



Modelling Green Jobs and Low Carbon Development in Mauritius

The Green Jobs Assessment Model
For Designing Better and Sustainable
Recovery and Climate Policies

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Antigua



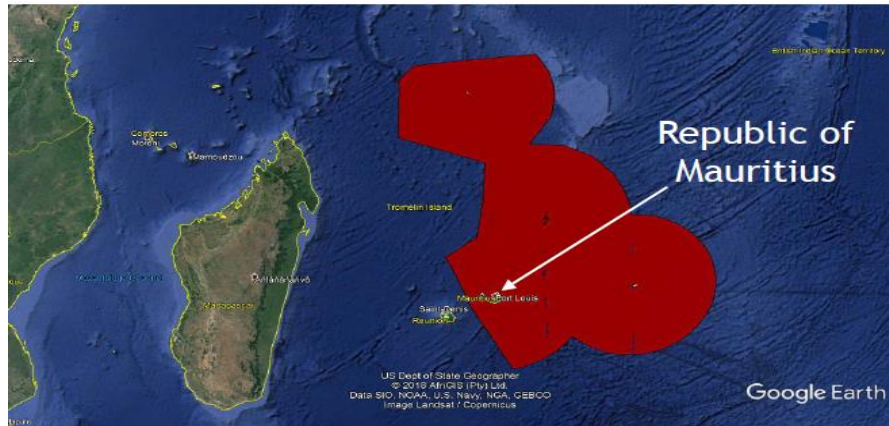
Objectives

- Green jobs and greener/low carbon sectors
- Can we achieve the twin objectives?
- Insights from economic-wide modelling of employment and GHGs

Structure

- Green jobs in Mauritius
- GHGs at sectoral level
- Multiplier analysis
- Green/low carbon strategy for 2021-2030: impacts on employment and GHGs

Republic of Mauritius



- Main island, Mauritius, is an area of 1,860 square km
- The Exclusive Economic Zone (“EEZ”) of the Republic of Mauritius extends over an area of about 2.3 million Km² (including approx. 400,000 Km² jointly managed with the Seychelles)
- This makes Mauritius the 20th country in the world with the largest EEZ.

Contribution of economic sectors to GDP

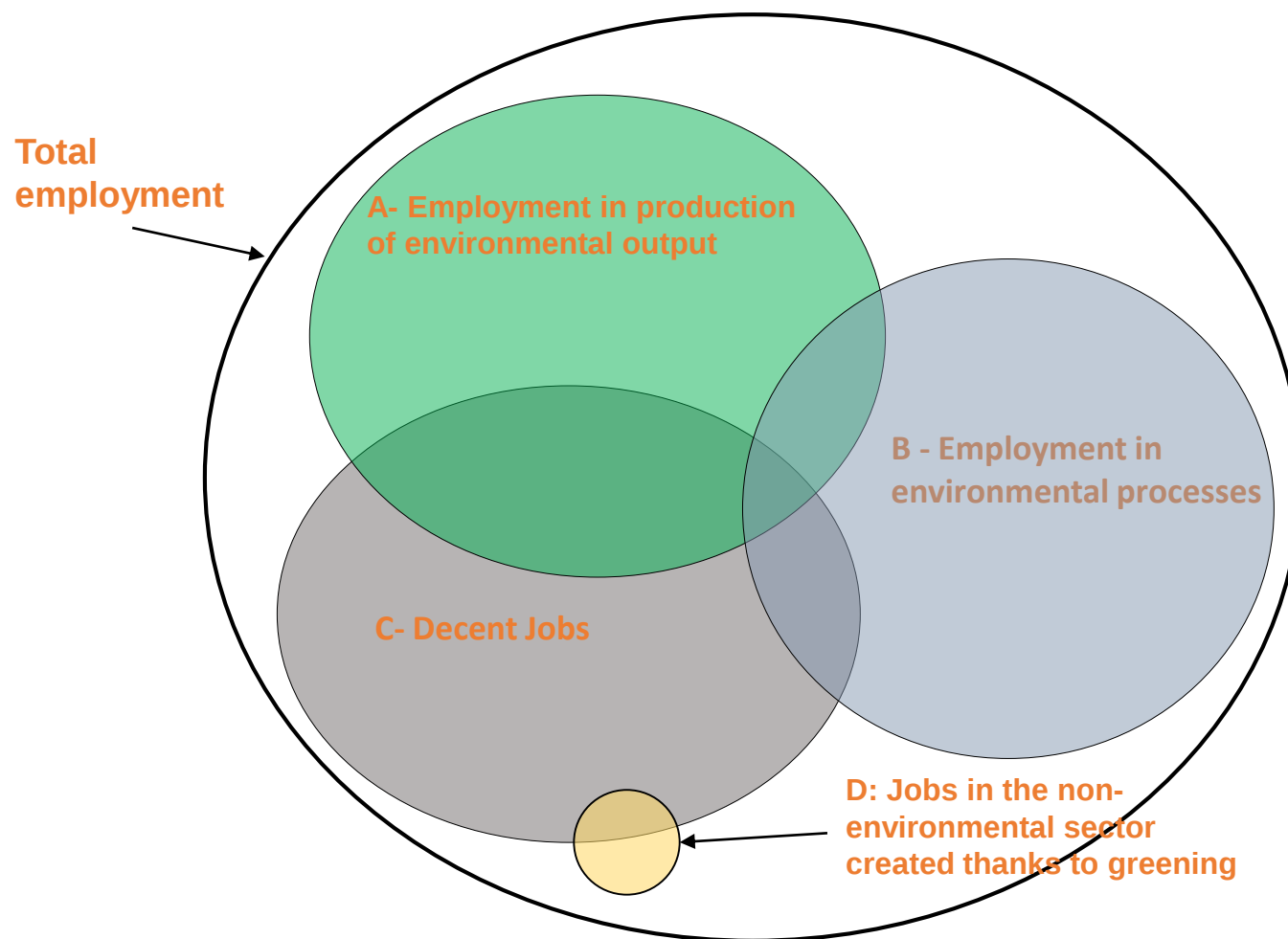
Economic sectors	2017	2018	2019
Agriculture, forestry and fishing	3.5	3.2	3.3
<i>Sugarcane</i>	0.6	0.4	0.4
<i>Other</i>	2.9	2.7	2.8
Mining and quarrying	0.2	0.2	0.2
Manufacturing	13.4	12.9	12.6
<i>Sugar</i>	0.1	0.1	0.1
<i>Food exc Sugar</i>	4.8	4.6	4.5
<i>Textiles</i>	3.9	3.6	3.5
<i>Other</i>	4.6	4.6	4.6
Electricity, gas, steam and air conditioning supply	1.7	1.7	1.7
Water supply, sewerage, waste management and remediation activities	0.4	0.4	0.4
Construction	4.3	4.7	4.9
Wholesale & retail trade; repair of motor vehicles and motorcycles	12.2	12.4	12.4
Transportation and storage	6.4	6.4	6.5
Accommodation and food service activities	7.2	7.3	7.0
Information and communication	4.2	4.2	4.3
Financial and insurance activities	12.0	11.7	11.8
Real estate activities	5.9	5.9	5.9
Professional, scientific and technical activities	4.9	5.0	5.1
Administrative and support service activities	3.0	3.1	3.2
Public administration and defence; compulsory social security	6.3	6.2	6.2
Education	4.9	4.9	4.8
Human health and social work activities	4.4	4.5	4.6
Arts, entertainment and recreation	3.5	3.7	3.7
Other service activities	1.6	1.6	1.6
Gross Value Added at current basic prices	100.0	100.0	100.0

ILO definition of green jobs for policy purposes

- Jobs are green when they help reduce negative environmental impact ultimately leading to environmentally, economically and socially sustainable enterprises and economies.
- More precisely green jobs are **decent jobs** that:
 - Reduce consumption of energy and raw materials
 - Limit greenhouse gas emissions
 - Minimize waste and pollution
 - Protect and restore ecosystems

