

ILO Green Jobs Programme



Assessing Labour Market Outcomes of Climate Policies

ILO Green Jobs Assessment Model (GJAM)

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Antigua



Outline

1. Why Green Jobs Assessment Model?
2. Properties, Data, Structure and how to build it
3. Country example key findings

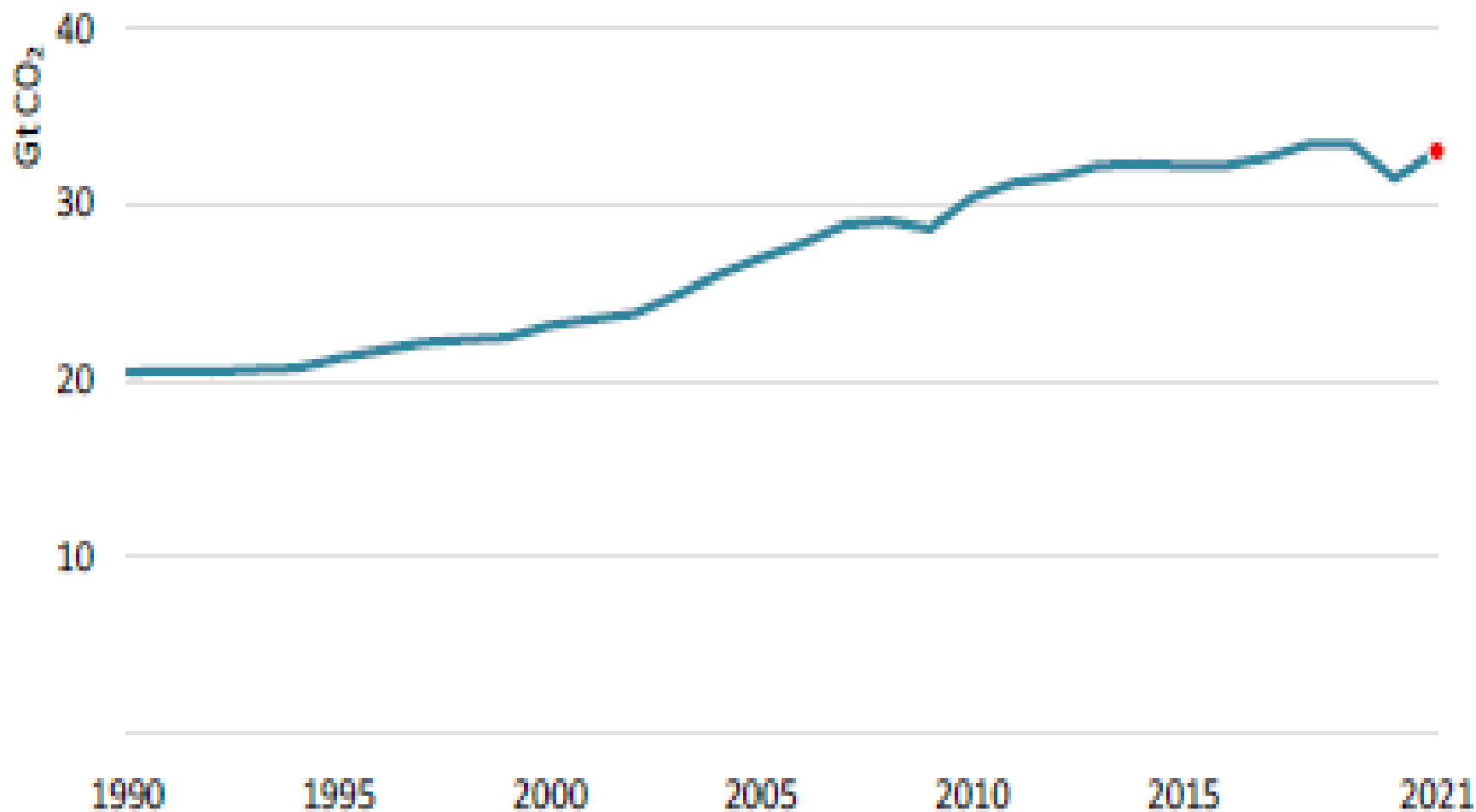


Why a Green Jobs Assessment Model?

