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Assessment of the interventions required to enable participation of South African SMMEs in renewable energy Global Value Chains

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SUMMARY

In the second quarter of 2022, the then Small Enterprise Development Agency (SEDA) reported that small, micro, and medium enterprises (SMMEs) accounted for 59% of total employment in South Africa. Some of these enterprises are attempting to, and or aspire to, localise the production and assembly of components in the renewable energy value chains given the increasing demand for renewable energy in South Africa, which can contribute to the reduction of unemployment, poverty and inequality. However, they do so in the context of these components being manufactured in global value chains dominated by east-Asian countries, particularly China.

This paper provides a detailed analysis of how South African SMMEs can participate in the renewable energy global value chains (GVCs), highlights the benefits that SMMEs can derive by participating in GVCs and the challenges that they, in general, encounter when trying to participate in GVCs. The insights presented herein are drawn from a review of international literature and a survey questionnaire that was sent out to South African SMMEs involved in the renewable energy industry. Drawing from the literature review and SMME survey responses, a case is made for why it would be beneficial for South African SMMEs to be integrated into renewable energy GVCs and, most importantly, what actions would need to be taken by both the SMMEs and the government - whose responsibilities would include, among others, creating an enabling and supportive environment for SMME integration into GVCs.

The interventions recommended in this paper are aligned with the South African Renewable Energy Masterplan (SAREM) vision of industrialising the renewable energy value chain in South Africa to enable participation in the energy transition, serve the needs of society and contribute to economic revival. Furthermore, these interventions relate directly to the SAREMs objectives, such as “growing the industrial capacity in the renewable energy and battery storage value chain”; “building the capabilities needed for the industry”, and “contributing to a just energy transition” in which SMMEs could play an integral role in democratising the energy sector, creating employment and contributing to economic growth.

KEYWORDS

Energy transition, SMME, value chain analysis

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1 BACKGROUND

Globally, the renewable energy industry has experienced significant growth, driven by global climate agreements, government policies and initiatives, technological advancements, financial support and investment, as well as increased public awareness and advocacy. Notably, the annual renewable energy capacity added to energy systems worldwide increased by 50% in 2023, reaching almost 510 gigawatts (GW), with solar PV accounting for three-quarters of the additions. The next five years are projected to see the fastest growth, with global renewable energy capacity forecast to grow to 7 300 GW by 2028 [1].

Aligned with international trends, South Africa has also embarked on the biggest rollout of renewable energy capacity on the African continent. This process started in 2010 when the then Department of Energy (DoE) promulgated the first Integrated Resource Plan (IRP). The IRP is the country's long-term plan for electricity generation, which seeks to diversify the country's electricity generation mix by introducing sustainable energy sources. The 2019 IRP envisages that 6 814 MW of solar, 2 088 MW of storage and 4 000 MW of embedded generation, biomass and landfill gas should be added to the power system by 2030 [2]. In the utility-scale segment of the market, these capacities are being procured under the Department of Electricity and Energy (DEE's) Renewable Energy Independent Power Producers Procurement (REIPPP) Programme and the Battery Energy Storage IPP Procurement Programme (BESIPPPP). In the embedded generation market, the capacities are being implemented in the residential, the commercial and industrial sectors, enabled by factors such as the amendment of Schedule 2 of the Electricity Regulation Act (ERA), load shedding, decreasing technology costs and the desire of consumers to reduce their energy bills.

Amidst the expanding renewable sector, the South African government is actively exploring avenues to localise key components within the renewable energy and battery storage value chains. This strategic move aims to foster economic growth and industrial development, all while addressing the country's persistent challenges of inequality, poverty, and unemployment, particularly among the youth. Small Medium and Micro Enterprises (SMMEs), which contributed to 59% of employment in South Africa as of mid-2022, are positioned as vital actors in this transition. Yet, their full potential remains largely unrealised due to limited access to global value chains, which hinders their ability to participate meaningfully in regional and international renewable energy value chains.

