1.5°C pathways for Africa
opportunities for sustainable development
Welcome

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Who we are

Climate Analytics is a non-profit climate science and policy institute based in Berlin, Germany with offices in New York, USA, Lomé, Togo and Perth, Australia.
Agenda

• About the 1.5°C national pathways project

• Africa transition to a low carbon region
  Saliem Fakir, Executive Director, The African Climate Foundation

• Case studies: South Africa, Egypt, Nigeria, Kenya, Senegal
About the project: 1.5°C national pathways

Key gaps

• **Global** Paris Agreement compatible pathways have been published, however, country level pathways are not available for many countries
• Current NDCs and policies are not sufficient to reach 1.5°C

Goals

• Provide key resources to stakeholders:
  • Support for NDC and LTS development
  • Provide national benchmarks which can support the development of sectoral policies
From global to national pathways

Global models assessed by the IPCC SR1.5 and other lines of evidence

Model region “Northern Africa”

Country-level results e.g. Morocco and Egypt

- Pathways may take very different approaches to stay within the temperature limit
  - Emission ranges are provided and discussed in country profiles
  - Illustrative pathways also provided for sector-specific transformations

- Pathways are selected based on sustainability limits as defined in the IPCC SR1.5

http://1p5ndc-pathways.climateanalytics.org/
What do we look at?

- Global cost-effective pathways:
  - Technical and economic feasibility

- We analyse:
  - Economy-wide emission pathways: GHG and CO₂ emissions, excluding LULUCF
  - Sectoral decarbonisation pathways: power
    - Fuel shares
    - Carbon intensity
    - Fossil fuel phase out dates
Saliem Fakir  
Executive Director, The African Climate Foundation
South Africa: snapshot

• Fifth largest coal exporter globally, largest GHG emitter in Africa

• 90% of electricity generation was coal-based in 2017

• Economy more carbon intensive than, and decreasing slower, than G20 average
  • 7.16 TJ/PPP USD2015 millions vs 4.46 for G20
  • -3.7% vs -11.6% 2013-2018

• New renewables have been cheaper than new coal as early as 2016

Sources: 1.5° National Pathway Explorer, IRENA 2021, Global coal plant tracker 2021

Sources: Primap-Hist 2019 and IEA CO2 Fuel 2019

Sources: IEA WEB 2019 and IEA CO2 Fuel 2019
South Africa: 1.5°C emissions trajectory

- Current NDC: +15% and -24% of 2010 level emissions by 2030
- NDC update: -17% and -24% by 2030
- Current policy projections* between -16% and -23% of 2010 level by 2030
- 1.5°C compatible pathway requires South Africa reduce emissions to 39% below 2010 levels – an ambition gap of 15%
- Continued coal dependency, as outlined in IRP2019, is incompatible with achieving a 1.5°C compatible pathway

*Source: Climate Action Tracker
South Africa: power sector transformation

- Huge and cost-effective potential for renewables to replace coal
- Coal phase out by early 2030s
- Increase of RE shares to 78% of the power mix by 2030
- CCS not an option – geological, geographical and cost constraints, and limited developmental benefits
- Need clear pro-decarbonisation policies and plans as signals for investment, but this unlikely in current policy context

- Decarbonisation offers opportunity to create developmental benefits
  - Avoid stranded fossil fuel assets & associated job losses
  - New green industries for job creation
  - Avoided health system burden
  - Cheaper electricity - universal access
  - Forge own path and not be as constrained by dictates of coal-importing countries
Egypt: snapshot

- 24% of total GHG from electricity, 17% transport sector
- Primary energy heavily reliant on oil and gas
- Power sector: natural gas 80%, oil 12%, renewable energy 8%
- Recession and severe power outages due to natural gas production slowdown in 2011-2014
- Capacity more than doubled since 2015, mostly based on natural gas: risk of stranded assets

Sources: Primap-Hist 2019 and IEA CO2 Fuel 2019
Egypt: 1.5°C emissions trajectory

• NDC has no emissions reduction target
• 1.5°C cost-effective pathways:
  • by 2030 GHG emissions 15-33% below 2015
  • By 2050 GHG emissions 57-70% below 2015
• No net zero target
• Focus on power and oil and gas sectors
Egypt: power sector transformation

- Sharp increase in renewable energy
- Zero emissions power by around 2040
- Phase out of gas between 2035-2039
- No expansion of coal

