



Forecasting Green Jobs in Africa

Main Report Final

JULY 2024

Africa, despite contributing only 3% of global carbon emissions, holds unique potential to lead in global decarbonization efforts and capitalize on new green industries. With vast natural resources, renewable energy potential, and the world's largest rising workforce, Africa can leapfrog directly to renewable energy, bypassing carbon-intensive infrastructure. Some expert organizations have estimated that the green economy could create up to 100 million new and improved jobs and livelihoods across Africa by 2050.

Achieving Africa's green promise requires supportive policies, infrastructure, and significant financial investments, estimated at over \$100 billion annually. However, the success of green economic growth also hinges on developing the right human capital and talent. A skilled green workforce is essential for both driving and benefiting from this growth.

Unfortunately, human capital often receives less attention in these discussions. While infrastructure, policy, and capital flows are frequently analyzed, talent demand and supply dynamics have been overlooked—until now.

This report presents the first pan-African forecast for near-term direct job creation in select green sectors, aimed at educators, training institutions, staffing firms, and policymakers. It serves as a foundation for further research on labor demand across different sectors, regions, and timeframes.

The near-term projection of over 3 million new direct jobs in 12 sub-sectors by 2030 is significant, but it underestimates the broader job creation potential. This is due to:

- Focusing only on jobs created by 2030, while the largest potential lies in the long term.
- Considering only the 12 most mature sub-sectors, excluding for now promising areas like biofuels, green hydrogen, agroforestry, and regenerative agriculture.
- Excluding "green-adjacent" sectors like minerals and mining, which are crucial for green growth but not typically considered green under current practices.
- Counting only direct jobs, not indirect, induced or “productive use” employment, which could significantly increase job creation estimates.

We believe it is important to start with this narrow 2030 view, because these 3+ million jobs will underpin broader growth in the green workforce. If we fail to identify, train and equip the talent needed immediately for Africa’s maturing industries, the larger and longer-term forecasts may remain aspirations.

We hope this report highlights the critical role of human capital in green economic growth and suggests further research to provide a detailed view of skills demand and potential mismatches. Alongside the report, we are also sharing the full Excel spreadsheet to enable others to learn from and build on the methodology. We look forward to feedback and efforts to build on this.



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Executive summary | 1.5 to 3.3M new direct green jobs are forecasted across Africa by 2030 in 12 material value chains

Context and objectives

The objective of this research is to create an indicative macro forecast of Africa's green jobs by 2030, along with a replicable methodology, to guide stakeholders in building core skills and talent pipelines for green growth

- A skilled green workforce is both a foundational input and a significant outcome to accelerating green industries across Africa; highlighting the need to invest adequately into skills development
- Public, private and social sector actors aiming to spur green growth and employment lack a shared and granular view of labour demand

Approach and methodology

We have taken a scalable, demand-driven approach to forecast direct green jobs in 12 high potential value chains

- Forecasting is done on direct green jobs in 12 value chains from 5 material sectors (energy and power, mobility and transportation, agriculture and nature, construction and real estate, and manufacturing and materials). These value chains were prioritized based on Africa's comparative advantage and potential employment intensity in the near term
- The number of gross direct green jobs are forecasted to 2030 (5 years) for Africa, with deep dives into Democratic Republic of Congo (DRC), Ethiopia, Kenya, Nigeria and South Africa

Findings

5-year forecasts (to 2030) in 12 material value chains indicates there will be 1.5 to 3.3M new direct green jobs, driven by ambitions to scale energy generation and efforts to modernise agriculture

- Energy and power is expected to generate up to **2M jobs (70% of total)**, primarily from solar at up to **1.7M (57% of total)** and power transmission and distribution at up to **197K (6% of total)**
 - Agriculture and nature are forecasted to have up to **700K jobs (25% of total)**, with climate smart agriculture technology (CSA) up to **377K (13% of total)**, aquaculture and poultry up to **189K (6% of total)**, and ecosystem and nature-based solutions (NBS) up to **117K (4% of total)**

Executive summary | Primary focus is to enable stakeholders to take action on deepening fact base, develop the workforce and enable the ecosystem

Findings (continued)

- Accounting for the approximately 20 nascent value chains, total new direct jobs could rise to **3.3M** in the next 5 years
- The 5 focus countries are forecast to contribute up to **720K jobs (22% of total)** by 2030
 - South Africa, Kenya and Nigeria represent the highest job creation potential (16%) due to population, gross domestic product (GDP) and industry maturity
 - The countries reflect considerable diversity, for example i) hydro being leading employer in **DRC at 16K** and **Ethiopia at 33K** jobs; ii) solar leading in **South Africa at 140K** and **Kenya at 111K** jobs; iii) aquaculture and poultry leading in **Nigeria at 69K** jobs
- Specialised and advanced jobs projected up to **1.3M (40% of total)**, require focused skilling efforts to ensure ample talent pipeline
 - Unskilled jobs such as casual labourers present the highest job creation opportunity at up to **1.3M (40% of total)**
 - General and administrative jobs are forecast at up to **650K (20% of total)**, followed by advanced skills at up to **320K (11%)**

Proposed way forward

The primary focus going forward is to enable broad stakeholders to act on deepening the fact base, developing the workforce and enabling the ecosystem

- Enhancing the fact base involves conducting deep dives in target countries and value chains to explore the current supply of skilled labour and identify potential gaps
- In line with the deep dives, stakeholders would need to enhance formal education programs, vocational training curricular, and on-the-job skills development to develop the workforce to meet the demand
- Enabling the ecosystem will involve:
 - Targeted investments in high-potential sectors and value chains
 - Fostering cross-sector collaboration between governments, private sector, learning and training institutions, and funders/investors
 - Developing comprehensive support policies for green sectors

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Industry experts expect significant green jobs growth by 2050—up to 100M jobs & livelihoods—but need to focus on short-term initiatives to realize growth

Up to
100M
green jobs &
livelihoods forecast
by industry experts

- **Significant growth expected:** Limited bodies of work on green labor force in Africa; however, sources agree that there will be a significant increase in green jobs & livelihoods in Africa by 2050 despite variation in estimates
- **Additional rigorous analysis required:** Estimates to date are high-level or only capture a subset of green sectors; need for more thorough and comprehensive forecasting to substantiate and make actionable
- **Short-term focus:** Up to 100M of jobs & livelihoods can't be reached in the long-term without rigorous analysis and workforce development focused on the short-term (by 2030)



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International
Labour
Organization



Climate Action
Platform
Africa

A skilled green workforce is both a foundational input and a significant outcome to accelerating green industries across Africa

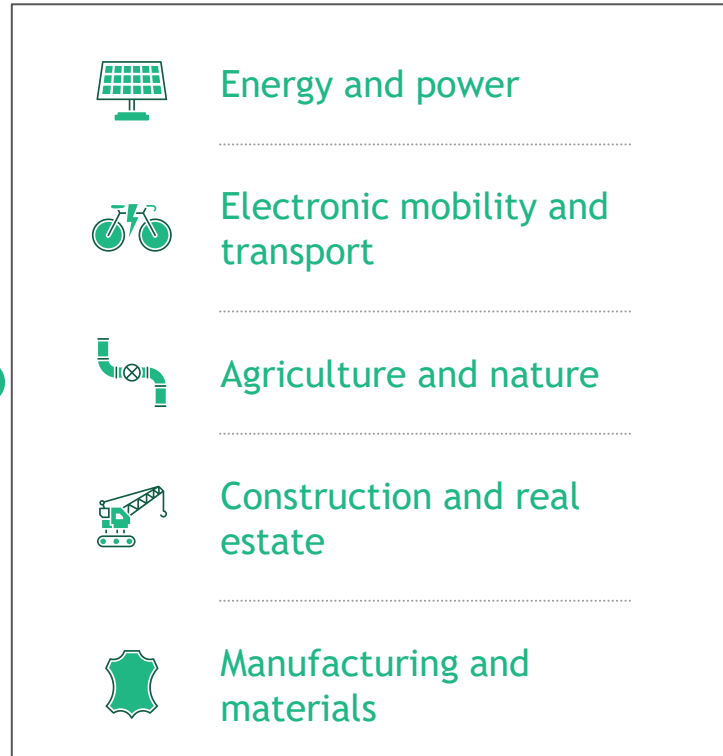
The skilled green workforce's dual role emphasises the need for skill development investment for sustainability and prosperity



Required inputs

☆ **Human capital/ skills:** to equip workforce with skills for green occupations and transition, and strengthen institutions to support planning, implementation and monitoring of green initiatives

- **Diverse capital availability:** for infrastructure, technology and business operations
- **Strong policies and governance:** to support stable operating environment, trade policy and incentives for investment in green sectors
- **Infrastructure:** to develop resilient infrastructure to support green sectors



Beneficial outcomes

☆ **Job creation and skills development:** Generate new jobs and continuously improve workforce skills leading to high productivity and more employment opportunities/ mobility

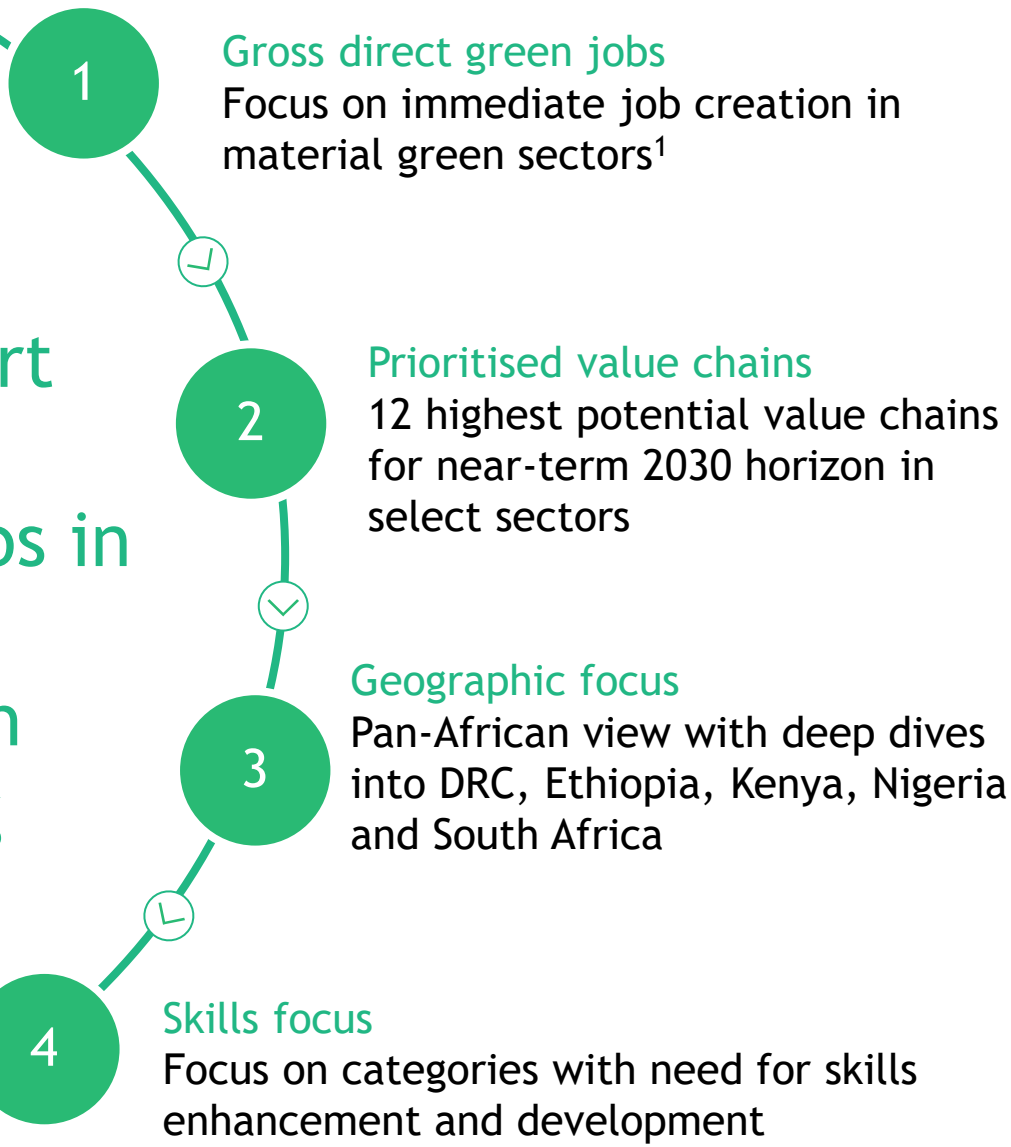


- **Economic growth:** Development of new industries increased innovation in green tech
- **Environmental benefit and climate resilience:** Reduce green house gasses (GHG) emissions, improve climate resilience and protect biodiversity
- **Social benefits:** Improved environmental quality leading better public health outcomes and empowered communities

Green sectors

Key: ☆ Focus of this analysis

The report forecasts green jobs in Africa by 2030 with following focus



1. Estimates do not include indirect and induced jobs

With the aim to enable following stakeholders

Learning and training institutions: Design training programs to fill skills gaps

Funders and investors: Allocate capital towards enterprise and skills required for their employees

Large employers and industry associations: aligning hiring practices and skilling with the evolving demands

Policy makers and researchers: to formulate policies promoting green economy jobs in line with national objectives

The prioritized 12 value chains lay the groundwork needed to scale employment on the continent to 2050

Illustrative

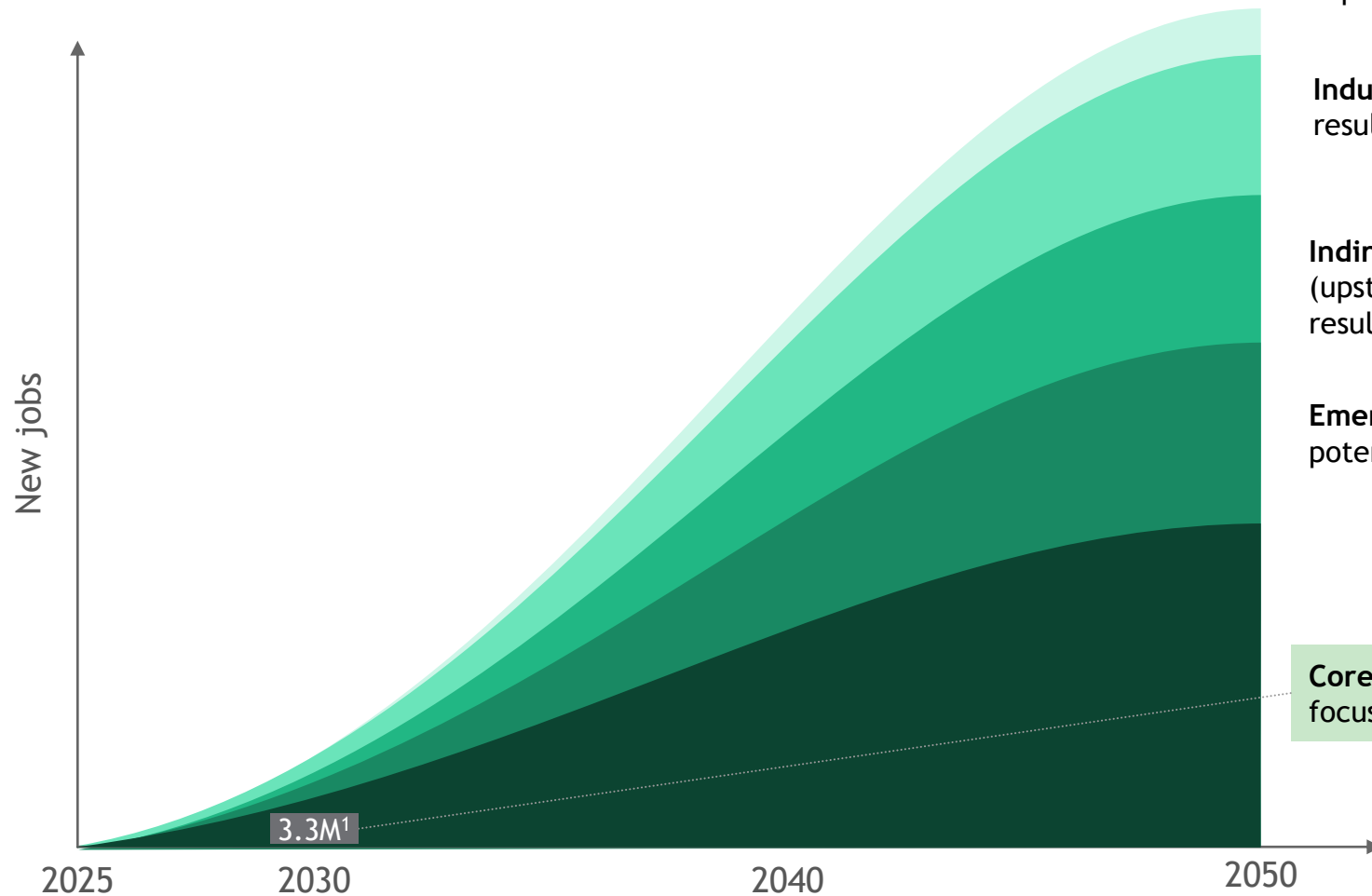
Localized jobs: currently overseas that could be replaced by workforce residing on the African continent

Induced jobs: created by increased economic activity resulting from direct and indirect workforce spending

Indirect jobs: jobs that arise in the supply chain (upstream) of the primary value chains, and as a result of their outputs (downstream)

Emerging value chains with longer-term job impact potential (beyond 2030)

Core 12 value chains with maturity by 2030 and focus of this report for near-term job potential



1. This is the upper bound figure

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We prioritised green value chains which will yield the most jobs in the next 5 years, based on Africa’s comparative advantage and employment intensity



Value chain prioritisation

- Africa’s unique comparative advantage e.g.,
 - Resource endowments
 - Time to impact 5 years and onwards
- Potential for employment impact
 - Employment intensity
 - Africa Union prioritisation



Green sector mapping

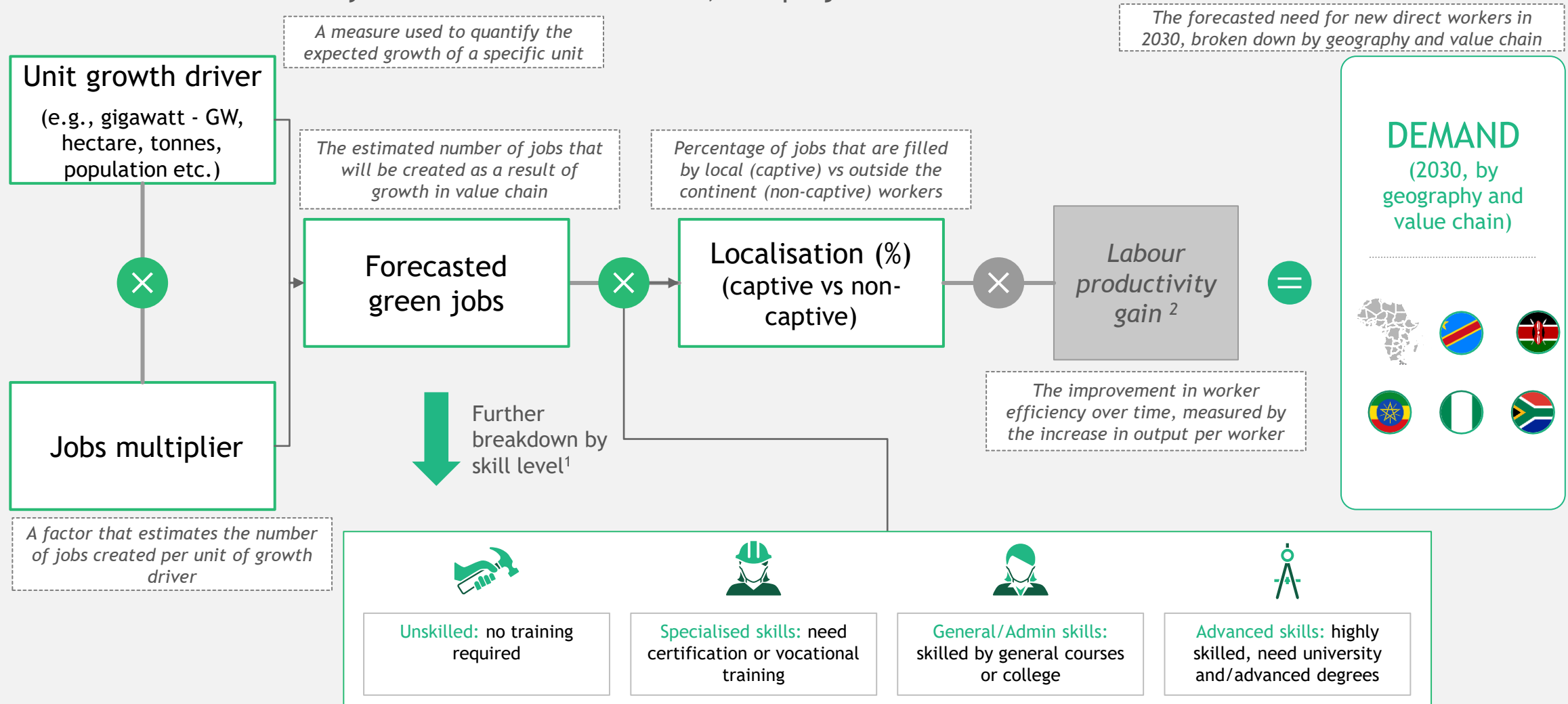
- 5 global green job taxonomies
- Over 20 global reports assessed
- Insights from industry experts

