PROMOTE GREEN MANUFACTURING INDUSTRIES « MADE IN AFRICA »

Observatoire Europe-Afrique 2030

Green Manufacturing Industries : Localization Potential in Africa

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1. Summary

In the present paper, the **“Localization Potential"** is defined as the proportion of added value of a manufactured good that can be localized in a given country.

The development of "Made in Africa" Green Manufacturing Industries involves localizing in Africa the design and manufacture of the "green" installations and equipment that the continent needs. This is a major challenge in terms of job creation potential, transmission of technological know-how and trade balance.

The Localization Potential for countries with a dense manufacturing base (Morocco, Egypt, South Africa) is estimated at around 30% for the manufacturing of products including complex equipment such as batteries. This is the case for electrically assisted bicycles and electric vehicles. This potential rises to around 40/50% for the wind farm and mini-grid manufacturing. It reaches 100% for bicycle manufacturing. In the medium term, these countries will be able to master the design and manufacture of the five green industries analyzed in this paper, with a localization rate of 100%.

Estimated Localization Potentials for countries with a moderately developed manufacturing base (Nigeria, Rwanda, Côte d'Ivoire....) range from 8% to 70%, depending on the sector considered. In the medium term, these countries will be able to achieve localization rates of between 30% and 100%, depending on the sector, provided they develop manufacturing expertise in the electronic equipment, mechanical engineering, IT and chemical sectors.

The estimated Localization Potential for countries with a low-developed manufacturing base (Senegal, Cameroon, Angola, Ghana....) is weak. In the medium term, these countries will remain limited to the manufacture of parts with a low degree of technological complexity. In the medium term, they will fluctuate between 8% and 70%, depending on the sector. This will require the development of multi-sector industrial expertise, which is currently underdeveloped.

For all three categories of countries, medium-term localization targets will require the upgrading of existing companies, or even the development of completely new manufacturing sectors.

2. Context

To implement the energy transition, African countries are importing a growing number of "green" installations: hybrid solar mini-grids, waste sorting and recycling units, wind farms and solar kits, as well as "green" equipment: bicycles, electric motorcycles, streetcars, electric locomotives, railcars, intelligent sensors, heat pumps.

Almost all of these installations and equipment are imported "turnkey" from Europe, the United States, Japan or China.

The economic impact of these imports is estimated in the hundreds of billions of euros over the next twenty years.

Morocco, Egypt and South Africa have already begun to develop an industrial basis in certain green sectors.

Conversely, in sub-Saharan Africa, investments are very limited and mostly confined to the assembly of imported kits. Local production initiatives are developing in Kenya, Rwanda, Côte d'Ivoire and Nigeria, particularly in the manufacture of bicycles, electric motorcycles and solar kits.

The development of "Made in Africa" green industries represents a major challenge for these countries, in terms of job creation potential, transmission of technological know-how and trade balance.

The stakes are just as high for European, Chinese, Japanese and American companies exporting turnkey "green" plants to Africa. Very few of them have embarked on a process of localizing design and manufacturing on the African continent. The initiatives identified, for example in the production of solar kits, are the work of SMEs. What's more, the few projects that have materialized generally contain little local added value.

For European companies holding the know-how, locating all or part of the design and manufacturing in Africa represents a unique opportunity to counter the growing competition from Chinese companies. Local roots, in the form of co-design and co-manufacturing agreements with one or more African partners, will ultimately become an undeniable commercial asset. Strategic partnerships would ensure the gradual transfer of know-how and maximize local added value, in a "win-win" framework.

3. Objectives

The aim of this note is to make an initial estimate of the "localization potential", i.e. the proportion of added value that can reasonably be localized in Africa, in the short and medium term, for five green sectors: bicycles, electric-assist bicycles, wind farms, hybrid solar mini-grids and photovoltaic farms.

4. Methodology

The method used consists in analyzing the value chains of several "green" manufacturing sectors, in order to identify the activities in the design and manufacturing processes likely to be localized in Africa, in the short or medium term.

The higher the "localization potential" for a given country, the more likely it is that this country will be able to acquire (total or partial) industrial mastery of certain green value chains.

