

# Renewable Energy Benefits: Boosting Renewable Energy Jobs

# IRENA's Knowledge Base on Employment

*Leading the work on jobs since 2011*

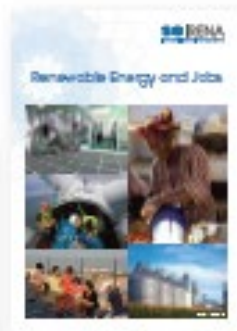
2011



2012



2013



2014



2015



2016



2017



2018

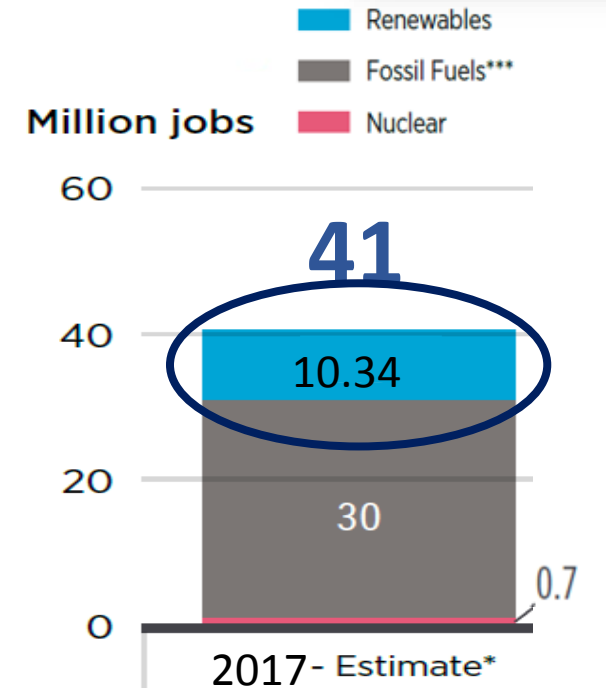
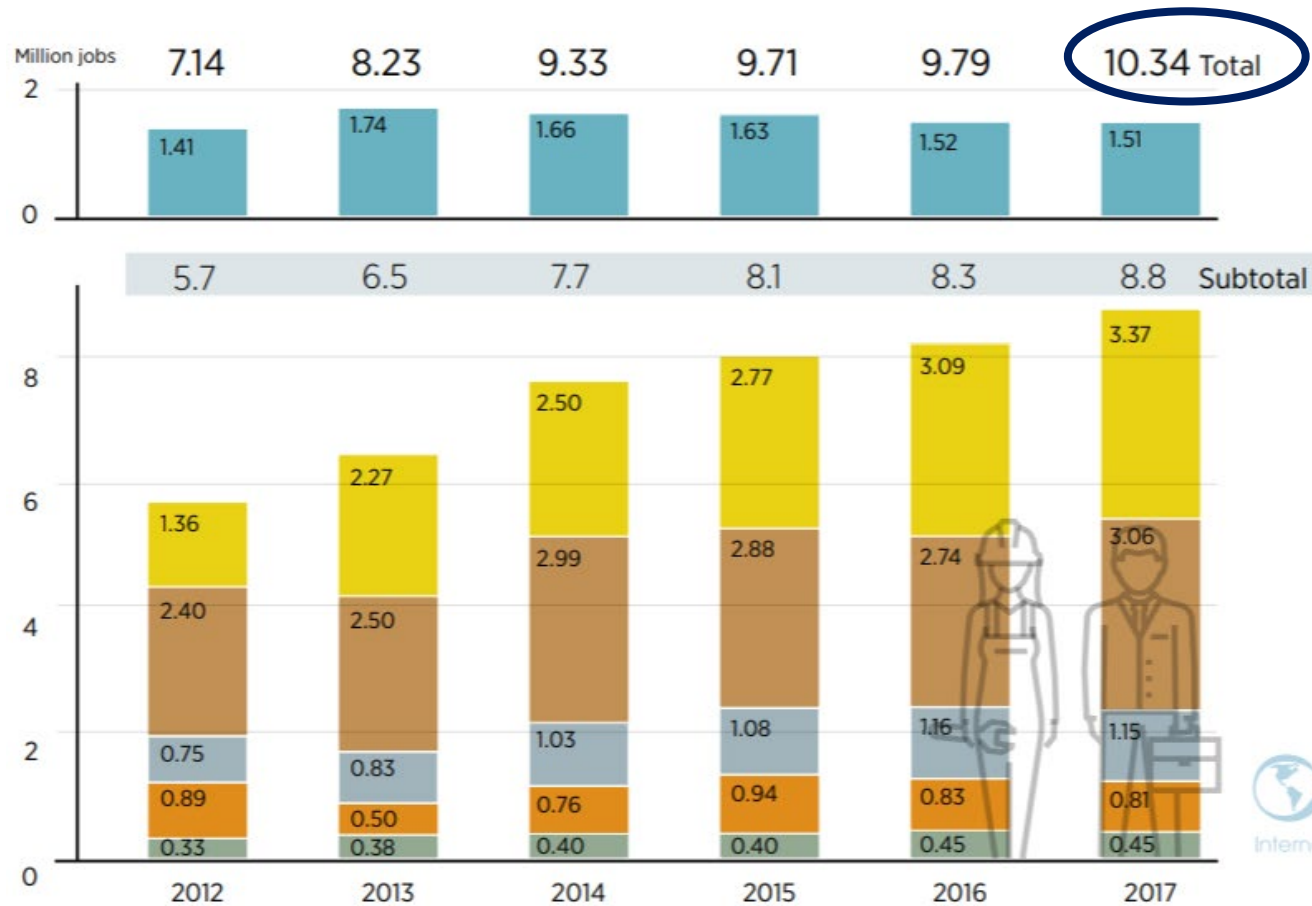
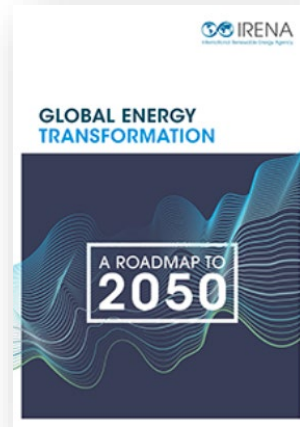
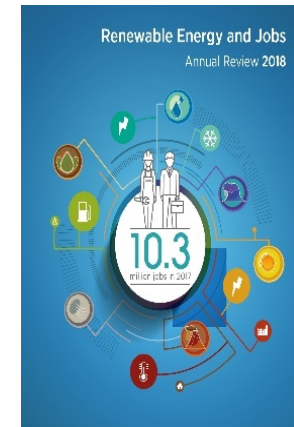