**Decarbonised power: what are the opportunities?**

- Egypt’s ambition to serve as a regional energy hub exporting electricity: less countries will be importing fossil fuel-based power
- Less power shortages due to increased efficiency and no dependency on fossil fuel production
- Increased energy security
- Phasing-out of fossil fuel subsidies
- Cheaper electricity for consumers

![Graph showing energy demand and reliance changes](image-url)
Nigeria: snapshot

• **Current situation:**
  - Primary energy: over 70% from traditional biomass
  - Power generation: 77% gas, 23% renewables (primarily hydro)
  - Significant reliance on oil-fired back-up generators
  - Energy is the highest emitting sector at 62%

• **Challenges:**
  Need to expand electricity access/clean cooking access, improve transmission & distribution infrastructure and grid reliability (significant black out issues)
Nigeria: 1.5°C emissions trajectory

- Nigeria’s conditional NDC is in line with a 1.5°C compatible domestic emissions range, requiring -13% to -35% below 2015 levels (or 210-281 MtCO$_2$e/yr by 2030 excl. LULUCF)

- The level of uncertainties on LULUCF emissions (potentially 25 to 50% of the country’s carbon footprint) might strongly influence the target compatibility with 1.5°C.

- Towards net zero – requires level of sinks in range of 147-215 MtCO$_2$e/yr by mid-century
Nigeria: power sector transformation

- 1.5°C cost-effective pathways show a strong RE uptake of 58% by 2030 and a complete phase out of fossil fuels including gas by 2040

- Nigeria’s Electricity Vision: 30-30-30 targets, 30% renewables by 2030 and draft National Energy Plan targets development of coal

- Recent announcement on just transition emphasises the importance of gas – stranded assets risk

- **Opportunities:**
  - Expanding renewable-based electricity access
  - Off-grid renewable energy solutions allow electricity access
  - Health co-benefits from reduced ambient and household air pollution
  - Job creation and other socioeconomic development through employment in renewable energy sector
Kenya: snapshot

- Agriculture and energy key emitting sectors
- Under business as usual, LULUCF is projected to overtake energy as 2nd highest emitting sector by 2030
- Primary energy - over 60% biomass
- Power sector - over 90% renewable
Kenya: 1.5°C emissions trajectory

- Conditional NDC target is +79% above 2015 levels
  
  vs.

- Least cost 1.5°C pathways requiring -12 to -34% below 2015 levels by 2030

- Net zero, reducing emissions from the FOLU sector to generate emissions sinks will be key
Kenya: power sector transformation

- Kenya’s power sector: mostly from renewable sources (90%)
- Coal plans - stranded assets
- Energy transformation targeting electric cooking to move away from use of traditional biomass for cooking and heating
- Air pollution related deaths: 22,000 deaths annually - health benefits from reduced air pollution given reliance on biomass and FF for cooking and heating
- Increased job opportunities – from ongoing and new off-grid renewable technologies
Senegal: snapshot

- Agriculture (47%) and energy (36%)
- Energy sector to overtake agriculture by 2022 under business as usual
- Heavily reliant on petroleum product imports for energy consumption: 48% in 2018 of export revenue went towards FF import bill
  - Primary energy: 62% fossil fuel (oil), 38% mostly biomass
  - Power sector: fossil fuel 89%, 11% renewables
- National energy production dominated by traditional biomass
- Plans to exploit oil and gas reserves from 2023 would lock in carbon intensive pathways and risk of stranded assets
Senegal: 1.5°C emissions trajectory

- Senegal’s conditional NDC targets emissions reductions of 24-59% above 2010 by 2030 (excl. LULUCF)
- 1.5°C cost-effective pathways: 1-23% below 2010 levels by 2030 (excl. LULUCF)
- Towards net zero, remaining emissions will need to be balanced by negative emissions
- Universal access to electricity by 2025
- Shifting away from traditional biomass use in primary energy will steer emissions reductions in the LULUCF sector by reducing deforestation and sustaining land-based sinks.
Senegal: power sector transformation

- Electricity mix: renewable energy share to 94-97% by 2030
- Complete phase-out of fossil fuels by 2040
- Senegal’s Priority Action Plan 2: 29.2% renewable energy by 2023
- Huge underexploited renewable energy potential for solar, wind, hydropower, and bioenergy

Opportunities:
- Avoid the risk of stranded assets
- Increase energy security by reducing reliance on petroleum product imports
- Renewable energy jobs potential
- Promote electric transportation and clean-cooking technologies: curb household traditional biomass combustion – health benefits and sustainability implications
Q&A

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http://1p5ndc-pathways.climateanalytics.org/