuel industry (NNPC, 2007).

The Former President (Obasanjo) became the most significant biofuels policy entrepreneur. To articulate and realise his objective, he created a federal agency known as the Renewable Energy Division (RED) in 2005 within the Nigerian National Petroleum Corporation (NNPC). This agency was tasked with the identification of biofuel materials, the development of feasibility studies and the identification of seven sites for bio refineries within the country. In addition, the agency was charged with the task of developing technical expertise to support the emerging biofuel industry. To facilitate a quick implementation of the mandate, the Renewable Energy Division and the energy commission in 2007 decided to import both the E10 and E20 blend of gasoline and diesel while concurrently growing energy crops and to encourage other out-growers’ schemes. Furthermore, the RED collaborated with Brazil; – a leading country in the development of biofuels – by having Nigeria’s experts trained by the Brazilian national oil company PETROBRAS.17 Investment in biofuels production in Nigeria was achieved through a public-private partnership approach. Private institutions such as the Renewable Energy and Energy Efficiency Partnership (REEP) granted Nigeria (RED) €70,000 (seventy thousand Euros) as a contribution for feasibility studies on potential biofuels production sites.

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17. PETROBRÁS is the national oil company, which is responsible for the biofuels distribution and retail network, and as such is a major player in the Brazilian biofuel sector.
The policy, created an arena for coordinating common agendas, as new niche actors such as research institutes and universities (Osunmuyiwa & Kalfagianni, 2016) mostly excluded from the earlier phases of the policy development began to carry out research on biofuels while also mobilising support for the sector. Examples of such higher institutions include the International Institute for Tropical Agriculture (IITA) Ibadan, the University of Agriculture Makurdi and the University of Agriculture Abeokuta. By developing shared visions and coalitions, these scientific institutions were able to demonstrate the viability of the biofuels industry. Nonetheless, most of their work consisted of pilot-scale projects that were independent of governmental support. Most of these pilot initiatives were sponsored either by the research institutes/universities as trial research (e.g. trial production of biodiesel from palm kernel), (Alamu, Waheed, & Jekayinfa, 2008) or by international organisations. A typical example of such collaboration is the pilot scale Jatropha project conducted by the Centre for Energy Research and Development (CERD) financed by the World Bank. One of the experts interviewed on this project however concluded that although the project suffered a huge setback due to financial difficulties, it, however, led to the first scientific conference in Nigeria on the use of Jatropha as an alternative to food crops (Kano Biofuels Conference 2009). The aftermath of the Kano conference led to the initiation of three pilot scale projects on Jatropha in three states across Nigeria; namely Kano, Enugu, and Kwara (Extract from interview). Finally, domestic and expert concerns on food security led to a review of the biofuels business model by the RED. The new business model is designed to regulate cassava use for biofuels production and specifically, restricts non-out-growers from selling their farm products to the government. In sum, from 2005 to 2007, biofuels as a solution to Nigeria’s energy and fuel transport demand developed as a result of landscape pressures such as the decline in GDP growth, the reduction in oil exports due to insurgency and the need to ensure energy security by reducing petrol imports. With these landscape pressures emerging almost at the same time, political members of the regime became more willing to explore other alternatives like biofuels to deliver transformative transport services, while pursuing other sustainability and economic benefits. For the regime, the convergence of problem, policy and politics became a priority. Nonetheless, despite Obasanjo’s ambitious targets, the biofuels industry did not experience any significant growth. Successfully merging biofuels with existing problems like energy security and GDP growth became difficult. Moreover, by mid-2007 when the biofuels policy came into force, Obasanjo’s tenure had already come to an end.