RENEWABLE  
ENERGY  
JOBS  
CONFERENCE

IRENA

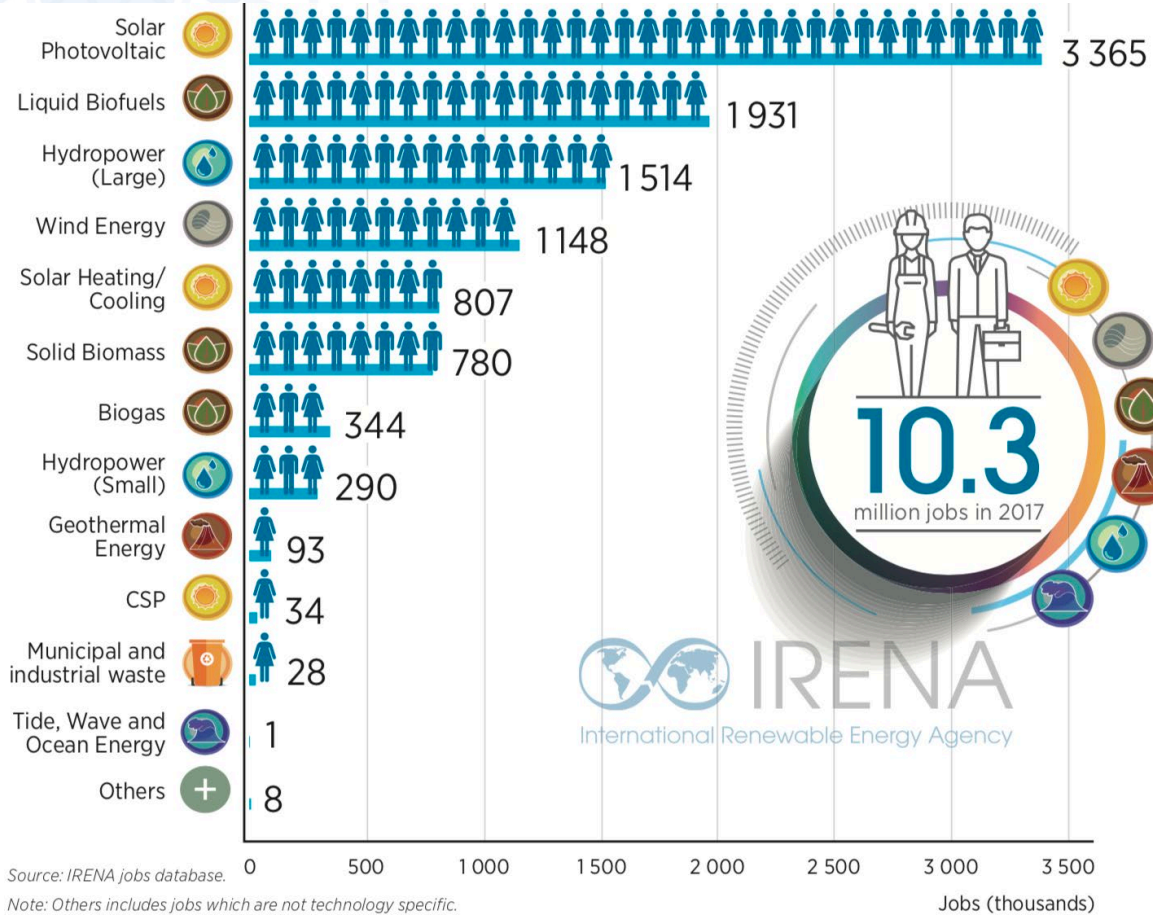


# Growth of Renewable Energy Jobs to Date

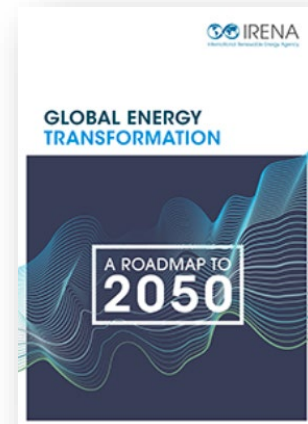
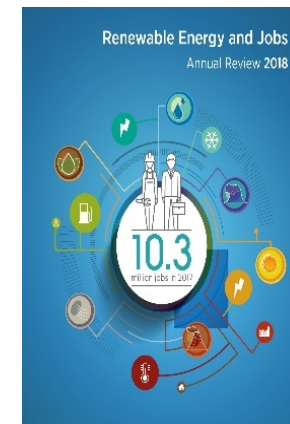


Source: IRENA jobs database.

