cambridge econometrics
clarity from complexity

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

The Green Economy Progress Measurement Framework

Accelerating Green Recovery Towards Climate-Neutral Economies

THIRD EDITION

UN environment programme

International Labour Organization

UNDP

UNIDO

unitar
United Nations Institute for Training and Research

Why a Third Edition ?

By Ronal GAINZA, Economic Affairs Officer, UNEP

cambridge econometrics
clarity from complexity

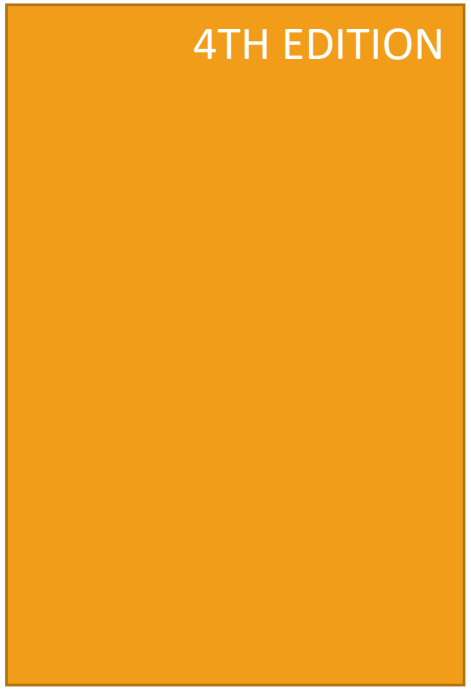
PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

GEP Measurement Framework – Tracking Economic Transformation

1st Edition
2017

2nd Edition 2021
(Planetary Boundaries)

3rd Edition 2023
(Climate Change)



2024 (TBC)
(Circular Economy)

Where are the entry points to reframe the economy?

Economic Transformation

Comprises fundamental changes in the economy

UN Guidance on Economic Transformation

Focus is at upstream /national level…

National planning and cross-sectoral policies

Sectoral, thematic policies, strategies

Public and private finance

CAPACITY BUILDING

… but the effects are felt downstream, at sectoral level…

Agriculture
Forestry
Fisheries
Water
Tourism
Manufacturing
Energy
Transportation
Infrastructure
Waste
Etc.

Raising productivity level

Ensuring adequate quantity & quality of employment

Ensuring equitable distribution of income & wealth

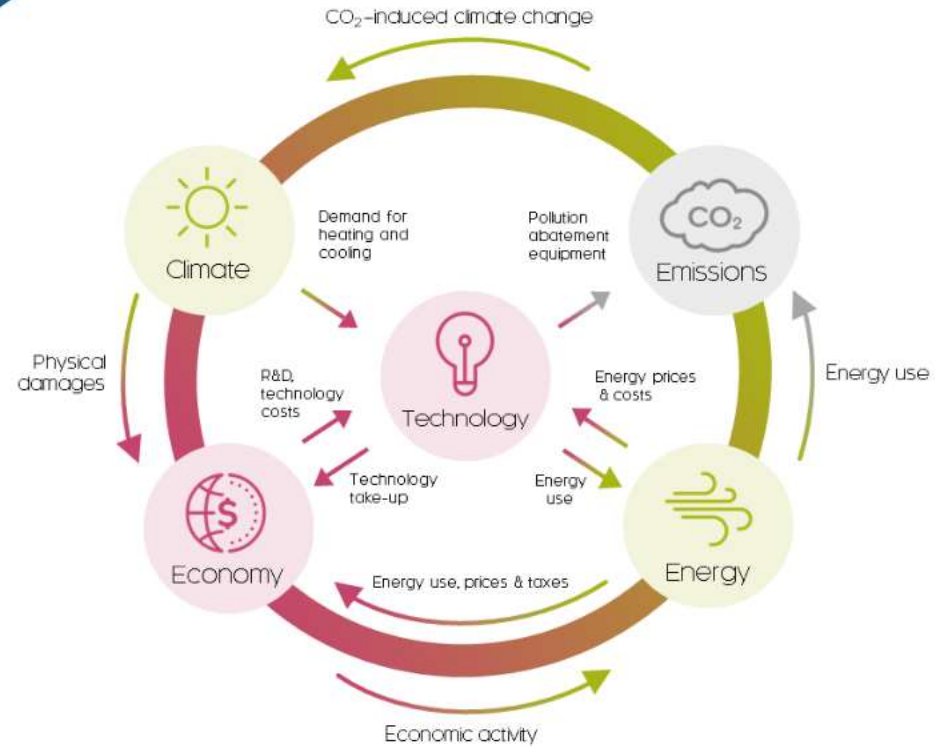
Ensuring access to quality public services

Protecting the environment

Time & investments

Image developed by PAGE (2022)

2014 - 2019 ⟷ 2020 - 2050



Pre-crises	COVID-19 & War in Ukraine	Recovery package: Investments in Net-Zero Transition	
2014 - 2019	2020 - 2021 - 2022	2023	2030 - 2050
Classical GEPMF	*Adjusted GEPI* *Taking data from E3ME*	Scenario Analysis	
		E3ME forecast	Adjusted GEPI

How was the IGE transition Pre-COVID 19?

By José Pineda, Senior Consultant, UNEP

cambridge econometrics
clarity from complexity

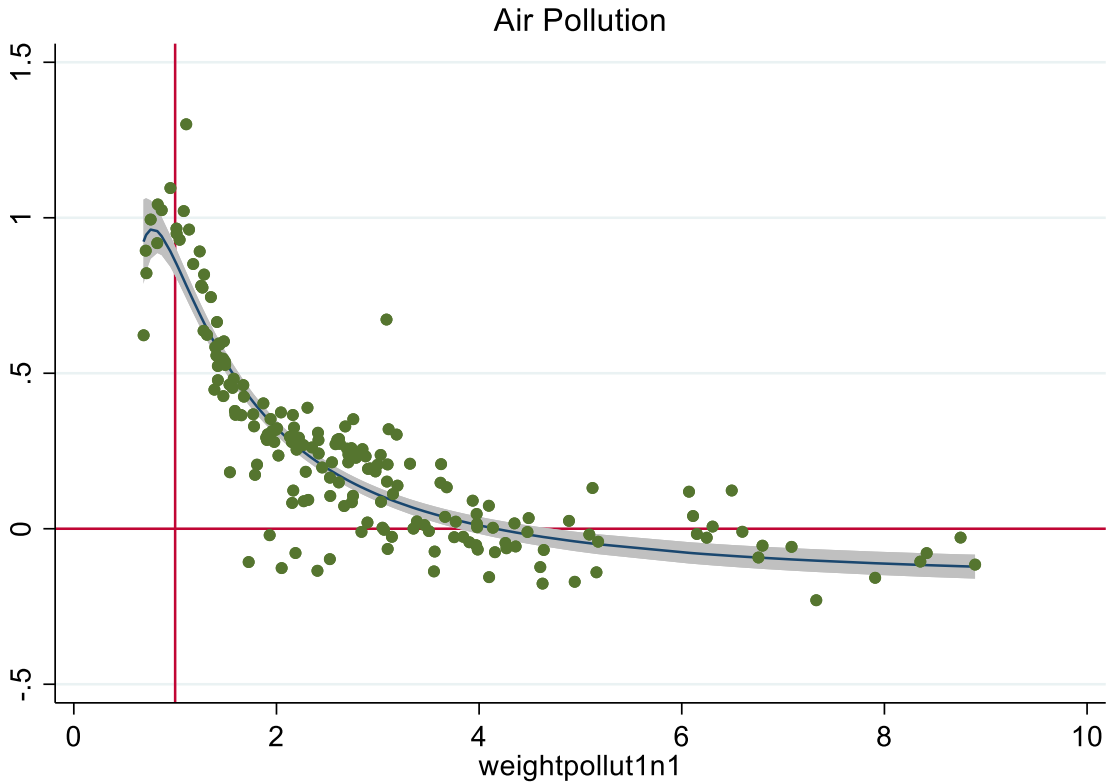
PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