Two factors are taken into account in this analysis to assess location potential:

- The degree of technological complexity of the parts/sub-assemblies to be designed, manufactured and assembled: use of more or less noble materials, more or less complex manufacturing processes, greater or lesser diversity and multiplicity of parts to be manufactured to achieve the finished product. In the graphs below, a three-color code is used to qualify the degree of technological complexity of the parts/sub-assemblies to be designed, manufactured and assembled: (high: red / medium: orange / low: green).

- The degree of industrialization of each African country is also analyzed. The denser and more structured a country's manufacturing sector, the more likely it is to be able to develop clusters of companies with the required skills, based on the existing industrial base.

Egypt, Morocco and South Africa have industrial sectors that already give them mastery of numerous chemical, metallurgical, machining, polymer processing and quality control processes..... These companies can form the future nucleus of manufacturing clusters focused on specific green sectors.

By contrast, Nigeria, Rwanda and Côte d'Ivoire have less dense industrial sectors, although some existing companies have mastered basic technologies in the metallurgy, plastics processing and machining sectors. The potential for locating green industries is therefore likely to be lower. Existing companies may need to be upgraded.

Finally, countries such as Senegal, Cameroon, Angola and Ghana have a small manufacturing sector, which limits short-term localization prospects.

In the following pages, these three categories of countries are specified as "Country A (dense industrial base)", "Country B (moderately developed industrial base)" and "Country C (less developed industrial base)".

5. Value Chains

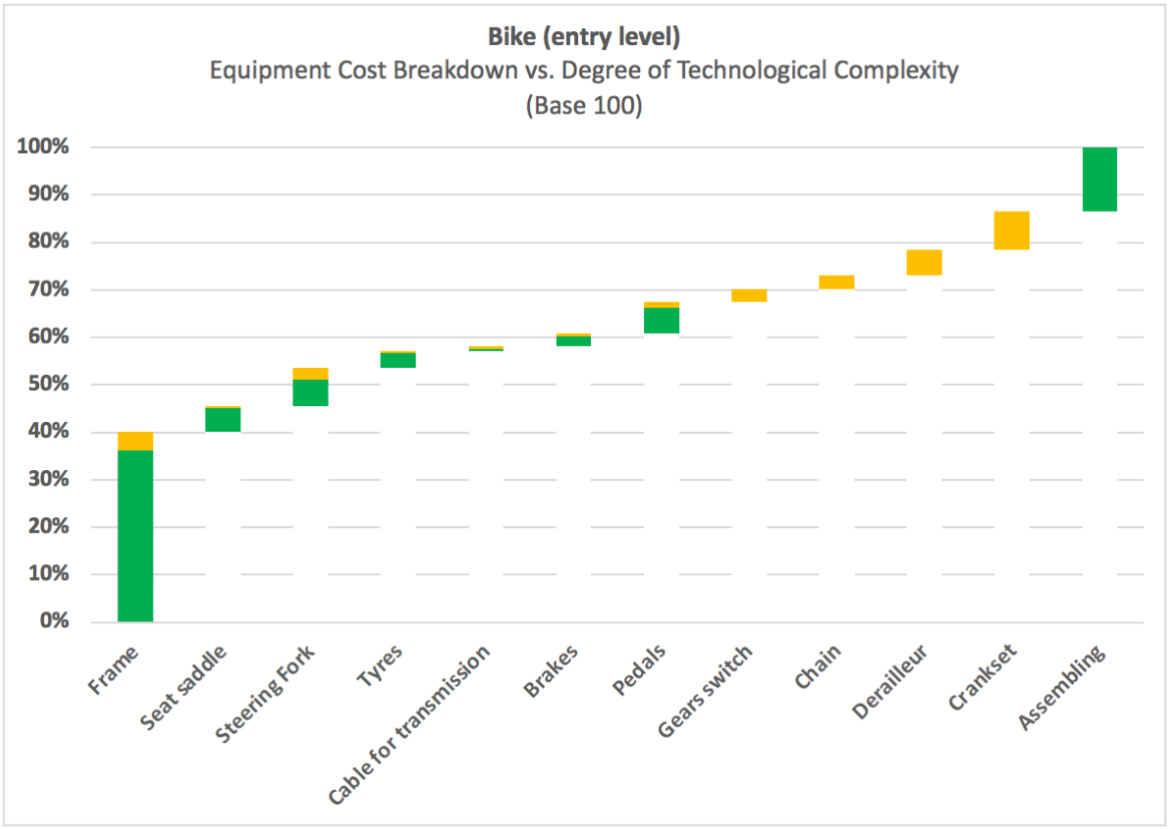
In this analysis, the scope of value chains is deliberately limited to the design and manufacturing phases of parts and subsystems. Indeed, these two phases are potentially the most impacted by the localization process.

