QUANTIFYING LABOR IMPACTS OF DECARBONIZATION STRATEGIES IN LATIN AMERICA AND THE CARIBBEAN

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Quantifying labor impacts of decarbonization strategies in Latin America and the Caribbean

- Experts Advisory Services for the Inter-American Development Bank
- April – October 2019
- Part of IDB's decarbonization pathways research program
  - Investigate ways to make decarbonization policies politically-acceptable

IDB Inter-American Development Bank

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Background: WESO and GAIN

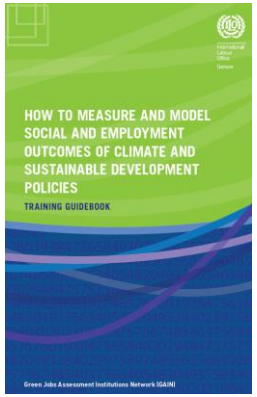
Extending previous work from ILO World Employment and Social Outlook (WESO) 2018: Greening with jobs

Green Jobs Assessment Institution Network (GAIN)

4-step methodology

1. Climate policy to analyse?
2. Develop national statistics!
3. Job outcomes at industry level with Input Output!
4. Social impacts with Social Accounting Matrix!

Global IO database



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Objectives and research question

- Assess in **which sectors jobs can be created** by 2050 in the transition to net zero emissions

- Quantify **how many high-carbon jobs today are at risk** of being stranded, per country and sectors

- In each country, what would be the net impact on jobs during the transition from today's situation to a 2050 world consistent with the Paris Agreement objectives?

3 knowledge gaps to be filled

1. Published quantifications in LAC limited to a **few countries** (Brazil, Mexico)

➔ We will quantify impacts in at least **10 countries**

2. Published literature tends to focus on **energy transition**

➔ We will also quantify impact of **dietary changes**

3. Published literature tends to analyse
one transition scenario (e.g. one energy mix) under
one set of assumptions (e.g. technology costs)

➔ We will explore a **multitude of scenarios and strategies**

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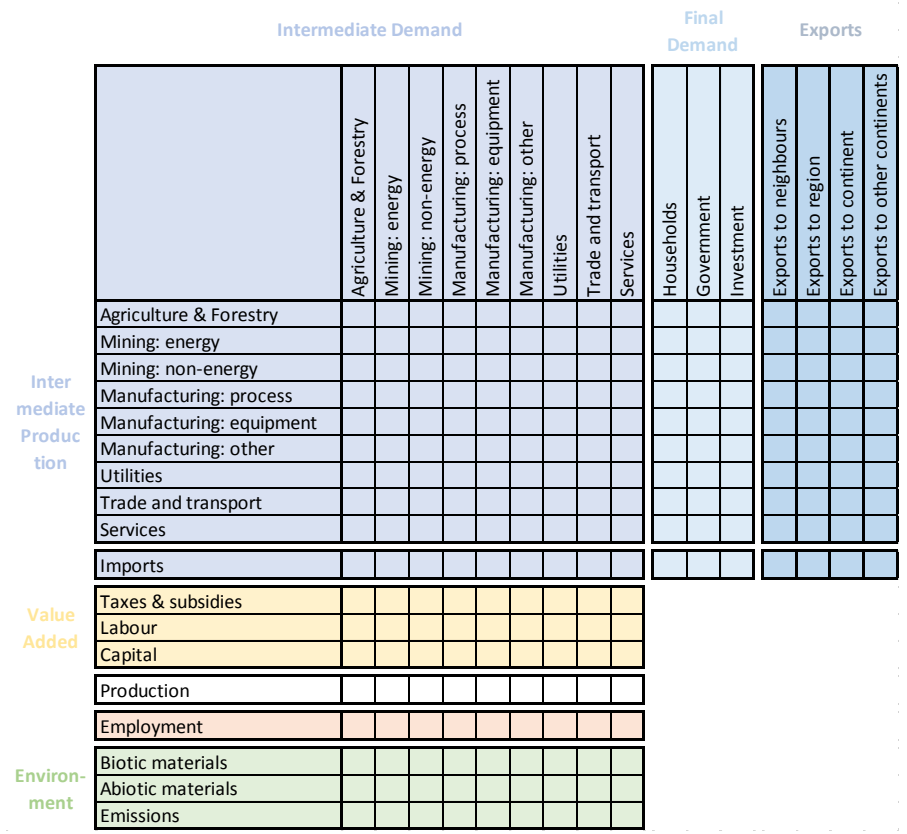
Methods I
Data analysis based input-output tables