This study provides a comprehensive analysis of how South African SMMEs can engage with the global value chains of solar PV and battery storage technologies. It provides a detailed analysis of how South African SMMEs can participate in the renewable energy global value chains, highlights the benefits that SMMEs can derive by participating in GVCs and the challenges that SMMEs - in general - encounter when trying to participate in GVCs. Drawing on market research and survey data, the report identifies cross-cutting opportunities and proposes targeted interventions - aligned with the South African Renewable Energy Masterplan (SAREM) - to promote SMME inclusion in global value chains "contributing to a just energy transition" in which SMMEs could play an integral role in democratising the energy sector, creating

employment and contributing to economic growth. These strategies aim to strengthen industrial capacity, support a just energy transition, and position South Africa as an active participant in the global renewable energy landscape, ultimately contributing to economic revival and social development.

2 THE OPPORTUNITY

The development and deployment of renewable energy technologies are taking place globally and involve the movement (import and export) of many minerals, raw materials, intermediate inputs, and finished products across different regions of the world. This movement of goods and services implies that these renewable energy value chains are global value chains / global commodity chains, with value being created and captured in different parts of the world. However, much of the world's manufacturing capacity of renewable energy generation and storage technologies is concentrated in a few countries, particularly China and other East Asian nations. There is limited to no participation from African enterprises in these value chains. Despite the concentration of manufacturing, the global nature of these chains still presents opportunities for such SMMEs to participate meaningfully.

The Asian Development Bank Institute (ADBI) points out that GVCs provide an easier way for SMMEs to participate in international trade by participating in one task or process and not aiming to vertically integrate the entire production process [3]. Gereffi and Lee [4], make the point that a country's capacity for prosperity and development depends on their participation in the global economy and that this is "largely a story about their role in global supply chains". This is further supported by Reddy and Sasidharan [5] who highlight the importance of SMME participation in GVCs as a platform for economic growth and development of local economies and businesses.

The South African Renewable Energy Masterplan (SAREM) and other studies which analyse the South African renewable energy generation and storage technology value chains have identified numerous opportunities for South African enterprises to participate in the value chains [6, 7, 8, 9]. The most prominent of these opportunities is the assembly of solar photovoltaic and battery energy storage systems and the manufacturing of balance of plant components such as battery management systems, inverters, and structural supports and casings. To this end, the SAREM has set national targets for increasing local content as a share of total project value for solar PV, wind and energy storage public procurement, this is an attempt to bolster South Africa's industrial development. Table 1 shows the baseline (i.e., 2023) levels and 2030 targets for local content for these technologies indicating that it is envisaged that local content in publicly procured solar PV, wind and energy storage projects will increase from 52.3% by 2030 compared to just an effective 37.3% in 2023.

Table 1: National targets for industrial development in the renewable energy sector set in the SAREM. Source: SAREM [6].

	Local content as a share of total project value	
Technology	**Baseline**	**2030**
Solar PV	45%	50%
Wind Turbine Generators	47%	47%
Storage	20%	60%

Although several companies in the country are already involved in some of the aforementioned activities, the scale of opportunity for value creation and capture is significant, given the country's ambitious goals for large-scale renewable energy and energy storage deployment as part of its energy transition and decarbonisation efforts.

In addition to industrial development, the participation of South African SMMEs in global renewable energy value chains presents an opportunity to create much-needed employment especially for the youth and those that will be affected by the energy transition. The SAREM sets an ambitious target of creating 25 000 jobs in the renewable energy and battery energy storage manufacturing industries by 2030, 50% of which would be jobs for the youth [6]. Achievement of this target will contribute to the alleviation of other socio-economic challenges facing South Africa, especially poverty and inequality.

