



Training on Photovoltaics with participants from Muscat, Oman © RENAC

Ensuring qualified staff for green energy market development

RENAC

The Renewables Academy (RENAC) AG is an internationally oriented training provider specialising in renewable energy technologies, energy efficiency, and fields of application for green hydrogen and power-to-X. We offer online courses, in-person training in Germany and abroad, set up local training structures and Train-the-Trainer seminars, implement study courses in cooperation with universities, and consult on training related topics.

All Arabic economies recognise the importance of green energy technology market development. Green energy technology development (including renewable energy technologies and energy efficiency measures) has positive macroeconomic effects such as job generation, diversification of energy sources, CO₂ reduction, and continuity of energy supply. It is also clear that increasing energy efficiency and renewable energy applications requires well-qualified staff for different job profiles along the whole value chain. Staff with various qualifications and expertise in green technology are needed in the public, private, and finance sectors.

When policy frameworks and economics favour green energy technology investment, the markets will develop, and the demand for a skilled labour force will increase.

Considering this growing demand, how should education and training programmes for green energy technology be organised so professionals can access the necessary training? And which approaches to training and education are promising? To answer these questions, we need to consider important variables.



PV module installation within a training for grid-connected PV in Cairo, Egypt © RENAC

Value chain

To support renewable energy and energy efficiency, a comprehensive approach involving the whole value chain (e.g., public, private, and finance institutions) is vital for success. Each sector has its responsibilities and tasks. Ministries define the policy framework, and local authorities are responsible for approval processes or investments. Private companies are doing project development, engineering consultancy, installation, operation, and maintenance. The finance sector is critical to making investments possible. And the grid operators must integrate fluctuating power from renewables into the grid.

Additionally, mounters, electricians, engineers, architects, lawyers, and economists are also crucial for realising the benefits of green energy technology development. These professionals may need to access further training. Considering the potentially diverse education and training needs of these professionals, the training landscape should include a variety of offers, including short-term further qualification opportunities, TVET programmes, and academic education programmes.

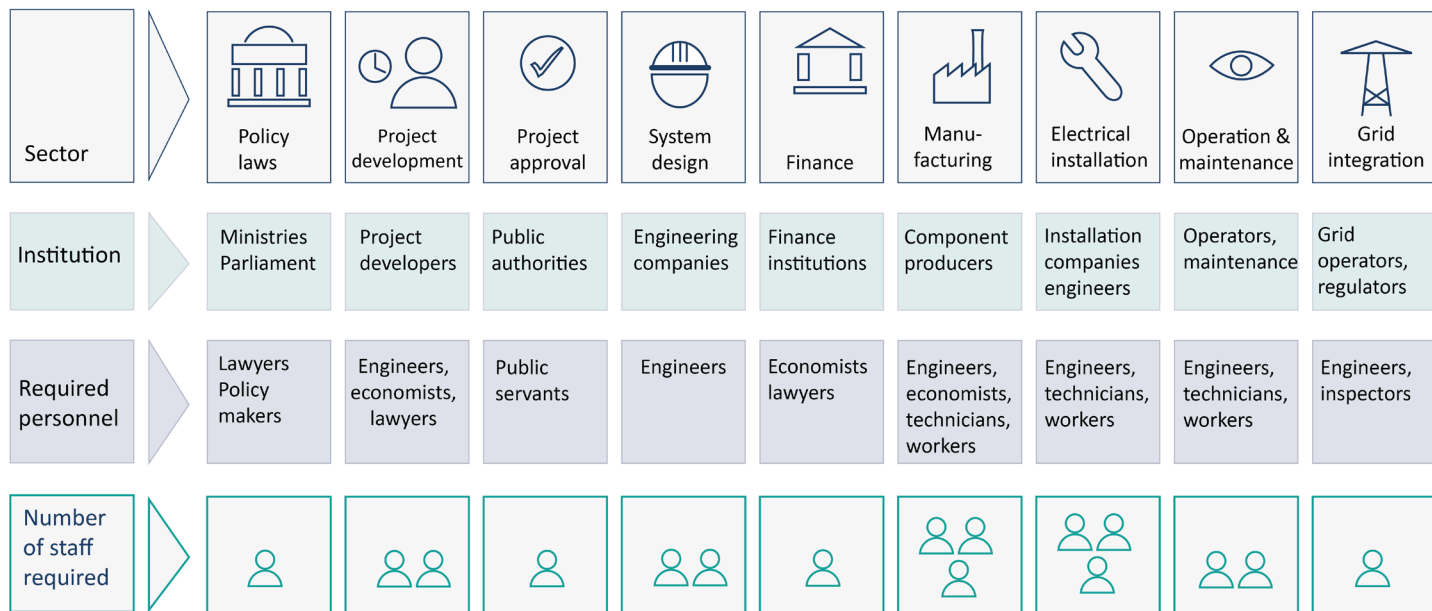
The challenge lies in simultaneously developing qualification offers for all relevant professions. If any key stakeholder group, such as grid operations or finance sector professionals, is not ready, the green energy technology market potential can remain constrained.

