NIGERIA

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2050 Pathways Platform – Annual Meeting Series

The inclusion of macro-economics and their analytical approaches in long-term strategies

Wednesday 17 May 2023

Key questions that countries wish to address WRT to the macro-economic aspects of the LT-LEDS?

Real GDP growth	**Unemployment rate/patterns**	**Real consumption (Non-energy) / welfare**	**Trade patterns**
Sectoral output	**Public Revenues/fiscal balance**	**Socioeconomic costs and benefits**	**Energy supply investment costs**

Key questions, as a practitioner in LT-LEDS, that could be answered on the economic side specifically? (1/2)

Trade-Offs	▪ What are the potential trade-offs between achieving ambitious climate targets and sustaining economic growth? ▪ How can countries strike a balance between mitigating climate change and ensuring long-term economic prosperity?
Private Sector Engagement	▪ What are the most effective policy instruments and mechanisms for incentivizing private sector investment in low-carbon technologies and infrastructure? ▪ How can countries create favorable conditions for private sector engagement and mobilize the necessary financial resources?
Maximizing Socioeconomic Benefits	▪ How can the socioeconomic benefits of climate action be maximized while minimizing the costs, particularly for vulnerable communities and sectors? ▪ What strategies can be employed to ensure a just and equitable transition to a low-carbon economy?

Key questions, as a practitioner in LT-LEDS, that could be answered on the economic side specifically? (2/2)
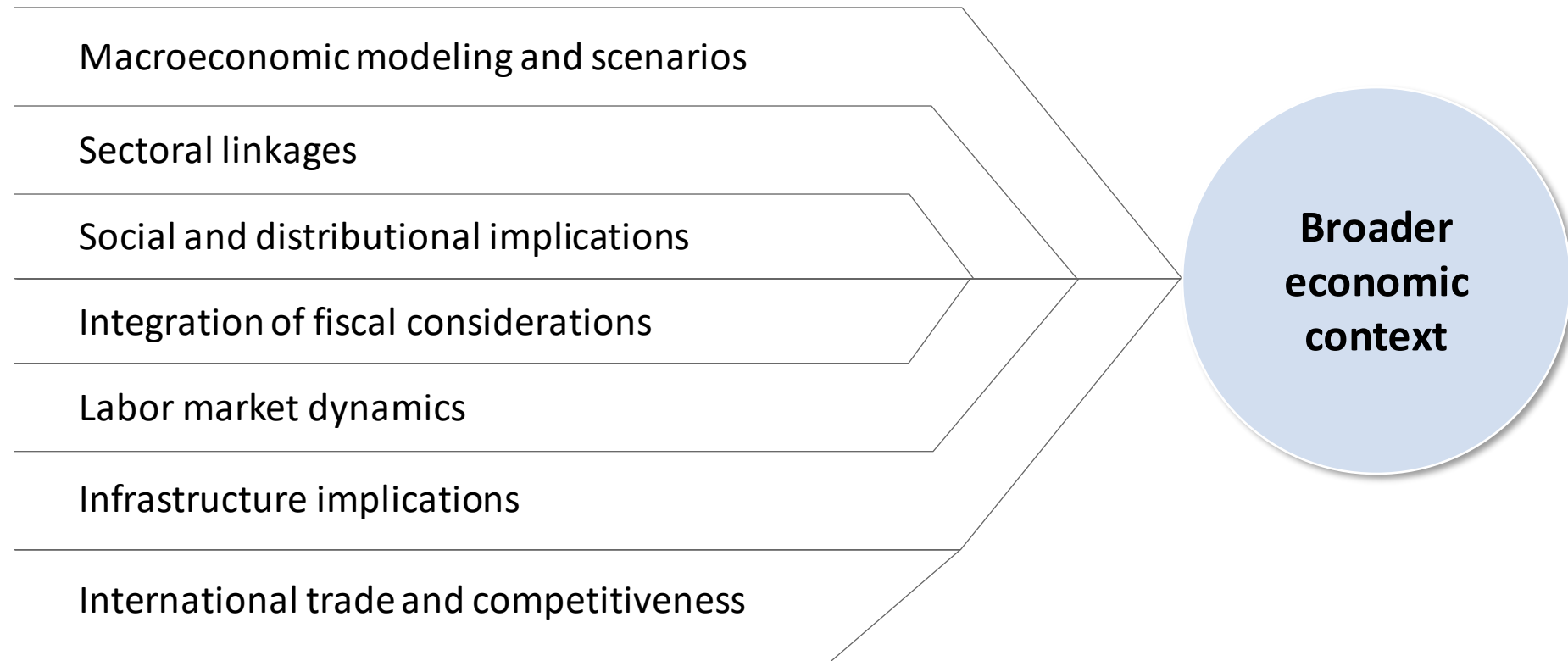
Financial Sector Resilience	▪ What are the implications of climate-related risks and uncertainties on the financial sector? ▪ How can countries enhance financial resilience and risk management to address climate-related challenges, including stranded assets and climate-related shocks?
Measuring Economic Impacts	▪ How can countries effectively measure and monitor the economic impacts of LT-LEDS over the long term? ▪ What are the appropriate indicators and methodologies for assessing the success and progress of climate policies in terms of economic performance, job creation, innovation, and overall well-being?