3 BENEFITS FOR SMMES PARTICIPATING IN GVCS

Global value chains present myriad benefits for SMMEs who engage in them; Deyshappriya and Maduwanthi [10] provide a comprehensive list of these including:

- Exposing SMMEs to international markets and quality standards,
- Increasing demand for the products or services provided by SMMEs and allowing them to expand their business operations,
- Enhancing the technical capabilities of SMMEs,
- Increasing their competitiveness and ability to attract highly skilled labour,
- Enabling them to raise capital from foreign investors, and
- Allowing them to achieve stability in their business operations.

These are all significant benefits that South African SMMEs and other enterprises can accrue by participating in the global renewable energy value chains, furthermore, these could enhance the co-benefits of establishing a domestic renewable energy technology ecosystem in South Africa, such, increasing employment, the retention of skilled labour in the country and spurring further innovation.

4 CHALLENGES IMPEDING SMME PARTICIPATION IN GVCS

Participation in GVCs, especially by SMMEs, is not an easy feat, there are many obstacles which inhibit the ability of SMMEs to participate in GVCs, some of which may be internal to the SMMEs and others external to them. An analysis done by the ADBI [5, 10] in Asian countries highlights some of these, including but not limited to:

- High start-up cost coupled with a lack of access to finance/funding;
- Lack of access to the latest technology & skilled labour;
- Lack of government support;
- Lack of access to information about export opportunities and export procedures;
- Lack of business development support;
- Inability to meet international quality standards;
- Inability to produce quantities required in the global markets and to achieve economies of scale and drive production costs down.

Although all of these are salient, the lack of access to finance is a particularly important pain point for SMMEs, especially those in low-income and developing countries without well-developed banking systems and capital markets.

According to the ADBI, the main financial challenges that dissuade SMMEs from participating in GVCs include i) costs such as rent for land, wages, research and development, market research and advertising; ii) high costs of capital; lack of transparency regarding loan terms and iii) a lack of financial literacy on the part of the SMMEs. These challenges are also relevant to South African SMMEs and addressing them will be crucial in creating an enabling environment for South African SMMEs to participate in global renewable energy value chains and other related GVCs.

Responses from the SMME survey conducted for this report indicate that many South African SMMEs struggle to enter renewable energy value chains, with 89% of the SMMEs indicating that they experienced barriers to entry into the South African renewable energy industry. Some of the barriers highlighted by the SMMEs include competition from more established incumbents, high start-up capital requirements, competition with cheaper imports, difficulties obtaining accreditation with industry bodies, and lack of access to the latest technology/machinery.

To emphasise the challenge SMMEs face with respect to financing, 83% of the SMMEs who responded to the survey indicated that they had encountered challenges in accessing funding or capital to invest/operate in the renewable energy industry. A myriad of financial challenges were stated by the SMMEs, including, *inter alia*:

- limited approval for finance,
- lack of financial literacy,
- high costs of capital,
- slow disbursement of funds from government funding agencies, which can result in SMMEs missing opportunities for market entry and running out of their own funds,
- SMME participation in the renewable energy industry being seen as a risky investment, and
- an inability to provide guarantees to clients due to limited cash flow hampering business sustainability.

These obstacles are consistent with those reported in the *2018 Inaugural SMME Access to Finance Report* which also highlighted other obstacles such as “bad credit history, limited collateral, lack of knowledge and skills to produce financial statements, poor business models, and an inability to produce high-quality business plans” [11].

SMMEs participating in the survey also stated that they faced challenges in developing or acquiring the technical capabilities required to service the industry. However, when asked whether any training programs or capacity development initiatives were available for them to participate in, the majority (94%) responded in the affirmative. This means that the challenges SMMEs face in acquiring or developing technical capabilities cannot solely be attributed to a lack of training/capacity-building opportunities or a lack of awareness about them. Plausible factors might include the affordability of such training, time constraints, training that is not calibrated to their needs, unclear return on investment and fear of disrupting daily operations through the implementation of new skills to name a few.