Qualification levels and training institutions

There are three main segments where educational programmes and short-term training are currently offered:

- Technical-vocational training as part of professional degree apprenticeships.
- Academic study programmes at universities that offer bachelor's or master's degrees.
- Further training for professionals with working experience or unskilled staff.

To ensure that there is a well-trained workforce in the mid to long term, integrating green energy technology instruction and education into standard curricula is key. Also,



Grafic 1: Value chain for different green energy technologies and required staff by professions

photovoltaics (PV) and energy efficiency training should be made mandatory parts of TVET programmes for electricians and technicians.

Within academia, universities should enable relevant departments to offer courses on the technical, legal, and economic aspects of green energy technology. Integrating these topics into academic programmes as electives for engineers, architects, economists, and lawyers would be foundational in establishing the continuous training of graduates who can immediately work in relevant institutions driving the green energy market development. This can support the economic expansion of the green energy market.

Time perspective

Economies pursuing a green energy market increase should consider the short-, mid-, and long-term need for qualified personnel by supporting an educational landscape that reflects the necessary qualitative and quantitative training needs.

The demand for short-term training can quickly be satisfied as national or international training providers already offer most of these training opportunities. It may take longer to integrate and make mandatory PV or energy efficiency training into electrician apprenticeship programmes because they involve the consent of relevant ministries or accreditation bodies. Also, elective integration into study programmes must follow an approval process involving education ministries and university boards.

Training approaches for green energy in the MENA region

RENAC has established itself as an international training provider with 16 years of experience working with training participants from many Arabic countries to support green energy technology market development. We want to highlight a selection of successful training approaches we have conducted over the years by providing an overview of different training activities, methods, and consultancy services.

RENAC projects in the region

Preparing the finance sector for green energy finance

The lack of adequate financing options remains a significant obstacle to the green energy technology market development in many countries. A key reason for this is the reluctance of banks and investors to finance renewable energy (RE) technology and energy efficiency (EE) measures due to the lack of experience with these projects, lack of knowledge on technology-specific risk mitigation schemes as well as a lack of information about funds available internationally for financing climate protection projects.

RENAC conducted a Capacity Needs Assessment for green energy finance and executed “Green Banking MENA”, a training programme for the finance sector (e.g., development banks, commercial banks, private equity, risk capital, and infrastructure funds as well as institutional investors) in Egypt, Jordan, Morocco, and Tunisia between 2018 and 2020. The main objective was to transfer knowledge on the technical and economic principles of RE and EE, economic evaluation and assessment of RE and EE projects, risk mitigation, and access to international funding instruments.

The training programme consisted of in-person workshops, online training courses, and train-the-trainer (TtT) programmes in collaboration with local finance associations.

Grid integration of renewables (Re-Grid)

Integrating large amounts of fluctuating renewable power generated by wind and solar PV is an important aspect of successfully pursuing green energy market development. Transmission and distribution grid operators should understand the fundamentals of grid integration and learn how to manage it effectively. Financed by the International Climate Initiative (IKI), RENAC conducted a Re-Grid training programme for management of grid operators and technical experts from Algeria, Egypt, Jordan, Libya, Morocco, and Tunisia from 2011 to 2023. The programme enabled representatives from participating countries to understand the technical challenges, important approaches, and the economics of measures, strategies, methodologies, and technologies related to the grid integration of renewables. The Re-Grid

Explaining a PV system with thin film modules during a study trip in Berlin for a delegation from Kuwait © RENAC





Practical PV training in the STAR-C training center in Mogadishu, Somalia © RENAC

programme was crucial in paving the way for regional renewable market development and grid integration.