How the economic analysis in the LT-LEDS can adequately reflect the broader economic context

Macroeconomic modeling and scenarios

Sectoral linkages

Social and distributional implications

Integration of fiscal considerations

Labor market dynamics

Infrastructure implications

International trade and competitiveness

Broader economic context

How are policies for the transition and macro-economy likely to interact once the long-term strategy is implemented?

Effective Interaction Space

1. Investment and financing

- **LTS:** Significant investments in
  - RE
  - EE
  - Low CO2 tech.

- **Macro:** Facilitate these investments
  - Promote private sector involvement (e.g., subsidies or tax breaks).
  - Influence the availability and cost of capital

2. Employment and labour markets

- **LTS:** Changes in employment patterns
  - Job losses in CO2-intensive sectors
  - New employment in clean energy industries

- **Macro:** Facilitate these investments
  - Support through reskilling and retraining
  - Foster job creation in sustainable sectors

3. Sectoral restructuring

- **LTS:** Sectoral restructuring in line with align with low-CO2 objectives (e.g., Energy, transportation, and manufacturing)

- **Macro:** Implications on supply chains, competitiveness, & industrial dev. Promote:
  - R&D
  - Innovation, &
  - Technological diffusion

4. Fiscal policy and taxation

- **LTS:** Adjustments in fiscal policies and taxation
  - Carbon pricing

- **Macro:** designing and implementing such fiscal measures to:
  - Ensure environmental effectiveness
  - Economic efficiency

5. International trade and competitiveness

- **LTS:** implications for a country's international trade and competitiveness
  - Carbon leakage

- **Macro:**
  - Border carbon adjustments
  - Trade agreements on sustainable production and consumption
  - Balancing trade-offs (env. goals and economic comp.)

6. Economic growth and welfare

- **LTS:** design focus:
  - Sustainable economic development
  - Social welfare improvement

- **Macro:** play a vital role in:
  - Providing enabling environment
  - Maintaining macro-economic stability
  - Addressing distributional concerns

Summary

The macro-economic aspects of LT-LEDS in Nigeria are critical for achieving sustainable and low-emission development.

Addressing key questions related to GDP, sectoral outputs, employment, tax revenues, and socioeconomic costs is essential.

Economic analysis should adequately reflect the broader economic context and consider existing challenges and opportunities.

Policy interactions between transition policies and macroeconomic policies need to be coordinated to ensure policy coherence and maximize the effectiveness of both sets of policies

The use of hybrid modeling frameworks, such as the LEAP and KLEM models, can enhance the analysis of sectoral linkages and macroeconomic impacts in LT-LEDS.

