Trade in Renewable Energies Goods

International trade flows and employment impacts for Australia, China, Japan, South Asia, and East Asia and Pacific

1. Introduction

The United Nations' Sustainable Development Goals (SDGs), established in 2015, describe the priorities to be pursued in order to enhance the quality of life of individuals and ensure the conservation of the planet's resources. The seventh goal refers to the provision of affordable and clean energy for the world population, and this goal consolidates the goal of an equitable, efficient and sustainable energy system. At present, while 90 per cent of the global population has access to electricity, more than 750 million people still do not. In order to meet the global electrification target, the world's electrification growth rate would have to reach 0.9 per cent per year (IEA, 2024).

Nevertheless, the world is facing a critical environmental situation. As stated in the IPCC's (2023) latest report, it is imperative that greenhouse gas (GHG) emissions are reduced by 30-50 per cent in the next two decades to prevent a rise in global temperatures above 1.5°C. The consequences of climate change are becoming increasingly evident, with a range of impacts already being observed. These include rising global temperatures, melting ice at the poles and warming oceans. This has resulted in an increased frequency and intensity of natural disasters, such as floods, droughts, hurricanes and other extreme weather events. In the current context, the energy sector is of utmost importance for the decarbonisation process, as it generates a large amount of direct greenhouse gas emissions through the consumption of fossil fuels. Globally, the majority of power generation is carried out using fossil fuels, such as coal, oil and gas, which account for 40 per cent of CO2 emissions (IEA, 2024).

In view of the challenges that have been identified, it is clear that the role of renewable energy is key to achieving these objectives of electrification, contributing to the phase-out of other more contaminant sources, such as coal and petroleum. At present, renewable energy accounts for 30 per cent of energy consumption in the electricity sector. Solar energy accounted for over 37 per cent of the total installed renewable energy capacity, while wind energy contributed around 33 per cent by 2024. Together, these sources account for over 70 per cent of the global renewable energy capacity (IRENA, 2024). With regard to biofuels, it is estimated that they constituted 9 per cent of renewable energy consumption in 2022, and they play a significant role in the utilisation of alternative energy in the transport sector (WBA, 2024). This form of energy can be regarded as a sustainable alternative in regions where electrification has yet to be accomplished.

Several global initiatives play a key role in driving the energy transition worldwide. The U.S. Inflation Reduction Act[1] (IRA) represents one of the most ambitious national climate policies to date, with roughly USD 369 billion allocated through 2032, it extends and expands tax credits for solar, wind, energy storage, hydrogen, and domestic clean energy manufacturing. The Africa Renewable Energy Initiative[2] (AREI) aims to add at least 300 GW of renewable capacity by 2030, significantly increasing access to sustainable energy across the African

[1] https://www.energy.gov/lpo/inflation-reduction-act-2022

[2] https://www.arei.info/eng

continent. Europe's ambitious European Green Deal[3], along with the recent REPowerEU initiative, seeks rapid acceleration in renewable energy deployment and energy efficiency to achieve climate neutrality by 2050 and reduce dependence on fossil fuels. Meanwhile, the International Solar Alliance[4] (ISA)—led by India and France—facilitates large-scale solar energy expansion, especially in developing regions.

This note examines international trade and employment patterns in goods associated with these types of renewable energies (REG) from 2012 to 2023, with a particular focus on Australia, China, Japan, and the regions of South Asia and East Asia and the Pacific, excluding the referred individual countries. The estimations were made using comprehensive international trade flow data (WITS/COMTRADE) integrated with the European Union (EU) list of renewables goods. A multi-regional input-output (MRIO) model is employed to estimate the employment impacts associated with exports of renewable goods. This model integrates the OECD Inter-Country Input-Output Tables with labour statistics from the International Labour Organization's Statistics Database (ILOSTAT). This methodological approach enables the estimation of both direct and indirect employment effects across countries and sectors.

[3] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en

[4] https://isa.int/

2. The International Trade in renewables energies goods

To estimate REG flows by origin and destination, we used UN Comtrade bilateral data for 2012-2023. UN Comtrade data provides detailed information on bilateral export (FOB) and import (CIF) values and quantities at the HS 6-digit level for approximately 178 countries.

In this document we follow classification utilized by the European Union (EU) to determine the list of products associated with renewable energies. The EU list contains a bundle of products to assess its progress in the world trade of renewables, including those derived from liquid biofuels, solar energy and wind energy[5]. Table 1 displays the details of the products selected for analysis.

Table 1: Product selected based on EU list of renewables

Type of energy	HS Rev. 2012 Product Code	Description
Solar energy	854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes
Wind energy	850231	Wind-powered
Biofuels	220720	Ethyl alcohol and other spirits, denatured, of any strength
	290919	Other
	382600	Biodiesel and mixtures thereof, not containing or containing less than 70 % by weight of petroleum oils or oils obtained from bituminous minerals.

