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Local Content Requirements and the Manufacture of Solar Photovoltaic Components in South Africa

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Research Report submitted to the faculty of Commerce, Law and Management, University of Witwatersrand, in 50% fulfilment of the requirements for the degree of Master of Management in the field of Public and Development Management.

March 2018

Declaration

This report is submitted in partial fulfilment of the requirements for the degree of Master of Management (Public and Development Management) from the University of Witwatersrand, Johannesburg. I declare this is my own unaided work and that it has not been submitted for any degree at any other university.

Signed: _____

At: _Johannesburg_____

Date: _23 March 2017__

Abstract

The outputs in this report are based on the experiences, beliefs and perceptions of a cross-section of Solar Photovoltaic industry stakeholders on whether Local Content Requirements is an appropriate policy instrument for building a local industry and the extent to which the Local Content Requirements of the Renewable Energy Independent Power Producer Procurement Programme have led to an increase in the South African solar component manufacturing capacity since the programme's inception in November 2011. Protectionist policies, including Local Content Requirements, were used by now industrialised countries to develop their respective countries, and continue to be used to this day despite World Trade Organisation prohibitions. Four models on building local industries are discussed and their relationship to the two research questions explored. Interview participants agreed that the Renewable Energy Independent Power Producer Procurement Programme was instrumental in building a large-scale local renewable energy industry in the country, created jobs and excitement around manufacturing capacity potential. However, many believe that programme design and implementation interventions are required to improve the programme's localisation impacts. The latest draft Integrated Resource Plan's sizeable allocation for Solar Photovoltaic until 2030 presents an opportunity to drastically improve localisation benefits for the country.

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To my parents, I truly am, because you were. Your light continues to guide my path.

To my wife and daughter, you truly light my candle.

To the research participants, thank you for giving me your most valuable asset – your time. Your perspectives, insights and views are deeply appreciated.

To my many unseen cheerleaders, thank you for keeping me sane, focused and making this possible.

Love, life and light to you all. Keep shining!

Dedication

This report is dedicated to Nomsisi…

Acronyms and Abbreviations

BBBEE	Broad Based Black Economic Empowerment
CAPM	Capital Asset Pricing Model
CFO	Chief Financial Officer
CSP	Concentrated Solar Power
DOE	Department of Energy
DTI	Department of Trade and Industry
ED	Economic Development
FDI	Foreign Direct Investment
GATT	General Agreement on Tariffs and Trade
IA	Implementation Agreement
IPAP	Industrial Policy Action Plan
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer
IRP	Integrated Resource Plan
IRR	Internal Rate of Return
LCR	Local Content Requirements
NDP	National Development Plan

NGP	New Growth Path
OEM	Original Equipment Manufacturer
PPA	Power Purchase Agreement
PPPFA	Preferential Procurement Policy Framework Act
PV	Photovoltaic
REIPPP	Renewable Energy Independent Power Producer Procurement Programme
ROI	Return on Investment
SABS	South African Bureau of Standards
SAP	Structural Adjustment Programs
SATS	South African Technical Specification
Treasury	National Treasury
WACC	Weighted Average Cost of Capital
WTO	World Trade Organisation

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1 Introduction and Background

1.1 Introduction

Development Economist, Ha-Joon Chang (2002, 2007, 2010, 2014), discusses how the now industrialised countries used protectionist policies to protect infant industries and create sustainable local businesses, since before the industrial revolution in the 18th century. Protectionism is the practice of using macroeconomic instruments / barriers to restrict foreign participation in local economies by introducing tariffs, quotas and subsidies. The United Kingdom, the United States of America and most European countries used protectionist policies to industrialise their respective economies. King Edward III in the early 1300's is said to have developed the local wool industry. In his 1791 report on the "*Subject of Manufactures"*, the first American Treasury Secretary, Alexander Hamilton, stated that '*industries in their infancy*' need to be protected from superior foreign competitors until they are strong enough to compete (Chang, 2007). Germany, France, Sweden, the Netherlands, Switzerland and Japan followed a similar industrialisation route (Chang, 2014).

Protectionist policies are often used as barriers to entry for foreign companies, and protect infant industries until they are strong enough to withstand foreign competitors (Chang, 2014). The World Trade Organisation (WTO) prohibits its members from using Local Content Requirements. However, member countries sometimes disguise the use of protectionist policies through employing anti-dumping laws, rules of origin and minimum local employment requirements to protect local industries (Belderbos, Jie-A-Joen & Sleugewagen, 2002; Johnson, 2013). It is important to note that although the World Trade Organisation was established in 1995, its predecessor, the General Agreement on Tariffs and Trade (GATT), was established shortly after World War II in 1947. Therefore, efforts to prevent the use of protectionist policies have been pursued since just after the Second World War.

Infrastructure development continues to be an instrumental catalyst for economic development in industrialised and developing countries alike (Darden, Shafik & Tedd, 2011; Johnson, 2013; Mhone, 2003). Countries implementing Renewable Energy technologies have often used Local Content Requirements as part of the public procurement processes (Johnson, 2013). Scholars writing on renewable energy have commented on the importance of creating enabling conditions, targeting specific industries, adopting progressive

localisation approaches and building local know-how (Johnson, 2013; Mhone, 2003; Porter, 1990). India's implementation of Local Content Requirements resulted in the creation of three large solar companies, namely, Indosolar, Mosar Baer and Tata BP Solar (Johnson, 2013). Through the creation of these companies, India aimed to create an integrated solar industry. Both China and India have set targets of installing 100GWs of solar capacity by 2020 and 2022 respectively in support of establishing local industries.

China is arguably the world's largest solar power producer, having established or dramatically expanded their solar module manufacturing capacity in the mid to late 2000's. This was facilitated, in part, by the accelerated Solar Photovoltaic (PV) uptake in Europe, particularly in Germany and Spain, which led to the growth of Chinese manufacturers such as BYD, Trina Solar, Yingli Solar and Jinko Solar (Shen & Power, 2017)

This report provides a review of the literature focusing on the relationship between infrastructure development and how the REIPPP Programme aimed to use Local Content Requirements to facilitate the development of the South African Solar PV manufacturing industry. It discusses South African and international Local Content examples, followed by a discussion of four local industry development models. It then discusses the research methodology adopted by the report including the paradigm, research design, sampling approach as well as trustworthiness. The data collection and analysis process is discussed, and concludes with findings and recommendations.

1.2 Background

In 2010, the Department of Energy published the Integrated Resource Plan (IRP). The IRP is South Africa's 20-year energy plan which aims to create a diversified energy mix by introducing sustainable energy sources to the electricity grid, including Renewable Energy. The IRP signalled a significant change in the supply of diversified energy in South Africa's electricity grid (Department of Energy, 2010). In line with the Electricity Regulation Act of 2006 and the provisions of the IRP, from 2011, the Minister of Energy issued a few Ministerial Determinations which created an enabling environment for Independent Power Producers (IPP) to develop Renewable Energy projects under the Department's Renewable Energy Independent Power Producers Procurement (REIPPP) Programme.

Infrastructure development programmes provide an opportunity for the development of local manufacturing capability, particularly in developing countries. Local Content has previously been used to successfully build local industries in South Africa, such as the telecommunications industry (Kaplan, 1989) and the motor industry. Local Content Requirements were included in the REIPPP Programme for purposes of facilitating an increase in the local solar manufacturing industry. The programme specifically targets solar modules, inverters and metal structures. However, the REIPPP Programme, which provides an aggregate measurement for Local Content, does not provide clear definitions for 'suppliers' and 'manufacturers' and does not specify a progressive approach to building a local manufacturing industry except for a progressive increase in the Local Content percentage. It is unclear if there has been an increase in the South African solar manufacturing industry as a result of the REIPPP Programme.

1.2.1 Problem Statement

From 2011, the South African Government began the implementation of the REIPPP Programme. The REIPPP Programme was to contribute towards the development of a local manufacturing industry, in terms of the industrial development plan of the country as stated in the Industrial Policy Action Plan, New Growth Path and National Development Plan.

A key feature of REIPPP Programme is Local Content, with percentage increases for each round of bid submissions. The World Trade Organisation defines Local Content Requirements as conditions requiring foreign investors to purchase certain inputs from local suppliers in order to produce the final product (Belderbos, *et al.*, 2002). Local Content definitions range from making use of local suppliers a condition of the public procurement process; to partial local business ownership of the project; to short-, medium- and long-term benefits such as job creation and building local manufacturing capacity (Johnson, 2013; Kaplan, 1989; Lewis & Wiser, 2005; Mhone, 2003; Moldvay, Hamann & Fay, 2013). The REIPPP Local Content definition has all the elements listed above.

The problem with Local Content in the REIPPP Programme is that it does not specify how the implementation of Local Content Requirements will lead to an increase of local solar manufacturing as a result of the programme. Although the Local Content Requirements for Solar PV specifies Government's objective of increasing local manufacturing for solar modules, inverters and metal structures; the current measurement is based on a percentage

commitment across all goods and services making up the Solar PV plant. The goods and services of a Solar PV plant include Key Components, such as solar modules, inverters, metal structures, transformers, trackers and Balance of Plant, such as civil and electrical works. The broad and aggregate measurement approach presents a challenge for monitoring the increase in manufacturing capacity for the three targeted components; solar modules, inverters and metal structures; as a result of the REIPPP Programme (DoE, 2015).

1.2.2 Purpose Statement

The research had a two-fold purpose of programme design and programme implementation. The first objective was to research whether Local Content Requirements in the REIPPP Programme was an appropriate policy instrument to facilitate the development of local industry. Local Content Requirements have previously been implemented with good results in South Africa, for example, the motor industry. The research tried to answer the question: was the use of Local Content Requirements an appropriate policy instrument for the REIPPP Programme?

The second objective was to investigate whether the REIPPP Programme's Local Content Requirements have led to an increase in the local solar manufacturing capacity as a result of the REIPPP Programme. The Government wanted to create a local industry for the three targeted components of solar modules, inverters and metal structures. Local Content Requirements were included in the REIPPP Programme with the view of leveraging the programme to increase the local solar manufacturing capacity.

1.2.3 Research Question

Research Question 1 (Programme Design): Is Local Content an appropriate policy instrument to facilitate the building of a local solar manufacturing industry?

Research Question 2 (Programme Implementation): Has the Renewable Energy Independent Power Producers Procurement Programme's Local Content Requirements led to an increase in the manufacturing capacity of Solar Photovoltaic components?

2 Literature Review

2.1 Introduction

This chapter provides a review of the literature related to how infrastructure development programmes have been leveraged for local industry development through the implementation of protectionist policies such as Local Content Requirements. Although renewable energy technologies have been developed over the past century, they have gained popularity on a utility scale more recently. The review is not comprehensive however, it adds to the growing body of knowledge on the impact of renewable energy technology implementation on local economies.

The Wits databases, Google Scholar, books on economics and some grey literature were used in this review. Most of the reviewed literature was written after the year 2000, with renewable energy specific literature having been written more recently. Although preference would have been given to renewable energy literature from the African continent, the shortage of such literature necessitated a broader search. Search strings included local industry development, models for local industry development, infant industry protection, local content, infrastructure development, renewable energy, Solar Photovoltaics and Africa.

Infrastructure development has previously been used as an instrumental catalyst for industrialisation. In discussing the history of industrialisation, one of the themes that emerge is how protectionist policies were adopted and promoted to accelerate local economic growth. The literature shows that local industries were developed by their Governments and deliberately protected from foreign competition. Only after the local industry was adequately developed, were external competitors allowed to enter local markets. At times, national Governments provided subsidies to local industries and supported their export initiatives (Chang, 2002; Chang, 2007). After achieving their economic development goals, developed countries have argued for a minimalist role of the state – largely informed by the neoclassical school of economics - and against the adoption of protectionist policies, claiming that such policies are detrimental to economic growth because they are inefficient in allocating resources (Johnson, 2013; Ma, 2010).

Scholars writing on renewable energy have commented on the importance of creating enabling conditions, adopting progressive localisation approaches and building local know-

how (Johnson, 2013; Mhone, 2003). Innovation emerges as a key theme in literature discussing sustainable local industry creation where local industry development leads to local economic growth (Johnson, 2013; Kuntze & Moerenhout, 2012; Lewis & Wiser, 2005; Porter, 1990). Porter (1990) provides a recipe for developing competitive national industries, Mhone (2003) discusses the importance of building technological capacity from firm to national level, Kuntze and Moerenhout (2012) explain four key enabling conditions for developing a local renewable energy manufacturing industry, while Lewis and Wiser (2005) offer a three-phased local manufacturing capacity building model, albeit based on the wind industry. This report considers the importance of creating technology knowledge in order to develop a solar manufacturing industry as a result of the REIPPP Programme (DoE, 2015a).

This chapter begins by looking at the history of using protectionist policies to develop local industries by advocates of free trade. It then discusses the importance of infrastructure development as a catalyst for economic growth. In particular, it discusses how renewable energy and solar power have formed an integral part of the climate change and green economy agenda in recent years. It then debates the use of Local Content Requirements by industrialised and developing countries despite the World Trade Organisation position on the matter, followed by an overview of the four models on the conditions and approaches conducive for building a local solar manufacturing industry and concludes with key findings.

2.2 A Brief History of Protectionism and Trade

The universally accepted free trade argument is based on the economic view that industrialised countries, such as Great Britain and the United States of America, developed their economies by adopting free market policies such as free trade. David Ricardo's theory of *Comparative Advantage* is often used as the basis for free trade, by its advocates. Ricardo theorised that countries should focus only on producing goods and services that come at a lower comparative cost relative to other counties and that the nett effect is for the greater collective good where everybody wins. Then again, Ricardo also believed that society is best served if "the greatest share of national income go to the capitalist class" (Chang, 2014 p. 117). To be fair, he lived in the 18th century and the world has changed significantly since then.

While the theory of *Comparative Advantage* theoretically makes sense, in reality there are winners and losers. Winners tend to be industrialised countries while losers tend to be developing countries mainly because industrialised countries started the economic

development race first and after achieving the requisite economic development levels, "*kicked away the ladder"* (Chang, 2002; Ma, 2010; Menson, 2012).

The arguments against protectionism are informed by the view that the state must have a minimalist role in the economy. Local Content Requirements are seen as trade barriers which artificially interfere with market forces in price determination and thus inefficiently allocates resources. In addition, protectionism results in the oversupply of some goods, the implementation of ill-conceived Government-driven policies and thwarts innovation, detractors argue (Chang, 2002; Chang, 2007; Chang, 2014). In her book entitled *The Entrepreneurial State,* Mariana Mazzucato (2011) presents evidence of how the state crowds-in the private sector by leading innovation through funding research and development and prototypes, after which the private sector players develop and grow the market. The issue is thus not state involvement, but rather the extent of state involvement in the economy. Despite this argument, history shows that this is not the economic development route followed by industrialised countries.

The United Kingdom, the United States of America and most European countries used protectionist policies to industrialise their respective economies. King Edward III in the early 1300's is said to have developed the local wool industry and only wore English cloth. However, it was not until the early 1700's that the first British Prime Minister, Robert Walpole, introduced protectionist laws to promote the development of the local wool manufacturing industry (Chang, 2007; Chang, 2014; Johnson, 2013). Americans followed towards the end of the 1700's, spearheaded by the then treasury secretary, Alexander Hamilton, who argued for a dirigiste state, much like Mhone (2003) in the 21st Century.

Americans developed local industries through inhibiting imports from relatively industrially advanced countries such as the United Kingdom. After introducing protectionist policies, America started her industrialisation efforts in earnest from the early 1800's (Chang, 2007; Chang, 2014; Johnson, 2013). The United Kingdom and the United States of America kept their protectionist policies for at least 100 years after first establishing them. Germany, France, Sweden, the Netherlands, Switzerland and Japan followed a similar route to industrialisation. Chang (2002; 2007) makes the point that industrialised countries acted as "*bad Samaritans*" by "*kicking away the ladder*" after their industries were well established, thus making it difficult for developing countries to climb the economic development ladder.

2.3 Infrastructure Development and Renewable Energy

Many scholars agree that infrastructure development plays an important economic role. Scholars have drawn positive relationships between infrastructure development and; improved national competitiveness, technological capacity enhancement, industrial development, economic development, Foreign Direct Investment (FDI) and trade. (Arthurs & Arthur, 2013; Darden, Shafik & Tedd, 2011; Johnson, 2013; Mhone, 2003; Porter, 1990; Smit & Musango, 2014).

Scholars agree that African countries have an urgent need for building sustainable and resilient economies to be able to withstand economic shocks. Most African countries rely on natural resources for economic growth, to the extent that some scholars have coined the phrase '*resource curse*' with reference to countries who end up in economic ruin following the commercialisation of discovered natural resources such as gold, copper, oil and gas (Arthur & Arthur, 2013; McSherry, 2006). Others have written on how to overcome challenges associated with the '*resource curse*' (Stiglitz, 2007). More recently, Equatorial Guinea has become a good example of economic growth with no economic development, such as human or physical development. McSherry (2006) argues that if structural economic fundamentals are not addressed in '*resource cursed'* countries, this may lead to instability and underdevelopment in the future. Commodity dependent economies are susceptible to economic shocks as a result of commodity price fluctuations (Grobbelaar, S. Gauche, P. & Brent, 2014; Mullings & Mahabir, 2016).

