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WIND ENERGY:
JOINING FORCES FOR AN AFRICAN LIFT-OFF

African-European Benefits of Unlocking an Exceptional Endowment

Policy Brief 2022/02

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POLICY BRIEF 2022/02

Wind Energy: Joining Forces for an African Lift-Off

African-European Benefits of Unlocking an Exceptional Endowment

Johan van den Berg, AEEP Secretariat[1]

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EXECUTIVE SUMMARY

Energy is critical to Africa and Europe's sustainable futures and shows immense opportunities for expansion in Africa, as a key driver of economic development. Due to their resource availability and competitive cost, wind power and solar PV are likely to anchor the on-grid energy future by providing dominating contributions to the electricity supply and also increasing shares to other sectors like transport and manufacturing. Africa needs to dramatically expand generation capacity to approach full access to sustainable energy services for its citizens and fully pursue its sustainable master plan as stipulated in the AU Agenda 2063. Working together, Africa and Europe could unlock an unprecedented wind energy potential. As a global powerhouse in both on-shore and off-shore wind energy, Europe can contribute technology, capital, know-how and skills training while Africa is resourced with a young workforce, abundant land, favourable wind regimes and displays deep electricity demand for affordable energy. While the enabling environment needs joint attention and efforts, the rate and sophistication of technology deployment are sufficiently advanced. If all of the global new wind power installations in 2020 had taken place in Africa (and if the grid would have been ready to receive and distribute it), this new annual capacity alone would have sufficed to close the energy access gap in Africa within twelve months for the more than 600 million people needing it. This shows the immense potential of wind power while simultaneously underlining the importance of immediate action on other enabling building blocks, like transmission and distribution systems. Africa now has a total of 6,468 MW of wind-based, installed capacity, but this figure only represents a fraction of the continent's technical wind potential. The latest wind resource analysis commissioned by the World Bank Group's International Finance Corporation estimates that there is enough wind to power the continent's energy demand 250 times over. Despite the very low per unit cost of modern wind power, Africa is presently only using 0.01% of its wind energy resource.

Progress has been made in Egypt (1993), Morocco (2000), South Africa (2002) and Kenya (2009) - all countries that began to install and operate wind farms several decades ago, in different regions of Africa. Further market development at regional level can enable regional power pools to tap into the immense and widely distributed African wind resource. Collaboration between all role players (multilateral, public, private and industry associations) will foster enabling regulation and

[1] This policy brief has benefitted greatly from peer review by GWEC (Africa Task Force), RES4Africa Foundation and the renewAfrica initiative and the contributions made by their personnel who generously contributed their time and expertise.

infrastructure to accelerate the process and bring the benefits of attractive capacity factors, scalability and the potential to localise supply chains and manufacturing – preferably at regional level. These role players include the GWEC[2], RES4Africa[3] and renewAfrica[4] as entities or initiatives with a specific focus on the subject. Regional approaches would align with and feed into continental developments like the African Single Electricity Market,[5] already linked to Europe through the pioneering work of the African Union Commission and the EU Technical Assistance Facility.

Further analysis shows that the critical steps required to fully unlock Africa´s wind endowment are known and that several are in place. A gap analysis highlights that five areas require intensive attention:

1. Enabling regulators and bankable Power Purchase Agreements;
2. Bold action to fund and construct a much-enhanced grid;
3. A vision of manageable, dynamic grid balancing;
4. Localisation roadmaps at regional African level;
5. Capacity development.

Suggestions are made about which actors are best placed to take responsibility for each respective imperative.

[2] The Global Wind Energy Council and specifically its Africa Task Force
[3] See https://www.res4africa.org/
[4] See https://www.renewablematter.eu/articles/article/renewAfrica-the-public-private-partnership-for-renewable-energy-in-africa
[5] See https://eeas.europa.eu/delegations/zambia/93014/african-leaders-launch-african-single-electricity-market-afsem_zh-hans

Why Wind Power?

Wind power is set to be a major contributor to a global and sustainable energy system. By 2015, it had already become one of the lowest cost sources of new electricity, able to deliver at bulk scale. Wind power as generally procured allows for a stable electricity production price over the course of a wind farm's lifetime, avoiding the increased volatility in fuel prices. Together with its renewable and climate-friendly nature, these factors have made wind power a natural technology to pursue between Europe and Africa also in delivering energy access and, thus, economic development.

Since the 2015 Paris Climate Agreement and adoption of Agenda 2030, wind has taken on a very important role in transforming global energy sectors towards sustainability. The primary policy developments in Africa (Agenda 2063) and in Europe (the Comprehensive Strategy with Africa and External Dimension of the European Green Deal) align very well with an accelerated roll-out of wind energy, underpinned by the fourteen-year-old Africa-EU Energy Partnership (AEEP). Europe's track record in both onshore and offshore wind energy enables it to contribute technology, capital, know-how and skills training. Africa can tap into a young workforce, abundant land, favourable wind regimes, deep energy demand, favourable regulatory regimes and increased regional integration.