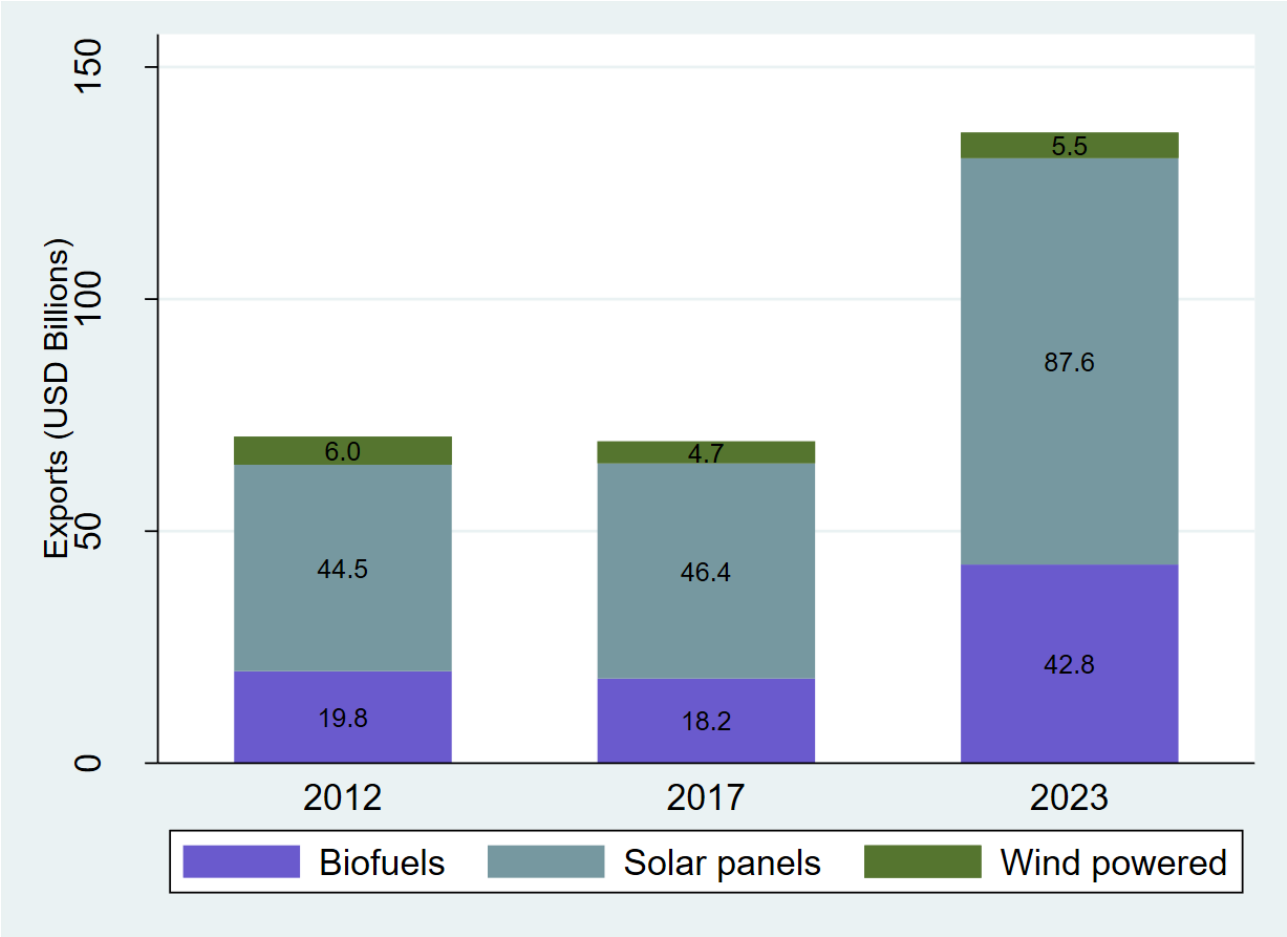
Source: European Commission (2024).

As illustrated in Figure 1, there has been significant growth in trade related to REG between 2017 and 2023. Exports increased by more than twofold between 2017 and 2023, primarily due to a surge in exports of solar panels and biofuels. The increase was significant in the field of biofuels, with a notable 116 per cent growth observed between 2012 and 2023. Solar panels also showed substantial growth, with a 96.8 per cent surge during the same period. From 2012 to 2023, global trade in wind turbines saw a modest decrease, with a decline from USD 6.5 billion to USD 5.5 billion, representing a 9.2 per cent reduction. However, from 2017 to 2023, there was a significant recovery, with trade volume increasing by 16.8 per cent, indicating a resurgence over the last five years.

[5] For more information see: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20241014-1

However, despite notable increases in solar energy and biofuels products, the share of these products in world trade is still not significant. Despite an encouraging trend between 2012 and 2023, these products account for no more than 1 per cent of world trade. At the beginning of the period under consideration, according to the WITS/COMTRADE database, the share was 0.46 per cent, while by 2023 these products had a share in global trade of 0.65 per cent.

Figure 1: Renewable energy goods global trade in 2012, 2017 and 2023. Current prices in United States dollars (USD Billions)

