



Green Jobs Assessment in Jordan Synthesis Report

Exploring the Employment Impact of selected Green Economy Initiatives

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Green Action in Enterprises (GAIN) Project
GIZ Jordan
Mohamed Baseem Al-Khammash St. 13, Sweifeh
Amman 11190
Phone +962-6-5868090
Fax +962-6-5819863
giz-jordanien@giz.de
www.giz.de/en/worldwide/102349.html

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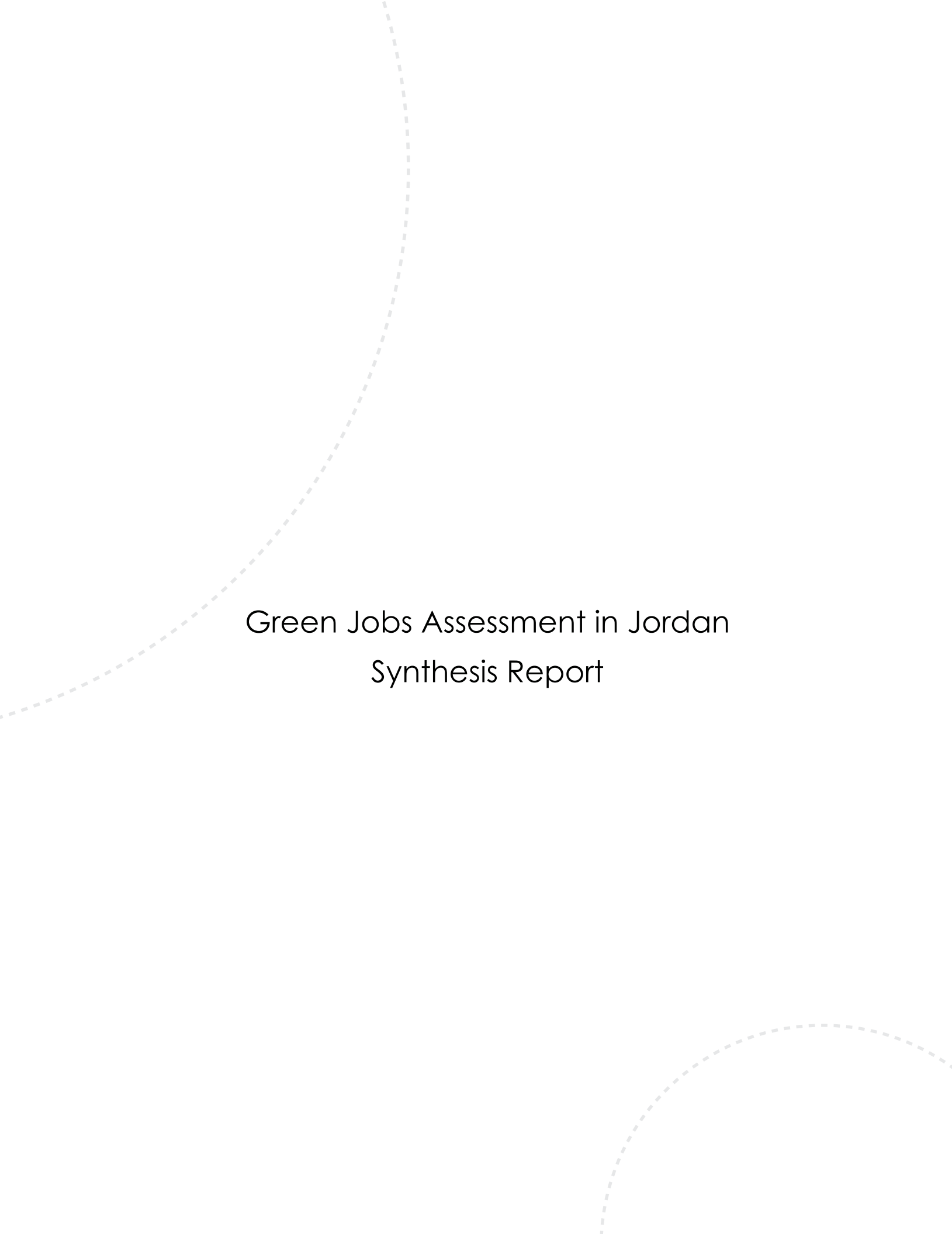
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Text

Dr. Cornelia-Madalina Suta, Stijn Van Hummelen, Alistair Smith, Robin Lechtenfeld (Cambridge Econometrics)
Prof. Dr. Nooh Al Sheyab, Prof. Dr. Serena Sandri

On behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

The page features two decorative dashed lines. One line starts from the left edge, curves upwards and to the right, and then turns downwards towards the top center. The second line is located in the bottom right corner, forming a partial arc.

Green Jobs Assessment in Jordan Synthesis Report



Dear esteemed reader,

It fills me with joy to present to you Jordan's first ever Green Jobs Assessment Report (G-JAR) as part of the national efforts led by the Ministry of Environment towards transition to green economy.

This report has been designed to act as a knowledge product and a tool for informed policymaking for all our partners from the public and private sector, academic institutions, civil society, local communities, and the media that wish to learn more about the promising potential of creating additional employment in Jordan by implementing green policies and sustainable economic activities.

This report's completion marks a first cornerstone in a promising journey Jordan is embarking on. As the Ministry of Environment is spearheading the Green Jordan Driver under the national Economic Modernization Vision (EMV) 2030, we seek to ensure that future economic growth is both socially inclusive and environmentally friendly. The generation of green employment, meanwhile, will be an outcome of this and has been a designated goal of this government and aligned with the strategic objectives of the EMV in creating more employment opportunities.

I therefore like to view the G-JAR as a conversation starter that should inspire us, as decision-makers in the public and private sphere, to work jointly towards the promotion of meaningful green jobs. It provides a clear definition and an initial assessment of existing and potential green jobs in selected economic sectors, which are in line with our national priorities expressed in the EMV and in the National Green Growth Action Plan (2021-2025).

The process of developing the G-JAR required contributions from various section of society and national consultations meetings among private and public sectors, academia, civil society, international institutions, and experts. It produced valuable policy implications to support effective greening of our national developmental priorities which will result in green employment generation in promising sectors.

Based on a participatory approach which the Ministry of Environment always adopts during green growth planning, policy and action development, and implementation, the Ministry looks forward for a continuous and real engagement of line ministries developing the proper policies towards creating green jobs in line with EMV objectives.

Finally, I would like to thank all experts who are part of this effort for their indispensable contributions and extend my gratitude to the Government of Germany for having supported this report through the GIZ-implemented "Green Action in Enterprises" (GAIN) project.

As we navigate through numerous ecological and economic challenges, it is pivotal to act in the right direction in alignment with our international commitments and national priorities. This G-JAR report represents one key quantitative piece of evidence for us to feel emboldened and work towards the green economy transition.

