

“Energy Transition and Green Skills”

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**INSTITUTE OF ENERGY
FOR SOUTH EAST EUROPE**



Definitions

- **“Green jobs”** are decent jobs that improve efficiency in the use of energy and raw materials, limit greenhouse gas (GHG) emissions, minimize waste and pollution, protect and restore ecosystems, and support adaptation to the effects of climate change. They can be found in traditional sectors such as manufacturing or construction, or in new, emerging green sectors such as renewable energy and energy efficiency (*ILO 2016*).
- **“Skills”** refer to the knowledge, competence and experience needed to perform a specific task or job. A “skill” is an ability to carry out a manual or mental activity, acquired through learning and practice.
- The **Green General Skill index** (*Vona et al., National Bureau of Economic Research*) identifies four groups of work tasks that are especially important for green occupations:
 - Engineering and technical skills: engineers, technicians.
 - Science skills: biologists, physicists.
 - Operation management skills: sales engineers, climate change analysts, sustainability specialists, chief sustainability officers and transportation planners.
 - Monitoring skills: environmental compliance inspectors, monitoring technicians, emergency management directors and legal assistants.
- **Soft skills:** design thinking, creativity, adaptability, resilience

ILO’s definition of Green Jobs



Source: ILO

Impact of green transition to employment



- There are three main ways in which the transition to a green economy affects needed skills (*UNIDO*):
 - structural changes lead to **increased demand for some tasks** and a **decrease for others**;
 - new economic activity will create **new occupations** and there will be a need for **new skills profiles**, qualifications and training frameworks;
 - many existing occupations and industries will experience **greening changes to tasks within their jobs**, and this will require adjustments to the current training and qualification frameworks for these occupations.

Current and expected effects of climate change and green economy policies on employment

Effects	Examples	Expected scale
New jobs will be created (in existing and new occupations)	Solar panel technicians, organic farmers, recycling managers, staff in eco-tourism resorts, workers in natural resource conservation and restoration, environmental advisers, workers in bicycle shops.	Modest
Certain jobs may be eliminated	Coal miners, workers in bottling industry adopting water and material-saving technology, staff of obsolete or prohibited packaging materials industry	Small
Jobs will be substituted (occupations change)	Jobs in transport systems moving to rail, electric cars and shared vehicles, waste management jobs in landfilling/dumpsite moving to incineration and recycling, jobs in quarries for construction using new building materials and re-use of left-overs and waste	Modest
Most jobs will be transformed (occupational profiles change)	Workers, operators and managers in greening sectors notably buildings, agriculture or transport: all learning to manage new technology and operating practices; workers in all sectors where energy and resource efficiency is introduced (cleaner production in manufacturing, retail services without packaging, bottle companies changing to new materials and products), staff in financial institutions adopting sustainable strategies.	Large

Source: UNIDO

The energy sector and energy transition

- The energy sector contributes just above 7% of global GDP and accounts for about 1% of all jobs (coal mining, oil and gas extraction, processing of fossil fuels, electricity generation – fossil or renewable- operation and maintenance of electricity grids) (*IRENA 2020*).
- It is the source of around three-quarters of greenhouse gas emissions globally (*IEA*).
- **Energy Transition:**

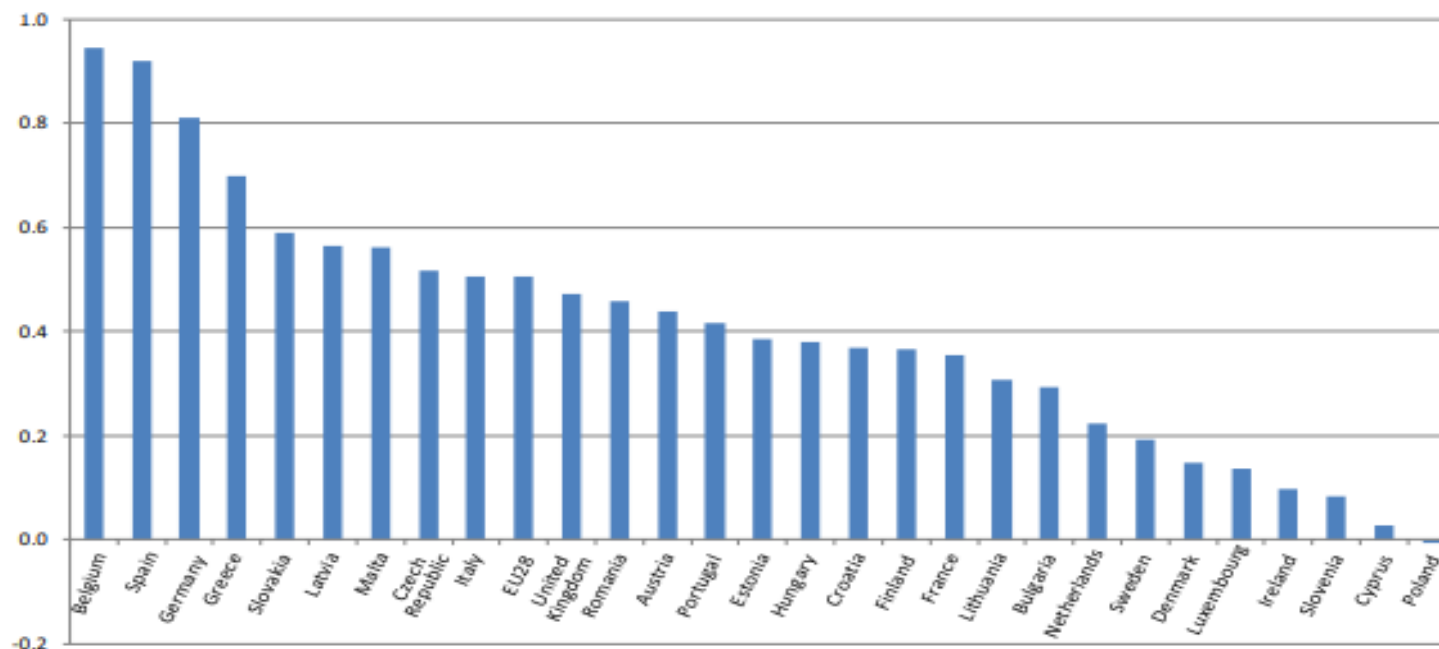
Energy transition refers to the global energy sector's shift from fossil-based systems of energy production and consumption — including oil, natural gas and coal — to cleaner energy sources and improved energy efficiency - renewable energy sources like wind, solar, hydro, geothermal and energy saving.
- Drivers of energy transition: renewable energy, electrification, energy storage, improved energy efficiency, electric mobility.
- The transition to a low carbon economy inevitably brings about changes in sectors and occupations, and therefore in workforce skills and competences.