18. Personal Interview (Oil and gas expert 1)
19. Personal interview with director for technology management (CERD)
20. Personal interview NNPC 2014
TABLE 5.2 Policy pathways in Nigeria’s Biofuels Sector Since 2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Policy Pathway</th>
<th>Policy Outcome/Effect</th>
</tr>
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<tbody>
<tr>
<td>2005</td>
<td>Government mandate on automotive biofuels</td>
<td>Creation of a renewable energy division within the Nigerian National Petroleum Corporation</td>
</tr>
<tr>
<td>2006</td>
<td>Policy mandate to increase gasoline and diesel blend with 10 percent ethanol and 20 percent bio-diesel (E10 and B20)</td>
<td>Increase in demand of 1.3 billion litres of ethanol and 480 million litres of bio-diesel</td>
</tr>
<tr>
<td>2007</td>
<td>Introduction of mandate as a national policy, with additional incentives such as pioneer status, import duty waivers and insurance</td>
<td>Seeding of market with importation of ethanol from Brazil until domestic production can cater for ethanol demand</td>
</tr>
<tr>
<td>2007</td>
<td>Regime change</td>
<td>Cancellation of ethanol importation</td>
</tr>
<tr>
<td>2010</td>
<td>Review of biofuels business model by the Renewable Energy Division</td>
<td>Sent to the Minister of Petroleum Resources (Alison Madueke) status of approval unknown</td>
</tr>
<tr>
<td>2011</td>
<td>Regime change</td>
<td>No political priority is given to biofuels and suspension of all previous Memorandum of Understandings</td>
</tr>
</tbody>
</table>

Source: NNPC [2014 Interview]

5.3.3 THE WINDOW CLOSES (2008-2016)

The global economic crash in 2008 quickly undermined global competitiveness of biofuels, investors began to pull out of operating countries as companies soon failed and were unable to obtain credit to get out of the crisis in a risk averse global economy (Romijn & Caniëls, 2011). In Nigeria with the entry in power of a new government, it became apparent to actors within the new sector that biofuels was not a political priority of the new government. Besides the general lack of interest displayed by the new government, the new biofuels sector lacked the needed institutional and agency support to trigger both structural and policy development hence resulting in the non-commercialisation of biofuels. Below, the study discusses observed institutional and agency challenges that facilitated the closure of the biofuels window of opportunity and the non-commercialisation of the sector.

5.3.3.1 INSTITUTIONAL CHALLENGES

By creating the biofuels mandate, the Nigerian Government was able to establish a framework for the commercialisation of the sector. Although this framework did establish regulatory standards by which production and consumption of biofuels could take place, it, however, failed to create the needed market structure to increase both domestic and international investment in the biofuels sector. Three institutional challenges were associated with the 2007 biofuels policy. I) institutional and inter-ministerial overlap in biofuels implementation. ii)
lack of parliamentary endorsement and legitimacy to promote investments in biofuels. iii) lack of a coordinated research strategy in the agro-allied industry.

I) Institutional overlap in the implementation of biofuel mandates: Under the mandate, the Ministry of Agriculture was tasked with the coordination of biofuels feedstock production while the Ministry of Petroleum Resources was tasked with the production of bio-ethanol and biodiesel. Based on the policy, biofuels was classified under the agro-allied industry. However, despite what seemed like a division of roles and portfolio, the Ministry of Agriculture in the last decade has been inactive while the Ministry of Petroleum Resources has been solely responsible for the “development” and “commercialisation” or in this case non-commercialisation of biofuels. The lack of emphasis on the distinctive role each ministry should play, somehow legitimised one’s claim of jurisdiction over the other. Particularly with each Ministry claiming jurisdictional hold to the development of biofuels little or no resources have been assigned towards the production of biofuels. Outside the dispute on production, there has been no attempt at creating a regulatory body to oversee activities within the biofuels sector.

According to the biofuels policy, a biofuels commission was to be established to regulate and coordinate biofuels company registration, biofuels research, fiscal and equity issues, industrial stabilisation mechanisms, monitor biofuels supply and review and adjust biofuels blending mandate. However, since 2008, the Energy Commission of Nigeria (ECN) the NNPC, both the Ministry of Agriculture and Ministry of Power have argued that the Biofuels commission is meant to be a sub-agency under their control. In the end, no commission was created, as there was no proper coordination and agreement between these different Ministries.