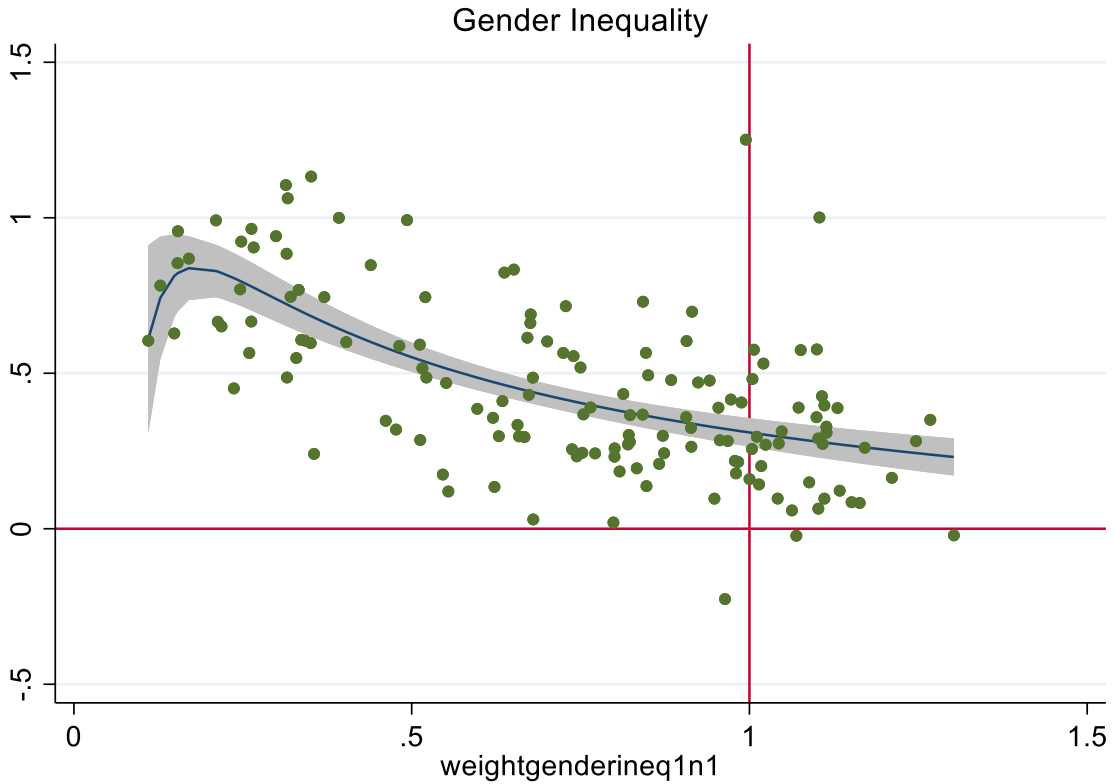
Results of the GEP Measurement Framework, 2004 – 2019

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
material footprint	108	**-0.67**	1.33	-7.38	1.35
air pollution	109	0.31	0.32	-0.23	1.10
protected areas	98	0.15	0.36	-0.04	2.44
energy use	103	0.50	0.44	-1.01	1.42
green trade	97	0.15	0.32	-0.22	1.62
green technology innovation	62	0.26	0.87	-0.57	4.60
renewable energy source	108	0.02	0.64	-3.11	2.45
Palma ratio	79	0.23	0.47	-0.90	1.24
gender inequality index	106	0.49	0.27	-0.02	1.13
access to basic services	96	0.38	0.26	-0.08	1.17
mean years of schooling	109	0.45	0.22	-0.02	1.26
pension coverage	88	0.34	0.90	-4.12	2.39
life expectancy	106	0.47	0.22	0.01	1.13

On average, progress was highest on the indicators measuring energy use, life expectancy, gender inequality, access to basic services and education. Notice almost no progress on average for renewable energy. On the other hand, material footprint experienced on average, was the only indicator experiencing regress.

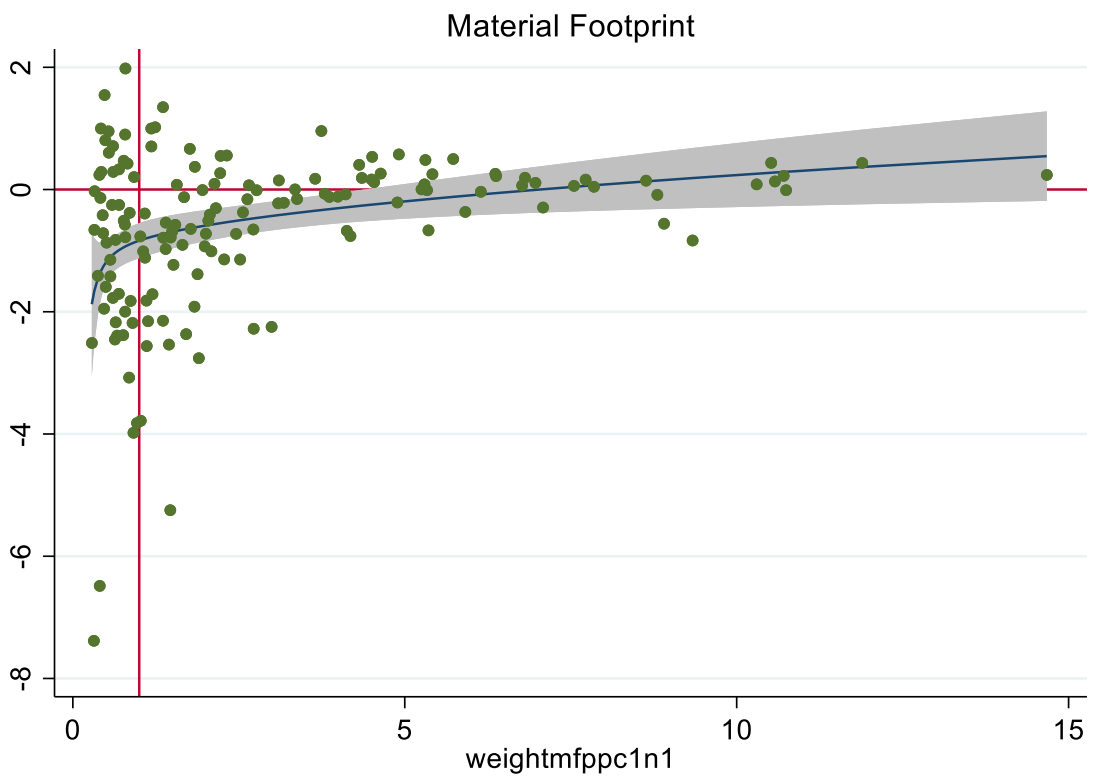
Higher Progress is not always happening where is mostly needed