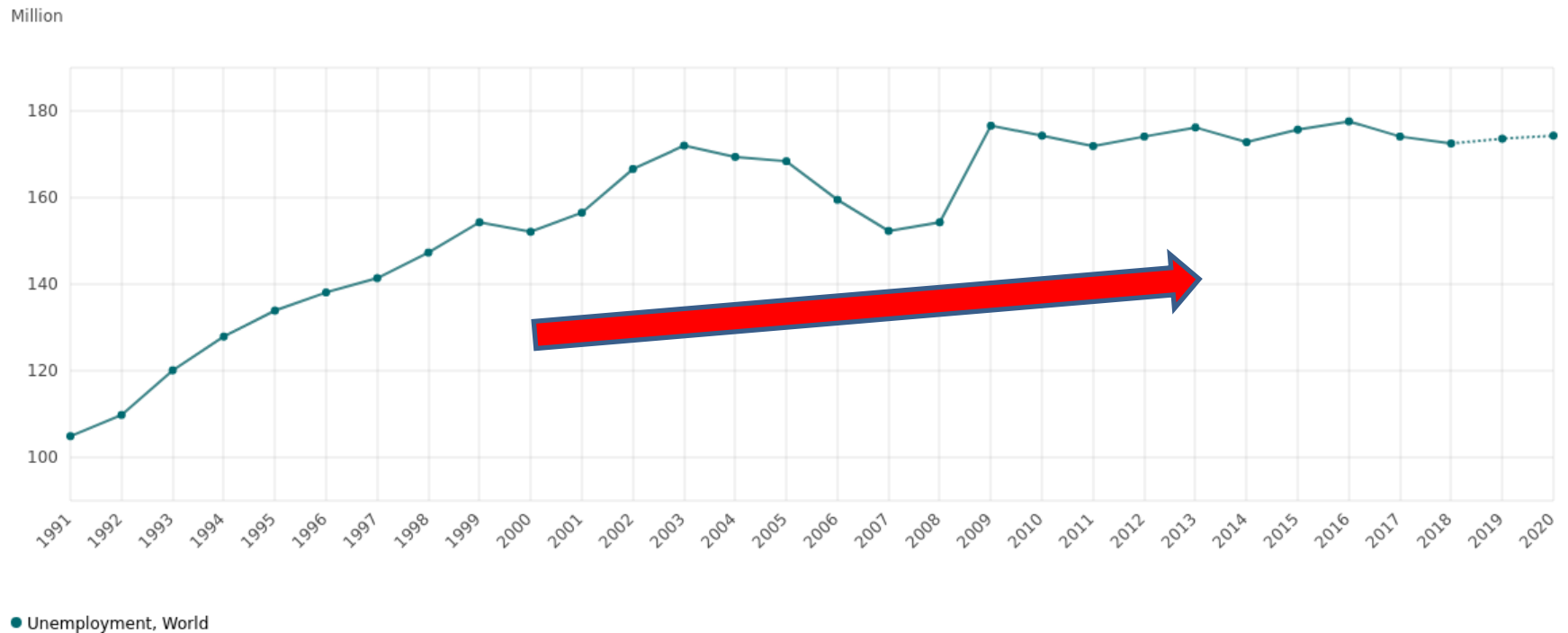


Fact is global emissions growing

Global energy-related CO₂ emissions, 1990-2021, and change in CO₂ emissions by fuel, 1990-2021



At same time, there is growing poverty, unemployment, inequality!



Countries promise climate action but emissions are growing! WHY?



Belief climate action slows GDP and cause job losses!

Grow first clean up later!