Upstream marketing, communication and R&D services have not been included in the analysis, as their "added value" is difficult to quantify.

Similarly, "downstream" civil works, erection, assembly and commissioning services are not included in the analysis. We assume that they are carried out with the same sharing of value between the supplier company and local companies, whatever the organizational structure adopted.

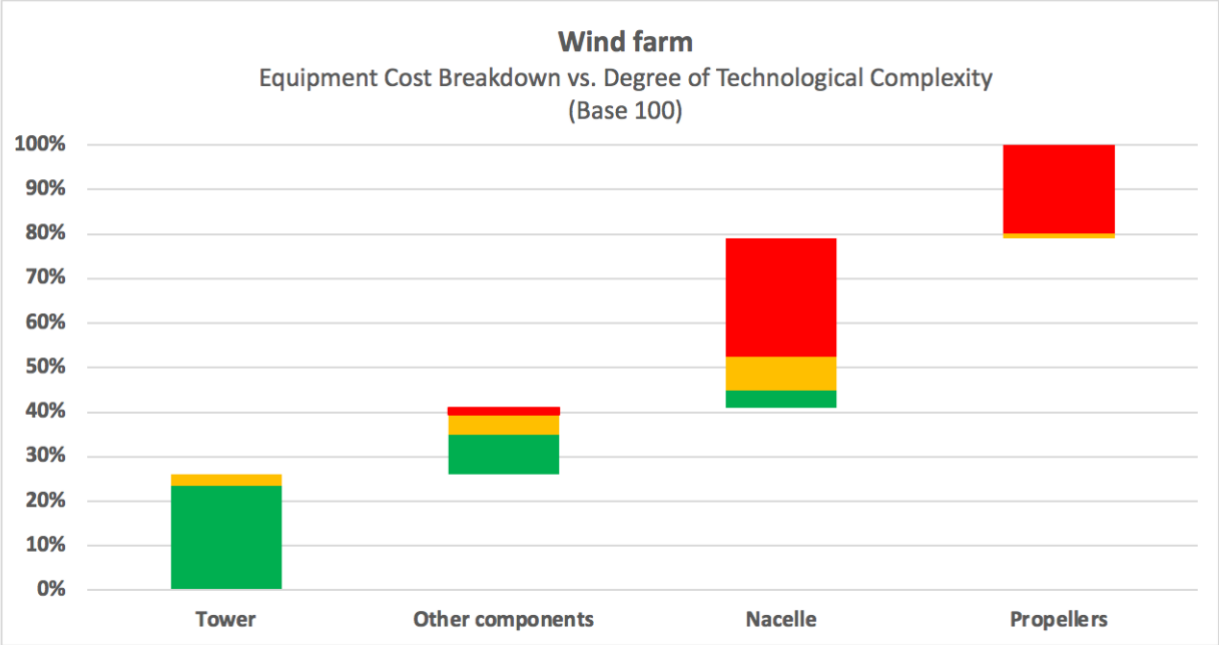
Road bike (entry-level model)

The added value generated by the manufacture of the frame + fork + saddle represents between 50 and 55% of the total added value of the manufacturing process. All parts and sub-assemblies are of low to medium complexity. The majority of the parts and sub-assemblies to be manufactured require sector-specific specialization in metallurgy and metal machining.