Commence focus now
Though impact expected in 10+ years horizon, requires dedicated focus from today

Sector	Near term (2025-2030) + onwards		Long term (2030 + onwards)	
Energy and Power	<ul style="list-style-type: none"> • Solar • Wind • Geothermal • Hydro 	<ul style="list-style-type: none"> • Battery storage • Power transmission and distribution 	<ul style="list-style-type: none"> • Bio-fuel • Green hydrogen • Bio-gas 	<ul style="list-style-type: none"> • Nuclear • Tidal and wave • Smart grid tech
Mobility and transportation	<ul style="list-style-type: none"> • Electric 2/3 wheelers 	<ul style="list-style-type: none"> • Charging infrastructure 	<ul style="list-style-type: none"> • Electric buses 	<ul style="list-style-type: none"> • Electric 4 wheelers
Agriculture and nature	<ul style="list-style-type: none"> • Climate smart agri-technology • Aquaculture and poultry 	<ul style="list-style-type: none"> • Ecosystem conservation and NBS 	<ul style="list-style-type: none"> • Water purification and desalination • Agro-forestry 	<ul style="list-style-type: none"> • Regenerative crop production
Construction and real estate			<ul style="list-style-type: none"> • Landfill management • Green building design and const. 	<ul style="list-style-type: none"> • Water management infrastructure
Manufacturing and materials	<ul style="list-style-type: none"> • Waste remediation and recycling 		<ul style="list-style-type: none"> • Sust. packaging • Sustainable fashion • Clean cooking 	<ul style="list-style-type: none"> • Sust. building materials • Green chemicals
Financial and professional services	<ul style="list-style-type: none"> • Green finance (including green bonds) • Carbon markets and services 		Enabler across all value chains	

Approach | Modelling future green jobs demand

Note: Model at the country level for time 2025 - 2030, and projected for Africa



1. Skill levels; 2. No meaningful gains expected within the next 5 years therefore not included in this modelling exercise

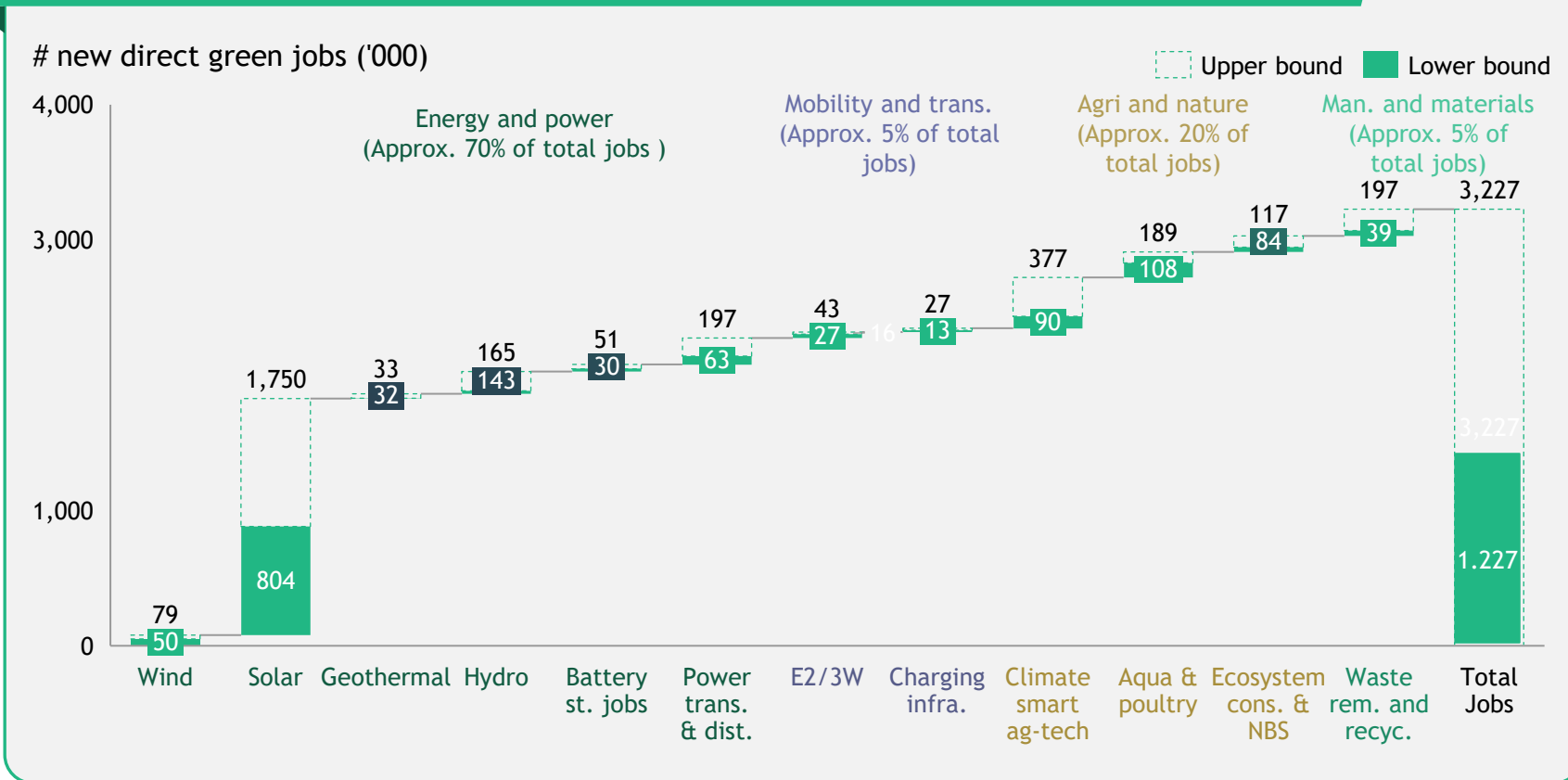
Source: ILO Skill level 1-4 definition;

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1.5 to 3.3M new green jobs are forecasted by 2030 in 12 main value chains

Total Green Jobs in Africa, Value Chain Breakdown, (2030) ('000 Jobs)



Solar (57%), and CSA (12%) present the highest job opportunity, followed by aquaculture and poultry, and waste remediation and recycling:

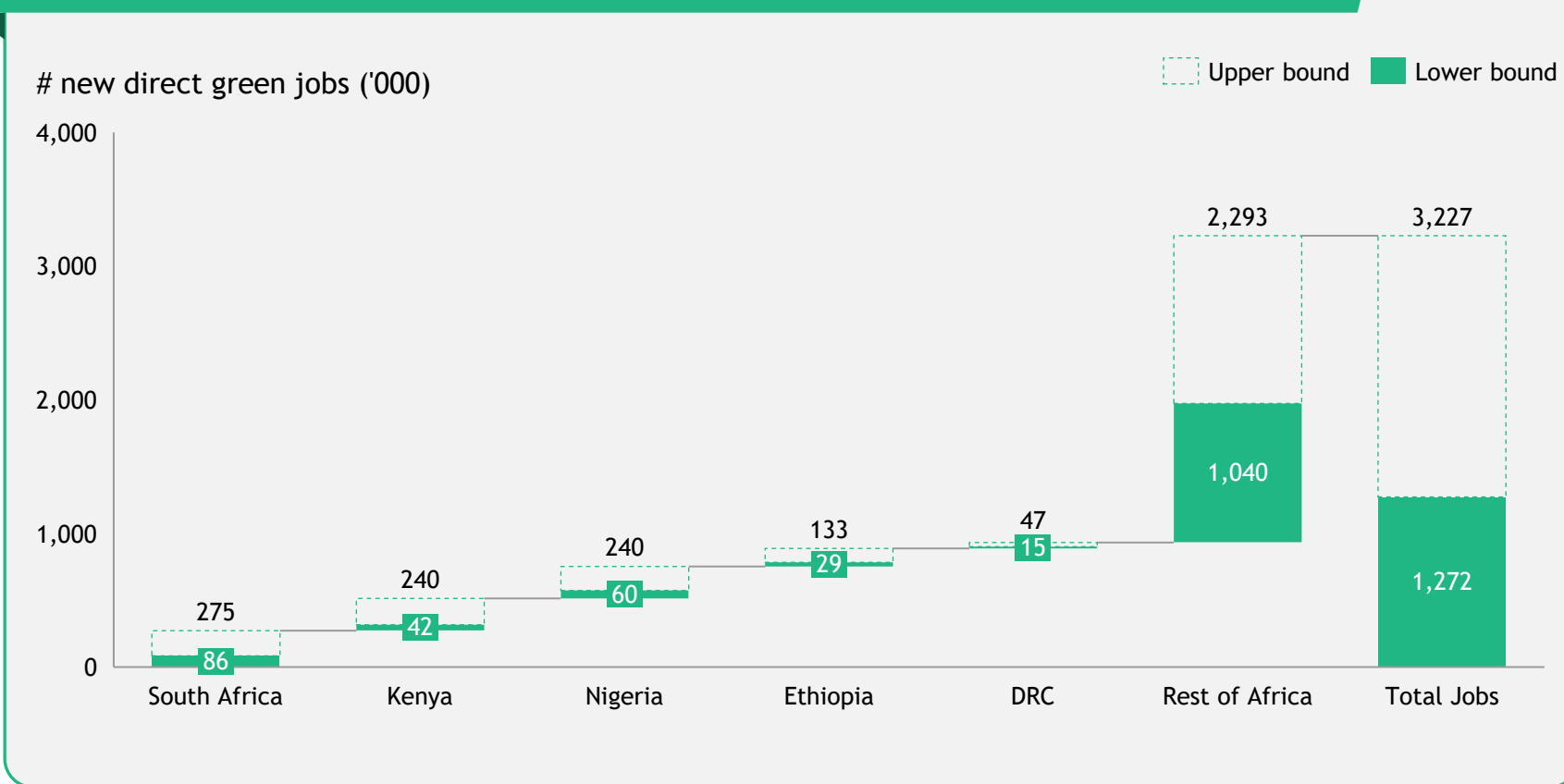
- Solar (57%) is universally accessible with **shortest deployment time** (for energy generation)
- CSA (12%) adoption expected to increase with big efforts towards **modernisation and increased productivity**, further enhanced by companies innovating to bring product costs down
 - CSA jobs forecast has a greater range due to nascency of tech adoption
- Waste remediation and recycling (6%) jobs expected to increase with **increased urbanisation, development and overall population**
- Aquaculture and poultry jobs (6%) increase from rising consumption as a result of **population growth and rising incomes (i.e., growing per capita consumption)**

Accounting for approximately 20 nascent value chains, total new direct jobs could rise to **3.3M** in next 5 years

Pan African estimates based on detailed projections for DRC, Ethiopia, Kenya, Nigeria and South Africa; Where country level data was unavailable credible proxies were used
 Source: Various online sources; Expert insights; BCG analysis

Of the 5 sample countries, South Africa, Kenya and Nigeria, show the highest green jobs creation potential

Total Green Jobs in Africa, Country Breakdown, (2030) ('000 Jobs)

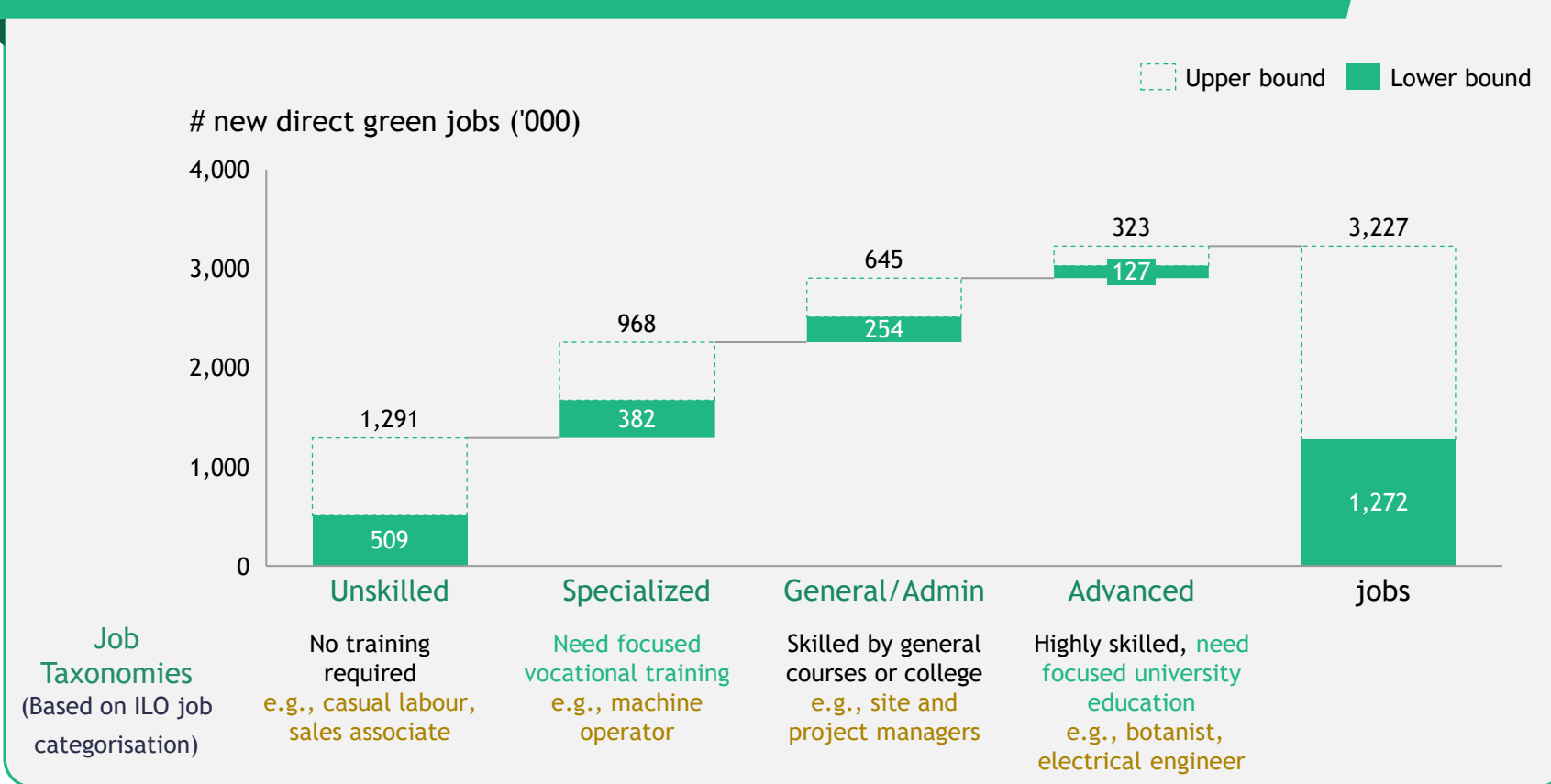


- 5 focus countries expected to contribute **30% (930K jobs)** of new green jobs by 2030
- **South Africa, Kenya and Nigeria** represent the highest job creation potential with joint **25% of total expected jobs** (755K jobs), driven by:
 - South Africa's high level of development i.e., relatively higher GDP per capita at \$ 6,072 in 2022 vs \$ 2,150 Africa average
 - Kenya's advancement in solar technology use (a value chain with the highest job creation potential)
 - Nigeria's high population projections in 2030 at 260M
- Countries reflect considerable diversity, e.g.,
 - Hydro being the leading employer in **DRC at 16K** and **Ethiopia at 33K**
 - Solar in **South Africa at 140K** and **Kenya at 111K**
 - Aquaculture and poultry in **Nigeria at 69K**

Pan African estimates based on detailed projections for DRC, Ethiopia, Kenya, Nigeria and South Africa; Where country level data was unavailable credible proxies were used
 Source: Various online sources; Expert insights; BCG analysis

Specialised, and general and administrative jobs make 50% of total and require efforts to develop the workforce

Total Green Jobs in Africa - Job Taxonomy Breakdown, (2030) ('000 Jobs)

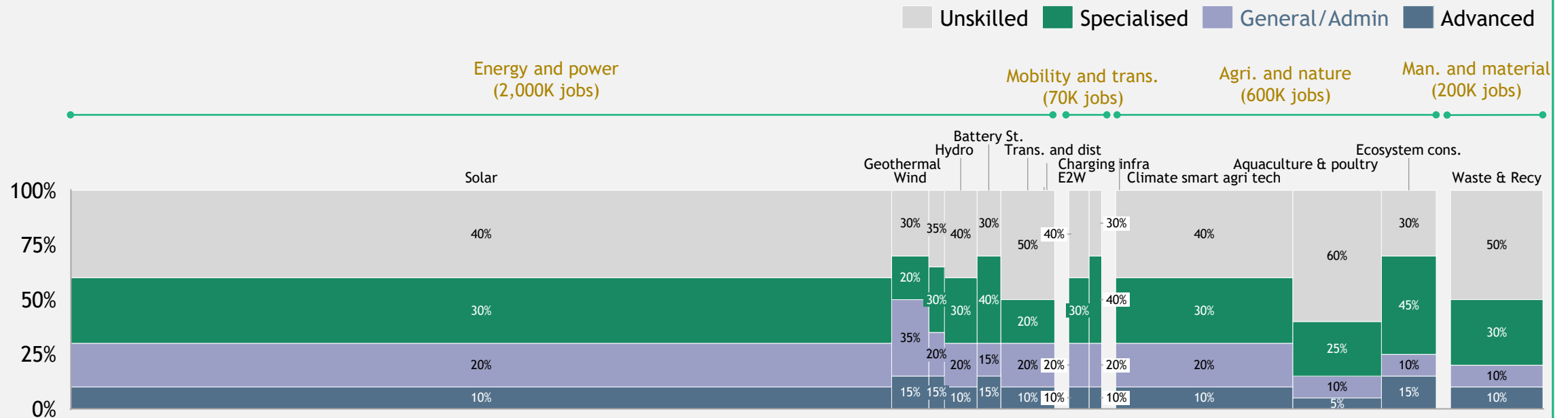


- **Unskilled jobs** represent the majority of jobs forecasted at (510K-1,300K, 40%). E.g., of jobs are casual labour, sales and customer care roles
- **Specialised skills (380K-970K, 30%)** present the 2nd highest job creation opportunity. E.g., of jobs are operations and maintenance across the value chains
- **General and administrative jobs (250K-650K, 20%)** present the 3rd highest potential. E.g., of jobs are quality inspectors, operations managers, and sales and distribution agents
- **Advanced jobs (130K-320K, 10%)** have lowest number of forecast jobs. E.g., of jobs are engineers (electrical and mechanical), geologists and technicians