Implications of the Paris Agreement

Regional summary table, 2030, percentage difference from baseline

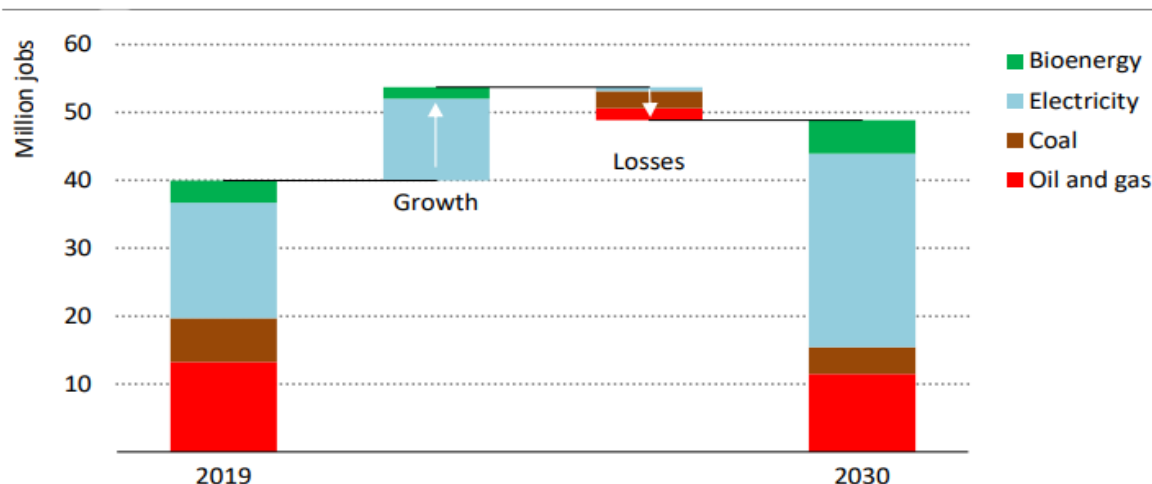
	Global (%)	United States (%)	China (%)	India (%)	EU28 (%)
GDP	0.1	-3.4	4.7	0.6	1.1
CO ₂	-34.7	-45.5	-26.5	-53.2	-20.3
Employment	0.5	-1.6	2.3	0.1	0.5
Investment	1.0	-2.5	3.2	1.1	1.7
Consumption	0.4	-2.0	11.2	-1.1	0.7

Impact on employment by country, 2030, percentage difference from baseline



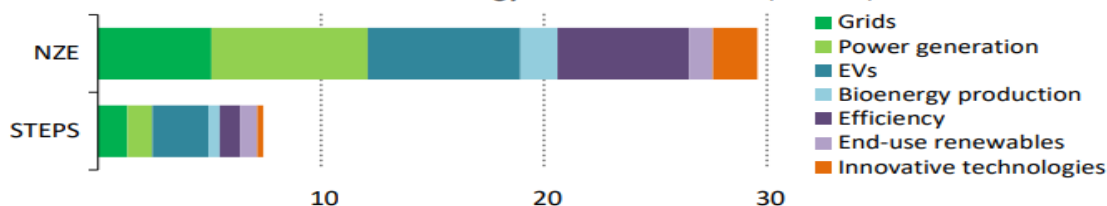
Global Energy Jobs by 2030

Global energy sector employment in the NZE, 2019-2030

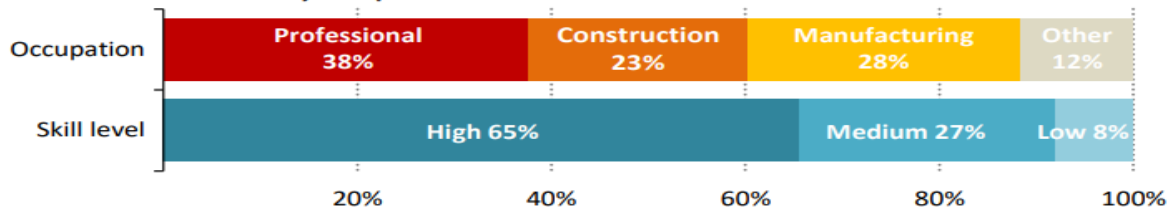


Overall direct employment in the energy sector increases by almost 9 million to 2030 as jobs created in clean energy sectors outpace losses in fossil fuels.

