



# Energy

## Annex

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## Annex

### Current Path adjustments

The first year for all interventions is 2026.

Name	Description	Country or Group	Adjustment in IFs 8.16	Remarks
gdsm	Government expenditure by destination multiplier (military)	World	To 1.1 over 10 years	An increase in world military expenditure, reflecting the international response to rising tensions
sfintlwaradd	State failure/internal war, addition - probability	World	To 0.15 over 10 years	Reflecting increase in conflict globally
goveffectm	Government effectiveness (quality), multiplier	World	To 0.95 over 10 years	The cost to growth due to retreat from common global governance standards
enpadd	Energy production additive factor (hydro)	Angola	Interpolate from 0 in 2028 to 0.014 in 2031, interpolate to 0 in 2060	The completion of the hydro build in Angola
		Ethiopia	Interpolate from 0 in 2025 to 0.032 in 2028, interpolate to 0 in 2078	The completion of the hydro build in Ethiopia.
		Nigeria	Interpolate from 0 in 2027 to 0.5 in 2030, interpolate to 0 in 2040	The completion of the hydro build in Nigeria.
		Tanzania	Interpolate from 0 in 2026 to 1.35 in 2030, interpolate to 0 in 2040	The completion of the hydro build in Tanzania.

enpadd	Energy production additive factor (nuclear)	Egypt	To 0.029 in 2028	The completion of the nuclear build in Egypt (4.8GW)
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## Africa Energy Policy scenario

First year for all interventions is 2026. The scenario includes the Current Path adjustments.

Name	Description	Country or Group	Adjustment in IFs 8.16	Remarks
enpoilmax	Energy production, oil maximum production	Algeria, Angola, Chad, Congo, Egypt, Gabon, Gambia, Ghana, Libya, Mozambique, Nigeria, Sudan South, Tanzania, Uganda, DR Congo	Individual country adjustments	Reduce production to 25% of 2020 level by 2050
enpm	Energy production multiplier (oil)	Algeria, Angola, Cameroon, Chad, Congo, DR Congo, Gabon, Gambia, Libya, Mozambique, Nigeria, Sudan, Sudan South, Tanzania, Uganda	Individual country adjustments	Reduce production to 25% of 2020 level by 2050
enpcoalmax	Energy production, coal maximum production	Botswana, Mozambique, South Africa, Zimbabwe	Individual country adjustments	End production by 2040
enpadd	Energy production additive factor (coal)	Botswana, Mozambique, South Africa, Zimbabwe	Individual country adjustments	Reduce production to 25% of 2020 level by 2050
enpm	Energy production multiplier (coal)	Botswana, Mozambique, South	Individual country adjustments	Reduce production to 25% of 2020 level

		Africa, Zimbabwe		by 2050
enpadd	Energy production additive factor (oil)	Sudan, Tanzania	Individual country adjustments	Reduce production to 25% of 2020 level by 2050

enrgdpgr	Energy demand to GDP ratio, annual technology-based change	Na	To 0.9 by 2100	
forestm	Forest protection multiplier	Madagascar, Togo, Burkina Faso, Nigeria, Malawi, Guinea, Gambia, Botswana, Eswatini, Benin, Ghana, Sierra Leone, Central African Republic, Senegal, São Tomé and Príncipe, Cameroon, Zimbabwe, Mozambique, Tanzania, Angola, DR Congo, Zambia and Congo	1.01 for those countries above 50% forest cover.  1.02 for countries with critical forests and ecosystems.	Intervention helps in reducing the rate of conversion for agricultural land. Not applied in countries with more than 70% forest cover (Gabon, Equatorial Guinea, Liberia). A very small increase over 40 years. Countries with critical forests included. This ensures that deforestation is stopped and reforestation slowly takes shape over the course of decades.
eninvtm	Energy investment by energy type multiplier (OthRenew)	Africa	To 2 by 2050	
eninvtm	Energy investment by energy type multiplier (Hydro)	Africa	To 2 by 2050	

eninvtm	Energy investment by energy type multiplier (oil)	Algeria, Angola, Chad, Congo, Egypt, Gabon, Gambia, Ghana, Libya, Mozambique, Nigeria, Sudan South, Tanzania, Uganda, DR Congo, Sudan, Cameroon	Individual country adjustments	
eninvtm	Energy investment by energy type multiplier (coal)	Botswana, Mozambique South Africa, Zimbabwe	To 0.02 in 2040	
eninvtm	Energy investment by energy type multiplier (nuclear)	Africa		
eninvtm	eninvtm Energy investment by energy type multiplier (gas)	Africa	To 1.75 in 2050	
eninvm	Energy investment multiplier	Libya, Algeria, Namibia, Mozambique, Botswana, Congo, South Africa, Morocco, Angola, Egypt, Kenya, Cameroon, Tanzania, Ghana, Cote d'Ivoire, Ethiopia, DR Congo, Sudan, Nigeria	Individual country adjustments	
carfuels3	Carbon generated by burning coal	Na	To 0.094 in 2050	
carfuels2	Carbon generated by burning oil	Na	To 0.102 in 2050	
carfuels1	Carbon generated by burning gas	Na	To 0.073 in 2050	

## Sustainable Africa scenario

First year for all interventions is 2026. The scenario consists of the Africa Energy Policy scenario and the Combined Agenda 2063 scenario, with the removal of the parameters listed in the table below.

Name	Description	Country or Group	Adjustment in IFs 8.16	Remarks
democm	Democracy level multiplier	Africa	Removed	Not compatible with Divided World scenario
goveffectm	Government effectiveness (quality), multiplier		Removed	To avoid overlap with world reduction in government effectiveness
SFINSTABALL	State failure through instability (abrupt regime transition) event occurrence	Africa	Removed	To avoid overlap with Current Path intervention using sfintlwaradd
SFINSTABMAG	State failure through instability (abrupt regime transition), magnitude	Africa	Removed	To avoid overlap with Current Path intervention using sfintlwaradd
sfintlwaradd	State failure/internal war, addition - probability		Removed	To avoid overlap with Current Path intervention using sfintlwaradd
sfintwarmagm	State failure/internal war magnitude, multiplier		Removed	To avoid overlap with Current Path intervention using sfintlwaradd

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## 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.

Ms Alize le Roux joined the AFI in May 2021 as a senior researcher. Before joining the ISS, she worked as a principal geo-informatics researcher at the CSIR, supporting various local and national policy- and decision-makers with long-term planning support. Alize has 14 years of experience in spatial data analysis, disaster risk reduction and urban and regional modelling. She has a master's degree in geographical sciences from the University of Utrecht, specialising in multi-hazard risk assessments and spatial decision support systems.

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