Pan African estimates based on detailed projections for DRC, Ethiopia, Kenya, Nigeria and South Africa; Where country level data was unavailable credible proxies were used
Source: Source: Various online sources; Expert insights; BCG analysis

Specialised and advanced skilling investments should be focused in solar, agriculture and nature, and waste remediation and recycling value chains

Total Green Jobs in Africa, Value chain - Job Taxonomy Breakdown, (2030), ('000 Jobs)



- **Unskilled jobs are crucial for economic development.** They offer the highest employment opportunities, (i.e., income generation opportunities), across all value chains and are accessible to individuals with limited educational attainment as well. Through this employment individuals receive training and upskilling often resulting in career or salary progression
- **Specialised and advanced jobs** require focused skilling efforts to ensure ample talent pipelines across value chains
- Accordingly, such skilling efforts should focus on **solar, agriculture and nature, and waste remediation and recycling**

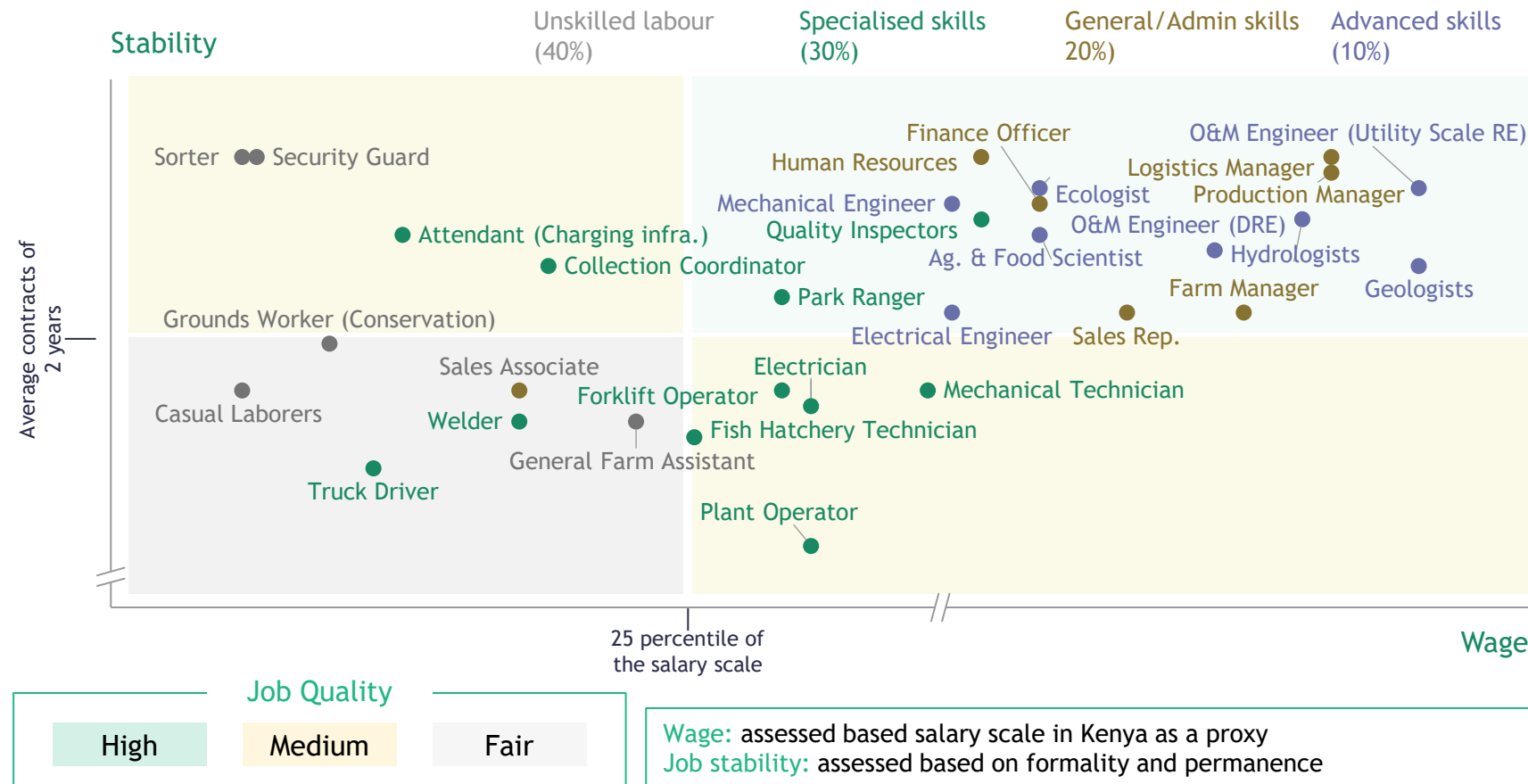
Pan African estimates based on detailed projections for DRC, Ethiopia, Kenya, Nigeria and South Africa; Where country level data was unavailable credible proxies were used

Source: Various online sources; Expert insights; BCG analysis

General/admin and advanced jobs present the highest opportunity in wage and job stability with opportunities to strengthen the quality of specialised jobs

Job stability and wage assessment

Illustrative



- **Unskilled jobs** (40% of total jobs) offer opportunity to pop. with limited formal education & often receive training and upskilling for career and salary progression; though scrutiny required on job stability, safety and wage
- **Advanced** (10% of total jobs) and **general/admin jobs** (20% of total jobs) represent the majority of high-quality jobs
- **Specialised jobs** (30% of total jobs) require investment to improve job quality as, currently, they have lower wage or lower stability

1. Wage was evaluated by using salary scale of Kenya as a proxy
Source: Glassdoor; Salary scale; Expert insights; BCG analysis

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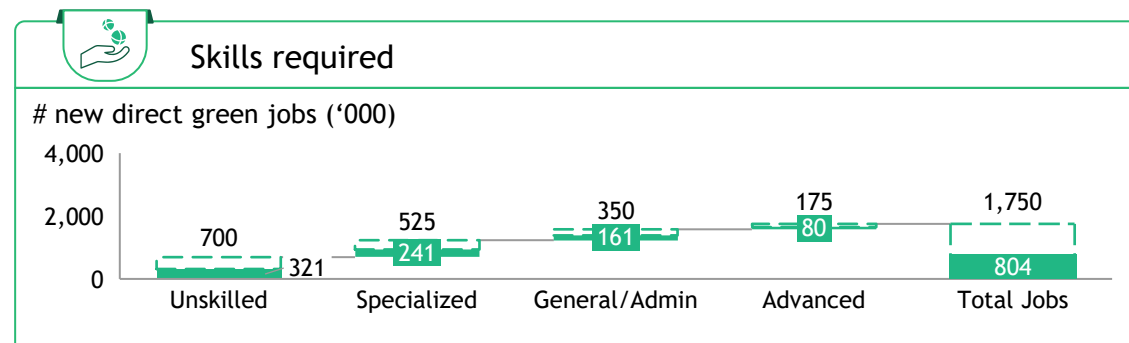
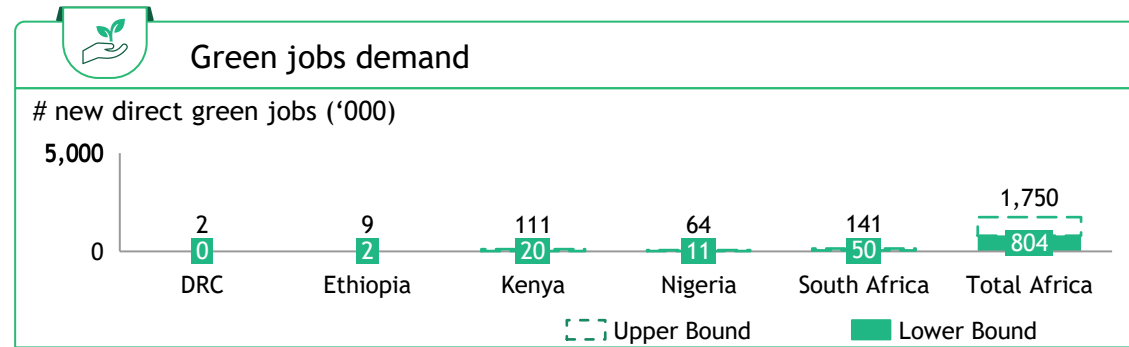
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Solar | 0.8-1.75M solar energy jobs projected in Africa by 2030

Energy generation from the sun including distributed renewable energy (DRE) and large-scale generation. Transmission and distribution jobs considered for distributed renewable energy (DRE) while excluded for large scale generation



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Installer Electrician Technician 	<ul style="list-style-type: none"> Production manager QC inspector 	<ul style="list-style-type: none"> Electrical engineer Mechanical engineer Project developer



Insights

Solar energy forecasted to generate **50% (1.7M jobs) of 2030 green jobs** across prioritised value chains

- Solar is universally accessible and has the shortest deployment time (within renewable energy - RE generation)
- Egypt, Morocco, and Namibia present high potential for installed solar capacity based on current investment trends

Both DRE and large utility scale generation expected to generate **sizeable jobs** due to high job per GW and to higher GW capacity respectively

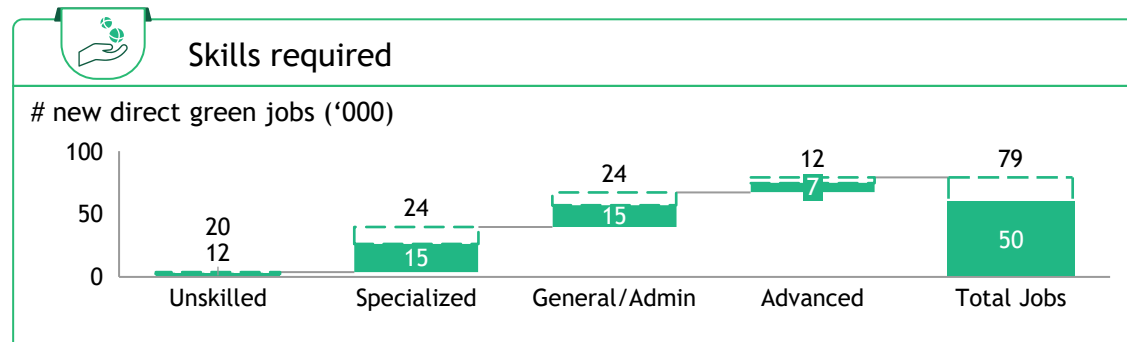
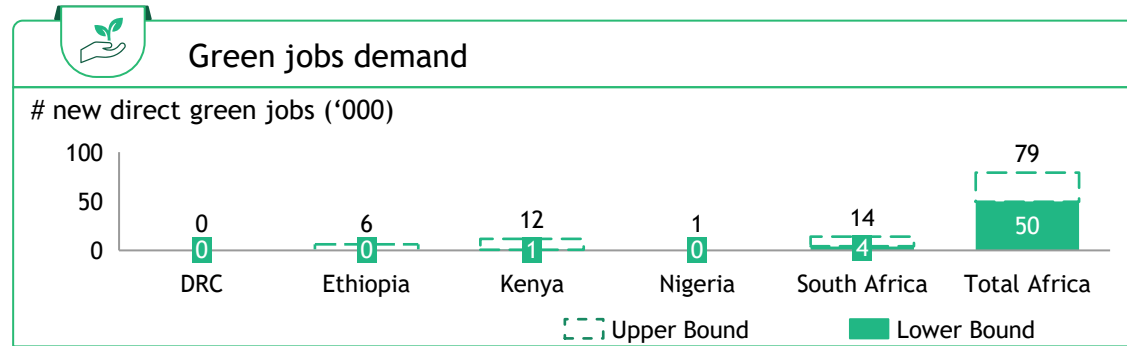
- DRE (50% of total) is more labour intensive per GW unit capacity (in comparison to large scale generation) with higher number of field jobs required e.g., sales agents and installation technicians
- Continued growth in innovative financing (e.g., pay-go solar) will see continued uptake of DRE
- Large utility scale generation (50% of total), however, contributes far more GWs

30% of solar jobs are specialised (e.g., installers and electricians)

- Solar jobs concentrated in installation and deployment with lower job stability (permanence)
- 40% of total solar jobs will be unskilled labourers and sales agents

Wind | 50-80K wind energy jobs projected in Africa by 2030

Converts the kinetic energy from wind into electrical power using turbines. Jobs forecasted do not include transmission and distribution of energy produced



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Welder Machine assembler Electrician 	<ul style="list-style-type: none"> Production manager QC inspector 	<ul style="list-style-type: none"> Scientist Engineer Technician



Insights

Africa's current installed and planned wind energy capacity only taps into **0.2%** of the continent's total technical potential

- Given long feasibility and development timelines, job forecasts of up to **80K (i.e., 3% of total)** are expected from wind production
- Most wind turbines in Africa are <1 megawatt (MW) due to rough terrain that impacts logistics and installation. This results in higher jobs per GW than projects with larger turbines
- Of the 5 countries assessed, **South Africa** (18% of wind jobs) and **Kenya** (15% of wind jobs) are estimated to have highest new direct green jobs due to higher current and projected production

Specialized skills (36K jobs) and **general/administrative skills (28K)** make up the highest job opportunities

- Majority of jobs will be in installation, and deployment and maintenance. This will require **30%** of specialized skills (e.g., welders and machine assemblers), and **30%** of general/administrative skills (e.g., production managers and quality control inspectors)
- Job localization in wind energy is **low in manufacturing** as most turbines are imported

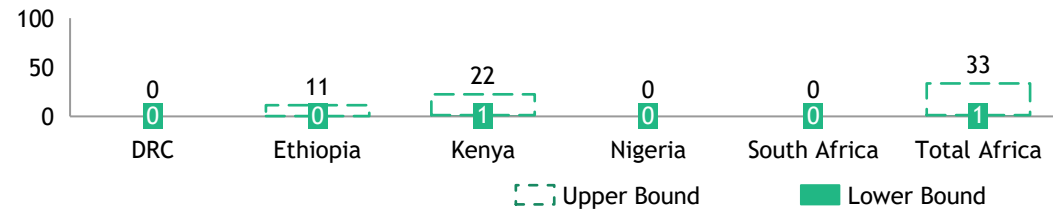
Geothermal | 1-30K geothermal energy jobs projected in Africa by 2030

Generated by harnessing the earth's heat in areas where it is closer to the surface. Jobs forecasted do not include transmission and distribution of energy produced



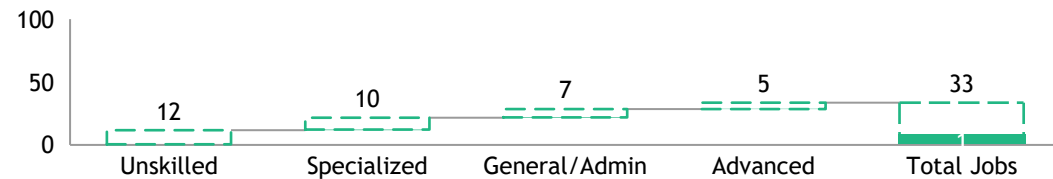
Green jobs demand

new direct green jobs ('000)



Skills required

new direct green jobs ('000)



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Electrician Plumber Pipe fitter 	<ul style="list-style-type: none"> Site manager Project manager OEM management 	<ul style="list-style-type: none"> Electrical engineer Pipeline expert Geologist

Jobs across the value chain



Insights

With low current installed and planned geothermal capacity, geothermal estimated to result in 30K jobs (1% of total)

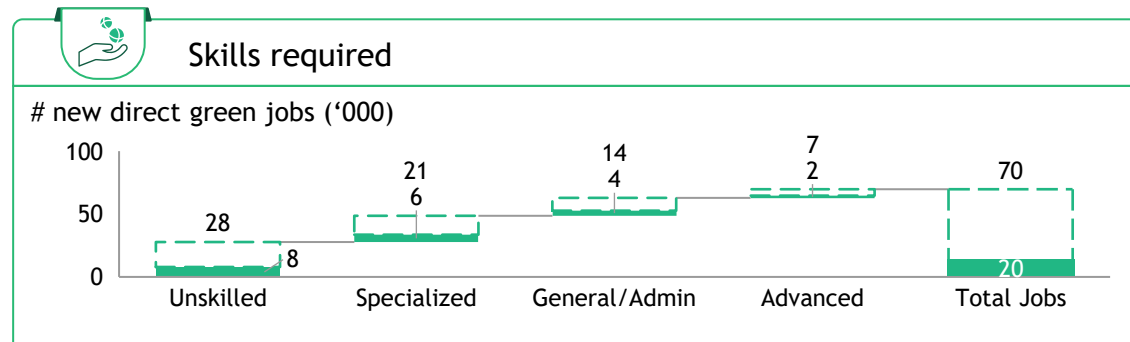
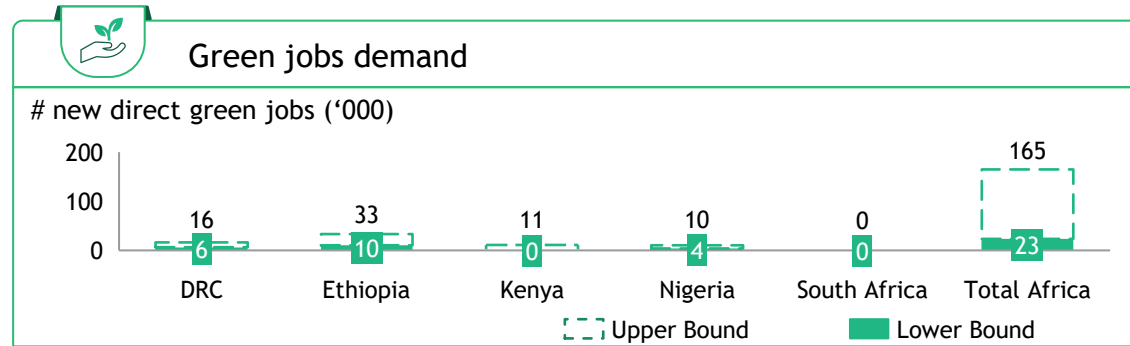
- Geothermal potential is geography-specific, based on natural resource, limiting geographic scope to East African nations
- Kenya and Ethiopia are actively developing, while other nations have announced plans for exploration: Burundi, Rwanda, Zambia, Tanzania, and Uganda
- Geothermal exploration and feasibility assessments have long timelines, inhibiting large capacity additions within the next 5 years
- The large range between upper and lower bounds reflects large gaps between countries current generation and their future target capacity

The majority of job opportunities are in general administration (20%) and advanced skills (15%)

- This reflects that majority of jobs are required to assess feasibility of potential projects and, operationalisation of the viable projects
- Examples of the 7K (~21%) general and administration jobs include site managers, project managers and original equipment manufacturer (OEM) managers
- Examples of 5K (15%) advanced skills jobs are civil and electrical engineers, geologists and pipeline experts

Hydro | 20-170K in hydro jobs projected in Africa by 2030

Energy generation through flowing/falling water from significant flow and elevated changes. Jobs forecasted do not include transmission and distribution of energy produced



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Construction worker Plant operator 	<ul style="list-style-type: none"> Production manager QC inspector 	<ul style="list-style-type: none"> Civil Engineer Hydrologist Environmentalist



Insights

Though Africa has high untapped hydropower potential, only a fraction is utilised resulting in modest job growth of 70K jobs