- Quantify **current jobs and GHG emissions per sector** and country
  - Special focus on energy and food
- Data source
  - GTAP9 – input-output tables with 57/68 industries
  - ILO labour force surveys
  - IEA energy and emission balances
  - FAO land use and emissions from land use change



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Methods II
Assessment of 2050 using XLRM

- **X** Exogenous uncertainties (low, medium, high)
  GDP and population growth, total energy needs, total food intake, GHG emissions consistent with Paris Agreement, exports
- **L** Levers
  Electricity mix, diatery changes, technological change in industry/transport/agriculture/food production
- **R** Relationships
  IO analysis of (levers) x (uncertainties) = at least 9 simulations
- **M** Metrics
  Jobs per sector, GHG emissions, value added, (resources used)

Response measures

- Energy transition
  - Based on IEA Energy Technology Perspectives 2-degree & beyond 2 degree scenarios
  - Increased energy efficiency
  - Increased deployment of renewable energy technologies

- Agriculture and land-use
  - Dietary changes: Eating less / no meat
  - Changing technology in agriculture (extensive/intensive)

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Expected positive and negative employment impacts – industries

http://wholelifefitness.co.uk/wp-content/uploads/2014/04/ID-100134330.jpg

Positive (direct and supply chain)

- Renewable energy production
  - Electrical equipment and apparatus
  - Mining: Metal ores (copper, lithium)
  - Mining: Non-metallic minerals
  - Agriculture: Crop production for biofuels
- Plant-based food
  - Agriculture: Crop production for food

Negative (direct and supply chain)

- Fossil energy production
  - Mining of fossil fuels
  - Processing of fossil fuels
- Animal-based food production
  - Agriculture: Animal products
  - Agriculture: Crop production for fodder

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Data availability
GTAP9 Power database: industries

Code	Description
PDR	'Paddy rice'
WHT	'Wheat'
GRO	'Cereal grains nec'
V_F	'Vegetables, fruit, nuts'
OSD	'Oil seeds'
C_B	'Sugar cane, sugar beet'
PFB	'Plant-based fibers'
OCR	'Crops nec'
CTL	'Cattle,sheep,goats,horses'
OAP	'Animal products nec'
RMK	'Raw milk'
WOL	'Wool, silk-worm cocoons'
FRS	'Forestry'
FSH	'Fishing'
COA	'Coal'
OIL	'Oil'
GAS	'Gas'
OMN	'Minerals nec'
CMT	'Meat: cattle,sheep,goats,horse'
OMT	'Meat products nec'
VOL	'Vegetable oils and fats'
MIL	'Dairy products'
PCR	'Processed rice'
PCR	'Processed rice'
SGR	'Sugar'
OFD	'Food products nec'
B_T	'Beverages and tobacco products'
TEX	'Textiles'
WAP	'Wearing apparel'