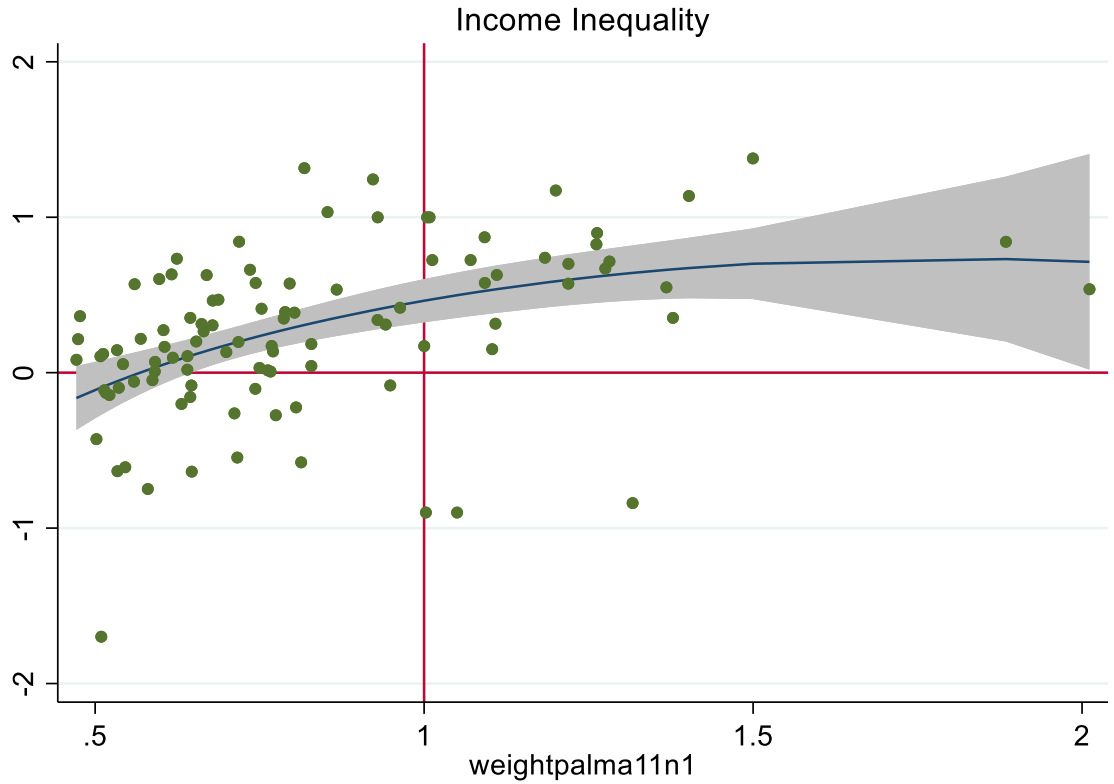




Source: Author's calculations.

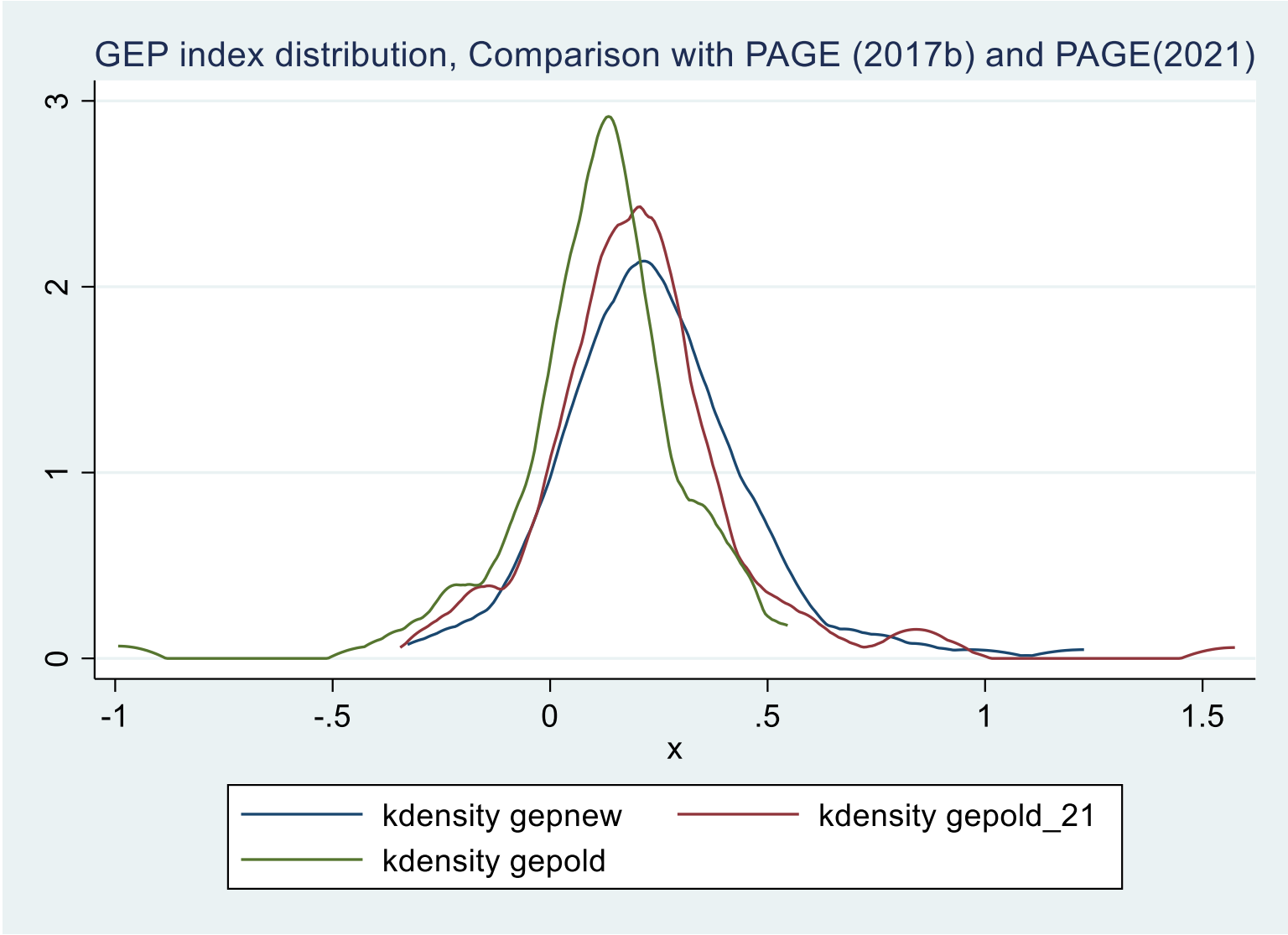
Although in some cases, it does (but with a lot variability)