At COP 26 last minute change by China and India to still allow for coal



E.g. US pull out of Paris Agreement:



+ 10 million jobs
created by 2030

(US Gov 2021)

- 2,700,000 jobs
lost by 2025

(US Gov 2016)

54,819 coal jobs only 2019! (US LabStat 2019)

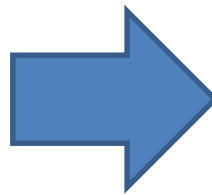
Who is right?



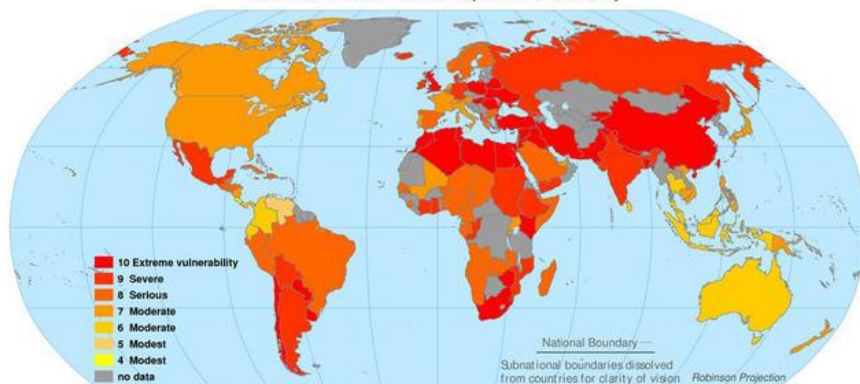
Objective is to inform policy!

How climate policies
(mitigate & adapt!)
impacts on...

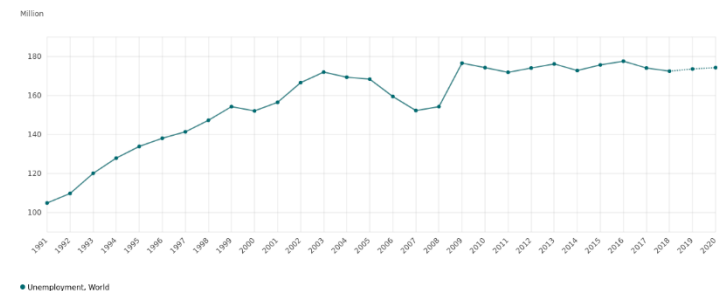
...jobs, poverty, GDP,
inequality & SDGs



Global Distribution of Vulnerability to Climate Change
Combined National Indices of Exposure and Sensitivity



Scenario A2 in Year 2100 with Climate Sensitivity Equal to 5.5 Degrees C
Annual Mean Temperature with Aggregate Impacts Calibration and Enhanced Adaptive Capacity



This dataset includes both real and imputed data from 1991-2018, as well as projections from 2019-20. Estimates may differ from official national sources.
Source: International Labour Organization, ILO modelled estimates (ilo.org/estimates)

For Just Transition Policies to min negative max gains!

Properties of Green Jobs Assessment Model

- should be guided by policy question



Policy questions the model should answer:

**What is the
impact of
Climate
policies
on...**



- Country and sector specific
- Based on data, statistics, Input Output
- Transparent

Social and Labour Market

- Direct & indirect jobs
- Un- under- informal empl.
-> model should allow!
- Skills, Gender, Youth

Economy

- GDP by sector
- Poverty, inequality
feedback on demand ->
Reality
- Tax revenues, profits,
wages

Environment

- CO2 emission by sector
- Forest, waste, energy,
water



Relevant modeling frameworks

1. **Input Output and Social Accounting Matrix** for multiplier analysis and short term simulations
2. **Structural Multisectoral Simulation Models** based on Input Output or Social Accounting Matrices
3. **Computable General Equilibrium Models (CGE)** based on Input Output or SAM
4. **System Dynamics** aggregate, long term & feedback loops
5. **Econometric**