State of the Global Wind Sector and Its Essential Role in Future Sustainability

The international wind sector has grown from humble beginnings in the early 1970s to a massive global industry today. At the outset, wind turbines had a maximum capacity as low as 20 kW,[6] producing roughly 43 MWh per annum - enough to serve the annual electricity needs of perhaps 12 average European households.[7] While most newly installed, onshore turbines today are in the 2-3 MW range, some offshore turbines now have a capacity of up to 14 MW (about 700 times more powerful than the modest models of the 1970s). These largest turbines are 260 metres high, their nacelles weigh nearly 700 tonnes each[8] and despite wind fluctuations, they yield an average of 60% of maximum output.[9]

[6] See https://windeurope.org/about-wind/history/

[7] Experimental models much larger had been built before that but only one was in the MW range – see https://www.renewableenergyworld.com/storage/history-of-wind-turbines/#gref. For energy usage, see https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/electricity-consumption-dwelling.html – EU average 3,7 MWhs per annum.

[8] https://www.energyfacts.eu/lifting-of-the-worlds-biggest-nacelle-haliade-x-12-mw/

[9] See https://www.ge.com/renewableenergy/wind-energy/offshore-wind/haliade-x-offshore-turbine. See also the first 3 minutes of https://www.youtube.com/watch?v=wr7QZ364jPY&feature=emb_rel_end for an indication of developments.

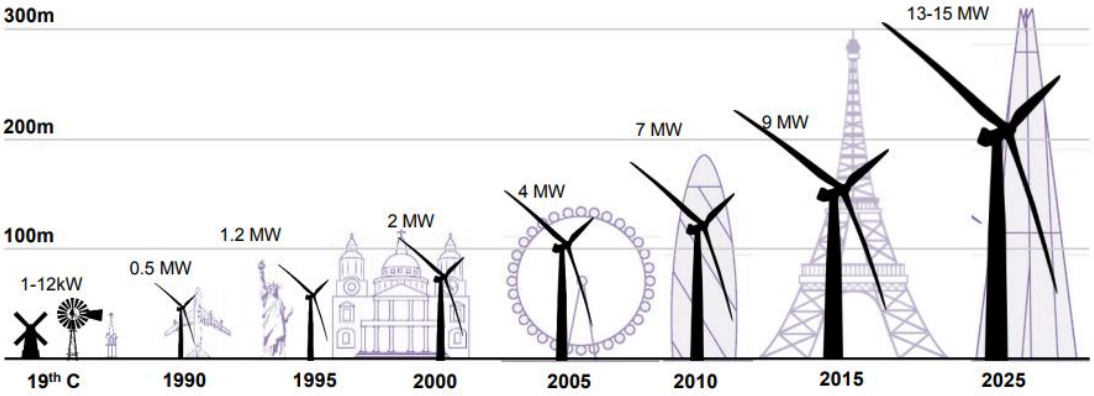

Figure 1: Evolution of wind turbine heights and output (Source: London Summit 2017, Michael Liebreich)

The industry employs more than a million people globally, with about 260,000 in Europe.[10] The market capitalisation of the largest global company dedicated to wind power is over € 150 billion,[11] which is greater than all the world´s oil and gas companies bar the top three.[12]

By the end of 2020, global installed wind capacity reached 743 GW, with 93 GW having been installed in just that calendar year alone.[13] This growth, if all of it had occurred in Africa and the grid was ready to receive and distribute it, could theoretically have lifted 737 million Africans from no access to sustainable energy services to Tier 3 access in the ESMAP framework – in just one year.[14]

[10] https://gwec.net/wind-energy-sector-employs-1-1-million-people-worldwide; https://windeurope.org/wp-content/uploads/files/about-wind/reports/WindEurope-Local-impact-global-leadership.pdf p. 6.
[11] Vestas - see https://ycharts.com/companies/SIEGY/market_cap
[12] Vestas would be the 4th largest oil and gas company globally if it operated in that industry - see https://companiesmarketcap.com/oil-gas/largest-oil-and-gas-companies-by-market-cap/..
[13] See https://gwec.net/global-wind-report-2021/
[14] 93 GW x 8760 hours = 814 680 GWh total output theoretical x 0,33 capacity factor (conservative) = 268 844 GWh = 268,844 million kWh divided by 365 kWh/annum = 737 million Africans could have been electrified at Tier 3 in the ESMAP framework in one year with wind power only. This of course assumes available grid. Assuming a stable grid available to everyone, some 90 million African could have been supplied with access to sustainable energy services at Tier 5 of the ESMAP framework (where 8.2 times more electricity is needed). See https://www.worldbank.org/content/dam/Worldbank/Topics/Energy%20and%20Extract/Beyond_Connections_Energy_Access_Redefined_Exec_ESMAP_2015.pdf p. 10.