Additional workers in clean energy and related sectors (millions)



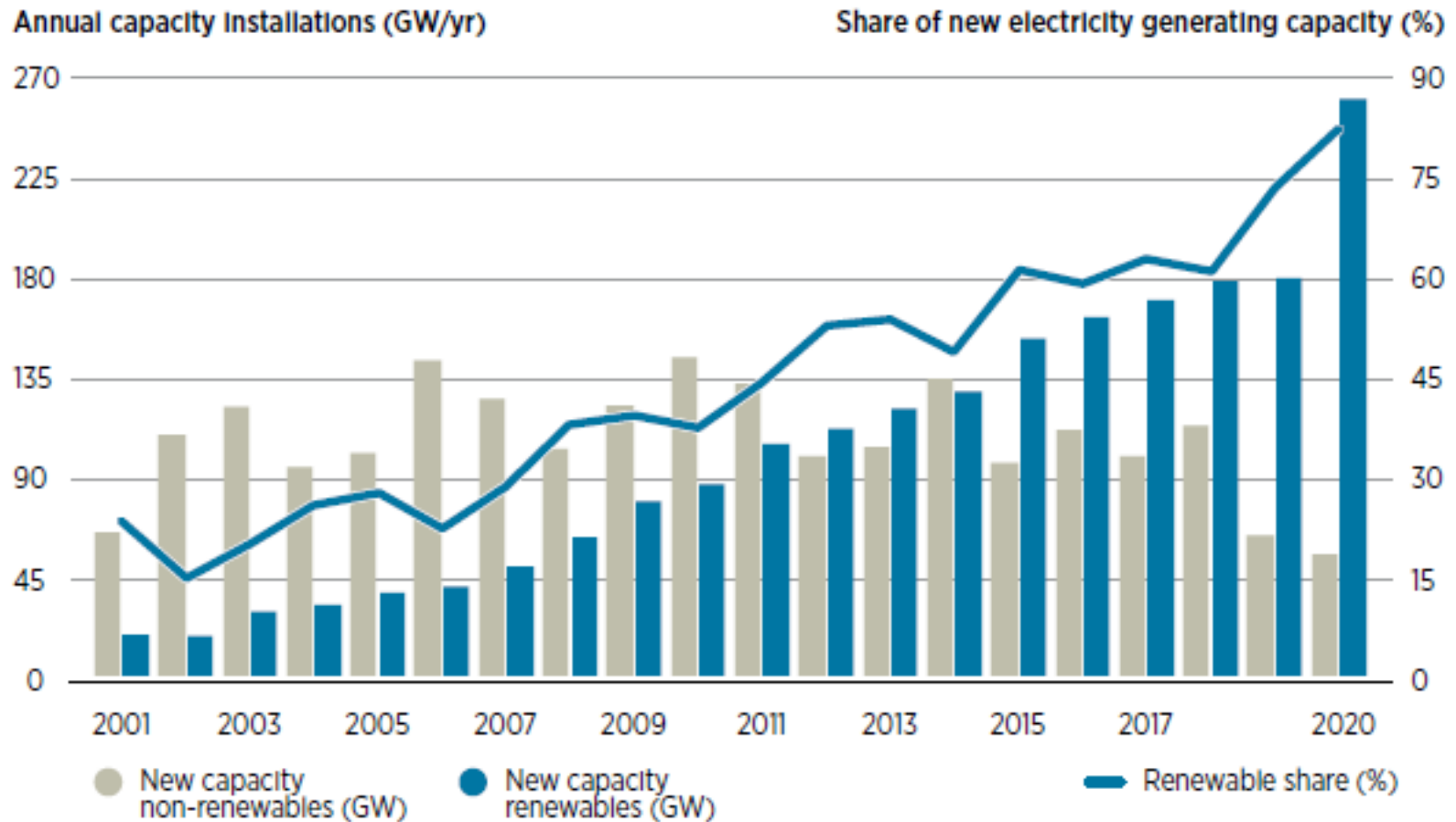
Positions by occupation and skill level in the NZE



Net-Zero Emissions by 2050 Scenario (NZE): global CO2 emissions reach net zero by 2050 and investment rises across electricity, low-emissions fuels, infrastructure and end-use sectors.