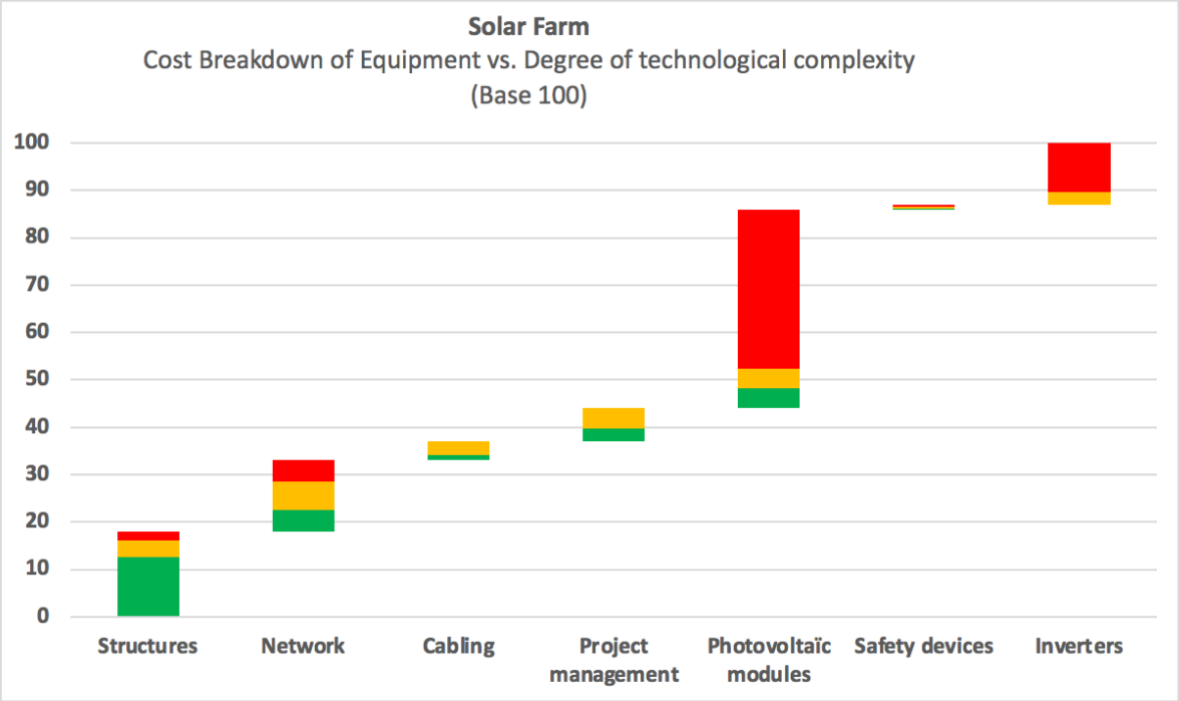
Wind farm

Around 20% of the value added corresponds to the manufacture of the masts. The other parts and sub-assemblies all contain a high proportion of technologically complex parts.



Photovoltaic farm

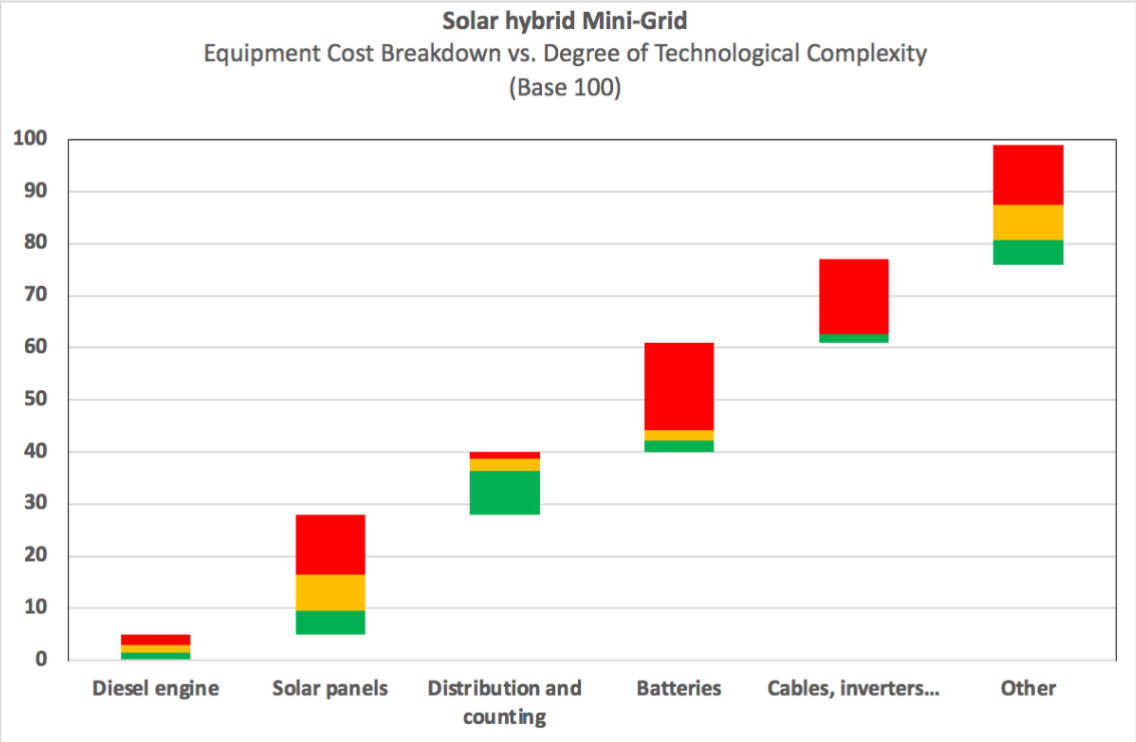
Solar panels (modules) account for around 40% of total added value. Cumulatively, up to 45-50% of added value corresponds to sub-assemblies of low or medium technological complexity (protection boxes, cables, structures, electrical equipment, etc.).