Mhone (2003) drew a distinction between economic growth and economic development where the latter, in addition to economic gains, results in human and physical development. He used Botswana as an example of a country which achieved economic growth without human and physical development. In contrast, other scholars argue that Botswana, South Africa and Mauritius are more economically resilient because they have diversified their economies and built local manufacturing sectors for local and export markets (Menson, 2012).

Lubbe and Brent (2009) distinguished between external and internal technologies in developing an international technology transfer strategy for foreign markets, where external technology is freely available and thus easily copied, and internal technology is intellectual property which gives the company a competitive advantage. They agree that understanding factors that lead to success in local markets are important for international competitiveness.

In the case of technology transfer, scholars propose a three-step process in addition to determining local industry success factors. The first is technology assessment which involves an assessment and evaluation of existing technology against a pre-determined technology rating model, followed by a market assessment based on the performance of a company against a pre-determined market rating model and finally, formulating a technology transfer strategy, provided that the first two steps are successful (Lubbe & Brent, 2009; Williams, 2012).

As helpful as infrastructure development is for economic development, it is not without challenges. Most infrastructure challenges on the African continent are centred on Transportation, Telecommunications and Energy (Manson, 2012; Williams, 2012). Transportation challenges, particularly in landlocked African countries, impact on competitiveness as they increase transportation costs and lengthen delivery times. An easier solution may be maintaining transportation infrastructure which comes at a fraction of the cost of building or rebuilding it. One study shows that preventative maintenance is 25% of the cost of rehabilitation (Darden, *et al*., 2011).

Telecommunications challenges abound, predominantly in rural areas, because private sector companies are not willing to invest in enabling infrastructure as the setup costs generally outweigh short term financial benefit (Lubbe & Brent, 2009; Mazzucato, 2011; Williams, 2012). Recent studies show that there is a direct correlation between telecommunications development and increases in GDP per capita (Chavula, 2013; Batuo, 2015). As a result, some scholars have designed innovative solutions to overcome rural access challenges, including the use of more cost effective Wi-Fi solutions instead of cable technology (Lubbe & Brent, 2009).

Scholars have written extensively about the link between access to electricity and economic growth, even providing the direct impact on GDP (Darden, *et al.*, 2011; Mullings & Mahabir, 2016). More recently some have written about the impact of unreliable electricity supply on the South African economy (Darden, *et al.*, 2011; Nhamo & Mukonza, 2016). Indeed, many agree that the increased uptake of renewable energy technologies in South Africa since 2011 is a direct result of electricity supply challenges which started in 2008.

On the one hand, a 2011 study on the Foreign Direct Investment to GDP ratio of 1% in Africa shows that it resulted in an increase in GDP per capita of 0.6%. On the other hand, the same study shows that an Aid to GDP ratio of 1% ratio resulted in a decrease in GDP per capita of

between 0.2% and 0.3% (Darden, *et al.*, 2011). The ravages of Foreign Aid are well documented on the African continent (Moyo, 2009). In addition, studies show that investment in enabling infrastructure precedes Foreign Direct Investment. Capital markets, Foreign Direct Investment, savings and remittances are recommended as sources of funding economic growth, including infrastructure development (Moyo, 2009; Mullings & Mahabir, 2016).

A 2016 study by Mullings and Mahabir (2016) based on data between 1990 and 2009 on the role of trade on the African continent with the three large trading partners namely: China, the United States of America and the European Union; found that different trading partners had different impacts on economic growth prospects of African countries. The study found that trade with China resulted in economic growth, trade with the United States of America had a neutral effect, while trade with the European Union had a negative growth impact. The authors were quick to state that the reason could be the extractive nature of agreements between African and European countries i.e. agreements based on the extraction of natural resources without concomitant development in African countries. Another reason may be the negative impact of Foreign Aid on economic growth (Moyo, 2009). It is therefore important to understand the value proposition, the impact on local economies and the nature of the relationship between parties involved (Stiglitz, 2007).

2.4 The Green Economy and Local Content

This section discusses the genesis of the green economy, Local Content Requirements, the World Trade Organisation's stance on the use of protectionist policies, infrastructure finance challenges and provides international as well as South African Local Content examples.

2.4.1 The Green Economy

The publication of evidence of anthropogenic climate change by the Intergovernmental Panel on Climate Change (IPCC) in their Fourth Assessment Report in 2007 has increased attention on the need for greener methods of achieving economic growth. The report shows a strong correlation between human activity and the increase in climate change inducing greenhouse gas emissions such as carbon dioxide and methane (IPCC, 2007). In 2007, the IPCC and Former United States of America Vice President, Al Gore, were awarded the Nobel Peace Prize for their efforts on climate change.

The need for economic development using cleaner technologies has created an opportunity for the development of the green economy. As the world transitions to a low carbon economy, advocates of the green economy see an opportunity for job creation (green jobs) in the short term, and sustainable local industry development in the long term (Aroun, 2012; Johnson, 2013; Smit & Musango, 2014). Some argue for a stronger link between the green economy and the informal sector, while others are interested in job creation as a result of the green economy (Aroun, 2012; Smit & Musango, 2014).

In South Africa, policy instruments such as the Industrial Policy Action Plan (IPAP), the Green Economy Accord and initiatives like the One Million Climate Jobs have provided specific job targets to be created from the green economy and promised that these initiatives would be used to reduce poverty, unemployment and inequality (Aroun, 2012; Moldvay, Hamann & Fay, 2013). A causal relationship between jobs creation and the green economy is difficult to establish in a dynamic and interconnected economy. In developing the green economy, it must be noted that South Africa faces stiff competition based on productivity and labour costs. China has relatively higher productivity levels and lower labour costs and has already developed a solar manufacturing industry, thus making it difficult for South Africa to compete on an equitable footing (Johnson, 2013; Smit & Musango, 2014).

2.4.2 What do Local Content Requirements look like?

Different scholars and writers provide different definitions on Local Content Requirements. Some definitions are focused on requiring procurement from local industries as a result of, or a condition of, a public procurement process or access to local markets (Arthurs & Arthur, 2013; Moldvay, *et al.*, 2013). Other definitions are focused on the outputs such as local capacity, capability and competence building (Kaplan, 1989; Moldvay, *et al.*, 2013). Yet other definitions are concerned with short-term benefits with tangible and measurable outcomes such as job creation, medium to long term benefits such as contributing to the national economy through tax collections and local procurement as well as longer term local industry creation (Arthur & Arthur, 2013, Johnson, 2013; Lewis & Wiser, 2005; Mhone, 2003). Others define Local Content in terms of ownership and/or business location i.e. locally based businesses irrespective of foreign ownership (Arthurs & Arthur, 2013; Moldvay, *et al.*, 2013).

The World Trade Organisation defines Local Content Requirements as conditions requiring investors to purchase certain inputs from local suppliers in order to produce final products.

The World Trade Organisation prohibits the use of Local Content Requirements because they are inefficient in allocating resources and creating welfare (Belderbos, Jie-A-Joen & Sleuwaegen, 2002).

The two main quantitative ways used to measure Local Content are percentages and/or monetary values of local goods and services procured or produced. Some have advocated for more qualitative indicators such as meaningful jobs, which may pose challenges of universal agreement on meaningfulness (Aroun, 2012; Smit & Musango, 2014). Trade barriers, subsidies or procurement eligibility requirements are used to facilitate the implementation of these requirements (Arthurs & Arthur, 2013; Moldvay, *et al.,* 2013). In South Africa, the Local Content definitions vary depending on procuring authorities. However, they tend to have features of; local goods and services, job creation, skills development, supplier development, local procurement, local ownership and proximity to site (Johnson, 2013; Kuntze & Moerenhout, 2012; Moldvay, *et al.*, 2013).

2.4.3 The South African Public Procurement Context

A brief background of the public procurement context is helpful in situating Local Content Requirements in South Africa. Section 217 of the Constitution provides five principles that guide public procurement. All organs of state are required to procure based on “a system which is fair, equitable, transparent, competitive and cost-effective”. However, it makes provision for “preference” and “advancement of persons, or categories of persons, disadvantaged by unfair discrimination” (Constitution, 1996, p. 112). To give expression to this provision, the Preferential Procurement Policy Framework Act (PPPFA) was promulgated in 2000. The Act and its Regulations make provision for organs of state to implement a procurement evaluation framework which gives some advantage to participants who make an effort to adhere to the Constitutional provision of the “advancement of persons…disadvantaged by unfair discrimination” (Constitution, 1996, p. 112; PPPFA, 2000).

The Act and its Regulations make provision for a 90/10 preferential procurement evaluation framework where the 90% weighting is Price and 10% is Broad-Based Black Economic Empowerment (BBBEE), for the procurement of goods and/or services for an estimated Rand value of R1 000 000 and above[1]. The 10% weighting for the BBBEE Level is informed

[1] Tenders valued below R1 000 000 are evaluated on an 80/20 weighting basis.

by five elements as a result of the company's performance against each of the BBBEE Elements detailed in Table 1 below. Importantly, a BBBEE certificate is not mandatory when responding to a public procurement tender, although it offers a 10% advantage. Price has the highest weighting (90%) and will therefore always trump BBBEE in the evaluation process.

Table 1: BBBEE Codes – Old and New (DTI, 2007 & 2013)

Seven Elements (Old Codes)	Points	Five Elements (New Codes)	Points
Ownership	20	**Ownership**	25
Management Control	10	**Management Control**	15
Employment Equity	15		
Skills Development	15	**Skills Development**	20
Preferential Procurement	20	**Enterprise and Supplier Development**	40
Enterprise Development	15		
Socio-Economic Development	5	**Socio-Economic Development**	5
TOTAL	**100**		**105**

The National Development Plan (NDP) is South Africa's long-term strategy which includes the country's vision for eliminating poverty and inequality through industrialisation, amongst other levers. The Department of Trade and Industry (DTI) is the custodian of the Industrial Policy Action Plan which articulates specific industrialisation programmes to be undertaken for purposes of industrialisation, economic growth and outlines localisation strategies as well as programmes. The New Growth Path (NGP) includes the Local Procurement Accord and the Green Economy Accord, both of which provide the backdrop for Local Content Requirements in the REIPPP Programme.

In an attempt to harmonise the various South African Local Content Requirement definitions, the Department of Trade and Industry through the South African Bureau of Standards (SABS) issued the South African Technical Specification (SATS) no. 1286 in 2011. According to the Specification, Local Content is the portion of the Tender Price procured by public institutions which excludes "Imported Content provided local manufacturing takes place". The specification defines Manufacture as "any kind of working or processing, including assembly or specific operations" (Department of Trade and Industry, 2011, p. 3).

The definition of Local Content in terms of the Price difference between Imported Content and Tender Price as well as a relatively vague definition of Manufacture, provides an unclear

framework for local manufacture as a key driver for industrialisation. It must be noted that the Specification was developed as a key instrument for the country's industrialisation programme and was a key output of the New Growth Path. Local Content is largely premised on principles of local industry protection and promotion leading to local economic growth through industrial development and job creation (Arthur & Arthur, 2013; Johnson, 2013).

2.4.4 REIPPP and Local Content Requirements

The IPP Office within the Department of Energy working with the Department of Trade and Industry, the National Treasury and the Department of Public Enterprises, required and secured an exemption from the PPPFA to enable it to deviate from the Act. The Economic Development Requirements of the REIPPP Programme are largely premised on the BBBEE requirements of the PPPFA described above, with some important differences. Firstly, it has a 70/30 evaluation framework where the 70% weighting is Price and the 30% is Economic Development as seen in Figure 1 below.

Of all the qualifying and evaluation criteria, the Economic Development Elements have a 30% weighting	
• Legal • Land acquisition • Environmental • Financial • Technical	Qualification criteria
Price	70 points
Economic Development	**30 points**

Source: Adapted from REIPPP Programme Procurement Documents, Economic Development (DoE, 2015)

	Economic Development Elements	Weighting
1	Job Creation	25%
2	**Local Content**	**25%**
3	Ownership	15%
4	Management Control	5%
5	Preferential Procurement	10%
6	Enterprise Development	5%
7	Socio-Economic Development	15%
	Total	**100%**
	Total points	**30 points**

Figure 1: Price vs Economic Development Elements (DoE, 2015)

Secondly, the 30% Economic Development weighting reflects the bidder's commitment to maintaining the Economic Development Obligations throughout the life of the project. In the case of the PPPFA, the bidder only needs to meet the requirement at procurement stage and there is no obligation to maintain the BBBEE level throughout the term of the contract.

Thirdly, four out of the seven Economic Development Elements have minimum thresholds. Local Content has a maximum of 7.5% weighting (25% of 30 points) in the REIPPP Programme evaluation framework. Points are accumulated to the extent to which the bidder makes a commitment above the minimum threshold and how the commitment compares to other bidders within the chosen technology, such as Solar PV, called the Highest Compliant Bidder in the REIPPP Programme procurement documentation.

This means that any commitment below the threshold is not compliant, resulting in an ineligible bid response, a commitment at threshold level attracts no points while a commitment at target level may potentially attract the full point allocation (7.5 points) contingent on the Highest Compliant Bidder provision. The four Economic Development Elements with minimum thresholds are Job Creation, Local Content, Ownership and Socio-Economic Development as seen in Figure 2 below.

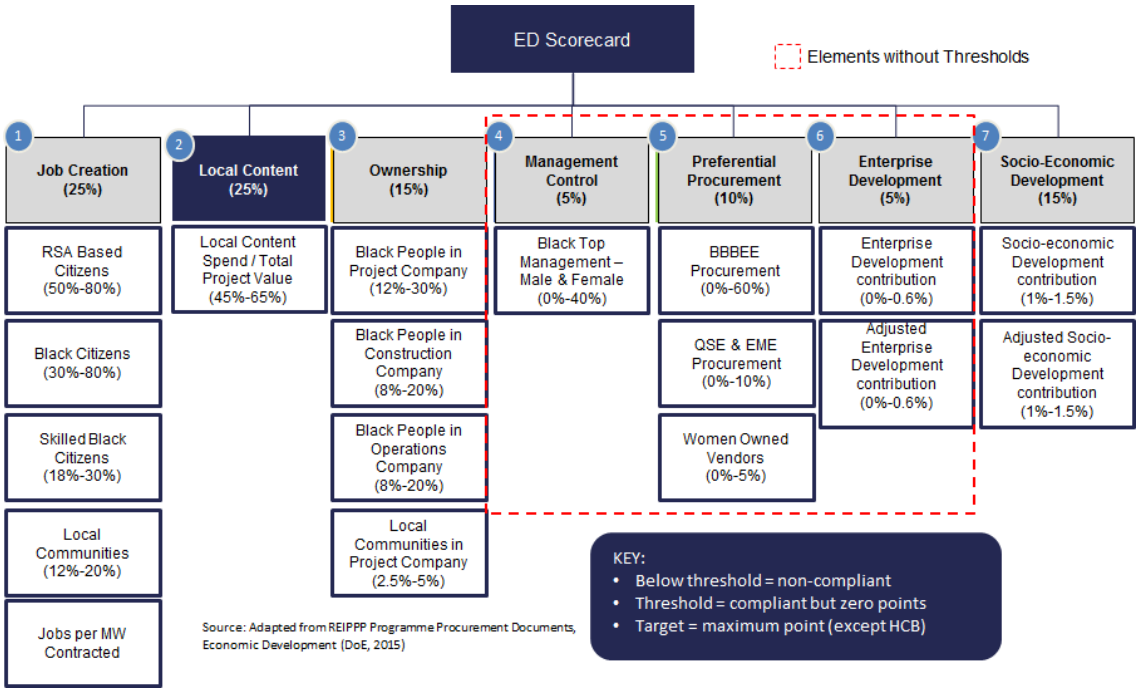


Figure 2: Economic Development Elements (DoE, 2015)

Fourthly, the Economic Development commitments reflected in the Implementation Agreement (IA) are linked to the Power Purchase Agreement (PPA) and are therefore binding during the construction and operations period, to the extent to which they are applicable. Local Content is a function of the Total Project Value and therefore only

applicable during the construction period. Finally, the composition and weighting of each Economic Development Elements and sub-element are different, as seen above.

The following observations can be made from a comparison of BBBEE Elements from the PPPFA and Economic Development Elements from the REIPPP Programme. Firstly, it is fair to assume that BBBEE Elements set a foundation for the development of the Economic Development Elements. Secondly, the Department of Energy put a strong development case to the National Treasuring and the Department of Trade and Industry to, firstly, deviate from the PPPFA provisions by changing individual elements, their composition and weighting and, secondly, to increase the general weighting from 10% to 30%. In addition, such an allocation is directionally contrary to the PPPFA where the 90/10 evaluation is applied to bids of R1 000 000 and above, while bids below R1 000 000 are evaluated on an 80/20 basis. The financial value of REIPPP Programme projects are well beyond the R1 000 000 mark and would, therefore, have attracted a higher Price to BBBEE weighting in the normal course of events.