Dr. Muawieh Khalid Radaideh
Minister of Environment

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Abdalla Hijawi
Ahmad Hijazi
Ahmad Malkawi
Ala'a Mahmoud Abu Khazneh
Ammar Abu Drais
Amina Mari
Dr. Arwa Abdelhaj
Burcu Tuncer
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Hazem Zuraigat
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Abbreviations

EMV	Economic Modernization Vision
GHG	greenhouse gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
ICE	Internal combustion engine
ILO	International Labour Organization
I-O	Input-Output
NDC	nationally determined contribution
NRW	Non-Revenue Water
PSF	polyester staple fibres
PET	polyethylene terephthalate



The background is a complex abstract composition. The upper half is dominated by various shades of green and yellow-green, featuring large, overlapping geometric shapes like triangles and polygons. On the right side, a stylized yellow-green figure of a person is depicted in a walking or running pose, carrying a briefcase. The lower half transitions into shades of blue and teal. This section contains several large, light-blue arrows pointing in different directions, some overlapping each other. A large, semi-transparent white rectangle is centered horizontally across the middle of the image, serving as a backdrop for the title text.

1 Background

1 Background

Efforts to identify and facilitate the transition towards a green economy are intensifying in Jordan. The Government of Jordan is currently supporting various policies, initiatives and programmes aimed at achieving a green economy. First and foremost is the recently adopted Economic Modernization Vision 2033 (EMV) which aims to accelerate sustainable economic growth. The adoption of the 'Renewable Energy and Energy Efficiency Law of 2012' (Jordan Government, 2012) and the 'Waste Management Framework Law for the year 2020' (Jordan Government, 2020) or the National Green Growth Plan (2021 – 2025)¹ are other key examples. The last of these (the National Green Growth Plan) was developed by the Ministry of Environment in consultation with key stakeholders to expand Jordan's climate and sustainable development ambitions by mainstreaming green growth, climate change, and sustainable development objectives into sectoral strategic frameworks. Furthermore, Jordan submitted its first Nationally Determined Contribution (NDC) in 2016 and an updated version in 2021 which encompasses a goal to reduce greenhouse gas (GHG) emissions by 31% in 2030 compared to a 'Business As Usual' scenario (Ministry of Environment, 2021).

Unemployment, particularly among young people holding qualifications of at least Bachelors, is a persistent issue in Jordan and the creation of green jobs is high on the policy agenda. With the Ministry of Labour's latest strategy, the National Employment Plan, the government aims to support sustainable job creation and has set itself an ambitious goal of 10% of jobs being green jobs by 2030.

For a first ever assessment of current and potential green jobs in Jordan, the "Green Action in Enterprises" (GAIN) project, commissioned by the German Federal Ministry for Economic Cooperation and Development and implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, cooperated with Cambridge Econometrics using the International Labour Organization (ILO) GAIN methodology (Jarvis, Varma and Ram, 2011). Such an assessment aims to estimate, on one hand, the current levels of green jobs (direct, indirect and induced) in green activities, and the potential for green jobs based on "what if" scenarios (i.e. employment effects from investing in a given green economy activity) using econometric modelling, on the other hand.

This assessment reveals that Jordan has considerable potential of green jobs, in particular in the agriculture, transport, water and waste, manufacturing, tourism and energy sectors.

Jordan's transition to a green economy

Green jobs as a solution for high unemployment

Jordan has considerable potential for green jobs

¹ Reports — Global Green Growth Institute (gggi.org) <https://gggi.org/reports/>

The background is a complex composition of overlapping geometric shapes and semi-transparent icons. On the left, a large grey gear is partially visible. In the center, a red circle contains a white icon of a person with arms raised and arrows pointing outwards. Below this, a grey bar chart with four bars of increasing height is shown. A large grey arrow points upwards from the bar chart towards the gear. The overall color palette consists of grey, red, and white.

2 Methodology

2 Methodology

There is no standard definition of green jobs. According to the ILO, green jobs can be found in many sectors of the economy, covering work in agricultural, manufacturing, research and development, administrative and service activities, and are linked to economic activities within sectors that “help preserve or restore the environment by:

- Improving energy and raw materials efficiency
- Limiting greenhouse gas emissions
- Minimising waste and pollution
- Protecting and restoring ecosystems
- Supporting adaptation to the effects of climate change.”(ILO, 2016)

To assess the number of green jobs, it is therefore important to first identify those green economic activities within sectors, and then the number of jobs associated with them. Green activities within a sector are generally identified using one of three methods:

- 1 the process-based method,
- 2 the output-based method, and
- 3 the natural resource conservation method.

The process-based method defines green activities as those whose production processes involves lower energy and resource intensity, lower need for virgin inputs and/or using recycled inputs, and/or lower generation of waste. In other words, the product is not necessarily helping to preserve or restore the environment, but the production process is organised with minimal impact on the environment and innovations are actively introduced to eliminate this impact.

The output-based method refers to the environmentally beneficial characteristics of final products or services in the sector. Examples of environmentally friendly products or services include: organic agricultural products (certified), green textiles (green labelling), eco-tourism (certified), green construction (certified) and green financing.

The natural resource conservation method examines activities that directly contribute to nature conservation. Examples of such activities include ecosystem support and natural resource management.

The ILO further emphasises that green jobs should be decent. This means that a green job is sustainable from an environmental perspective, and inclusive and equitable from a social perspective, by offering fair wages and social security. In the absence of reliable information, in this report only those employees with a formal employment contract are considered being in decent jobs without considering other aspects such as wages, working conditions etc. As a result, informal jobs, even if they help preserve or restore the environment are not considered to be green jobs.

What are
green jobs?

What are the steps in a Green Jobs Assessment?

The assessment carried out for this study follows the ILO GAIN methodology for green jobs assessments. This is an established methodology and has been used in several countries around the world². It is based on the six steps summarised in Figure 2.1.

Figure 2.1: Methodological framework



Source: ILO.

In the first step, the structure of the economy and employment in Jordan is studied in detail to identify the main economic sectors and challenges of the Jordanian labour market. The second step entails a more detailed assessment of selected sectors in the economy to identify existing green activities within those sectors. Step three entails the estimation of current direct employment associated with the green activities identified in the previous step, based on official employment data and various assumptions. In step four, current indirect and induced effects associated with the green activities are estimated using Input-Output (I-O) tables.

Step five is then forward-looking. Potential future investments in green activities are identified that could help Jordan achieve its EMV. Using a macroeconomic model, the future employment impact of these investments is then assessed through the simulation of 'what-if' scenarios. Finally, based on the results from the modelling and expert views, policy implications are formulated in step six.

What are direct, indirect, and induced employment?

Direct jobs are those jobs directly linked to the generation of economic output within a green activity in a given sector. Indirect employment impacts relate to supply chain effects of green activities, and the jobs generated in other sectors by these green activities. Each green activity has linkages with other sectors through its supply chains. Induced jobs refer to the jobs associated with changes in output as a result of changing prices and household incomes, which lead to further expenditure. Only direct jobs are considered green, but to estimate the economy-wide employment potential from an investment or policy, it is important to also account for indirect and induced employment.

² See list of reports at: <https://www.ilo.org/global/topics/green-jobs/areas-of-work/gain/reports/lang-en/index.htm>

This analysis uses the FRAMES model. FRAMES is a single-country macroeconomic model designed to examine economy-wide socioeconomic and environmental effects of changes in investment and/or policy. FRAMES can be considered a simplified version of the global dynamic E3ME model developed by Cambridge Econometrics over several decades. E3ME resembles the Integrated Assessment Models used by the IPCC and simulates a demand-led economy with supply constraints, with parameters derived using time-series econometrics. E3ME and FRAMES are simulation tools, well-suited for comparing a baseline projection with outcomes of alternative scenarios.