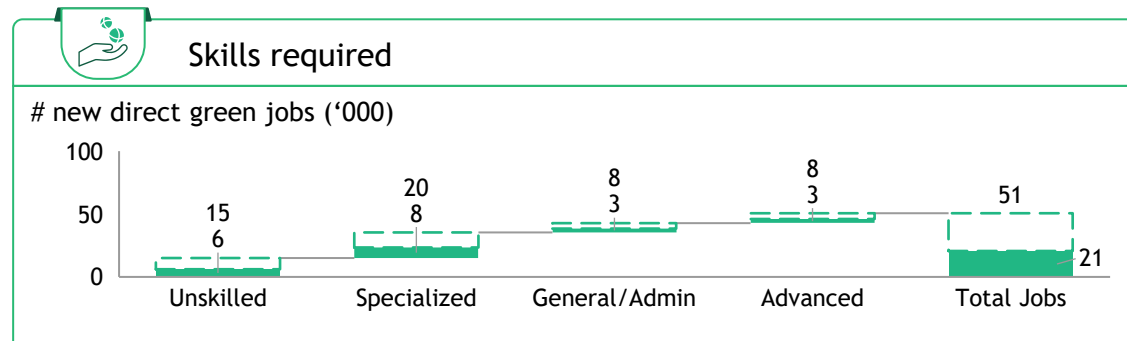
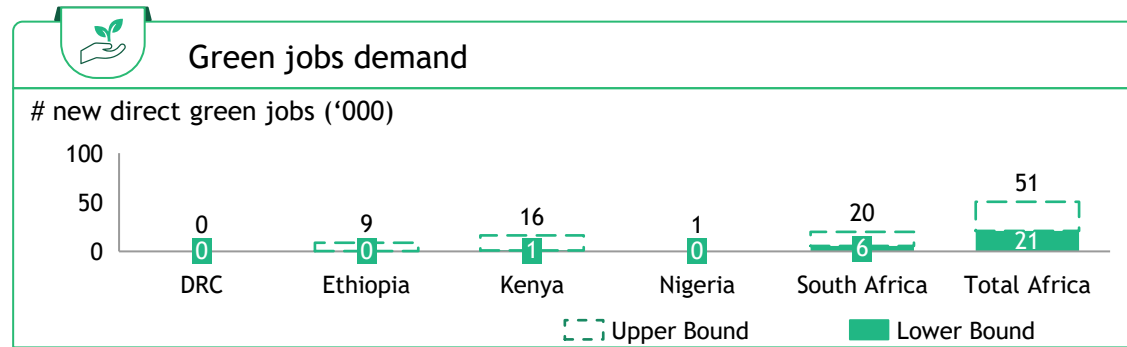
- Africa has significant untapped hydropower potential, estimated at about 350GW. As of 2023, only a fraction of this potential is utilised, with around 37GW installed capacity
- Modest job estimates of 70K (2% of total) are forecasted
- Ethiopia is building a 6GW mega-dam, Grand Ethiopian Renaissance Dam, which will be largest in Africa, producing > 6GW and creating over 33K direct jobs
- However, South Africa hydro production has stalled due to precipitation challenges and unfavourable regulatory policies

40% of jobs forecasted to be unskilled, followed by 10% requiring advanced skills

- 60% of installed hydro capacity in the region is over 20 years old, requiring modernisation efforts to maintain and improve facilities
- These efforts are estimated to require 40% (28K) unskilled casual labour; and 10% (7K) advanced jobs such as civil engineers, hydrologists and environmentalists

Battery storage | 20-50K battery storage jobs projected in Africa by 2030

The storing of excess energy to balance electricity supply and demand. The complete range of jobs related to battery storage are also represented within the solar (DRE) and mobility value chains



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Welder Machine assembler Electrician 	<ul style="list-style-type: none"> Production manager QC inspector 	<ul style="list-style-type: none"> Scientist Engineer Technician



Insights

Conservative number of storage jobs (21K) forecasted in battery storage as utility scale demand is expected to be low

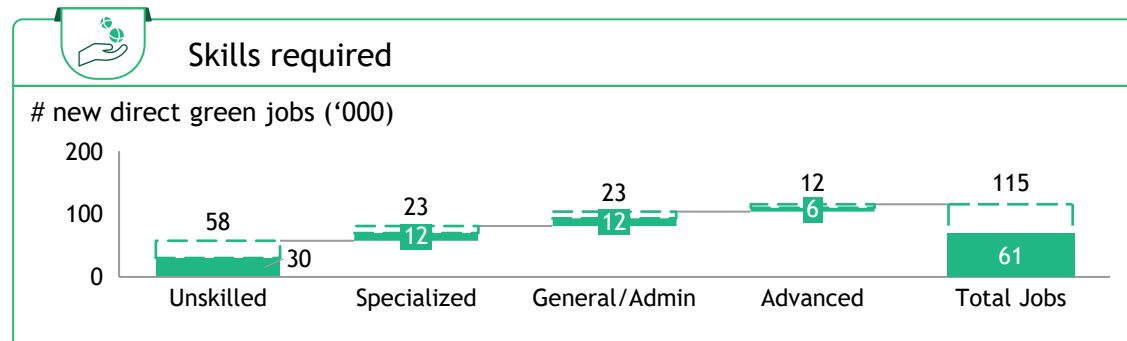
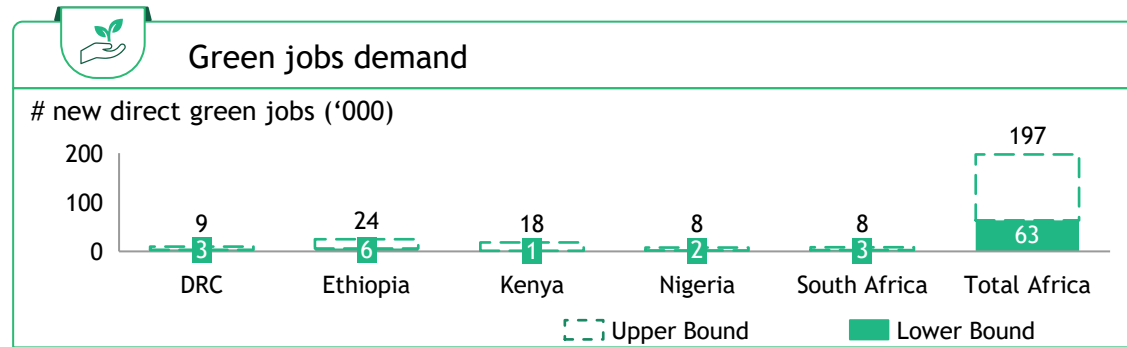
- Battery storage is essential for maximising the benefits of renewable energy, addressing the intermittent nature of wind and solar power
- Currently, South Africa and Kenya are exploring battery energy storage systems (BESS), hence accounting 40% and 32% of forecasted jobs, respectively
- Additionally, Burkina Faso, Egypt, Ghana, Kenya, Malawi, Mauritania, Mozambique, Nigeria, and Togo expressed interest in joining the BESS consortium to participate in efforts to reach storage commitments of 5GW by end of 2024

BESS jobs are transferrable beyond wind and solar energy to other forms of energy and industries

- 40% (20K) jobs demanded will be roles that require specialised skills such as maintenance technicians, machine operators etc.
- Specialised skills in BESS can be leveraged in other energy value chains, in addition to solar and wind, making skilling investment highly impactful
- 50% of total battery storage jobs are not located on the continent with manufacturing taking place in other markets (e.g., China)

Power transmission and distribution | 60-200K jobs projected by 2030

Involves electricity transfer from generation plants to end-user. Jobs forecasts relate to grid infrastructure used only for projected additional renewable energy generation



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Installer Technician Operator 	<ul style="list-style-type: none"> Sales agent Accountant 	<ul style="list-style-type: none"> Engineer Project manager



Insights

Power transmission and distribution (T and D) is directly proportional to renewable energy capacity, resulting in **115K jobs (4% of total)**

- Ethiopia (24K), and Kenya (18K) have largest number of new jobs due to large renewable energy capacities coming online
- The length of T and D lines are expected to increase as renewable energy is often located in remote areas far from existing infrastructure
- Deployment of lines, however, face significant challenges as countries face high infrastructure deficits and fiscal constraints

Most jobs will be **unskilled (50%)** for largely installation and maintenance roles

- 58K unskilled jobs expected to take up largely field work to clear land and installation of lines, followed by specialised skills at 23K
- Demand for general or administrative and advanced skills such as production managers or scientists and engineers are likely to be low as these roles oversee large volume of installation in a technologically mature sector

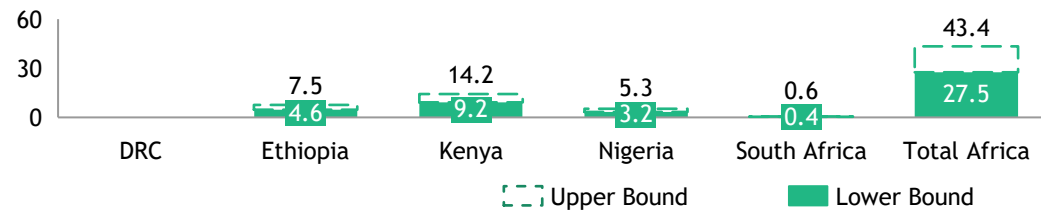
Electric 2 wheelers | 28-43K E2W jobs projected in Africa by 2030

Electric 2 wheelers (E2W) are battery powered electric bicycles, scooters, and motorcycles designed for commercial or personal use. 2W rider jobs excluded from forecast as they are not new jobs



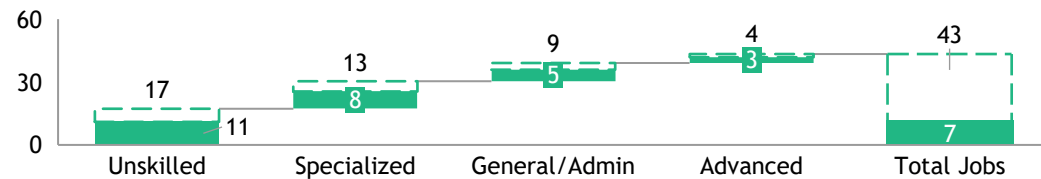
Green jobs demand

new direct green jobs ('000)



Skills required

new direct green jobs ('000)



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Material handler Casual labourer Sales agent 	<ul style="list-style-type: none"> Welder Electrician Customer service rep 	<ul style="list-style-type: none"> Sales representative Production manager 	<ul style="list-style-type: none"> Electrical engineer Mechanical engineer

Jobs across the value chain

Assembly

Sales and After Sales

Maintenance



Insights

E2W adoption will follow existing 2W use in Africa: predominant in equatorial countries (running East-West)

- E2W adoption will be highest in countries with large 2W fleets and commercial (vs personal) use to drive unit economics
- Kenya (14.2K jobs) followed by Ethiopia (7.5K jobs), lead in E2W job potential due to favorable policies towards electric vehicles and strong startup presence in the sector respectively
- Other smaller African countries, such as Rwanda, show potential for growth with strong start-ups operating in the sector
- Nigeria (5K jobs) lags due to poor electricity services and cheap fuel while South Africa (0.6K jobs) has very little 2W usage overall due to a more affluent pop., colder weather and better public transport

Majority of jobs will be unskilled (40%) and in sales and distribution

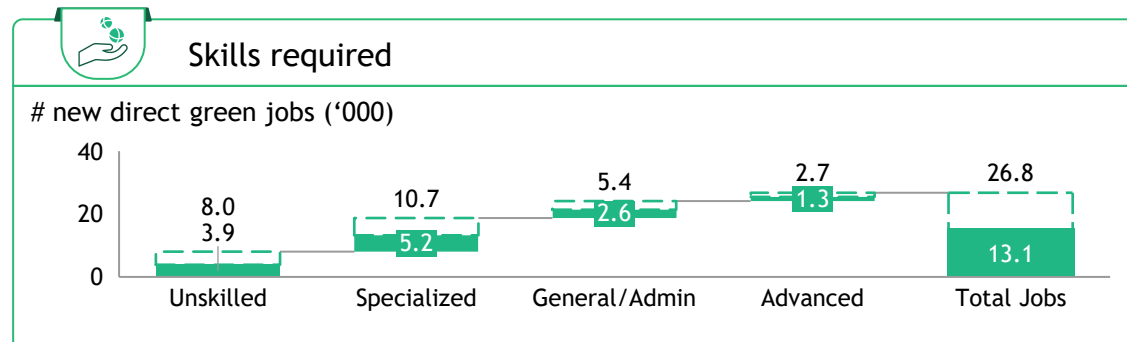
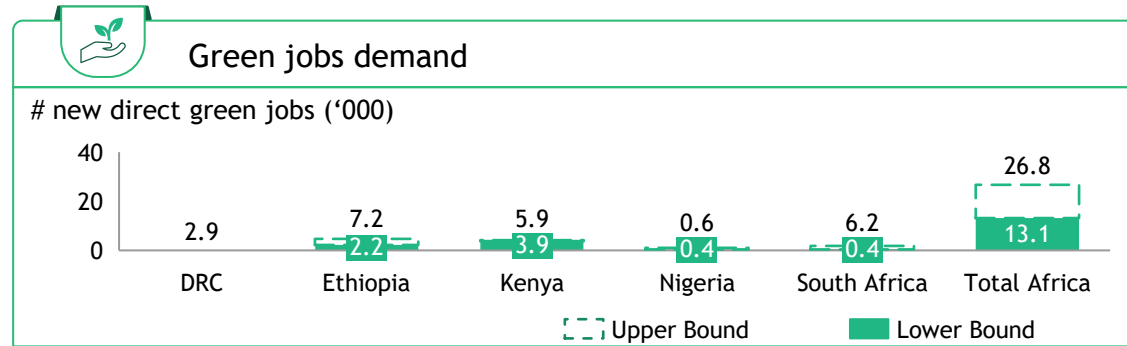
- Unskilled and general/admin jobs, (11K) and (4K) respectively, such as sales representatives are more involved in the sales and distribution activities
- E2Ws require 0.5X of the maintenance compared to normal 2Ws, resulting in fewer jobs being created in maintenance
- While technical assembly of vehicles is expected on the continent—especially in markets like Kenya—, manufacturing of core components (e.g., battery cells, drivetrain) is not expected in the near-term

Note: Electronic 3 wheelers are not considered in model since E2W make up more than 75% of E2/3W sales

Source: UNEP Global Electric Mobility Program report; Ethiopian Ministry of Transport; Ola Electric Mobility reports; Ather Energy India reports; Recharged.com; Expert interviews; BCG analysis

Charging infrastructure | 13-27K jobs projected in Africa by 2030

Battery swapping for E2Ws and charging point operation for electric vehicles (EVs). Jobs forecasts based on projected E2W and EV numbers and utilisation rates



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Security guard 	<ul style="list-style-type: none"> Attendant Construction worker 	<ul style="list-style-type: none"> Logistics manager 	<ul style="list-style-type: none"> Electrical engineer Software dev



Insights

Jobs will be driven by swapping points, rather than charging points as we project more E2W than EV on the continent

- Swapping points are more labour intensive than charging points that are often self-charging
- Ethiopia (4.6K jobs), followed by Kenya (4.2K jobs), have the highest job potential due to strong E2W and EV numbers
- South Africa is projected to have more EV, leading to fewer jobs (1.8K jobs) from charging points
- Nigeria's poor electricity services and cheap fuel leads to lower EV and E2W adoption hence very little demand for charging infrastructure (0.9K)

50% of jobs will be specialised followed by 30% general/administrative skills

- Installation of the charging infrastructure requires specialised jobs (35%) such as electricians while the management of the charging points require more advanced roles (10%) such as engineers
- General/admin (25%) roles such as logistics managers are more involved in the overall supervision of the network
- While there will be meaningful job volumes in installation, not many manufacturing jobs expected as most components will be imported

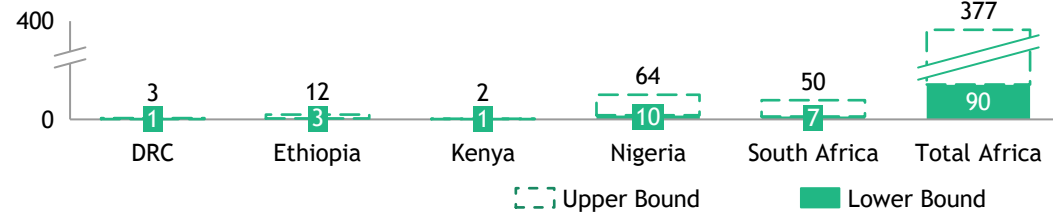
Climate smart agriculture | 90-377K jobs projected in Africa by 2030

Technologies that enhance agriculture productivity, resilience, and sustainability. Solar irrigation and cold storage used as proxies for job projection. Projections do not include farmers



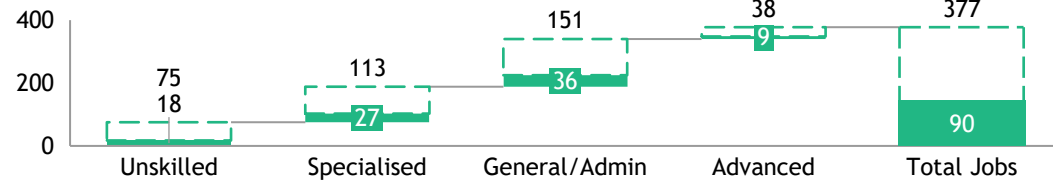
Green jobs demand

new direct green jobs ('000)



Skills required

new direct green jobs ('000)



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Casual labourer 	<ul style="list-style-type: none"> Installer Technician Operator 	<ul style="list-style-type: none"> Sales agent Accountant 	<ul style="list-style-type: none"> Engineer Project manager

Jobs across the value chain



Insights

CSA expected to account for 15% of total jobs, driven by efforts towards modernisation and to increase productivity

- Nigeria at 64K (16% of total) and South Africa at 50K (12% of total) take the lead in new CSA jobs driven by large hectares of arable land and export volumes of perishable agriculture production
- Despite low adoption rate, countries like Kenya, Nigeria, South Africa, Morocco, Ghana, and Rwanda are increasing access to low-cost technology with startups and service providers innovating
- Climate financing, direct financing, private, public partnerships (PPPs), and aggregation models will boost adoption of CSA by subsidising costs and providing financing options to smallholder farmers

70% of jobs will require specialised and general/administration skills

- High demand for sales and installation jobs accounting for 40% of jobs
- Advanced skills are required for innovation of CSA technologies, however account for only 10% of jobs due to limited room for rapid innovation
- Beyond direct jobs, this value chain results in material improvements for farmers that make up 70% of the continent's work force

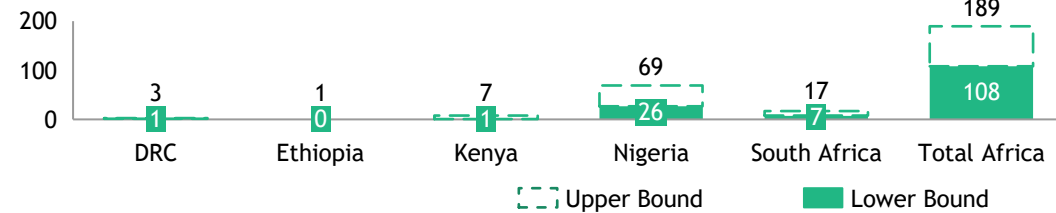
Aquaculture and poultry | 110-190K jobs project in Africa by 2030

Aquaculture involves farming fish (e.g., tilapia, catfish and shellfish), while poultry includes raising chicken for meat and eggs, both have low carbon footprint at 1.5 and 5.3Kg CO₂/Kg of animal-based protein, up to 4x lower than alternatives. Jobs projected do not include farmers



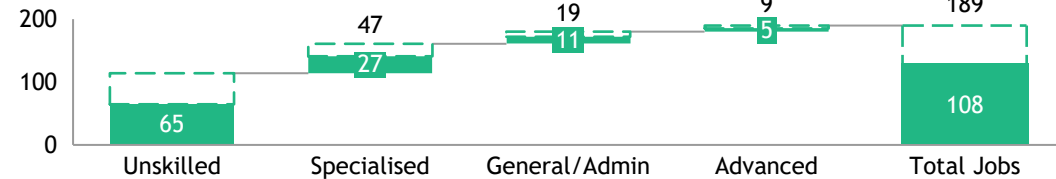
Green jobs demand

new direct green jobs ('000)



Skills required

new direct green jobs ('000)



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Fishery labourer Farmhand 	<ul style="list-style-type: none"> Boat technician Hatchery technician 	<ul style="list-style-type: none"> Farm manager QA analyst 	<ul style="list-style-type: none"> Aquacultural engineer Biosecurity specialist Veterinarian

Jobs across the value chain



Insights

Jobs in aquaculture and poultry will be driven by **increasing demand for protein** as populations grows and per capita income increases