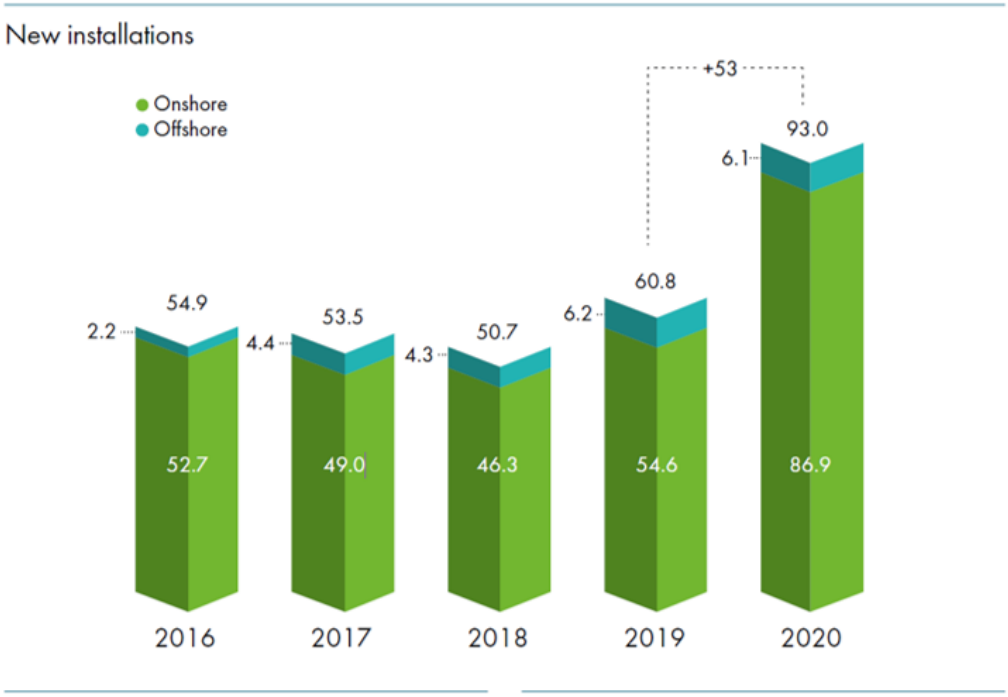

Figure 2: Global new wind power installations in GW (Source: GWEC Global Wind Report 2021)[15]

The global community is aligned in pursuing a low carbon future as underpinned by the Paris Agreement, meaning that cost competitive renewable energies deployable at scale will be required and relied upon. IRENA recognises wind and solar PV as the two leading technologies in this category.[16] Thus, while wind power has grown dramatically in the decades before an energy transition was widely seen as essential, the central position of energy in climate stability and sustainable development means that wind´s continued and accelerated development is now a core element of future, global harmony and human well-being.

Wind's potential contribution has become even more vital against the backdrop of the global COVID19 pandemic. Leveraging the technology's full potential in Africa would be an essential stepping-stone in delivering a green recovery, strengthening the African Single Electricity Market (AfSEM) and creating sustainable jobs.[17]

Leading countries around the world are successfully managing high levels of wind and solar PV into their grids.[18] In the transition to a modern, global economy based on these variable renewable resources, the technical developments mooted to meet this challenge include interconnecting grids over larger geographies to reduce variability.[19] Furthermore, grid operators are developing the skill and know-how to dynamically balance energy grids in real time. Energy storage is a critical

[15] See Global Wind Report 2021 | Global Wind Energy Council (gwec.net) p. 44.
[16] See https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Oct/IRENA_Future_of_wind_2019.pdf p. 9.
[17] https://www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf
[18] See https://www.irena.org/publications/2018/Nov/Power-system-flexibility-for-the-energy-transition and https://www.iea.org/reports/system-integration-of-renewables.
[19] See https://www.irena.org/cleanenergycorridors

component in finally meeting this challenge. The technology to do so already exists and cost projections look extremely promising.[20]

The transport and heating/cooling sectors of the economy are also part of the global decarbonisation journey and aim to do this by electrifying to the greatest extent possible. This further raises the ceiling of the contribution wind power could make in the future. Finally, for hard-to-decarbonise sectors, green hydrogen seems set to become the dominant zero-emissions fuel and wind power is a leading candidate to provide the energy required for its manufacture.[21]

The abovementioned report by IRENA investigates *inter alia* the degree to which wind is on track to deliver its required contribution to the global energy transition and provides encouraging conclusions:[22]

- The levelised cost of electricity for onshore wind power is already competitive with all forms of fossil fuel generation and expected to drop from USD 0.06/kWh in 2018 to as low as USD 0.02/kWh in 2050, through economies of scale and technological innovation.
- The wind industry globally can employ more than 6 million people by 2050.
- Wind power can deliver more than a third of global electricity demand by 2050.
- Global installed wind capacity should be increased to more than 5000 GW - nine-fold the 2018 global capacity and approximately 30 times the installed capacity of the entire African continent in 2016.[23]
- The possible investments globally given such an ambition are in the **€ 100 billion per annum plus** range.
- Wind power in a scenario of deep electrification can yield more than a quarter of the emissions reductions required by 2050 to reach the Paris Agreement and subsequent targets.
- Many of the above aspects are on track for success by 2050.

Wind Power - Where Are We in Africa and Europe?