Promoting green businesses

- Sustainable agriculture: (adaptation)
 - Climate Smart Agriculture' project, bio farming zones; bio-production protocols, bio-food production and bio-farming certificate/label; 50% bio agricultural by year 2020; Bio-farming Promotion Scheme; Mauritius Good Agricultural Practices (Standards cover efficient use of resources; adoption of environmentally sound practices for natural resources; biodiversity preservation; pre and postharvest best practices; workers' health and safety; and agricultural waste recycling); Compost Subsidy Scheme and the Sheltered Farming Scheme
- Energy efficient manufacturing: (mitigation)
 - Mandatory Energy Efficiency Labelling of Electrical Appliances (refrigerating appliances, electric ovens, electric dishwashers Appliances); Mandatory Energy Audits, ; Mandatory Registration of Energy Auditors, and Monitoring of Energy in public sector buildings
- Clean energy sector
 - Small-Scale Distributed Generation (SSDG) scheme
 - 237 households, schools and public institutions to install small-scale (<50 kW) photovoltaic (PV) panels and wind turbines through the provision of a targeted feed-in tariff scheme
 - Master Plan for Energy Efficiency/Demand Side Management and Action Plan for the period 2016 to 2030
 - Mauritius Renewable Energy Agency (MARENA) –investment and the promotion of Renewable Energy Technologies and to facilitate the implementation of projects



Employment in environmental sector= $A \cup B$

Employment created thanks to greening = $A \cup B \cup D$

Green jobs (Sub-component of employment in environmental sector that is decent)= $(A \cup B) \cap C$

Green Jobs in the Agricultural Sector

Agriculture Sector	Jobs
Conventional: Product of agriculture (non-sugar)	15500
Green: Non-sugar - Products of agriculture, etc. (non-sugar)	830
Forestry	708
Conventional: Sugar cane	8167
Green: Sugar cane	833
Live animals and animal products	8000
Unsustainable (coastal fishing)	1800
Sustainable fishing (high seas and FADs)	4008
Aquaculture	410
Total employment in agricultural sector	40256
Green jobs	6748
%	16.7

Green Jobs in the Manufacturing Sector

Manufacturing Sector	Jobs
Meat, fruit, vegetables, oils and fats, grain mill products, starches and starch products and beverages	16000
Fish processing	3119
Sugar milling	1600
Conventional: Yarn and thread; woven and tufted textile fabrics	6396
Low Carbon: Yarn and thread; woven and tufted textile fabrics	850
Conventional: Knitted or crocheted fabrics, wearing apparel (SMES)	2445
Conventional: Knitted or crocheted fabrics, wearing apparel	16293
Low Carbon: Knitted or crocheted fabrics, wearing apparel	15299
Ship buildings	1451
Other manufactured goods	33549
Total manufacturing: 97001 Green/Low Carbon: 20867 % Green/Low Carbon: 21.5%	

% Green/Low Carbon: 21.5%

Green Jobs in the services sector

Sectors	Jobs	Sectors	Jobs
Wholesale and retail trade services	96200	Real estate services	1500
Food and beverage serving services excl hotel	16111	Telecommunications services; information retrieval and supply services	1820
Lodging and accommodation	23963	Travel Tour and Agency	2817
Lodging and accommodation (Low Carbon)	4200	Cleaning and Landscaping	2370
Sea transports	396	Other bus. Ser.	3331
Sightseeing boats	1980	Public administration and other services to the community as a whole; compulsory social security services	4430
Storage and freeport infrastructure	2772	Education services	3180
Cargo handling	3168	Health and social services	2020
Transport services: Land and ocean	11880	Sewage and refuse disposal, sanitation and other environmental protection services	883
Shipping agents	75	Services of membership organizations	2000
Passenger air transport services	11880	Land-based Sports and Recreation activities	6325
Land transport excl public transport	3199	Ocean-based Sports and recreation activities	2711
Public transport	4261	Other amusement activities	2711
Gas and air conditioning	739	Other services	3100
Financial intermediation, insurance, and auxiliary services	13900		
Total 394853			
Green Jobs 23126			
% of Green Jobs 5.86%			

Green jobs in the renewable energy sector

- The employment in the electricity sector stood at 1641 in 2019 and the renewable component employs 23.8%, i.e., around 390.

Greenhouse Gases (GHGs) in Mauritius

GHGs in Mauritius 2019

	Gg CO ₂ -eq	CO ₂	CH ₄	N ₂ O	HFCs
Energy	4288.79	4227.48	0.86	0.14	0
Industrial Processes and Product Use (IPPU)	48.77	36.72		0	12.05
Agriculture and Forestry and Other Land Use (AFOLU)	116.37	0	1.06	0.30	0
Waste	1323.12	0	61.92	0.07	0

	Gg CO ₂ -eq
Electricity generation	2449.9
Manufacturing industries and construction	355.78
Transport	1131.99
Others (residential, commercial and agriculture)	351.12

Types of fossil fuel across sectors in Mauritius 2019

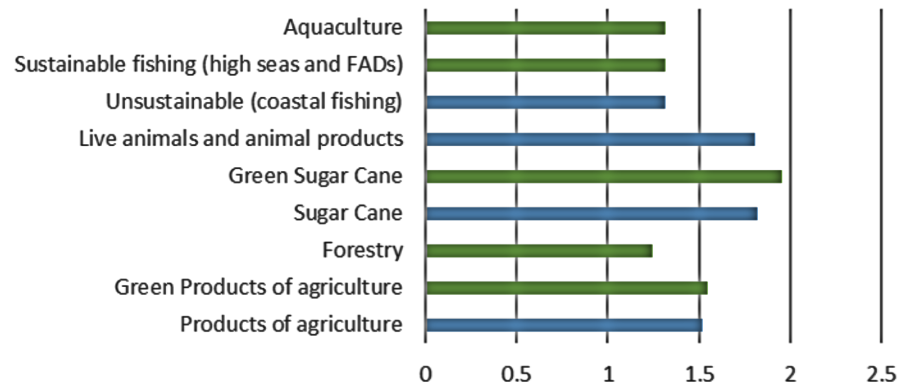
Types of fuel	Man.	Transport			Com. And Dist. Trade	House.	Agri.	Elec.	Others	Total
		Land	Air	Sea						
Fuel oil	38926			4459				273117		316502
Diesel oil	37810	179356		1655			2040	659		221520
Gasolene	0	188824		4645						193469
LPG	6518	3052			22668	51780			348	84366
Coal	29668							634238		663906
Fuelwood	1100					10120				11220
Kerosene			146851			3.7		3709		150564
Charcoal					350					350
Electricity	990.5				1006.4	947.2	19.1		37.6	3001
Bagasse	104285							1001810		1106095

Terminologies

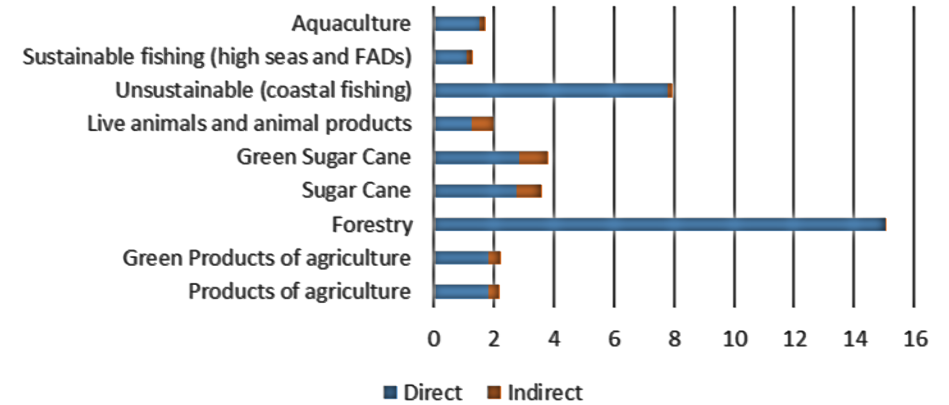
Direct Impact	The impact on output, employment, and CO ₂ eq. emission in any sector as a result of an increase in final demand from that sector
Indirect Impact	The impact on output, employment, and CO ₂ eq. emission of other sectors, through the supply chain, because of an increase in final demand of a particular sector.
Induced impact	The impact of output, employment, and CO ₂ eq. as a result of changes in final demand in the economy due to a change in the level of income which emanates from an initial change in final demand of any sector.