Code	Description
LEA	'Leather products'
LUM	'Wood products'
PPP	'Paper products, publishing'
P_C	'Petroleum, coal products'
CRP	'Chemical,rubber,plastic prods'
NMM	'Mineral products nec'
I_S	'Ferrous metals'
NFM	'Metals nec'
FMP	'Metal products'
MVH	'Motor vehicles and parts'
OTN	'Transport equipment nec'
ELE	'Electronic equipment'
OME	'Machinery and equipment nec'
OMF	'Manufactures nec'
TnD	Transmission and distribution
NuclearBL	Nuclear power
CoalBL	Coal-fired power
GasBL	Gas-fired power as base load
WindBL	Wind power
HydroBL	Hydroelectric power as base load
OilBL	Oil-fired power as base load
OtherBL	Other power nec: waste, biofuels, biomass, geothermal, tidal
GasP	Gas-fired as peak load
HydroP	Hydroelectric as peak load
OilP	Oil-fired as peak load
SolarP	Solar power: photovoltaics and thermal
GDT	'Gas manufacture, distribution'
WTR	'Water'
CNS	'Construction'

Code	Description
TRD	'Trade'
OTP	'Transport nec'
WTP	'Sea transport'
ATP	'Air transport'
CMN	'Communication'
OFI	'Financial services nec'
ISR	'Insurance'
OBS	'Business services nec'
ROS	'Recreation and other services'
OSG	'PubAdmin/Defence/Health/Educat'
DWE	'Dwellings'

Expected employment impacts

positive

negative

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Data availability
ILO Labour Force Survey

		Year close to IO data		Recent data available		Diatery changes			Energy transition					
									Mining					
		Year1	#ind	Year2	#ind	Agriculture	Forestry	Food	Coal	Oil & Gas	Metal ores	Minerals	n.e.q.	Services
ARG	Argentina	2011	22	2018	22	AF	AF	MAN						
BOL	Bolivia	2011	22	2017	22	AF	AF	MAN						
BRA	Brazil	2012	87	2018	87	x	x	x	x	x	x		x	x
CHL	Chile	2011	17	2018	21	AF	AF	MAN					x	
COL	Colombia	2011	60	2018	60	x	x	x	x	x	x		x	
ECU	Ecuador	2011	60	2018	88	x	x	x	x	x	x		x	
PRY	Paraguay	2011	7	2017	7	AF	AF	MAN					MIN+UTI	
PER	Peru	2011	84	2018	83	X	x	x		x	x		x	x
URY	Uruguay	2011	86	2017	86	X	x	x		x	x		x	x
VEN	Venezuela	2011	49	2012	49	X	x	x	x	x	x	x		
CRI	Costa Rica	2012	17	2018	17	AF	AF	MAN					x	
GTM	Guatemala	2011	86	2018	73	X	x	x	x	x	x		x	
HND	Honduras	2011	54	2017	81	X	x	x			x		x	
NIC	Nicaragua	2014	57			X	x	x			x		x	
PAN	Panama	2011	82	2017	21	X	x	x			x		x	x
SLV	El Salvador	2011	84	2017	21	X	x	x		x	x		x	x
DOM	Dominican Republic	2011	55	2016	55	X	x	x			x		x	
JAM	Jamaica	2014	52	2016	54	X	x	x			x		x	
TTO	Trinidad and Tobago	2011	7	2016	7	AF	AF	MAN					MIN+UTI	