The energy transition is deeply embedded in pan-African policy as developed and steered by the Africa Union Commission (AUC). The Africa Energy Transition Programme led by the Africa Energy Commission (AFREC) anchors Africa's energy transition to the AU Agenda 2063, UN Agenda 2030 and the Paris Agreement through six strategic objectives. It adopts an ambitious yet flexible Africa-centered implementation approach to rapidly increase the use of renewable energy sources

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[20] See https://www.irena.org/publications/2017/Oct/Electricity-storage-and-renewables-costs-and-markets
[21] See AEEP-Green-Hydrogen-Policy-Brief-Publication-version-Final.pdf (africa-eu-energy-partnership.org) and AEEP_Green-Hydrogen_Bridging-the-Energy-Transition-in-Africa-and-Europe_Final_For-Publication_2.pdf (africa-eu-energy-partnership.org). See also https://ecfr.eu/publication/power-surge-how-the-european-green-deal-can-succeed-in-morocco-and-tunisia/ and https://www.siemensgamesa.com/en-int/explore/journal/2021/03/siemens-gamesa-green-hydrogen.
[22] Irena ibid pp. 10-11. While not all African countries are equally endowed with wind power, the continental endowment is extremely high, as detailed below.
[23] 168 GW as per AfDB at https://www.afdb.org/fileadmin/uploads/afdb/Documents/Development_Effectiveness_Review_2017/ADER_2017__En__Ch._2.pdf p. 24.

such as solar, wind and hydropower to eventually become a fully decarbonised society. As of the STC decision dated 30 June 2021, the AU Member States requested AFREC/AUC to mobilise resources for implementing programmes that will accelerate green energy investments for increased energy access and climate ambition including, among others, wind and solar energy development. AFREC has been specifically mandated to lead on energy transition and is executing this mandate very pro-actively.[24] The African Union Development Agency-NEPAD (AUDA-NEPAD) executes practically on policy developed by the AUC[25] and is about to commission reports into the possible contributions of different technologies (like wind) to the AfSEM. The Programme for Infrastructure Development in Africa (PIDA) is approaching its mandate holistically and with vigour in its Priority Action Plan 2 (PAP2) - also on energy[26]. The African Renewable Energy Initiative (AREI) is "*a transformative, Africa-owned and Africa-led inclusive effort to accelerate and scale up the harnessing of the continent's huge renewable energy potential. Under the mandate of the African Union and endorsed by African Heads of State and Government on Climate Change (CAHOSCC)*"[27] and has much potential to help unlock wind power in Africa.

At member state level, several countries in Africa have built sizeable wind industries in the past decade, as appears from Figure 3 below. These countries generally have established regulatory regimes that will foster growth in wind power and the importance of this aspect is widely acknowledged.[28] These installed capacities (6,468 MW in total in 2020) are only a tiny fraction of what is possible, with the IFC concluding that just onshore, the potential in Africa is sufficient to satisfy the entire continent's electricity demand 250 times over.[29]

The analysis carried out by Everoze also states that **27 African countries on their own each have sufficient wind potential to theoretically supply all of Africa with electricity**.[30] While an optimal generation mix will likely suggest otherwise, it is clear that there is enough potential in wind energy in Africa to easily connect and supply the whole continent and all its people with access to sustainable energy services (grid permitting).

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[24] See "Designing the African Energy Transition" at https://au-afrec.org/publications/afrec-energy-transition-en.pdf.
[25] See https://www.nepad.org/who-we-are/about-us.
[26] See https://pp2.au-pida.org/wp-content/uploads/2020/04/English-Analytical-Report-Integrated-Corridor-Approach-and-Selection-Criteria.pdf.
[27] See http://www.arei.org/#about. Having achieved its goal to realise at least 10 GW of new and additional renewable energy generation capacity by 2020, it is now aiming to generate at least 300 GW by 2030.
[28] See https://africa-eu-partnership.org/sites/default/files/documents/11-2019_sei-platformreport-executivesummary_05.pdf p 4, https://gwec.net/africa-wind-energy-handbook:-private-investment/. The importance is also acknowledged in the work of the Strategy Group on Energy currently working under the auspices of the Africa-Europe Foundation and steered by Friends of Europe.
[29] See https://gwec.net/exploring-africas-untapped-wind-potential/
[30] Ibid. See also the statements by the IFC at https://pressroom.ifc.org/All/Pages/PressDetail.aspx?ID=24607.