Which macroeconomic model has been used?

For this study, a baseline (business-as-usual) projection was first derived. In the baseline, annual growth of the Jordanian economy of 2.7% pa to 2024 and 3% pa from 2025 to 2030 is assumed, in line with the IMF's most recent economic outlook for Jordan (IMF, 2023). In the absence of public sectoral forecasts, each sector of the economy is expected to grow in line with GDP.

What are a baseline and 'what-if' scenarios?

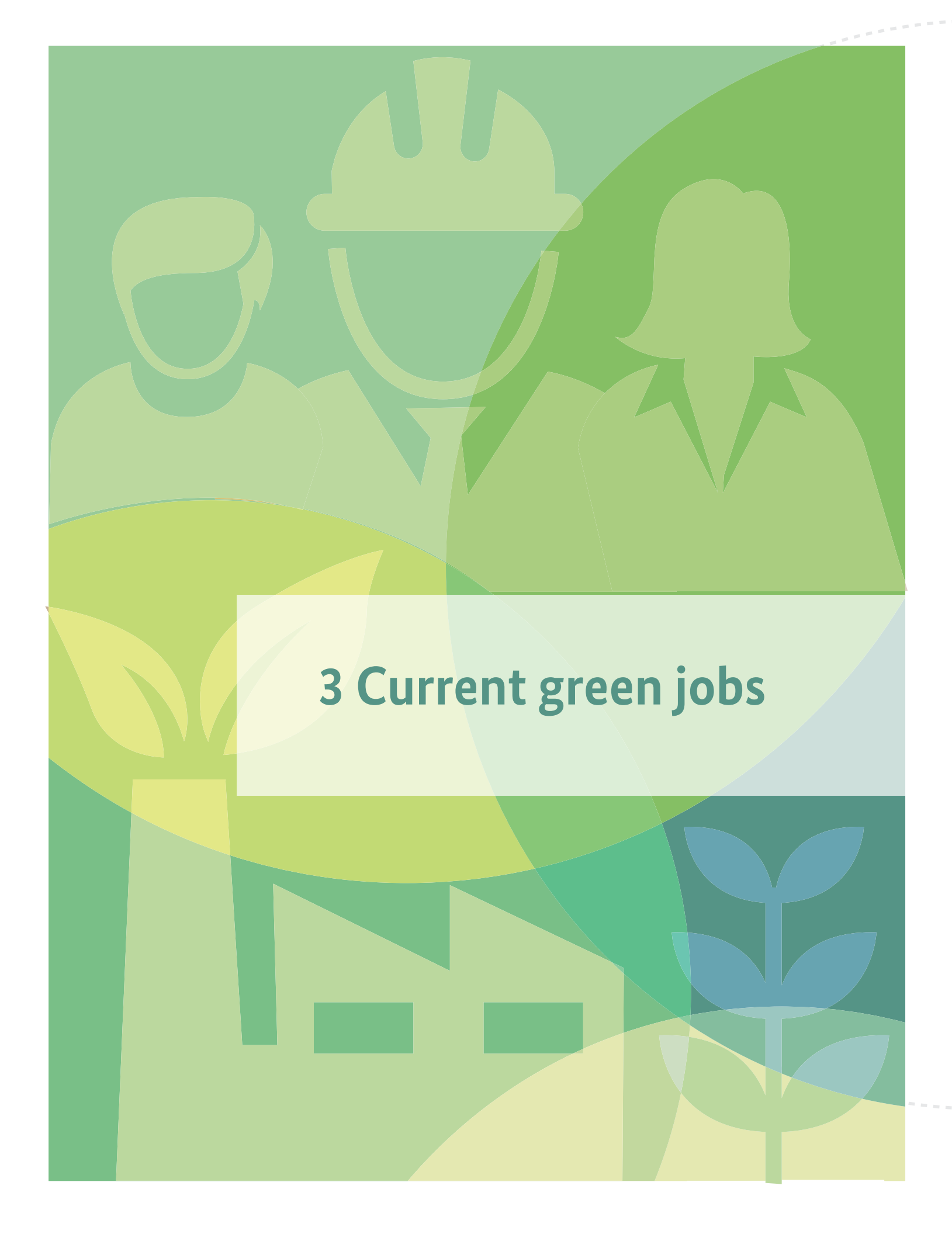
Scenarios show alternative pathways relative to the baseline, identifying which sectors gain or lose from investing, whether by the adoption of or substitution with new technology, and/or substitution of inputs. The term used throughout this report is 'What-if scenarios' because they are not forecasts of the most likely future outcomes, but simulations of what could happen if an investment in a certain promising green economy initiative takes place. This report covers six scenarios which have been selected by a steering committee consisting of the Ministry of Environment; the Ministry of Industry, Trade and Supply; and the Ministry of Labor; as well as representatives from the Prime Minister's Office.

The analysis incorporates various assumptions and estimates the direct, indirect, and induced employment impacts by 2030 of the chosen potential investments. The results of the what-if scenarios are presented as additional to the baseline scenario. Already in the baseline, there is employment growth over time, but the aim of the scenarios is to assess whether an investment would lead to higher or lower employment compared to the business-as-usual investment and other economic patterns reflected by the baseline.

Positive externalities on the environment are not captured in the modelling of the scenarios.

There is no single unique source of data on green activities in Jordan, which presents a challenge for the estimation of green jobs. Data have been collected through desk research and comprehensive stakeholder engagement. The 2016 I-O table, an essential piece of data for the analysis, as well as most of the other secondary data (e.g. labour force and employment data) was acquired from the Department of Statistics. Other secondary data sources include the IMF, the World Bank and the GIZ.

What are the main data sources?



3 Current green jobs

3 Current green jobs

The study focuses, based on decisions taken by the steering committee, on the assessment of six economic sectors, namely agriculture, waste and water, manufacturing, energy, tourism, and transport. The sectors were chosen from green activities identified during the detailed analysis of Jordanian sectors. Each sector was disaggregated into a sustainable component and a conventional component by identifying economic activities with environmentally friendly processes (i.e. applying the process-based method) or environmentally friendly products (i.e. by the output-based method). Given the nature of the conservation method, this was used only for the tourism sector for employment in natural reserves. The estimation method differs from activity to activity and, given the data limitations, green jobs can be considered as having different shades of green depending on the sustainability criteria (e.g. process, output, nature conservation) considered.

Table 3.1 presents the summary of the estimated number of green jobs by sector/subsector and the method used to estimate them. Between 21% and 30% of the employment in the selected sectors and subsectors can be considered as green. In some cases, a range of estimates are provided, owing to data limitations and uncertainty.

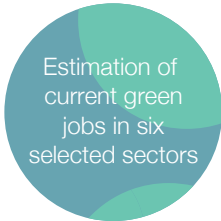
In the agricultural sector, the identified green activities are organic farming, drip-irrigation and hydro-/aquaponics. Around 10,000 permanent workers in agriculture are assumed to work in these green activities.