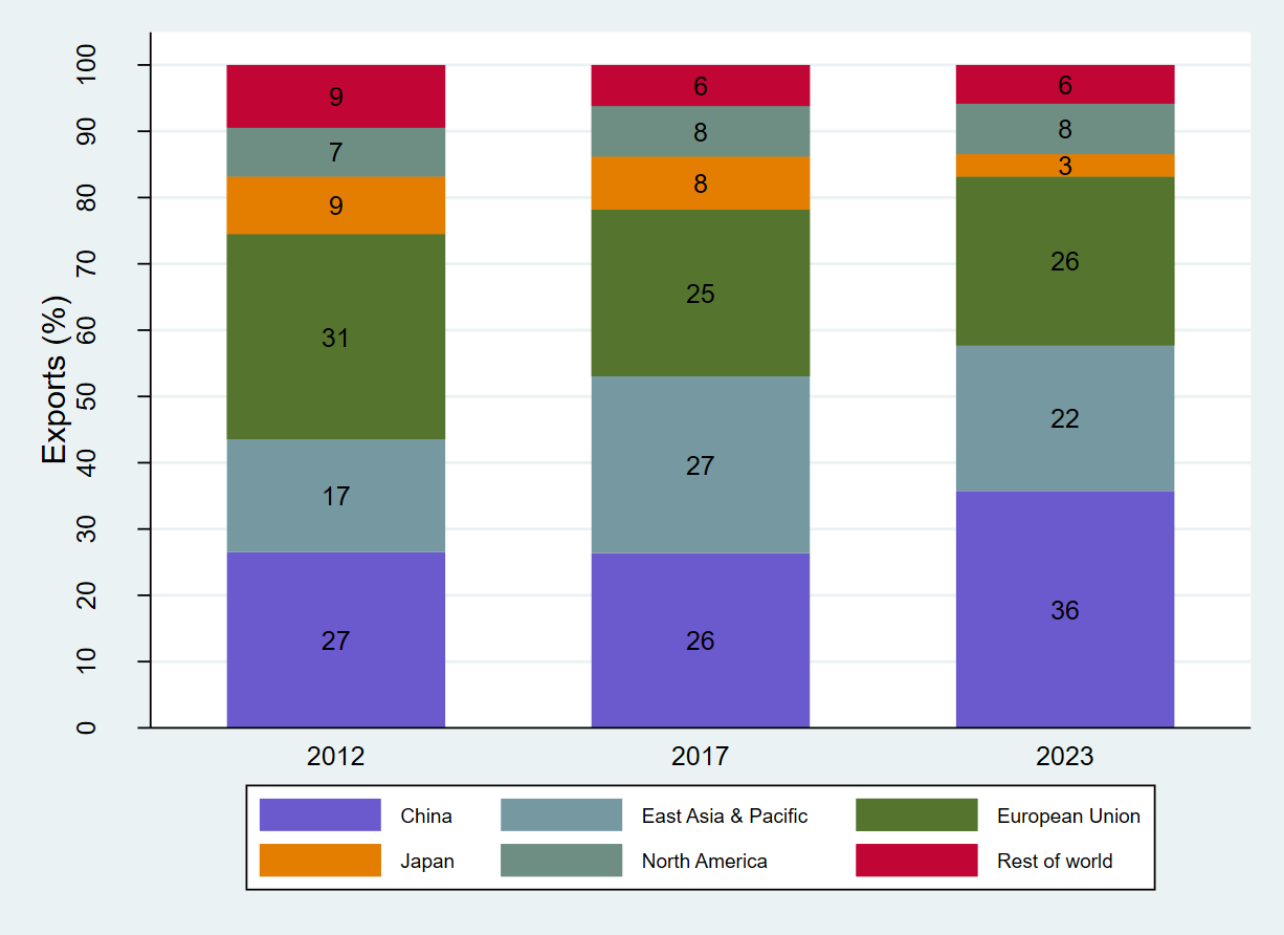


Source: Author estimates based on the WITS/COMTRADE database.

Over the past decade, China has firmly established its dominance in the global export market in REG. As illustrated in Figure 2, China's share of global exports grew from 27 per cent in 2012 to 36 per cent in 2023. In contrast, the export share of the European Union decreased to 25 per cent in 2023.

North America's share of global export REG has remained consistent at around 8 per cent over the past decade. Meanwhile, Japan has experienced a significant decline in its export share, dropping from 9 per cent in 2012 to 3 per cent in 2023, reflecting challenges in maintaining competitiveness in the evolving global market.

Figure 2: Exports of REG products by regions in 2012, 2017 and 2023 (as percentage of the total)



Note: Countries that are presented individually (e.g. Japan) are not included in the broader regional aggregation.

Source: Author estimates based on the WITS/COMTRADE database.

As shown in Table 2, the distribution of exports and imports by energy type varies significantly between regions and countries. With regard to biofuels, the European Union (EU) is the leading global exporter and importer, with each transaction valued at over USD 19,000 million. North America (USD 6,126 Million) and China (USD

2,200 Million) follow as the second and third exporters, respectively, while North America (USD 3,241 Million) and East Asia and Pacific (USD 1,958 Million) are the primary importers after the EU (USD 21,780).

In terms of trade balance, North America (USD 2,884 Million) and China (USD 1,647 Million) exhibit the most substantial surpluses, followed by East Asia and the Pacific with USD 106 Million. The European Union, conversely, has the most substantial deficit (USD 1,869 Million), followed by Japan (USD 1,289 Million).

In terms of the solar panel market, China emerges as the predominant exporter, with exports surpassing USD 29 billion. The East Asia and Pacific region followed closely behind with exports totaling around USD 18.4 billion in 2023. Notably, the European Union and the East Asia and Pacific region were the main importers, with imports totaling USD 17.415 billion and USD 11.992 billion respectively in 2023.

China's substantial share of global solar panel exports has resulted in a surplus of over USD 24.8 billion, followed by East Asia and the Pacific region and Japan with surpluses of USD 6.5 billion and USD 2.6 billion, respectively. In contrast, the European Union and North America have the highest deficits, at more than USD 9 billion each.

When it comes to wind energy exports, the European Union, China and South Asia stand out as the main exporters. As shown in Table 2, the EU and China together account for over 93 per cent of global exports. In terms of imports, the Rest of the World (ROW) accounts for over 47 per cent of the total, with more than USD 2,900 million, followed by the EU and East Asia and the Pacific with USD 1,600 million and USD 670 million, respectively.

In Australia's case, solar panels and wind turbines are the most significant products, representing 2.3 per cent and 2.2 per cent of total world imports, respectively. In terms of exports, Australia plays a comparatively negligible role in relation to other countries and regions.

Table 2: Exports, imports and trade balance for RE in 2023

Energy	Region	Exports		Imports		Trade Balance
		Value (USD Millions)	Per cent (%)	Value (USD Millions)	Per cent (%)	Value (USD Millions)
Biofuels	**Australia**	**12**	**0.0%**	**6**	**0.0%**	**6**
	China	**2,200**	**6.5%**	**552**	**1.6%**	**1,647**
	East Asia & Pacific	**2,066**	**6.1%**	**1,958**	**5.8%**	**108**
	European Union	19,911	58.5%	21,780	64.0%	-1,869
	Japan	**155**	**0.5%**	**1,443**	**4.2%**	**-1,289**
	North America	6,126	18.0%	3,241	9.5%	2,884
	South Asia	**301**	**0.9%**	**322**	**0.9%**	**-21**
	ROW	3,256	9.6%	4,724	13.9%	-1,471
	World	**34,027**		**34,027**		