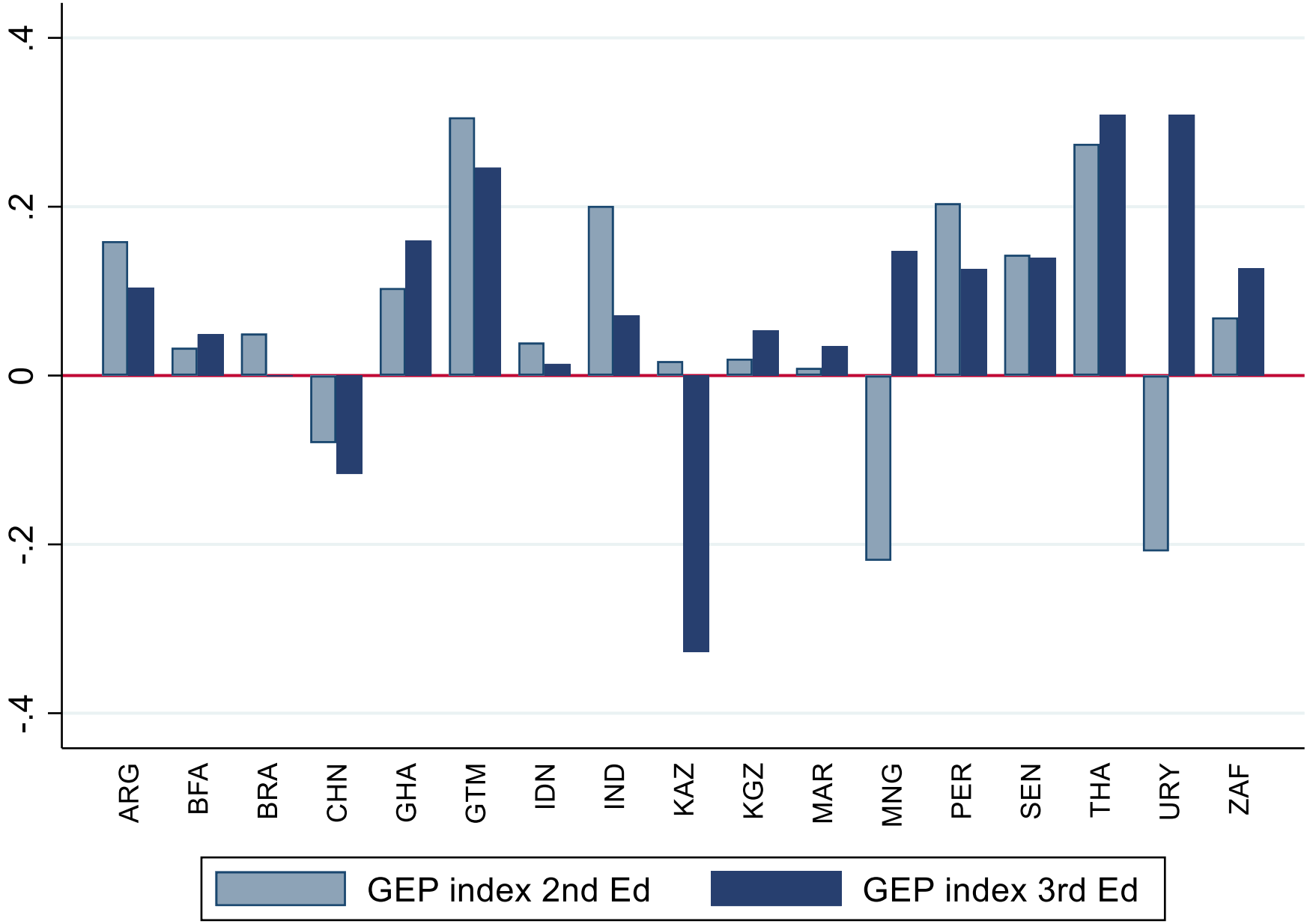
Source: Author's calculations

GEP Index, comparing with GEP index of PAGE (2017, 2021)



Note: GEP new corresponds to the updated calculations, GEP old corresponds to PAGE (2017) and PAGE (2021).
Distribution of the GEP Index has moved towards the right, indicating that the more recent data shows higher progress.

GEP Index results for PAGE countries



- Average 0.085.
- Uruguay and Thailand the highest progress (0.31).
- China (-0.117) and Kazakhstan (-0.328).
- Mongolia and Uruguay presented the biggest improve across previous editions.

How to limit Global Warming to 1.5°C through IGE investments despite recent shocks?

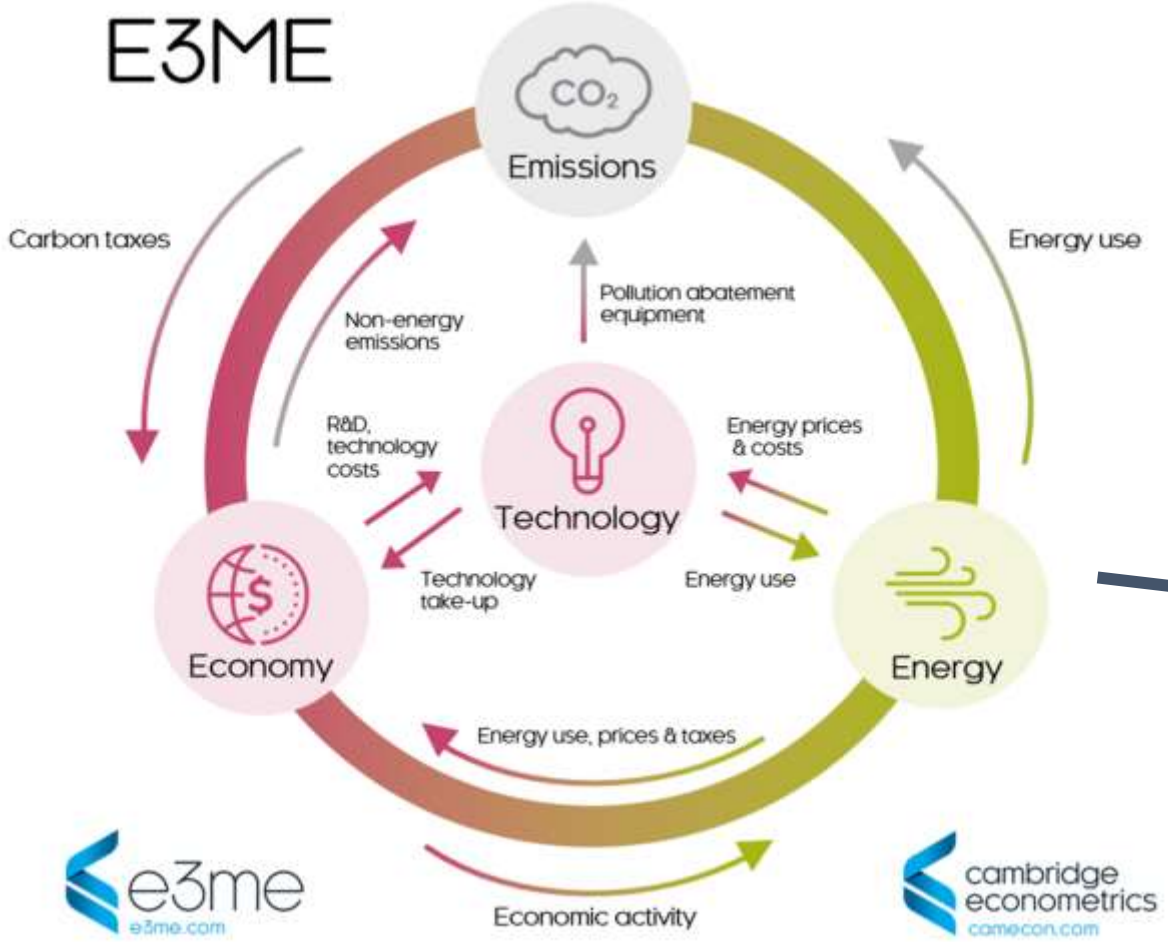
By Bence Kiss-Dobronyi, Senior Economist, Cambridge Econometrics

cambridge econometrics
clarity from complexity

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

Integrated assessment modelling / E3ME

E3ME is a simulation-based non-equilibrium
E3-type model, primarily used for impact assessment