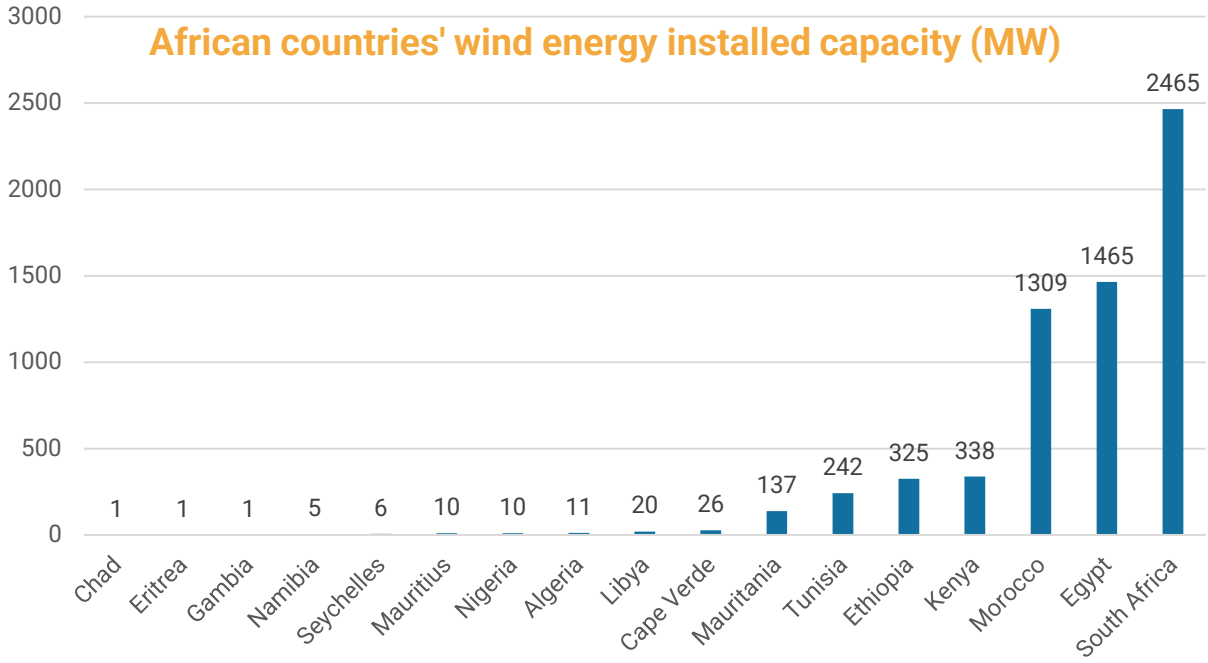

Figure 3: Installed wind energy capacity in MW in selected African countries 2020 [31]

The wind resource in Africa is exceptional in many places and sometimes unprecedented. Africa´s largest wind farm at Lake Turkana in Kenya has shown a capacity factor of around 50%, with similar values available in South Morocco and in Egypt.[32] This value approaches what is achieved offshore in other places. Prices yielded in Africa are already very competitive, displaying the global trend pointed out by IRENA and mentioned above. In South Africa, prices dropped by 59% in the less than 5 years preceding April 2016 and reached approximately USD (also Euro) 4c/kWh.[33] At the time, new wind-based electricity in South Africa, despite the country´s rich coal endowment, was already 40% cheaper than new coal-based electricity.[34] In Senegal, the first commercial windfarm will sell power at well below half the pre-existing generation costs in the country.[35] Morocco has seen wholesale prices in the USD 4c/kWh range and Egypt as low as € 2,8c/kWh.[36] For reference, domestic electricity consumer prices are around USD 20c/kWh in Johannesburg[37],

[31] See Transforming lives through renewable energy access in Africa: UNDP's Contributions | UNDP in Africa. Also see Global Wind Report 2021 | Global Wind Energy Council (gwec.net).
[32] See https://ltwp.co.ke/faq/ question 6.
[33] The euro and dollar were closely aligned at the time at an exchange rate of about 1.13 – see https://www.poundsterlinglive.com/best-exchange-rates/euro-to-us-dollar-exchange-rate-on-2016-04-30. See http://www.energy.gov.za/files/renewable-energy-status-report/Market-Overview-and-Current-Levels-of-Renewable-Energy-Deployment-NERSA.pdf pp. 27-28.
[34] See https://cisp.cachefly.net/assets/articles/attachments/65080_new_power_generators_rsa_-_csir_-_14oct2016.pdf.
[35] See Taïba Ndiaye wind farm https://www.dfc.gov/sites/default/files/2019-08/PublicSummary_Taiba.pdf.
[36] Values communicated by GWEC
[37] See https://www.joburg.org.za/documents_/Documents/TARIFFS/2020-21%20Tariffs/ITEM%2007%20-%20Electricity%20Tariffs.pdf p. 5.

USD 13c/kWh in Rabat[38], USD 19c/kWh in Dakar[39] and USD 5c/kWh in Cairo[40] - while microgrids lead to tariffs of around USD 50c/kWh and Solar Home Systems to tariffs around USD 1,00/kWh.[41]

There are promising signs about job creation, enterprise development and the localisation of wind energy supply chains.[42] South Africa already saw the establishment of wind tower manufacturers while Morocco has welcomed a blade manufacturing facility in Tangier.[43]

The **continental policy framework** ultimately regulating a future pan-African wind industry is Agenda 2063, Africa's blueprint for continental development agreed and published in 2013. Such a continental framework is particularly important given that future energy systems based on variable renewable energy will function best when implemented over large interconnected geographical areas so that variability is lessened and complementarities between different energy sources available in different areas can be optimised. A renewable energy future is thus most often also a politically interdependent and multilateral energy future. This means that pan-African institutions like the African Union, AUDA-NEPAD and Regional Economic Communities will become essential enablers of the energy transition.