Solar panels	**Australia**	**16**	**0.0%**	**1,427**	**2.3%**	**-1,411**
	China	**29,732**	**47.3%**	**4,845**	**7.7%**	**24,887**
	East Asia & Pacific	**18,461**	**29.4%**	**11,992**	**19.1%**	**6,468**
	European Union	6,567	10.4%	17,415	27.7%	-10,847
	Japan	**5,498**	**8.7%**	**2,909**	**4.6%**	**2,589**
	North America	1,100	1.7%	10,964	17.4%	-9,865
	South Asia	**539**	**0.9%**	**3,517**	**5.6%**	**-2,978**
	ROW	978	1.5%	9,820	15.6%	-8,849
	World	**62,890**		**62,890**		
Wind powered	**Australia**	**0**	**0.0%**	**139**	**2.2%**	**-139**
	China	**2,498**	**40.3%**	**5**	**0.1%**	**2,493**
	East Asia & Pacific	**27**	**0.4%**	**678**	**10.9%**	**-651**
	European Union	3,273	52.8%	1,648	26.6%	1,625
	Japan	**1**	**0.0%**	**176**	**2.8%**	**-175**
	North America	53	0.8%	505	8.1%	-452
	South Asia	**277**	**4.5%**	**101**	**1.6%**	**177**
	ROW	69	1.1%	2,947	47.6%	-2,878
	World	**6,198**		**6,198**		
Total		**103,115**		**103,115**		

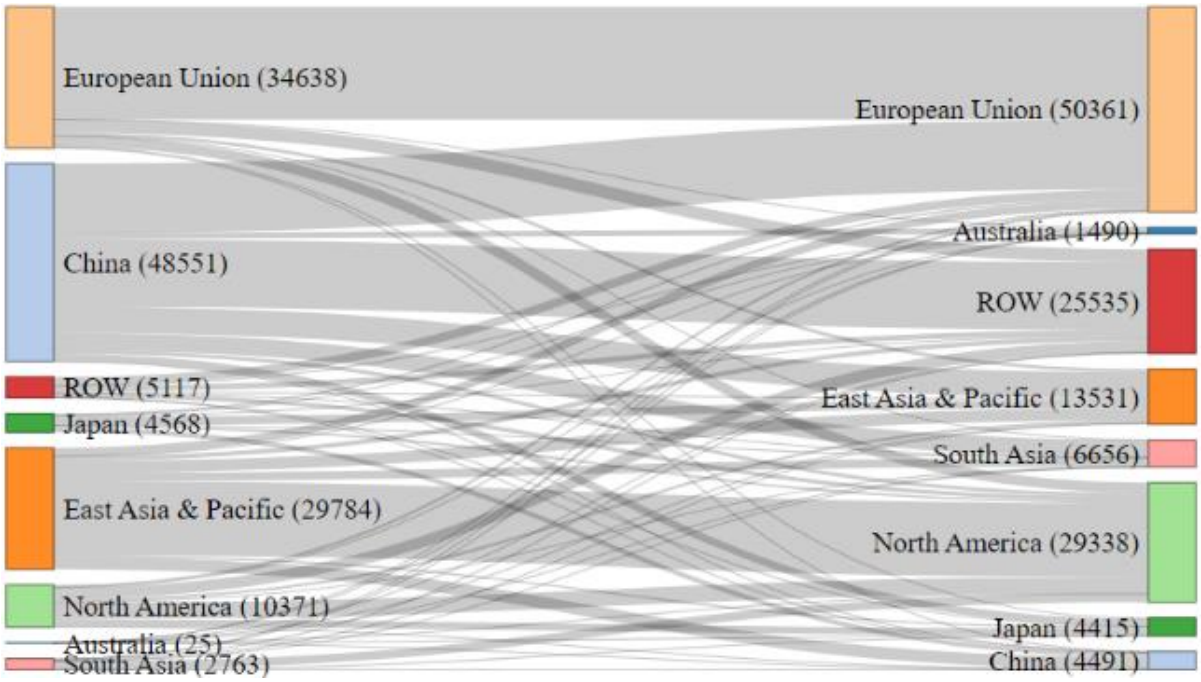
Note: Countries that are presented individually (e.g. Japan) are not included in the broader regional aggregation.

Source: Author estimates based on the WITS/COMTRADE database, 2023.

Figure 3 depicts a Sankey diagram of the world trade in REG, divided by region and country. Trade flows are illustrated as moving from exports on the left to imports on the right. Exports from Australia were predominantly directed towards South Asia and East Asia and the Pacific region. The analysis of China's trade flows reveal that primary export destinations are the European Union (USD 17,128 Million), ROW (USD 16,601 Million), and East Asia and the Pacific (USD 6,385 Million). On a smaller scale, exports from China primarily went to South Asia and Japan.

In the case of East Asia and the Pacific, the main destinations are North America (USD 18,133 Million), China (USD 2,966 Million), and the region itself (USD 2,922 Million). For Japan, East Asia and the Pacific is the most significant destination of its exports (USD 2,052 Million). For South Asia, North America emerges as the primary destination, with exports amounting to over USD 2,054 Million by 2023. The chart also reveals the considerable trade surplus in China and East Asia and the Pacific, which was offset by a substantial trade deficit in North America and the European Union, as previously mentioned.

Figure 3: World trade in RE goods in United States million dollars, Sankey diagram by region, 2023



Note: Countries that are presented individually (e.g. Japan) are not included in the broader regional aggregation.