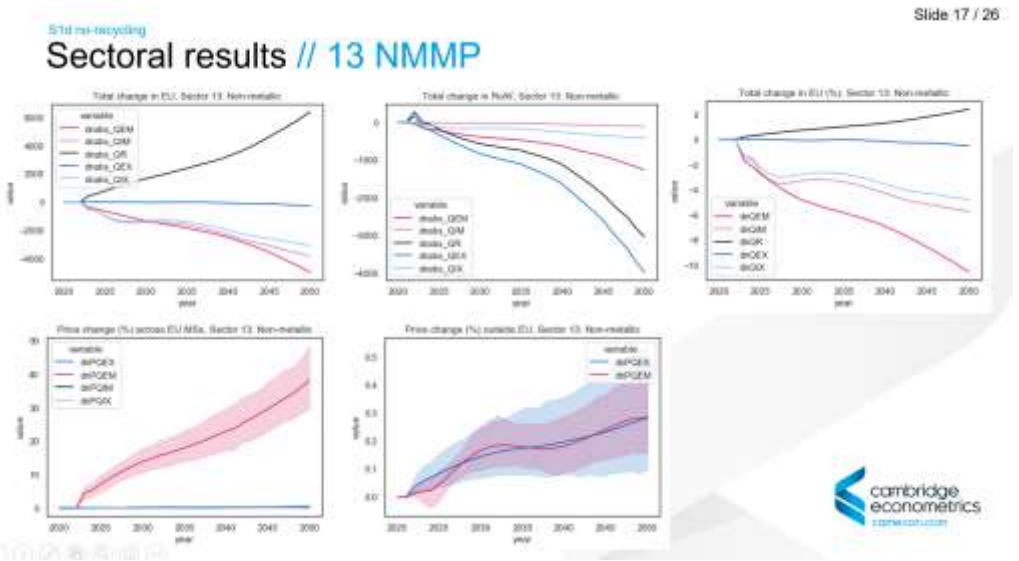


Note: Illustrative E3ME modelling results for a single sector

Exogenous assumptions, shocks

- Baseline scenario 'BAU'
- Impact scenario 'A'
- Impact scenario 'B'

Detailed and aggregated results



Updated baseline

Baseline updates aim to fit the model to New realities including the conflict in UKR

Updates 2

1

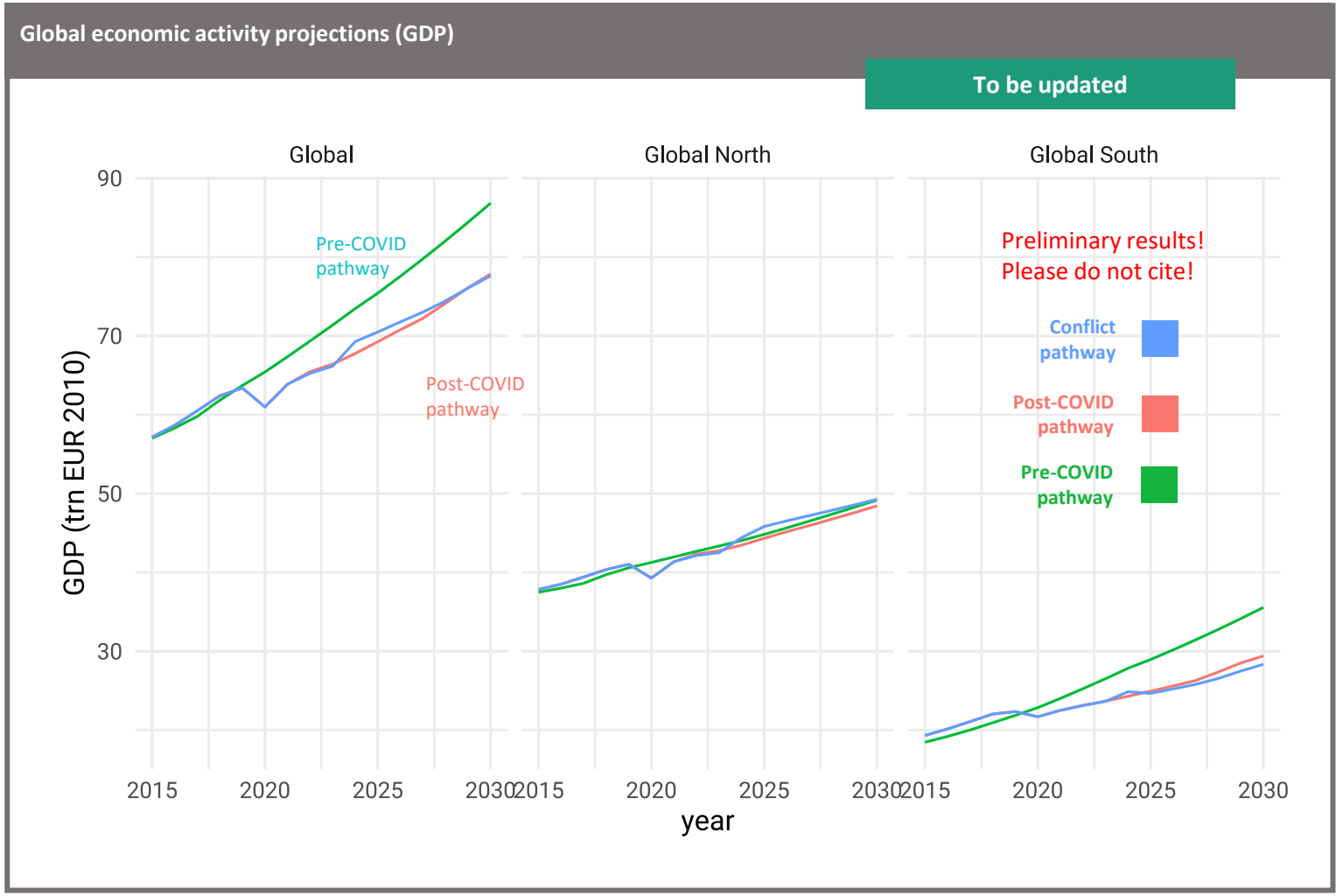
Updating **baseline statistical data** in the modelling, this includes:

- Long-term forecasts based on IEA WEO STEPS
- COVID shock, based on EC and IMF data
- Including adapted recovery measures

2

Impacts **related to the war in Ukraine**[1], this includes:

- Updated assumptions on energy prices per region
- Impacts of sanctions and trade disruptions to the conflict



[1] **Based on:** Hartvig, Kiss-Dobronyi, Vercoulen, Zareczky (2021) Regional rivalry: SSP3 modelling of the war in Ukraine, preliminary results, presented at the IAMC 2022

UN PAGE Global “Green Push” scenario

OECM global scenario including financing questions

UTS 1.5c (OECM)[1] UNEP FI

Global 1.5c focusing on non-breakthrough solutions

High energy efficiency

No CCUS use

Coal phase-out NAmerica and EU

High RES in power generation

Scenario	Investment level	Investment target
Updated baseline	-	-
Green Push	Increased to achieve below 2C	Global GP
Green Push development	as in GP	**North -> south**, achieving *at least* GP
Status quo (SQ) investment	as in GP	Global for GP, but **into SQ sectors**

E3ME 1.5c[2] CE work

Fairly standard 1.5c pathway, developed in 2018, high BECCS and technology use

Fairly standard 1.5c scenario

High BECCS use

High RES in power generation

EE in all sectors (but half of OECM)

Notes: 1 - UTS (2022): https://www.unepfi.org/wordpress/wp-content/uploads/2022/05/UTS_Limit-global-warming_Sectoral-Pathways-and-Key-KPIs.pdf
2 – JF Mercure, Pollitt, et. al (2018): https://www.nature.com/articles/s41558-018-0182-1