Agricultural sector

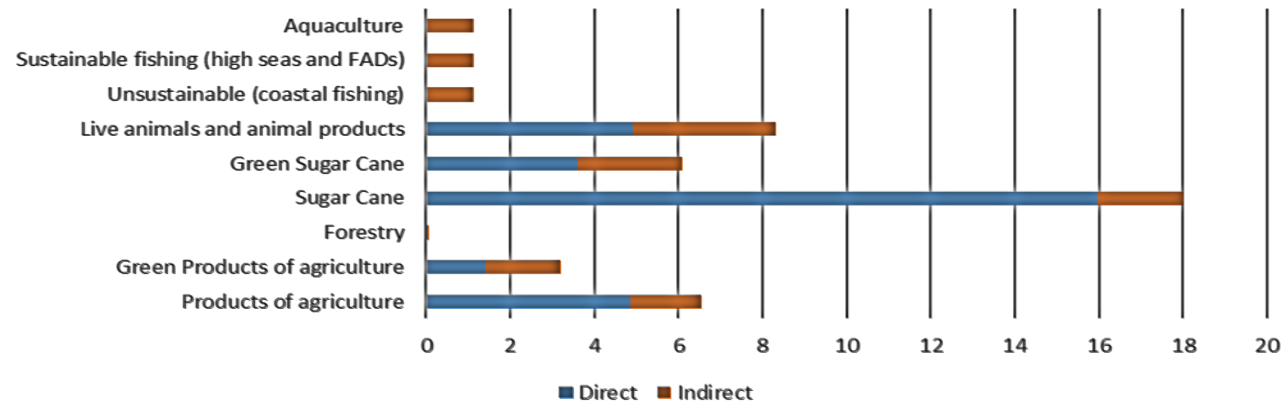
Output multipliers



Emp. multipliers

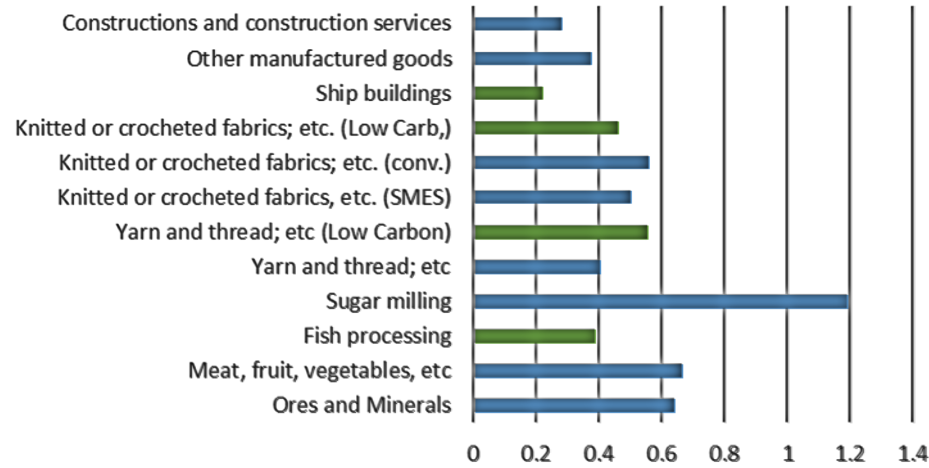


tCO2 equ. in per Rs million

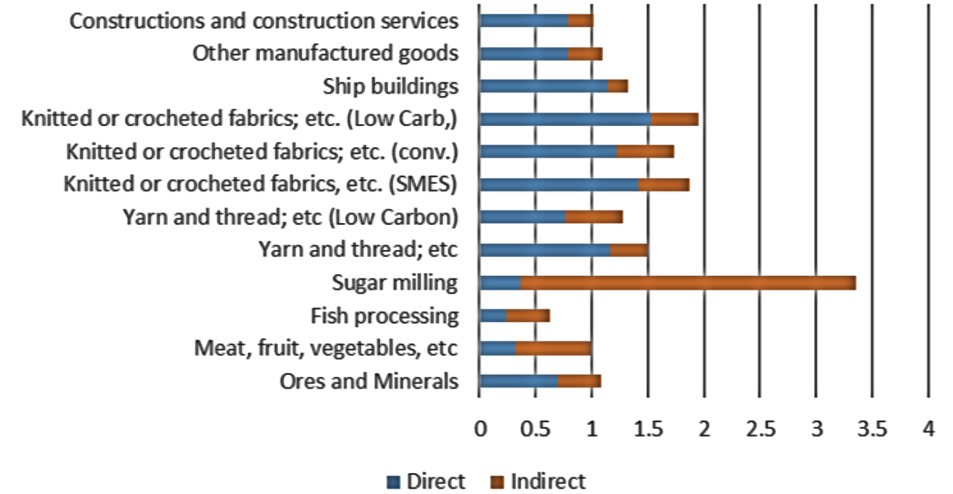


Manufacturing sector

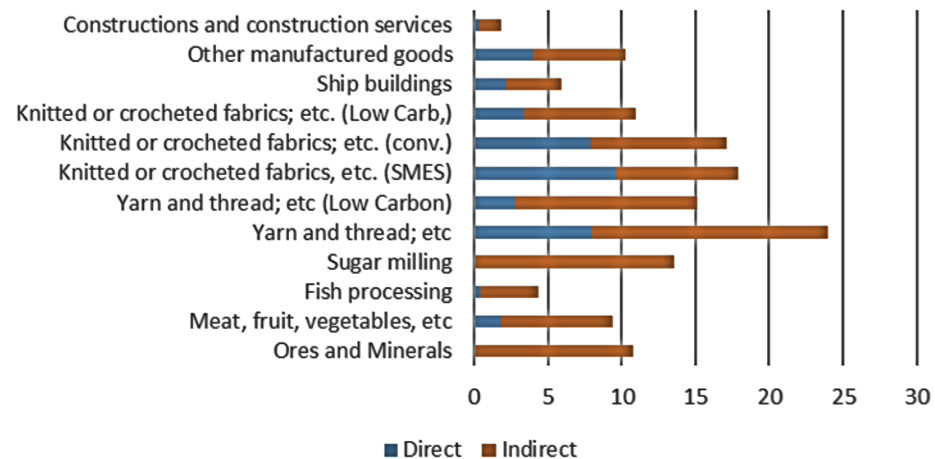
Output multipliers



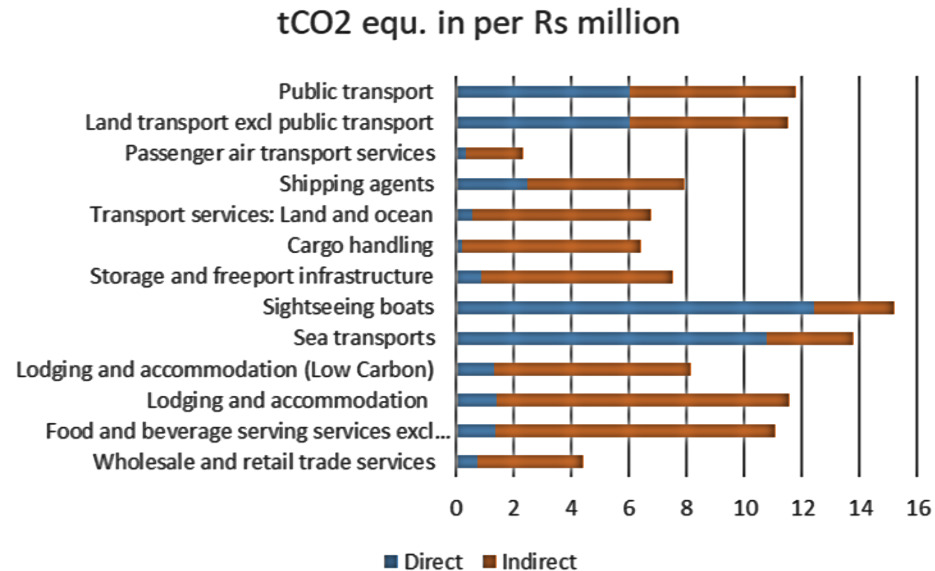
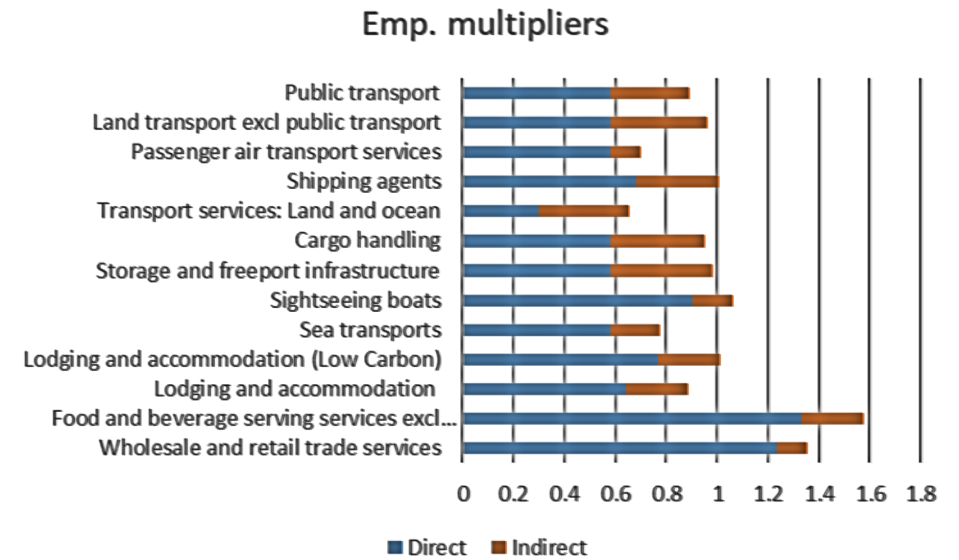
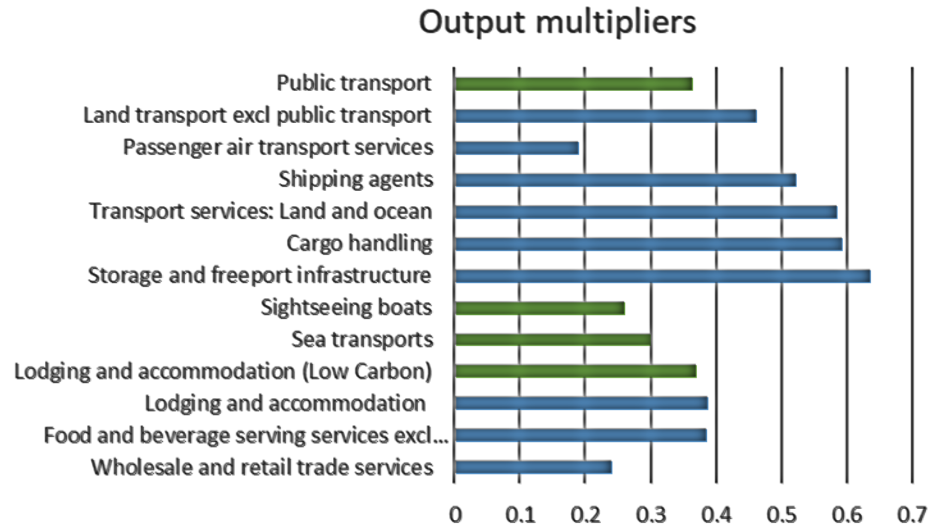
Emp. multipliers