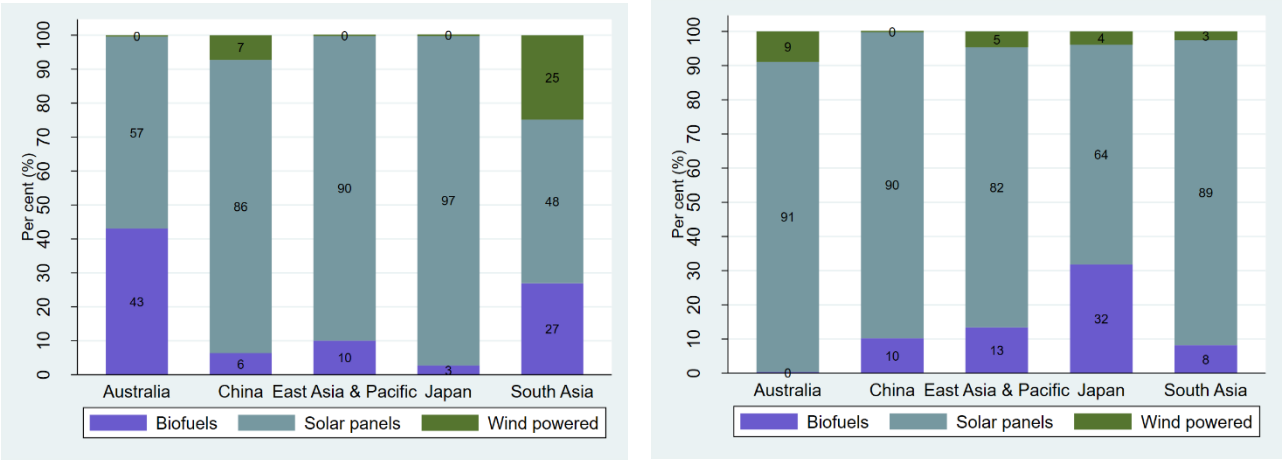
Source: Author estimates based on the WITS/COMTRADE database.

As previously mentioned, the data reveal that China, East Asia and the Pacific are the regions that exhibit the highest participation in the exports of renewable energy products. Figure 4 provides a detailed breakdown of the analysis by energy type. This graph reveals that solar panels accounted for the largest share of average trade flows between 2019 and 2023. Figure 4a shows that, in terms of exports, biofuels contribute a more substantial share to Australia and South Asia than to other regions and countries under scrutiny. Conversely, wind energy turbines constitute over 24.8 per cent of South Asia's total exports. In the East Asia-Pacific region and Japan, however, solar panels account for over 89 per cent of total exports of the products under consideration.

It is evident that Japan and East Asia and the Pacific have a higher share of biodiesel imports among the countries and regions under consideration. In terms of wind turbines, Australia accounts for 9 per cent of the total imports analyzed in this report. The East Asia and Pacific region, in conjunction with Japan and South Asia, collectively accounts for a proportion exceeding 3 per cent, while China's contribution is marginal at less than 1 per cent.

Figure 4: REG product's shares by region (in per cent), average 2019-2023

a. Exports **b. Imports**

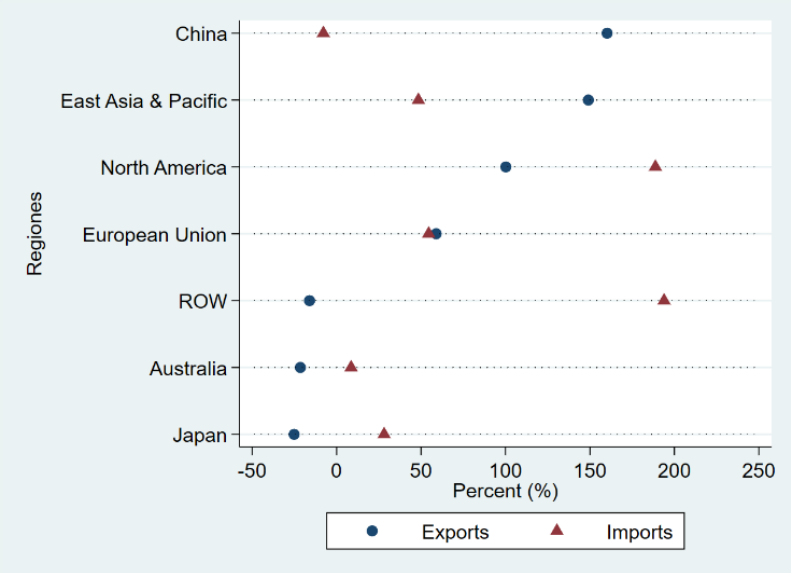


Note: Countries that are presented individually (e.g. Japan) are not included in the broader regional aggregation.

Source: Author estimates based on the WITS/COMTRADE database.

As illustrated in figures 5a and 5b, the evolution of export and import values by region showed notable disparities between 2012 and 2023. South Asia emerged as the region with the highest growth rate, with substantial increases in both export and import values between 2012 and 2023. Figure 5a shows that China had the highest export growth rate for these products at 160.2 per cent, followed by East Asia and the Pacific and North America at 149.1 per cent and 100.2 per cent respectively. Conversely, the largest increases in imports were observed in North America (188.8 per cent) and ROW (193.9 per cent), while China's import growth declined to a negative rate of -7.8 per cent from 2012 to 2023. Australia and Japan, however, exhibited a decline in export dynamics, with export growth rates of -21.5 per cent and -25.2 per cent, respectively.

Figure 5: Growth rate in REG trade flows (in per cent) between 2012 and 2023



Note: Countries that are presented individually (e.g. Japan) are not included in the broader regional aggregation.

Source: Author estimates based on the WITS/COMTRADE database.

Analyzing trade flows in terms of growth and evolution between 2012 and 2023 reveals significant changes in export and import volumes from the selected regions to the rest of the world. It is therefore imperative to ascertain the impact of these changes on employment in the next section.

3. The employment related to the trade in renewable energies goods

This section provides an analysis of the labour aspect of renewable energy goods trade, focusing on the number and quality of jobs directly and indirectly created by exporting these products. In practice, these jobs can be categorised as either 'green' or 'brown', although the limited available information does not permit an assessment of this important dimension.

One of the most frequently utilised techniques for conducting such an estimation is the input-output model. Multisectoral models have a long tradition, with their origins in the seminal work of Leontief (1951). These models present a simplified framework of the circular flow, in a manner analogous to Quesnay's Tableau Economique (1759). To produce goods and services, firms require labour and intermediate inputs and utilise capital. These are subsequently sold to households, other firms, the government or the rest of the world. Households utilise their income to purchase goods and services, pay taxes (T), and save the remainder (S). Consequently, the government collects revenue through taxation, demands goods and services (G), and generates changes in investment and savings.