Scenarios modelled

Name	Narrative	Climate outcome*	Investment addition
BA_preCOVID	Existing policies growth pathway before COVID induced economic shocks	Over 3°C	
BA_postCOVID	Existing policies pathway including COVID shocks, using updated projections (pre-2022)	Over 3°C	
BA_Conflict	Existing policies pathway including COVID shocks, geopolitical / energy market shocks (from 2022)	Over 3°C	
GP_OECM	Green Push scenario aiming to reach well-below 2°C warming by 2100	1.9°C	~ 18 trn EUR
GP_OECM_GS	Green Push scenario aiming to reach well-below 2°C warming by 2100, increased climate finance towards developing countries	1.8°C	~ 18 trn EUR
SQ_Investment	Similar additional investment globally than in GP scenarios, but into SQ sectors	Over 3°C	~ 16 trn EUR

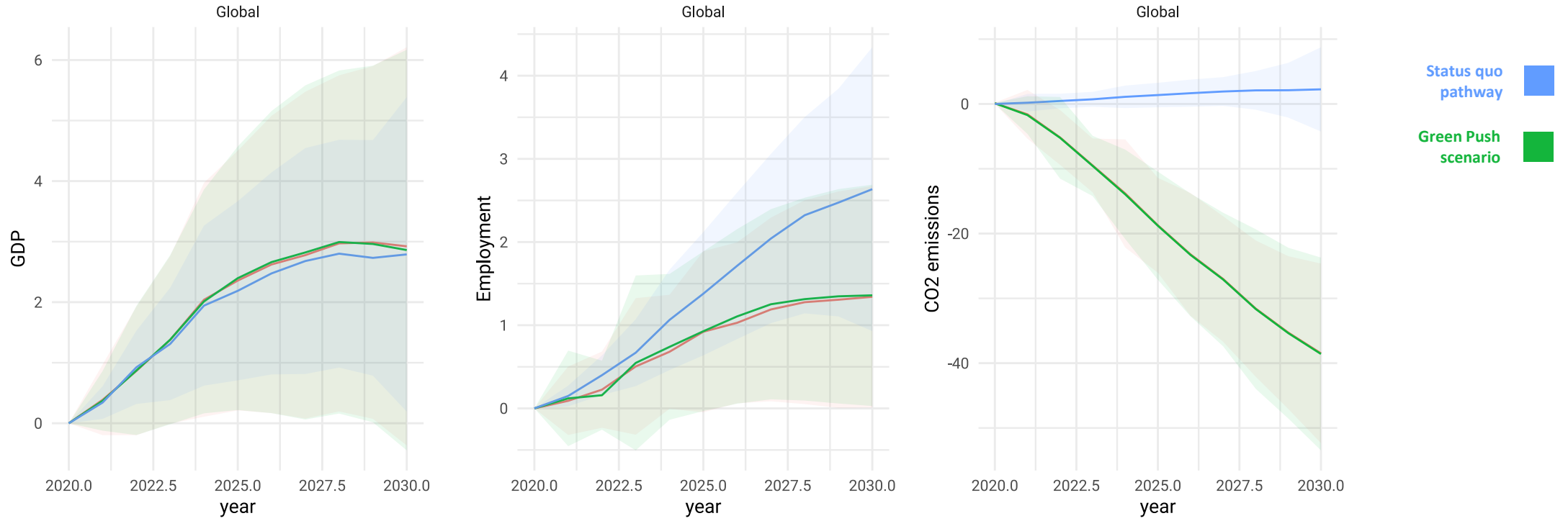
Note: * Emissions are projected linearly after 2030.

Preliminary results!
Please do not cite!

Green Push and status quo

Compared to the *status quo* investment scenario, the NZ scenario significantly decreases emissions, but also leads to lower employment additions

Revised emissions of CO2 projections



Source: E3ME modelling results

Preliminary results!
Please do not cite!

How is the IGE transition impacted by recent shocks and the Net-zero scenarios?

By José Pineda, Senior Consultant, UNEP

cambridge econometrics
clarity from complexity

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

Integrating the Green Economy Progress Measurement Framework to Modeling from CE

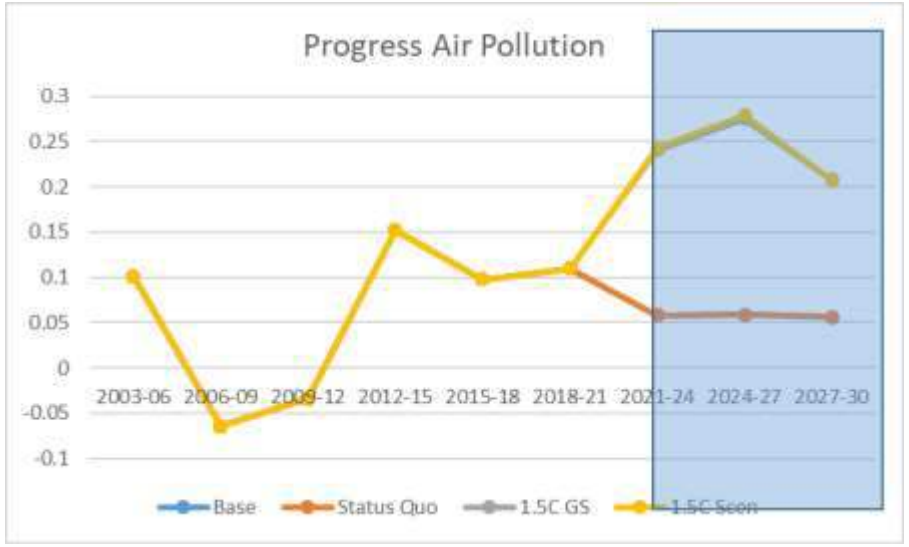
Data from 2003 to 2022 (forecast from 2023-2030)

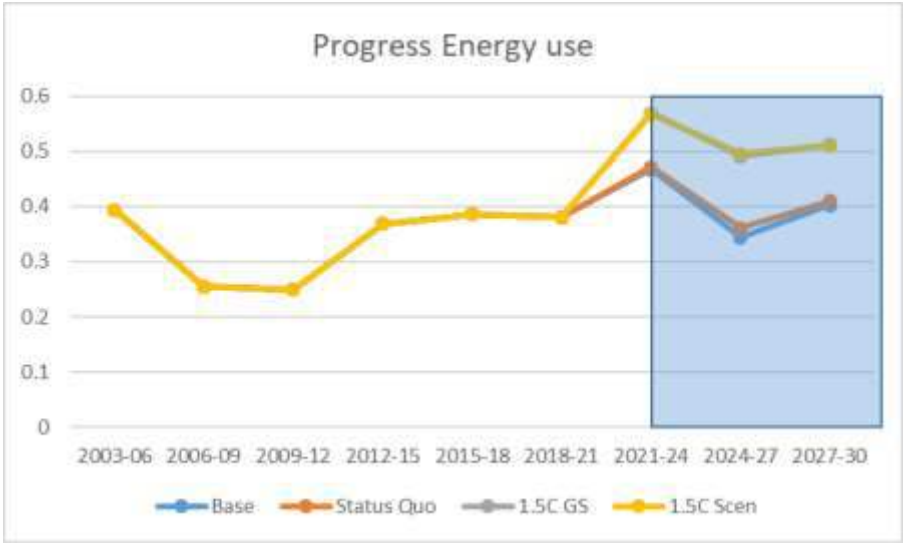
1) 58 countries: VH HDI (44), H HDI (9), M HDI (2), and L HDI (2).
   - 6 PAGE countries: Argentina, Brazil, China, India, Indonesia, Kazakhstan, and South Africa
2) Progress is calculated for 9 sub-periods:
   - 2003-06, 2006-09, 2009-12, 2012-15, 2015-18, 2018-21, 2021-24, 2024-27, 2027-30
   - Allows seeing the effects of the Covid-19 pandemic and the recovery
3) Four scenarios:
   - Base, Status quo, 1.5C Global South, 1.5C Scenario