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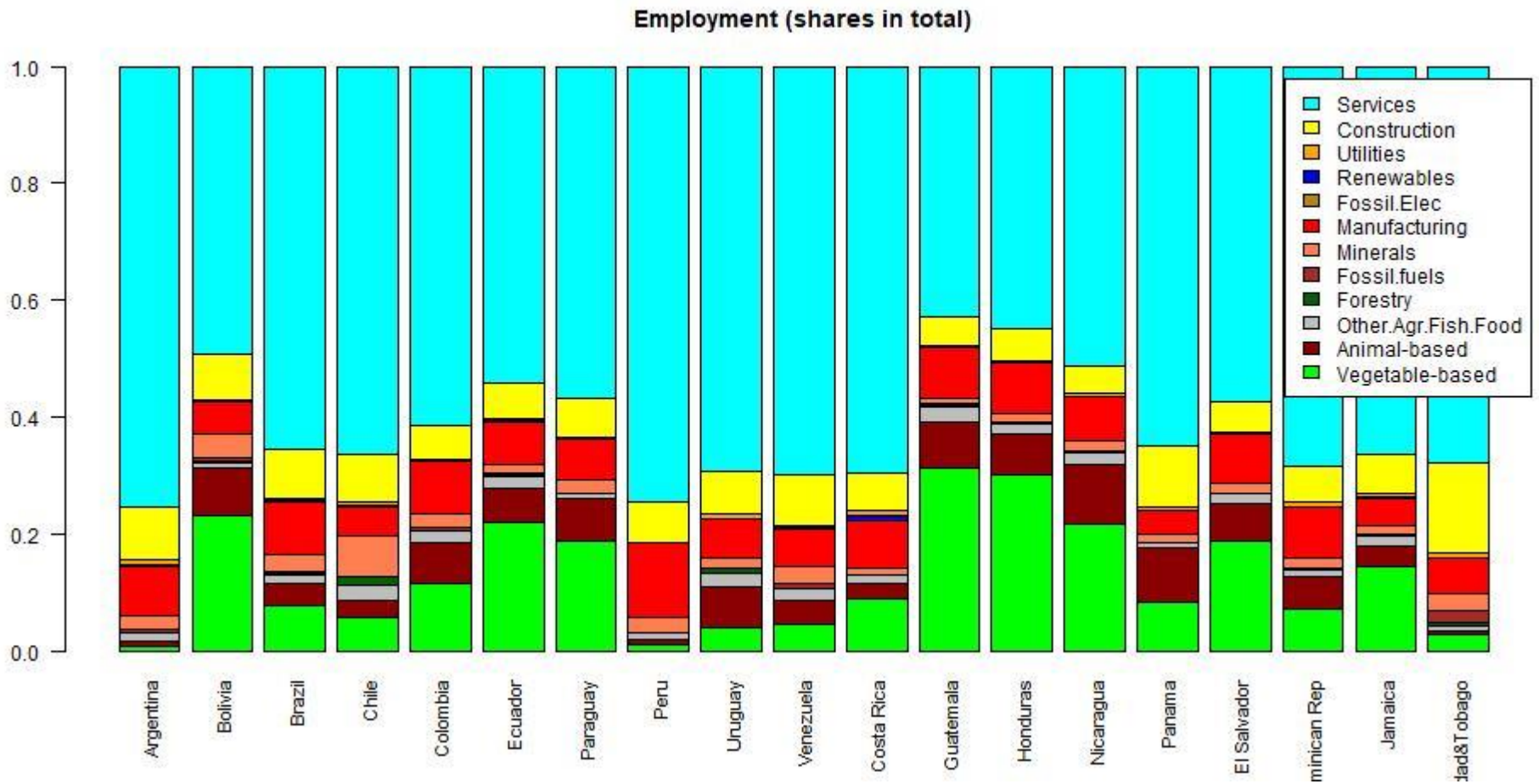
Employment by country and industry today