Desirable properties of models

1. Include Economic, Environment and Social dimension, realistic features of the labour market.
2. Allow for **unemployment or underemployment, formal and informal**
3. Social outcomes of **inequality and distribution** need to feedback on demand -> **because this is reality.**
4. Country and sector specific: Market adjustment tailored to the sectoral characteristics. Beyond statistics, input output and multiplier analysis there is **no universal blueprint.**



Input Output based models have the desired properties:

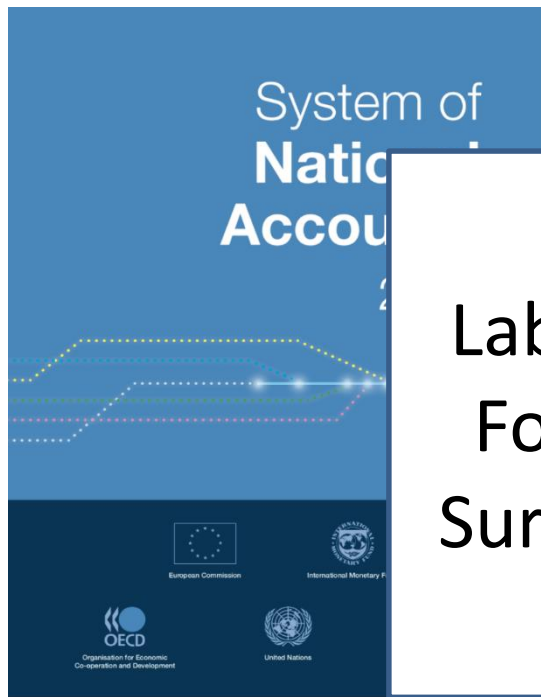
- They are based on economic statistics following the System of National Accounts (SNA)
- Economic sectors are highly disaggregated by the International Standard Classification of Industries (ISIC) (up to 4 digit level)
- AND, they allow the integration of environment and social statistics



The Input-Output table provide an integrated data framework to combine data in a systematic way

Sector		Final demand (f)			Total output
		Government consumption			
		Household consumption	Investment		
		Agriculture	Industry	Services	
Sector	Agric.	z_{11}	z_{12}	z_{13}	x_1
	Industry	z_{21}	z_{22}	z_{23}	x_2
	Services	z_{31}	z_{32}	z_{33}	x_3
Value added	Wages	w_{L1}	w_{L2}	w_{L3}	
	Profits	w_{K1}	w_{K2}	w_{K3}	
Net taxes on prod.		t_1	t_2	t_3	
Total output		x_1	x_2	x_3	
Employment		$emp\ 1$	$emp\ 2$	$emp\ 3$	
CO2 Emissions		$e\ 1$	$e\ 2$	$e\ 3$	

IO is an empirical model
which combines multiple
data sources on social,
economic and environment
statistics in a consistent
framework



Labour
Force
Surveys



Household
Budget
Survey

Environment
Assessment
Emissions
IPCC



Structural Simulation Green Jobs Assessment Model

exogenous

endogenous

Table 2.3: Supply and Use Tables framework

UN Handbook on Supply, Use and Input-Output Tables with Extensions and Applications (2018)

		Products				Industries				Final uses			
		Agriculture, forestry, etc.	Ores and minerals; etc.	...	Services	Agriculture, forestry, etc.	Mining and quarrying	...	Services	Final consumption	Gross capital formation	Exports	Total
Products	Agriculture, forestry, etc.					Intermediate consumption by product and by industry				Final uses by product and by category			Total use by product
	Ores and minerals; etc.												
	...												
	Services												
Industries	Agriculture, forestry, etc.	Output by product by industry											Total output by industry
	Mining and quarrying												
	...												
	Services												
Value added						Value added by component and by industry							Value added
Imports		Total imports by product											Total Imports
Total		Total supply by product				Total output by industry				Total final uses by category			

Empty cells by definition

GJAM captures

- Direct effects
- Indirect effects
- Induced effects

**Employment
by industry**

**Emissions by
industry**

**GDP per
capita &
inequality**



Design of Policy Scenarios

- **Changing production structure**
 - New product/industry
 - E.g climate smart agriculture
 - E.g energy efficiency
 - Employment coefficients
 - Emission coefficients
- **Changing final demand**
 - Investments
 - Household consumption structure
 - Government consumption structure