As previously outlined, this paper employs a multi-regional input-output approach (OECD (2018); Timmer et al. (2015)). To facilitate meaningful cross-country comparisons of employment, it is essential to consider the relationship between final demand and the structure of the world economy. This section provides a concise overview of the methodology used to estimate this employment-trade link, followed by a presentation of the main findings.

3.1. Methodology

The multiregional input-output model can be represented by the following subset of matrices and vectors, starting from the expenditure side:

1) $x = Ze + F$

Where $\boldsymbol{x}$ is the vector of gross output values, $\boldsymbol{Z}$ is the matrix of intermediate uses, $\boldsymbol{e}$ is a row vector of ones and $\boldsymbol{F}$ is the matrix of final demand.

After some algebraic steps, dividing and multiplying the elements of the matrix $\boldsymbol{Z}$ by the gross output, it is possible to reformulate equation (1), such that:

2) $x = Ax + F$

where $\boldsymbol{A}$ the input-output coefficients matrix describing the units of intermediate inputs needed to produce one unit of gross output.

Finally, passing elements from one side of the equation to the other, is obtained the following expression:

3) $x = (1 - A)^{-1}F$

The matrix $B = (1 - A)^{-1}$ is the so-called Leontief matrix or total requirements matrix. Each element of B represents the direct and indirect requirements of input *i* by activity *k*, in country *n* from partner *m*.

To calculate how much employment is generated directly and indirectly by the REG exports it is necessary to recover the diagonal matrix θ, whose elements contains the labour to output coefficients.

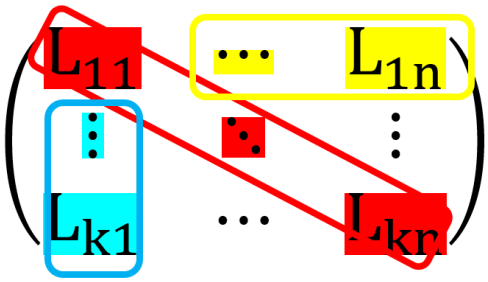
Finally, multiplying the matrix θ by ***B*** and the gross REG exports matrix, ***E***, yields the matrix ***L.*** The subscript *n* refers to the country, while *k* indicates the activity.

$$\begin{pmatrix} L_{11} & \dots & L_{1n} \\ \vdots & \ddots & \vdots \\ L_{k1} & \dots & L_{kn} \end{pmatrix} = \begin{pmatrix} \theta_{11} & \dots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \dots & \theta_{kn} \end{pmatrix} \begin{pmatrix} 1-a_{1,1} & \dots & -a_{1,n} \\ \vdots & \ddots & \vdots \\ -a_{k,1} & \dots & 1-a_{k,n} \end{pmatrix}^{-1} \begin{pmatrix} E_{11} & \dots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \dots & E_{k,n} \end{pmatrix} \quad 4)$$

The matrix ***L*** provides all relevant information to estimate the employment included in the gross exports of REG. Following a similar classification as in the value-added analysis (Aslam et al., 2017), it is possible to estimate the domestic labour input (DLI), the exported labour input (DLX) and the foreign labour input (FLI), which are highlighted in equation x as different components of the ***L*** matrix. The diagonal elements of the ***L*** matrix, shown in red, make up the DLI. The sum of the off-diagonal elements in each column, highlighted in blue, make up the FVI indicator, while the sum of the off-diagonal elements in each row, highlighted in yellow, make up the DLX indicator.

This empirical analysis focuses on the DLI indicator for each country, which is given by the diagonal elements of the ***L*** matrix and represents the domestic labour content embedded in the gross exports of REG. This estimation excludes, by definition, the foreign labour content in exports contained in the FLI indicator. It is also important to note that DLI includes both direct and indirect employment related to REG. This means that the result is influenced by national vertical integration, as well as some minor domestic value that returns home via imports and double-counted exports produced domestically (Aslam et al., 2017).

Figure 6: Labour content of exports matrix



Source: Own elaboration.

3.2. Results

This section presents aggregate figures on employment supported by REG trade, based on the matrix calculations presented in the previous section. The estimations were carried out using the latest IO data prior

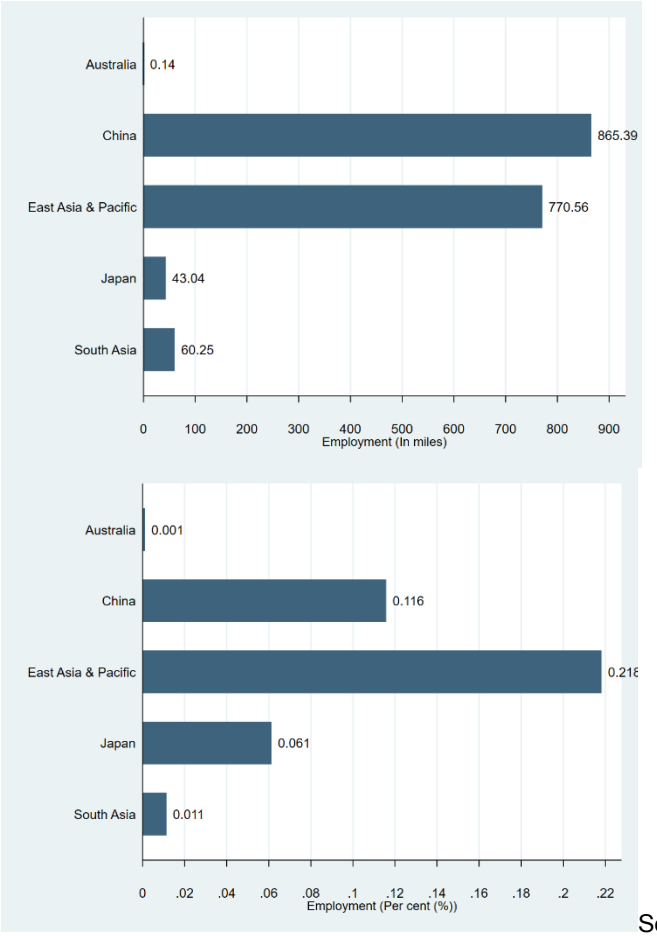
to the pandemic, with a base year of 2019. Although the OECD has published a matrix for 2020, this particular year may introduce bias into the estimation, so it was decided to avoid using it.