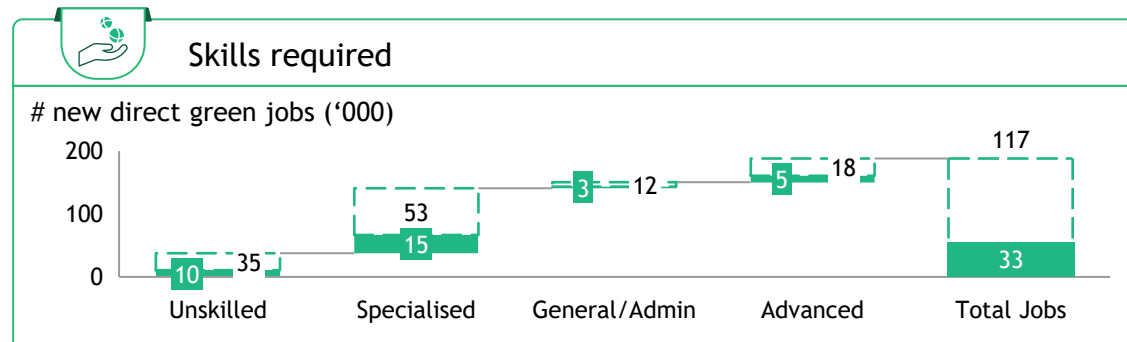
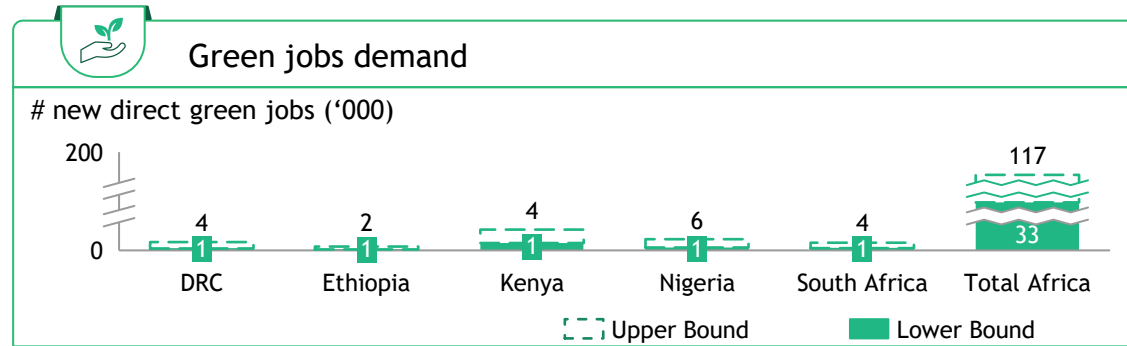
- Nigeria projected to have most jobs **69K (32% of total)** followed by South Africa at **17K (8% of total)**. This reflects strong domestic demand, moderate to high government support and access to large water bodies
- Public awareness campaigns, supportive policies and improvement of supply chains can increase uptake of these alternative proteins

60% of jobs in the aquaculture and poultry value chain expected to be unskilled

- Higher demand of unskilled labour due to manual nature of processes such as feeding, cleaning, collecting eggs, maintaining equipment
- While specialised (**25%**) and advanced skills (**5%**)—such as hatchery management, water quality control, disease management, genetic selection and breeding, and biosecurity measures—have lower proportions, these roles are essential to unlocking Africa's aquaculture and poultry potential

Ecosystem conservation and NBS | 30-115K jobs projected

Activities that focus on carbon sequestration and avoidance through ecosystems such as forests, wetlands, and oceans; excluding activities that improve environmental conditions for harvest i.e., agroforestry, regenerative agriculture, etc.



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Cleaner Grounds worker 	<ul style="list-style-type: none"> Wildlife ranger Tour guide Fence technician 	<ul style="list-style-type: none"> Communications specialist Grant manager 	<ul style="list-style-type: none"> Ecologist Statistician



Insights

Job creation potential highly dependent on overall **area under conservation** and **labour intensity** of NBS activities

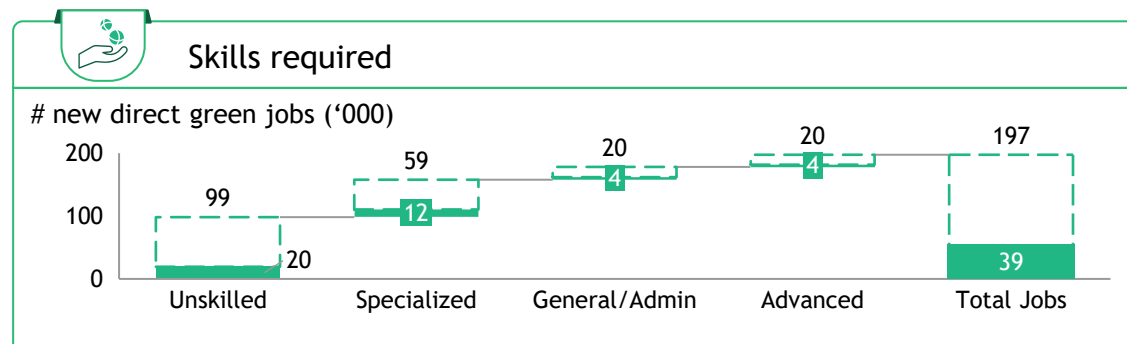
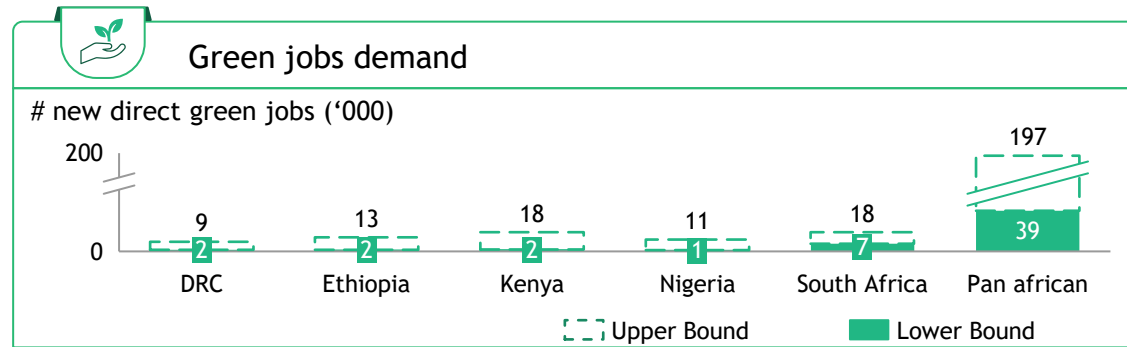
- Jobs in Kenya at 11K (5% of total) and South Africa at 4K (2% of total) are driven by the higher labour-intensive activities e.g., mangrove restoration and animal protection
- Nigeria at 6K (3% of total) has strong job potential due to their relatively larger total area. Job numbers estimated using a country's potential to increase area under protection by 2030 based on their progress to date and targets
- Consideration of climate financing vehicles such as carbon credits to finance conservation and NBS activities increased job creation **projections by 20%** (reflected in upper bounds)

45% of jobs require specialised skills with unskilled and advanced jobs respectively making 30% and 15% of the jobs projected

- Higher demand for specialised skills as projected jobs involve activities that require technical skills e.g., fence technician, park ranger, wetland and forest restoration technician
- Few advanced skills such as veterinarians and forest ecologist can oversee vast areas of conservation

Waste remediation and recycling | 40-200K jobs expected

The removal of contaminants and the transformation of waste materials into new, usable products help reduce waste, avoid new emissions, and mitigate environmental impact. Waste collection jobs not considered as they are often informal and not permanent



Illustrative roles per job taxonomy

Unskilled	Specialised	General/Admin	Advanced
<ul style="list-style-type: none"> Cleaner Sorter Packer 	<ul style="list-style-type: none"> Machine operator Forklift Operator 	<ul style="list-style-type: none"> Production manager QC inspector Sales and marketing 	<ul style="list-style-type: none"> Engineer Scientist Technician



Insights

Job volumes are primarily in countries with high population, waste per capita and urbanisation rate

- South Africa and Kenya are estimated to **both create 9% of total jobs (each)**. This reflects reported higher waste per capita and overall progress in recycling rates
- South Africa currently recycles 3% of plastic waste, and Kenya's notable policy push towards plastic waste free cities indicates higher
- **Ethiopia (6%), Nigeria (5%) and DRC's (4%)** high projected population growth contributes to the significant increase in waste generated
- **The current recycling rate of most sample countries (4-8%),** falls significantly short of the 50% target set for waste recycling by 2030 (initially 2025). Forecast based on actualisation estimates (not commitment)

Recycling jobs less skill intensive and more labour intensive

- **50% of jobs require unskilled workforce** due to the labour-intensive tasks present in the initial stages of the value chain e.g., sorting
- **Investment in specialised skills (30% of total jobs in the value chain)** is critical in creating a commercially oriented value chain as it enables formalisation of the industry. Specialised jobs include shredding technician, machine operator etc.

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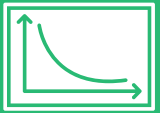
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Green jobs create significant opportunities for African countries



Our research findings reinforce that green jobs have great potential to drive job creation in the next 5 years on the continent, **with up to 3.3M direct green jobs by 2030**, while ensuring African countries are building the strategic green industries for the future global economy



The African Development Bank (AfDB) projects that by 2030¹, Africa will create **15M¹** jobs for new entrants joining the workforce; the new direct green job forecasts will account for **20% of the new entrants workforce**



Achieving or exceeding these targets requires **persistent and intentional action** from stakeholders (i.e., learning and training institutions, funders and investors, large employers and industry associations, and policy makers and researchers) on skilling and enablement

1. AfDB estimates 10M-12M individuals enter the workforce annually, with only 3.1M jobs created. Extrapolating to 2030, this implies of the 50M joining the labour force (taking lower bound), only 15M will get jobs
Source: [Jobs for Youth in Africa](#)

The primary focus going forward is to enable broad stakeholders to take action on deepening the fact base, developing workforce and enabling the ecosystem

Stakeholders	Proposed way forward	
<p>1 Learning and training institutions</p> <p>2 Funders and investors</p> <p>3 Large employers and industry associations</p> <p>4 Policy makers and researchers</p>	<p><u>Enhance the fact base</u></p>	<ul style="list-style-type: none"> • Socialise with broad stakeholders: Identify and engage priority stakeholders to socialise methodology, further refine forecast estimates and develop coordinated recommendations to fill skills gaps 1 2 3 4 • Conduct labour market assessments: Conduct deep dives in specific countries and value chains to explore the current supply of skilled labour and identify potential gaps relative to the demand 1 2 3 4
	<p><u>Develop workforce</u></p>	<ul style="list-style-type: none"> • Invest in formal education and training programs: establish or enhance formal education programs and vocational training curricular that offer technical skills for targeted green jobs 1 2 3 4 • Support on-the-job skills development initiatives: invest in on-the-job skills development programs (e.g., apprenticeship) that equip workforce with emerging skills, and offer continuous professional development 1 2 3 4
	<ul style="list-style-type: none"> • Implement workforce planning and development strategies: Develop strategies to attract and retain skilled workers. Offer competitive wages, career dev. opportunities and training to upskill employees 1 2 3 4 	
	<p><u>Enable green sectors</u></p>	<ul style="list-style-type: none"> • Targeted investment in high-potential sectors: Direct investment towards sectors with the highest potential for job creation, such as solar energy, climate-smart agriculture and recycling 1 2 3 4 • Foster cross-sector collaboration: encourage collaboration between government, private sector, learning and training institutions and donors to create cohesive strategies for green job growth and sustainable dev. 1 2 3 4 • Develop comprehensive support policies: Create and implement policies that incentivise green job creation, support skill development and promote sustainable business practices 1 2 3 4

Key: # Relevant to stakeholder

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Definitions | Commonly used terms

Nomenclature	Definition
Captive jobs	Jobs that must be performed by residents of a location i.e. in Africa
Direct jobs	Jobs created directly by a specific sector as a result of economic activities within that sector
Green economy	Economy that promotes sustainable development by efficiently managing natural resources, reducing pollution, addressing climate change, and ensuring economic growth and social inclusion
Green jobs	Decent job in major green value chains that contribute substantially to preserving or restoring environmental quality forecasted for 5 years (2030)
Green Transition	Shift from a carbon-intensive economy to environmentally sustainable, focusing on decarbonizing key sectors, improving resource management, and promoting clean energy to ensure economic growth and resilience against climate change
Indirect jobs	Jobs created in the economy due to the operations and investments of the sector but not directly within it, such as supply chain jobs related to the materials needed for sector's activities
Induced jobs	Positions created within the broader economy as a result of the spending of incomes earned by employees from direct and indirect jobs
Job family	Regular position where one performs duties, tasks or work to earn money e.g. project development, manufacturing, operations and maintenance
Net Zero	Reducing human-caused greenhouse gas emissions to the lowest feasible levels
Non-captive jobs	Jobs that do not require physical presence in a specific location i.e. jobs that can be performed outside Africa
Sector	High-level grouping of economic activities based on the type of goods and services that are produced
Value chain	Full range of activities and processes needed to bring a specific product or service from conception through the different phases of production, delivery to final consumers and disposal after use

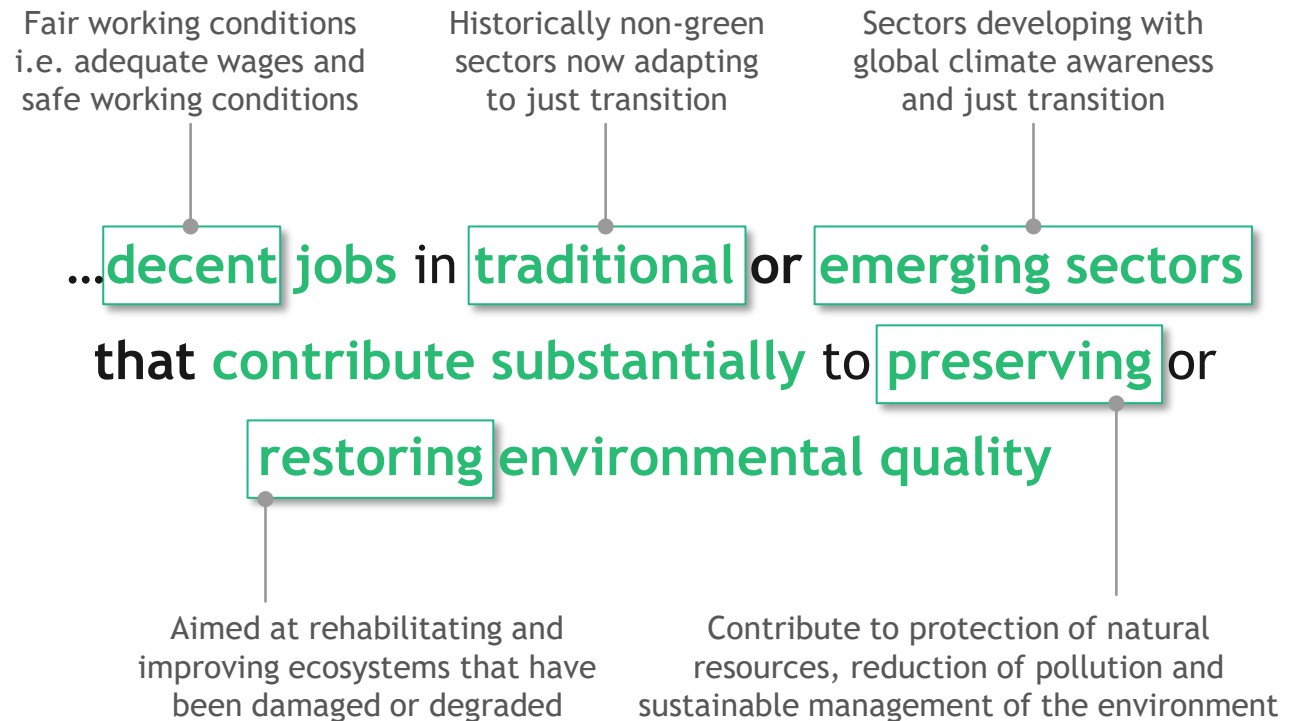
Green jobs are broadly define as...

Sources have varying definitions of green jobs

“ Jobs are defined as green when they **produce goods or services which are beneficial to the environment or conserve natural resources**
 -Output definition, BLS¹ 2013

“ Jobs are considered as green when work related **activities contribute to the organisation's production processes being more environmentally sustainable** or use fewer resources
 -Process definition, BLS 2013

“ Green jobs are **decent jobs that contribute to preserve or restore the environment**, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency. Green jobs help: **Improve energy and raw materials efficiency, limit greenhouse gas emissions, minimise waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change**
 -ILO² 2016



Source: International Labor Organisation, Jobs For the Green Transition
 1. United States Bureau of Labor Statistics; 2. International Labor Organisation

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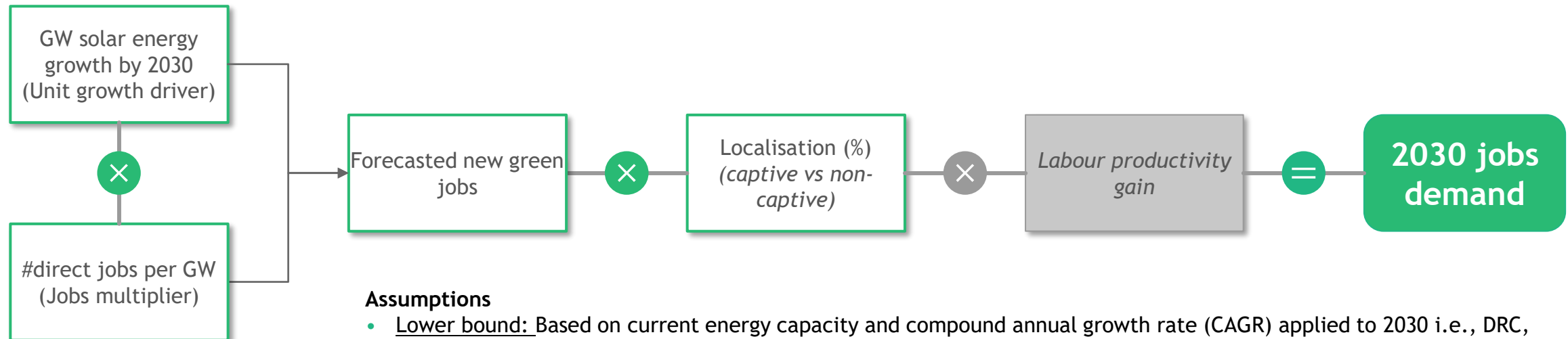
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Future research and model

Solar | Demand driven approach taken to forecasting solar energy jobs with GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and compound annual growth rate (CAGR) applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) preferred i.e., Kenya and Ethiopia for large scale forecast
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume tiered actualisation of national plan energy installation targets
- Job creation per GW: Compiles jobs created across Africa over the past 3 years and total capacity installed within same period, DRE multiplier evaluates workers per thousand units sold for solar home system (SHS) and installed capacity (in MW) for mini-grids and commercial and industrial (C and I)
- Localisation: 30% of jobs are within manufacturing and materials, 90-95% of these jobs are not within the African continent