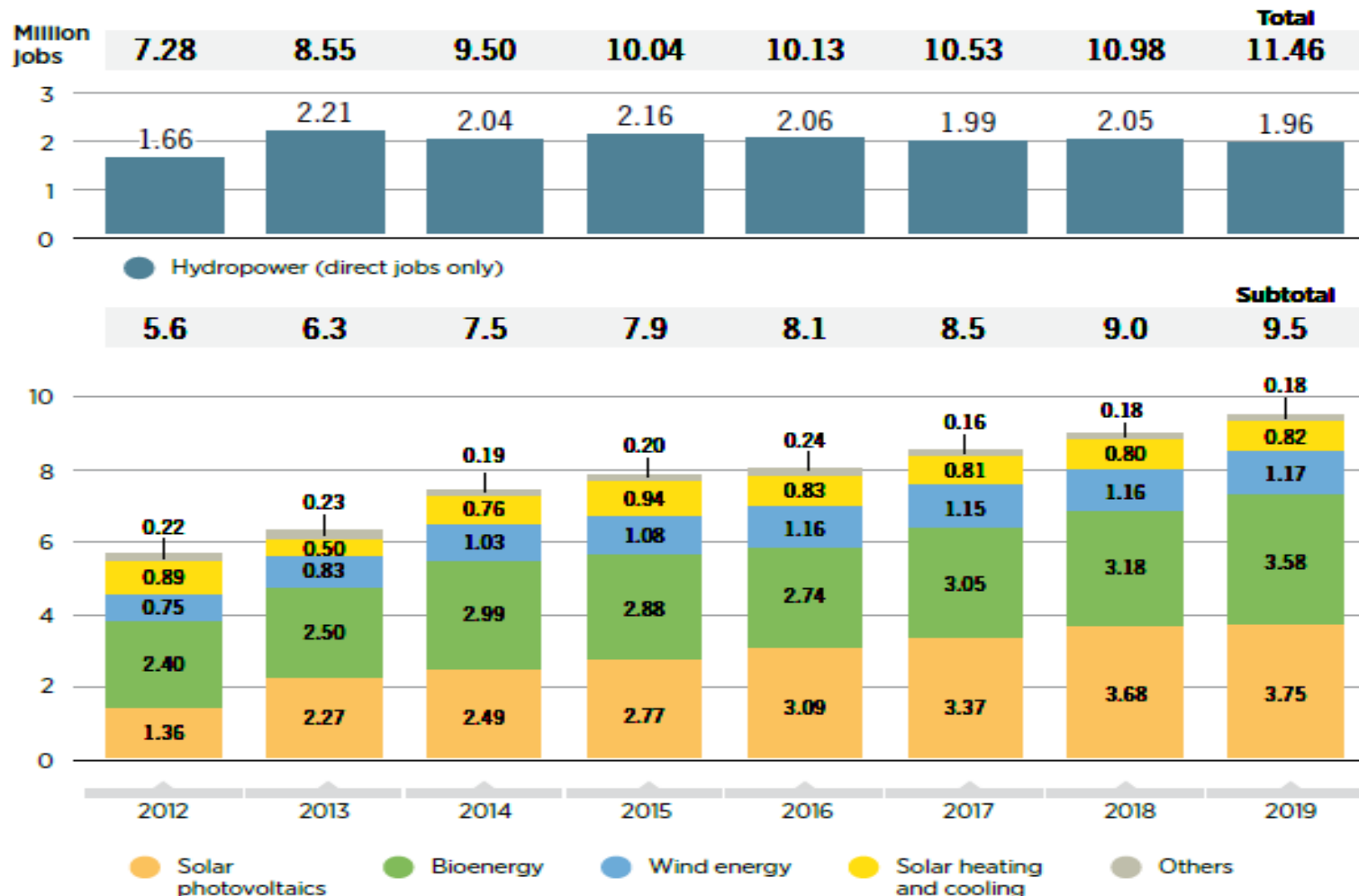
The Stated Policies Scenario (STEPS): CO2 emissions rise from 34 Gt in 2020 to 36 Gt in 2030 and remain around this level until 2050. Oil use in 2050 is 15% higher than in 2020.

Share of electricity capacity 2001-2020



Source: IRENA – World Energy Transitions Outlook 1.5 C Pathway

Global Renewable Energy Employment by Technology



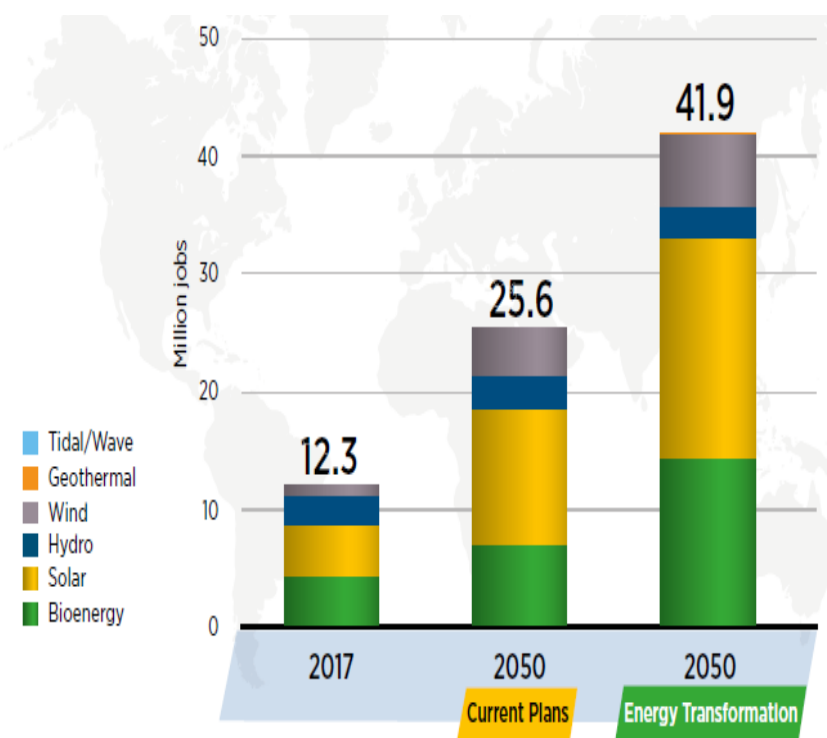
Source: IRENA – Renewable Energy and Jobs Annual Review 2020