II) Lack of an enabling law and legitimacy to promote investments in biofuels: Although the 2007 policy on biofuels was officially gazetted in Nigeria, however, it was never passed as a law neither did it receive a legislative approval. The absence of legislative approval however raised issues of legitimacy, as most investors were unsure of the continuity of this policy. The lack of faith by potential investors can be traced to Nigeria’s past antecedents with stop and go policies. Also, Nigeria ranks 138th out of 185 in world business climate, as a result, the political instability associated with Nigeria’s investment climate led to a decline in the implementation of promised investments. Although most private investors were risk averse, yet some were still committed towards the development of the biofuels sector.

21. Personal Interview, NNPC taking ownership of the plantation phase of the biofuels while the ministry of agriculture takes a backseat in decision making and implementation.
22. Personal Interview (oil and gas expert 2)
23. Personal Interview (oil and gas expert 3)
24. World business climate ranking according to the world bank 2014
A review of different databases and website revealed that several investment commitments culminating in a total of USD 12.3 billion were made over the past decade in the biofuels sector (see table 5.3). However, none of the proposed projects was implemented partly because of NNPC’s inability to reach a concrete agreement (sign an MOU) with potential investors.25 In addition, the private sector was and is still scarcely involved in the biofuels sector as the government largely takes responsibility for biofuels production. The dominant role of the government limited private sector involvement thus reducing local investment in this sector.

Another observed bottleneck was the excessive regulatory powers granted to the Minister of Petroleum Resources and the NNPC under Section 9 of the Petroleum Act with regards to the development of new energy sources such as biofuels (Abila, 2012; Edomah et al., 2016). With these unencumbered powers, the Minister of Petroleum Resources has the sole decision-making power on whether or not to promote the development of the biofuels sector. The decisions by the Ministry of Petroleum Resources on biofuels development therefore go unchallenged. This explains the ministry’s nonchalant stance towards the implementation and execution of a single project since 200726.

III) Lack of a Coordinated Research Strategy in the Agro-allied Industry: The biofuels mandate clearly creates an opportunity for the growth of the agro-allied industry through its intended use of agricultural feedstock. However, the agricultural industry in Nigeria has been faced with numerous challenges already discussed above (see section 5.3.1). Thus, the focus of this section is on agricultural and biofuels research respectively. It is widely accepted by scholars (Bastos Lima, 2012; Li et al., 2014) that substantial government support through designed research funding platforms is required to encourage the development of biofuels.

However, in Nigeria, the lack of funding for research, niche innovations as well as capacity building resulted in the meagre progress observed in the biofuels sector. Under the Federal Ministry of Agriculture, the Department of Agricultural Services is the overall body in charge of agricultural research in Nigeria. The department oversees the disbursement of research funds to over 15 agricultural research institutes in Nigeria while also ensuring the development of cutting-edge technologies by these institutes for farm use (Cervigni et al., 2013). Currently, agricultural research funding in Nigeria is estimated to account for 0.8% of the GDP (Enete & Amusa, 2012), which is significantly less than other countries in Africa (Kenya, Ghana).

25. Personal Interview (government official 1)
26. Personal Interview (Government official 2)
This is not directly surprising as the R&D funding of the Department of Agricultural Services severely declined since the initial drop in oil prices in the 1980s (IFPRI, 2010). While the biofuels policy stipulates that a research agency on biofuels be established by the Ministry of Agriculture, to date no such agency has been established. The only active institute working on biofuels research are non-biofuels specific institutions such as the Institutes for Tropical and Agricultural Research (IITA) and other Agricultural-based universities (Ogaboh, M.E, Abam, Agba, & Okoro, 2010). Although the IITA and other universities specialised in agricultural research and teaching have conducted research on biofuels, the NNPC has mostly carried out its own independent research on the development of biofuels. Lastly, Nigeria lacks a clearly defined national strategy to promote the development of agricultural technology. This has a clear impact on the biofuels industry, as there is no nationally coordinated research agenda to develop the sector.