Solar-hybrid mini-grid

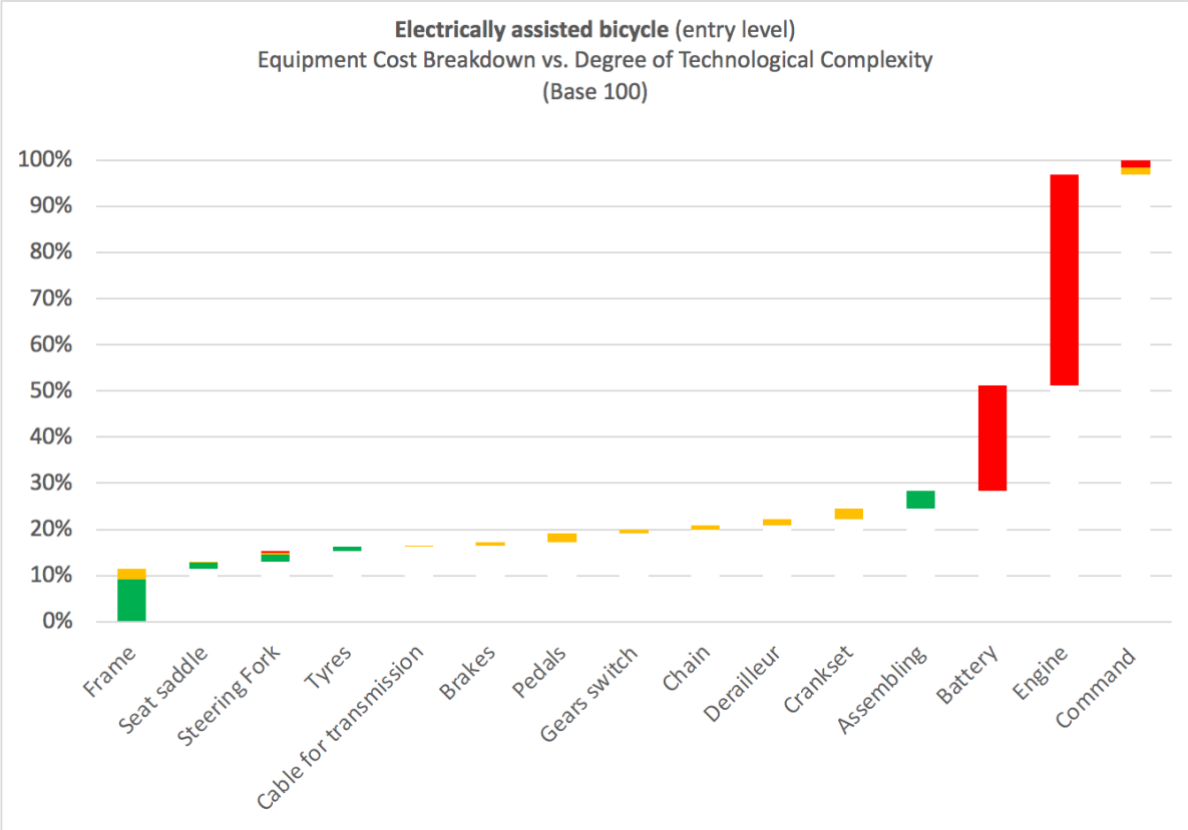
The total added value is divided into 20% tasks of low difficulty, 20% tasks of medium difficulty and 60% tasks of high difficulty.