Solar | South Africa reveals highest employment impact potential across solar value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Africa Total
Energy and Power						
Solar						
Solar - DRE ¹ Future Capacity units by 2030 (Lower bound)	54,000	240,000	2,000,000	1,500,000	-	
Solar - DRE Future Capacity units by 2030 (Upper bound)	178,031	1,186,875	9,890,625	4,945,313	-	
Solar - Large ² Scale Future Capacity GW by 2030 (Lower bound)	-	-	0.24	0.03	1.53	30.61
Solar -Large Scale Future Capacity GW by 2030 (Upper bound)	-	-	1.69	1.15	3.45	66.68
Solar - SHS Jobs created per product	0.01	0.01	0.01	0.01	0.01	0.01
Solar Large scale- Jobs created per GW	35,000	35,000	35,000	35,000	35,000	35,000
# of direct DRE green jobs (lower bound)	524					
# of direct DRE green jobs (upper bound)	2,196	12,435	90,420	45,510	1,800	-
# of direct large scale green jobs (lower bound)	-	-	8,540	988	53,420	1,071,350
# of direct large scale green jobs (upper bound)	-	-	59,063	40,250	120,750	2,333,800
Solar - Localisation (%)	75	75	75	75	75	75
Solar - Productivity gain (%)	100	100	100	100	100	100
Direct DRE Green Jobs forecasted by 2030 (lower bound)	390	1,635	13,485	10,102	89	-
Direct DRE Green Jobs forecasted by 2030 (upper bound)	1,636	9,264	67,363	33,905	1,341	-
Direct Large Green Jobs forecasted by 2030 (lower bound)	-	-	6,362	736	39,798	803,513
Direct Large Green Jobs forecasted by 2030 (upper bound)	-	-	44,002	29,986	89,959	1,750,350

Solar | 30% of solar jobs require specialised skills and 10% require advanced skills

Jobs across the value chain

Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Casual labourers 	<ul style="list-style-type: none"> Installers Electricians Technicians 	<ul style="list-style-type: none"> Production managers QC inspectors 	<ul style="list-style-type: none"> Engineers (mechanical, electrical) Project developers
Employment impact	direct jobs (40%)	direct jobs (30%)	direct jobs (20%)	direct jobs (10%)




Relevant value chain stages



- **Unskilled labour accounts for 40% of new jobs with casual labourers setting up solar farms**
- **Specialised skills accounts for 30% with technicians installing and maintaining solar farms**
- **General/ administrative jobs account for 20% of jobs with managers and quality control inspectors inspecting grid systems**
- **Advanced skills account for 10% of jobs with electrical engineers and developers focusing on new solar technologies**

Solar | DRE solar creates many more jobs per unit of power compared to large scale solar

Illustrative

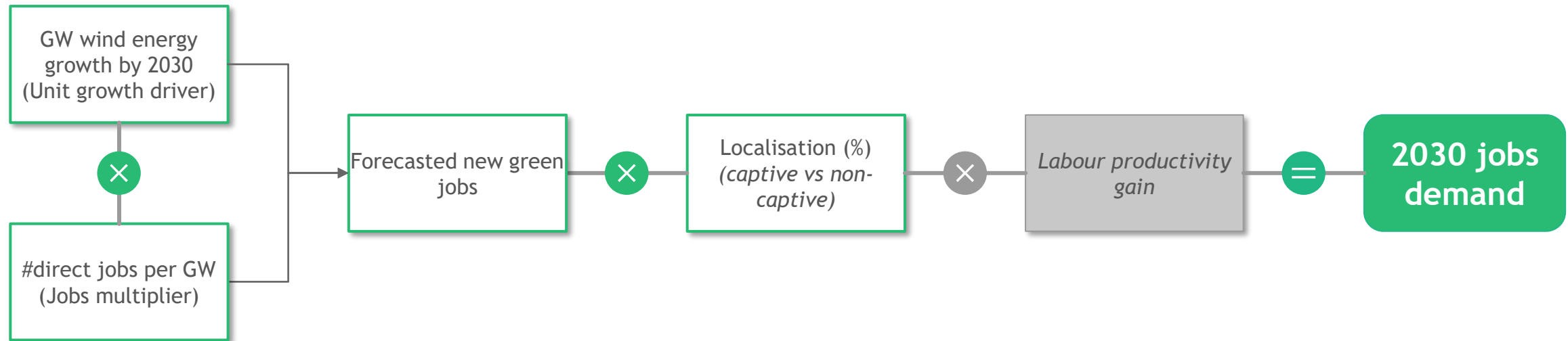
Category	Type	Size	Job multiplier (per GW/unit)	Jobs	Job types
Large scale	 Large scale	31-67 GW	35,000	63-220k	<ul style="list-style-type: none"> Site engineer Environmental specialist
DRE ¹	 Mini grids	0.004-0.06 GW	120,000	0.5-7k	<ul style="list-style-type: none"> Community engagement specialist
	 SHS ²	5-24M units	0.045	47-212k	<ul style="list-style-type: none"> Home installer Sales rep

Large scale in comparison to DRE requires less labor to produce a GW of solar power due to geographic concentration and economic of scale

DRE (50% of total) is more labour intensive per GW unit capacity (in comparison to large scale generation) with higher number of field jobs required e.g., sales agents and installation technicians

1. Distributed renewable energy 2. Solar home systems
Source: Expert interviews; BCG analysis

Wind | Demand driven approach taken to forecasting wind energy jobs with GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and CAGR applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) preferred i.e., Kenya and Ethiopia
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume 50% actualisation of national plan energy installation targets
- Job creation per GW: Compiles jobs created across Africa over the past 3 years and total capacity installed within same period
- Localisation: GWEC Wind in Africa Report 2023 captures direct jobs in Africa therefore we assume 100% localisation based on data leveraged

Wind | South Africa reveals highest employment impact potential across wind value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Africa Total
Energy and Power						
Wind						
Wind - Future Capacity (GW) by 2030 (Lower bound)	-	0.04	0.20	0.01	0.97	12.01
Wind - Future Capacity (GW) by 2030 (Upper bound)	-	1.50	2.81	0.16	3.38	19.15
Wind - Jobs created per GW	5,511	5,511	5,511	5,511	5,511	5,511
# of direct green jobs (lower bound)	-	211	1,075	56	5,329	66,184
# of direct green jobs (upper bound)	-	8,266	15,499	868	18,599	105,502
Wind - Localisation (%)	75	75	75	75	75	75
Wind - Productivity gain (%)	100	100	100	100	100	100
Direct Green Jobs forecasted by 2030 (lower bound)	-	158	806	42	3,997	49,638
Direct Green Jobs forecasted by 2030 (upper bound)	-	6,200	11,624	651	13,949	79,127

Wind | 55% of wind jobs require specialised and general / administrative skills

Jobs across the value chain

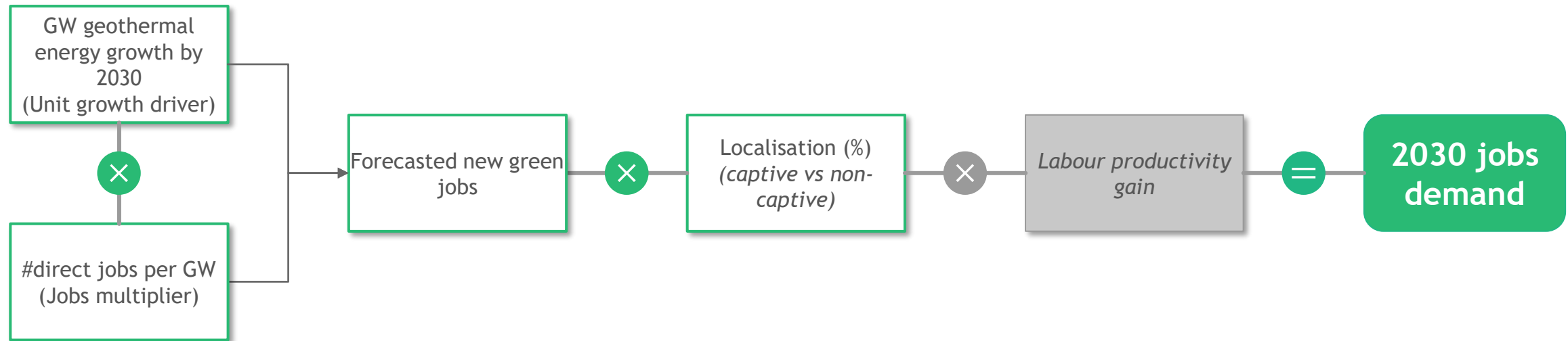
Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	Casual labourers	<ul style="list-style-type: none"> Welders Machine assemblers Electricians 	<ul style="list-style-type: none"> Production managers QC inspectors 	<ul style="list-style-type: none"> Scientists Engineers Technicians
Employment impact	direct jobs (30%)	direct jobs (20%)	direct jobs (35%)	direct jobs (15%)

Relevant value chain stages



- Unskilled labour accounts for 30% of new jobs with casual labourers
- Specialised skills accounts for 20% with technicians installing and maintaining wind turbines
- General/ administrative jobs account for 35% of jobs to provide administrative oversight on regulatory and compliance requirements
- Advanced skills account for 15% of jobs with electrical engineers and developers focusing on research and development (R and D), designing and maintaining wind turbines

Geothermal | Demand driven approach taken to forecasting geothermal energy jobs with GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and CAGR applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) or IRP¹ preferred i.e., Kenya and Ethiopia
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume 50% actualisation of national plan energy installation targets
- Job creation per GW: Based off direct jobs created by Kengen in existing geothermal plants in Kenya
- Localisation: Based off direct jobs estimates across geothermal energy value chain by the Geothermal Energy Association in Washington USA

Geothermal | Kenya reveals highest employment impact potential across geothermal value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total
Energy and Power						
Geothermal						
Geothermal - Future Capacity by 2030 (Lower bound)	0	0.04	0.30	0	0	0.34
Geothermal - Future Capacity by 2030 (Upper bound)	0	2.63	5.25	0	0	7.88
Geothermal - Jobs created per GW	5,300	5,300	5,300	5,300	5,300	26,500
# of direct green jobs (lower bound)	-	212	1,590	-	-	1,802
# of direct green jobs (upper bound)	-	13,913	27,825	-	-	41,738
Geothermal - Localisation (%)	80	80	80	80	80	80
Geothermal - Productivity gain (%)	100	100	100	100	100	100
Direct Green Jobs forecasted by 2030 (lower bound)	-	170	1,275	-	-	1,445
Direct Green Jobs forecasted by 2030 (upper bound)	-	11,158	22,316	-	-	33,474

Geothermal | 35% of jobs require advanced or general/administrative skills

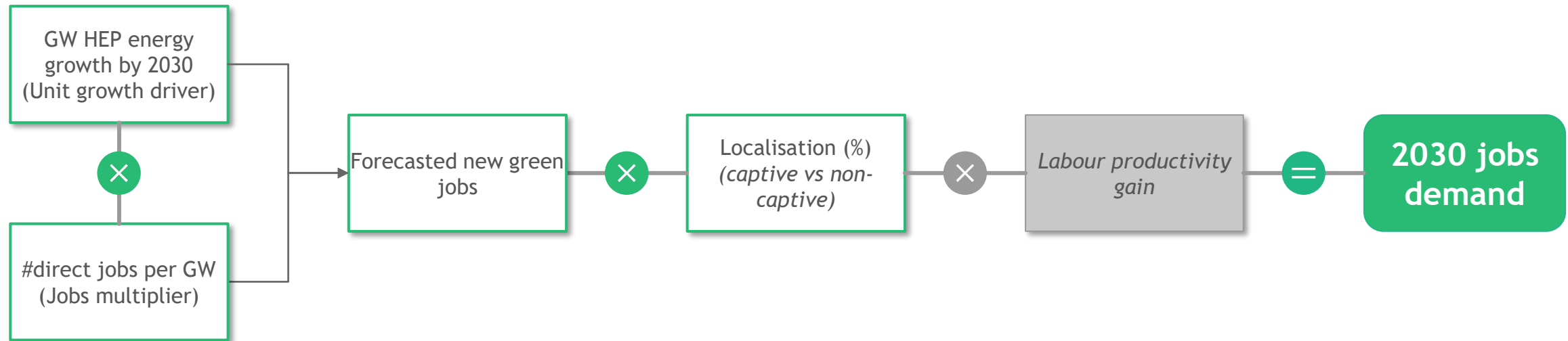
Jobs across the value chain

Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Casual labourers 	<ul style="list-style-type: none"> Electricians Plumbers Pipe fitters 	<ul style="list-style-type: none"> Site managers Project managers OEM management 	<ul style="list-style-type: none"> Civil, Electrical engineers Pipeline experts Geologists
Employment impact	direct jobs (35%)	direct jobs (30%)	direct jobs (20%)	direct jobs (15%)



- **Unskilled labour accounts for 35% of new jobs** with limited casual labourers due to automation and mechanisation
- **Specialised skills accounts for 30%** with technicians installing and maintaining the power plants
- **General/ administrative jobs account for 20% of jobs** to provide administrative oversight on regulatory and compliance requirements
- **Advanced skills account for 15% of jobs** with electrical engineers and developers focusing on R and D, designing and maintaining the power plants

Hydro | Demand driven approach taken to forecasting HEP jobs with GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and CAGR applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) preferred i.e., Kenya and Ethiopia
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume 50% actualisation of national plan energy installation targets
- Job creation per GW: Compiles jobs created across Africa over the past 3 years and total capacity installed within same period
- Localisation: IRENA RE Report 2023 captures direct jobs in Africa therefore we assume 100% localisation based on data leveraged

Hydro | Ethiopia followed by DRC reveal highest employment impact potential across hydroelectric value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Energy and Power						
Hydroelectric						
Hydroelectric - Future Capacity by 2030 (Lower bound)	2.98	4.77	0.20	1.80	-	11.38
Hydroelectric - Future Capacity by 2030 (Upper bound)	8.00	16.50	5.25	5.00	-	82.83
Hydroelectric - Jobs created per GW	2,353	2,353	2,353	2,353	2,353	2,353
# of direct green jobs (lower bound)	7,015	11,224	471	4,236	-	26,734
# of direct green jobs (upper bound)	18,824	38,825	12,354	11,765	-	194,659
Hydroelectric - Localisation (%)	0.85	0.85	0.85	0.85	0.85	0.85
Hydroelectric - Productivity gain (%)	1.00	1.00	1.00	1.00	1.00	1.00
Direct Green Jobs forecasted by 2030 (lower bound)	5,966	9,546	401	3,603	-	22,724
Direct Green Jobs forecasted by 2030 (upper bound)	16,010	33,021	10,507	10,006	-	165,460

Hydro | 40% of hydro jobs are unskilled

Jobs across the value chain

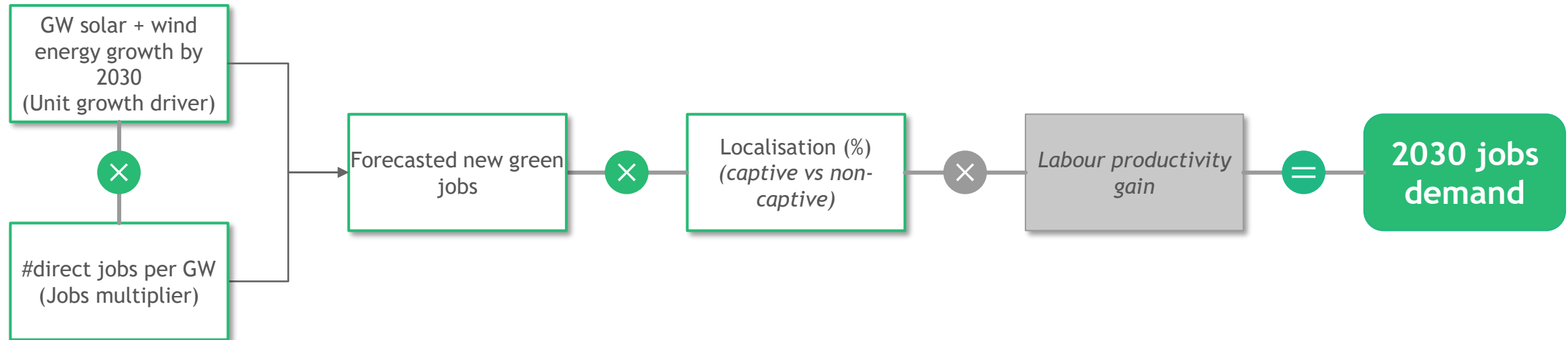
Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Casual labourers 	<ul style="list-style-type: none"> Construction workers Plant operators 	<ul style="list-style-type: none"> Production managers QC inspectors 	<ul style="list-style-type: none"> Civil Engineers Hydrologists Enronmentalists
Employment impact	direct jobs (40%)	direct jobs (30%)	direct jobs (20%)	direct jobs (10%)

Relevant value chain stages



- **Unskilled labour in hydro accounts for 40% of new jobs** with casual labourers working in site preparation and material handling
- **Specialised skills accounts for 30% of hydro labour** focused on building dams and powerhouses
- **General/ administrative jobs account for 20% of jobs** driven by need to monitor and inspect materials to ensure operational efficiency of dams
- **Advanced skills account for 10% of direct new jobs** primarily focused on design, planning, supervision of water movement and environmental impact

Battery storage | Demand driven approach taken to forecasting battery storage jobs with solar and wind GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and CAGR applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) or IRP¹ preferred i.e., Kenya and Ethiopia
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume 50% actualisation of national plan energy installation targets
- Job creation per MW: Compiles utility battery storage jobs expected between 2020-2050 and existing battery storage MW pledges by African countries between 2020-2050
- Localisation: 30% of jobs are within manufacturing and materials, 90-95% of these jobs are not within the African continent

Battery storage | South Africa reveals highest employment impact potential across battery storage value chain due to strong solar and wind commitments

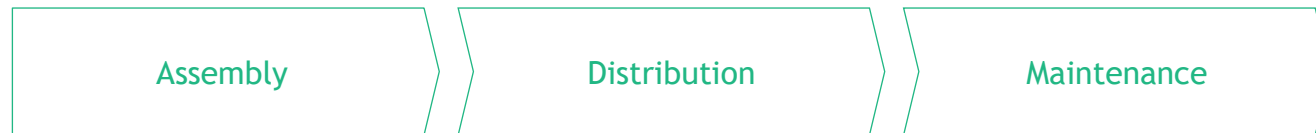
Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Africa Total
Energy and Power						
Battery storage						
Battery Storage - Future Capacity by 2030 (Lower bound)	0.33	38	197	11	968	3,585
Battery Storage - Future Capacity by 2030 (Upper bound)	5	1,515	2,828	168	3,390	8,745
Battery Storage - Jobs created per MW	70	70	70	70	70	70
# of direct green jobs (lower bound)	24	2,694	13,755	770	67,759	250,950
# of direct green jobs (upper bound)	350	106,050	197,925	11,725	237,300	612,150
Average battery needs per MW of solar/wind installed (%)	0.15	0.15	0.15	0.15	0.15	0.15
Battery Storage - Localisation (%)	0.55	0.55	0.55	0.55	0.55	0.55
Battery Storage - Productivity gain (%)	1.00	1.00	1.00	1.00	1.00	1.00
Direct Green Jobs forecasted by 2030 (lower bound)	2	222	1,135	64	5,590	20,703
Direct Green Jobs forecasted by 2030 (upper bound)	29	8,749	16,329	967	19,577	50,502

Battery storage | 40% of jobs will require specialised skills

Jobs across the value chain

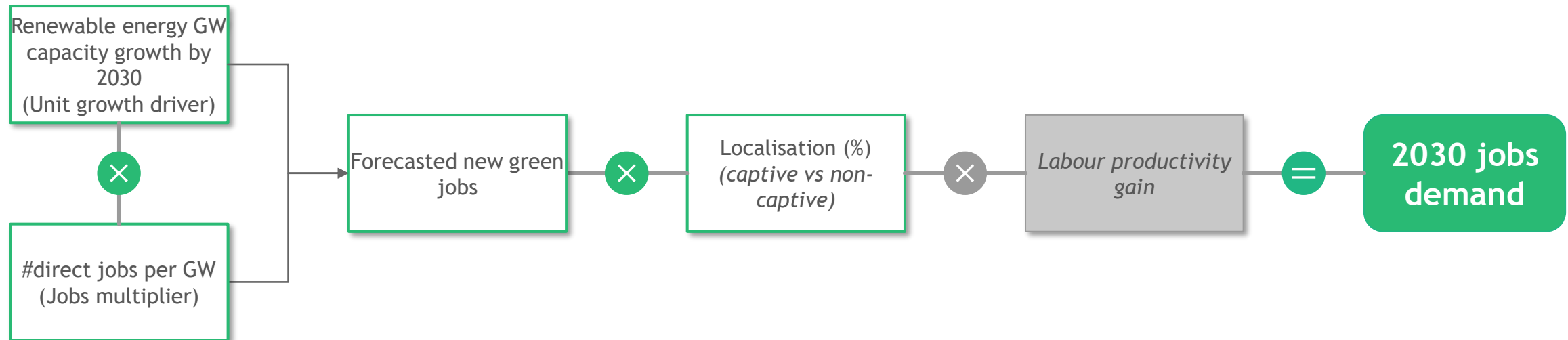
Job Taxonomy	Unskilled	Specialised Skills	General/ Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	Casual labourers	<ul style="list-style-type: none"> Welders Machine assemblers Electrician 	<ul style="list-style-type: none"> Production managers QC inspectors 	<ul style="list-style-type: none"> Scientists Engineers Technicians
Employment impact	direct jobs (30%)	direct jobs (40%)	direct jobs (15%)	direct jobs (15%)