The generation of energy using solar PV, wind, hydropower, and biomass is a green activity. At least half of the employment in the energy sector is assumed to be linked with this type of energy generation and thus deemed green. Around 1,600 green jobs are in activities such as retrofitting old buildings to make them energy efficient, building efficient new buildings and increasing industry efficiency.

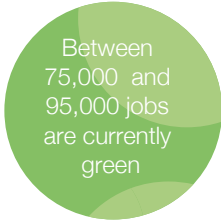
In the manufacturing sector, green activities were identified in sub-sectors where production processes are either reducing energy and resource intensity, more eco-efficient, or reducing and recycling waste. Around 8,000 green jobs are in facilities that use either recycled plastic or recycled paper as raw material. Over 700 green jobs can be found in food-processing, textile or pharmaceutical/ chemicals companies that hold an environmental-related certification.

Collection of waste and water-treatment are green activities with over 8,000 green jobs.

Green jobs in green hotels and eco-tourism represent more than a third of jobs in the tourism sector. Public or shared transport of people are also greener options than individual transportation. As much as a third of employment in transport is estimated to be green.



Estimation of
current green
jobs in six
selected sectors



Between
75,000 and
95,000 jobs
are currently
green

Table 3.1: Estimated current green jobs in selected sectors

Sector	Total employment*	Of which are green jobs
Agriculture (crop production)	18,349	10,145 – 10,179
Energy	9,435	4,750
Energy efficiency	Not available	1,686
Manufacturing - Plastic	11,875	3,713
Manufacturing - Food processing	59,646	61
Manufacturing - Clean technology	Not available	1,178
Manufacturing - Textile	68,489	66
Manufacturing - Packaging	11,875	4,160
Manufacturing – Pharma and Chemicals	26,655	592
Tourism	12,418	3,166 - 5,416
Waste	Not available	6,400
Water	7,966	1,957
Transport	81,031	30,920 - 63,500
Total	307,739	74,135- 95,060

Note(s): Current employment is based on a variety of sources.

Source(s): Cambridge Econometrics estimation.

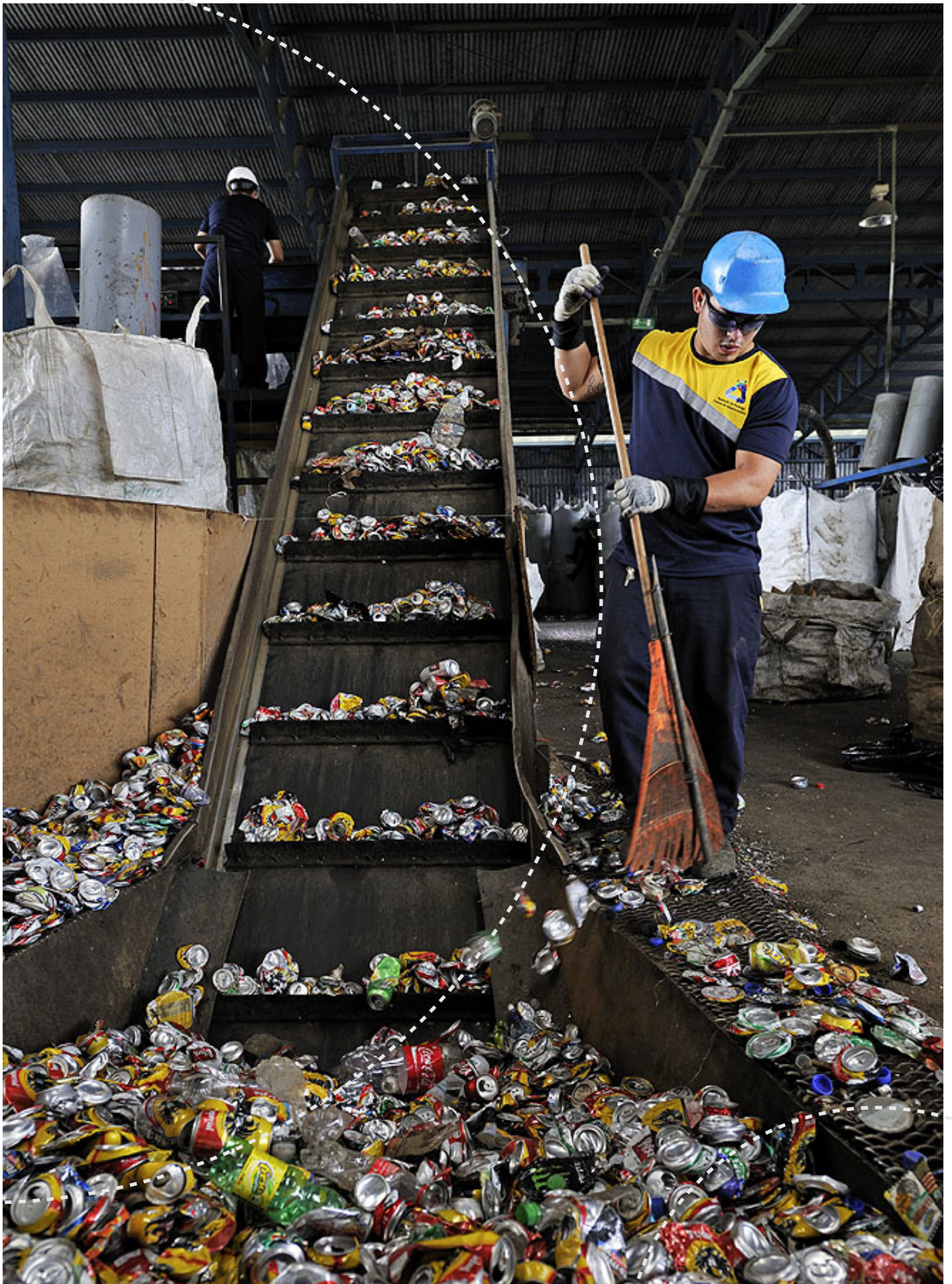
On the one hand, the numbers of green jobs are likely underestimated for two reasons:

- The analysis has looked at those 6 sectors known to have considerable potential for green economic activities. It may be that there are green jobs in other sectors not considered in this analysis (i.e. construction, services).
- Considering the openness of the Jordanian manufacturing sector, and that more exporting companies are implementing environmentally friendly processes to comply with destination country requirements than the number assumed here.

On the other hand, these numbers may be subject to at least some overestimation since many formal jobs do not fully comply with the 'decent' aspect of the ILO green jobs definition.



A few caveats





4 Future green jobs

4 Future green jobs

Six green activities within the chosen economic sectors were selected for scenario analysis:

- 1 recycled plastic
- 2 recycled textile
- 3 resource efficiency in the food-processing sector
- 4 sustainable value extraction of sludge
- 5 water scarcity
- 6 green public transport

The selection by the steering committee was made at the beginning of March 2023 and based primarily on two criteria: i) the availability of detailed information on the expected pathway (data from feasibility studies or government sources), ii) and relevance to the Economic Modernization Vision 2033.

In May 2023, the assumptions used for the modelling and the initial set of results were discussed with national experts in the field and amendments were made based on the feedback received.