As the custodian of the PPPFA, the National Treasury is mandated to procure in a “fair, equitable, transparent, competitive and cost-effective” public procurement framework (Constitution, 1996). The Department of Trade and Industry, as the custodian for industrial policy and BBBEE Codes, is mandated to industrialise and advance the interests “of persons…disadvantaged by unfair discrimination” (PPPFA, 2000), while the Department of Energy is mandated to ensure that there are cost effective megawatts on the national electricity grid. The REIPPP Programme provides an ideal opportunity for the three departments of Government to meaningfully interact to meet their respective mandates for the greater good of the South African population. This may require compromise from involved departments to optimally meet country level objectives. Sacrifices would need to be made. The question is: are the various mandates aligned for purposes of maximising value for South Africa Inc. in the REIPPP Programme?

Although the understanding of the Economic Development Elements has improved over time and the Local Content threshold progressively increased over various bid submission windows as depicted in Table 2 below (Eberhard, 2014), the significance of Local Content Requirements is ‘diluted’ by the other six Economic Development Elements. Despite Local Content being one of two Economic Development Elements with the highest weighting, it is one of seven elements with a combined 30% weighting of the total evaluation. Finally, each of the elements of both BBBEE and Economic Development seeks to address very important

development elements. An argument could be advanced that the "one size fits all" approach dilutes development objectives (Mthembi, 2016).

Table 2: Progressive Local Content Level Increase (DoE, 2015)

	Bid Window 1		Bid Window 2		Bid Window 3 & 4	
Solar PV	**Threshold**	**Target**	**Threshold**	**Target**	**Threshold**	**Target**
	35%	50%	35%	60%	45%	65%

The Local Content definition in the REIPPP Programme has changed over time to give expression to industry inputs and requirements from the Departments of Trade and Industry and Energy. The first definition was based on the Total Project Value at Commercial Operating Date "excluding finance charges, land costs and the mobilisation costs of the Operations Contractor" (DoE, 2015a, p. 18). The next definition was more aligned to SATS 1286 and stated that spend must be on South Africans[2] and South African Products. It also excluded Imported Goods and Services (DTI, 2011).

From bid window three, the Department of Energy required bidders to provide Rand values for Key Components which includes solar modules, inverters, metal structures, transformers and trackers and Balance of Plant which is everything else, including civil and electrical works such as foundation, transport and erection, electrical, crane erection and labour costs. The definition also deemed raw steel and aluminium as local, irrespective of origin and excluded distribution and transmission connection costs from the definition of Total Project Value.

Although the Local Content definition in the REIPPP Programme changed over time and to some extent became clearer, the link between Local Content and Local Manufacture remains unclear. The threshold and target were based on the aggregate measurement across both Key Components and Balance of Plant and was therefore not confined to local manufacture, but also included other aspects such as labour and services.

On a different but related point, there is nothing new, unusual or unique with the use of public procurement to facilitate local industry development and meeting local development objectives. Internationally, the Indian, Chinese, German and Italian Solar PV markets were a

[2] South Africans are defined according to Citizenship and thus the Local Content definition in SATS 1286 is indirectly linked to Job Creation. Job Creation here is different from the Job Creation Economic Development Element which aims to measure jobs directly attributed to the project activities during the construction and operations periods. The changing definition of Job Creation in the REIPPP Programme has also been a subject of research.

direct result of deliberate public policy (EScience, Urban-Econ & Ahlfedt, 2013; Johnson, 2013). In South Africa, after identifying the plight of Afrikaans-speaking white people, the Apartheid Government took deliberate steps to facilitate Afrikaner empowerment (Kaplan, 1989; Kenney, 1980; Mbeki & Mbeki, 2016). Implementation mechanisms may differ from Government to Government with specific procurement mechanisms resulting in different outcomes. However, the objectives and instruments employed are generally similar.

2.4.5 Arguments For and Against the Use of Local Content Requirements

There are arguments advanced for and against the use of Local Content Requirements. One argument in favour of the use of Local Content Requirements is creating market leading and globally competitive industries. India used protectionist policy instruments to create a local manufacturing industry with the objective of being a global leader in the solar manufacturing industry. This not only created local jobs but also built a local manufacturing industry (Johnson, 2013).

Other arguments include national security, infant industry protection and diversification of local economies. The national security argument is around security of supply, country autonomy and self-determination (Arthur & Arthur, 2013). The infant industry protection argument is centred on protecting local industries until they are developed and strong enough to compete with foreign companies (Chang, 2002; Chang, 2007), while the diversification argument is about a country's ability to withstand economic shocks by not relying on limited goods and services for production output or relying solely on natural resources for economic growth (Ma, 2010; Mullings & Mahabir, 2016). An increased tax base is often put forward as one of the key benefits of local industry protection.

On the other end, arguments against protectionism are centred on the minimalist role of the state in the economy. This view is predominantly based on the state focusing on maintaining law and order, protecting personal and business property rights as well as balancing the national budget. Advocates of this argument say the use of protectionist policies leads to inefficient allocation of resources, resulting in higher prices and finance challenges (Johnson, 2013; Ma, 2010). As a result, World Trade Organisation members are legally prohibited from using protectionist policies such as Local Content Requirements. However, members often disguise the use of these policies through employing antidumping laws, rules

of origin and minimum local employment requirements (Belderbos, *et al.*, 2002; Johnson, 2013).

Another argument against the use of Local Content Requirements is the oversupply of some goods, inappropriate Government policy design and the thwarting of innovation. Oversupply happens mostly in Government protected industries with captive local markets and without an export market strategy (Moldvay, *et al.*, 2013). They argue that innovation is a direct result of demanding customers and fierce rivalry amongst competitors in a local market (Porter, 1990). Hence, they advocate for a minimalist, indirect role of Government (Moldvay, *et al.*, 2013; Porter, 1990). Although others argue that Government is key creator and facilitator of innovation (Mazzucato, 2011).

2.4.6 Infrastructure Finance Challenges

A discussion on infrastructure development would be incomplete without due consideration paid to infrastructure finance. Infrastructure finance is one of the biggest challenges in developing countries. The simultaneous addition of a new industry and new technology magnifies the challenge and associated perceptions of investor risk. Risk management is an integral part of assessing investment opportunities and risk premium determination (Darden, *et al*., 2011; Fay & Kumar, 2013; Moyo, 2014; Nhamo & Mukonza, 2016). Investors use different tools to assess the cost of capital and the required Return on Investment (ROI). Popular models for determining the return on investment include Weighted Average Cost of Capital (WACC), Internal Rate of Return (IRR) and Capital Asset Pricing Model (CAPM) (Fay & Kumar, 2013).

Investors are attracted to projects where the proposed ROI includes the additional investment risk. This is called the risk premium. The higher the perceived risk, the higher the required ROI. To unlock the challenge of different risk premiums in assessing project risk on South African renewable energy projects, Fay and Kuma (2013) have developed an index-based model which is largely informed by principles of the CAPM model. The proposed model provides a more standardised way of determining the risk premium and thus providing a more uniform way of determining project risk and required returns.

One of the key risks of Local Content Requirements is the monitoring challenge. Transfer pricing is one such risk. Transfer pricing happens when a multinational company establishes a local office, adds no value to imported goods and sells them at a below market price to the

local office. The local office then artificially inflates the price or sells the product at market rate and registers the difference as Local Content. This practice disadvantages local economies in at least two ways. It evades payable tax such as import duties and creates no local value.

2.5 Local Content Case Studies

2.5.1 International Case Studies

This section discusses international Local Content examples from Europe, China and India, as well as Ghana. These examples support the claim that although the World Trade Organisation prohibits the use of protectionist policies such as Local Content Requirements for reasons already discussed, member countries, industrialised and developing, continue to employ these practices.

Europe

In the 1970's, Japanese manufacturers Matsushita, Hitachi and Sanyo were compelled to source some input materials from Philips, a European manufacturer, in order to access the European colour television market (Belderbos, *et al.,* 2002). Developers planning to operate in the Spanish Renewable Energy market, through their Feed-in-Tariff, were required to procure some wind technology components from the local industry. This led to the creation of one of the largest wind turbine manufacturing companies, Gamesa. Many local jobs were created as a result. Canada employed Local Content Requirements in the renewable energy procurement processes until the World Trade Organisation, in 2012, ruled that these requirements were inconsistent with the free trade principles advocated by the organisation. All the countries discussed above are members of the World Trade Organisation (Belderbos, *et al.*, 2002; Johnson, 2013, Moldvay, *et al.*, 2013; Nhamo & Mukonza, 2016).

China and India

China and India set targets of installing 100 GWs of solar capacity by 2020 and 2022 respectively. Both countries set high Local Content Requirement levels. India's implementation of Local Content Requirements resulted in the creation of at least three large solar companies, namely, Indosolar, Mosar Baer and Tata BP Solar (Johnson, 2013).

Through the creation of these companies, India aimed to create an integrated solar industry with suppliers throughout the solar value chain. There are two types of Solar PV technologies, namely silicon crystalline and thin film (Grobbelaar, *et al.*, 2014; Nhamo & Mukonza, 2016). The Indian programme design was such that developers were required to meet Local Content Requirements only on the silicon crystalline technology and there was no such requirement for thin film. When the demand from the United States, Germany and Spain changed and Solar PV module prices took a nose dive, thin film modules became cheaper which led to greater demand for thin film rather than silicon crystalline technology. The three companies that were created as a result of this initiative suffered heavy financial losses as a result, and many jobs were lost (Johnson, 2013; Shen & Power, 2017).

Ghana

In his 2009 book titled *Architects of Poverty*, political economist, Moeletsi Mbeki, tells of how, when, on a flight down the gulf of Guinea, he saw oil rigs which were detached from the mainland, directly pumping crude oil from the earth straight into oil tankers. Tankers were *en route* to America and Europe with no value added to African countries except lining the pockets of the African political elite (Mbeki, 2009). Some African countries have attempted to use their natural resources to create socio-economic benefits. Ghana discovered commercially viable oil reserves in 2007 and started production in 2010. The Ghanaian Government aimed to use this to develop local industry; a local supply base, skills development, infrastructure development and to contribute to economic growth through Local Content Requirements. In 2012, it was reported that 110 000 barrels of oil per day were being produced. The implementation had skilled jobs and local industry development challenges and negatively impacted on the development of indigenous producers and the local supplier base (Arthur & Arthur, 2014)

2.5.2 South African Case Studies

In addition to the international case studies discussed above, this section explores the role played by the South African Government in developing local telecommunications and energy industries through the employment of protectionist policies. It discusses the genesis of the Government-led electricity sector in the form of the state utility, Eskom. In this context, success is based on the sustainability and economic contribution of the industries concerned.

Telecommunications

The development of the South African telecommunication industry during Apartheid, although born out of necessity, provides a glimpse into state-driven infrastructure development. The state provided long term contracts to leverage Foreign Direct Investment and international expertise to develop a globally competitive local industry. The South African Government, through the Post Office, entered into three procurement contracts for a combined 35 years, split in 10 years, another 10 years, and finally 15 years' procurement contracts. This resulted in the development of Altech, amongst others, and created an integrated industry in the form of upstream and downstream supplier networks (Kaplan, 1989). This is the type of technological capacity building with mutually sustaining intersectoral linkages (Arthur & Arthur, 2013; Mhone, 2003; Porter, 1990). Importantly, the state employed targeted procurement, created an enabling environment and provided the necessary support and consistent leadership which resulted in the development of an internationally competitive telecommunications industry.

Electricity

The South African electricity utility, Eskom, was established in the early 1920's through an Act of Parliament with the initial purpose of supplying electricity to commercial and mining industries. The electricity generation division was established first, followed by the transmission division and finally, the distribution division. Rapid economic growth in the late 1960's almost threatened availability of supply leading to the procurement and building of many of the current coal fired power plants. The infrastructure stood South African in good stead until the 2000's. The new Government had the objective of increasing access to a previously marginalised majority while simultaneously considering privatising Eskom. There was a rapid increase in access to electricity by the previously marginalised majority, but there were investment delays in deciding between privatisation and building new electricity plants, resulting in electricity supply constraints and power shortages from 2008 (Marquad, 2006). As in the telecommunication example above, the South African Government took deliberate decisive action to develop an electricity industry and provided the necessary support and leadership to meet this objective.

2.5.3 Key Insights

Themes emerging from case studies for successfully leveraging infrastructure development to develop local industry include: deliberate decisions by Government to develop specific industries thus providing clear direction, providing long term contracts with clear demand signals, and responsiveness to changing economic conditions as demonstrated in the telecommunications example, and less so in the electricity example. The Indian and Ghanaian examples highlight the need for proper planning and giving due consideration to changes in global value chains when developing strategic local industries.

2.6 Models for Building Local Industries

This part discusses four models by Porter (1990), Mhone (2003), Lewis and Wiser (2005) and Kuntze and Moerenhout (2012). What they all have in common is that they advocate the creation of technology knowledge or intellectual capital. Innovation and the need to continuously upgrade such knowledge emerges as a theme from models discussed. Innovation is defined in its broadest sense, including new designs and technologies or new ways of doing things. Porter's Diamond Model for achieving national competitiveness is first discussed, followed by Mhone's Technology Capacity Creation Model, then Lewis and Wiser's Progressive Local Manufacturing Industry Development Model and finally, Kuntze and Moerenhout's Enabling Conditions Model. This is followed by a brief discussion on technology knowledge.

2.6.1 Porter's Diamond Model

Competition theory and gaining a competitive advantage are at the core of Michael Porter's paradigm. His first popular theory, *Porter's Five Forces*, published in 1985 discusses five forces which he deems essential for building a competitive company and continues to be taught in business schools around the world to this day. It is small wonder that in 1990 he published *The Competitive Advantage of Nations* where he discussed the diamond of national advantage (Porter, 1990). Interestingly, some of the reviewed literature which discusses the importance of renewable energy technology as a catalyst for economic growth, refers to this work (Belderbos, *et al.*, 2002; Keane, 2008; Lubbe & Brent, 2009;

Moldvay, *et al.*, 2013). In *The Competitive Advantage of Nations*, Porter discusses how to create a competitive advantage and outlines four key areas, namely: factor conditions, demand conditions, related and supporting industries as well as firm strategy, structure and rivalry as depicted in Figure 3 below. He makes the point that to improve sustainable competitiveness, nations must use these factors to create mutually sustaining intersectoral linkages. The more integrated and intersectoral the linkages, the better for sustainable growth and economic stability.

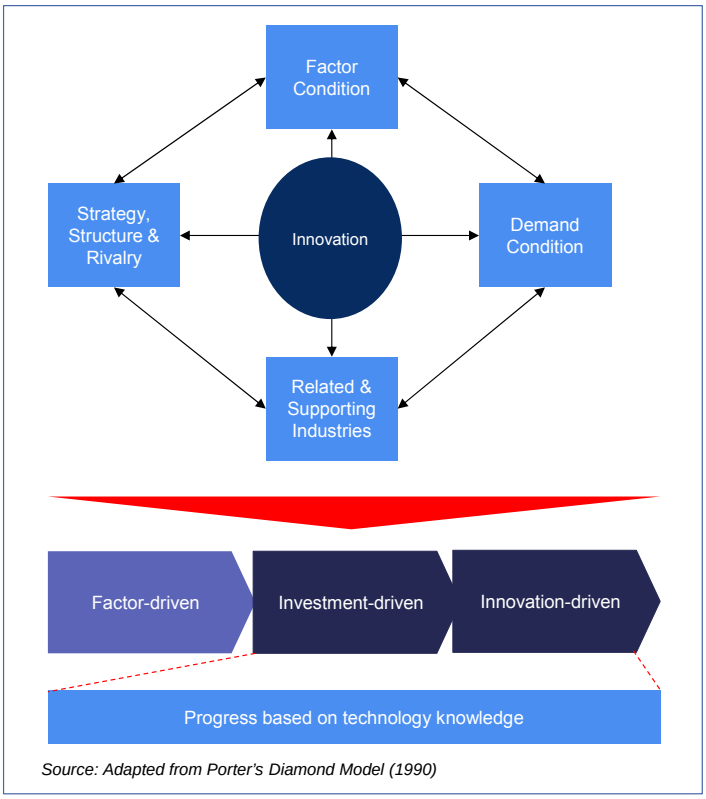


Figure 3: Porter's Diamond Model (Porter, 1990)

Factor Conditions

Although conventional economic theory says that factors of production are important for economic growth. Porter (1990) argues that only highly specialised, skilled labour offers a competitive advantage. He advocates for innovative, skilled labour which constantly upgrades innovation to maintain a competitive advantage. The problem with Government driven industry creation is that the time required to build an industry, a minimum of 10 years, is at odds with quick political gains.

Demand Conditions

The character of the local market is essential, particularly the nature of the local customers, while the size of the local market comes secondary to its character. He makes the point that seeking demanding customers who constantly push the organisation to innovate and improve efficiencies, is key to creating market conditions conducive for international competitiveness.

Related and Supportive Industries

In addition to demanding customers, it is essential to have world class suppliers who pressure the company to improve its efficiencies through innovation. Proximity to the end user is also important for value maximisation.

Strategy, Structure and Rivalry

While national context influences company operations, it is the interplay between management practice and organisational culture which creates a competitive advantage. World class competitors are essential for effective strategy formulation, implementation and continuous innovation.

From Factor to Innovation Driven Economy

Porter (1990) argues that, used appropriately, these factors can help transform an economy from a factor-driven to investment-driven and ultimately an innovation-driven economy. Other Scholars emphasise the importance of progression from factor driven and resource based colonies to investment and technological development driven economies through building local productive capacity (Grobbelaar *et al.,* 2014; Mhone, 2003, Mullings & Mahabir, 2016).