5 PROPOSED INTERVENTIONS

The interventions required to alleviate the challenges faced by SMMEs looking to participate in GVCs should primarily be driven by the government through the development of appropriate timely interventions, such as the development of enabling infrastructure, improving access to low-cost finance for SMME's, skills development interventions, and the development and implementation of SMME support programmes. These are outlined in the ensuing section and are essential because, as renewable energy value chains become less concentrated, the competitiveness of firms from other developing countries will increase. As such, South African SMMEs need to be supported to establish themselves as major participants in these value chains.

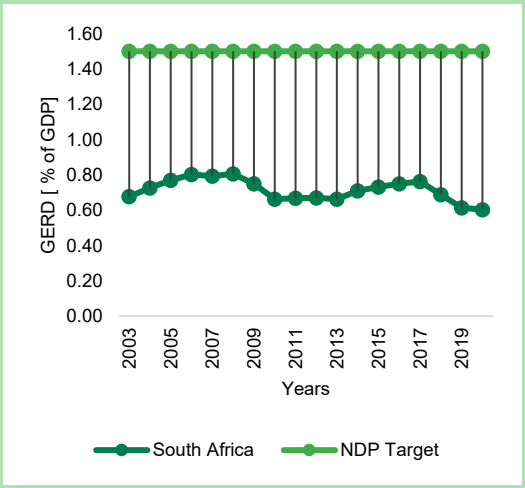
The key areas that the South African government needs to focus on to improve the competitiveness of South African SMMEs in global renewable energy value chains include:

- Improve infrastructure (transportation, communication, energy, and water) to create an environment conducive to conducting business.
- Attracting foreign direct investment.
- Improve access to low-cost finance for domestic SMMEs, which, as outlined in the SAREM, includes the establishment of a Transformation Fund to support new entrants in the value chain. Given the challenges around financial literacy, the Fund would need to also have dedicated resources which assist SMMEs become "funder ready".
- Skills development – increasing investment in demand-led skills initiatives (including stricter requirements for skills transfer).
- Information symmetry: Develop channels for sharing information regarding available funding schemes, export opportunities and export procedures for SMMEs.
- Export promotion of SMME products and services.
- Technology transfer from multinationals establishing operations in South Africa. This could assist SMMEs in upgrading their expertise and develop manufacturing capabilities in high-value segments of the renewable energy value chains.
- Local content requirements for public procurement such as the different Independent Power Producer Procurement Programmes (i.e., REIPPPP, BESIPPPP, and RMIPPPP).

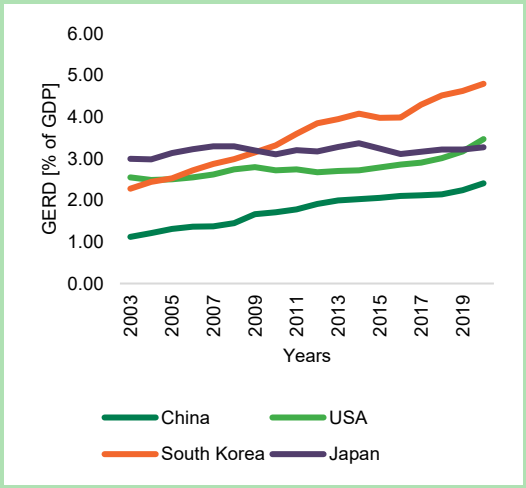
- Governance: improving the states' capacity for planning, monitoring and evaluation.
- State investment in research and development: South Africa needs to increase investment in R&D, particular in universities and science councils. Furthermore, there is also a need to convert R&D innovations into commercially viable products/services. See Box 1 below for a comparative analysis of SA's gross expenditure on research and development (GERD) and other countries, particular those leading innovation in renewable energy value chains.

Box 1: South Africa's GERD since 2003 and comparison with renewable energy generation and storage technology manufacturing leaders.