Table 4.1 shows the additional green jobs in the green activities and the indirect and induced effects in the wider economy over the period 2023-30.

By 2030,
over 350 new
green jobs will be
created by six
selected green
economy
initiatives

The indirect and
induced effects of
these investments
are large

Table 4.1: Summary of the scenario results (difference from baseline)

Scenario name	Sector	2023	2024	2025	2026	2027	2028	2029	2030
Recycled plastics	C22 - Manufacture of rubber and plastics products	1	40	51	56	57	56	54	53
	Rest of economy	51	24	31	34	36	35	35	34
Textile recycling	C2C - Manufacture of wearing apparel, textiles, and leather	0	0	277	271	265	259	254	249
	E00 - Water supply; sewerage, waste management and remediation activities	0	0	4	4	4	4	4	4
	Rest of economy	78	76	73	71	70	68	67	66
Resource efficiency in food-processing	C1A - C1D - Food and beverages	2	0	0	0	47	46	45	44
	Rest of economy	217	-35	-34	-34	47	46	45	44
Sustainable sludge	E00 - Water supply; sewerage, waste management and remediation activities	1	2	2	7	7	7	7	7
	Rest of economy	1,017	2	2	12	12	11	11	11
Enhancing Water Efficiency	E00 - Water supply; sewerage, waste management and remediation activities	6	6	6	5	5	5	1	0
	Rest of economy	6,896	6,743	6,580	6,429	6,290	6,159	666	97
Greening public transport	HB0 - Transport by road	3	6	6	6	7	6	2	2
	Rest of economy	115	201	220	241	265	239	108	105

4.1. Recycled plastic

The aim of this scenario is to measure the impact of an increase in the reuse of plastic waste i.e. material recycling in manufacturing. There is currently no large facility for polyethylene terephthalate (PET) plastic recycling in Jordan and this scenario focuses on the development of recycling for post-consumption PET plastic in the country.

The assumptions made in the scenario are partly based on the Feasibility Study for Establishing Polyethylene Terephthalate Recycling Facility in the Jordan Valley (Hijawi, 2021). Assumptions were discussed and – where needed – updated based on experts' feedback to the preliminary results during a workshop held on 15 May in Jordan.

Table 4.1 shows the employment impact of the investment and operations costs of implementing PET recycling by 2030. The impact of the investment to build the facility is assumed to be in 2023, though this may be proved infeasible in practice, with just half the year to go. It is assumed that the facility will produce at 70% of its capacity in 2024, 90% in 2025 and 100% in 2026. The capacity of the facility will from that point be 6,000 tons of PSF production per annum. In the modelling, it is assumed that the new recycling facility can operate competitively and displace current and forecasted imports of PSF.

The indirect and induced effects are observed largely in construction during the initial phase. In the operational phase (2026-30), the benefits of increased output of the plastic sector are observed in supply chain effects (such as manufacture of chemicals, transport, and wholesale trade)

4.2 Textile recycling

The aim of this scenario is to measure the impact of an increase in the quantity of fabric waste recycled and used as input material in manufacturing.

The assumptions are based on a series of circular economy business cases in the ready-made garment (RMG) sector developed by the GIZ-implemented GAIN project. Two types of recycling are assumed to take place in the textile and waste sectors under this scenario: i) mechanical recycling for industry symbiosis (waste to felt), ii) and mechanical recycling for fibre-to-fibre yarn production. It is assumed first that a sorting facility in the waste sector is built over 2023-24, and that from 2025, 25 tons of textile waste per day are processed into felt. The fine sorted waste is sold for felt fluff production (to the construction and furniture sectors), and for yarn production (to the textile sector).

Table 4.1 shows the employment impact of adopting circularity in the textile sector, which would also green the entire sector identified by the process-based method. By 2030, the modelling calculates 249 expected new jobs in the textile sector from increased recycling capacity at

the scale assumed. Most of the additional jobs are driven by the production of extra output (i.e. recycled yarn) which, in turn, leads to the generation of more output by the entire textile industry (benefiting from domestic raw materials).

These changes in the production process will lead to changes in the demand and supply from other sectors, such as waste collection, and therefore have positive indirect and induced effects leading to even further employment gains.

Indirect effects are expected through the supply chains of the textile and waste sectors. The increase in energy demand will also lead to a small increase in employment in the electricity sector. Induced effects in service sectors from increased domestic income are also accounted for.

4.3 Resource efficiency in food-processing

The aim of this scenario is to estimate the impact of implementing resource efficiency measures in food processing in 60% of medium and large companies in the sector.

High energy bills for production are one of the main challenges confronting Jordan's industrial sector. The assumptions in the scenario are based on the investment and cost savings reported in a number of collected audits, particularly those undergone by manufacturers as part of their engagement with the GIZ-implemented GAIN project.

Table 4.1 shows the employment impact of the investment and operations costs of implementing resource efficiency measures in the food-processing sector by 2030. The impact of the investment in technology is captured in the figures for 2023. A reduction in costs for electricity and water from 2024 onwards is assumed.

It is assumed that the 60% of medium and large-sized manufacturers invest to become energy and water efficient from 2024 onwards. By introducing these efficiency measures, all the jobs in these companies (from the baseline) become green. In addition to these green jobs, 44 additional jobs could be added to the sector from higher output driven by cost savings.

If the reduction in demand for water and electricity is not offset by demand from other sectors (e.g. electric cars), then it could lead to a small reduction in employment in those sectors (and their supply chains). The net aggregate employment impact is 89 jobs by 2030. The strongest employment impacts are in the initial year in which there is an investment demand stimulus; in 2023, aggregate employment increases by 219, with 132 more jobs in construction and 37 in manufacturing based on the modelling.



4.4 Sustainable value extraction of sludge

The aim of this scenario is to measure the impact of developing value addition through economic and ecological sustainability of sludge management

An estimated 105,000 solid tonnes of dried sewage sludge were produced in 2020 with most of this quantity currently dumped onsite or transported to unsanitary landfills; this is based on a study prepared by the Water, Environment, and Energy Centre at University of Jordan. The assumptions used in this scenario are based on the market analysis and sales channels for sludge-based products (Alokab Consulting, 2023) and the sector expert's feedback on the preliminary results. It is assumed that 54,000 tonnes of sludge are sold every year by Al-Samra wastewater treatment plant to be used as an energy carrier.

Positive externalities on the environment from greening of the water sector through the reuse of sludge are not captured in the modelling of the scenarios. The value of this is likely to outweigh the employment effects.

Sustainable value extraction of sludge is expected to add seven green jobs to the water sector by 2030 in addition to baseline employment. The greening of the water and other sectors through investment is expected to bring higher employment in the short term.

Short-term jobs impacts in the economy are large because of the scale of construction activity needed to build the facilities to dry the sludge

Short-term jobs impacts in the economy are large because of the scale of construction activity needed to build the facilities to dry the sludge. Construction will benefit from these effects. Switching from diesel to sludge will also benefit eight companies from manufacture of wood, paper and printing, manufacture of other non-metallic mineral products and manufacture of basic metals and fabricated metal products.