Relevant value chain stages



- **Unskilled labour in battery storage accounts for 30% of new jobs with casual labourers supporting manufacturing plants and basic assembly line work**
- **Specialised skills accounts for 40% of labour driven by need of technical expertise in assembly, installation, and maintenance of battery storage systems**
- **General/ administrative jobs account for 15% of jobs in storage and logistics coordination**
- **Advanced skills are primarily deployed in research, accounting for 15% of direct new jobs with the highest quality**

Power transmission and distribution | Demand driven approach taken to forecasting jobs with renewable energy GW capacity as unit growth driver



Assumptions

- Lower bound: Based on current energy capacity and CAGR applied to 2030 i.e., DRC, Nigeria, South Africa, where available Least Cost Power Development Plan (LCPDP) or IRP¹ preferred i.e., Kenya and Ethiopia
- Upper bound: Leveraged national plan energy installation targets by 2030 and assume 50% actualisation of national plan energy installation targets
- Job creation per GW: Compiles number of employees across utility companies and the number of GW installed
- Localisation: 30% of jobs are within manufacturing and materials, 90-95% of these jobs are not within the African continent

Power transmission and distribution | Ethiopia and Kenya reveal highest employment impact potential across power transmission and distribution

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Africa Total
Energy and Power						
Power transmission and distribution						
Power Transmission - Future Capacity by 2030 (Lower bound)	2.98	4.86	1.04	1.91	2.57	51.76
Power Transmission - Future Capacity by 2030 (Upper bound)	8.01	20.70	15.51	6.56	7.21	98.63
Power Transmission - Jobs created per GW	1,800	1,800	1,800	1,800	1,800	1,800
# of direct green jobs (lower bound)	5,372	8,749	1,874	3,446	4,627	93,166
# of direct green jobs (upper bound)	14,426	37,262	27,923	11,817	12,986	177,541
Power Transmission - Localisation	0.65	0.65	0.65	0.65	0.65	0.65
Power Transmission - Productivity gain	1.00	1.00	1.00	1.00	1.00	1.00
Direct Green Jobs forecasted by 2030 (lower bound)	3,492	5,687	1,218	2,240	3,008	60,558
Direct Green Jobs forecasted by 2030 (upper bound)	9,377	24,220	18,150	7,681	8,441	115,402

Power transmission and distribution | 50% of jobs are unskilled

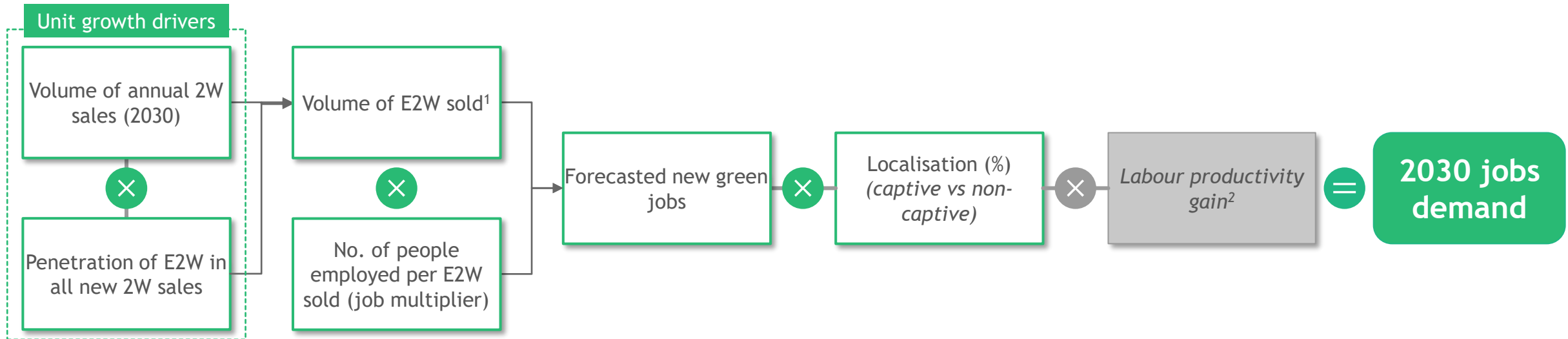
Jobs across the value chain

Job Taxonomy	Unskilled	Specialised Skills	General/ Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	Casual labourers	<ul style="list-style-type: none"> • Installers • Technicians • Operators 	<ul style="list-style-type: none"> • Sales agents • Accountants 	<ul style="list-style-type: none"> • Engineers • Project managers
Employment impact	direct jobs (50%)	direct jobs (20%)	direct jobs (20%)	direct jobs (10%)



- Unskilled labour in transmission and distribution accounts for 50% of new jobs with casual labourers working laying down transmission lines and building sub-stations
- Specialised skills accounts for 20% of T and D labour with electricians specialising in T and D systems
- General/ administrative jobs account for 20% of jobs mainly in supervision and logistics
- Advanced skills are primarily deployed in planning new T and D systems and research, accounting for 10% of direct new jobs

Electric 2 wheelers | Demand driven approach taken to forecasting green jobs with volume of E2W sold in 2030 as unit growth driver



Assumptions

- Lower bound: based on India average adoption curves (India's E2W penetration rate CAGR weighted by 75% to account for possible growth slowdown after initial years) multiplied by number of 2Ws sold in focus country in 2030
- Upper bound: based on India industrious adoption curves (India's E2W penetration rate CAGR) multiplied by number of 2Ws sold in focus country in 2030
- Jobs created per unit: only considers manufacturing, assembly + distribution and maintenance jobs since operation (motorbike taxi operators) are not considered direct jobs. Based on employee and production figures from E2W firms from India (Ola Electric) and pan-Africa (Spiro)
- Localisation: evaluated based on domestic companies operating in the sector and country's competitive position to localise jobs in the value chain

1. Direct projections from credible sources will be used if available, otherwise, it will be modelled using the three drivers
 2. No meaningful gains expected within the next 5 years therefore not included in this modelling exercise

Electric 2 wheelers | East to West belt countries show high potential in E2Ws due to larger existing 2W user base

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Mobility and transportation						
E2W						
E2W - Annual sales ² (000s) by 2030 (Lower bound)	-	86,501	162,505	57,399	6,758	518,264
E2W - Annual sales ² (000s) by 2030 (Upper bound)	-	140,522	252,005	93,245	10,480	819,549
E2W - Jobs created per 1k units	0.07	0.07	0.07	0.07	0.07	0.07
# of direct green jobs (lower bound)	0	6,056	11,376	4,018	474	36,282
# of direct green jobs (upper bound)	0	9,837	17,641	6,528	734	57,371
E2W - Localisation (%)	0	0.77	0.81	0.81	0.77	0.70
E2W - Productivity gain (%)		1	1	1	1	1
Direct Green Jobs forecasted by 2030 (lower bound)	0	4,640	9,162	3,236	363	27,451
Direct Green Jobs forecasted by 2030 (upper bound)	0	7,537	14,207	5,257	562	43,405

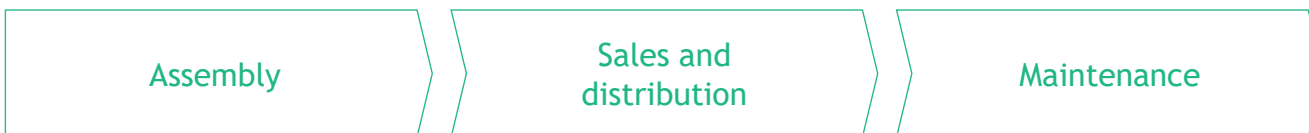
Note: E3W not considered in model since E2W make up more than 75% of E2/3W sales

1. Numbers not projected for DRC due to very low electrification rates and lack of industry interest in the country 2. Annual sales figure used due to majority of jobs being in assembly
 Source: UNEP Global Electric Mobility Program report; Ethiopian Ministry of Transport; Ola Electric Mobility reports; Ather Energy India reports; Recharged.com; Expert interviews; BCG analysis

Electric 2 wheelers | 40% of E2W jobs are unskilled

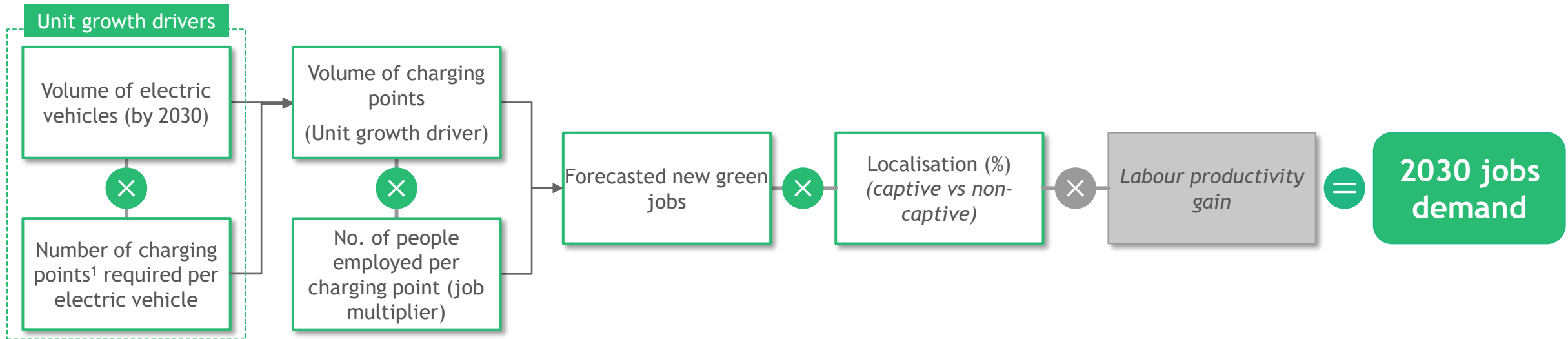
Jobs across the value chain

Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Material handlers Casual labourers Sales agents 	<ul style="list-style-type: none"> Welder Electrician Customer service rep 	<ul style="list-style-type: none"> Sales representative Production manager 	<ul style="list-style-type: none"> Electrical engineer Mechanical engineer
Employment impact	direct jobs (40%)	direct jobs (30%)	direct jobs (20%)	direct jobs (10%)



- Unskilled labour accounts for 40% of new jobs with casual labourers working in the factory
- Specialised skills accounts for 30% with electricians assembling the E2Ws
- General/ administrative jobs account for 20% of jobs with sales representatives working at the E2W stores
- Advanced skills account for 10% of jobs with electrical and mechanical engineers working on assembling the E2Ws

Charging infrastructure | Demand driven approach taken to forecasting green jobs with volume of charging ports in 2030 as unit growth driver



Assumptions

- **Lower bound:** For charging points, calculated using South Africa chargers per EV figure. For swapping points, calculated using E2W lower bound figures.
- **Upper bound:** For charging points, calculated using India chargers per EV figure. For swapping points, calculated using E2W upper bound figures.
- **Jobs created per unit:** Combination of jobs per charging point and jobs per swapping point. Jobs per charging point based on figures from an industry player from a comparable country (India) and an East African country. Jobs per swapping points based on figures from an East African charging infrastructure company.
- **Localisation:** evaluated based on domestic companies operating in the sector and country's competitive position to localise jobs in the value chain

1. Charging points will be representative of both charging stations and battery swapping stations
 2. No meaningful gains expected within the next 5 years therefore not included in this modelling exercise

Charging infrastructure | All EV charging infrastructure is led by Kenya at 3.9-4.2K jobs

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Mobility and transportation						
Charging infrastructure						
Charging Infrastructure - Future Capacity (#s) by 2030 (Lower bound)	0	4,882	8,110	852	1,013	16,167
Charging Infrastructure - Future Capacity (#s) by 2030 (Upper bound)	0	10,317	8,858	1,957	3,954	39,654
Charging Infrastructure - Jobs created per Unit	0	0.6	0.6	0.6	0.6	0.64
# of direct green jobs (lower bound)	0	3,137	5,211	548	652	10,386
# of direct green jobs (upper bound)	0	6,628	5,691	1,257	2,540	25,474
Charging Infrastructure - Localisation (%)	0	0.69	0.74	0.74	0.69	0.6
Charging Infrastructure - Productivity gain (%)	0	1	1	1	1	1
Direct Green Jobs forecasted by 2030 (lower bound)	0	2,165	3,856	406	450	13,108
Direct Green Jobs forecasted by 2030 (upper bound)	0	4,573	4,211	930	1,753	26,752

Note: Charging infrastructure includes both battery swapping (mainly used by E2W) and plug in charging points (other EVs)

1. Numbers not projected for DRC due to very low electrification rates and lack of industry interest in the country

Source: Shell Foundation; IEA; PREO; News24; Guardian Nigeria; Biz Community; InfraCo Africa; Tech Arena; Traxn; Company websites; BCG analysis

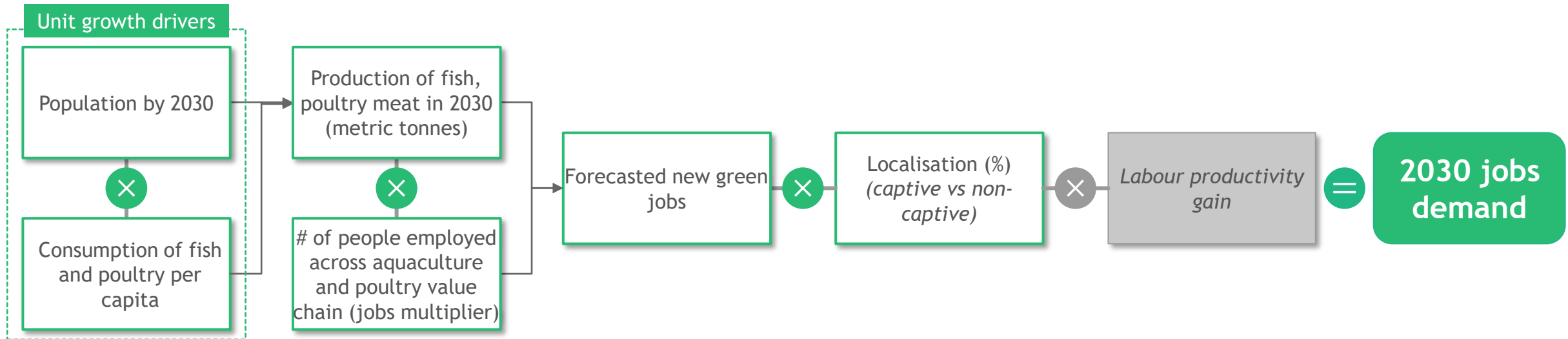
Charging infrastructure | 40% of jobs require specialized skills

Job Taxonomy	Unskilled	Specialised Skills	General / Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	• Security guards	• Attendants • Construction workers	• Logistics manager	• Electrical engineer • Software dev
Employment impact	direct jobs (30%)	direct jobs (40%)	direct jobs (20%)	direct jobs (10%)



- **Unskilled labour accounts for 30% of new jobs** with security guards protecting the swap stations and charge points
- **Specialised skills accounts for 40%** with attendants at the swap points
- **General / administrative jobs account for 20% of jobs** with logistics managers coordinating the deployment of technicians
- **Advanced skills account for 10% of jobs** with software developers designing the apps used to use the charging points

Aquaculture and poultry | Demand driven approach taken to forecasting green jobs with fish and poultry production in 2030 as unit growth driver



Assumptions

- Lower bound: based on population growth to 2030 and current per capita consumption of fish and poultry
- Upper bound: set by population growth to 2030, considering either national targets like Kenya's vision 2030, the average of current African average and CAGR for the last 5 years in DRC and Ethiopia, and higher preference for fish and poultry in Nigeria and South Africa
- Jobs created per unit: Based on employees' ratio to production from 2 comparable companies, this does not include farmers
- Aquaculture and poultry: have been prioritised due to their low carbon footprint at 1.5 and 5.3 Kg CO₂ / Kg edible meat respectively
- Localisation: Based off direct jobs created by existing farms, assume 100% localisation for poultry and 99% for aquaculture

Aquaculture and poultry | Nigeria reveals highest employment impact potential across aquaculture and poultry value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Agriculture and nature						
Aquaculture and poultry						
Aquaculture and poultry production in (MT) by 2030 (Lower bound)	375,178	24,320	37,756	1,047,567	1,039,649	8,458,786
Aquaculture and poultry production in (MT) by 2030 (Upper bound)	877,865	770,667	541,763	2,757,219	3,046,810	12,797,622
Aquaculture and poultry - Jobs created per Unit	0.01	0.01	0.01	0.01	0.01	0.01
# of direct green jobs (lower bound)	1,347	178	530	26,716	7,145	108,576
# of direct green jobs (upper bound)	2,757	1,332	7,349	69,547	17,129	191,011
Aquaculture and poultry - Localisation (%)	1	1	1	1	1	1
Aquaculture and poultry - Productivity gain (%)	1	1	1	1	1	1
Direct Green Jobs forecasted by 2030 (lower bound)	1,341	178	525	26,448	7,143	107,846
Direct Green Jobs forecasted by 2030 (upper bound)	2,741	1,324	7,280	68,855	17,109	189,488

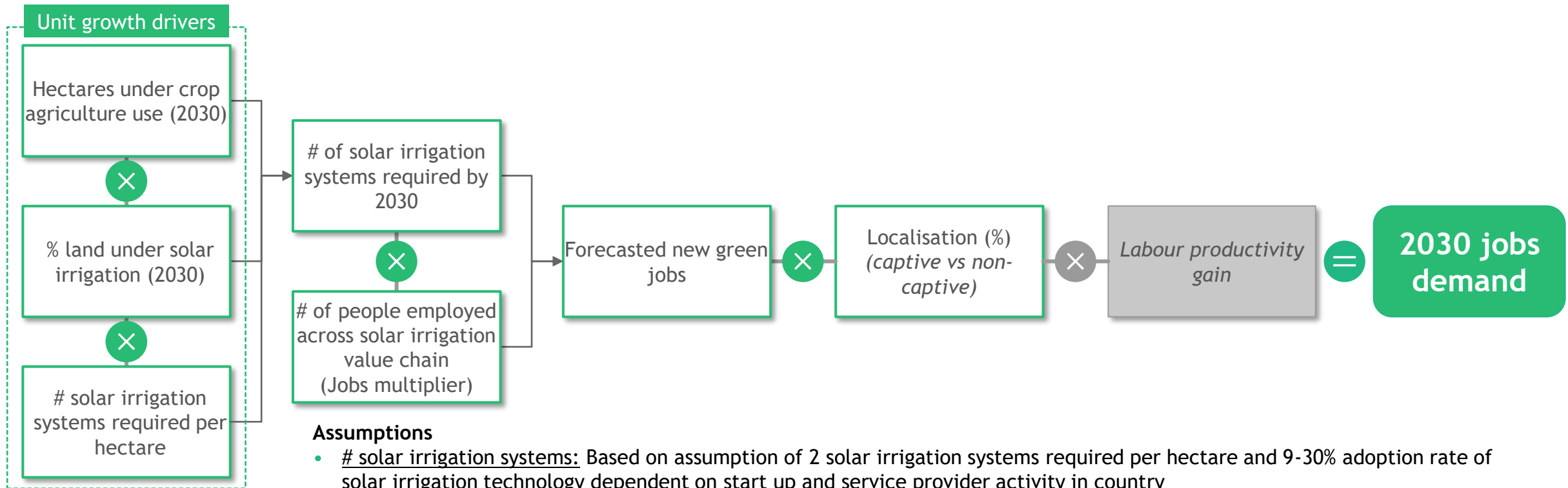
Aquaculture and poultry | 60% of jobs in aquaculture and poultry will be unskilled