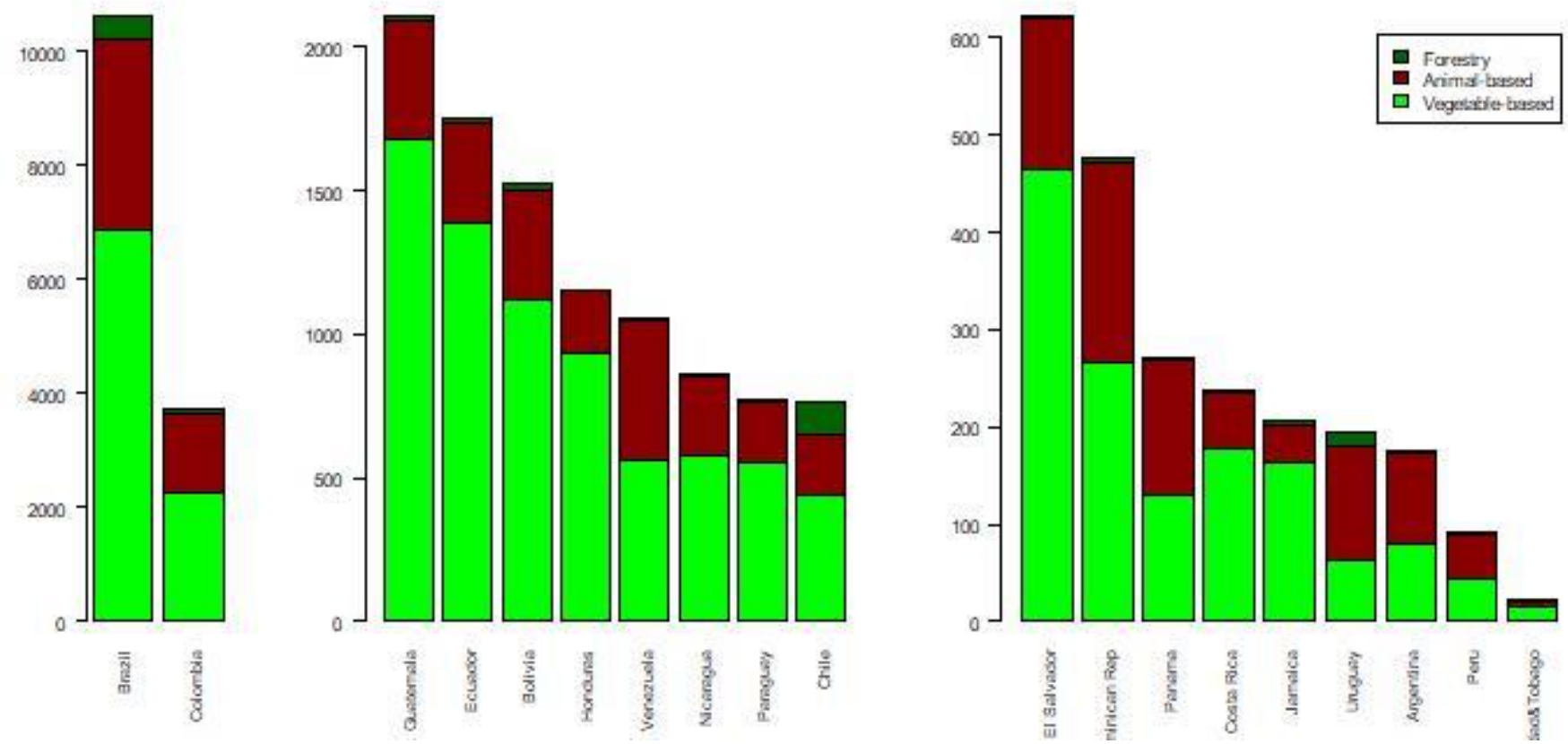
based on ILO LFS, allocated to GTAP industries for 2011