2.6.2 Mhone's Technology Capacity Model

Mhone (2003) advocates a dirigiste state and the building of national technological capacity. He discusses a cumulative approach to building technological capacity; from firm to sector, industry and then national technological capacity as depicted in Figure 4 below.

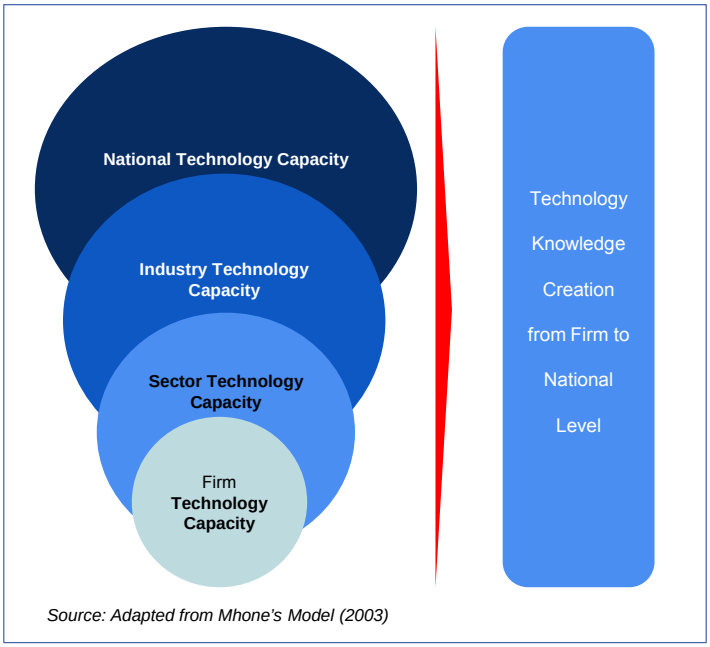


Figure 4: Mhone's Technology Capacity Model (Mhone, 2003)

He warns against the fallacy of composition, noting that the whole is not always equal to, or greater than, the sum of its parts and highlights the importance of creating mutually sustaining intersectoral linkages for successful national technological capacity development. Mhone (2003) agrees with Porter (1990) on the need to build industries with integrated and intersectoral linkages. However, he advocates for strong state economic involvement which creates an enabling environment and provides direction to the private sector in building technological capacity which is developed for domestic use and for export to foreign markets. Other scholars agree that it is better for local companies to have a strong local base before exploring foreign markets, stating that discovering success factors in local industries informs the export strategy (Lubbe & Brent, 2009; Menson, 2012; Mullings & Mahabir, 2016).

Porter and Mhone differ on the extent of state involvement, where Mhone supports strong state involvement while Porter advocates a minimalist role of the state. It is noteworthy that they argue from different contexts. Mhone (2003) is talking about the failed African economic growth path following the implementation of Structured Adjustment Programmes (SAPs) of the 1980's which dealt a devastating blow to many African economies and has been well documented by many scholars (Chang, 2014; Dunning; 2006; Mhone, 2003; Stiglitz, 2007), while Porter (1990) speaks about sustainable competition by already developed countries.

2.6.3 Lewis and Wiser's Progressive Local Industry Development Model

Lewis and Wiser (2005) provide a progressive model for localisation of technology and building a local industry. They offer a risk managed approach which progressively builds technological know-how starting with assembly, followed by component manufacturing and lastly, full manufacturing as depicted in Figure 5 below.

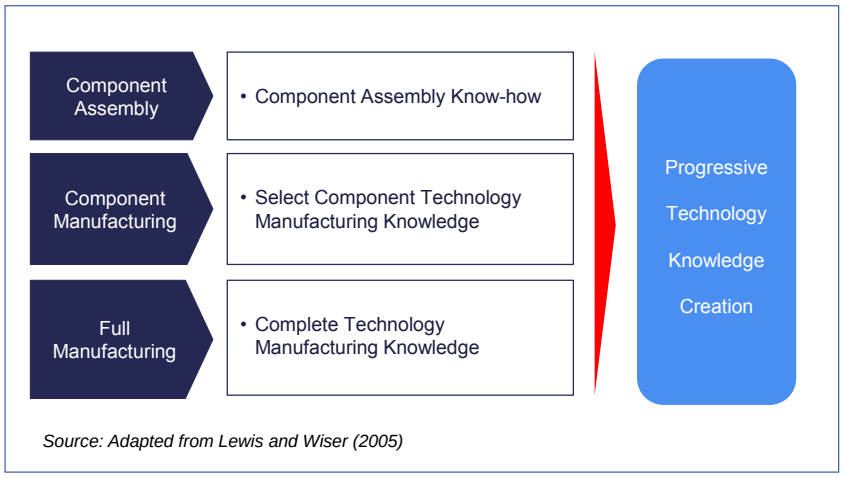


Figure 5: Lewis and Wiser's Progressive Local Industry Development Model (Lewis & Wiser, 2005)

The component assembly stage offers specific component assembly know-how. This is the lowest risk localisation approach. Original Equipment Manufacturers (OEMs) risk no intellectual capital loss as most of the assembly processes are external technology, according to Lubbe and Brent (2009). The second stage is component manufacturing and offers the first opportunity for leveraging the specialised skills based on Porter's (1990) factor component discussed above. The final stage of full assembly poses the highest potential intellectual capital risk both to OEMs and localising countries, if not well managed. As a localising country, how do you know that you are being offered the latest technology at fair value by OEMs? As OEMs, how do you know your technology is protected from international competitors? The Danish turbine manufacturer, Vestas, formed a joint venture with the Spanish company, Gamesa, allowing the latter to use its technology for the domestic market. Years later, Gamesa became one of Vestas' key competitors (Lewis & Wiser, 2005).

2.6.4 Kuntze and Moerenhout's Enabling Conditions Model

Kuntze and Moerenhout (2012) outline four enabling conditions for the creation of local industries. The conditions include market size and stability, Local Content Requirement level, financial incentives and technology knowledge as depicted in Figure 6 below.

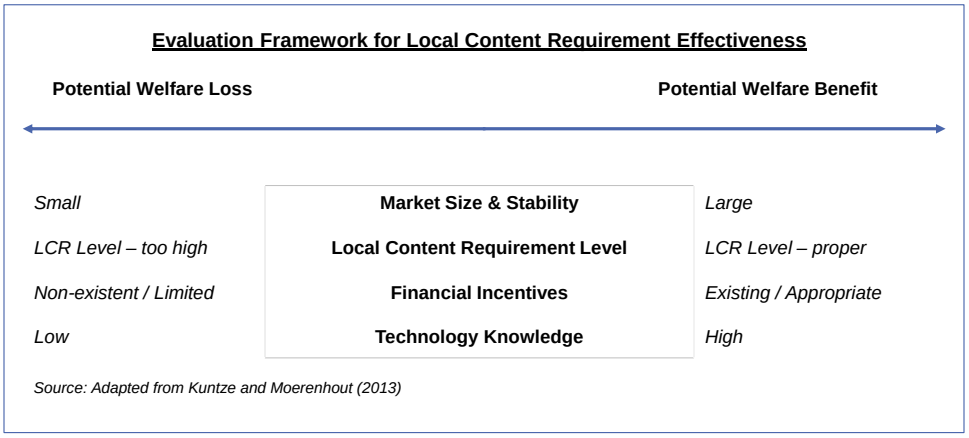


Figure 6: Kuntze and Moerenhout's Enabling Conditions Model (Kuntze & Moerenhout, 2013)

Market Size and Stability

The market size must be large enough to provide clear demand signals and provide an opportunity for the development of a supplier base. Over time, the growth of the market should provide economies of scale. Investors prefer stable markets with predictable returns. In addition, unstable markets attract higher risk premiums which may be detrimental for purposes of developing local industries (Fay & Kumar, 2013).

Local Content Requirement Level

The Local Content Requirement level must be set at an appropriate level and be gradually increased. If it is too high, it may discourage investors or not meet its intended objectives and if it is too low, it may retard local growth prospects. Although there is no model for determining the optimum Local Content Requirement level, Kuntze and Moerenhout (2012) advise that it should be set where the opportunity cost results in positive economic value creation.

Financial Incentives

Supply chains are complex and component compositions can be exhaustive. It is therefore important for policy makers to carefully select industries that are targeted for development so that there can be an alignment between targeted industries, Local Content Requirements and financial incentives (Johnson, 2013).

Although not directly discussing Kuntze and Moerenhout's (2012) model, some scholars have made observations that incorporate aspects of their model. For instance, in discussing policy, institutions and programmes in Mozambique, Zimbabwe and South Africa, Nhamo and Mukonza (2016) make important policy and finance observations which contribute to Kuntze and Moerenhout's conditions model while Grobbelaar *et al*.'s (2014) work on developing a competitive Concentrated Solar Power Industry in South Africa, incorporates both enabling conditions and supportive processes. Although Concentrated Solar Power and Solar Photovoltaic are solar technologies, they are different in significant ways. The former uses thermal energy while the latter generates electrical energy.

Technology Knowledge

Chosen technologies must have the potential to increase the country's technological capacity and competitiveness (Mhone, 2003). They must have long term growth and export potential (Porter, 1990). They often have a greater sustainable impact to develop either existing industries or industries which can more easily integrate with existing industries. Although some scholars have written about building a competitive South African renewable energy market, it is unclear if the development of the local solar industry will lead to long-term growth and export potential especially as China and India have already developed solar industries and have set ambitious targets for 2020 and 2022 respectively (Grobbelaar, *et al.*, 2014; Johnson, 2013; Moldvay, *et al.*, 2013).

2.6.5 Technology Knowledge

All four models discussed above advocate for progressive technology knowledge creation facilitated by enabling Government policies in targeted areas where nations want to be locally and internationally competitive. Technology knowledge creation through innovation thus sits at the centre of these models.

Porter (1990) argues that in order to be competitive, nations must acquire deep specific skills in targeted areas. Other scholars argue that new technologies must be progressively developed, starting with a smaller focus area and building from there (Lewis & Wiser, 2005; Mhone, 2003). The nature of the chosen technology knowledge must be such that it offers the country increased technological capacity and competitiveness over a long period (Kuntze & Moerenhout, 2012; Mhone, 2003). This is why the knowledge must be deep, specific and the initiative Government specifically directed in order to achieve uniformity of purpose and focus (Mhone, 2003). Technology knowledge creation through innovation is the first step, followed by aggressively defending that position through continuous improvement (Porter, 1990).

In order to continuously upgrade technology knowledge, it is advisable for companies to be market leaders in their domestic markets. Scholars agree that mastery of the local market is a crucial first step before venturing into foreign markets (Lubbe & Brent, 2009; Porter, 1990). The technology knowledge spoken of is thus the nation's intellectual capital which can be progressively built and in time, exported (Lubbe & Brent, 2009).

2.7 Conclusion

The purpose of this chapter was to provide a literature review of how infrastructure development has been leveraged for local industry development through the implementation of protectionist policies such as Local Content Requirements. After discussing the importance of infrastructure development in facilitating economic growth, it provided a brief history of how now-industrialised countries used protectionist policies to develop their local economies. It then provided the merits and demerits of Local Content Requirements, discussed advocates and opponents of Local Content Requirements and how its advocates, especially WTO members, often disguise the application of Local Content principles in their respective economies. International and South African case studies of Local Content application were discussed, along with key insights from applying Local Content Requirements.

The report then introduced literature which centres on renewable energy technologies as instruments of facilitating economic growth. It introduced four models for building local industries. Innovation is a theme that cuts across all four models. Innovation leads to the creation of technology knowledge or national intellectual capital which must be constantly

upgraded to sustain growth and a competitive advantage (Lubbe & Brent, 2009; Mhone, 2003; Porter, 1990).

Porter (1990) discusses internal and external conditions most conducive to creating a competitive advantage including skilled labour, demanding customers, competent suppliers and organisational strategy. In addition to market size, Kuntze and Moerenhout (2012) discuss the importance of an enabling policy framework including Local Content Requirement level, availability of finance and current technology knowledge. Mhone (2003), as well as Lewis and Wiser (2005), discusses the progressive implementation of the pre-determined strategy from firm to national level and/or from component assembly to full manufacturing. The objective is thus to determine if the South African Renewable Energy programme has been adequately leveraged to build a local solar manufacturing industry considering conditions and progressive implementation (DoE, 2015a).

3 Research Methodology

3.1 Introduction

The purpose of this chapter is to discuss the research methodology which includes the paradigm, the research design, the sampling approach, the data collection and analysis methods, as well as trustworthiness. The report adopted a qualitative methodology approach although some quantitative measures were incorporated for triangulation purposes.

3.2 Paradigm

The research paradigm is a set of underlying philosophical assumptions that inform the research's view of reality, knowledge and truth. The report employed the constructivist / interpretivist paradigm in that it aimed to understand the experiences and perception of industry players on the effectiveness, or otherwise, of the REIPPP Programme's Local Content Requirements as an instrument for increasing local Solar PV manufacturing capacity. Reality is socially constructed based on constantly changing political and economic views. As such, knowledge is created by society, based on lived experiences and is cemented through practical application. To meet set objectives, the paradigm adopted value laden views (Chilisa & Kawulich, 2012).

3.3 Research Design

The intersection of reality, knowledge and truth or values inform the research design. The report adopted the case study research design with elements of cross-sectional design. Yin (2014, p. 16) defines case study research as "an empirical enquiry that investigates a contemporary phenomenon (the 'case') in depth and within its real-world context". In addition, Bryman (2012) states that the case study research design is distinguished from other designs by its focus on a particular location, such as a community or organisation, which in this instance, was the South African solar PV industry.

A cross-section of industry players was purposively sampled with the objective of getting their experiences and perceptions regarding the effectiveness of Local Content Requirements in facilitating the development of a local Solar PV manufacturing industry. Semi-structured interviews were used to get individual experiences and perspectives and thus unearthed the richness and texture of industry player's views (Nieuwenhuis & Smit, 2012). The interviewees were made up of Transaction Advisors[3], Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers. Their perception served as the unit of measure. The report sought to draw key insights to contribute to the advancement of South African industrialisation objectives and thus add to the growing body of knowledge regarding late-late industrialisation policies (Kohli, 2014) in the context of the South African Renewable Energy Programme.

3.4 Sampling

In view of expert knowledge involved in conducting the research, a purposive sample of key industry players was sampled, resulting in the employment of a non-probabilistic sampling method. The South African solar energy industry served as the population from which the purposive sample was drawn. The original intention was to sample 18 interviews composed of three people from each of the six categories made up of Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers (Laher & Botha, 2012). However, only one Transaction Advisor was available for the interview process. To meet the target of 18 interviews, more Policy Makers and Independent Power Producers were interviewed for purposes of enhancing internal triangulation.

3.5 Data Collection

The report used semi-structured interviews, specifically employing open-ended questions as a primary source of data collection. Semi-structured interviews provided the 18 purposively sampled interviewees with the space to provide their experiences, perceptions, views, motivations and beliefs about the effectiveness of using Local Content Requirements as a tool of stimulating local industry (Gottfert, 2015). An interview guide aligned to the two

[3] *Independent Power Producers* - IPPs participating in the REIPP Programme; Project Financiers – South Africa Financial Institutions; *Policy Makers* - senior officials from the three departments (DoE, DTI & Treasury); *Manufacturers* - producers of targeted components (modules, inverters & structures); *Transaction Advisors* - organisations involved in providing advisory services to the DoE at one point or another; *Researchers* - institutions involved in South African Renewable Energy research

research questions was used and can be found in the Appendix section. Interviews were used to source detailed and nuanced understanding of context and key issues. The interview guide included open-ended, probing and indirect questions while leading and close-ended questions were avoided. It contains 14 questions, and interviews generally took no more than an hour each.

Interviews were conducted with a cross-section of solar industry players including Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers. The original intension was to conduct interviews in person by the researcher on a face-to-face basis. However, a few were not possible in person and telephonic interviews were conducted instead. Due to the potentially commercially sensitive nature of the research, no recording devices were used. Listening was the key instrument for data collection. Data was gathered in the form of hand written notes. The researcher used the interview guide which arranged interview questions which sought to answer the two research questions. At the end of each interview, permission was sought from interviewees for clarification questions at a later date, although this option was never exercised. After each interview, the researcher checked and reviewed the collected data to enhance the accurate content collection. In addition, industry generated reports, including reports from the Department of Energy's IPP Office, were used to collect key secondary data (Nieuwenhuis & Smit, 2012). Such reports enhanced triangulation and introduced useful quantitative data.

3.6 Data Analysis

As mentioned above, the report used open-ended, probing questions as a primary source of data collection, with interview questions arranged according to the two research questions. At data analysis stage, each interview was analysed for consistency. Each interview was then arranged according to questions which were then arranged into the two research questions. Themes emerging from the data ware drawn and key insights documented as depicted in Table 3 below (Kawulich & Holland, 2012).

Table 3: Interview Analysis Framework

Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers			
	Interview 1	Interview 2	Interview 3…18
Question 1			**Key Insights and Themes**
Question 2			**Key Insights and Themes**
Question 3			**Key Insights and Themes**

3.7 Trustworthiness

Trustworthiness is used in qualitative research to ensure that the research consistently measures what it intends to measure. To meet this objective, the report employed credibility, transferability, dependability and triangulation (Creswell & Miller, 2000; Kawulich & Holland, 2012).