Job Taxonomy	Unskilled	Specialised Skills	General / Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Fishery labourers Farmhand 	<ul style="list-style-type: none"> Boat technicians Hatchery technicians 	<ul style="list-style-type: none"> Farm managers QA analysts 	<ul style="list-style-type: none"> Aquacultural engineers Biosecurity specialists Veterinarian Nutritionist
Employment impact	direct jobs (60%)	direct jobs (25%)	direct jobs (10%)	direct jobs (5%)



- Unskilled labour in aquaculture and poultry accounts for 60% of new jobs, with casual labourers working in feeding, cleaning, and basic maintenance
- Specialised skills accounts for 25% of jobs with technicians managing hatcheries, and ensuring the efficient operation of aquaculture systems
- General / administrative jobs account for 10% of jobs focused on managing operations, quality assurance and sales
- Advanced skills account for 5% of direct new, high-quality jobs, primarily focused on R and D in sustainable aquaculture systems

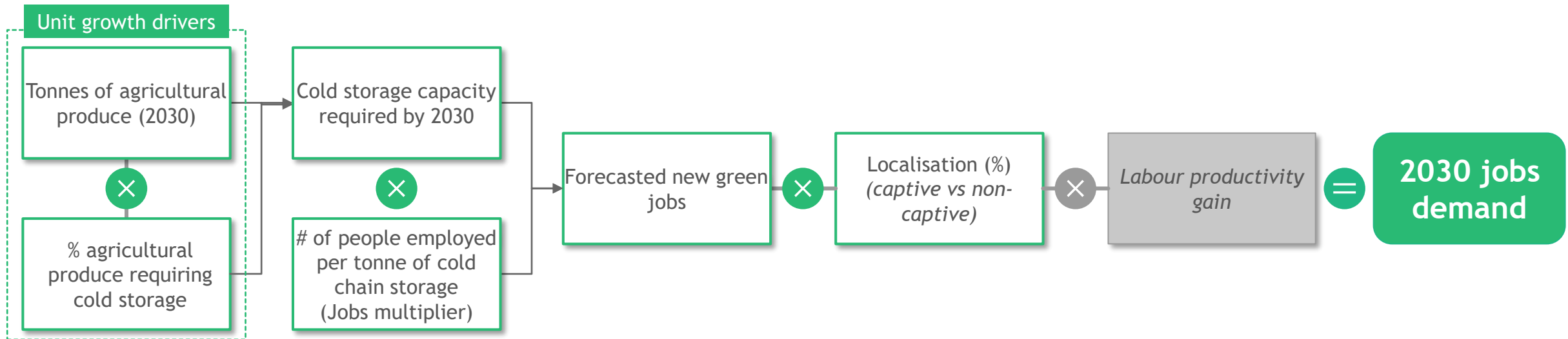
Climate smart agriculture | Demand driven approach taken to forecasting solar irrigation jobs with # systems in 2030 as unit growth driver



Assumptions

- **# solar irrigation systems:** Based on assumption of 2 solar irrigation systems required per hectare and 9-30% adoption rate of solar irrigation technology dependent on start up and service provider activity in country
- **Lower bound:** Based on 25-50% actualisation of commitments to increasing area of land under irrigation based on realisation of passed commitments
- **Upper bound:** Based on optimistic 60-85% actualisation of commitments to increasing area of land under irrigation dependent on securing financing; including carbon financing for avoided emissions
- **Job creation per irrigation system:** Compiles jobs created across solar irrigation value chain based on company comparatives
- **Localisation:** 60-80% of jobs in solar irrigation value chain are localised; dependent on start up and service provider activity in the country

Climate smart agriculture | Demand driven approach taken to forecasting cold chain storage jobs with capacity required in 2030 as unit growth driver



Assumptions

- Cold storage capacity required: Based on tonnes of high export value agricultural produce and 10-30% adoption rate of cold chain storage technology dependent on start up and service provider activity in country
- Lower bound: Based on 2-5% actualisation of commitments to decreasing post harvest food loss, increasing cold chain storage adoption, and realisation of passed commitments; historically low across African countries
- Upper bound: Based on optimistic 10-30% actualisation of commitments to decreasing post harvest food loss, increasing cold chain storage adoption, start up and service provider activity in country dependent on securing financing; including carbon financing for avoided emissions
- Job creation per irrigation system: Compiles jobs created across cold storage value chain based on company comparatives
- Localisation: 60-90% of jobs in cold storage irrigation value chain are localised; dependent on start up and service provider activity in the country

Climate smart agriculture | Nigeria and South Africa reveal highest employment impact potential across climate smart agriculture

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Agriculture and nature						
Climate smart agriculture						
Climate smart tech. -new solar irrigation systems units (lower bound)	8,333	14,212	19,200	65,640	20,000	874,983
Climate smart tech. -new solar irrigation systems units (upper bound)	21,667	28,423	34,560	118,152	45,000	1,272,703
Climate smart tech. -new cold storage tonne capacity (Lower bound)	16,246	46,042	5,440	133,049	119,805	1,580,376
Climate smart tech. -new cold storage tonne capacity (Upper bound)	64,984	230,212	21,762	997,866	898,534	7,901,880
Climate smart tech. -jobs per solar irrigation system	0.04	0.04	0.04	0.04	0.04	0.04
Climate smart tech. -cold storage jobs per tonne	0.07	0.07	0.07	0.07	0.07	0.07
# of direct solar irrigation green jobs (lower bound)	333	568	768	2,626	800	34,999
# of direct solar irrigation green jobs (upper bound)	867	1,137	1,382	4,726	1,800	50,908
# of direct cold storage green jobs (lower bound)	1,097	3,108	367	8,981	8,087	106,675
# of direct cold storage green jobs (upper bound)	4,386	15,539	1,102	67,356	60,651	533,377
Climate smart tech. -solar irrigation systems localisation (%)	0.70	0.80	0.80	0.80	0.80	0.60
Climate smart tech. -solar irrigation systems productivity gain (%)	1.00	1.00	1.00	1.00	1.00	1.00
Climate smart tech. -cold storage localisation (%)	0.60	0.70	0.90	0.90	0.80	0.65
Climate smart tech. -cold storage productivity gain (%)	1.00	1.00	1.00	1.00	1.00	1.00
Direct Solar Irrigation Green Jobs forecasted by 2030 (lower bound)	233	455	614	2,100	640	21,000
Direct Solar Irrigation Green Jobs forecasted by 2030 (upper bound)	607	910	1,106	3,781	1,440	30,545
Direct Cold Storage Green Jobs forecasted by 2030 (lower bound)	658	2,176	331	8,083	6,469	69,339
Direct Cold Storage Green Jobs forecasted by 2030 (upper bound)	2,632	10,878	992	60,620	48,521	346,695

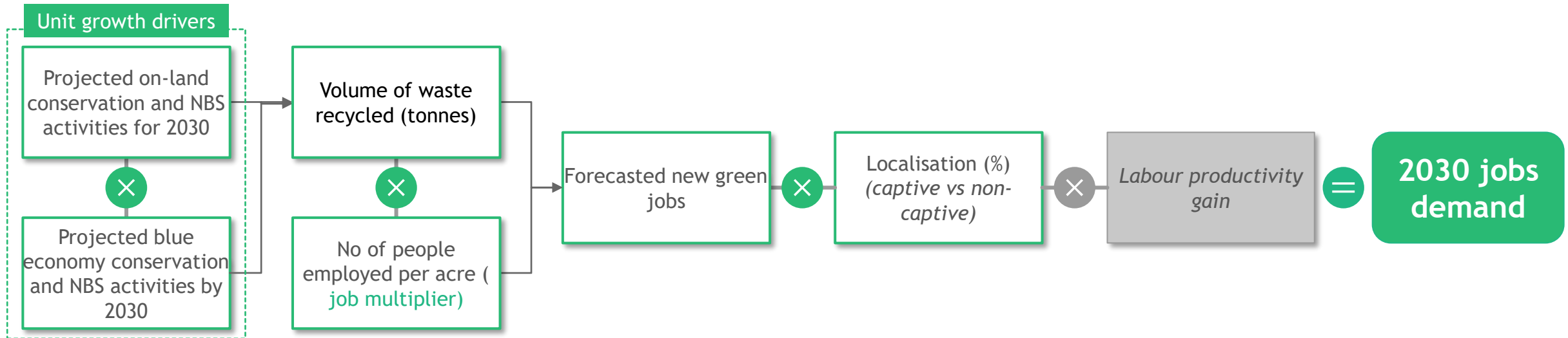
CSA | 40% of CSA jobs are unskilled

Job Taxonomy	Unskilled	Specialised Skills	General / Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	Casual labourers	<ul style="list-style-type: none"> • Installers • Technicians • Operators 	<ul style="list-style-type: none"> • Sales agents • Accountants 	<ul style="list-style-type: none"> • Engineers • Project managers
Employment impact	direct jobs (40%)	direct jobs (30%)	direct jobs (20%)	direct jobs (10%)



- Unskilled labour in CSA accounts for 40% of new jobs with casual labourers working in maintenance
- Specialised skills accounts for 30% of CSA labour with technicians working in installation and after sales services
- General / administrative jobs account for 20% of jobs due to demand for on field sales agents advancing adoption of CSA technologies
- Advanced skills are primarily deployed in research and manufacturing, accounting for 10% of direct new jobs with the highest quality

Ecosystem conservation and nature-based solutions | Demand driven approach taken to forecasting jobs with project land conserved



Assumptions

- Lower bound: based on countries' potential to achieve 30 by 30² goal (calibrated by government statements)
- Upper bound: based on a countries' potential to achieve their 30 by 30 goal at 80% based on ambitious commitments of comparable countries; Consideration of impact of climate finance vehicles has increased the
- Jobs created per unit: Based on employees to land protected, watershed management, and forest conservation ratio

Ecosystem conservation and nature-based solutions | Nigeria, followed by Kenya and DRC present the highest job creation potential by 2030

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Agriculture and nature						
Ecosystem conservation and nature-based solutions (NBS) ¹						
Area under conservation (KmSq) by 2030 (lower bound)	68,011	33,857	28,457	27,323	60,655	1,086,385
Area under conservation (KmSq) by 2030 (upper bound)	272,046	112,857	79,680	109,292	194,094	3,821,797
Conservation- Jobs created per Unit	0.02	0.02	0.04	0.05	0.02	0.031
# of direct green jobs (lower bound)	1,106	610	1,274	1,455	1,259	33,244
# of direct green jobs (upper bound)	4,421	2,032	3,566	5,820	4,028	116,948
Conservation - Localisation	1.00	1.00	1.00	1.00	1.00	1.00
Conservation - Productivity gain	1.00	1.00	1.00	1.00	1.00	1.00
Direct Green Jobs forecasted by 2030 (lower bound)	1,106	610	1,274	1,455	1,259	33,244
Direct Green Jobs forecasted by 2030 (upper bound)	4,421	2,032	3,566	5,820	4,028	116,948

1. NBS includes activities that focus on carbon sequestration and avoidance through ecosystems such as forests, wetlands, and oceans; it does not include activities that focus on improving environmental conditions for harvest i.e., agroforestry, aquaculture etc.; 2. UN Agreement in the 2022 Bio-diversity Conference (COP 15) to protect 30% of land globally by 2030 (agreed up on by all countries)

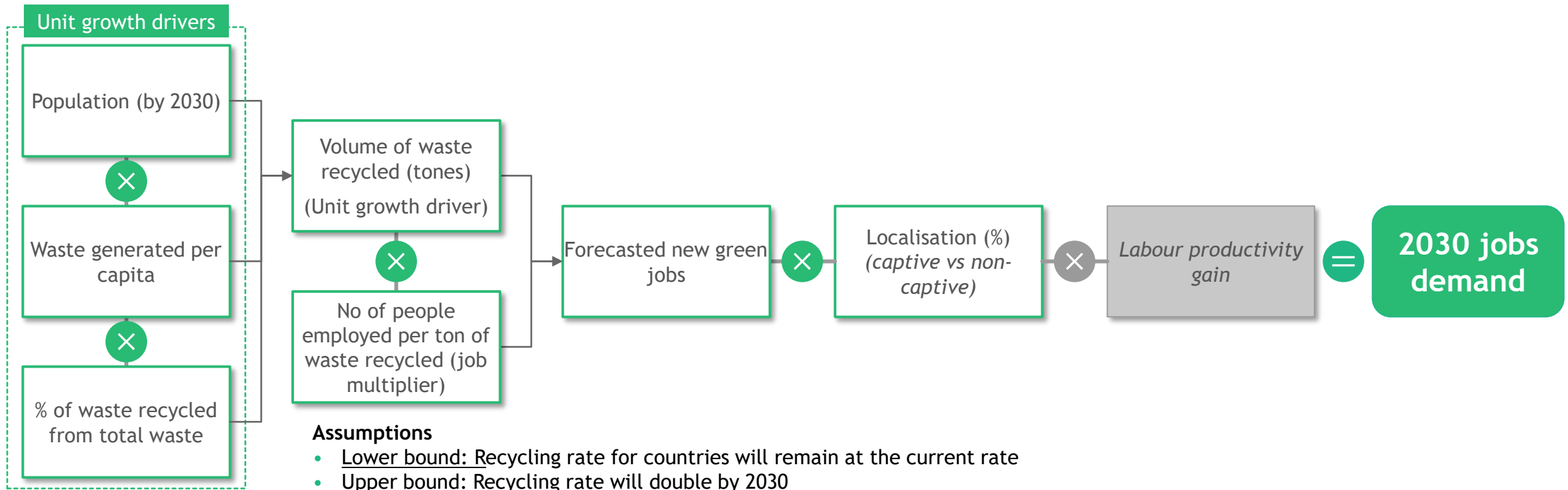
Ecosystem conservation and NBS | 55% of jobs require specialised skills

Job Taxonomy	Unskilled	Specialised Skills	General/Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Cleaner Grounds worker 	<ul style="list-style-type: none"> Wildlife ranger Tour guide Fence technician 	<ul style="list-style-type: none"> Communications specialist Grant manager 	<ul style="list-style-type: none"> Ecologist Statistician
Employment impact	direct jobs (30%)	direct jobs (45%)	direct jobs (10%)	direct jobs (15%)



- Unskilled labour accounts for 30% of new jobs with cleaners and grounds workers
- Specialised skills accounts for 45% of NBS labour with rangers, fence technicians and tour guides
- General / administrative jobs account for 10% of jobs due to demand for HR managers and accountants
- Advanced skills are primarily ecologists and statisticians accounting for 15% of direct new jobs with the highest quality

Waste remediation and recycling | Demand driven approach taken to forecasting jobs with volume of waste in 2030 as unit growth driver



Assumptions

- Lower bound: Recycling rate for countries will remain at the current rate
- Upper bound: Recycling rate will double by 2030
- Job creation per tonne: Average number of jobs created per tonne of waste recycled by different recycling businesses (Kenya, Nigeria, and South Africa)
- Localisation: Small proportion focusing on manufacturing of recycling machines will be outside Africa

Waste remediation and recycling | South Africa and Kenya boast the highest employment impact potential in the recycling value chain

Country Selection	DRC	Ethiopia	Kenya	Nigeria	South Africa	Total Africa
Manufacturing and materials						
Waste remediation and recycling						
Recycling - New future capacity (tonnes p.a.) (by 2030) - Lower bound)	129,381	148,961	172,997	121,716	612,200	3,306,181
Recycling - New future capacity (tonnes p.a.) (by 2030) - Upper bound	781,325	1,129,205	1,552,697	945,955	1,546,651	16,613,350
Recycling - Jobs per tonne	0.01	0.01	0.01	0.01	0.01	0.01
# of direct green jobs (lower bound)	1,617	1,862	2,162	1,521	7,652	41,327
# of direct green jobs (upper bound)	9,767	14,115	19,409	11,824	19,333	207,667
Recycling - Localisation (%)	0.95	0.95	0.95	0.95	0.95	0.95
Recycling - Productivity gain (%)	1.00	1.00	1.00	1.00	1.00	1.00
Direct Green Jobs forecasted by 2030 (lower bound)	1,536	1,769	2,054	1,445	7,270	39,261
Direct Green Jobs forecasted by 2030 (upper bound)	9,278	13,409	18,438	11,233	18,366	197,284

Waste remediation and recycling | 50% of jobs will be unskilled

Job Taxonomy	Unskilled	Specialised Skills	General / Admin Skills	Advanced Skills
<i>Illustrative jobs</i>	<ul style="list-style-type: none"> Cleaner Sorter Packer 	<ul style="list-style-type: none"> Machine operators Forklift Operators 	<ul style="list-style-type: none"> Production managers QC inspectors Sales and marketing 	<ul style="list-style-type: none"> Engineers Scientists Technicians
Employment impact	direct jobs (50%)	direct jobs (30%)	direct jobs (10%)	direct jobs (10%)



- Unskilled labour in waste accounts for 50% of new jobs with collectors and sorters
- Specialised skills accounts for 30% of waste labour with machine and forklift operators
- General / administrative jobs account for 10% of jobs due to demand for production managers
- Advanced skills are primarily deployed in research and manufacturing, for 10% of direct new jobs with the highest quality

Contents

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Approach and methodology

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Value chain findings

Conclusions and next steps

Appendices

Definitions

Value chain details

 Future research and model

Following this report, there are 3 broad categories of research to enhance this fact base and enable immediate action

Not exhaustive



Enhancing the job demand forecast to granular job profiles

- For the largest value chains, what are the specific job profiles and associated employment volumes in specific countries?
 - e.g., the number of solar installers in Nigeria or aquaculture hatchery technician in Kenya
- For these identified job profiles, what are the core skills and technical capabilities required
 - e.g., electric drive train maintenance for E2W mechanics



Quantify, where exists, job supply and demand alignment and gaps

- What is the **current employee base and talent pipeline (supply side)** for specific job profiles?
- Therefore, what is the **current and projected workforce gaps** (difference between forecasted supply and demand) for job profiles?
 - e.g., assessing number of electrical engineers graduating in Kenya against the current and forecast demand
- What are the **main skills gaps** (missing capabilities) in current and future job profile levels?
 - e.g., training needed for E2W assembly workers



Forecasting long-term job demand and prioritize enablers

- What are the forecasted number of direct jobs in **emerging value chains by 2050**?
 - e.g., forecasting the number of jobs in green hydrogen in Africa through 2050
- What **enablers have an outsized role** in preparing Africans for green transition?
 - e.g., growth in green jobs focused skilling enabled by increased capital from green finance

Guide to excel model | The model leveraged to forecast green jobs in Africa has three main sections

1 Summary

Dashboard: Quick tool to visualize out puts by value chain

Job Projections - Summary: Summary of key job forecasts by country and by value chain

Job Taxonomy Breakdown: Pan Africa and country level breakdown of projected job demand by skill level (unskilled, specialised skill, general/administrative skill, and advanced skills)

2 Outputs

Each page includes the job forecasts for the sample countries (DRC, Ethiopia, Kenya, Nigeria and South Africa) and total Pan-Africa; sectors and value chains covered are:

- **Energy and power:** wind, solar, geothermal, hydro, battery storage and power transmission and distribution
- **Mobility and transport:** electric 2 wheelers and charging infrastructure
- **Manufacturing and materials:** waste remediation and recycling
- **Agriculture and nature:** aquaculture and poultry, climate smart agricultural technologies and, ecosystem conservation and nature-based solutions

3 Inputs

Each page includes data points, assumptions and sources used for the jobs forecast; The sectors and value chains covered are similar to the ones covered in the outputs section



Note: You will find additional pages labeled "back-up" for the value chains where the input pages were not sufficient to describe current state or calculations



 fsd africa  Shortlist

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