



Large Infrastructure

Annexure

Jakkie Cilliers and Blessing Chipanda

Last updated 25 April 2024 using IFs v7.64

Annexure

This scenario used IFs version 7.84. All interventions start in 2024, interpolate to 2033 and then are maintained at that level unless indicated otherwise.

| Parameter | Adjustment in IFs | Justification/ benchmark |
|--|--|--|
| Increased electricity access rate for urban (infraelecaccm) | <p>Low income countries and Equatorial Guinea interpolate to 1.04; lower-middle-income countries to 1.032; Namibia, Botswana and South Africa to 1.08.</p> <p>No intervention for Mauritius, Egypt, Tunisia, Seychelles, Morocco, Ethiopia, Gabon and Algeria.</p> | <p>Access to electricity in urban areas is positively correlated with income across Africa. Between 2010 and 2019, the average low-income African country increased its access rate by 23%, lower-middle-income country by 10% and upper-middle-income country by 36% between 1995 and 2004.</p> <p>The intervention increases access to electricity in urban areas by 3.6% above the Current Path forecast by 2043.</p> |
| Increased electricity access rate for rural (infraelecaccm) | <p>Low-income countries Interpolate to 1.27 for low-middle-income countries 1.2; upper-middle income countries to 1.15.</p> <p>No interventions for Mauritius, Egypt, Tunisia, Seychelles, Morocco and Algeria.</p> | <p>Access to electricity in rural areas is positively correlated with income across Africa. Between 2010 and 2019, the average low-income African country doubled the access rate; lower-middle-income African countries increased access by 24%; and upper-middle-income African countries increased access by 20% between 1997 and 2006.</p> <p>The intervention increases rural access to electricity by 22% above the Current Path forecast by 2043.</p> |
| Reduction of electricity transmission and distribution loss (infraelectranlossm) | <p>Low-income countries interpolate to 0.8; low-middle-income countries to 0.85; upper-middle income countries and Seychelles to 0.9</p> | <p>Historically, South America reduced transmission loss by 10% between 2000 and 2010. Historical data indicates that transmission and distribution loss is highest at low income and lowest at high income. Therefore, from a low base,</p> |

| | | |
|---|----------------------------|--|
| | | <p>low-income countries can reduce loss by a larger percentage than high-income countries.</p> <p>From 1981 to 1991, average low-income African countries were able to reduce transmission and distribution loss by 25%; lower middle-income countries (between 1981 and 1989) by 22%, and upper-middle-income countries (between 1985 and 1993) by 21%.</p> <p>The intervention reduces transmission loss by 15% below the Current Path forecast by 2043.</p> |
| Reduction in capital cost to output ratio in hydro (qem – hydro) | Africa interpolate to 0.8. | <p>Capital cost to output (US\$/barrel) for hydro energy is initialised in 2017.</p> <p>The intervention will reduce cost by 17% below the Current Path forecast for Africa in 2043.</p> |
| Reduction in capital cost to output ratio in other renewables (qem – Q(otherRenew)) | Africa interpolate to 0.8. | <p>Capital cost to output (US\$/barrel) for other renewables is initialised in 2017.</p> <p>The intervention will reduce cost by 20% below the Current Path forecast for Africa in 2043.</p> |
| Increase production of hydro energy (enpm – hydro) | Africa interpolate to 1.2 | <p>South America increased production of hydro by 44% between 2001 and 2011.</p> <p>According to the 2022 Hydropower Status Report, Africa has among the largest untapped potential for hydropower development in the world. By 2022, 43 countries had installed hydro capacity, and 13</p> |