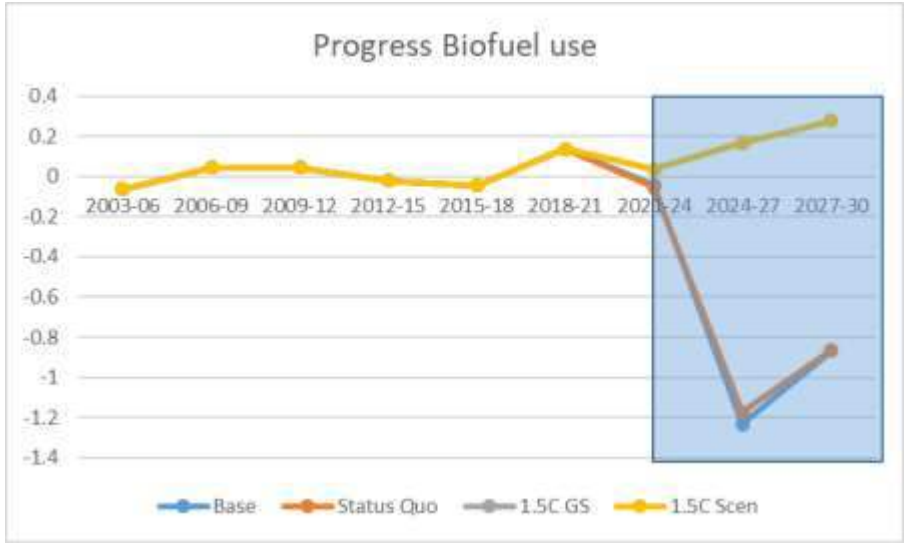
Adjusted GEPI

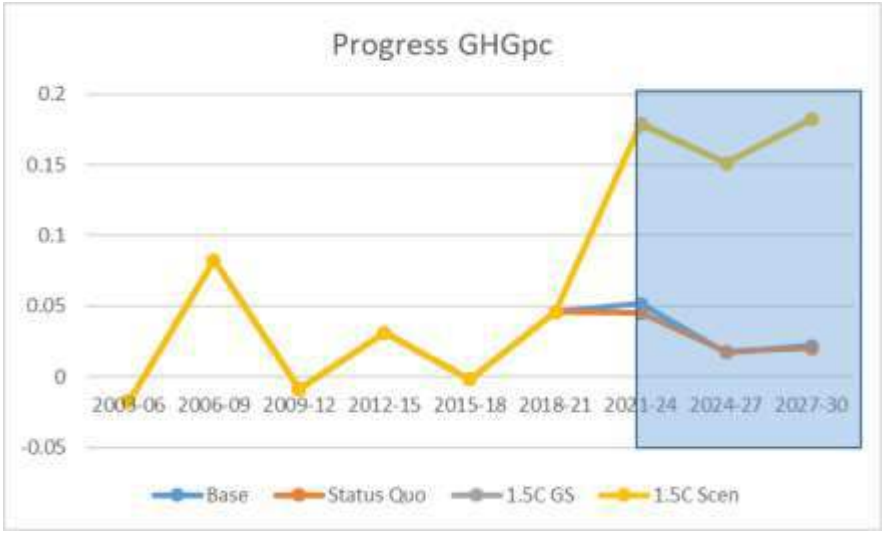
1) 6 indicators for the GEP index, and 2 for the dashboard of sustainability indicators
2) BADs
   - Material footprint per capita
   - Electricity use per GDP
   - Total energy use per GDP
   - Air pollution per capita
   - **GHG emissions per capita**
   - **Nitrogen emissions per capita**
3) GOODs
   - Labor Productivity
   - Biofuel use per GDP