3.7.1 Credibility

The objective of credibility is to ensure that the data collection and analysis methods are both believable and trustworthy. The report met this requirement through the data collection methods from the cross-section of participants involved in the research. The report used semi-structured interviews with various industry players to distil key themes and insights. Interviews were conducted with industry players from different parts of the solar industry value chain, most of whom have been involved in the programme since its inception in 2011 (Creswell & Miller, 2000).

3.7.2 Transferability

The objective of transferability is generalisability of research outcomes. To meet this requirement, the report detailed the data collection and analysis methods used, as well as the different contexts and assumptions used (Creswell & Miller, 2000). The report provides thick descriptions by providing a summary of inputs for each question supported by quotes from participants. Most interviews were conducted at the respondent's place of work with a few conducted after hours, over the phone. Bias was minimised through interviews with a

cross-section of industry participants operating in different parts of the value chain, with diverse educational backgrounds and experiences. Participants were coincidentally equally split between males and females, with most being South African nationals.

3.7.3 Dependability

The dependability aspect of the research addresses the consistency of the research. Qualitative methodologies are generally highly contextual and somewhat subjective because the researcher is an instrument of the research. Therefore, to ensure that key insights and emerging themes drawn are consistent with the data, interviews were conducted with various industry players who operate on different aspects of the solar industry value chain including Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers (Creswell & Miller, 2000).

3.7.4 Triangulation

To improve the trustworthiness of the research, primary data was collected from a cross-section of industry players. This assisted in enhancing internal and external triangulation. Internal triangulation was achieved through conducting semi-structured interviews with industry players from various parts of the solar PV industry made up of Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers. External triangulation was achieved through consulting industry reports, including reports from the Department of Energy's IPP Office (Potter, 2012; Yin, 2015).

3.8 Limitations

The limitations of this report included time, cost and access to interviewees who are based across the country. The research was finalised within the time allocated by the school. Research costs were borne by the researcher. Some of the interviewees are based in Pretoria, Cape Town, Port Elizabeth, as well as East London, and thus access to interviewees posed a challenge. In cases where interviews could not be conducted in person, telephonic interviews were conducted instead. The interviewer made all efforts to personally arrange and confirm all interviews to limit time, cost and access challenges.

3.9 Ethics

An explanatory note and consent form was developed and signed off by each participant. The explanatory letter briefly explains the purpose of the research, what the research findings will be used for and discusses issues of anonymity and confidentiality. The consent form provided the participants with an opportunity to confirm their understanding of the purpose of the research, that participation is voluntary and that the research is for academic purposes (Ogletree & Kawulich, 2012). Examples of both are provided in 8.1 and 8.2 under Appendices below.

Due to the potentially sensitive nature of the research, anonymity of participants is maintained. All participants know that the researcher is an industry participant who has worked in the renewable energy industry for over 10 years and the few who did not know were informed. The majority of the participants come from the researcher's network of industry associates. All disclosures were made to participants prior to conducting the interviews and comfort provided that all information received and insights drawn, would be used only for academic purposes. The nature of the information provided is proprietary in the sense that it is the participant's personal experiences, perceptions and views about the programme and how various organisations have responded to the requirements. In addition, some of these personal experiences, perceptions and views may be contrary to the organisations which provide employment to some participants. For instance, participants working for multinational organisations may not agree with the development approach of their employers. Their views are captured herein while their anonymity is maintained.

3.10 Chapter Structure

The research report structure includes six parts. The first part provides an introduction and context to the research. The second part discusses the literature reviewed to contextualise and situate the research. The third part discusses the research methodology employed. The fourth part presents the data collected through semi-structured interviews, followed by the data analysis part which presents findings. The sixth part discusses conclusions and recommendations. The report has an Appendix section which includes an explanatory note and consent form, as well as the interview guide.

4 Data Presentation

4.1 Introduction

This chapter presents the data collected from a cross-section of industry participants from interviews conducted over a six-week period from May 2017. It also presents the areas of overlap between the industry participants and models discussed in the literature review chapter above (refer to Chapter 2 of this report). The chapter discusses demographic information, followed by interview questions arranged into five themes falling under two research questions.

4.2 Context and Demographic Information

Interviews were conducted with participants based in Johannesburg, Pretoria, Cape Town, Port Elizabeth and East London. A non-probabilistic purposive sample approach with elements of snowball sampling was employed. The majority of participants were sourced from the researcher's network while a few were referred by interviewed participants. All participants allocated sufficient time for interviews. Interviews took less than an hour to conduct. Participants engaged enthusiastically in the interview process and demonstrated a deep understanding of both the renewable energy sector and the REIPPP Programme. Manufacturers demonstrated a more specialised manufacturing knowledge, while some manufacturers were not fully *au fait* with the intricacies of the REIPPP Programme.

All interviews were conducted once with no follow-ups. The majority of interviews were conducted in person (face-to-face) while a few were conducted telephonically. Telephonic interviews were with persons outside of the Gauteng province, although some interviews with persons outside Gauteng were conducted in person. The researcher made efforts to travel to and arrange face-to-face interviews with persons in Cape Town, Port Elizabeth and East London. The few interviews not conducted in person were a result of a combination of scheduling conflicts and extenuating circumstances. Telephonic interviews offered flexibility with regard to time; allowing for interviews to take place after hours while all face-to-face interviews took place during working hours.

One challenge with telephonic interviews is the inability to observe body language and other signals, as well as the inclination to minimise periods of (un)comfortable silence, leaving words and tone of voice as the only communication tools. A well-placed pause in a face-to-face interview often allows the participant to elaborate their views. Telephonic interviews thus somewhat limited the researcher's ability for follow-up questions and possibly a deeper appreciation of the participant's views on matters under discussion. On the other hand, an argument could be advanced that the barrier provided by the telephone offers greater freedom to the participant.

Table 4: Participants Demographics

Source		Interview Type		Gender	
Own	Referral	In Person	Telephonic	Male	Female
11	7	13	5	9	9
61%	39%	72%	28%	50%	50%

Coincidentally, participants were equally divided between male and female as seen in Table 4 above. There was a 100% response rate with 18 interviews conducted involving participants sampled from the six pre-selected categories namely: Transaction Advisors, Independent Power Producers, Policy Makers, Project Funders, Manufacturers and Researchers. It was not possible to interview more Transaction Advisors due to lack of availability. As a result, more Policy Makers and Independent Power Producers were interviewed as seen in Table 5 below. Policy Makers and Independent Power Producers were selected due to their regular interaction with project related issues and thus Local Content implications, compared to other respondent categories.

Table 5: Participants Categories

Respondent Category	No.
Transaction Advisors	1
Independent Power Producers	4
Policy Makers	4
Project Funders	3
Manufacturers	3
Researchers	3
TOTAL	**18**

Results from non-probabilistic purposive samples are inherently difficult to generalise to a wider population. Add the dimension of referrals to that and you could be dealing with

mutually reinforcing homogenous views. However, the consistency of opinions from a cross section of industry players working in different organisations and therefore with 'misaligned' objectives strengthens the outcome of the findings. In addition, the research provides inputs from secular reports, including reports from the Department of Energy's IPP Office.

It must be noted that each of the respondent categories are 'worlds' in their own right. Put differently, an exploration directed at one category could possibly offer deeper and more nuanced insights, although narrower, than the ones documented in this report. A cross-section of industry participants offers fascinating areas of convergence and divergence within and across categories and thus a broader view, which would not be possible with a single category exploration. Although not explicitly pronounced as such, it is remarkable that most discussed perceptions are neither organised by category nor by gender.

4.3 Interview Questions and Emerging Themes

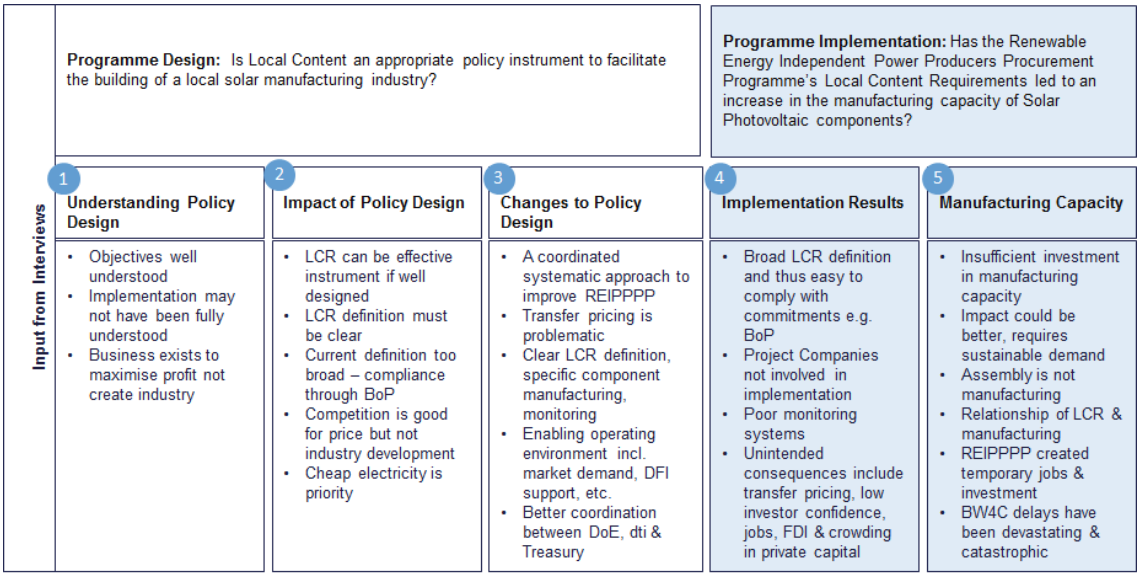
The research measured the experiences, perceptions, views, motivations and beliefs of a cross-section of solar industry participants across six categories on the two research questions on programme design and programme implementation. The programme design Research Question is, "is Local Content an appropriate policy instrument to facilitate the building of a local solar manufacturing industry?" while the programme implementation Research Question is, "has the Renewable Energy Independent Power Producers Procurement Programme's Local Content Requirements led to an increase in the manufacturing capacity of Solar Photovoltaic components?". A total of 14 questions, arranged under two research questions were posed to all participants. The questions were further arranged into five key themes, three from the first and two from the second research question as depicted in Table 6 below.

Table 6: Analysis Framework

Research Questions	Key Themes	No of Questions	Total
Programme Design	Understanding policy objectives	1	8
	Impact of current policy design	6	
	Changes to current policy design	1	
Programme Implementation	Implementation Results	3	6
	Manufacturing Capacity Impact	3	
TOTAL		**14**	**14**

4.4 The Interviews

Figure 7 below presents the relationship between the two research questions and the five emerging themes.



Source: Data Analysis

Figure 7: Relationship between Research Question and Input from Interviews & Emerging Themes

Each question along with a summary of the participants' views supported by quotes from participants are stated in turn, hereafter. Both the responses and quotations have been *italicised* for ease of reference.

4.4.1 Programme Design

The programme design research question was: Is Local Content an appropriate policy instrument to facilitate the building of a local Solar PV manufacturing industry? Eight interview questions falling under the three key themes under the programme design research question are stated along with responses below.

Understanding of REIPPP Programme Local Content Policy Objectives

There was one question under the theme of understanding Local Content policy objectives which is as follows:

1. *The purpose of including Local Content Requirements in the REIPPP Programme was to increase local solar manufacturing capacity. Do you believe the Local Content policy objectives are understood by bidders? Please elaborate?*

   All participants agreed that Local Content Requirements objectives were well understood by bidders who participated in the programme. Participant A said, *"Yes, bidders have a deep understanding of the objectives which is reflected in their negotiation with the EPC (Engineering, Construction and Procurement) contractors";* while Participant B said, *"Yes, (objectives are) well understood, but the design and implementation needs improvement".*

   Most participants felt that this understanding led to the circumvention of the objectives of Local Content Requirements. Participant C said, *"Bidders understand objectives too well, hence the manipulation of the system".* While some added that the implementation details may not have been fully understood at the start of the programme roll out. Participant D said, *"There was wide consultation before the programme came into effect. However, the actual implementation details may not have been well understood".*

   Others highlight the contrasting objectives of the public and private sectors, which may have been the reason why the private sector has not embraced the objectives of Local Content Requirements despite understanding them well. Participant E said, *"Yes, objectives are well understood. However, it is not the bidder's job to create a local industry. The purpose of a company is to maximise profit".* The implication is thus that

the public sector must concern itself with the alignment between the policy and implementation, without apportioning responsibility to the private sector.

Key Learnings – Understanding of Local Content Objectives

Participants agreed that Local Content objectives are well understood by bidders but the Local Content definition needs to be updated to be more aligned with its intended objectives.

The Impact of the Current Local Content Policy Design

There were six questions under the theme: the impact of current Local Content policy design.

2. *Do you believe the use of Local Content Requirements as a policy instrument can lead to building a local solar manufacturing industry?*

   All participants agreed that Local Content Requirements can be effective policy instrument for developing local industries provided that it is well-structured, aligned to broader industrialisation policy objectives, well monitored and carefully implemented with predictable demand. Participant A said, *"Yes, but not in the current form. Monitoring systems must have teeth";* while Participant B said, *"Yes, but the country's development priorities should drive the design. They currently do not";* in addition, Participant C said, *"When rolled out in a stable manner with predictable demand, to stimulate manufacturing which requires longer term planning";* and finally Participant D said, "*Yes, if structured correctly, which means aligning the objectives with the design".* In summary, participants felt that the current Local Content design is not conducive for meeting its intended objectives.

3. *What impact has the aggregate measurement of Local Content across all goods and services making up the Solar PV plant, had on the local South African manufacturing industry?*

   All participants felt that the current Local Content design was too broad. Participant A said, *"The definition is broad enough to enable ease of compliance and reporting".* They also felt that it provided too much leeway for bidders to meet Local Content commitments through means that would not translate to the development of local industry. Compliance

is primarily met through Balance of Plant and not manufacturing. Participant B said, *"The current design makes it possible for compliance to be met with Balance of Plant";* and Participant B said, *"90% of compliance is through Balance of Plant. Although generally good for existing South African service industry, it limits the ability to create new industries".* This point is well captured in Mthembi's (2016) article titled *Lost in Compliance*. Without minimising the importance of measurability, she discusses the folly of sacrificing development objectives at the altar of compliance. She then suggests that additions be made to the current framework. For instance, Job Creation and Skills Development so that the Programme is both measurable and has the desired development impacts of developing a skilled work force as opposed to only creating temporary jobs.

4. *What impact do you believe the deeming of raw and unworked steel and aluminium as local irrespective of origin had on the local solar component manufacturing industry?*

   Uncompetitive local steel and aluminium prices led the DoE IPP Office to deem raw steel and aluminium as local irrespective of source during the third Bid Window submission. This meant that all raw steel or aluminium products would be regarded as local even if they were not sourced from South Africa. In addition, the deeming provision would add to the Local Content value without any value add to the local economy. It is noteworthy that metal structures are predominantly made of these materials.

   The general sentiment was that this decision may have had a detrimental effect on the local steel industry and may have limited Local Content Requirements. Participant A said, *"The South African steel industry may have suffered as a result";* and Participant B asked; *"How does deeming foreign goods as local, lead to local industry development?";* and Participant C concluded, *"It takes away from South African manufacturing as it takes away from well-established steel industry which could have increased throughput and thus GDP (Gross Domestic Product) contribution".*

   Most understood the reasons surrounding the decision to deem raw steel and aluminium to be a result of an uncompetitive local steel and aluminium industry. Participant D explains, *"(The local steel industry) was using import substitution prices; as a result their prices were too high and inhibitive for encouraging local procurement, that's why Government took that decision*".

Some participants felt Local Content must by definition, benefit infant industries. They felt that a well-established steel industry need not benefit from protectionist policies. Participant E said, *"Local Content is supposed to develop infant industries, the steel industry is well established and mature".* Few are not sure what happened or what the possible effects may have been in the steel industry.

Government's decision to deem raw steel and aluminium irrespective of source most probably negatively impacted the local industry as seen from Arcelor Mittal's 17 February 2017 news release. The news release discusses a five-year agreement (renewable) with the DTI intended to "*achieve a fair price for steel*" by establishing "*Fair Pricing Principles*" which would enable the steel giant to "*earn reasonable margin from domestic sales while being competitive and efficient*" (Arcelor Mittal, 2017).

5. *Do you believe a competitive bidding process is conducive for leveraging the REIPPP Programme to build a local solar component manufacturing industry?*

The question drew contrasting views. Most participants felt that it all boils down to the country's objectives and priorities, a choice between cheap electricity and local industry development because of challenges associated with trying to meet both objectives simultaneously. Participant A said, *"We have to balance priorities and cannot be driven by price only or manufacturing only";* and Participant B said, *"Price competition puts price pressure and advances less expensive and more efficient solutions. The real priority in South Africa is affordable electricity which creates downstream industrialisation opportunities".*

Some felt that competition is good because it leads to lower prices for consumers, while others felt that the introduction of competition so early in the process advantaged well-established multinational firms. However, the consequences were detrimental to the achievement of Local Content objectives. Participant C said, *"By definition, competition works. The point of competition is the attainment of the best price for the consumer, company and wider economy";* and Participant C said, "*The programme required proven technology and experienced contractors (from the beginning) which excluded local companies by definition, because large scale Renewable Energy was new to South Africa";* and finally, Participant D concluded by saying*, "A (competitive bidding) created space for multinationals to set up shop without adhering to desired objectives".*

To provide evidence of "proven technology", manufacturing companies require a Tier 1 manufacturing certificate which is both expensive to acquire and requires evidence of capacity. It is a conundrum, to prove that sufficient capacity levels of the technology have been in operation over the required period of time requires that the technology be in operation; and yet to achieve this, necessitates that manufacturing companies acquire the Tier 1 manufacturing certificate. In addition, proven technology affects the 'bankability' of the project and directly impacts on the quantum of insurance premiums[4] which in turn, affects the tariff. Based on these stipulations, only well-establishment international manufacturing companies would be competitive. Existing and new South African manufacturing plants would be automatically excluded.