| | | |
|---|--|---|
| | | <p>countries with more than 1 000 MW capacity.</p> <p>The intervention will increase hydro energy production by 14% above the Current Path forecast for Africa in 2043.</p> |
| Increase production of other renewable energies (enpm – OthRenew) | Africa interpolate to 1.2. | <p>South America increased production of other renewable energy more than twofold between 2008 and 2014.</p> <p>The intervention will increase other renewable energy production by 55% above the Current Path forecast for Africa in 2043.</p> |
| Increase access to mobile broadband, multiplier (ictbroadm) | Africa interpolate to 3. | <p>South America was able to leapfrog mobile broadband connections more than threefold between 2010 and 2017 and South Asia by more than 20-fold during the same period.</p> <p>The intervention increases mobile broadband connection above the Current Path forecast by 14% in 2033 and 3% in 2043.</p> |
| Increase access to fixed broadband, multiplier (ictbroadm) | Africa interpolate to 2. | <p>South America was able to leapfrog fixed broadband connections by 95% between 2010 and 2017 and South Asia more than twofold during the same period.</p> <p>The intervention increases fixed broadband connection above the Current Path forecast by 64% in 2043.</p> |
| Reduce informal contribution to GDP (gdpinformshrm) | <p>Low-income countries interpolate to 0.86; low-middle-income countries to 0.89;</p> <p>Botswana, Gabon, Libya, Namibia and</p> | <p>South Asia reduced informality by 27% between 1999 and 2008. The</p> |

| | | |
|--|--|--|
| | South Africa to 0.94; Equatorial Guinea and Somalia to 0.98; DR Congo to 0.95; Eritrea, Ethiopia, Gambia, Malawi, Mauritius, and Zimbabwe to 0.95. | intervention will reduce informality in Africa by 11% below the Current Path forecast by 2043. |
| Reduce informal labour share (labinformshrm) | Africa, interpolate to 0.98 | |

Donors and sponsors



Reuse our work

- All visualizations, data, and text produced by African Futures are completely open access under the [Creative Commons BY license](#). You have the permission to use, distribute, and reproduce these in any medium, provided the source and authors are credited.
- The data produced by third parties and made available by African Futures is subject to the license terms from the original third-party authors. We will always indicate the original source of the data in our documentation, so you should always check the license of any such third-party data before use and redistribution.
- All of our charts [can be embedded](#) in any site.

Cite this research

Jakkie Cilliers and Blessing Chipanda (2024) Large Infrastructure. Published online at futures.issafrica.org. Retrieved from <https://futures.issafrica.org/thematic/11-large-infrastructure/> [Online Resource] Updated 25 April 2024.

About the authors

Dr Jakkie Cilliers is the ISS's founder and former executive director. He currently serves as chair of the ISS Board of Trustees and head of the African Futures and Innovation (AFI) programme at the Pretoria office of the Institute. His 2017 best-seller *Fate of the Nation* addresses South Africa's futures from political, economic and social perspectives. His three most recent books, *Africa First! Igniting a Growth Revolution* (March 2020), *The Future of Africa: Challenges and Opportunities* (April 2021), and *Africa Tomorrow: Pathways to Prosperity* (June 2022) take a rigorous look at the continent as a whole.

Dr Blessing Chipanda joined the African Futures and Innovation (AFI) programme in January 2023. Before joining the ISS he worked as an assistant lecturer/research assistant at the University of Pretoria, Department of Economics. He is particularly interested in tasks within the wider realm of international trade, development economics, public policy, monetary policy, and econometric modelling. Equally interested in economic and socio-economic activities that impact social welfare. Blessing has a PhD in economics from the University of Pretoria, South Africa.

About African Futures & Innovation

Scenarios and forecasting can help Africa identify and respond to opportunities and threats. The work of the African Futures & Innovation (AFI) program at the Institute for Security Studies aims to understand and address a widening gap between indices of wellbeing in Africa and elsewhere in the world. The AFI helps stakeholders understand likely future developments. Research findings and their policy implications are widely disseminated, often in collaboration with in-country partners. Forecasting tools inspire debate and provide insights into possible trajectories that inform planning, prioritisation and effective resource allocation. Africa's future depends on today's choices and actions by governments and their non-governmental and international partners. The AFI provides empirical data that informs short- and medium-term decisions with long-term implications. The AFI enhances Africa's capacity to prepare for and respond to future challenges. The program is headed by Dr Jakkie Cilliers.