Figure 1(a) below compares South Africa's GERD from 2003 to 2020 against the NDP target of 1.5%. The data indicates an overall downward trend in South Africa's expenditure on R&D which is concerning given how close the 2030 horizon of the NDP is. This suggests that there is a need for increased effort from the state to invest more in R&D across all the institutions mandated to carry out R&D (e.g., science councils and universities). However, in specific reference to renewable energy technology value chains, there is a strong need for the government to also provide R&D funding to companies involved in these value chains if, indeed, South African companies are to be competitive and on the bleeding edge of technology innovation in these GVCs.



(a)



(b)

Figure 1: (a) South Africa's GERD/GDP over the period 2003 to 2020 compared to the NDP target of 1.5%, (b) GERD/GDP in some of the renewable energy technology innovation leading nations over the period 2003 to 2020. Source: Authors Analysis with data from multiple sources compiled by the World Bank processed by Our World in Data.

Figure 1(b) illustrates the increasing trend in R&D expenditure for China, Japan, South Korea and the US over the same period, these are countries that lead in renewable energy value chains and serves as the benchmarks for any aspirant nations. Moreover, their R&D efforts are already being channelled towards next generation technologies, for instance in the battery industry, China is already providing R&D support for the development of solid-state batteries which provide more energy density and safety among other benefits and could replace the current generation of batteries (particularly, LIBs) which use liquid electrolyte [12].

South Africa also needs to ramp up its investment in research and development and support innovation done by SMMEs. In this regard, the extension of the Section 11D R&D Tax Incentive to 2033 and the accompanying amendments such as allowing "applicants to claim R&D expenses for approved activities conducted during a six-month period prior to the date of application" for the credit and the changes to the definition of R&D are already a positive sign of the government's commitment to support research, development and innovation in the country. However, more still needs to be done.

- Introducing carefully considered interventions such as lowering tariffs for inputs that are not produced locally, import substitution measures and exemptions to protect local industries and local SMMEs. Such measures should be aligned with the government's broader developmental goals.

There should interdepartmental coordination when implementing such interventions to avoid negative outcomes such as the missed opportunities for industrial development in the Solar PV industry. Box 2 provides a case study of South Africa's delayed implementation of an import duty on assembled crystalline silicon solar PV modules.

Box 2: The case of South Africa's delayed 10% import duty on solar PV modules and panels – importance of correct sequencing of government interventions and alignment between government departments.

According to filings by the International Trade Administration Commission of South Africa (ITAC) appearing in Government Gazette No. 42337 published on 29 March 2019 ITAC had received an application from Amisec (Pty) Ltd, trading as ARTSolar, one of South Africa's solar PV module manufacturers/assemblers, for an "increase in the general rate of customs duty on crystalline silicon PV modules or panels classifiable under subheading 8541410, by way of creating an 8-digit tariff subheading, from free of duty to 10% *ad valorem"* [13]. Through the application, ARTSolar sought protection from low-priced imported PV modules and panels coming mainly from China which made their products uncompetitive. In the application a number of motivations/reasons for the application were given by ARTSolar, including that at the time there was no protection provided for PV module manufacturers in the Southern African Customs Union (SACU); there was a need to retain the remaining local production capacity and jobs in the SACU to enable the local industry to grow as there were foreign companies that sought to invest in South Africa; there had already been solar PV module manufacturers that had closed shop in South Africa due to being crowded out by cheap imports including Jinko Solar and JA Powerway; and that local manufacturers had no meaningful participation in government procurement programmes, particularly the REIPPPP.

At the time of ARTSolar's application, there was one tariff subheading used to recognize PV cells (whether assembled into modules/panels or not), this was 85414010. ARTSolar sought for a disaggregation of the classification and for a separate code for "PV cells not assembled into modules or panels" and "PV cells assembled into modules or made up into panels" and an application of the 10% customs duty in on the latter. Figure 2 below shows the value of solar PV imports into South Africa under different tariff subheadings (shown by the lines) and the capacity of solar PV projects registered with NERSA (shown by the bars) from the first quarter (Q1) of 2018 to the second quarter (Q2) of 2024.