Global Renewable Energy Jobs by 2050

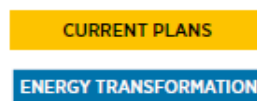
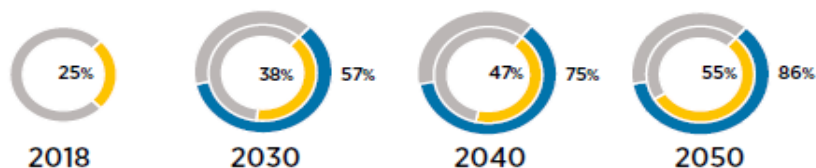
According to IRENA (energy transformation scenario):

- Accelerated uptake of renewables could boost total energy jobs to **100 million by 2050**.
- Energy efficiency jobs would reach **21 million**.
- Jobs in renewables could reach **42 million by 2050**.
- Asia could account for **64% of jobs in renewables by 2050**, the **Americas 15%**, and **Europe 10%**.
- In terms of all energy jobs, **Asia could have over 60% by 2050**, the **Americas 13%**, and **Europe 12%**.

Global jobs in renewable energy (2017 and 2050)



Renewable energy share in power generation

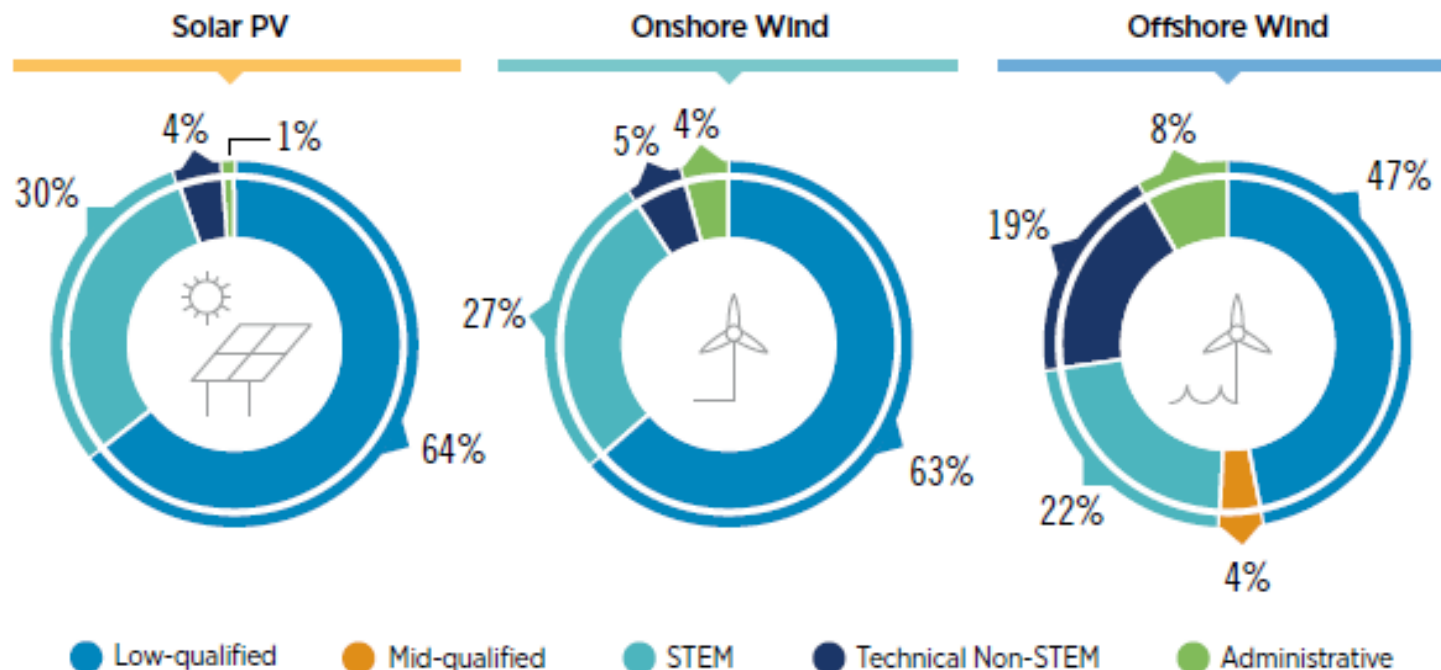


Source: IRENA – *Measuring the Socio-economics of Transition: Focus on Jobs, 2020*

Human Resources Requirements in the Solar PV and Wind Industries





The renewable energy sector offers employment prospects for people with a wide range of experiences and backgrounds, and **many of the required skills are typically available in most countries. While there is a demand for professionals** with training in fields such as science, technology, engineering and mathematics (STEM), as well as other highly qualified individuals (such as lawyers, logistics experts, marketing professionals, financial analysts and experts in regulation and standardisation), **most jobs do not require a university degree, but high manual dexterity and on-the-job experience.**



Occupations and skill sets in current and future demand in the renewable energy sector



- Occupational change most affected by the green transition (2018).