Longer-term jobs impacts are lower owing to low ongoing labour requirements for operation and longer-term efforts to recoup water sector investment costs.

4.5 Enhancing water efficiency

The aim of this scenario is to assess the impact of combinations of selected water supply investments and water efficiency interventions to increase water supply.

Table 4.1 shows the employment impact of the investment and operations expenditure required to implement the water adaptation measures by 2030. Here, the water sector is investing in increased efficiency of water infrastructure as well as the production of water by desalination. The operational costs involved are linked to increased electricity consumption by the water

sector. Therefore, in the water sector, no change in employment is expected. However, the investment demand increases employment elsewhere in the economy, e.g. construction, mechanical engineering and logistics.

The direct impacts are very small, as the modelling does not assume higher water demand from the rest of the economy, relative to the baseline. The modelling results suggest that over 6,000 new jobs could be added during the (short-term) construction phase of the investments in the water sector.

The effects of higher water supply on households and the effect on the price of water are not captured.

4.6 Greening public transport

The aim of this scenario is to measure the impact of promoting the adoption of e-mobility in the public transport sector. The level of ambition of the scenario is to replace the current fleet of polluting internal combustion engine (ICE) public buses with cleaner e-buses so that by 2030 they represent close to 50% of the buses used for public transport (both government and privately owned).

Table 4.1 shows the employment impact from the investment and operations costs of greening the public fleet by 2030. It is assumed that a carbon trading system for the power sector is put in place in Jordan³ and revenues from the system are used to help the government / local authorities purchase e-buses and chargers. Privately held buses are paid for by the private sector.

World Bank data suggest that 5,400 buses (including large buses and minibuses) were in use in 2020-21 and that only 24% are owned by the public sector (World Bank, 2022b). This suggests that there are currently 0.5 buses per thousand inhabitants available in Jordan, which is well below the target of 1.5 per thousand inhabitants by 2025 as stipulated in the 'Green Growth National Action Plan 2021-2025' (Jordan Government, 2020). The growth in the number of buses for our assessment is set to maintain the 0.5 ratio over time and grow in line with Jordan's population.

The switch from diesel buses and minibuses to e-buses is expected to maintain the current level of green jobs in public transport, which was estimated to be between 30,920 and 63,500⁴. By 2030, the additional jobs in road transport will arise mostly through supply chain effects of the investment in charging and grid infrastructure.

The deployment of e-buses requires investment in charging infrastructure, and therefore leads to higher employment in mechanical engineering, electronics, and construction. The highest positive employment effects are observed in these sectors.

³According to the World Bank, Jordan has built digital infrastructure that includes monitoring, reporting, and verification (MRV) systems that link greenhouse gas emissions and emission reduction data to national or international registries, see (World Bank, 2022a).

⁴The range of estimates is based on the data provided by the different stakeholders.

Increased demand for electricity requires investment in electricity generation, EV charging stations and grid reinforcements, and therefore more activity and employment in this sector. However, because of the increased electricity demand, as well as the carbon trading system increasing the cost of electricity generation with fossil fuels relative to electricity generated with renewables, the price of electricity is projected to go up by a small margin, leading to small negative effects as higher prices curb demand slightly.

On the one hand, the increase in electricity demand also increases employment in the gas supply sector, as most electricity in Jordan is still being produced with gas, even if the share of renewables is going to increase over time. On the other hand, the fuel switching leads to considerable savings in spending on diesel, and cost savings overall. As diesel is mostly imported, this also means a reduction of international dependencies (conversely improved energy security).

As e-buses require less maintenance and are imported, this leads to a small negative employment effect in related sectors (repair of motor vehicles, transport equipment), but these are offset by the positive effects inside the road transport sector from increased overall demand for transport offsetting the impacts in other sectors as well as the operational cost savings.

All effects considered, the greening of the public bus fleet leads to more employment, not less. This is in addition to the considerable benefits of improved air quality and health from reduced emissions. Higher benefits would be reaped if the extra electricity demand would be met by renewable electricity generation.







5 Policy implications

5 Policy implications

Jordan's EMV fosters the ambition of Jordan "to be a low-carbon, resource efficient and socially inclusive nation that serves as a regional hub for green entrepreneurship and innovation" (Jordan Government, 2022). It targets the creation of one million jobs by 2033, activating eight main drivers of growth in 35 sectors, via a broad portfolio of 366 initiatives.

The results of desk research, data analysis and expert consultations in the frame of the present green jobs assessment enabled the identification of some key sectors which appear to be particularly promising in terms of a job-rich greening of the economy. In line with the EMV, the considered sectors are manufacturing (with specific attention on plastics, textiles, food processing), water and waste, transportation, as well as energy, agriculture, and eco-tourism. The above selection has been selected and reconfirmed by the steering committee.

The **water sector** is a strategic sector for the Jordanian economy and with a high number of green jobs. Despite a good performance in terms of wastewater reuse, there is still need and potential for improving water efficiency and quality, including the use of non-conventional water sources to compensate for the extreme water stress in the country.



In line with the government's plans for non-revenue water reduction and the Aqaba-Amman desalination plant, the what-if scenario shows that the investment will lead to additional jobs during the construction phase (up to 2028) compared to baseline. There is a modest employment increase in the water sector, where all the employment in the water treatment plants can already be considered green.

The **manufacturing sector** is the second largest in terms of output creation and employs 9% of the labour force in Jordan. The promotion of environmentally friendly practices, energy efficiency, and the use of sustainable water in manufacturing and the industrial sector are among the goals of the EMV and of the Jordanian government's green growth strategy. In parallel, efforts should be invested into the availability of green skills and in fostering public awareness of climate change related issues.



The main potential for green jobs based on the above modelling lies with the use of **recyclable plastics**. Green jobs can already be found in the companies which are using recyclable plastic as raw material. This assessment illustrates that investing in the recycling of PET to produce PSF can generate additional green jobs and economic activity. PSF production is one example - and there are other ways in which plastic waste could be recycled and reused in Jordan, likely with similar employment effects.



Stakeholders emphasised that a more reliable and better supply of scrap and recyclable materials would be crucial to ensure the availability of sufficient inputs to production to feed a growing recycling business. The plastics sector is looking at this with growing interest. Furthermore, with

waste collection currently dominated by informal workers, these are not currently considered to be green jobs whereas they could be, if formalised. Both to support the potential that plastic waste recycling holds and grant decent (green) job opportunities for a growing share of individuals; the formalisation of waste collection would make a large contribution. To achieve this, the government could provide incentives in the form of tax exemptions and/ or attractive social protection schemes. Besides reducing the size of the informal economy, this may yield a more transparent flow of recyclables and reduced environmental pollution while generating new economic activity in the domestic economy.



A further promising green business for Jordan is **textile recycling**. Green jobs can already be found in the RMG companies which hold an environment management certification. The current scenario analysis shows that investing in textile waste collection and recycling it into felt and then yarn would benefit both the waste and textiles sectors. In addition to creating green jobs, the production of felt and yarn will reduce the import dependency of Jordanian manufacturers.

One of the challenges relating to recycled textiles is the need to create appropriate skills. The stakeholders suggested to capitalise on existing capacity building interventions and to direct them towards the creation of green skills. Better professional profiles of green textile specialists could also result into attracting more Jordanians to work in the sector.