6. *Do you believe it is possible to have a policy balance between competitiveness and local industry development? What would that balance look like?*

Most participants believed that it is possible to have a policy balance between competitiveness and local industry development but felt it was challenging and must be informed by the country's priorities and objectives. Participant A said, *"The primary objective of the programme was to get MW on the (electricity) grid, followed by a competitive price because of the nature of electricity and its role in a macroeconomic environment as an enabler of industrialisation;* while Participant B said, *"Challenging to balance, local content is seen as expensive while programme demands competitive pricing".*

One participant felt that the policy met its objectives by being both competitive and developing local industry. Participant C said, *"The programme has met its intended objectives; the price has reduced with each bidding round while Local Content commitments have increased. Although the (local industry development) impact has been limited, there has been an impact that would otherwise not have happened in the absence of the programme".*

7. *Do you believe the difference between component suppliers and component manufacturers is clearly articulated in the RFP (Request for Proposal) documentation?*

All participants felt that the difference between component suppliers and manufacturers is poorly articulated in the procurement documentation and that a clear Local Content

[4] Insurance is a key requirement for large scale infrastructure projects

definition is vital to overcome this challenge. The poor definitions and lack of clarity provides space for programme abuse, including transfer pricing. Participant A said, *"No, the difference is not clear which makes it easy to dodge programme requirements",* and Participant B said, "*The Local Content definition must make a clear distinction between supplier and manufacturer. Local value add must also be very clear, it cannot be based only on location because it enables transfer pricing".*

All participants understood transfer pricing as the practice by a multinational organisation of setting up local distribution companies. The parent company sells components to a local subsidiary at below market value and the subsidiary sells it locally at market value and counts the difference as Local Content. Most agreed that a clear Local Content definition would go a long way in improving the programme's effectiveness while a few added that some IPPs lacked the will to support clearly understood objectives. Participant C said, "*A clear (Local Content) definition is required, right now it is not. However, it is a matter of will because how do some get it right while others not?";* while Participant D asked, *"What does Local Content really mean? Assembly is not manufacturing".* This view coincided with the view that it is not the responsibility of the private sector to build the local industry. A view which was also shared in question 1 of this chapter.

Key Learnings – the Impact of the Current Local Content Policy Design

Participants acknowledged that Local Content Requirements can lead to the development of a local industry, but not in the current form. The current Local Content design is too broad which makes it easy to meet the requirements. The definition must change and monitoring tightened.

The balance between building an industry based on development objectives while using competition to get a good price is difficult to navigate. Often the result is positive for the consumer through lower electricity tariffs with limited or no development. Indeed, some argue that the objectives were cheap electricity followed by development and by this measure, the REIPPP programme has met its intended objectives.

Some argued that electricity is an enabler of industrialisation and should, as such, not be subjected to protectionist policies which artificially inflate prices such as Local Content requirements. The procurement documents do not provide a clear distinction between

suppliers and manufacturers. Coupled with an unclear Local Content definition, the manipulation of the system is easy, thus rendering the Local Content policy ineffective.

Changes to the Current Local Content Policy Design

There was one question under the theme of changes to the Local Content policy design.

8. *There have been five bid submissions since the inception of the REIPPP Programme in 2011, with Local Content percentage thresholds steadily increasing with each round. Would you change anything in the current Local Content procurement design to meet this intended objective? Kindly explain?*

   All participants felt that the REIPPP Programme has huge potential to move from "good to great" – to borrow a phrase from Jim Collins (2001). It is a good programme in that it kick-started the large scale renewable energy industry in South Africa. Inputs on how much greater the achievement could be realised, varied greatly but generally fell into three general categories, namely: programme interventions, environmental intervention or both.

   Most participants felt the programme could target specific component manufacturing, use better monitoring systems, have a single definition interpretation and should have been changed to REFIT (Renewable Energy Feed in Tariff) after some time. Participant A said, *"A more detailed analysis is required to see what makes the most sense. Is the current spend-based Local Content approach effective or a component-targeted procurement better?";* and Participant B said, "*I would have considered REFIT after BW3. Price had reduced enough. I would then use the remaining 'fat' from REFIT to create local industry*".

   The environmental interventions include the creation of a more conducive operating environment by providing implementation support, including support from DFIs (Development Finance Institutions), better alignment with the designation mechanism of the DTI (Department of Trade and Industry's), better integration / linkages with existing industry, value chain creation and support from skills development training interventions for module installers to product delivery. Participant C said, *"It is a great programme but (it) can be improved, (the IPP Office) needs to conduct detailed research and then target component procurement to encourage component manufacturing, have better monitoring*

systems, get DFIs (Development Finance Institutions) to support the programme, provide clear demand signals to the industry and consistently roll it out to create a sustainable industry".

Few felt that it should be better aligned to meaningful transformation by creating black developers and providing them with skills, opportunity and finance akin to the Department of Trade and Industry's Black Industrialist Programme. Participant D said, *"It requires better alignment with the DTI's Designation mechanism of separating Balance of Plant and Key Component. Have component specific targets, have greater and more meaningful participation by black developers".*

Some suggestions straddle programme and environmental interventions, such as creating predictable demand to increase investor confidence, better alignment between the Integrated Resource Plan (IRP), Ministerial Determinations and programme roll out to maintaining sustainable demand and increasing investor confidence in the programme. Participant E said, "*Local Content must be structured along the Solar PV value chain, better aligned with the IRP, the programme and roll out to provide stable demand and increase programme certainty";* and finally, Participant F said, *"(The IPP Office must provide) a clear definition with one interpretation, create specific industries which are more easily integrated with existing industries, and support these throughout the value chain from skills development training to product delivery…this means that good research and analysis would need to be done".*

Key Learnings – Changes to the Current Local Content Policy Design

Most participants suggest a coordinated systems approach to rolling out the programme. Such coordination would involve environmental interventions including support from DFI, better alignment between the programme and the IRP, alignment of programme Local Content Requirements and the DTI's designation system. Programme interventions include a clearer Local content definition and target component procurement as opposed to an aggregate spend-based Local Content policy. They felt that this is possible only through good research, as well as cooperation between the key Departments of Energy, National Treasury, as well as Trade and Industry.

4.4.2 Programme Implementation

The programme implementation research question was: Has the South African solar manufacturing capacity increased as a result of the REIPPP Programme Local Content Requirements? Six interview questions equally divided by the two key themes under the research question are stated below.

Implementation Results

There are three questions under the theme of implementation results.

9. *Have bidders experienced any challenges in meeting Local Content commitments? If so, what were the challenges and how have they been overcome?*

   Most participants believed that it was relatively easy to meet Local Content commitments because of the current programme design which is "blended" in nature along with limited or no monitoring systems. Participant A said, *"No, primarily because of the blended nature of the programme design. It is easy to take a little bit from everywhere to meet commitments";* and Participant B said, *"(There were) no challenges in meeting the obligations because Local Content Requirements are lenient and therefore easy to meet. However, without the current Local Content Requirements, South Africa could have lost what we currently have (as a result of the REIPPP Programme) like jobs and local procurement".*

   Some participants said that they did not know of any underperforming IPP which has been penalised by the DoE IPP Office for not meeting their Local Content Obligations. Some speak of under-reporting and transfer pricing while others speak of known offenders who have gone 'unpunished'. Participant B said, *"It is easy to meet obligations because of the programme design. I do not know a single person who has been penalised because of non-compliance. I think it is because of a poor monitoring system and the need to maintain the image of a successful programme."*

   Unfortunately, all reviewed DoE IPP Office reports are silent on the issue of any misreporting or not meeting obligations. Indeed, the words 'penalty' and 'termination' – save as part of the definition of Contract Year - do not appear on the DoE IPP Office

reports (DoE, 2017a), leading one participant to conclude that there is a "*need to maintain the image of a successful programme*".

A brief review of the Implementation Agreement (IA) shows that the penalty system requires a quarterly report but the reporting during the construction and operating periods are quite different (DoE, 2015a). In both periods, the IPP is requested to submit a report detailing corrective action in the case of under-performance against Economic Development Obligations. Under-performance leads first to financial penalties followed by Termination Points which could lead to the IPP losing their PPA. Because of the histogramic nature of the construction period with an average lead time of 1.8 years (DoE, 2017a), the system aggregates performance at the end of the term. While performance evaluation is aggregated annually during the operating period. It is possible that participants were referring to the Termination Point[5] penalty while some projects may have attracted less visible financial penalties. However, the validity or otherwise of these views cannot be verified because DoE IPP Office reports are quiet on this point.

One respondent noted that the contracting party, the IPP, is 'removed' from the process because project operations are run by the EPC (Engineering Procurement and Construction) who is not directly contracted to the Department of Energy. Participant C said, *"One challenge is that implementation is run by the EPC Contractor. So the IPP (Independent Power Producer) may not have a clear line of sight".*

10. *The Department of Energy's IPP Office reports show that there has generally been compliance with the Local Content obligations. How have projects managed to meet these commitments?*

Most participants stated that compliance was possible because of a broad and unclear Local Content definition which allows for compliance through services (Balance of Plant), coupled with poor monitoring systems. Participant A said, *"It is relatively easy based on the (Local Content) definition";* and Participant B said, *"Through box ticking. Bidders evaluate what they can get away with based on (the current) Local Content definition. Assembly is not manufacturing".*

One respondent stated that the single biggest challenge with the programme is its poor monitoring system. Participant C said, *"Poor monitoring is a key shortfall of the*

[5] Termination Points are punitive points triggered by the IPPs failure to meet the Economic Development obligations, including Local Content commitments, which could lead to the termination of the PPA.

programme, because it enables commitments that are not monitored. At one point, the SABS (South Africa Bureau of Standards) wanted to charge for monitoring services but the monitoring costs were not included in the pricing of the programme". As a result, some felt misreporting has gone unpunished.

11. Have there been any unintended consequences of the Local Content Requirements?

Responses varied between positive and negative consequences with varying impacts. On the negative side, most felt unintended consequences included creative accounting, transfer pricing, negative investor confidence because of inconsistent programme roll out, exclusion of larger local companies because of programme design which local companies could not meet, manipulating voiceless local communities, unfulfilled expectation and limited involvement by IPPs because operations are run by EPCs. Participant A said, "*Negative impacts include transfer pricing, lack of local community involvement through limited job creation and ownership";* while Participant B stated that, *"The REIPPP Programme created unmet expectations and led to disappointment and then disinvestment. EPC Contractors do not recruit locally and it ends up being an Independent Power Producer problem. Unscrupulous political councillors try to take advantage of the programme for self-enrichment. Challenges include stakeholder engagement, governance and risk mitigation";* and Participant C concluded that, *"Perverse incentives include fronting using local community trusts with limited or no voice. Some local communities do not know that they are part-owners in certain EPCs and manufacturing companies. Community trusts are designed to be opaque and have little monitoring".*

One participant (Participant D) felt that the programme was almost deceptive stating that, "*It created an impression of local procurement and on development while it created limited incentive to procure locally*".

On the positive side, some felt jobs which would have otherwise not been created were created, albeit temporarily. In addition, there was a development of smaller companies, such as women owned vendors situated close to the project site, FDI and the crowding-in of local private capital. The biggest winners from the programme are said to be lawyers, bankers and technical advisors. Participant E said, *"The REIPPP Programme created companies and jobs in the short term but long-term sustainability is questionable due to the stop-start nature of the programme";* while Participant F said, *"Smaller entities*

were developed during and after construction such as local panel cleaning companies, women owned vendors and jobs were created. These are small but important impacts of the programme"; and Participant F stated that, *"The programme has been positive for construction companies, Foreign Direct Investment, Job Creation and in-country investment."*

Key Learnings – Implementation Results

Participants felt that implementation results gave a veneer of success while a closer look revealed that Local Content objectives were not met. Bidders experienced no challenges in meeting the Local Content obligations because of the loose definition and therefore it was easy to meet the requirements. Those that misreported were not held to account. Compliance was met primarily through box ticking and existing services such as Balance of Plant and as such, the Local Content policy has not led to the building of local industry. There were positive and negative unintended consequences. The negative included transfer pricing, negative investor confidence, manipulating voiceless local communities, unfulfilled expectation and unscrupulous politicians. Positive consequences included job creation, the creation of women-owned businesses, economic stimulation of remote locations as well as investment from foreign and local capital. Although the implementation of the REIPPP Programme has had some positive effect, it has much greater potential than in its current form. The potential is restricted by a combination of the current compliance driven design and bidder system manipulation.

Manufacturing Capacity Impact

There are three questions under the theme of manufacturing capacity impact.

12. *According to Department of Energy IPP Office reports, as of October 2015, over 90 projects had been selected as part of the REIPPP Programme, attracting almost R200 billion in private sector investment, totalling a contribution of over 6 300 MW. Do you think there has been sufficient investment in the South African Solar PV manufacturing industry to facilitate its development?*

    The majority of participants felt that there has been insufficient investment in the solar component manufacturing industry with most Local Content commitments being met through Balance of Plant. Most participant felt that much more can be done. Participant A said, *"No, the R32 billion spent on Local Content (so far) has been mainly on services*

such as EPC costs and Balance of Plant"; and Participant B added*, "No, not even 1% of the almost R200 billion committed has been invested (in local industry development), otherwise it would be reflected in the development of the industry… External analysis must inform policy for local industrialisation".*

Some felt that most components were imported while a few components were assembled in the country. Participant C said, *"No, more than 60% of Solar PV components are imported. The few that are not imported are assembled, like modules".* A few participants felt that some foreign manufacturers were initially attracted to the country, but have either divested or are planning to. The key issue is scale, the inconsistent roll out of the REIPPP Programme and the need for predictable demand by manufacturers. Participant D said, *"Yes it did, some foreign companies set up plants in South Africa but sustainability is an issue because of scale and the start/stop nature of the programme".* A few also felt that Development Finance Institutions are coming late to the party, but coming to the party nevertheless. Participant E said, *"DFIs (Development Finance Institutions) are only now waking up to making Local Content Requirements a funding requirement. Why not from the start in 2011?".*

13. *What impact has the REIPPP Programme had on the South African Solar Component Manufacturing Industry?*

There were mixed responses to the question, ranging from no impact to minimal and finally, a few saying the programme has had a good impact, depending on the definition of manufacturing. Participant A said, *"The Programme generally had a good impact, the industry didn't exist before the REIPPP Programme";* in contrast Participant B said, *"I have not seen the impact, probably because there is so much unrealised potential".*

All participants agree that the impact could be better if Local Content is structured to have sustainable impacts. Indeed, sustainability emerges as a key theme throughout the research, along with a need for a proper cost benefit analysis. Participant C said, *"Local Content can work if a structured methodological approach is used. The programme created temporary jobs and temporary investment";* and Participant D stated that, *"The impact was good but could be much better, there were industries that were created and jobs created, but sustainability is a problem. We also need to consider whether this approach works because we pay a premium and yet the plants can be closed immediately after the programme is complete while the country sits with a 20-year bill. It*

created industries but it must be sustainable, perhaps we should look at smaller downstream impacts which are more sustainable".

Most participants question the current Local Content definition and whether it leads to local manufacturing with many saying there has been no manufacturing since the programme's inception, except assembly, which they do not consider to be manufacturing. Some felt that the programme created temporary jobs and temporary investments. Participant E said, *"Manufacturing does not mean assembly. By this definition, there has been no impact. All so-called solar manufacturing companies are assembling not manufacturing".*

The two key observations are compliance versus industrialisation and minimal current impacts versus greater possible impacts, where the latter was desired, but the former was realised. At the centre of responses to this question was the distinction between assembly and manufacture.

It is difficult to discuss Local Content Requirements with a poor definition of manufacture. In the literature chapter above, we discussed that SATS 1286 defines manufacture as "any kind of working or processing, including assembly or specific operations" (DTI, 2011, p. 3). The majority of participants believe that the definition of manufacture must exclude assembly. Many participants believe that manufacturing involves using raw materials to produce the primary components which could be used / assembled to produce secondary / final goods. The glass production process is seen as manufacturing while using glass in producing solar modules is considered assembly. Some argue that this is what is meant by the inclusion of the words "provided local manufacturing takes place" in the Local Content definition in SATS 1286 (p. 3). A clearer definition of both Local Content (Requirements) and Manufacturing would go a long way in clarifying needless debates.

14. *What impact has the delay in announcing Bid Window 4C (Expedited procurement) preferred bidders had on the South African Solar component manufacturing industry, specifically solar modules, inverters, metal frames? (The submission date was November 2015)*.