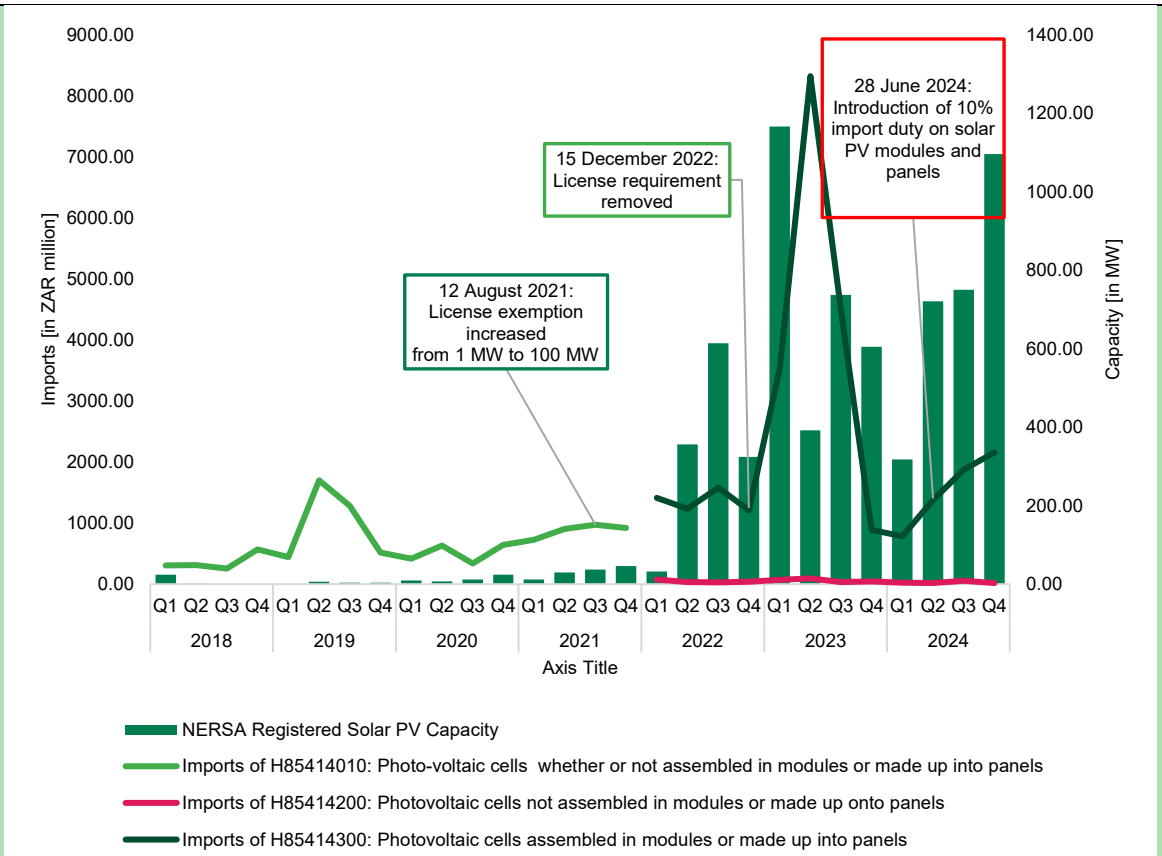


Figure 2: Analysis of solar PV cell imports into South Africa and capacity of solar PV projects registered with NERSA over the period 2018 to Q2 2024 and the key policy events that have occurred in the period. Source: CSIR analysis. Import data obtained from EasyData (HS Codes: 85414010, 85414200, 85414300). Registered solar PV project data obtained from NERSA.

The light green line in the chart shows that from Q1 2018 to Q4 2021, the code 85414010 was used (i.e., there was no distinction made whether imported cells were assembled into modules/panels or not). Over this period a total of ZAR 10.94 billion worth of solar PV cells was imported into South Africa duty-free. Furthermore, the amount of solar PV capacity registered with NERSA started increasing.