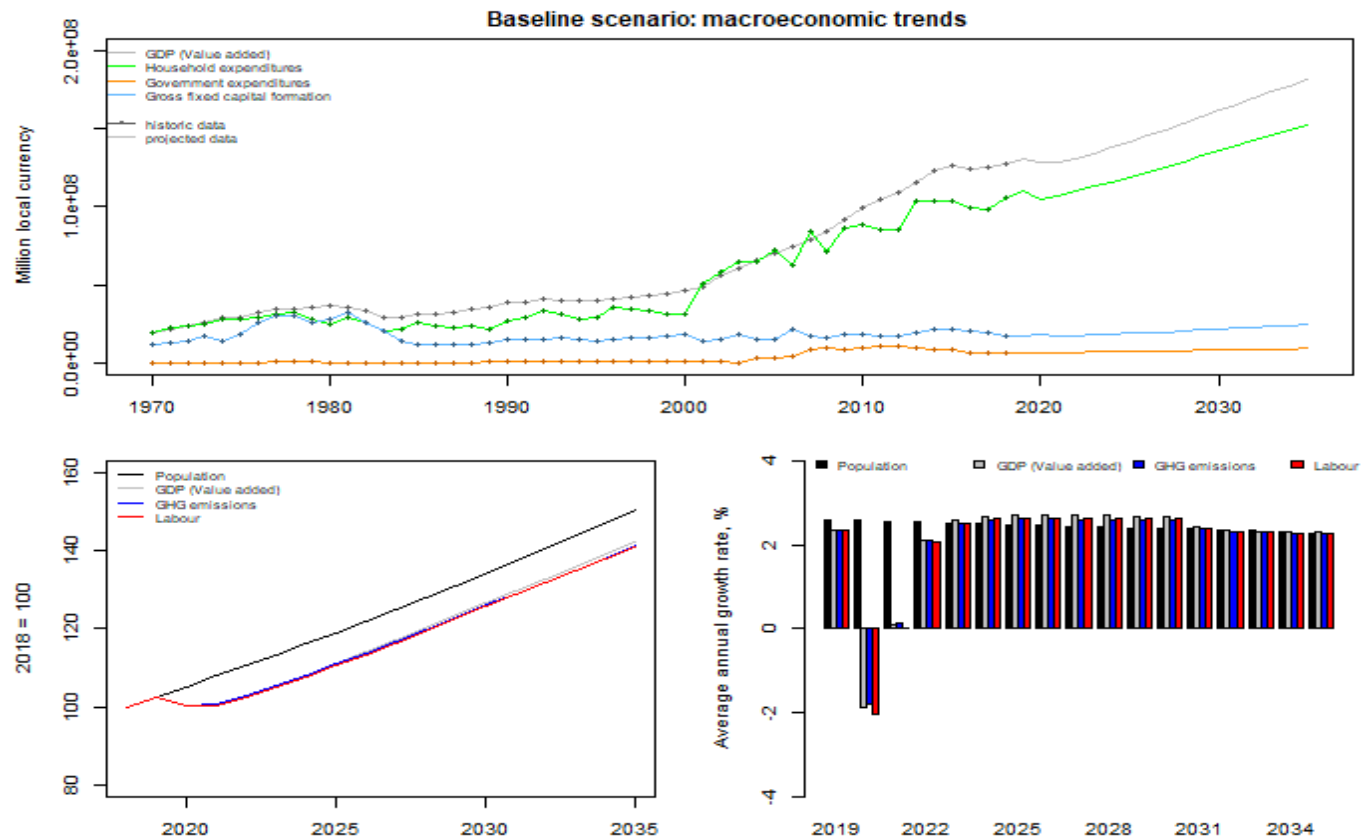
		Products				Industries				Final uses			Total
		Agriculture, forestry, etc.	Ores and minerals; etc.	...	Services	Agriculture, forestry, etc.	Mining and quarrying	...	Services	Final consumption	Gross capital formation	Exports	