Agenda 2063 explicitly envisions the kind of future that optimal wind energy development requires. The first two of the seven "Aspirations" guiding the document mention "*prosperity based on inclusive growth and sustainable development"* and in addition "*an integrated continent, politically united and based on the ideals of Pan-Africanism…*".[44] In its ambitions on energy, the Agenda mentions "*harnessing all African energy resources to ensure modern, efficient, reliable, cost effective, renewable and environmentally friendly energy to all African households.*"[45] Its vision of regional integration and free trade has already manifested in the African Continental Free Trade Agreement entered into effect on May 30, 2019 with trade having commenced on January 1, 2021.[46] In summary, the political aspirations in Africa are well aligned with the considerable wind potential needing to be unlocked. The process has begun but requires some **enablers** that will be discussed below.

The **wind industry in Europe** is a global leader, well established, strong and comparatively mature. Its progress and explosive growth over the last four decades have built on strong political support in many European countries. Enabling regulation and co-ordination were facilitated by strong, Pan-European and Global Industry Associations (the European Wind Energy Association – later WindEurope and the Global Wind Energy Council). The growth consistently surpassed expectations and serves as a reminder of what is possible in Africa.

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[38] https://www.globalpetrolprices.com/Morocco/electricity_prices/, retrieved 7 September 2021
[39] https://www.globalpetrolprices.com/Senegal/, retrieved 7 September 2021
[40] https://www.globalpetrolprices.com/Egypt/, retrieved 7 September 2021
[41] See MGP-2020-SEforALL.pdf p. 36 and further.
[42] See https://www.ipp-projects.co.za/Publications/GetPublicationFile?fileid=2cb151e8-eeee-eb11-954d-2c59e59ac9cd&fileName=20210630_IPP%20Office%20Q4%20Overview%202020-21%20WEB%20VERSION.PDF generally and with a summary on p. 3 – accessed 13 August 2021.
[43] See and https://hulisani.co.za/project/gri-wind-towers and https://www.siemensgamesa.com/newsroom/2017/10/siemens-gamesa-inaugurates-the-first-blade-plant-in-africa-and-the-middle-east.
[44] https://www.un.org/en/africa/osaa/pdf/au/agenda2063.pdf.
[45] Ibid p.16.
[46] See https://www.tralac.org/resources/infographic/13795-status-of-afcfta-ratification.html.

EWEA/Wind Europe Forecast: European Installed Wind Power Capacity in the Future	By 2010	By 2020	By 2030
1991			100.000
1997			100.000
2003	75.000	180.000	
2006			300.000
2011		230.000	400.000

Figure 4: Wind Industry Growth Exceeding Expectations (Source: EWEA/WindEurope Forecast 1991-2011)

It is clear that the expectation of the size of the industry measured in MW installed by 2030 rose by 400% in twenty years after 1991 and that the actual installed capacity of just over 200 GW in 2020 was more than double of what in the year 1991 was expected to be built only by 2030.[47]

The European industry and supply chain contain all elements of wind power from installation and skills for wind measurement through environmental impact assessment, contracting, finance, logistics and transport, construction, insurance, operation and maintenance, refinancing and land rehabilitation/repowering of wind farms.

In the **policy domain,** Europe has set out on an ambitious thirty-year journey encapsulated in the European Green Deal. The main principles for Europe are:[48]

- there are no net emissions of greenhouse gases by 2050;
- economic growth is decoupled from resource use;
- no person and no place left behind.

The initiative has an external dimension that focuses intensely on Africa[49] and if read with the Comprehensive Strategy with Africa,[50] makes it clear that an eye-level partnership of equals is meant to underpin joint ambitions on a range of topics including access to sustainable energy, combatting climate change, regional integration and the strengthening of the multi-lateral rules-based order.[51] Dramatic further growth of the wind sector is foreseen in Europe.[52]

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[47] Ibid printed p. 1 (PDF p. 2).
[48] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en
[49] See https://ec.europa.eu/newsroom/devco/item-detail.cfm?item_id=673950&utm_source=devco_newsroom&utm_medium=Website&utm_campaign=devco&utm_content=The%20external%20dimension%20of%20the%20Green%20Deal&lang=en
[50] See https://ec.europa.eu/international-partnerships/system/files/communication-eu-africa-strategy-join-2020-4-final_en.pdf.
[51] Ibid printed p. 1 (PDF p. 2).
[52] The European offshore strategy, for example, proposes to increase Europe's offshore wind capacity from its current level of 12 GW to at least 60 GW by 2030

Europe has existing initiatives with strong contributors, relevant political alignment,[53] deep expertise and with mandates that specifically include growing the wind sector in Africa. These actors include the GWEC, RES4Africa and renewAfrica. Moreover, the EU Technical Assistance Facility (EU TAF) works in close collaboration with the AUC and is already delivering ground-breaking outputs in topics related to the energy transition.

In summary, Europe has firmly set out on the zero-carbon journey and its political approach is highly synergetic with the imperatives of the African Union. This alignment is reflected with respect to the potential at a commercial and technical level for co-operation between the continents.