5.3.3.2 AGENCY CHALLENGES

Two main agents have been driving the “development” of biofuels in Nigeria. I) the federal government and II) the group of scientific niche actors (academic organisations and associations), which possesses scientific vision, technological knowledge and discursive power in biofuels agenda setting. Despite the presence of the identified agents in the formation of biofuels rules in Nigeria, there has been little or no development in this sector. In the following section, the study will trace the reasons for the poor development of the biofuels sector to challenges in the energy regime. These challenges are I) regime change and lack of political commitment from each successive government; ii) the unresolved role of the NNPC in the business model.

I) Regime Change: Historical progression of biofuels development shows that regime change and lack of continuity in policy greatly hindered the production of biofuels and implementation of a biofuels policy in Nigeria. It took each successive government after the Obasanjo administration, years to undertake concrete steps towards the implementation of the program27 which therefore failed to gain a priority position on the political agenda (Abila, 2012). With regime change, priorities of each succeeding government changed and shifted towards the regulation of the oil sector (introduction of the petroleum industrial bill) and the expansion of oil and gas facilities. At this period (2008-2015), the government introduced and maintained an amnesty programme as a peace building mechanism, between Nigeria and armed militants in the Niger-Delta region agitating for better economic and environmental conditions. The amnesty program was designed to educate, empower and promote economic activities in the Niger/Delta region in exchange for peace. The implementation of the program ended the destruction of oil facilities by militants.

27. Personal Interview (policy maker 1)
and ensured an end to the abduction of oil workers in the region. As a result, crude oil production increased as the NNPC redirected its efforts towards oil exploration and argued that it does not have enough financial resources to implement a purely federal biofuels policy.28

Obviously, more damaging to the biofuels sector was the lack of funding or budgetary allocation by Obasanjo’s successors towards the development of the sector. An analysis of the federal government’s budget in the last ten years revealed that little or nothing was allocated to the development of the seven sites earmarked for biofuels processing since 2009. Outside the feasibility studies carried out, no commercial biofuel production has taken place under the aegis of the NNPC. The disposition of the past two administrations (2007-2015) towards the program significantly affected a number of international investments in biofuels, as most investors had little or no reassuring commitment from these past administrations.29 Consequently, previous Memorandums of Understanding (MOUs) signed by PETROBRAS and other international biofuels companies were abandoned as the successive Nigerian governments showed little or no interest in the development of biofuels30. Finally, the resurgence in oil prices in 2011 led to a shift in government policy as more resources were diverted towards the discovery of new crude oil sites and other petroleum activities. By 2013, the Minister of Petroleum Resources “argued that the country should focus more on its strengths (oil and gas exploration) than new areas (biofuels)”.31 This led to a more coordinated focus of the ministry on gas exploration.

II) The unresolved role of the NNPC: Right from the introduction of the biofuels policy, there had been internal squabbles within the NNPC on how to differentiate the role of the RED and the NNPC within the policy framework. The inconclusive role of the RED/NNPC (the implementation body) within the biofuels framework created an internal setback for proposed projects. Internally and among decision makers within the RED/NNPC, specific questions posed were “whether the NNPC should be involved in the agricultural aspect (upstream) of biofuels production as it was established solely for crude oil exploration and production. Some actors argued for the sole downstream involvement of the NNPC in the biofuels industry, i.e. majorly concentrating on the distillation and processing aspects of biofuels”32. These internal evaluations within the NNPC also created a debate on the need to re-examine the previously proposed business model developed to facilitate the implementation of the biofuels program.