Products	Agriculture, forestry, etc.					Intermediate consumption by product and by industry				Final uses by product and by category			Total use by product
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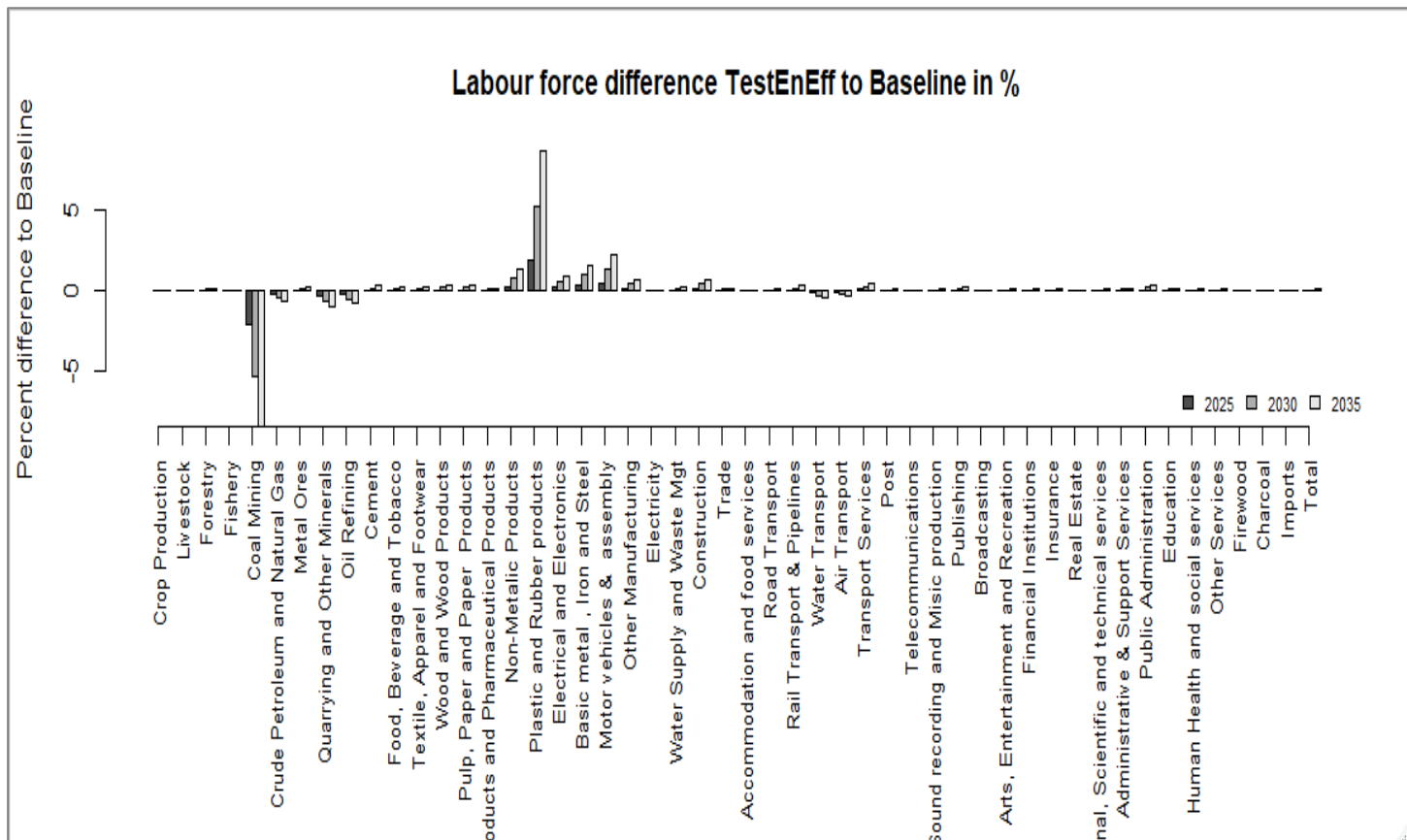
Employment by industry