It is crucial to engage the economic policy community, including academia and policymakers, in the elaboration of robust long-term strategies
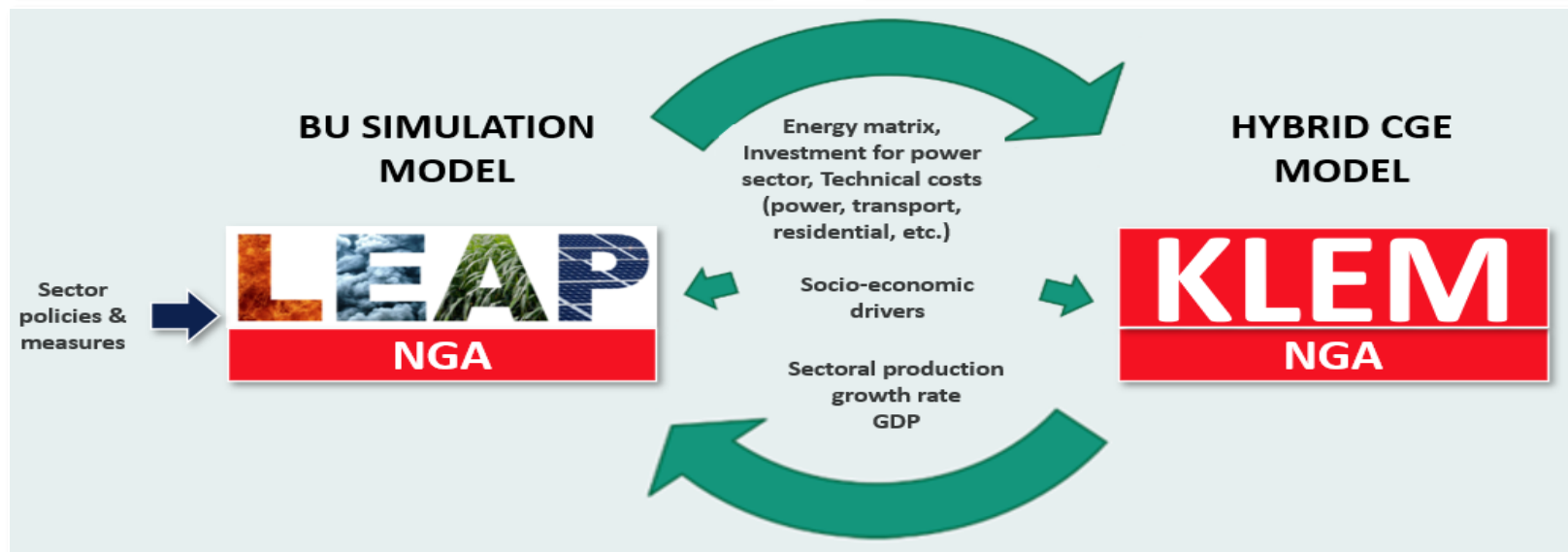
Model Choice for Nigeria's LTS

- Hybrid modelling → Combining bottom-up and top-down models.

LEAP Modelling Tool (Bottom-up)
- Low Emission Analysis Platform
- For analyzing strategic integrated energy-environment scenarios for policy

KLEM/IMACLIM Model (Top-down)
- Follows a CGE framework
- Neoclassical—Solow-Swan— growth model

Energy System Scenarios

- *Business As Usual (BAU):*
  - A significant increase in Nigeria's emissions from all sectors
  - Increasing socioeconomic development
  - Increasing and population
  - No substantial mitigation efforts

- *Current Policy Scenario (CPS):*
  - Guided by the ambitiousness of the ETP (Net-Zero by 2060) and the NDC.
  - Over 90% RE;
  - 85% EV
  - 85% replacement of inefficient household technologies by 2050
  - End of gas flaring by 2030.
  - Backup fossil fuel generators will be eliminated by 2050.