What is Required Now: The Africa-Europe Synergy of an African Wind Lift-Off

The energy ambitions and policy objectives of Africa and Europe are well aligned and converging. It is clear that the Africa-EU Energy Partnership (AEEP) is an established and robust framework to anchor enhanced and more fundamental co-operation on energy.

Given the highly competitive prices achieved by wind power globally and also in Africa, it seems certain that Africa has the potential to dramatically expand its wind sector. Just how much more growth is possible in African wind power is illustrated by a continental comparison:

	Europe	Africa
Present installed base (GW) 2019	205[54]	6[55]
GW installed per million square km	21,5[56]	0,2[57]
Citizens per GW wind power installed	3.5 million[58]	200 million[59]

Figure 5: Potential Growth in Wind Power in Africa (Various sources as cited)

With clarity on Africa's vast wind power potential, the question is **what is required to realise this potential** and which components need to be fostered?

The literature and the AEEP's engagements with market experts reveal that an African lift-off in wind power requires the following, all of which Europe is well placed to support as a partner:

- **Enhanced multilateralism** to create the political framework in which large, multi-country power pools utilising deep penetrations of affordable wind and solar PV energy can flourish. Multilateralism is already a common and shared value between the continents. It would be **enhanced by regional African energy planning** that quantifies the benefits of transnational collaboration on energy. At present, modelling is already planned to support

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and to 300 GW by 2050 – see https://audiovisual.ec.europa.eu/en/topnews/M-005846

[53] DG INTPA, DG DEVCO and DG CLIMA

[54] See 2019 data at https://windeurope.org/about-wind/statistics/european/wind-energy-in-europe-in-2019/.

[55] See https://www.statista.com/statistics/441630/installed-wind-power-capacity-in-middle-east-north-africa/.

[56] 215/Europe´s size of 10 million square kilometers.

[57] 6/Africa´s size of 30 million square kilometers.

[58] 750 million/215 GW.

[59] 1,2 billion/6 GW.

the Continental Masterplan, led by the EU TAF[60] with technical input from the IAEA and IRENA. This would also embed the concept of regional power pools with policymakers of the present and future.

- **Enabling regulatory regimes and regulators and bankable Power Purchase Agreements** – These related topics have been identified repeatedly as key enablers of African countries like South Africa being able to rapidly scale up their wind sectors and dramatically bring down the cost of wind power, also by utilising leveraged (project) finance.[61] The African Development Bank (AfDB) publishes an annual Electricity Regulatory Index that guides countries towards best practice. Europe possesses good examples to supplement those already present in Africa and is supporting further progress through the EU TAF. An African School of Regulation, launched in February 2022 and supported by the Africa Europe Foundation, aims to equip African regulators with the capacity to encourage private sector investment in the African power sector. Attracting additional generation contributors to power pools would lower prices and risk.

- **A much expanded and enhanced grid with greater interconnectivity**. Again, the EU TAF has done extensive work supporting the policy paper and roadmap for AfSEM and the Continental Power Systems Master Plan. The importance of getting started early on grid expansion was likewise articulated in the SEIP Report.[62] What was **missing, was a bold and mobilising vision** to fund and construct a much-enhanced grid immediately - in the firm belief that it is needed and will be utilised, once there. Symbolically, such a grid would embed the idea of multilateralism and interdependence in the Pan-African energy future. This vision has now seen the light with the launch of the **Grids4Africa** initiative.[63]

- **A vision of manageable, dynamic grid balancing** through international collaboration, transition fuels and/or storage. Large power pools and endowments with hydro, geothermal and other non-variable renewable resources will allow ever higher penetrations of wind and solar PV. Nevertheless, policymakers and grid operators should be reassured that a complete energy transition is feasible and achievable. A lot is still to be done and **Europe has the case studies and experienced operators** to demonstrate and convey what is possible.

- **Localised value chains that create jobs and embed political support for wind power**. Some good examples already exist in Africa[64] and many jobs by default are created in wind measurement, environmental impact assessment, contracting, finance, logistics and support, construction, insurance, operation and maintenance and land rehabilitation/repowering of wind farms. Manufacturing jobs in the wind supply chain require **political dialogue and green diplomacy** to manage divergent convictions on the merits of procurement systems designed to produce local manufacturing and jobs. From an African perspective, such design is essential to bed down political support for wind power. From a European perspective, it is clear that massive export opportunities in goods and services will exist even if say 50% of wind supply chains in Africa were to be localised. There is a **need for localisation road maps at regional African level**. The immediate urge is

[60] Mr. Peter Kinuthia, AUC, 8 March 2021.
[61] https://africa-eu-partnership.org/sites/default/files/documents/11-2019_sei-platformreport-executivesummary_05.pdf p. 4 and further.
[62] Ibid p. 6.
[63] See https://www.youtube.com/watch?v=EQNjUeUnzpQ and General 2 — RES 4 AFRICA.
[64] See http://www.wasaproject.info/docs/WindEnergyLocalisationStudyJan2015.pdf.

for all countries to want to make and even export everything in the value chain. Competitive advantage, however, needs to be taken into account. Regional approaches will enlarge markets, leading to thresholds for localisation being exceeded sooner. It would unlock synergies and avoid destructive competition where young markets can only sustain a limited number of participants.