Employment by country and industry today

based on ILO LFS, allocated to GTAP industries for 2011 **(Agriculture)**

in 1000 persons



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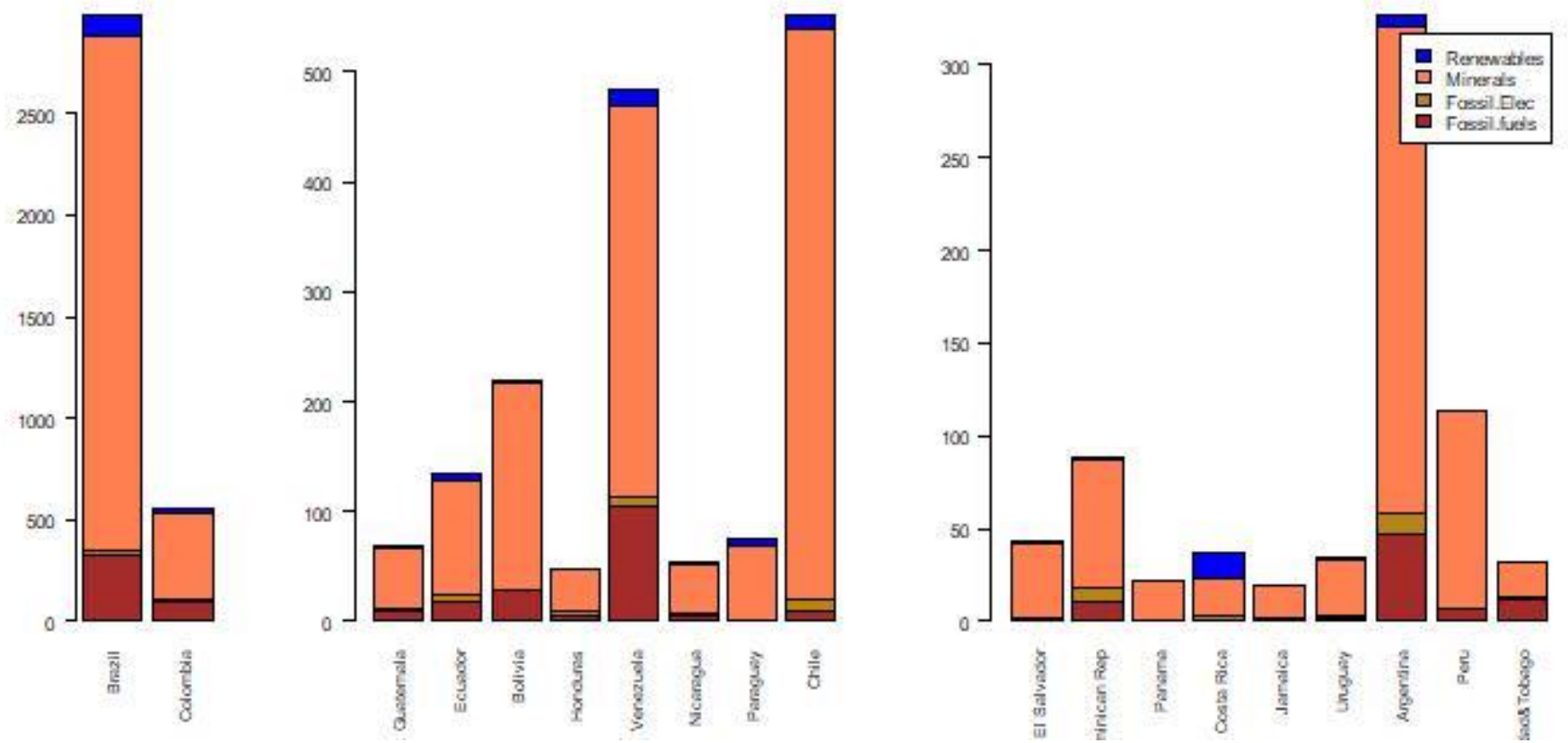
Employment by country and industry today

based on ILO LFS, allocated to GTAP industries for 2011 **(Energy)**



Expected outcomes

- Tables quantifying **jobs and carbon emissions by sector** in selected Latin American and Caribbean countries **today**
- Tables quantifying **jobs and carbon emissions by sector** in selected Latin American and Caribbean **in scenarios for 2050**
- **Joint ILO-IDB report & academic paper** including review of experience with managing job disruption in past transitions: *What are the policy lessons learned from other failed and successful transitions to ensure this one is just for all?*

Lessons to learn

"if we don't know possible impacts we cannot design response measures"

What does the data tell us about today?

- Largest share of LAC workforce in services + construction
- High number of employees in agriculture → possibly large effect in animal-based agriculture

Putting results into a context

- Results will show employment impacts given that everything else remains constant
- How do employment impacts from a green transition compare to employment impacts from digitalisation?

Technology for a better society

Teknologi for et bedre samfunn

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