- *Gas Economy Scenario (GES):*
  - 58% of power generation will be from natural gas with carbon capture and sequestration (CCS).
  - Natural gas powers 57% of the energy-intensive industry
  - 100% replacement of inefficient household appliances
  - 90% of cooking services are powered by LPG and electricity
  - A modal shift of 43%
  - End gas flaring by 2030
  - Reforestation rate, at 5% annually

- *Renewable Energy Scenario (RES):*
  - 97% RE
  - Nuclear power
  - Clean cooking accounts for 95% of cooking energy
  - 50% modal shift
  - 40% electric buses
  - 40% ethanol buses
  - 2.3% reforestation

Macroeconomic Assumptions

Macroeconomic assumptions & hypotheses

- **Two common macroeconomic assumptions**

  - **Potential growth & the investment effort**

- **Two additional macroeconomic hypotheses allow to extend the number of scenarios explored**

  - **Trade deficit level & unemployment rate**

$1A. Potential\ growth = labour\ supply \times labour\ productivity$

Index 1 in 2018

Labour productivity — Labour force — Potential GDP
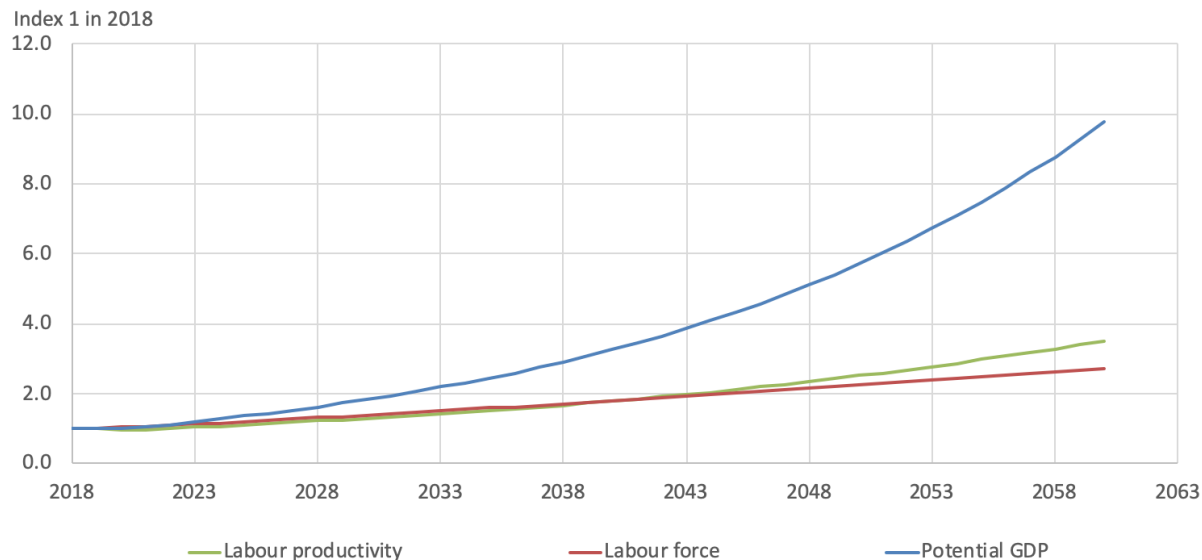
- Statistical series of real GDP and employed population **(WDI)** from 2018 to 2021. Subsequently, **SSP2**