- **Capital – debt and equity -** Accumulated wind power investments in Africa between the year 2020 and 2040 is projected to amount to USD 38 billion.[65] European entities have already been extremely active in providing debt and equity to wind projects in Africa. This possibility will continue to exist for interested European entities. There is promise in applying the model of Scaling Solar to wind.[66]
- **De-risking, concessional loans and support with the equivalent of sovereign guarantees** - to lower the cost of capital and underpin Power Purchase Agreements.[67] National utilities in Africa are usually the off-takers and their credits ratings are not always high. Guarantees by governments solve this in the short term but need to be kept at manageable levels as the renewable energy industry brings more projects online.
- **Pan-African industry associations** to be the custodians of wind power, and foster capacity building. It is clear that WindEurope and GWEC were critical enablers in Europe and internationally. This capacity now needs to be replicated in Africa to foster and guide the African wind journey. GWEC, through its Africa Task Force, is already working to support the evolution of such associations.

[65] See GWEC at https://gwec.net/africa-wind-energy-handbook:-private-investment/.
[66] See https://www.scalingsolar.org/.
[67] The AEEP Secretariat report on "European Financial Flows on SDG7 to Africa for the years 2014 – 2019" identifies the very important role played by concessional finance in the journey towards achieving SDG7 in Africa. See https://sdg7.africa-eu-energy-partnership.org/wp-content/uploads/2021/08/AEEP-European-Financial-Flows-on-SDG7-to-Africa-2021-Report.pdf

The Road Ahead

An African wind lift-off that fully leverages the continent´s special relationship with Europe is well underway. To occur in time to secure wind´s proportionate contribution to Agenda 2063 and Agenda 2030, all enablers need to be activated and initiatives placed with the entities best able to execute. The analysis above suggests that the following tasks presently unallocated could be carried out by the following entities:

1. **Enabling regulators and bankable Power Purchase Agreements**
   The African School of Regulation, once fully established, will foster cutting edge perspectives with African electricity/energy regulators about the energy system of the future and how to regulate it. Bankable PPAs can be created by testing drafts with project finance institutions and by following African best practice. Consideration can be given to creating a standardised template. Such work can possibly be undertaken by African Regional Industry Associations in collaboration with GWEC and supported by the EU TAF.

2. **Bold action to fund and construct a much-enhanced grid**
   Already noted in important documents mentioned above, a way has to be found to build and fund grid infrastructure soon. While distributed energy solutions will play a critical role in Africa´s future, wind power needs transmissions systems to deliver its full potential. This is perhaps the most challenging missing step in Africa´s wind journey. If the grid is there, it will be possible to build wind farms in all ideal locations. The chicken-and-egg dilemma of whether the projects or the grid must go first needs to be resolved. An ambitious grid plan as now voiced through the Grids4Africa initiative would fit very well with international climate finance and the aims of the Green Climate Fund. Multilateral funders like the IFC or World Bank could contribute significantly.

3. **A vision of manageable, dynamic grid balancing**
   Study tours to Europe and strategic peer exchanges between Europe and Africa and intra-Africa will create confidence with grid operators and power pools that modern economies can be run on very deep penetrations of renewable energy. This can be hosted by the EU TAF in collaboration with the AUC and the AEEP. In the medium-term, storage or transition fuels would have to be included in regional energy planning and regional roadmaps would have to be created for these. IRENA is well positioned to assist in such an endeavour.

4. **Localisation roadmaps at regional African level**
   These should be driven by regional wind industry associations in Africa in collaboration with the Regional Economic Communities and the GNSEC Centres for Renewable Energy and Energy Efficiency.

5. **Ongoing capacity development**
   This will be key, given that the energy transition requires buy-in and alignment at the highest political level and technical understanding throughout the entire economy, in a multi-disciplinary manner. Manifold initiatives already target this requirement and will need to be maintained, expanded and deepened. The AEEP will continue to co-ordinate efforts.

   All of the above would be served in an overarching fashion by a comprehensive, multi-decade wind energy programme embedded in the AUC and also in AUDA-NEPAD as the executing agency of the African Union, displaying integration with the Programme for Infrastructure Development in Africa (PIDA).

Figure 6: Five Main Action Areas to Unlock Africa's Wind Lift-Off, Image Source: AEEP – Data Source: Everoze/IFC

About

The Africa-EU Energy Partnership (AEEP) is Africa and Europe's gateway for joint action on a green energy future. With an unmatched overview of the political processes and initiatives across both continents, the AEEP maps, monitors and convenes the actions and stakeholders that drive the African and European energy transformation. Providing a forum for political dialogue, knowledge sharing and peer connections, it enables Africa and Europe to make progress on their path to a sustainable energy future.

Tap into more information

africa-eu-energy-partnership.org

info@aeep-secretariat.org

@AfricaEUEnergy

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Ministry of Electricity and Renewable Energy

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