Localization in Africa is made tricky by the presence of tasks of high technological complexity in all subsets without exception.



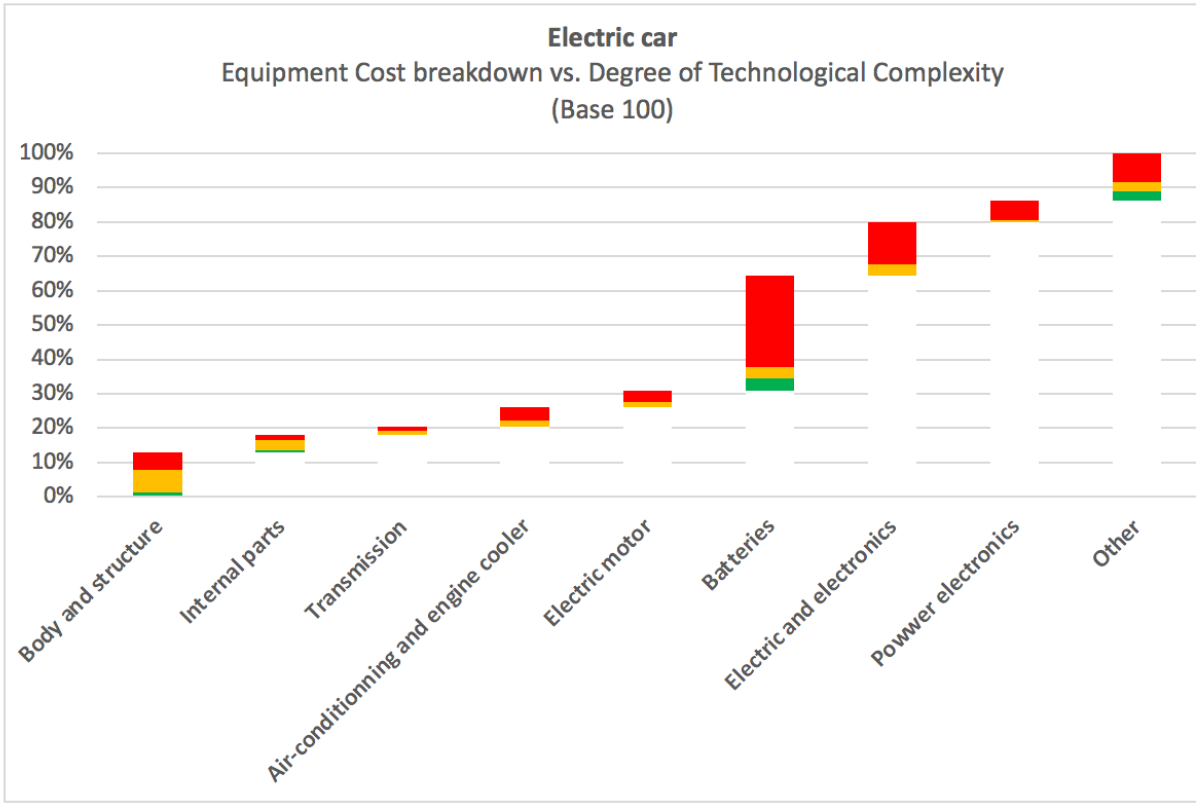
Electric-assist bicycle (entry-level model)

The battery and motor together represent between 65 and 70% of the total added value of the manufacturing process. Due to the high technological complexity of these two sub-assemblies, only 30% of the added value is localizable in the short and medium term for countries "B" and "C".



Electric car

No sub-assembly is exempt from high technological complexity. This is the most "complex" of the green sectors analyzed. Only "A" countries (dense manufacturing base) can hope to gain medium-term access to electric vehicle manufacturing.