- The dynamic calibration to capture **Covid-19** impacts.
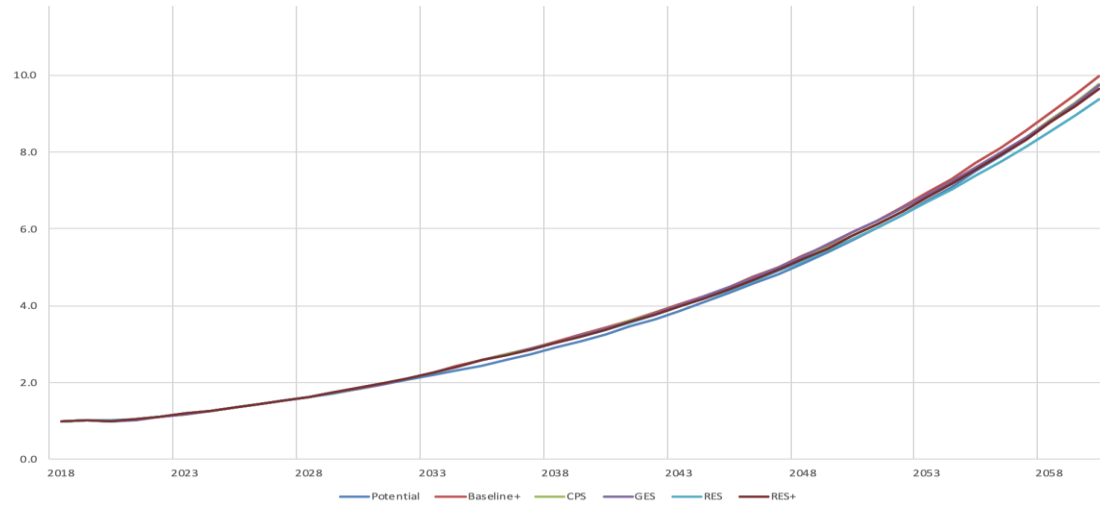
- The **PAGR** of real GDP (2021-2060) is **5.87%.**

Macroeconomic Assumptions

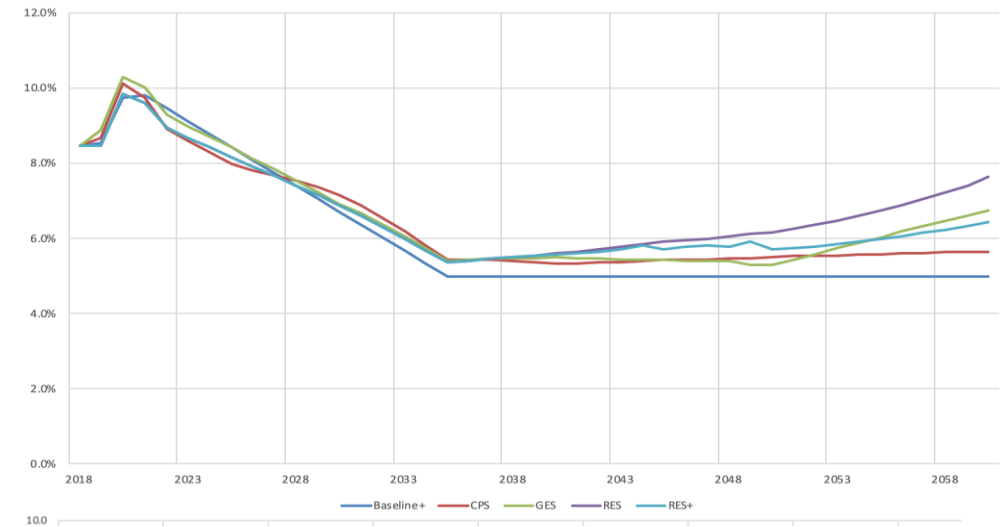**Competitiveness Shock for structural transformation (proxied by a trade shock)**

