

Appendix A - Selection of case study firms

To identify and select the five case study firms studied in this paper, we made use of the list of registered members of the South African Wind Energy Association (SAWEA) (see <https://sawea.org.za/>). The members' list consists of 101 companies, 71 of which register themselves as mainly service companies and ten as manufacturing companies. A number of companies (twenty) register themselves as 'other'. Table 1 shows the number of companies within each of the overall categories, as well as the companies that have registered services as coming second, third or fourth in respect of their overall activities. While operation and maintenance (O&M) is the main activity of only nine companies, a total of twenty companies have included O&M as one of their activities.

Table 1. Categories of companies listed as members of SAWEA.

Main activity	Priority of activities				Total
	1	2	3	4	
<i>Developers and owners</i>	23	10	6	0	39
Developer	15	6	1		22
Independent Power Producer / Utility	8	4	5		17
<i>Professional services</i>	28	9	6	0	43
Academia/Research	5				5
Professional Services	8	6	2		16
Consultancy	10	2			12
Sustainable Development/ED/SED expert	1		4		5
Financial Services	4				4
Training		1			1
<i>Construction services</i>	11	1	0	0	12
Construction / Installation / Grid Connection	10				10
Installer		1			1
Transport / Logistics	1				1
<i>After sales services</i>	9	2	1	8	20
Operations and Maintenance	9	2	1	8	20
<i>Total service companies</i>	71	22	13	8	114
Total manufacturing companies	10	1			11
Total other (incl. 1 NGO)	20	2	2		25
Total members	101	25	15	8	150

Source: authors' elaboration based on SAWEA (2020).

While the list provided by SAWEA is not exhaustive, it does cover a significant number of firms involved in wind-energy projects in South Africa. We therefore identified additional wind service firms of relevance within the three main types of embedded services in the wind deployment chain, which we are focusing on in this paper (i.e. professional services, infrastructure services and aftermarket services) (see Figure 4).

The case study firms selected in the paper are not representative for all of the firms within each of the three categories of services in a statistical sense. The case study firms were purposely selected based on their observed ability to compete and survive within their respective segments of the market. These firms may therefore be considered successful in the sense that they have shown to be able to thrive and capture economic value over a longer period from their involvement in the market for wind services in South Africa. Accordingly, the detailed empirical research undertaken on these firms allows us to derive important insights about their individual upgrading trajectories,

including the main processes, mechanisms and factors importance. By investigating such 'critical cases' (Flyvbjerg, 2006), we can thus generate insights of theoretical relevance of how upgrading in services in GVCs operate at the micro-level of firms.

Professional services

Professional services are relevant during the pre-deployment phase of a project and include services such as planning, engineering, environmental assessment, procurement, finance and legal advice. When REIPPPP was launched in 2011, there were well-established local service providers that could deliver such services, so a common challenge for local firms (whether locally owned or foreign-owned subsidiaries) was how to acquire specific knowledge and capabilities related to wind-power projects. South African firms in this category that have been involved in wind projects include Rand Merchant Bank (corporate finance), Fieldstone Africa (financial services), Windhunter Africa (wind assessment services), ENS Africa (legal and contractual services), Old Mutual Life (insurance services) and Obelisk (engineering services) (see also Table2).

Table 2. Professional services companies listed as members of SAWEA.

Council for Scientific and Industrial Research (CSIR)	Academia/Research
ENERTRAG South Africa	Academia/Research
Langa Thibini	Academia/Research
Prof Samson Mamphweli	Academia/Research
SARETEC (CPUT)	Academia/Research
3E	Consultancy
AltGen Recruitment	Consultancy
American Wind Energy Association (AWEA)	Consultancy
Arcus Consultancy Services Ltd	Consultancy
ArcVera Renewables	Consultancy
ED Platform	Consultancy
HYTORC Industrial Tools SA (PTY) LTD	Consultancy
Jonathan Visser	Consultancy
Matthew Kearns	Consultancy
Raymond Takuba	Consultancy
Actis	Financial Services
AIIM	Financial Services
Hulisani Limited	Financial Services
Rand Merchant Bank	Financial Services
3Energy Renewables (Pty) Ltd	Professional Services
Alon Meyerov	Professional Services
Arup (Pty) Ltd	Professional Services
DNV GL	Professional Services
Fasken	Professional Services
Hannetjie Marais	Professional Services
Jason van der Poel	Professional Services
Obelisk Group	Professional Services
Jill Johnson	Sustainable Development/ED/SED expert

Source: authors' elaboration based on SAWEA (2020).

Infrastructural services

Infrastructural services are provided during the deployment phase of projects and may include preparation of the site, the installation of components, services for grid-connection, services to construction, and transport and logistics. South African firms in this category that have been involved in wind projects include Concor Construction (construction and civil works), Adenco Construction (electrical contractor), Resolux (tower internals) and Instrument Transformer Technologies (transformer installation) (see also Table 3).

Table 3. Construction, installation and transport companies listed as members of SAWEA.

Deon Strauss	Construction/Installation
Element Consulting Engineers	Construction/Installation
Khobab Wind Farm (RF) (Pty) Ltd	Construction/Installation
Kouga Wind Farm RF (Pty) Ltd	Construction/Installation
Loeriesfontein 2 Wind Farm (RF) (PTY) Ltd	Construction/Installation
Noupoort Wind Farm (RF) (Pty) Ltd	Construction/Installation
South Africa Mainstream Renewable Power Kangnas (RF) (Pty) Ltd	Construction/Installation
South Africa Mainstream Renewable Power Perdekraal East (Pty) Ltd	Construction/Installation
Tshepo Manotsi	Construction/Installation
Southern African Institute of Steel Construction	Construction/Installation
Grant Cromhout	Transport company

Source: authors' elaboration based on SAWEA (2020).

Aftermarket services

Aftermarket services comprise O&M of the wind turbines and the balance of plant components, such as substations and grid connections. South African firms in this category that have been involved in O&M of the balance of plant components include 3Energy Wear Check, Adenco Construction and BladeRite Maintenance (see also Table 4). When REIPPPP started in 2011, there was limited experience with O&M of wind turbines in South Africa. Globally, independent service-providers (ISPs) have typically been contracted by project owners to perform after-sales services, but over the last ten to fifteen years lead firms have increasingly captured this attractive market through long-term service contracts negotiated as part of the procurement of turbines. In South Africa, the main lead firms have pursued this strategy by establishing local subsidiaries to be responsible for after-sales services.

Table 4. O&M companies listed as members of SAWEA.

Bureau Veritas South Africa	Operations and Maintenance
Cennergi (Pty) Ltd	Operations and Maintenance
Consolidated Power Maintenance	Operations and Maintenance
EDF Renewables	Operations and Maintenance
Enel Green Power RSA (Pty) Ltd	Operations and Maintenance
Globeleq South Africa	Operations and Maintenance
juwi Renewable Energies	Operations and Maintenance
Mark Campbell	Operations and Maintenance
Tritec Sintered Products PTY LTD	Operations and Maintenance

Source: authors' elaboration based on SAWEA (2020).