Higher progress in the 1.5C scenarios for several indicators



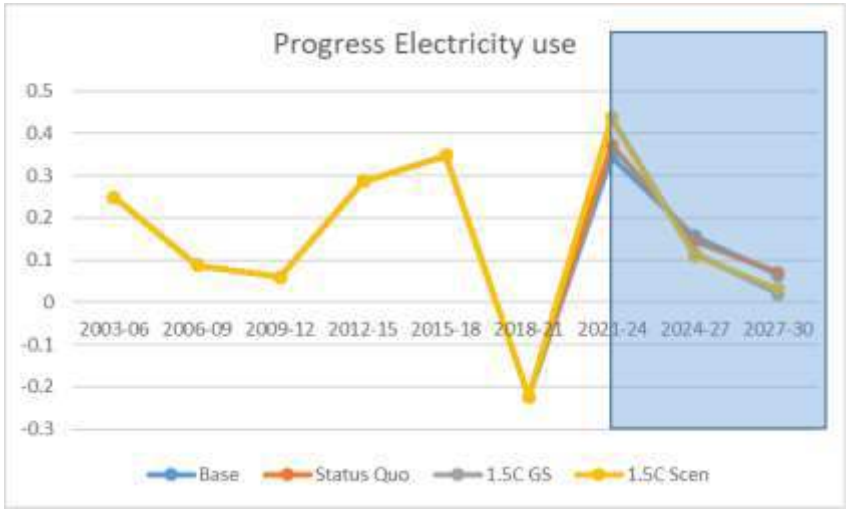


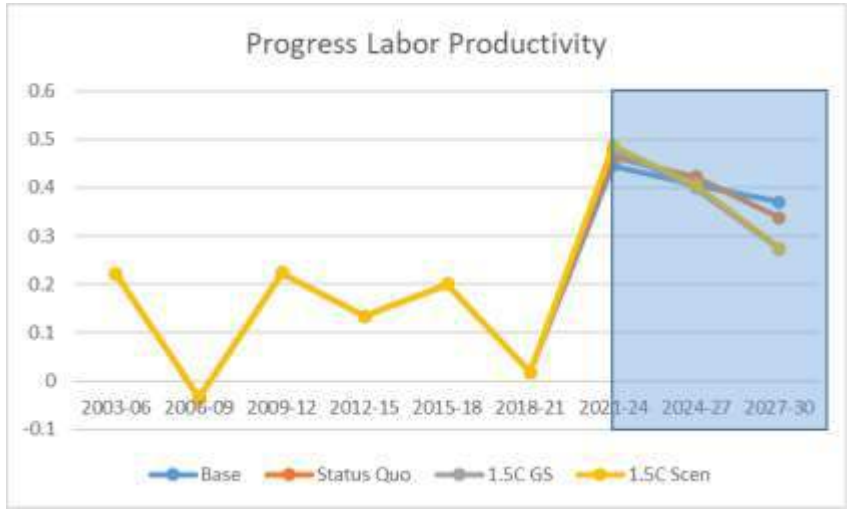




Source: Author's calculations.
Note: Median Value is presented in the Figure

But this is not always the case

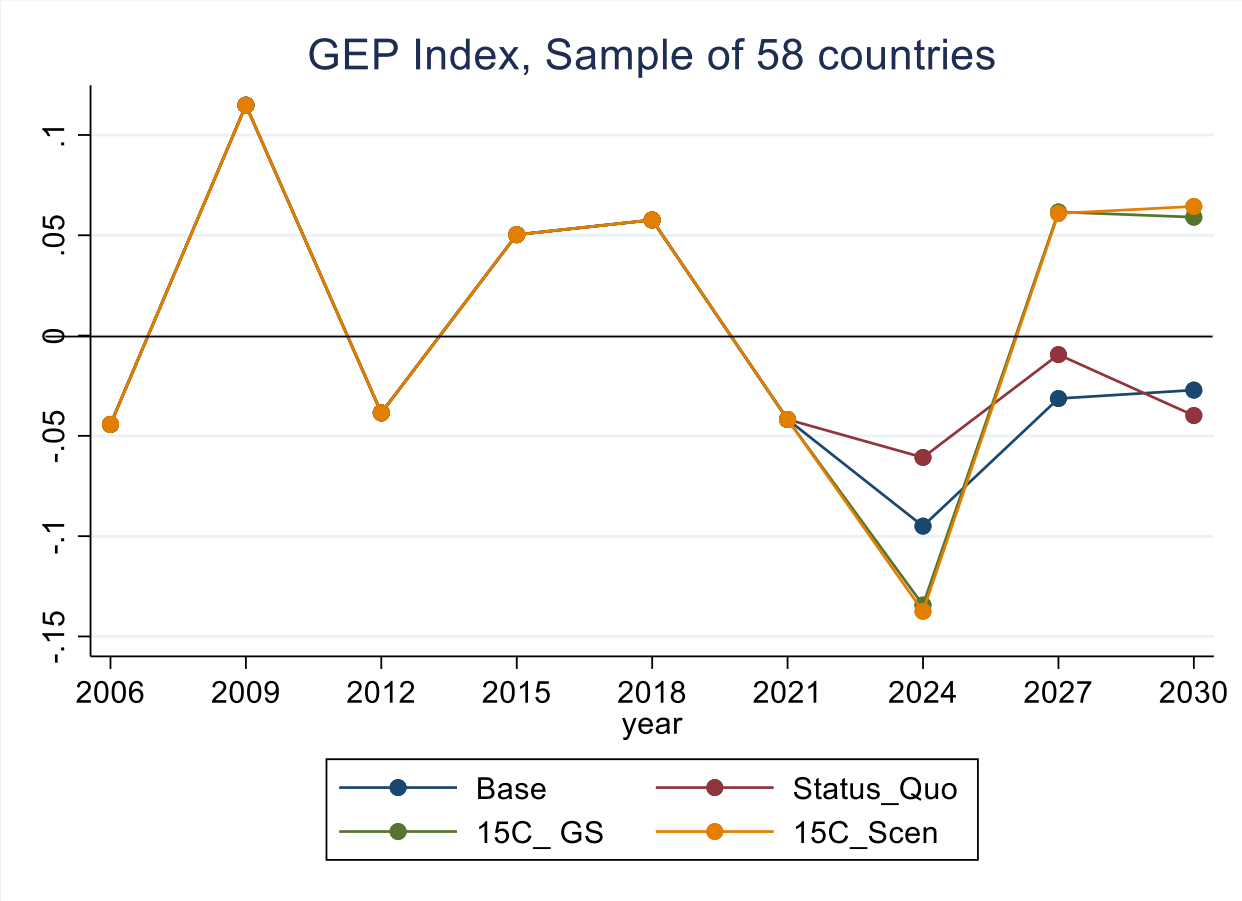


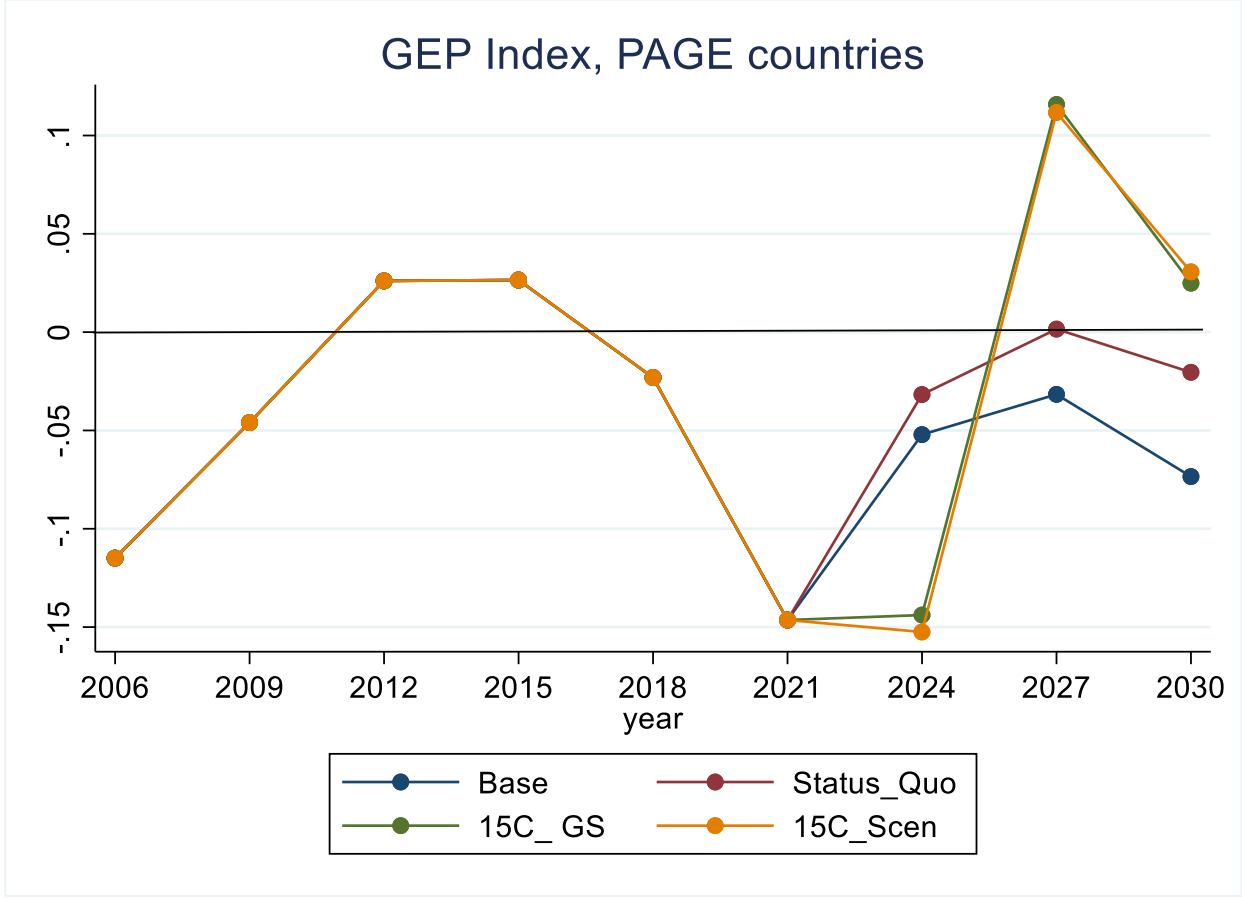


Source: Author's calculations.

Note: Median Value is presented in the Figure, except for the Gini which is the average

1.5C Scenarios will generate moderate progress





Source: Author's calculations.

Note: Median Value is presented in the Figure

Final considerations

1. **Until 2019**, the analysis showed important **improvements** in inclusive green economy, although with **sustainability challenges**
2. The **Covid-19 pandemic** represented an **important setback** on the previous progress on an inclusive green economy
3. **Base and Status Quo scenarios** present **no actual progress**, just lower regress
4. **1.5C scenarios** illustrate how policies can contribute to an **economic transformation** that leads to higher **inclusive green economy progress**
   - Significant progress in emissions, pollution, energy efficiency, labor productivity
   - Challenges on inequality and material footprint
5. **Connecting** the index with the modeling reinforces their **usefulness for policymaking**
   - Allows synthetizing and compering scenarios
   - Limits the number of indicators used in the application, but through time, that can be overcome

cambridge econometrics
clarity from complexity

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

Thank you

UN environment programme

International Labour Organization

UNDP

UNIDO

unitar
United Nations Institute for Training and Research