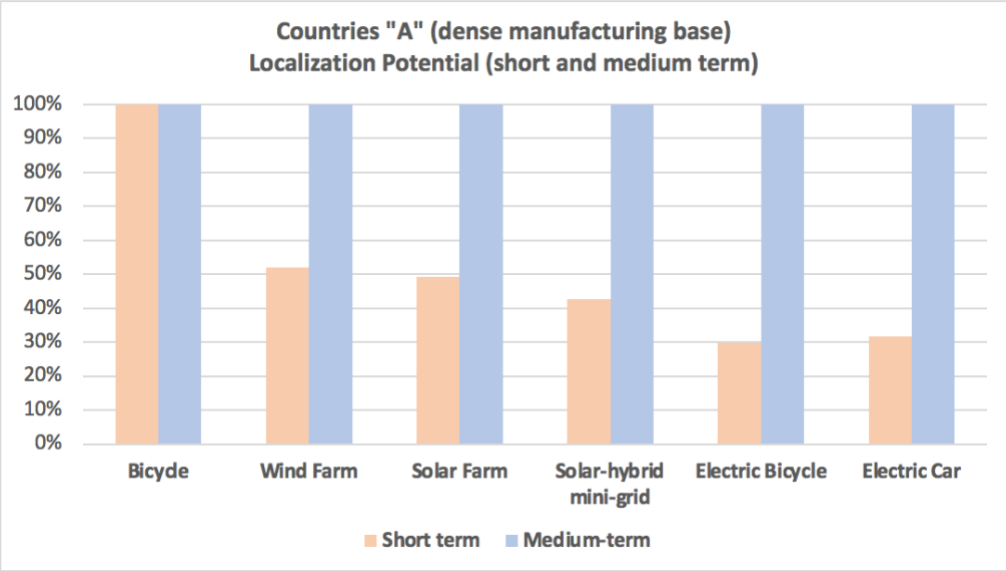


6. Localization potential in Africa

The graphs below show the estimated localization potential for green industries in Africa, in the short term (1 year) and medium term (5 years), by country category.

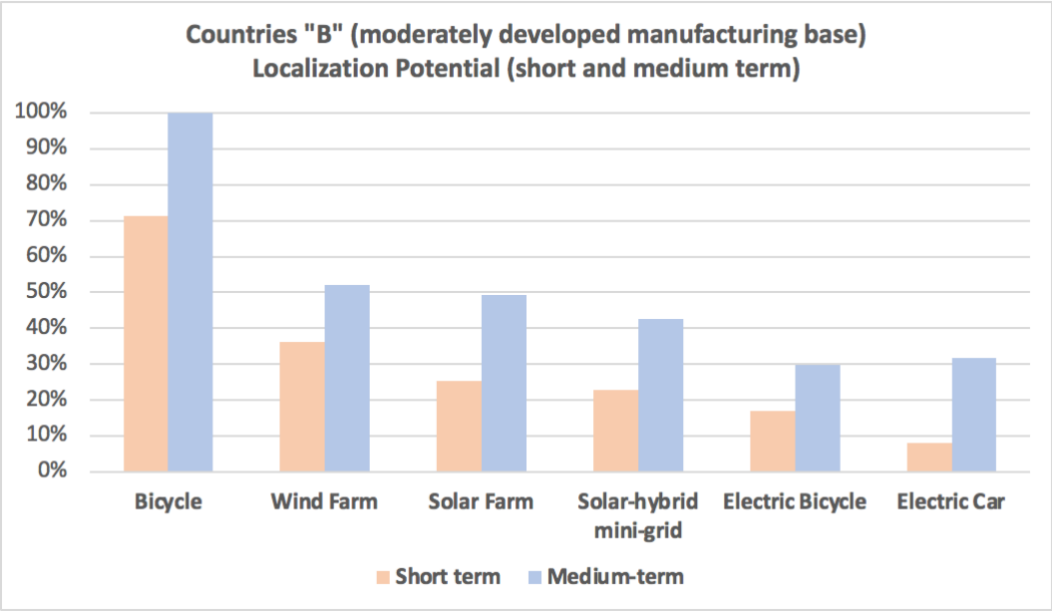
The first graph summarizes the estimated location potential for "A" countries (dense manufacturing sectors). It can be seen that short-term potential is far from negligible. The lowest potential is estimated at 30%, and concerns the manufacture of products containing batteries and/or electric motors, such as electric-assist bicycles and electric cars. Short-term potential climbs to 40/50% for the wind farm and mini-grid manufacturing, and reaches 100% for bicycle manufacturing.