Every respondent agreed that programme delays have had gravely devastating impacts with comments such as "devastating", "catastrophic", "unfortunate", "negative" and "not

good" being used with reference to delays. Reasons provided for the sentiment include unemployment, company shut downs, disinvestment by some manufacturers due to programme uncertainty. Participant A said, *"Shut downs, increased unemployment and uncertainty. Some say it has ruined lives as some people took retirement money and invested in the programme";* while Participant B said, *"Lost investor confidence, some decided not to come to South Africa on the back of the news of Eskom's decision not to sign PPAs (Power Purchase Agreements)"* Some have questioned Eskom's motives. Participant C said, *"Impression that the sector has plateaued. Eskom's interests may not be aligned with the country's interests".*

Other participants, directly and indirectly, invoked the need for a benevolent dictator. One respondent spoke of the South Korean leader, General Park Chung-Hee, who led the country to unprecedented economic development highs from the 1970's and under whose leadership the country produced modern day industrial giants such as POSCO, LG and Hyundai (Chang, 2014). Interestingly, Dambisa Moyo also advocates for a benevolent dictator in her book titled *Dead Aid* (2009). These sentiments are more about creating a stable operating environment and the implementation of stable macroeconomic policy rather than dictatorship. Participant D said, *"We need a benevolent dictator who would drive the process. Although we believe in the sector, delays hit the developers and manufacturers directly and no amount of belief helps keep companies afloat".*

Key Learnings – Manufacturing Capacity Impact

The last theme brought into sharp focus the definitions and relationship between Local Content, manufacturing and the objective of creating jobs. Participants believe that the inclusion of Local Content requirements were good for starting an industry that did not exist. They also acknowledge that jobs have been created as a result. The delays in announcing BW4C bidders had a devastating effect on the industry. However, they state that clearer Local Content and manufacturing definitions would not only lead to more jobs and greater impact, but also create a sustainable manufacturing industry.

4.5 The Models

Figure 8 below presents the relationship between the two research questions and the four models discussed in chapter 2.

Input from Models	**Programme Design:** Is Local Content an appropriate policy instrument to facilitate the building of a local solar manufacturing industry?	**Programme Implementation:** Has the Renewable Energy Independent Power Producers Procurement Programme's Local Content Requirements led to an increase in the manufacturing capacity of Solar Photovoltaic components
	Porter: • Skilled local labour • Market size and efficiency improvements • Mutually reinforcing intersectoral linkages **Mhone**: • Progressive growth from firm to nation • Government sets clear policy & demand signals • Mutually reinforcing intersectoral linkages **Lewis & Wiser**: • Progressive manufacturing capacity creation (assembly to full) • Progressive Intellectual Property creation **Kuntze & Moerenhout**: • Market size – clear demand signals • Clear LCR definition and appropriate level • Enabling environment & supportive processes including financial incentives	**Porter**: • Competitive suppliers & demanding clients • Mutually reinforcing intersectoral linkages **Mhone**: • Mutually reinforcing intersectoral linkages • Strong local customer base before exports **Lewis & Wiser**: • Progressive manufacturing capacity creation (assembly to full) • Progressive Intellectual Property creation **Kuntze & Moerenhout**: • Enabling environment & supportive processes including financial incentives • Technology knowledge creation must add to country capacity

Source: Data Analysis

Figure 8: Relationship between Research Questions and Models

4.5.1 Programme Design

In making an argument premised on building national competitiveness, Porter (1990, p. 73) first states that "national prosperity is created not inherited". He thus sets the tone for what nations should do to attain national prosperity which he believes needs continuous improvement and innovation, starting with skilled local labour. Mhone (2003) also highlights the need for investment in human capital to achieve national technological capacity. He distinguishes economic growth from economic development with conscious human capital development, in addition to physical / infrastructure development.

Understanding national endowments, primarily through Research and Development, informs the industrialisation development policy focus of a country with the knowledge that "no nation can or will be competitive in every or even most industries" and therefore needs to focus and prioritise (Porter, 1990, p. 73). The objective must be to develop industries that link to existing industries to maximise the creation of mutually reinforcing intersectoral linkages across industries (Porter, 1990; Mhone, 2003). The Government must set a clear national

industrial development strategy and provide clear industry direction and crowds-in the private sector (Mhone, 2003).

Market size / capacity and a clear but progressive Local Content definition and the level conducive to building a sustainable local industry is required (Kuntze & Moerenhout, 2012; Mhone, 2003). The Local Content Requirements level must be set just right, not so high that it is inhibitive, but equally not so low that it has zero impact. A clear definition is also effective in minimising the abuse of industrial policy, such as inadvertently incentivising actions which are misaligned with policy objectives, such as transfer pricing.

4.5.2 Programme Implementation

Skilled local labour is key to the implementation of a national industrialisation strategy which leads to the creation and development of local industry (Mhone, 2003; Porter, 1990). A progressive approach to industry development is key both for an adoption or development of a particular technology and/or creating mutually reinforcing intersectoral linkages across industries and thus building national technological capacity (Kuntze & Moerenhout, 2012; Lewis & Wiser, 2005; Mhone, 2003; Porter, 1990). Effective implementation is a product of continuously innovating and skills development, a competitive operating environment, including suppliers and demanding clients, as well as competitiveness in the local environment before venturing into the export market.

Based on the outcomes of credible Research and Development processes informed by national endowments, new local industry creation is often sustainable if it is related to existing industry so that products or services created can cater for a wider consumer base. It is also helpful if inputs are available for creation of other markets. Additionally, logistics are critical in creating manufacturing facilities. Proximity to raw materials and customers is key to limiting costs.

An enabling operating environment which results in crowding-in the private sector includes financial incentives such as tax incentives (Kuntze & Moerenhout, 2012). Decisive and consistent leadership, such as giving clear demand signals, is also important (Mhone, 2003; Porter, 1990) as well as a clear plan of how Local Content Requirements are progressively going to be used to create a local manufacturing industry (Kuntze & Moerenhout, 2012; Lewis & Wiser, 2005).

4.6 Conclusion

This chapter presented the data gathered from the six pre-selected categories based on 14 questions across the two research sub-questions on programme design and implementation. It gave voice to the participants and captured these inputs according to the five emerging themes. In addition, it presented a summary of the inputs on the programme design and programme implementation from the four local industry building models by Porter (1990), Mhone (2004), Lewis and Wiser (2005) as well as Kuntze and Moerenhout (2014) together with data gathered from industry reports. The term “technology knowledge” was a key output from the literature review chapter as it related to the theme cutting across the four models.

The chapter also explained that “national prosperity” and building “technological capacity” requires the deliberate development of specialised skills and decisive leadership. It superimposed inputs from the four models with the five themes emerging from the interview process supported by Department of Energy’s IPP Office reports across the two research sub-questions. Importantly, the need for more research on interconnected policy instruments to inform localisation strategies was highlighted and the need for outputs to be presented to the constantly changing global operating network (Johnson, 2013).

5 Data Analysis and Findings

5.1 Introduction and Context

This chapter discusses key findings from the data regarding taking deliberate action if Local Content Requirements are to be an effective instrument for building a local industry and in that way, provides a response to the two research questions. It explores possible changes to the programme's Local Content definition as a result of the DTI Solar PV designations and offers support from circular reports. It explains associated choices, limitations and conflicting paradigms that influence views on Local Content after providing an analysis of DoE IPP Reports on the capacity and distribution of Solar PV projects thus far.

5.2 Key Findings

5.2.1 Answering the Research Questions - Choices and Limitations

The REIPPP Programme has succeeded in facilitating the procurement of electricity from renewable energy projects in a relatively short period (6 422 MW from 112 projects in five years) and the electricity tariffs experienced a sharp decline since the programme's inception (75% from the programme's inception). However, the role of the programme in facilitating the building of a Solar PV manufacturing industry, as a result of Local Content Requirements, remains unclear. Yet, the inclusion of Local Content Requirements in the programme came at a price premium.

Some participants argue that infrastructure development should be leveraged to facilitate local industry development while a few participants differ when it comes to the procurement of electricity because electricity is an enabler of downstream economic activity and therefore should be as cheap as possible, they say. Additionally, some say this is part of the different approaches taken by Government departments involved in the REIPPP Programme. For instance, the DTI generally advocates for the use of Local Content Requirements in the programme while Treasury is in favour of cheap electricity. At the heart of this matter, is a conundrum between cheap electricity and local industry development.

The key insight based on responses to the programme design research question of whether Local Content is an appropriate policy instrument to facilitate the building of a local solar manufacturing industry seems to be: Yes, but not in its current form. Although bidders understand the Local Content Requirements objectives, changes need to be introduced to the operating environment and the programme design to improve its effectiveness. Macroeconomic history in both industrialised and developing countries, including South Africa, shows how it has, and continues to be, used as such.

The key insight based on responses to the programme implementation research question of whether the South African solar manufacturing capacity increased as a result of the REIPPP Programme Local Content Requirements is: No, not enough or not at all depending on how you look at it. Clarity on the following issues would greatly increase the effectiveness of Local Content Requirements as a policy instrument which enhances local manufacturing capacity, namely: the Local Content definition, the inclusion/exclusion of assembly in the definition of manufacturing, prioritising local industry development over competitive pricing, alignment between the Integrated Resource Plan and the REIPPP Programme, alignment between key Government departments, as well as the provision of clear demand signals to increase certainty.

There is an appreciation that there have been positive changes as a result of the programme including job creation, local ownership and some local industry development. In addition, the key to answering the research question is an understanding of the extent to which these changes are attributable to the inclusion of Local Content Requirements in the REIPPP Programme along with the associated cost of localisation. The question arises: has the cost of localisation been worth its benefit?

The intention of including Local Content Requirements in public procurement is to facilitate the development of sustainable local industries. The definitions of Local Content and Manufacturing are critical in the cost-to-benefit analysis here proposed. If assembly is included in the definition of manufacturing, it is possible that the country would be left with a 20-year bill[6] with little or no sustainable manufacturing capacity development. The test of whether Local Content Requirements have led to an increase in the manufacturing capacity of Solar Photovoltaic components would thus be evidenced by the benefits outweighing

[6] The PPA (Power Purchase Agreement) term is 20 years long

associated costs. This research could not find convincing evidence that current local developments results justify the cost of localisation.

Therefore, the choice is between either including or excluding Local Content Requirements. A decision to exclude Local Content Requirements would be reflected in an even lower electricity tariffs, while a decision to include them must be reflected in unambiguous industry development. This cannot be achieved based on the current programme design and implementation and therefore, requires changes to the programme.

An unfortunate limitation is this report's inability to more directly comment on the relationship between Local Content Requirements and the Solar PV manufacturing industry as a result of the REIPPP Programme. This is primarily because DoE IPP Office reports reflect a 'blended' picture of Solar PV Local Content performance as seen in Figure 9 below.

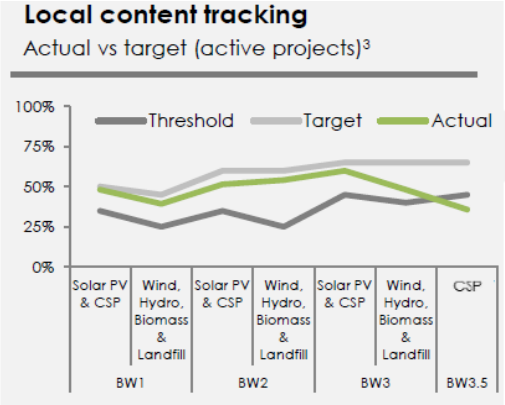


Figure 9: Solar PV Local Content Performance (DoE, 2017a; DoE, 2017b)

The DoE IPP Office reports boast that Local Content performance across the portfolio would be expected to be between 25% and 65% with a mean of 45%. They also state that the portfolio's 50% performance exceeds the "45% commitment from IPPs and thresholds for BW1 to BW4" thus giving the impression that more local development has taken place than was envisaged based on commitments. Although this may be correct, for purposes of this report, what would be more helpful is Solar PV specific performance data against submitted obligations across the four bid windows along with reports against the three targeted key components, namely, solar modules, inverters and structures. Although the submission obligation requiring a division between Key Components and Balance of Plant was only introduced in bid window 3, it is standard practice to require such information for reporting and monitoring purposes.

5.2.2 Another Look at the Local Content Definition and Measurement

The Department of Trade and Industry has a designation mechanism to encourage the development and procurement of specific local goods and services. Once products are designated, all organs of state are obliged to be guided by these designations when conducting public procurement (Treasury, 2016). Solar PV component parts were not designated when the programme commenced in November 2011. However, in 2016 the DTI designated some Solar PV components, such as laminated PV modules, module frames, DC combiner boxes, mounting structures and inverters. Each of these components have minimum thresholds and may impact the Local Content definition in the future phases of the REIPPP Programme (Treasury, 2016). However, as discussed in Chapter 2, it must be noted that the REIPPP Programme enjoys an exemption from the PPPFA and may, as such, not be immediately affected by these developments.

Industry associations and Non-Governmental Organisations have also been calling for closer alignment between the current Local Content definition and its intended objectives. After acknowledging that localisation does not always lead to industrialisation, Green Cape (2016) discusses localised industrialisation which includes shifting the Local Content definition from spend-driven to targeted components along the Solar PV value chain, changing Local Content calculation from Total Project Value to capacity (MWs) as a denominator, improved reporting systems and a more stringent burden of proof by requiring CFOs to sign-off values certified by independent auditors. Coincidentally, most of these suggestions also emerged from the interview process.

5.2.3 Follow the Sun

The Solar PV aspects of the REIPPP Programme would be incomplete without paying due attention to the Northern Cape. The three biggest winners from the REIPPP Programme in terms of number of projects and capacity are the rural areas of the Northern, Eastern and Western Cape. As at March 2017, out of the 112 projects procured with a combined installed capacity of 6 445 MWs, the Northern Cape province accounts for 59 projects, 33 of which are Solar PV projects with an installed capacity of 3 621 MWs and 2 127 MWs respectively as seen in Table 7 below (DoE, 2017a; DoE, 2017b).

Table 7: Useful REIPPP Programme Statistics (DoE, 2017a; DoE, 2017b)

	Capacity (MWs[7])	No. of Projects
IRP[8] Allocation for Renewable Energy (National)	17 800	-
Total Determination[9] for Renewable Energy (National)	14 725	-
Total Determination for Solar PV (National)	*6 225*	-
Total Procured for Renewable Energy (National)	6 422	112
Total Procured for Solar PV (National)	*2 292*	*45*
Total Active[10] for Renewable Energy (National)	3 052	56
Total Active for Solar PV (National)	*1 474*	*33*
Total Procured for Renewable Energy in (Northern Cape)	3 621	59
Total Procured for Solar PV (Northern Cape)	*1 552*	*39*
Total Active for Renewable Energy (Northern Cape)	2 127	33
Total Active for Solar PV (Northern Cape)	*952*	*20*

This means that 53% of the total number of total projects procured are in the Northern Cape, 56% out of the total Northern Cape projects are Solar PV projects. From a capacity perspective, 56% of the total national renewable energy capacity procured is situated in the Northern Cape, while 68% the total Solar PV procured capacity is also situated in the Northern Cape. This comes as no surprise because the Northern Cape Province enjoys the largest solar irradiation in the country, has the lowest population density and is thus a natural home for Solar PV projects in the country as depicted in Table 7 above. The benefits emanating from the REIPPP Programme and Solar PV projects in particular, would thus be most pronounced in this province.

Importantly, only 2 292 MWs out of a possible 6 225 MWs which has been determined through Ministerial Determinations, has been procured to date. This means there is a great potential (2,7 times) to exceed the Local Content impact achieved nationally so far. In reality, the potential is larger than 2,7 times for at least four reasons. Firstly, only 1 474 MWs of Solar PV projects are operational out of 2 292 MWs which have been procured thus far for Solar PV. Secondly, the 14 725 MWs for all Renewable Energy technologies has been

[7] Energy capacity is generally denominated as Megawatts (MWs).
[8] The (IRP) Integrated Resource Plan is the country's 20-year energy strategy which is reviewed every two years.
[9] The Minister of Energy issues Ministerial Determinations based on the IRP against which public procurement is possible. The Minister has to date, issued four such Determinations.
[10] Active means projects that have reached Financial Close.

determined out of a potential 17 800 MWs based on the current Integrated Resource Plan until 2030. Thirdly, the Solar PV portion of the Ministerial Determinations will most probably exceed the current 6 225 MWs because the Integrated Resource Plan is a living document subject to review every two years. Finally, although not yet approved, the latest draft Integrated Resource Plan 2016 allocates 17 600 MWs to Solar PV technologies between 2021 and 2050 (DoE, 2016). There is therefore a very real potential to realise substantial localisation value from Solar PV.

As stated above, the 2 292 MWs of Solar PV projects that have been procured nationally, present great potential manufacturing capacity that could have been achieved thus far. The additional 3 933 MWs of Solar PV capacity (between what has been procured [2 292 MWs] and what has been determined [6 225 MWs]), presents an even greater opportunity based on lessons learnt from the implementation of the first four bidding rounds.