tCO2 equ. in per Rs million

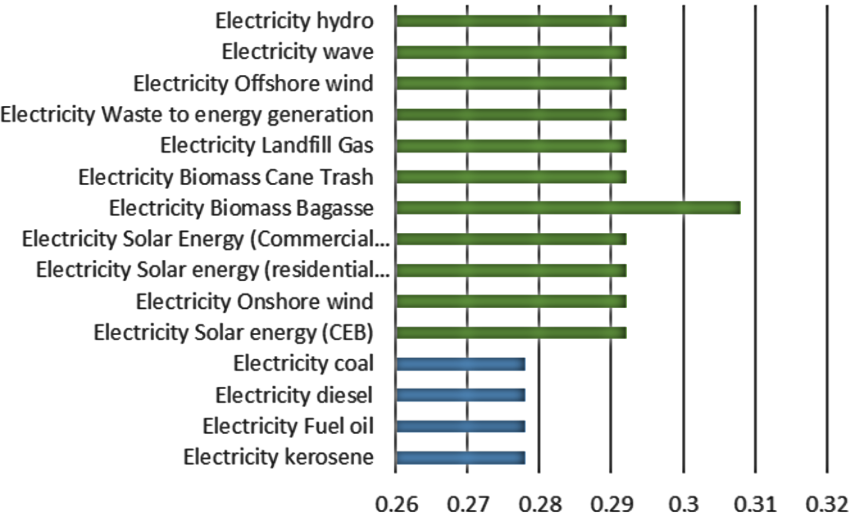


Services sector

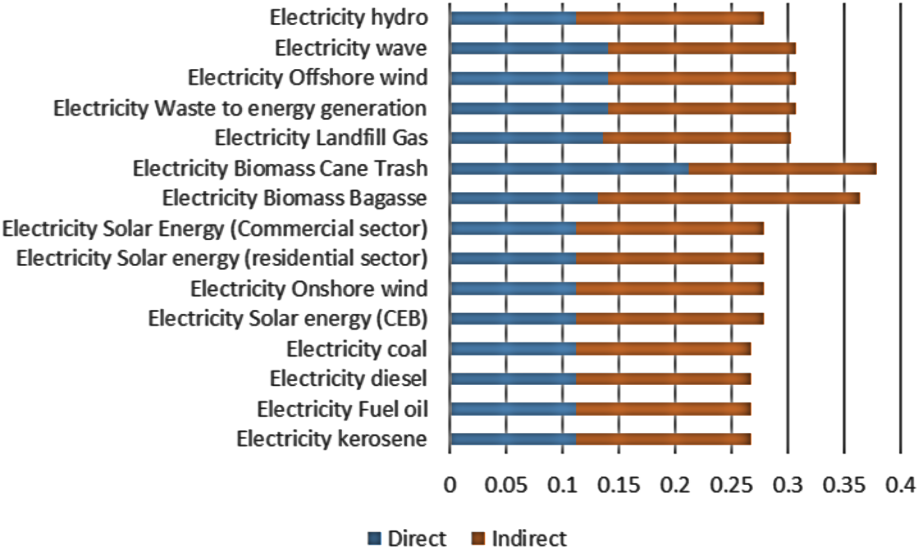


Renewable energy

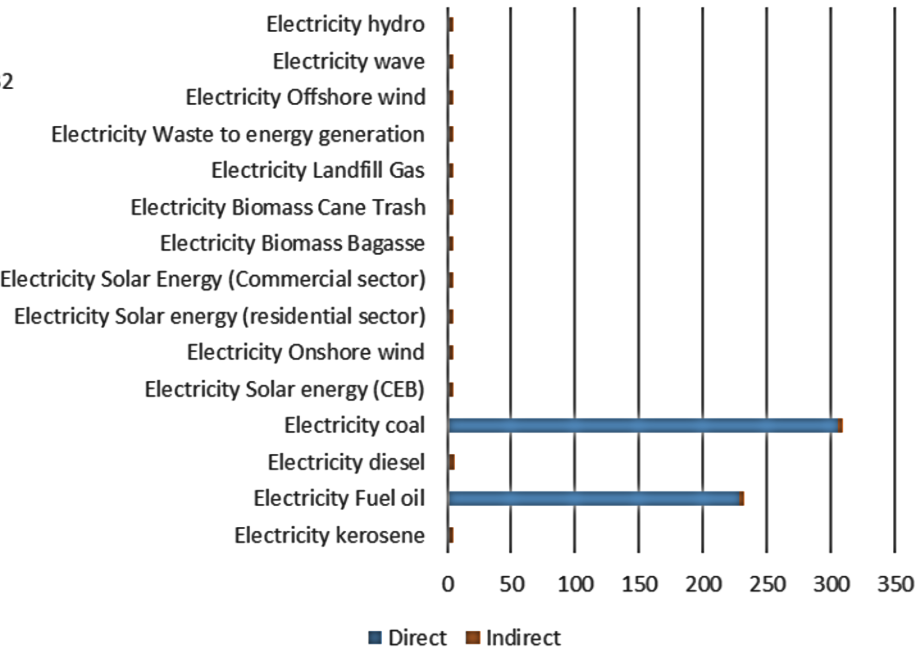
Output multipliers



Emp. multipliers



tCO2 equ. in per Rs million

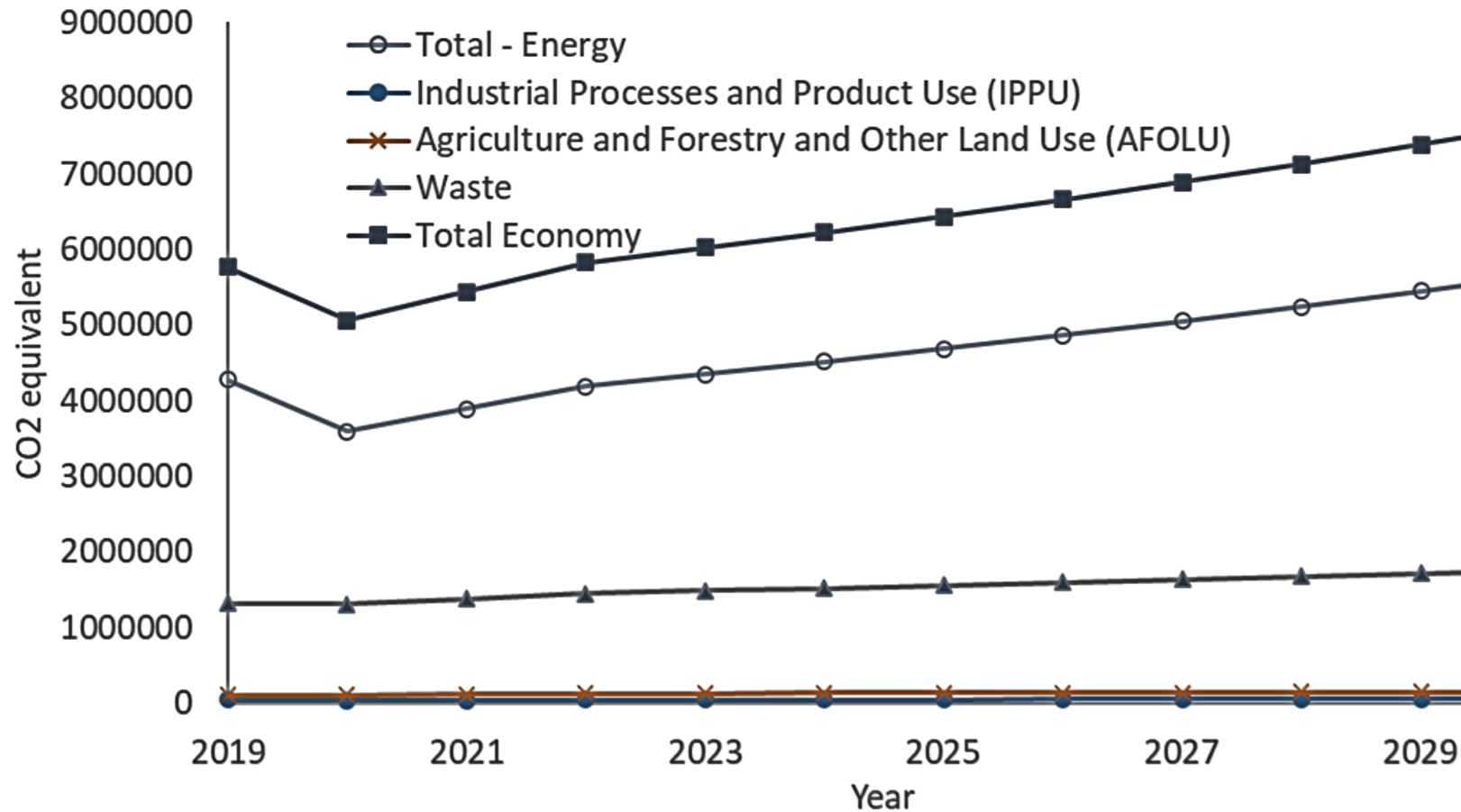


Modelling the green jobs and low carbon economy – baseline

2021-2030

Gross Value Added (GVA) at basic prices	-15%	8%	8%	4%
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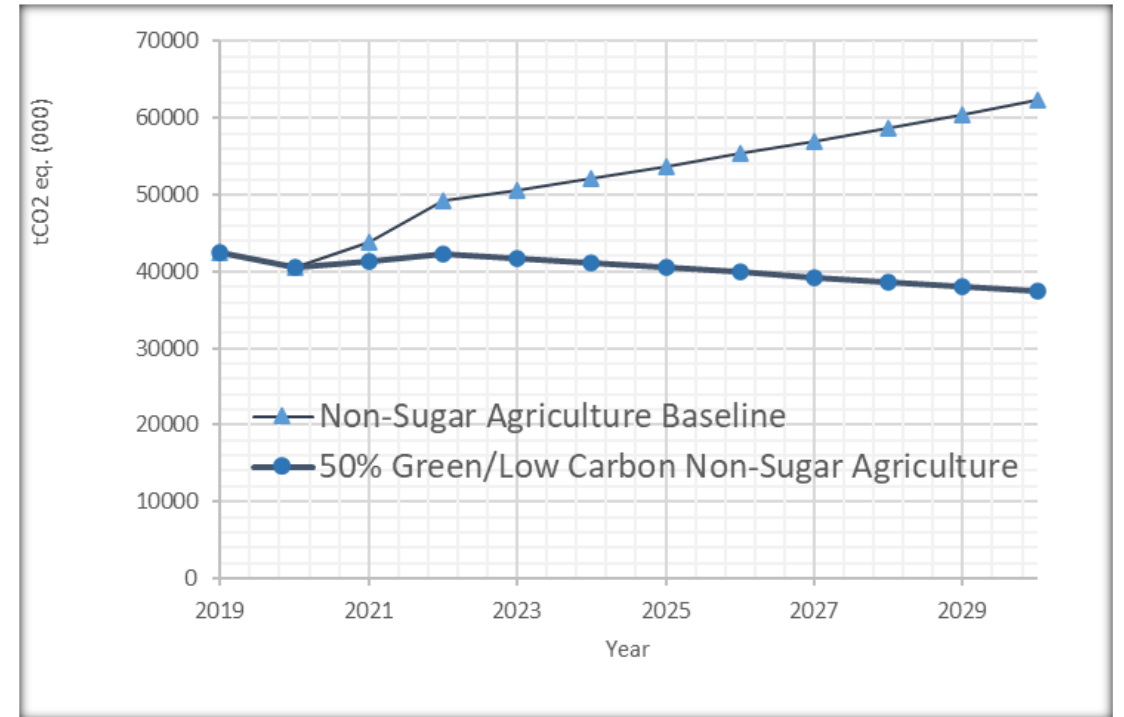
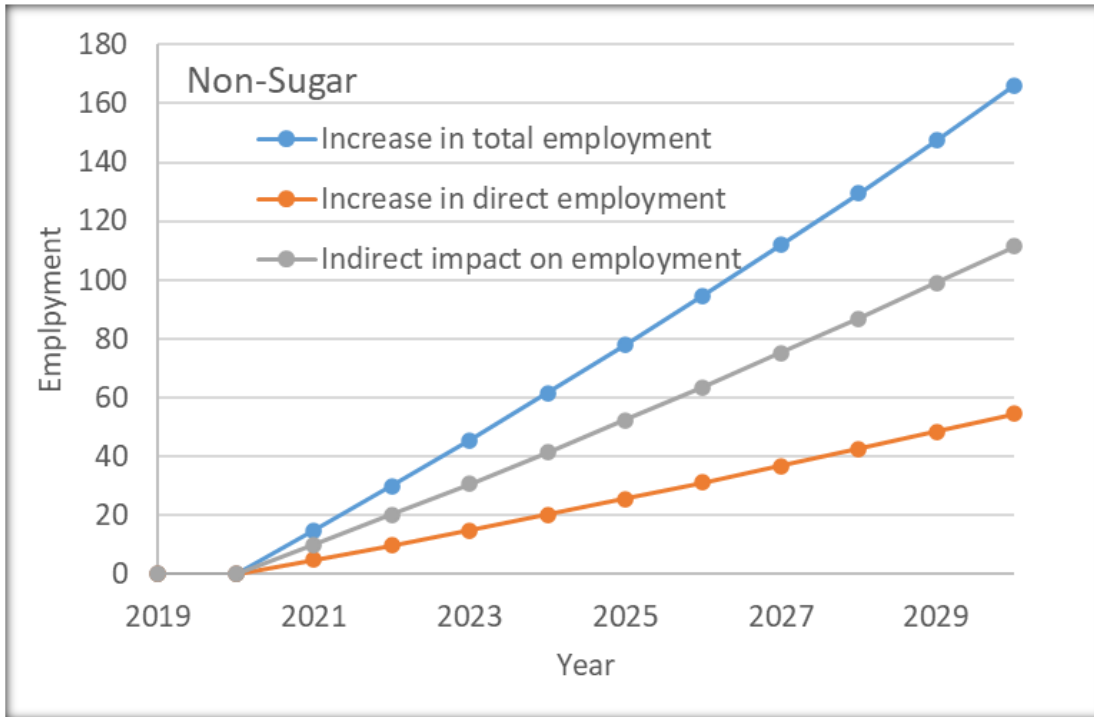