28. Personal Interview (policy maker 2)
29. Personal Interview, Nigeria ranks 138 out of 185 in world business climate
30. Personal Interview (policy maker 2)
31. Personal Interview (Government official 1)
32. Personal Interview (Policymaker 3)
TABLE 5.3 List of proposed biofuels investment in Nigeria yet to take-off

<table>
<thead>
<tr>
<th>Year</th>
<th>Biofuels project</th>
<th>Country / company</th>
<th>Amount</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>Tolao Energy and Canada’s Aura Bio signed a Letter of Intent for a project in the</td>
<td>N/A USD20.2 Million</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>Cross-River State to use up to 7500 acres (3,000 hectares) to cultivate Jatropha</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>for biofuel production.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Nosak Distilleries Ltd planned to raise production capacity at its Lagos facility</td>
<td>N/A N/A</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>to 540,000 litres per day from its current 350,000 litres per day.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Global Biofuels announced plans for ethanol plants</td>
<td>COZA of Hong Kong and WEMET of China.</td>
<td>USD183 million</td>
<td>Biofuel digest</td>
</tr>
<tr>
<td>2011</td>
<td>Construction of three sugarcane plantations and ethanol plants</td>
<td>Ondo</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td>2011</td>
<td>Construction of fertiliser and ethanol plant by Indorama Eleme Petrochemical</td>
<td>Dangote Group USD9.7 billion</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>Company.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Nigerian government signed a development deal with Global Biofuels, to construct</td>
<td>N/A USD68 million</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>15 integrated bio-refineries.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>Kogi state government planned to develop a Jatropha-based biodiesel plant with</td>
<td>Global Green Field Development Group</td>
<td>N/A</td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>the Global Green Field Development Group.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>China New Energy signed an MOU with Sunbird energy to immediately begin designing</td>
<td>China/Sunbird energy USD24 million</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>a 100,000 tonne per year cassava-based ethanol plant.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>Allied Atlantic Distillers Limited commissioned the first cassava-based biofuel</td>
<td>N/A N/A</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>plant in Ogun state.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>Completed B-60 Biodiesel plant sale to Avandith Energy in Lagos, Nigeria</td>
<td>Florida Biodiesel, Inc. N/A</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td>2014</td>
<td>Ethanol from cassava in the Ikpoba Okha area of Edo state that could potentially</td>
<td>N/A N/A</td>
<td></td>
<td>Biofuel digest</td>
</tr>
<tr>
<td></td>
<td>be available by 2016.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s compilation

Fossil fuel advocates within the NNPC argued that “there was no strategic financial advantage in the production of ethanol in a business manner (free market i.e. no subsidies) when it will eventually be blended with a subsidised product (petroleum)”. Questions emerged as to why the organisation should invest in a business, which looks okay within a seven-year payback when it would eventually be sold with a subsidised product. To buttress their stance, fossil fuel advocates argued: “the NNPC’s core business was oil and gas and it

33. Personal Interview (Government official 3)
thus has no business in the upstream production of biofuels i.e. the agricultural aspects of biofuels”. This argument prompted a review of the initial integrated business model by the Renewable Energy Division to a non-integrated model. The non-integrated business model excludes or minimises NNPC’s involvement in upstream (agricultural-side) production and only permits it to operate in the downstream (biofuels refining). The non-integrated model, however, had its pitfalls, i.e. it exposed the biofuels program to little or no guarantee of feedstock for fuel processing.34

In sum, the period between 2008-2016 showed how scientific niche actors and private sector groups have attempted to bring biofuels back on the agenda either through pilot scale initiatives, and discursive measures (conferences). Still, these actors were unable to successfully engineer a favourable policy change due to institutional challenges within the biofuels sector, the absence of a tenacious policy entrepreneur, and the lack of a receptive political environment. Unlike 2005 to 2007 where Nigeria experienced intense economic and energy security pressure, the post 2009 era was stable. Consequently, the resurgence in oil prices in 2011, stability in the previously insurgency affected oil producing region and a diversion of attention to the petroleum sector (government’s campaign for the enactment of the Petroleum Industrial Bill) ultimately shut the window for biofuels in Nigeria.