2035: 147%

2030: 100%

2060: 121%

Trade shock (Index 1 in 2018), Baseline
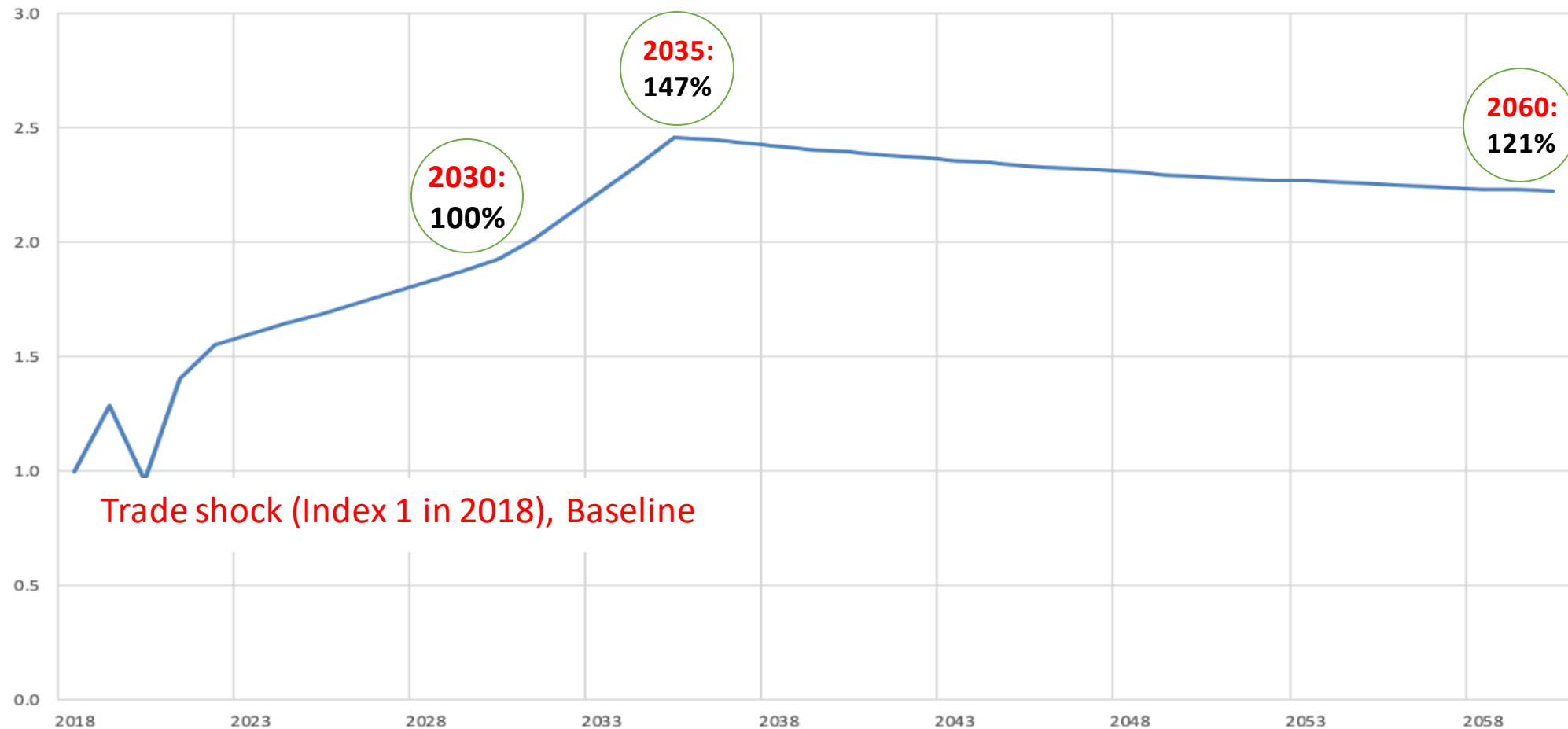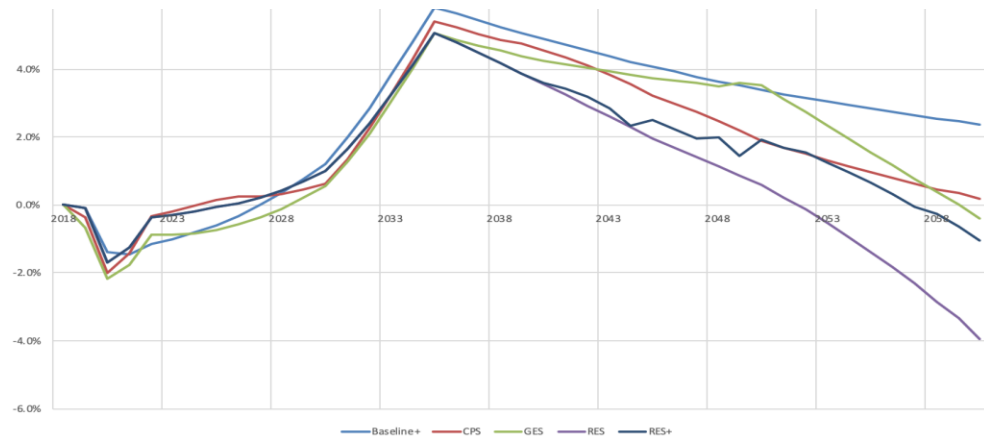
Key Results