GHGs emission from the baseline scenario



Green/Low Carbon Strategy for Mauritius

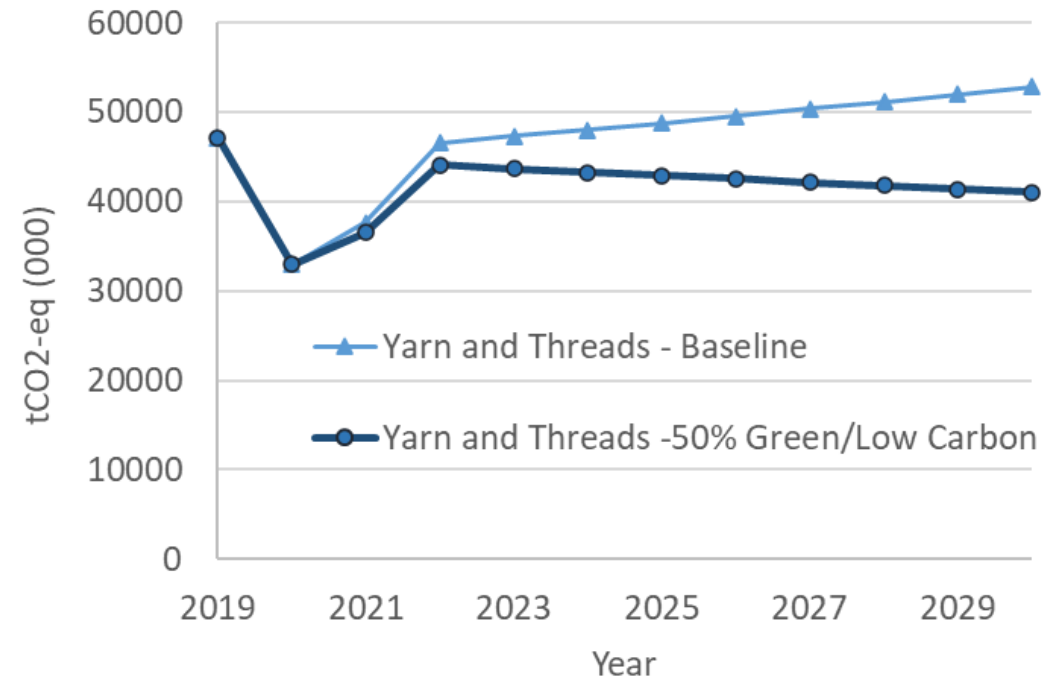
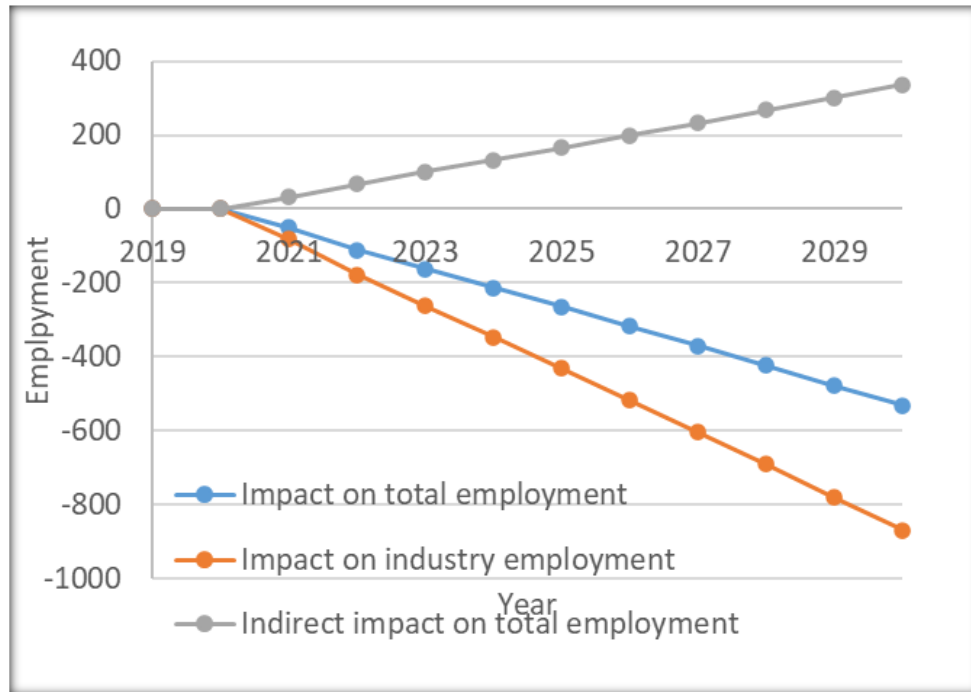
- The Green/Low Carbon Strategy for Mauritius considers four (4) main sectors: agriculture (sugar and non-sugar), manufacturing textile sector, tourism and electricity. For each sector, a Green/Low Carbon scenario is constructed.
- **Agriculture - non-sugar:** The current green output is estimated at 5% of the total. The Strategy is to attain 50% organic agriculture by 2030.
- **Sugar-sector:** The target is to reach 50% green/low carbon sugar cane cultivation by 2030.
- **Manufacturing textile – Yarn and Threads Fabrics, etc.:** The current green/low carbon output is estimated at 13%. The Green/Low Carbon Strategy sets a target of achieving 50% by 2030.
- **Manufacturing textile sector – Knitted and Threads, etc.:** Currently, 43% of output is classified as green/low carbon. The target is to reach 75% in 2030.
- **Hotels and Accommodation sector:** The target is to achieve 50% of output from a low carbon activity.
- **Electricity sector:** a target to reach 35% in 2025 and 40% in 2030.