<table>
<thead>
<tr>
<th>Landscapes/ window opens</th>
<th>Policy entrepreneurs/ regime actors</th>
<th>Problem Identification</th>
<th>Problem Articulation (Introduction of Niches, venue shopping)</th>
<th>Window Closes (regime capacity to shut)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduction in GDP growth, reduction in oil production due to insurgency/ Increase in oil Imports</td>
<td>The president and the ministers</td>
<td>Stirring interests at the national executive council/ cabinet meeting</td>
<td>Proposal of biofuels as an alternative. The initial rejection of biofuels by food experts. Re-articulation of the proposal to address food security issues. Collaboration with foreign experts (PETROBRAS). Creation of overseeing agency (Renewable Energy Division)</td>
<td>The increase in crude oil prices. Change in government. Institutional overlap. Lack of an enabling law to legitimate biofuels. Lack of a coordinated research strategy to drive the agro-allied industry. the inconclusive role of the NNPC in the implementation process.</td>
</tr>
</tbody>
</table>

34. Personal Interview (oil and gas expert 4)
5.4 CONCLUSION

Transitions towards renewable energy adoption are a fundamental requirement for sustainable societies. By and large, this also requires an understanding of the political, social, and environmental complexities surrounding the deployment of such technologies because efforts to overturn incumbents might just reproduce the regime in another form. Sustainability transitions scholars have argued for a more nuanced analysis, which pays attention to the political and policy processes underlying the emergence of such solutions. By combining the MLP with the agenda-setting model, this chapter has shown how landscape pressures infiltrate the regime to create an arena for policy making. As demonstrated in the study, factors such as timing and nature of pressure played a dominant role in the regimes’ reaction to landscape pressures. The fact that a hike in international fuel prices, a downturn in GDP growth, and the problem of insurgency all disruptively occurred at the same time forcibly opened up the regime for interactions. The agenda-setting model explains how the regime responded to this pressure.

First, the study recognised the emergence of a policy entrepreneur (former President Obasanjo), the use of cognitive shifts (ideas) to trigger the adoption of biofuels as a policy solution and the organisation of actors to “ride on the coat-tails” of such windows of opportunities. Second, the study provides insights on how niche actors like the research institutes and agricultural universities in Nigeria reacted to this window of opportunity by seeking transnational collaboration with organisations like the World Bank and the European Union in the development of biofuel prototypes.

Nonetheless, these actors were unable to subvert the regime as niche innovations were not mature enough (prototype stage) and the prime mover had disappeared from the policy-making scene. Third, although biofuels development was initially not well attached to the problems as seen when issues of food security and agricultural development emerged, actors interested in the development of biofuels were able to re-calibrate the solutions (biofuels policy and business plans) to include possible societal concerns. This way, they ensured that this window of opportunity remained open.

Finally, an evaluation of the politics stream suggests that, although Nigeria seemed aggressive in its initial drive towards the development of a green economy, as manifested by its ambitious biofuel targets and mandates, structural challenges in and outside the biofuels policy created certain institutional and agency drawbacks. Biofuels as a policy solution was not well nurtured, resulting in the closure of the window of opportunity. Ultimately, the resurgence in international fuel prices in 2011 redirected the efforts of the government and other stakeholders away from biofuels. Based on the above, for biofuels
to feature prominently as a post-oil transition policy on the political agenda in Nigeria, it must emerge as a well-articulated and clear policy solution that is concretely pushed as a national strategy by the government. In conclusion, the agenda-setting model complements the socio-technical analysis of energy transitions, as it provides insights on how solutions to structural problems are framed by policy actors and how regime resistance to such solutions occurs in the policy making sphere.