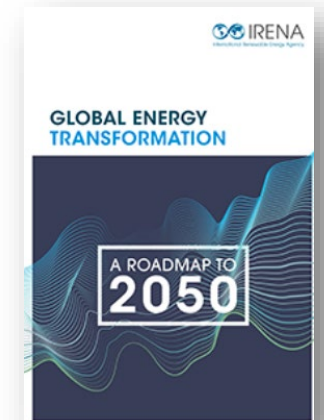
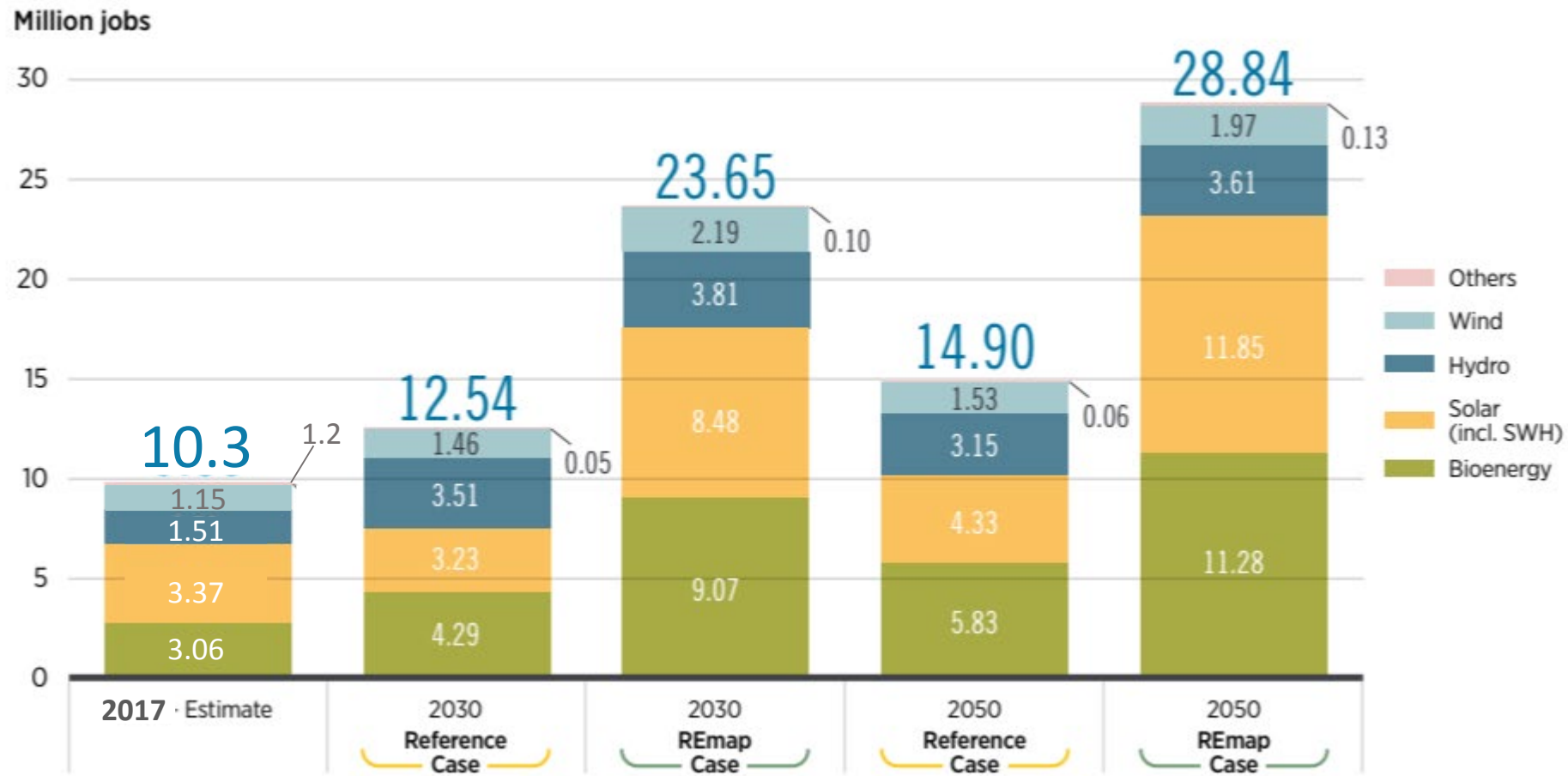
# Renewable Energy Jobs Today