The Strategy is to attain 50% organic agriculture by 2030

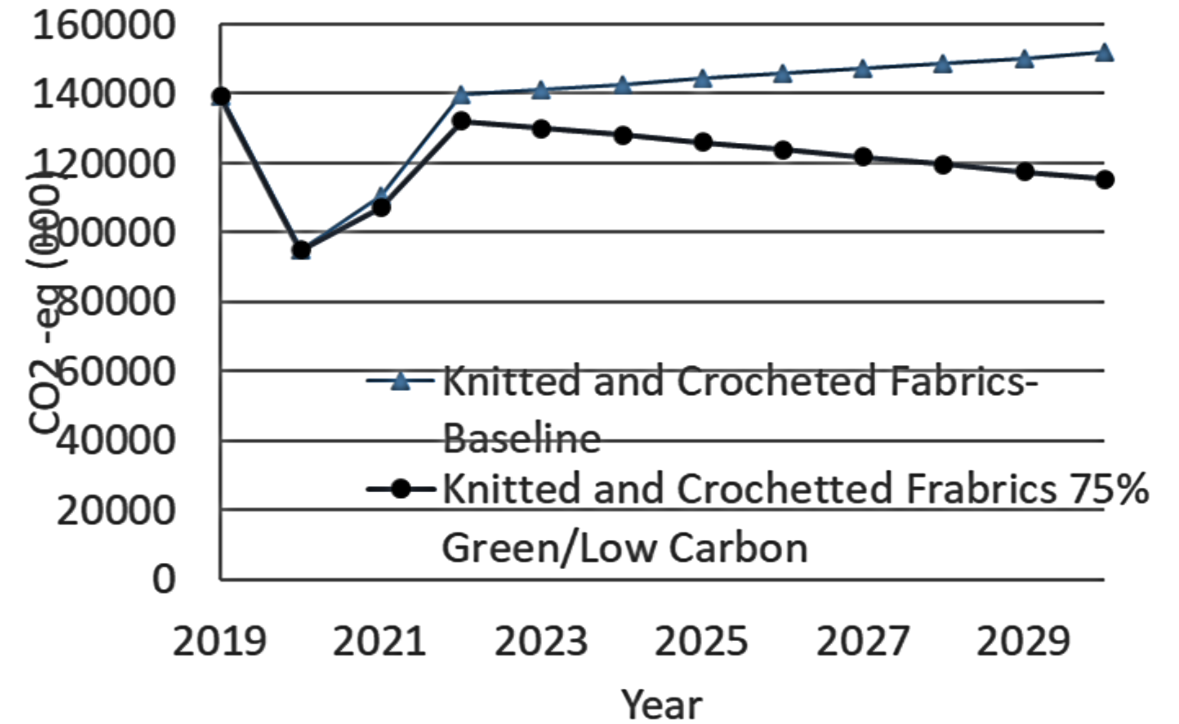
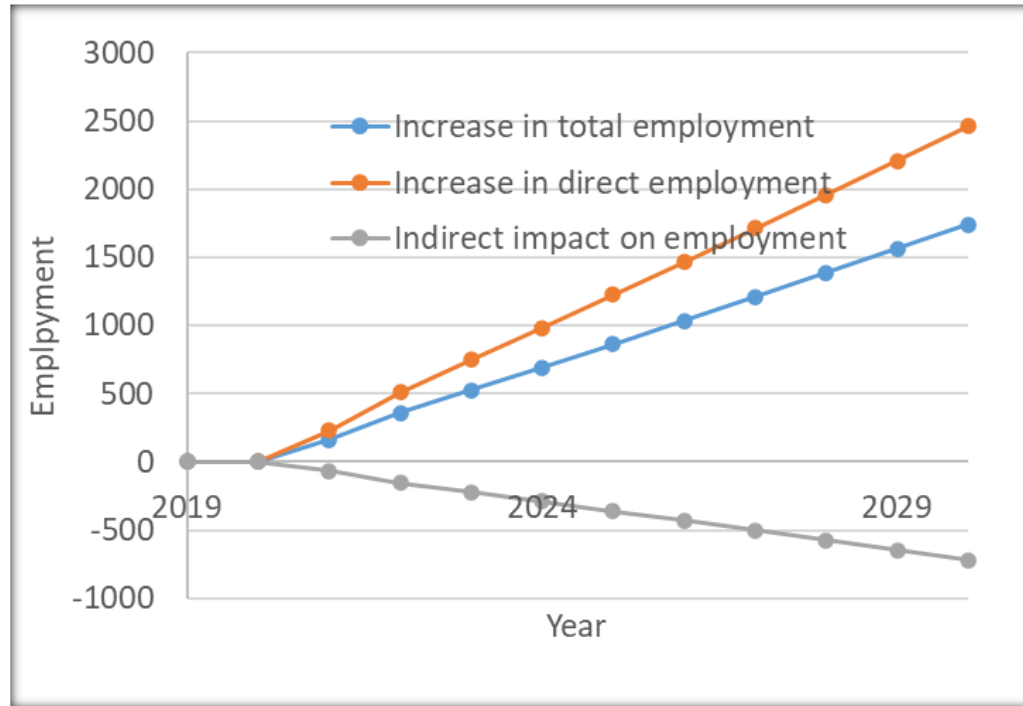


The Green/Low Carbon Strategy sets a target of achieving 50% by 2030 Yarn and Threads