Emissions by industry

Screenshot in R - Baseline Green Jobs Assessment Model



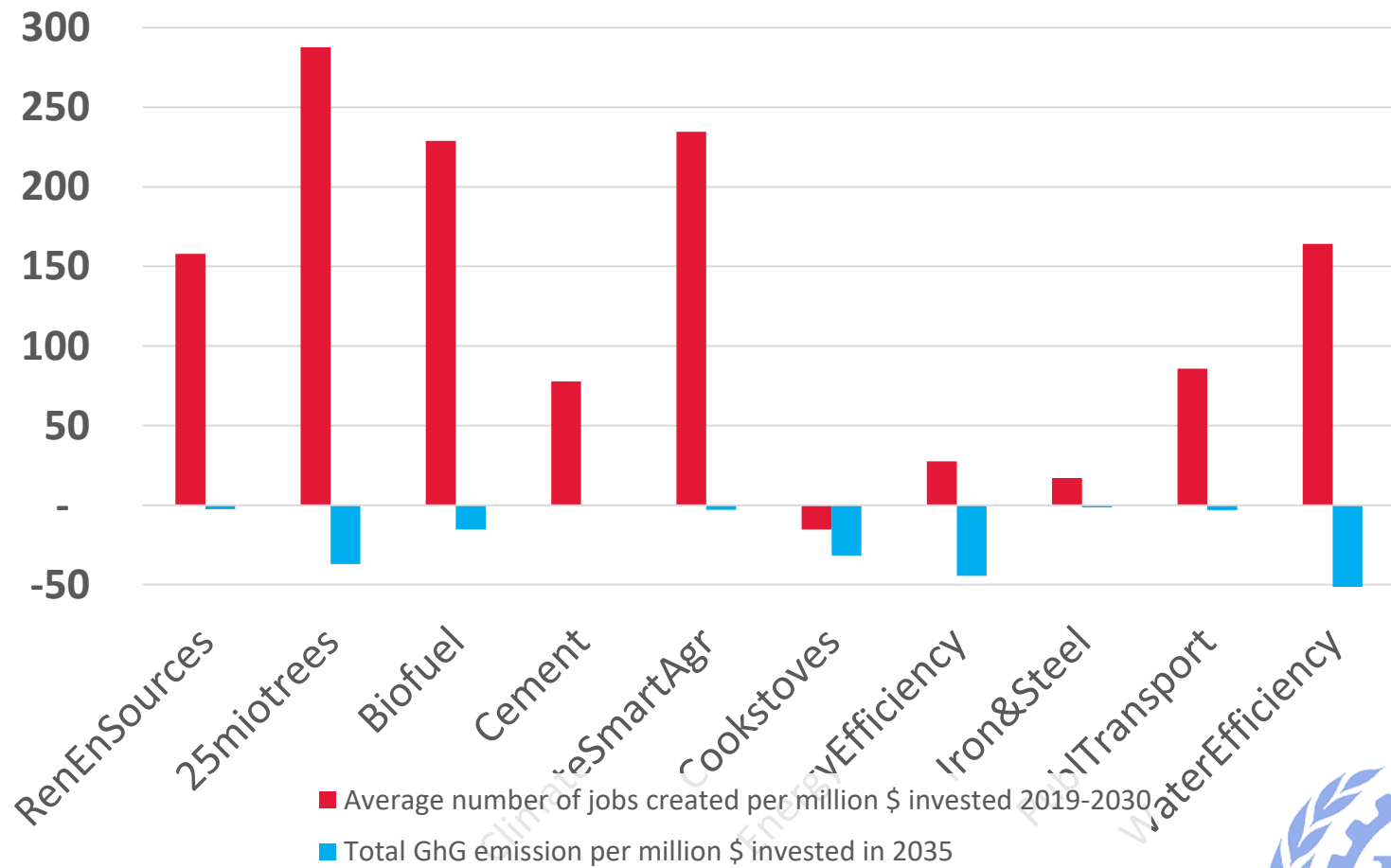
Employment by sector



Selected policy scenarios
Country examples - key findings



Depending on Sector & Technology, a Dollar invested
has different job & CO2 impacts



Key findings

❑ Social and Employment gains are not automatic!