SECTOR	NATURE AND EXTENT OF OCCUPATIONAL CHANGE TO DATE	EXAMPLES OF NEW AND CHANGING OCCUPATIONAL PROFILES ^A
Renewable energy 	<p>One of the most significant sectors for development of new occupational profiles, and common to all countries. New occupations may also come into being alongside closely related existing trades, e.g. in solar energy systems installation</p>	<p>Medium skill level: solar PV/wind turbine/biomass systems: installers, technicians, plant managers, quality engineers. Existing trades with new relevant knowledge and skills: electricians; plumbers; heating, ventilation and air-conditioning technicians</p> <p>High skill level: Engineers and system designers (overlap with manufacturing)</p>
Manufacturing 	<p>All manufacturers will need new skills related to reduction of environmental impacts; this may involve new occupations, e.g. pollution control officers</p> <p>Greatest effects on manufacturers involved in design and manufacture of products for the “greenest” sectors, i.e. renewable energy (solar panel systems, wind turbines, biodigesters) and green construction (insulation, energy efficiency). Likely to involve mainly adaptations of existing occupations rather than wholly new ones, though eco-design is a new field</p>	<p>Medium skill level: occupations related to reducing environmental impacts, e.g. pollution control officers, energy auditors (overlap with environmental goods and services)</p> <p>High skill level: occupations related to design and production of new products and systems, e.g. product designers, production engineers</p>

Source: ILO – Skills for a greener future. A global view

SMEs basic figures

- SMEs represent: 99% of enterprises in the global economy, 60% of employment, 13% of global total energy demand (*Interreg Europe Policy brief: Sustainable energy in SMEs*).
- Greece and EU-27

	ENTERPRISES		PERSONS EMPLOYED		VALUE ADDED	
	NUMBER	SHARE	NUMBER	SHARE	€ BILLION	SHARE
Greece, 2020						
SMEs (0 -249 persons employed)	718 558	99.9%	2 153 872	83.0%	24.6	56.7%
LARGE ENTERPRISES (250+ persons employed)	522	0.1%	442 391	17.0%	18.7	43.3%



The data for 2020 are estimates produced by DIW Econ, based on 2008-2018 figures from national and Eurostat databases.