In Q1 2022, two tariff subheadings were adopted to differentiate PV cells that were not assembled (85414200) and those that were assembled (85414300). The period from Q1 2022 to Q2 2024 shows that the vast majority of what was imported into the country were assembled solar PV cells (shown by the dark green line in Figure 2). Between Q1 2022 and Q2 2024 a total of ZAR 28.5 billion worth of assembled PV cells was imported compared to just ZAR 476.44 million worth of unassembled PV cells. Furthermore, during this period the number of PV projects registered with NERSA increased dramatically, totalling 5 265.96 MW compared to just 215.78 MW in the previous four years.

During the 2022 to 2024 period, events occurred to which the increase in imports of PV cells assembled into modules/panels and the increase in registered solar PV capacity could be attributed to. The intensity of loadshedding increased dramatically, rising from just 1169 hours in 2021 to 3773 hours in 2022 and peaking at 6838 hours in 2023 [14]. The rising intensity of loadshedding precipitated increased demand for embedded generation throughout the country. As a result of the high levels of loadshedding and the increased demand for independent power generation, in December 2022 NERSA removed the requirement for systems over 100 MW to apply for a generation license – this had previously

been increased from 1 MW to 100 MW in August 2021. The spikes in both imports of solar PV modules/panels and registered PV capacity occurred after the removal of the generation license requirement during which loadshedding was at its most intense.

As shown in Figure 2, ITAC only granted the 10% customs duty at the end of Q2 2024 (i.e. on the 28th of June 2024), over five years after the original application appeared in Gazette No. 42337. This means that the large volume of assembled PV modules and panels imports and the increase in registered capacity of PV projects occurred whilst there was no duty on these products. Throughout this period, South African module manufacturers have had to compete with cheap imports from elsewhere without any protection.

Some of the reasons cited by ITAC in support of its decision to finally grant the 10% customs duty include a recognition that renewable energy generation and consequently local manufacturing of renewable energy technologies could be a "significant catalyst for industrial development and job creation"; local manufacturers in the SACU ceasing operations due to competition from low-priced imports; declining market share and profitability coupled with increasing production costs experienced by local manufacturers; and a decline in domestic employment and investment opportunities.

It remains to be seen what the effects of the introduction of the 10% customs duty by ITAC will be, especially given the reduced intensity of loadshedding which for all intents and purposes could be regarded as a major driver of solar PV imports as previously discussed. It can be argued, however, that there has been a missed opportunity to create a domestic anchor market, particularly when the proverbial "flood gates" of solar PV projects opened through the removal of the generation license requirement.

The development of interventions targeted towards the aforementioned areas could improve the competitiveness of South African firms, especially SMMEs, in the GVCs. However, aside from interventions led by the government, SMMEs can also proactively take actions that will enable them to participate in the GVCs. Such actions include:

- Establishing relationships with original equipment manufacturers both domestic and international and entering joint ventures with them.
- Seeking opportunities to participate in supplier development programmes.
- Participating in existing supplier development programmes and industrial support programmes such as the DTIC's Manufacturing Competitiveness Enhancement Programme (MCEP).

6 CONCLUSION

Given the rising demand for renewable energy and supporting technologies globally, there is ample opportunity for new entrants into the GVCs, particularly those from countries with an already existing manufacturing base and with relatively modern infrastructure such as South Africa. Areas in which South African SMMEs are active and have a comparative advantage have been identified in the SAREM and other studies. However, the integration of South African SMMEs in these GVCs remains limited, and the government needs to address the challenges highlighted above, which inhibit SMME integration into GVCs through implementing the proposed interventions. Implementation of the interventions proposed in this study will ensure that South African SMMEs are successfully integrated into these GVCs and, moreover, ensure

that these SMMEs contribute to the countries attainment of the industrial and socio-economic development targets set by the government in such plans as the SAREM.

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