Climate policies have positive job outcomes if accompanied by Just Transition Policies

— Notably investment into Skills & Social Protection:

➤ Skills training for 12 million jobs in renewables and supply industries: **\$96 m/year**

➤ (\$/year 96 million (\$26/pupil/secondary education; Underestimate as private and student finance)

➤ Conditional cash transfer to stop firewood & charcoal collection of 530,000 workers: **\$900 m/y**

➤ (\$/year 900 million (\$1.9/day/hh size 5, ½ income; Clean energy support to fire/charcoal cooking households (50 million hh)

➤ Financing by fiscal neutral progressive climate tax \$10 ton carbon for richest 10% : **\$1.06 bn/y**

➤ (10.6 million adults (10%) earn 42% of national income and account for majority of Mt480 GHG)



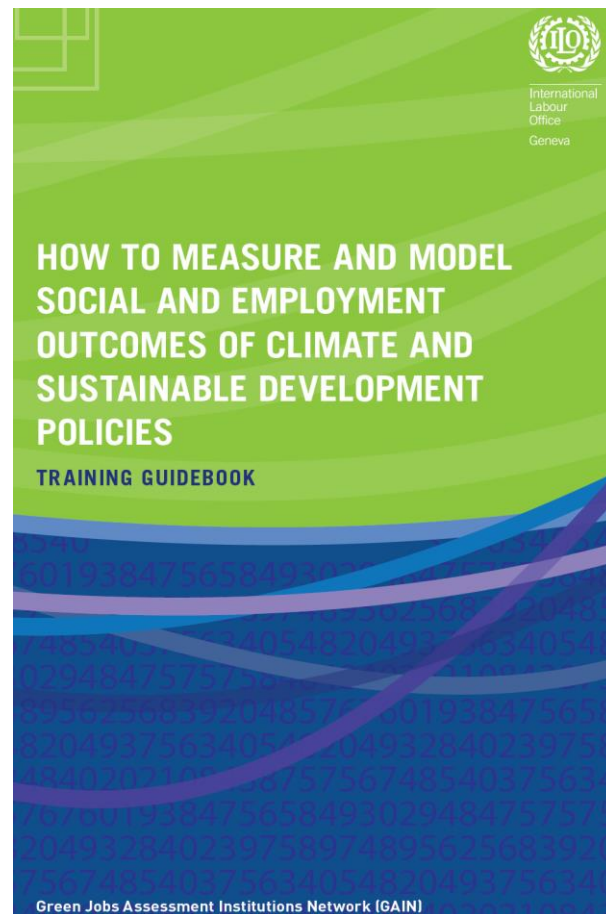
Policy recommendations

1. Design Just Transition policies **ex-ante** to accompany climate policies
2. **Biggest bang for the buck**: Focus on agriculture and forestry, biomass and renewable energy sector
3. Develop **skills training system** for climate smart agriculture, agro-processing, renewables & cook stoves
4. Extend **social protection** to informal rural population
5. Fiscal neutral **progressive climate tax**



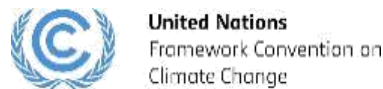
National capacity building to build models

- ✓ Open source methodology Training Guide published
- ✓ GAIN Network of 30+ Research Institutions
- ✓ Capacity building of Government & national institutions
- ✓ GAIN Training Hubs in Pretoria and Abidjan
- ✓ To build national models for better climate policy



Green Jobs Assessment Institutions Network provides support

ILO managed secretariat



Thank you