Source: European Commission 2021 SBA Fact Sheet

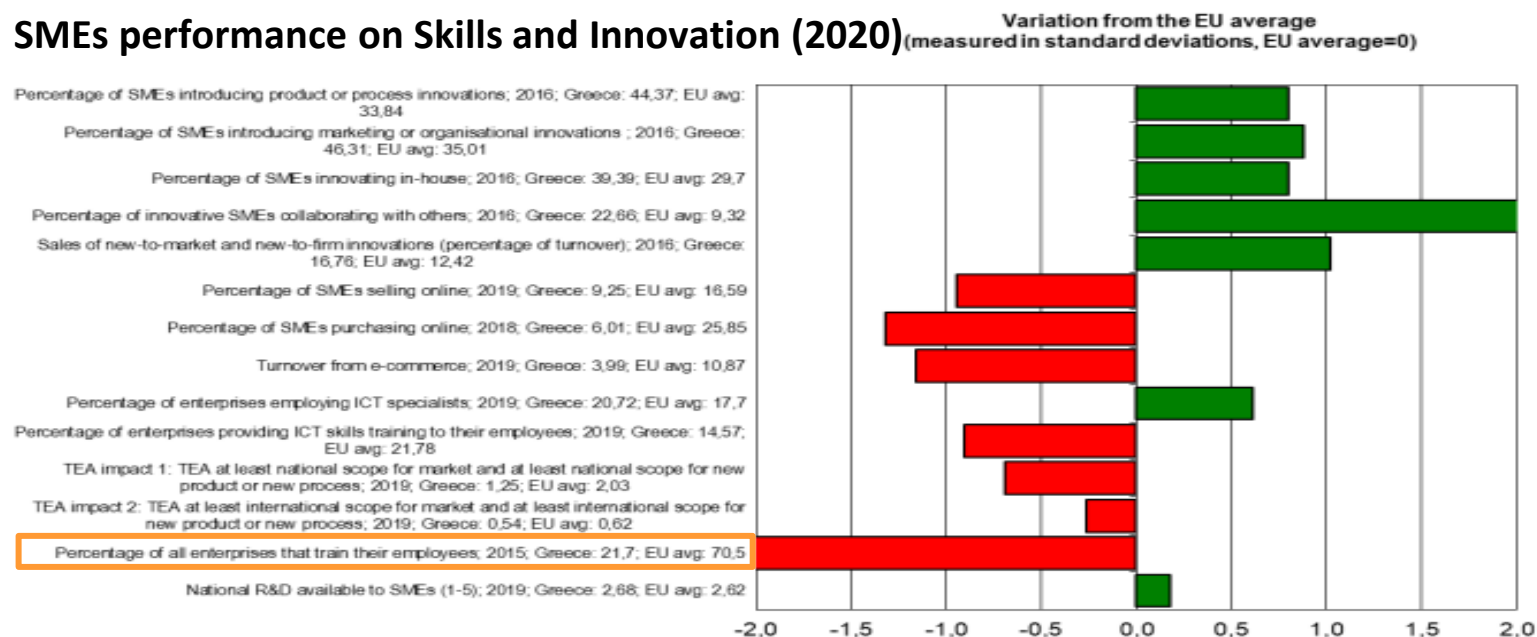
➤ Outlook for 2021

	Value added in 2019 (in € million)	Estimated value added in 2020 (in € million)	Forecasted value added in 2021 (in € million)	Percentage change in value added from 2019 to 2020	Percentage change in value added from 2020 to 2021	Level in 2021 relative to level in 2019
EU27	3,614,135	3,338,286	3,531,010	-7.6%	5.8%	97.7%
EL	30,590	24,551	28,016	-19.7%	14.1%	91.6%
	Employment 2019	Estimated employment in 2020	Forecasted employment in 2021	Percentage change in employment from 2019 to 2020	Percentage change in employment from 2020 to 2021	Level in 2021 relative to level in 2019
EU27	84,879,280	83,397,944	83,885,840	-1.7%	0.6%	98.8%
EL	2,185,073	2,153,872	2,381,580	-1.4%	10.6%	109.0%

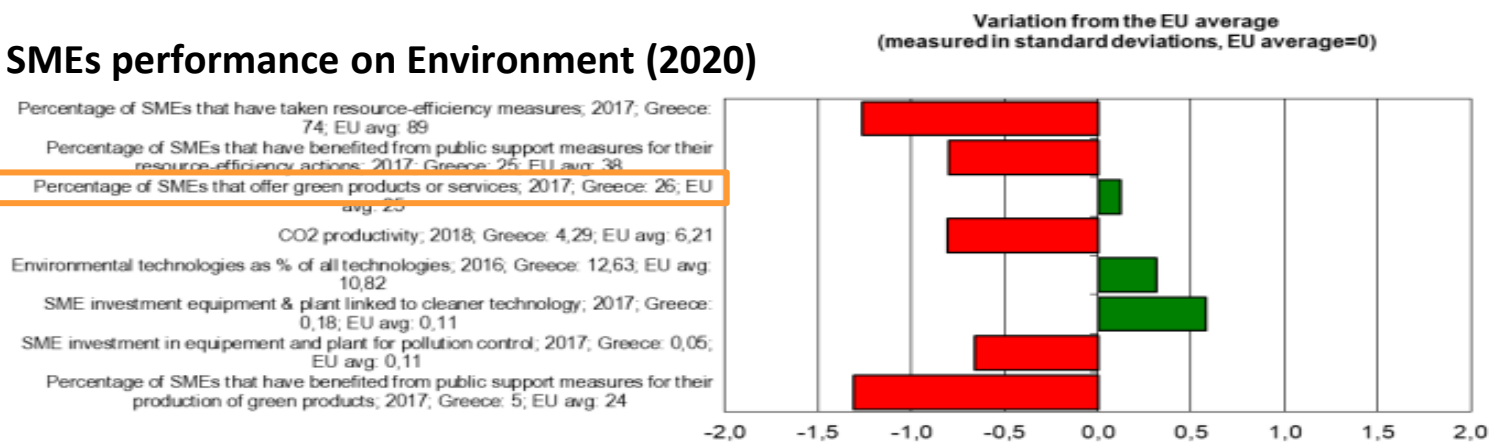
Source: European Commission- Annual Report on European SMEs 2020/2021

The case of Greece

□ SMEs performance on Skills and Innovation (2020)



□ SMEs performance on Environment (2020)

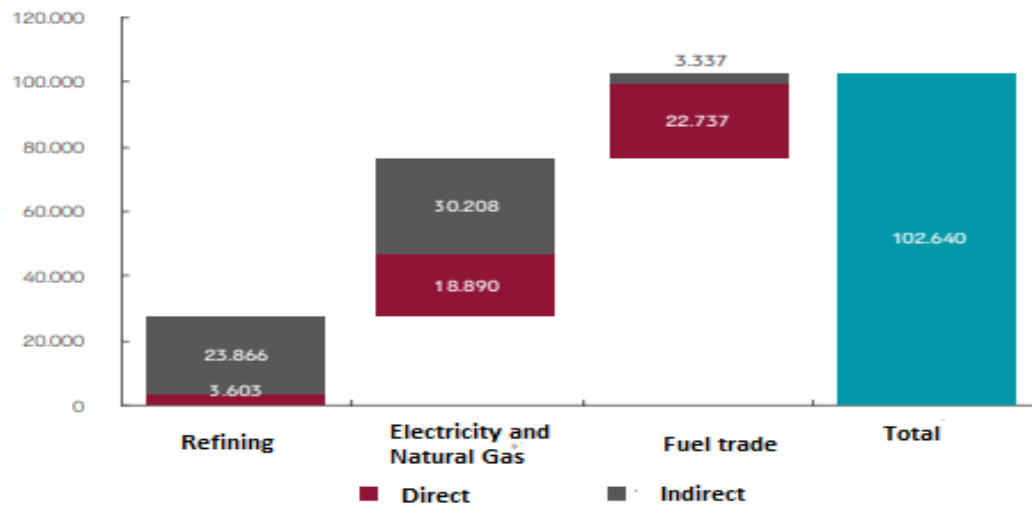


Note: Data bars pointing right show better performance than the EU average and data bars pointing left show weaker performance.