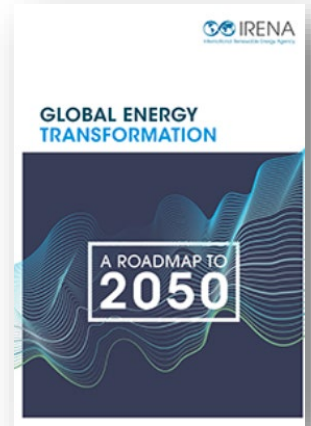
**28.8 million**  
jobs in 2050



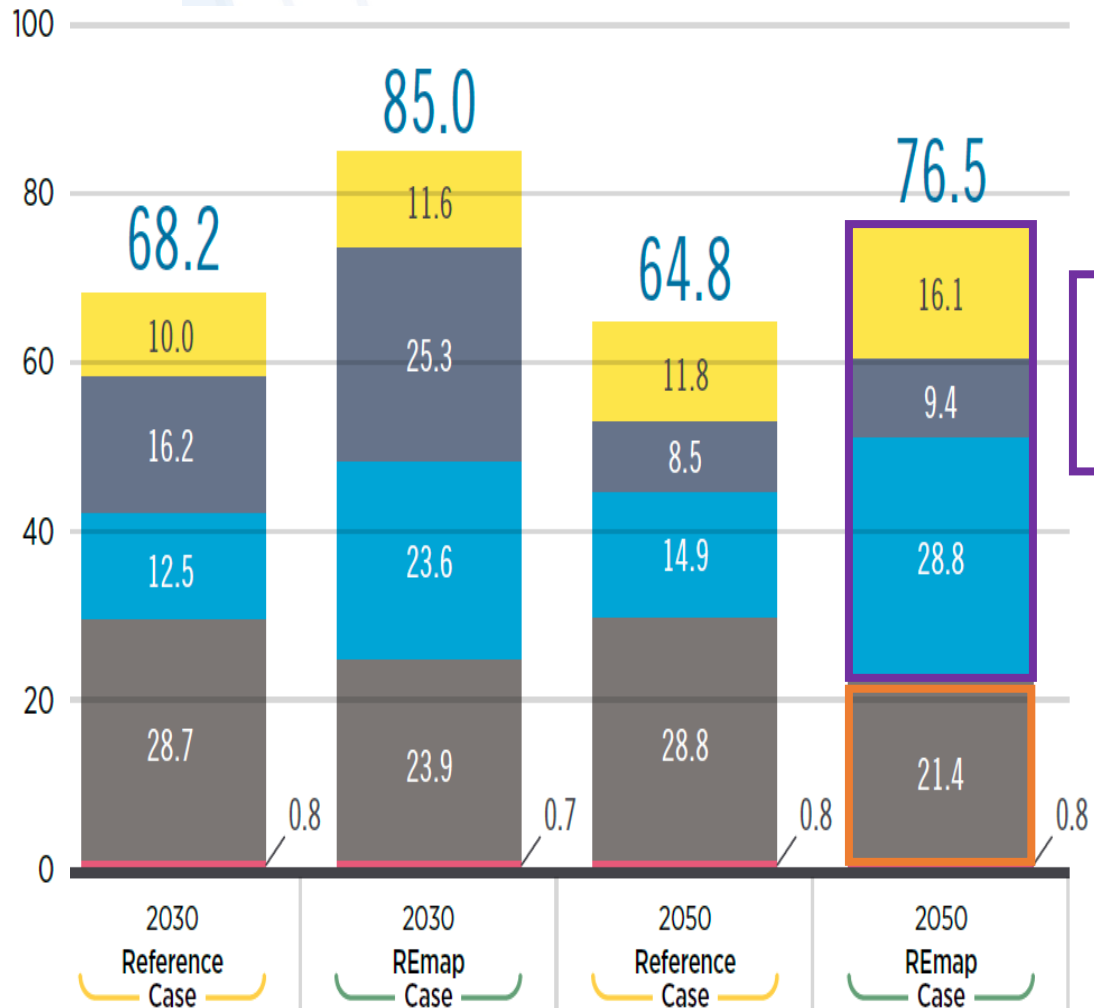
# Renewable Energy Jobs by 2050



# Energy Jobs by 2050





Million jobs



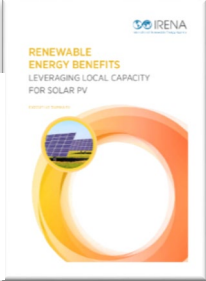
■ Grid Enhancement\*\*  
■ Energy Efficiency  
■ Renewables  
■ Fossil Fuels\*\*\*  
■ Nuclear

**54.3 million jobs in non-fossil fuels, non-nuclear**

**Fossil fuels: loss of 8.6 million jobs by 2050 compared to today's 30 million.**

# Solar PV



Project Planning 1%

50 MW Solar PV: 229 055 person days

Procurement

Manufacturing

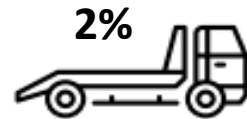
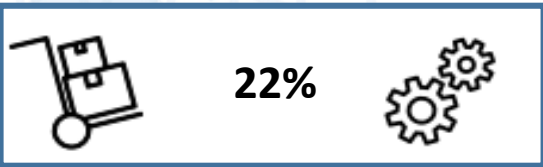
Transport