As previously stated, the purpose of Local Content Requirements is to stimulate the creation of a sustainable local industry without which it would have been either difficult or impossible to achieve. Although a correlations seems to exist between the establishment of manufacturing/assembly plants, such as PIA Solar and Jinko Solar in Port Elizabeth and Cape Town respectively, it is difficult to see a clear connection between their establishment and REIPPP Program's Local Content Requirements. Is it possible that these companies could have been established anyway because of market forces, without Local Content Requirements?

Even though solar modules, inverters and structures are mentioned in the procurement documentation, no specific targeted value/percentage is set for each component per technology. Moreover, the DoE reporting mechanism was initially not designed to collect component, source of origin and deeper value chain data to enable an analysis which could inform meaningful insights in this regard. If the DoE IPP Office has such data, it has not been shared with the public thus presenting an even greater research challenge. It is therefore not possible, based on available and analysed data, to determine if the local solar manufacturing capacity has increased as a result of the REIPPP Programme Local Content Requirements.

5.2.4 Tariff Reductions, Manufacturing Facilities and Local Content

According to Department of Energy IPP Office reports, which are corroborated by other industry reports, Solar PV project tariffs enjoyed a 75% reduction to R0.91 between Bid Window 1 and 4 when the programme grounded to a halt in November 2015. At the beginning of September 2017, the Minister of Energy said the signing of PPAs for bid window 3.5 and 4 would be capped at R0.77 (Engineering News, 2017a). This reduction happened while Eskom fossil fuel tariffs continued on a steady increase over the same period, as depicted in Figure 10 below (DoE, 2017a; Green Cape, 2017). It is noteworthy that the 75% tariff reduction excludes submitted, but yet to be awarded, projects from Bid Window 4C (Expedited Bid Submission), submitted in November 2015 - the tariffs of which are expected to be lower than previous submissions thus presenting a further potential aggregate tariff reduction (Green Cape, 2017).

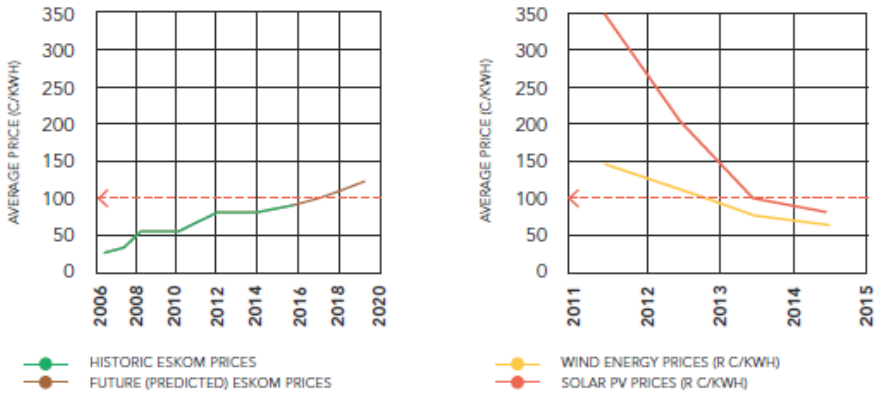


Figure 10: Solar PV Tariff Reduction (Green Cape, 2017)

Interestingly, of the R201.8 billion investment committed to the REIPPP Programme, only 24% (R48.8 billion) is foreign investment (DoE, 2017a) which raises two issues. Firstly, it means that the REIPPP Programme must be commended for crowding-in previously idle local capital. Crowding-in private capital in infrastructure projects is often applauded by mainstream economists as a key driver of sustainable economic growth. Secondly, although R48.8 billion is a significant value - the programme clearly poses a greater local investor confidence risk than the popularly believed foreign investor confidence.

From a manufacturing perspective, it must be noted that although there have been murmurings about solar manufacturing facilities in the Northern Cape, historically Gauteng - the country's economic hub with the highest population density and smallest landmass -

followed by the Western Cape, Kwa-Zulu Natal and the Eastern Cape have traditionally housed the country's manufacturing facilities. The end result is that the majority of Solar PV projects are located in the Northern Cape and the Western Cape while renewable energy manufacturing facilities are predominantly situated in Gauteng and the Western Cape with a few in the Eastern Cape.

A 2015 Department of Energy IPP Office report noted some 12 new renewable energy industrial facilities – eight in the Western Cape, three in the Eastern Cape and one in Kwa-Zulu Natal - five of which are for solar industries (which could potentially include Concentrated Solar Power), are as a direct result of the REIPPP Programme (DoE, 2015b). Unfortunately, the report is thin on detail.

There seems to be an inverse relationship between tariff reduction and developing manufacturing capacity. Local Content Requirements prescribe that a portion of local goods and services must be procured to support local industrial development, irrespective of price. Indeed, if local markets were competitive from the start, the Local Content policy would be unnecessary. Of course, well developed and executed Local Content Requirements offer industrial development support for a period so that local industry can develop enough to be competitive, both locally and internationally (Chang, 2002; Porter, 1990). In order to develop industry under these circumstances, a more conscientious approach is required.

To date, projects have allocated R147.6 billion to Total Project Value and R67.1 billion to Local Content spend, R37 billion of which has already been spent across all technologies from Bid Window 1 in November 2011 (DoE, 2017b). More than a third (36%) of the procured capacity to date has been to Solar PV projects. Although technology component costs vary between manufacturers, technologies and coupled with the reduction in Solar PV module prices (IRENA, 2015), it is fair to conclude that a sizeable amount of the R37 billion already spent on the REIPPP Programme to date was on Solar PV projects. Yet, despite the 12 new industries discussed in the Department of Energy's IPP Office, Solar PV component manufacturing plants remain elusive because most of the current local Solar PV component manufacturing companies are only involved in component assembly. As such, this reports concludes that limited or no manufacturing capacity has been created as a result of the REIPPP Program's Local Content Requirements.

5.2.5 Conflicting Paradigms

It is generally accepted that the neoclassical school of economics – which advocates for a minimalist state involvement - has dominated mainstream economics since the 1980's, leading to the implementation of failed, Bretton Woods institution-led, Structural Adjustment Policies in developing African countries (Chang, 2014, Mhone; 2003; Stiglitz, 2007). The acknowledgement that the neoclassical school of economics is but one of many schools of economics is often missing in modern-day macroeconomic discourse. This oversight is particularly concerning in a developmental country, such as South Africa, where our form of capitalism must be tempered by developmental economic thinking.

In this report, the battle between the two economic schools is seen where participants working for multinational IPPs in responding to the first interview question say that "*IPPs have a deep understanding of objectives"* of the REIPPP Programme Local Content Requirements or that "*they understand them too well"* but "*they don't believe in (them)" or "it is not the bidder's job to create a local industry".* The sentiment expressed by locally based European IPPs is that Local Content Requirements are inefficient in allocating resources. At the very least, this situation highlights the need for some state involvement. Chang (2010, p. 196) says it best when he says, "we are not smart enough to leave things to the market".

5.3 Conclusion

This chapter discussed the importance of taking deliberate action in ensuring that Local Content Requirements are effective in facilitating the development of a sustainable local Solar PV manufacturing industry. An analysis of the renewable energy projects was presented, along with the concentration of Solar PV projects in the Northern Cape which has to date, not translated into manufacturing capacity in the province. The recently (Treasury, 2016) issued Solar PV component designation was discussed along with Green Cape's proposal for component specific localisation strategies.

It looked at changes in the DTIs designation mechanism which may impact the REIPPP Programme, considered the differences in renewable energy tariff and fossil fuel tariff directions where the former is reducing and the latter increasing. It also discussed the traditional location of manufacturing facilities in South Africa versus where Solar PV plants are located. Finally, it highlighted the conflict of paradigms regarding the macroeconomic

policy approach. The next chapter discusses four recommendations to make Local Content Requirements more effective in the REIPPP programme.

6 Conclusion and Key Recommendations

6.1 Introduction

This report began with a discussion of the role played by protectionist policies in facilitating the development of now industrialised countries, such as the United Kingdom and the United States of America, leading to the industrial revolution of the 18th century. Free trade policies were introduced much later and their thinking premised on a particular application of David Ricardo's theory of *Comparative Advantage*. Much time has passed since the industrial revolution. The current globalised and interconnected world is a world divided largely between developed and developing economies concerned with the social and environmental impacts of economic development.

Development, particularly "development economics and systems of innovation", necessitate a re-conceptualisation of how policy instruments can be used to facilitate sustainable economic "green-led industrialisation and manufacturing" (Muchie, 2016, p. 15). Although a discussion on sustainability falls outside of the realm of this report, its acknowledgement highlights the importance of adapting the application of current macroeconomic policy instruments to meet their intended objectives in the modern day public procurement context.

While the Data Analysis and Findings chapter (Chapter 5 of this report) provides a response to the two research questions, this Chapter 6 discusses four interrelated recommendations emerging from the data which would make the use of Local Content Requirements more effective in facilitating the development of a local industry. They are:

- Enhanced coordination and predictable demand;
- A clear and consistently applied and understood Local Content definition;
- Component specific Local Content alignment and;
- A robust monitoring and measurement system.

Importantly, all data analysed highlights the need for thorough Research and Development aligned with country endowments as well as industrial development priorities and objectives.

6.2 Recommendations

6.2.1 Enhanced Coordination and Predictable Demand

One participant put it best when s/he said, "*it is a coordination issue…The state cannot exist only in a design capacity. It must coordinate to drive certain objectives*". The first key recommendation is thus better Government coordination and predictable demand which lead to building local know-how. Both Mhone (2003) and Porter (1990) agree on the need for decisive leadership to create technological capacity because "national prosperity is created not inherited". To create predictable demand requires enhanced coordination between the three Government departments involved with the REIPPP Programme (Department of Energy, Department of Trade and Industry and National Treasury), improved communication with key stakeholders including bidders and funders, better alignment between policy instruments such as the Integrated Resource Plan and the REIPPP Programme, Ministerial Determinations and a consistent roll out of the REIPPP Programme with no or predictable delays. It also involves providing a clear policy direction and decisive leadership from Government.

6.2.2 Clear Local Content Requirements Definition

As discussed in Chapter 2 of this report, the Department of Energy developed a strong case to secure an exemption from the provisions of the PPPFA to better align the REIPPP Programme with the country's developmental objectives. The current broad Local Content definition tries to be everything to everyone by attempting to create jobs, build industry and facilitate local ownership, etc. A clear and specific Local Content definition which is commonly understood, consistently interpreted and applied, is a second key recommendation. It is equally important to have a predictable and steadily increasing Local Content Level over time (Kuntze & Moerenhout, 2012). Most participants rejected the inclusion of assembly in the definition of manufacturing, despite SATS 1286's inclusion of assembly as part of the definition (DTI, 2011). The state must set a clear Local Content definition to minimise confusion and reduce loopholes (Mhone, 2003). This must be coupled with a clear manufacturing definition.

The recent designation of specific Solar PV components by the DTI including laminated PV modules, module frames, DC combiner boxes, mounting structures and inverters is in line with what comes out of the data. Additionally, it is conceivable that the perceived increase in Solar PV Local Content commitments with each bidding window is related to the global Solar PV module reduction over the same period, particularly considering that solar modules are the single largest component weighting on Imported Content in the current calculation of Local Content. This raises the question: have Local Content commitments really increased with each bidding window or is this artificial in view of the current Local Content design? The definition must thus minimise both policy misalignment and the possible illusion of increased commitments.

6.2.3 Component Specific Procurement

The REIPPP Programme procurement documentation suggest that three Solar PV components – solar modules, inverters and mounting structures - are targeted for local Solar PV industry development. However, measurement mechanisms and intended objectives seem to be misaligned (DoE, 2015a). The National Treasury's Solar PV designation sets component specific thresholds but relies on the SATS 1286 Local Content definition (Treasury, 2016). Identifying and setting component specific thresholds addresses the component issue, but does not address the Local Content definition issue. Green Cape (2016) advocates for localised industrialisation which includes refining the Local Content definition, targeted components and changing the Local Content calculation to capacity (MWs) rather than the current practice of calculating it as a percentage of Total Project Value.

Research needs to be conducted to establish if the current spend-driven localisation approach has yielded the desired results. Preliminary assessments and respondent inputs are not encouraging. Whether South Africa can compete with China by targeting all three Solar PV components - bearing in mind that China had a head start, enjoy the lion's share of the market and has scale in its local and international markets - remains a question worth pondering (Lubbe & Brent, 2009; Johnson, 2013; Shen & Power, 2017). If South Africa can indeed compete, how does it compete and on which components? In addition, targeted components must be aligned with the country's natural endowments and current industry profile to increase mutually sustaining intersectoral linkages.

6.2.4 Monitoring and Measurement

Finally, the REIPPP Programme's "*monitoring systems (and measurement) must have teeth*" as advocated by one Participant. Another said, "*Poor monitoring is a key shortfall of the programme because it enables the 'meeting' of commitments that are not monitored*". Yet another said, "*Focus less on targets and focus more on implementation support".* Green Cape (2016) also advocates for improved reporting systems and a more stringent burden of proof from bidders by requiring the CFO to sign-off values certified by independent auditors. This approach is also advocated by SATS 1286 (DTI, 2011).

In September 2017, the Minister of Trade and Industry announced the establishment of a task team to "assess how to improve local-content enforcement across government departments and the State-owned companies in line with instruction notes issued by the National Treasury" (Engineering News, 2017b). Although the article was published after the report was completed, it highlights the dire need for improved compliance to Local Content Requirements if they are to achieve their intended objectives. Robust monitoring and measurement systems will limit creative reporting, transfer pricing and circumvention of policy objectives. Importantly, it will provide key insights on actual programme impacts, when it would be appropriate to reduce the Local Content level and ultimately eliminate the use of Local Content measures as the industry matures.

6.3 Conclusion

After providing context to the two research questions, the report defined and discussed Local Content Requirements and its present-day application. Importantly, the report adopts a constructivist / interpretivist paradigm and as such, presents findings from the experiences, perceptions, views, motivations and beliefs of key Solar PV industry participants. These inputs are validated by industry reports. Themes, insights, observations, findings and recommendations reflected in this report contribute to the growing information which assists South Africa to hone macroeconomic policy instruments and thus inch closer to building enabling physical infrastructure, human development and achieve sustainable development objectives.

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8 Appendices

8.1 Explanatory Note and Consent Form

Figure 11: Explanatory Letter

Research Topic:	Local Content Requirements and the Manufacture of Solar Photovoltaic Components in South Africa

I am a Masters student at the Wits School of Governance and am conducting research regarding the effects of Local Content Requirements in the Renewable Energy Independent Power Producer (REIPPP) Programme. My research topic is, "*Local Content Requirements and the Manufacture of Solar Photovoltaic Components in South Africa*". The objective of my research is to explore whether Local Content is an appropriate policy instrument for building a local industry and the extent to which Local Content Requirements in the REIPPP Programme have contributed towards increasing the solar manufacturing capacity.

This interview is anonymous and voluntary. Please note that the findings of this report will focus on the combined results from the interviews. Therefore, your anonymity is guaranteed and no findings which could identify any individual participant will be published. Please note that this report is for academic purposes only.

Thank you for your participation.

Figure 12: Consent Form

Consent Form

(i)	I confirm that I understand the purpose of the research report.	□ Yes □ No
(ii)	I confirm that the research purpose has been explained to me.	□ Yes □ No
(iii)	I confirm that I am participating in this report voluntarily.	□ Yes □ No
(iv)	I accept that my inputs may be used for academic research purposes	□ Yes □ No
	Date:	

8.2 Interview Guide

1) The purpose of including Local Content Requirements in the REIPPP Programme is to increase local solar manufacturing capacity. Do you believe the Local Content policy objectives are understood by bidders? Please elaborate?

2) Do you believe the use of Local Content Requirements as a policy instrument can lead to building a local solar manufacturing industry?

3) What impact has the aggregate measurement of Local Content across all goods and services making up the Solar PV plant, had on the local SA manufacturing industry?

4) What impact do you believe the deeming of raw and unworked steel and aluminium as local, irrespective of origin, had on the local solar component manufacturing industry?

5) Do you believe a competitive bidding process is conducive for leveraging the REIPPP Programme to build a local solar component manufacturing industry?

6) Do you believe it is possible to have a policy balance between competitiveness and local industry development? What would that balance look like?

7) Do you believe the difference between component suppliers and component manufacturers is clearly articulated in the RFP (Request for Proposal) documentation?

8) There have been five bid submissions since the inception of the REIPPP Programme in 2011, with Local Content percentage thresholds steadily increasing with each round. Would you change anything in the current Local Content procurement design to meet this intended objective? Kindly explain?

9) Have bidders experienced any challenges in meeting Local Content commitments? If so, what were the challenges and how have they been overcome?

10) The Department of Energy's IPP Office reports show that there has generally been compliance with the Local Content commitments. How have projects managed to meet these commitments?

11) Have there been any unintended consequences of the Local Content Requirements?

12) According to Department of Energy IPP Office reports, as of October 2015, over 90 projects had been selected as part of the REIPPP Programme, attracting almost R200 billion in private sector investment totalling a contribution of over 6 300 MW. Do you think there has been sufficient investment in the SA Solar PV manufacturing industry to facilitate its development?

13) What impact has the REIPPP Programme had on the South African Solar Component Manufacturing Industry?

14) What impact has the delay in announcing Bid Window 4C (Expedited procurement) preferred bidders had on the South African Solar component manufacturing industry, specifically solar modules, inverters, metal frames? (The submission date was November 2015).