The case of Greece

- DIANEOSIS research “The Energy Sector in Greece” concludes that direct and indirect employment in the Greek Energy Sector was 102.640 people in 2017.

Direct and indirect impact of energy sector on employment, 2017



- 64% of this figure corresponds to people employed in SMEs in the Greek Energy Sector.

- **Just Transition Development Plan of lignite areas.**

- Photovoltaic parks, green hydrogen production, power storage facilities, biomass processing center, electromobility industrial park etc.
- Around ~ 8,000 total jobs by 2028.



The case of Greece

W. Macedonia: ~2,600 positions (~47%) are expected to require moderate or high reskilling

Initial assessment

New skills	Positions to cover	Absorbed skills and coverage ¹	Difference	Reskilling need
Architects, engineers	~215	Engineers / Physicists (~1,130)	+915	Low
Craftsmen, drivers, etc. ¹	~1,295	Drivers / Operators(~1,450)	+155	Low
Doctors, nurses, etc ²	~220	Biologists / Doctors(~420)	+200	Low
Business Executives	~515	Economists (~210) Office Workers(~1,130)	+825	Low
Researchers, scientists	~615	Engineers / Physicists(~915)	+300	Low
Horticulturists, agronomists, winemakers	~160	General Duties(~450)	+290	Moderate
Farmers, stockbreeders	~260	Unskilled workers (~1,220)	+960	Moderate
Catering tourism professionals	~520	Merchant / Sellers(~1,800)	+1,280	Moderate
Other administrative staff	~1,615	Office Workers (~820) Merchants/ Salesmen (~1,280)	+485	Moderate
Total	~5,415	~7,850	+2,400	

~47% of the total

Need and type of reskilling
 Low (<1 month intra-corporate) Moderate (1-3 months in a competent body) High (3+ months in a competent body)

Note: Skills marked with "bold" are absorbed into two skills for this and displayed with different numbers in parentheses? Were the indirect and induced jobs estimated based on the multipliers of TEE w. Macedonia? 1. In parentheses the number of positions that can be filled per skill? 2. Secondary absorption option Source: SDAM Group Analysis

The case of Greece

Megalopolis: Possible influx of up to ~1,200 employees and moderate to high reskilling for ~1,000

Initial assessment

New skills	Positions to cover	Absorbed skills and coverage ¹	Difference	Reskilling need
Architects, engineers	-130 (-5%)	Engineers / physicists (-125)	-5	Low
Craftsmen, drivers, caretakers, etc. ¹	-990 (-37%)	Construction Technicians (-70), Drivers/ Operators(-415), Unskilled workers(135)	-370	Low
Doctors, nurses, etc. ³	-25 (-1%)	Biologists / Doctors(-25)	0	Low
Researchers, scientists	-255 (-10%)	Biologists / Doctors (~10), Teachers(-15)	-230	Low
Business Executives	-210 (-8%)	Economists (-15)	-195	Low
Farmers, stockbreeders	-135 (-5%)	Unskilled workers(-135)	0	Moderate
Other administrative staff	-695 (-27%)	Office Workers (-185), Merchants / Sellers (-150)	-370	Moderate
Horticulturists, agronomists, winemakers	-85 (-3%)	Others (-85)	0	High
Catering tourism professionals	-115 (-4%)	General Duties (-35), Others (-55)	-25	Moderate
Total	-2,645	-1,500	-1,200	

Need and type of reskilling

- Low (<1 month intra-corporate)
- Moderate (1-3 months in a competent body)
- High (3+ months in a competent body)

Possible influx of up to -1,200 employees

Note: Skills marked with "bold" are absorbed into two skills for this and displayed with different numbers in parentheses? Were the indirect and induced jobs estimated based on the multipliers of TEE w. Macedonia? 1. In parentheses the number of positions that can be filled per skill? 2. Secondary absorption option Source: SDAM Group Analysis

IENE - Energy and Employment

- ❖ A major study in progress **“Energy and Employment in Greece 2021/2022”**. It follows an earlier study on “Energy and Employment” conducted by IENE in 2013.
- ❖ The aim of the current study is:
 - to provide an estimate of the total workforce in the energy sector and also identify the workforce strength for the different branches (e.g. oil, gas, electricity, renewables etc.),
 - to highlight the prospects for further employment growth in years 2025, 2030, and
 - to identify the skills needed for the energy sector transformation and to present the new evolving profile of the Greek employee in the energy sector.

The research and analysis is based on data that will be collected from Greek and international sources, as well as on questionnaires and interviews conducted with individual companies and business associations.



**Thank you for
your attention**

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