In the medium term, these countries should be able to set up complete integrated value chains, with a localization rate of 100%. To achieve this, they will need to capitalize on the experience they have already acquired in the automotive, aeronautics and space sectors.



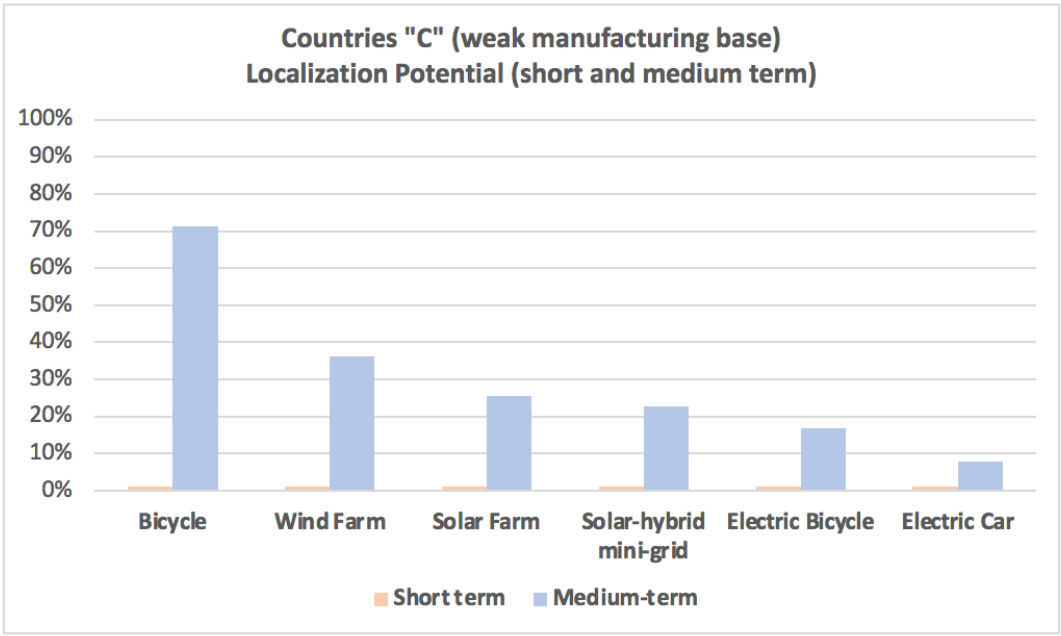
The second graph shows the estimated localization potential for "B" countries (moderately developed manufacturing sectors). Short-term potential ranges from 8% to 70%, depending on the sector.

In the medium term, these countries will be able to achieve localization rates of between 30% and 100%, depending on the sector, provided they develop specific expertise in sectors such as electronics manufacturing, IT and chemicals.



The third chart summarizes the estimated localization potential for "C" countries. In the short term, the potential is almost non-existent, as the existing manufacturing base has too many shortcomings in terms of both sector expertise and industrial integration.

In the medium term, the potential for localization will remain limited to the manufacture of parts with a low degree of technological complexity. Estimated rates are not negligible, however, and fluctuate between 8% and 70% depending on the sector. This will require the development of industrial expertise, which is currently underdeveloped.



7. Conclusions and recommendations

It can be seen that the localization rates that can be envisaged in the short term are high in the case of countries “A” and “B”. In the medium term, "A" countries can aim for almost total control of manufacturing.

For all three categories of country, the realization of medium-term localization potential presupposes the upgrading of existing companies, or even the construction of completely new production units.

In addition to "Degree of technological complexity" and "Density of industrial base", the determinant "Technological homogeneity of sub-assemblies" could be taken into account in the analysis. Indeed, a sub-assembly with an "average degree of technological complexity" can sometimes contain one or more elements that are complex to manufacture (electronic component, advanced chemical process, etc.). In such a case, the logistics of physical flows between suppliers, the European partner and the African partner will have to adapt to the new constraints of partnership manufacturing.

A more in-depth study could also attempt to define the economic model to be implemented to encourage the emergence of joint ventures that design and manufacture on African soil the "green" installations and equipment that these countries need.

Finally, it should be noted that the results presented in this note are orders of magnitude intended to provide an initial perspective. Potential localizations should be considered as orders of magnitude. Further investigation of the sources is essential in order to refine the analyses.