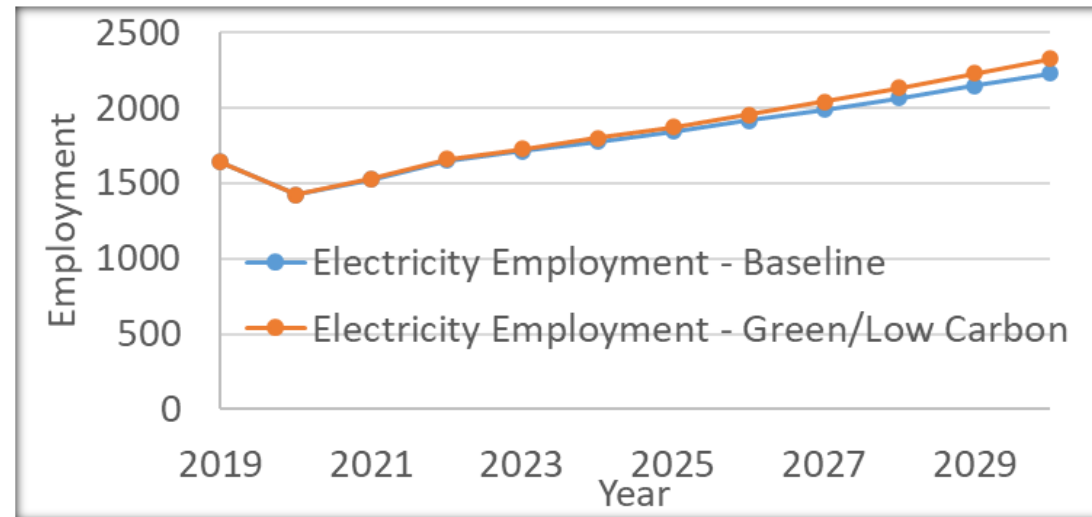
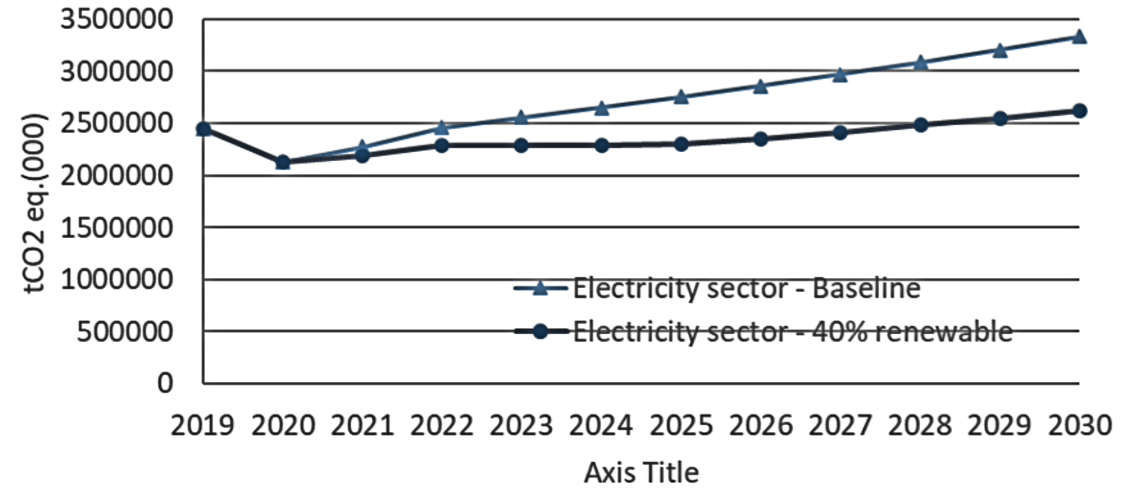
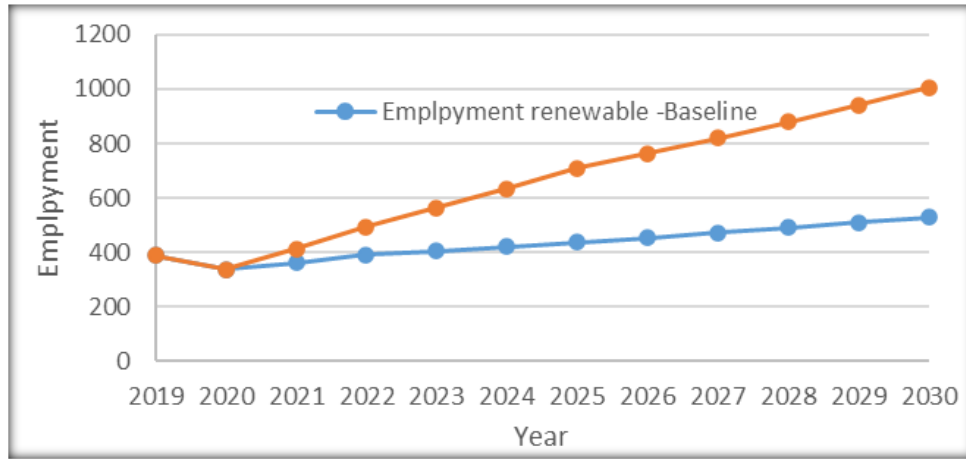
The current green/low carbon output is estimated at 13%.



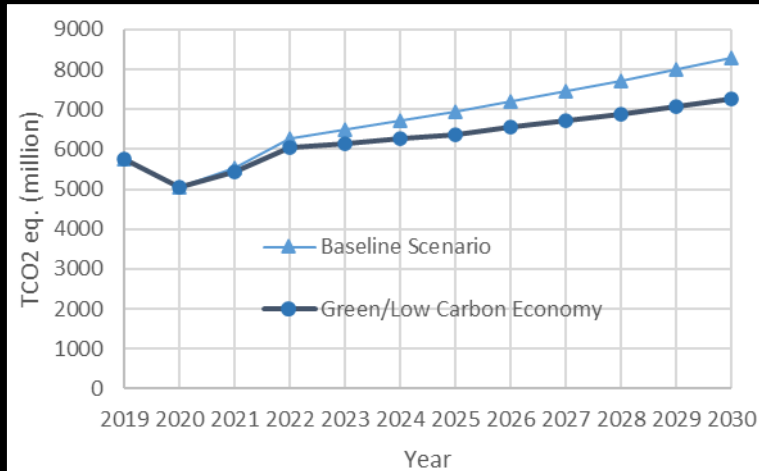
Green/low carbon Knitted and Crocheted Fabrics



Renewable energy: a target to reach 35% in 2025 and 40% in 2030.



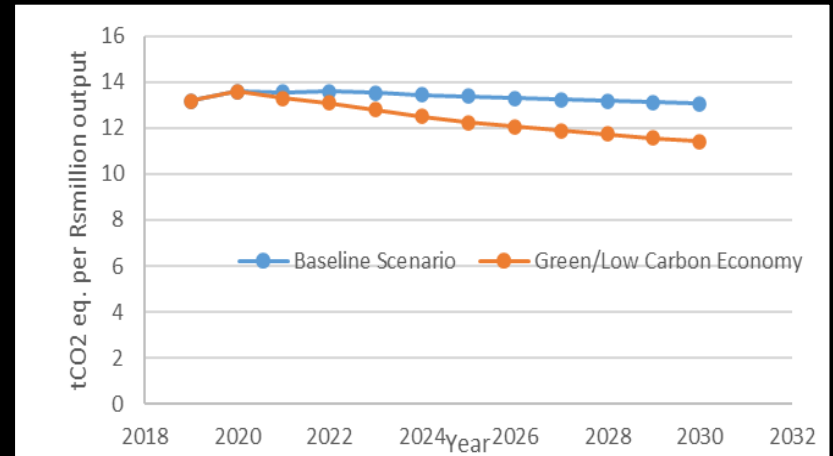
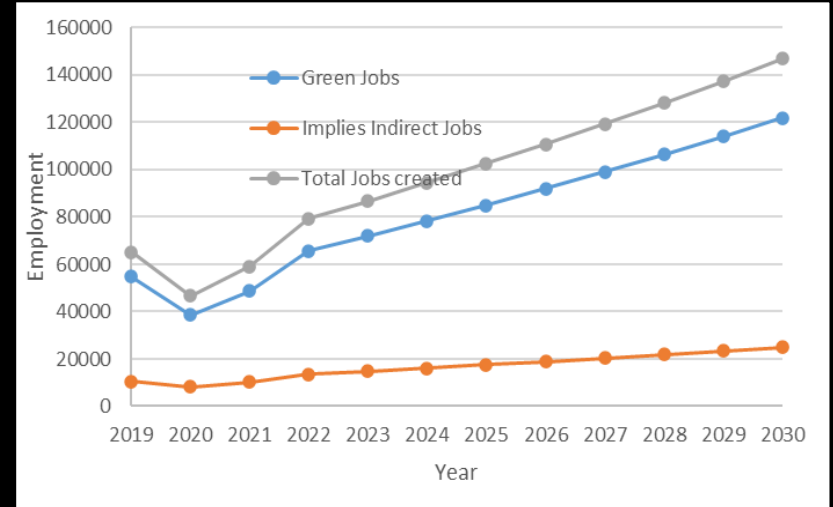
Economy-wide impacts



In a no-action scenario, the total tCO₂ for Mauritius would increase by 43.5% by 2030, while the the Green/Low Carbon Strategy would lead to a rise by 25.9%.

The Green/Low Carbon Scenario leads to 126410 people working in the green sectors by 2030.

The associated indirect jobs stands at 24400, leading to the conclusion that at least 151000 jobs are linked to the strategy



Conclusion

- Investment in a business climate towards a greener/low carbon economy could be a driver for the economic recovery post COVID-19
- Future work: carried a concise assessment of economic recovery and determine the economic strategies and policies