An Agenda for Green Industrialization in Zambia

Robin Burgess (LSE, IGC)

Zambia Economic Growth Forum

Feb 22, 2024
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Introduction

Today I’m going to talk about the opportunities for green industrialisation in Zambia - four overarching themes

1. Occupational Change
2. Climate Change
3. Innovation and Leapfrogging
4. Data and Digitalisation

Guiding principle → how to make people more productive → occupational change → the wealth of people

Draw on experience working in Bangladesh, Brazil, China, India, Indonesia, Pakistan, Uganda, South Korea
Three Potential Areas for Innovation

1. Industrial Policy
2. Redistribution
   1. Access to Energy
   2. Big Push Anti-poverty Programs
3. Natural Capital
Industrial Policy
World Employment Share

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Employment Share - Brazil

Jobs to 90% of workforce

log GDP/capita

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Self-employed

Wage work

# jobs accounting for 90% within work type

\[ \text{In GDP p/c} \]

\[ N = 36 \]
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Rural vs Urban

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Four jobs account for 90% of the workforce in rural areas

- Market-oriented crop and animal producers
- (72%) Agricultural, fishery and related labourers
- (12%) Fishery workers, hunters and trappers (4%)
- Other elementary agricultural labourers (3%)
Service led development?

The top 10 urban jobs include:

- Market-oriented crop and animal producers (10%)
- Elementary agricultural labourers (6.4%)
- Business services agents and trade brokers (5.7%)
- Street vendors and related workers (5.6%)
- Shop salespersons and demonstrators (5.5%)
- Protective services workers (4.5%)
- Other salesperson (4.5%)
- Agricultural, fishery and related labourers (4.3%)
- Motor-vehicle drivers (4.2%)
- Building frame and related trades workers (4.2%)

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Can mineral resources play a role in jobs focused industrial policy?

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Many potential value chains

Exports (2021) [Click to Select a Product]
Total: $13.4B

[Diagram showing exports with Raw Copper at 47.3% and Refined Copper at 22.2%]

Exports (2021) [Click to Select a Product]
Total: $3.59B

[Diagram showing exports with Gold at 22.7% and Precious Stones at 7.81%]
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2. Redistribution
Redistribution

Two approaches to redistribution are core to a green industrial agenda for Zambia:

1. Access to energy for both households and firms
2. Big push asset transfers

These are both means by which we can foster occupational change that enable people to protect themselves from the effects of climate change.
2.1 Access to Energy
Between 2000 and 2016, India dominated world electrification, contributing over 80% of the total gain in the number of households connected to the grid (IEA 2017).
Figure: Solar Innovation and Policy Support in China
Figure: Solar Innovation and Policy Support in China
Cost of solar has fallen dramatically

**Figure:** Global average price of solar PV modules (in 2019 US$ per Watt)

Source: LaFond et al. (2017) & IRENA Database
Huge fall in cost of solar relative to other energy sources (1880-2020)
Figure: Market Integration and Spatial Variation in Electricity Prices (Gonzales et al. 2023)
Disparities exist in how electricity is accessed.
Disparities exist in how electricity is accessed.
The opportunity of solar energy

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In Harm’s Way?

Evolution of electricity generation sources in Zambia since 2000


Source: International Energy Agency, Licence: CC BY 4.0

Electricity generation, Zambia, 2021

Coal 7.3%
Hydro 91.1%
Solar PV 0.8%
2.2 Big Push Anti-poverty Programs
Poverty Traps
(b) Total Consumption
(A) Productive Assets
Climate Resilience

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- total expenditure
- food
- non-food

flood effect for control group
flood effect for treated group
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Getting people out of poverty requires a big push

Alternative Policies:
- NREGA microloan $100 PPP
- microloan $200 PPP
- Banerjee et al. (2015), India
- BRAC
- Blattman et al. (2013)

Household transfer value
(share of average annual per capita consumption)
3. Natural Capital
Smart Conservation

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Smart Conservation

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Carbon stock in the Brazilian Amazon in 2000

Figure 1: Carbon Stock in 2000

This map plots carbon stock density (tons of $CO_2$ per hectare) at 30 meter resolution. The values vary from blue (less carbon) to yellow (more carbon).
Costa Rica - Annual growth rate of tourist arrival = 7.4% per annum since 1990; Tourism = 5% of GDP in 2016; Employs 150,000 people; Main source of foreign exchange.
Protected areas cover much of Zambia
Natural capital in Zambia is an asset with increasing value

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Deforestation is degrading natural capital

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Subsistence agriculture = main driver of deforestation
Much of energy comes from fuelwood

Total energy supply, Zambia, 2021

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>4.0%</td>
</tr>
<tr>
<td>Oil</td>
<td>12.0%</td>
</tr>
<tr>
<td>Hydro</td>
<td>11.6%</td>
</tr>
<tr>
<td>Biofuels and waste</td>
<td>72.3%</td>
</tr>
</tbody>
</table>

Source: International Energy Agency. Licence: CC BY 4.0