As illustrated in Figure 7a, China leads the way with a total of 865,300 jobs. East Asia and the Pacific is ranked second, with 770,5 thousand jobs. Notable disparities in employment levels are observed between China and East Asia and the Pacific, and South Asia and Japan, with respective figures of 60.2 thousand and 43 thousand jobs.

Conversely, the share of direct and indirect employment activated by renewable energy products in all the countries and regions under analysis is below 0.25 per cent of the total labour force. As Figure 6b shows, the East Asia-Pacific region has a higher proportion of total employment generated by renewable energy (REG) exports than China. In this instance, Japan (0.06 per cent) surpasses South Asia (0.01 per cent), while Australia's share amounts to 0.001 per cent.

Figure 7: Employment supported by REG exports by region

a. Jobs (Thousands) **b. Share of total employment (%)**



Source: Author estimates.

The employment generated by the products analysed in this report can be categorised as either direct or indirect, depending on the structure of the input-output matrices. Direct employment refers to jobs created within the exporting sector itself. By contrast, indirect employment encompasses the jobs generated in other sectors that supply inputs to the exporting sector.

As shown in Table 3, the number of indirect jobs created always exceeds the number of direct jobs in all analyzed regions. According to Figure 7a, Australia has the lowest employment impact, with just 140 direct jobs and 60 indirect jobs. In Japan, direct employment amounts to 10,900 jobs, while indirect employment exceeds 32,120 jobs. The South Asian region has a similar level of direct employment to Japan but a significantly higher number of indirect jobs, totaling 48,300.

Due to their size, the East Asia and Pacific region and China play a key role in job creation. China has created more direct employment than the East Asia and Pacific region, with 251,500 jobs compared to 143,300 in the region. However, the East Asia and Pacific region has more indirect employment than China, with 625 thousand jobs compared to 623.8 thousand.

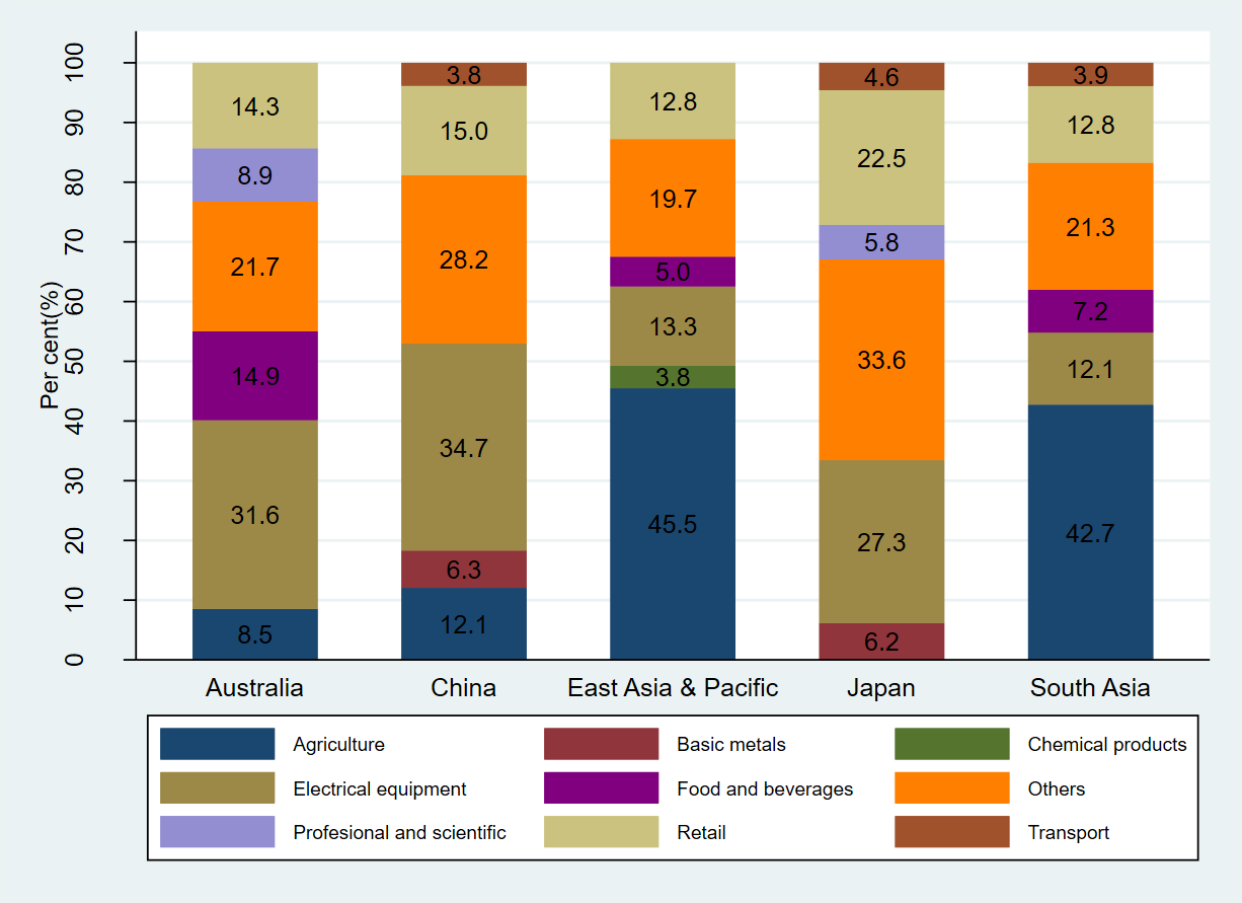
Table 3: Export-led employment classification REG by regions (in thousand jobs), 2019.