Green initiatives should target **resource efficiency in food processing**. This will help alleviate the high cost of production (in particular, energy) and may, in line with the EMV, improve environmental compliance by food manufacturers.

The scenario analysis illustrates that by investing in resource efficiency, Jordanian food-processing manufacturers can create green jobs. The cost savings will help both the sector to expand their output, and indirectly the households which would benefit from higher local production through raised incomes.

Stakeholders suggested that, for implementing resource efficiency measures, skills are crucial and currently represent a bottleneck to greening the sector. Therefore, increasing attention should be dedicated to skills and capacity building as well as to building workers' awareness of green processes in food production.



As a by-product of the expansion and improvements in wastewater, **sustainable management of sludge** is becoming a further priority, being connected with the high cost of disposal. The scenario analysis shows the additional green employment generated in the water sector from improved practices. The high investment benefits the entire economy in the short term, with additional employment being generated to build the facility to dry the sludge.

In addition to the benefits explored by the what-if scenario on using sludge for energy production in other sectors, the experts recommended its use for electricity generation in water treatment plants. Experts estimate that this would yield a reduction of electricity cost in wastewater facilities by 30%. More wastewater treatment plants adopting sustainable management of sludge should heighten the relevance and profitability of this option. Investments in R&D are a precondition for improving sludge management and should be accompanied by capacity and skills development. Better sludge management will also result in higher demand for new professional occupations, such as sludge managers and technicians and both academic and vocational training institutions should respond swiftly to support this new trend.

Transport is one of the key sectors targeted by the EMV, aimed at fostering increased adoption of clean energy in transport and **improving public transport**. Current barriers are connected to the inadequacy of a reliable network of transportation for both people and goods, in particular in light of growing population and connectivity needs. Growing mobility demand in Jordan has not been met with the required development of public transport to enable passenger movement and accessibility (World Bank, 2022b), while road transport remains the only available way of transporting commodities in Jordan.



In line with the EMV's ambition for the sector, the what-if scenario postulated increased adoption of e-buses for public transport and e-charging facilities throughout the Kingdom, resulting in significant indirect, and induced employment effects. To support this change, authorities should develop an appropriate regulatory framework including progressive plans and clear targets for the decarbonisation of mobility. Considering that, except for the Greater Amman Municipality, public transport is mostly licensed to private providers, financial incentives to compensate investment in more expensive e-buses should be designed and, in parallel, charging infrastructure should be built throughout the country. The results suggest that this holds considerable potential to add green jobs to the economy.

The **agricultural sector** is depicted as one of the strategic sectors of the EMV, also due to its link to food security, resilience, and income opportunities of rural communities, as well as to its significant water use. Water scarcity, fragmentation of land ownership, low levels of investment, low productivity, and informality of operations are all factors constraining the growth of the sector (Jordan Government, 2022).



Based on the NDCs, improving the efficiency of irrigation should be achieved by boosting adoption and building capacity for water harvesting techniques, but also by increasing acceptance among farmers of using treated wastewater, and expanding drip irrigation. The use of drip irrigation makes agricultural production greener. The current green jobs estimated in agriculture are linked to vegetable production. By extending this green process to other types of crops, Jordanian agricultural sector could increase the number of green jobs in the sector.



Despite observing encouraging improvements in the deployment of renewable energy, Jordan's **energy** mix is still dominated by conventional (imported) fuels. Authorities are envisioning a green transition of the sector and energy is at the core of the Jordan Energy Strategy 2020-2030 (MEMR, 2020).

Reviewing the structure of the sector, energy efficiency improvements should guide a fully-fledged portfolio of interventions, targeting companies, as well as private individuals. Public awareness and a streamlined certification process should be regarded as a precondition for the success of this line of interventions. Green jobs are found in the part of electricity generation using renewables and in the adoption of energy efficiency technologies. The higher the share of renewables in electricity generation, the higher will be the number of green jobs in the sector.

According to the EMV, tourism is both addressed as a driver of growth within the Destination Jordan flagship initiative and within the Quality-of-Life framework. The COVID-19 pandemic had a significant negative impact on tourism and led to major job losses in the sector.



Green jobs are currently found in **eco-tourism** and in **green hotels**. The green transition of the tourism sector necessitates investment and emphasises the value of corporate social responsibility. Government incentives for certification may be crucial in facilitating this change and increasing the green jobs potential of the sector. For example, initiatives directed towards awareness and tailored marketing for eco-tourism in Jordan could be implemented and, once again, skills for qualified eco-tourism operators need to be fostered. Investing in awareness and skills can also benefit the entire supply chain, with potentially important employment and income effects among typically marginalised social groups, such as farming communities and agro-pastoral workers in rural areas





6 Conclusions

6 Conclusions

This report allowed for an initial assessment of current green jobs in key sectors of the Jordanian economy - water and waste, energy, transport, agriculture, manufacturing, and tourism - and showcased through specific green economy initiative that Jordan holds great potential for green employment creation from additional capital investments in green technologies. Green investment promotion will play a pivotal role in creating and sustaining green jobs, as well as supporting a widespread transition towards a green economy in Jordan.

The current level of green employment in the six key sectors is between 74,135 and 95,060 jobs. Transport and agriculture are the sectors with the highest number of green jobs.

National strategies and individual sector green initiatives are expected to increase employment above the business-as-usual case. Six sector-level green initiatives were selected for simulation with a macroeconomic model, showing that direct investments in the green economy can indeed yield economic benefits while helping to preserve and restore the environment at the same time.

By 2030, over 350 direct green jobs could be created from investments in specific green economy initiatives. Additional employment (indirect and induced) in the rest of the economy during the investment/ construction phases ranges from 6,500 to 8,300 jobs. By 2030, around 350 additional indirect and induced jobs in the economy will be generated by the operational phase of those green economy initiatives.

Such investments need to be supported with a robust legal framework that creates enabling conditions for green financing, technology transfer, and capacity development of human resources in addition to market-based incentive systems that encourage the private sector to generate green jobs.