Real GDP growth by scenario (index in 2018), 2018-2060
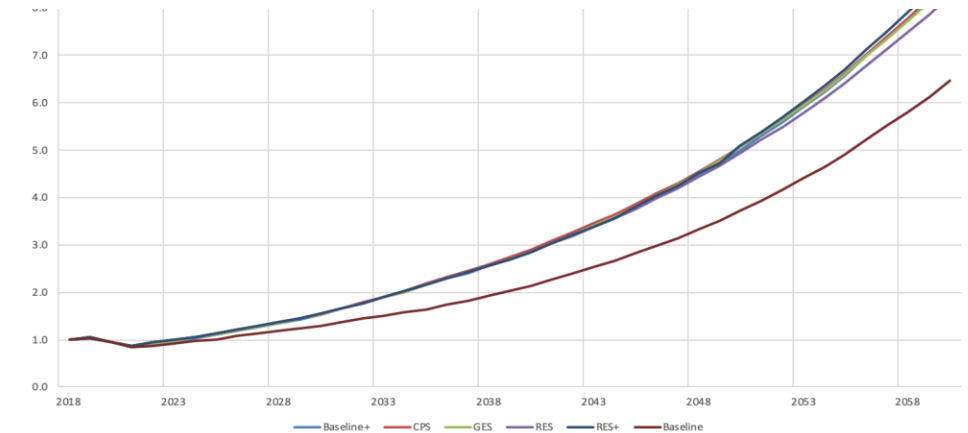

Unemployment rate by scenario (percentage)

Gap to potential GDP by scenario (index in 2018)

Non-energy consumption by scenario (index 1 in 2018)

Key Results

- The Baseline+ scenario reaches an average annual GDP growth of 5.63% over the entire projected period. Potential growth → 5.57% for potential growth.

- Unemployment decreased in all scenario until 2035 due to successful structural transformation & larger employment of the active population in the non-energy domestic production via the trade shock.

Scenarios	GDP Growth rates	Emissions (MMTCO2-eq)	Unemployment	Non-energy consumption Index
Baseline+	5.63%	1,053	5.00%	8.62
CPS	5.58%	268	5.65%	8.62
GES	5.57%	92	6.75%	8.55
RES	5.47%	14	7.62%	8.25
RES+	5.55%	14	6.43%	8.80

- However, from global development perspective, the overall, the RES+ scenario is the most interesting

Key Results

- Energy supply investment requirement

Scenario	Unit	2030	2040	2050	2060
Baseline+	In billion 2018 USD	11.5	13.7	14.9	19.3
	(As a percentage of GDP)	1.5%	1.0%	0.6%	0.4%
CPS	In million 2018 USD	27,528	29,694	27,949	39,315
	(As a percentage of GDP)	3.5%	2.0%	1.1%	0.9%
GES	In million 2018 USD	22,571	26,583	74,100	133,279
	(As a percentage of GDP)	2.9%	1.8%	3.0%	2.9%
RES	In million 2018 USD	18,957	29,403	50,387	111,920
	(As a percentage of GDP)	2.4%	2.1%	2.1%	2.6%
RES+	In million 2018 USD	18,957	29,593	50,971	123,193
	(As a percentage of GDP)	2.4%	2.1%	2.1%	2.5%

Take Away

1. The results obtained without transformation of the Nigerian economy establish the incompatibility of the hypotheses of macroeconomic inertia and the reduction of external imbalances.

2. Unemployment rate reaches socially unacceptable levels, whatever the energy development path followed.

3. The terms of trade adjustments required by the gradual reduction of the trade deficit harm the economic activity and employment in an unsustainable way within a few years.