Region	Total	Direct	Indirect
Australia	**0.14**	**0.06**	**0.08**
China	**865.4**	**251.5**	**613.9**
East Asia & Pacific	**770.5**	**143.3**	**627.2**
European Union	148.0	69.1	78.8
Japan	**43.0**	**10.9**	**32.1**
North America	3.6	1.9	1.7
South Asia	**60.2**	**11.9**	**48.4**
Other regions	231.4	104.1	127.3

Source: Author estimates.

Figure 8 shows the sectoral composition of employment generated by REG exports, both direct and indirect. In the case of China, Japan and Australia, the most important sector is electrical equipment, accounting for over 30 per cent of REG exports-driven employment in the former two countries and 27.3 per cent in Japan. In the East Asia-Pacific and South Asia regions, however, the dominant sector is agriculture, since biofuels are exported from these regions. In Australia, this sector, together with food and beverages, has a significant share due to the production and export of liquid biofuels. Conversely, the professional and scientific activities sector accounts for 8.9 per cent and 5.8 per cent of employment in Australia and Japan, respectively. In addition to the importance of the electrical equipment sector for China and Japan, activities related to basic metals are also significant. In the East Asia-Pacific region, the chemical sector is another important sector, with 3.8 per cent of employment generated by REG products.

Figure 8: Employment supported by REG exports by region (in per cent (%))



Source: Author estimates.

Figure 9 illustrates the observed bias across different groups of employment: gender, age, skill and formality status. Now, "bias" is defined as the percentage point (pp) difference between the observed share of a group of reference (i.e. formal or youth) supported by green trade and the economy wide average. For instance, if female employment in green trade-related jobs is 51per cent and is 50 per cent in the economy, the estimated bias is 1pp. This kind of analysis is useful for gaining insight into the distinctive characteristics of renewables trade-related employment.

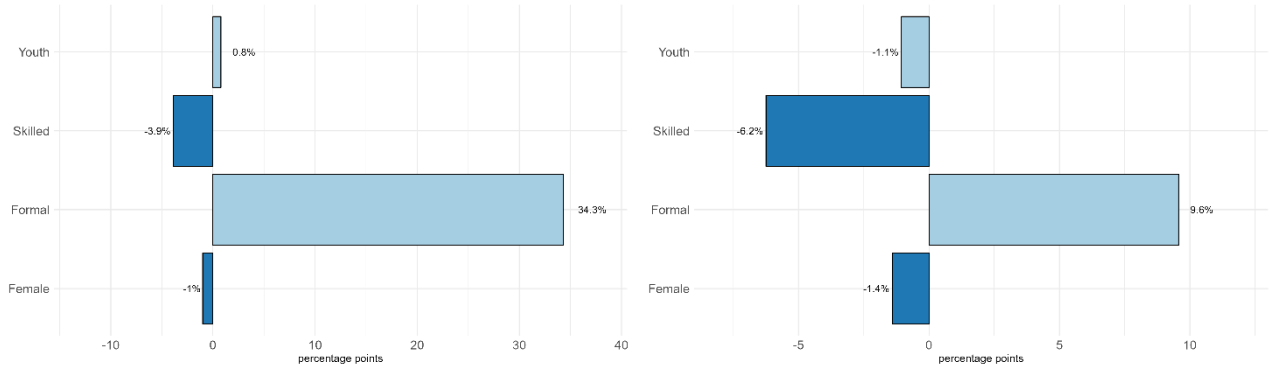
5) $$bias_i = \sum_j x_{(j/i=1)}^{REG} \Big/ \sum_j x_j^{REG} - \sum_j x_{(j/i=1)} \Big/ \sum_j x_j$$

Estimates show a negative bias towards high-skilled employment in all regions, as well as towards female employment in both direct and indirect employment demand. Nonetheless, direct employment is less negative due to its links with core manufacturing activities, whereas indirect jobs include other sectors such as trade and transport.

In both cases, there is a positive and strong formal bias, which is stronger in the case of direct employment demand. Finally, the evaluation of age bias reveals a positive effect for direct jobs and a negative effect for indirect employment. In both cases, however, this margin is relatively small.

Figure 9: Group bias in Employment supported by REG exports (in per cent (%))

(a) Direct Jobs (b) Indirect Jobs



Source: Author estimates.

Note: China was excluded due to some statistical limitations in terms of its labour groups composition.

4. Concluding remarks

The study's findings indicated that China and the East Asia and Pacific region dominated the renewable products export market. While South Asia saw a substantial increase in export volume from 2012 to 2023, Japan and Australia experienced a decline over the same period. Concurrently, South Asia witnessed a significant rise in imports, suggesting substantial market growth during this period. In contrast, East Asia and the Pacific experienced comparatively modest import growth, lagging behind the substantial export growth rate. While exports from these countries declined, imports increased. Notably, China exhibited a negative import growth rate for the analyzed products, suggesting a relevant import substitution effect.

In terms of trade balances, China has the largest surplus in all three energy categories examined in this report for the specified regions. The East Asia and Pacific region exhibit surpluses in liquid biofuels and solar panels but has deficits in wind turbines. On the contrary, Japan had a significant deficit in liquid biofuels and a substantial surplus in solar panels. South Asia, meanwhile, demonstrated deficits in solar panels and biofuels, while exhibiting a positive balance in wind turbines.

Using input-output matrices, to calculate employment generated by REG exports, this report projected that China is the main driver, with over 865,000 jobs activated. East Asia and the Pacific are other key players in this context, with over 770,000 jobs, generating relatively more direct than indirect employment within the region. South Asia and Japan exhibit a more modest impact, with around 60,000 and 43,000 jobs respectively.

According to our estimations, the most significant sectors are electrical equipment, agriculture, food and beverages, and related service industries, such as retail and professional services. However, the importance of these sectors varies depending on the country or region analyzed.

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