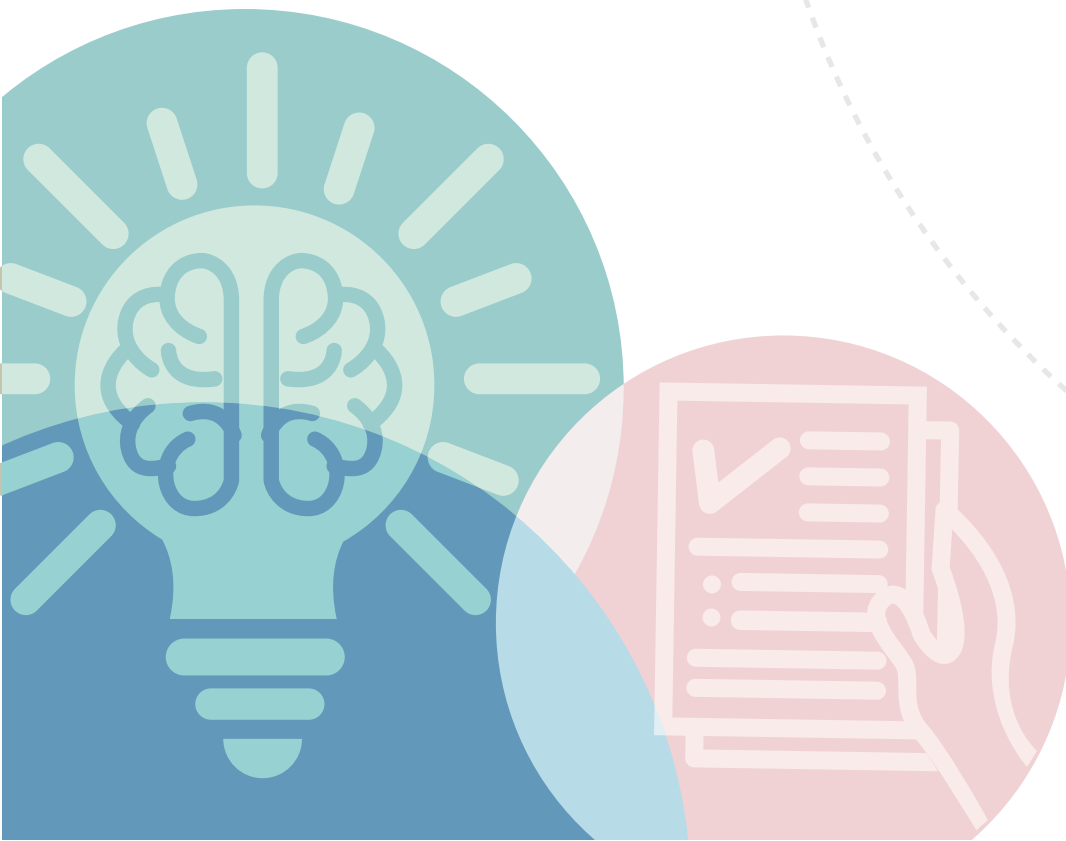
This current assessment serves as a starting point for more economy-wide and sector-specific scaling up of green jobs assessments, using new data sources and more in-depth investigation. Enabling economic and social policies should be explored to create the proper conditions for green job creation, greening of current jobs and the enhancement of practical skills in the labour force in Jordan to realise the emerging potential for green jobs.

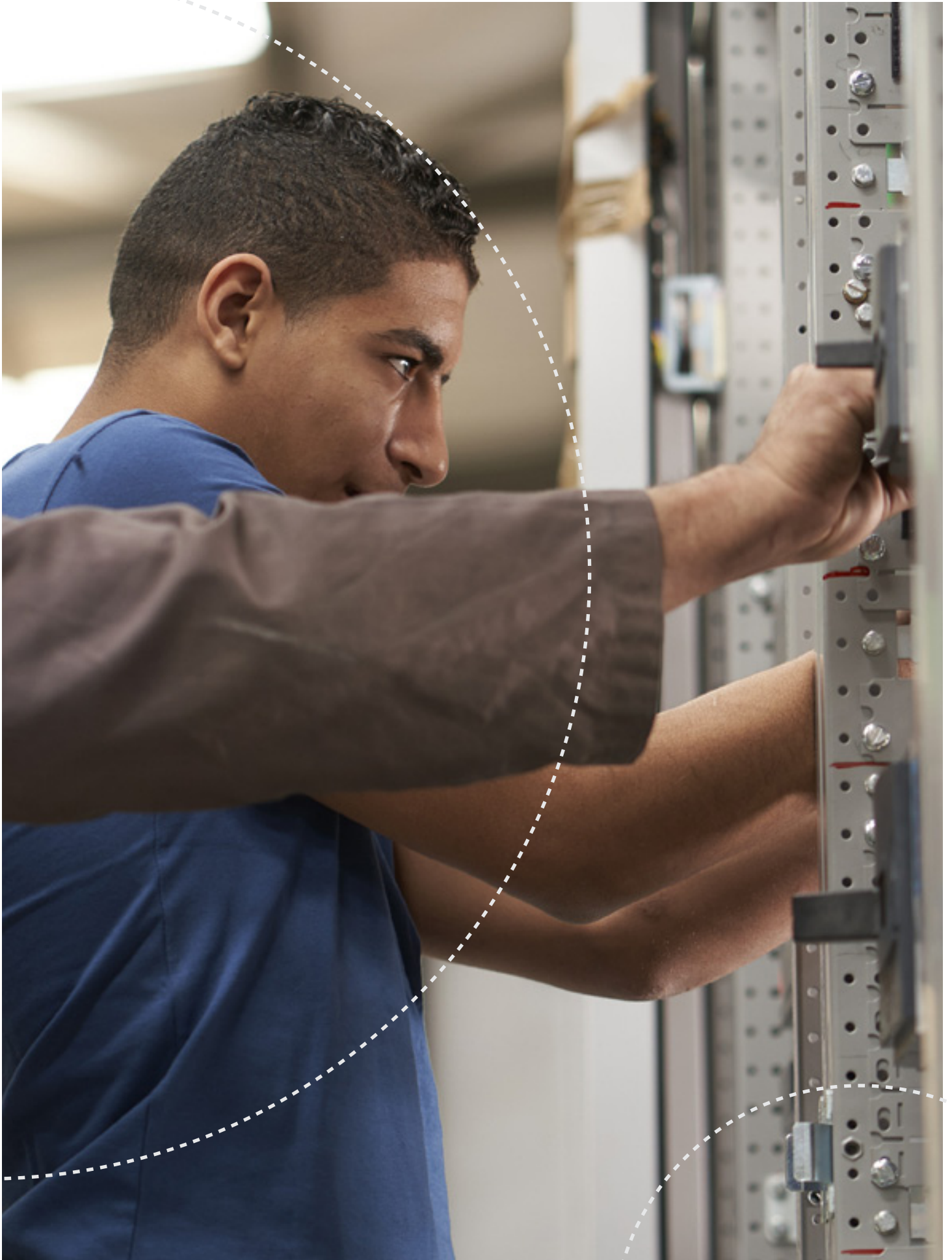
While the analysis shows that the green transition has the potential to increase net jobs, the pattern of job gains and losses suggests that careful design of an appropriate policy package (including legislative changes) will be important to manage a smooth jobs transition. For example, it would be desirable to enact energy efficiency, EV deployment and renewables take-up as a package to support stable energy and employment demand, while also pursuing effective decarbonisation. Implementing a package of policies facilitates synergies and can help ensure that jobs created in one sector absorb the jobs losses in another sector. Education and training

that jobs created in one sector absorb the jobs losses in another sector. Education and training providers will also play a crucial role in the smooth transition of workers between the sectors/roles.

The impacts of new technological trends could either support or deter green job creation, depending on the strategic approach taken by both the public and private sectors. Technology will also redefine some jobs, so re-skilling opportunities would help current workers remain in employment as skills requirements change.

The transition to a green job market is a long process that requires political commitment, wide-ranging policy reforms, tools for measurement of green jobs creation and the adoption of appropriate technologies. If such commitments could be achieved, Jordan seems well-positioned to unlock the potential of the green economy in generating meaningful employment opportunities.





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