Country specific references

Iraq

Based on an assessment of PV market development for Iraq, RENAC designed and executed a training programme on PV and energy efficiency from 2020 to 2023. The programme was financed by the German development cooperation, GIZ, and cofounded by the European Union. The programme aimed to build up local training capacities for PV targeting technicians, engineers, and sales engineers. By developing a local trainer pool, building up three PV training centres, and developing training materials in Arabic and Kurdish, RENAC laid the ground for a continuous offer of PV training courses. The supported training centres are located at the University of Sulaimani, the Baghdad Renewable Energy & Sustainability Center (BRESC), and a TVET for electricians in Basra.

As part of the programme, a website (www.solar-iraq.com) was also created in Arabic, Kurdish, and English. The web-

site aims to increase the demand for PV applications, provide guidance to consultants, and provide a networking platform for PV and energy efficiency professionals and trainers.

Another innovative aspect was the development of the Energy Innovation Coaches (EIC) training programme. The EICs role is to consult consumers with high energy consumption (e.g., public sector, industry, and commerce) on reduction possibilities for electricity demand by implementing energy efficiency measures and on green electricity supply by using renewable power generation.

Additionally, in its role as a service provider for the World Bank, RENAC organised study tours in Spain and Germany for a delegation from the University of Baghdad (UoB). The objective of the study tours, Study Visit for Learning International Good Practices, was to prepare the concept development of a future Center of Excellence in Renewable Energy – Solar at UoB.

Kuwait

The collaboration with Kuwait dates back to 2008. Starting with in-person training for the Kuwait Institute of Scien-

tific and Research (KISR), RENAC offered several training programmes in Berlin for public servants from the Ministry of Electricity and Water (MEW) to support policy-making for renewables. For several years, online training has been offered as scholarship programmes financed by the Kuwait Foundation for the Advancement of Sciences (KFAS).

Somalia

The government of Somalia sees renewable energy as one of the backbones of the country's development. Besides developing energy policies, it strives to build local professional capacities and collaborates closely with the International Solar Alliance (ISA) to establish a Solar Technology Application Resource Centre (STAR-C). On behalf of ISA, RENAC conducted the country assessment, developed the implementation concept, designed the practical training lab, and made a business plan for STAR-C in 2023. After completing the training lab, RENAC conducted four 8-day, in-person training programmes in 2024. These programmes covered installing, commissioning, operating, and maintaining small-scale rooftop solar PV, solar-assisted pumping, and solar mini-grids with international and national trainers.

Oman

The Public Authority for Electricity and Water (PAEW) in Oman has used RENAC's expertise to build up in-house capacities for policymakers and regulators in 2010 and 2016. The objectives of the training courses were to provide participants from the public sector with the necessary basic knowledge (e.g., technical, legal, economic) to develop and monitor policies concerning energy efficiency in the built environment and solar technologies. For the practical part of the PV training, RENAC brought its mobile PV training centre to Muscat. These training opportunities contributed to the progressive and forward-thinking development of Oman's green energy policies.

The way forward

Enabling local professionals to work along the entire value chain of green energy technology is key for its market development. The leading technologies for the MENA region are solar PV, solar thermal, wind energy, energy efficiency in the building sector, and energy efficiency in the residen-

tial and public sector, industry, and commerce. Developing national capacity-building strategies will help align training offers with market demand, both in terms of quality (i.e., training that matches needed job profiles) and quantity (i.e., for different technologies and professional levels). Such strategies should address the immediate need for qualified staff as well as the mid- and long-term demand, with training provided by qualified TVETs and universities. Capacity building in green energy technologies requires investment from the private sector, governments, and donors. These investments will pay off for the economy if they are part of a holistic training strategy supported by favourable policy frameworks for developing green energy markets.



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RENAC

-  Renewables general
-  Energy efficiency general
-  Photovoltaics
-  Solar thermal
-  Energy efficiency in the building sector
-  Project in development
-  Energy efficiency technologies
-  Grid integration of renewables
-  Financing of green energy technologies
-  Green hydrogen
-  ESG criteria (environmental, social and governance)
















































































































Activity	Algeria	Egypt	Iraq	Jordan	Kuwait	Libya	Morocco	Oman	Palestine	Saudi-Arabia	Somalia	Tunisia	UAE
Capacity needs assessments	 	 									  		
Country assessments on RE training			 	   							 		
Online training	    	 	   		   								
In-person training	     	   		       	    		    	   		   		       	
Train-the-trainer training			 	 									
RE/EE academic programs													
Training centre concepts				 			 						
Procurement for practical training labs		 											
Energy innovation coaches programs			   										
Certification schemes												 	
Study tour													
Web-portal			  										

Table 1: RENAC education and training projects in Arabic countries on green energy technologies