Installation

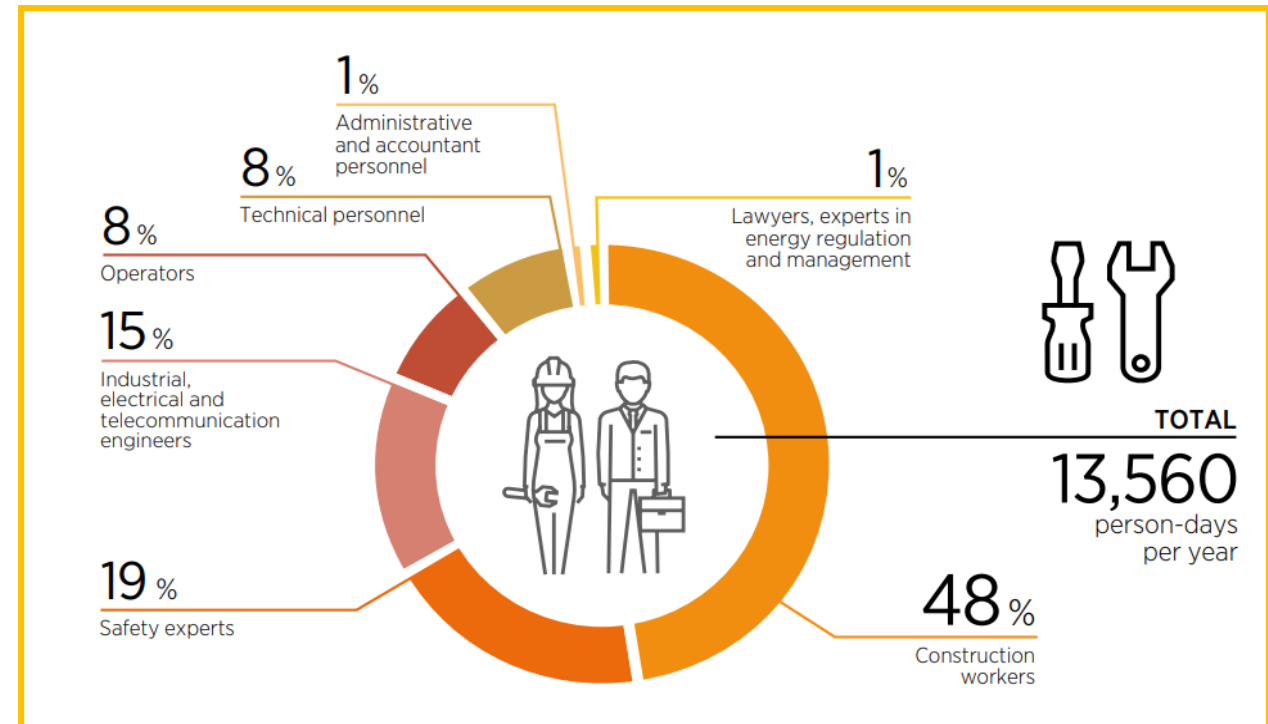
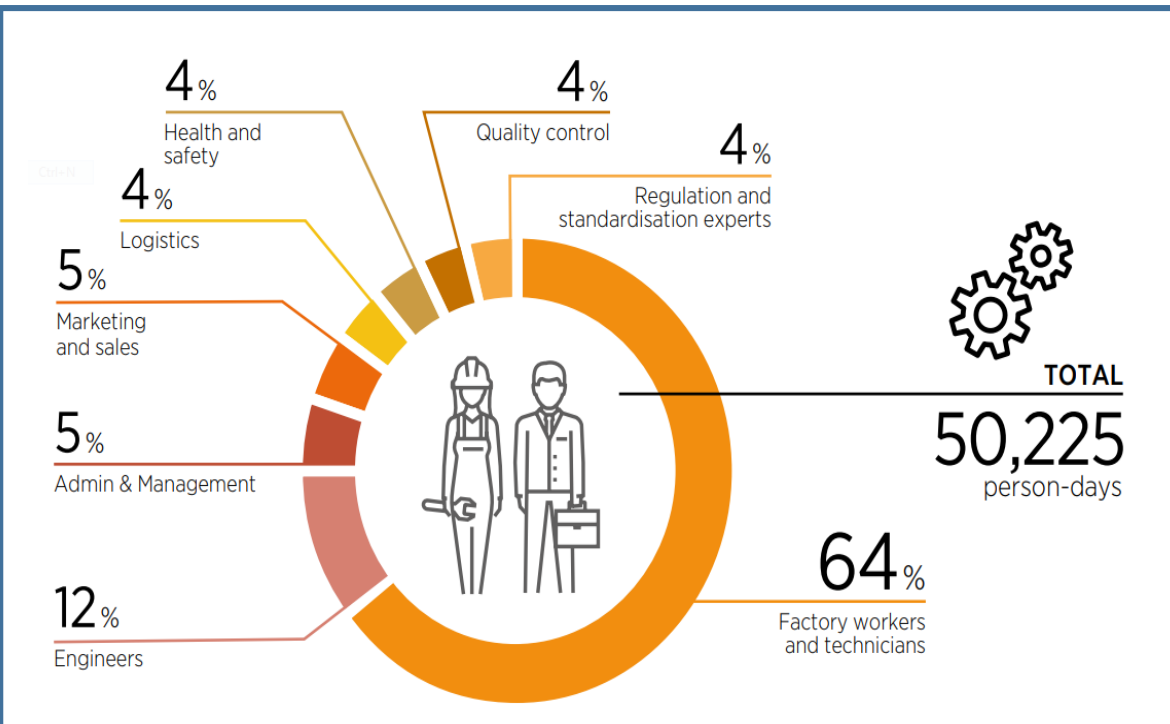
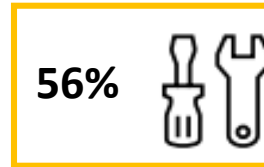
Grid Connection

Operation and Maintenance

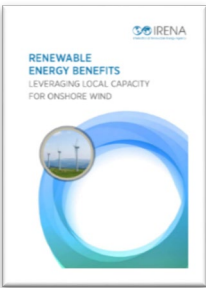
Decommissioning



17%

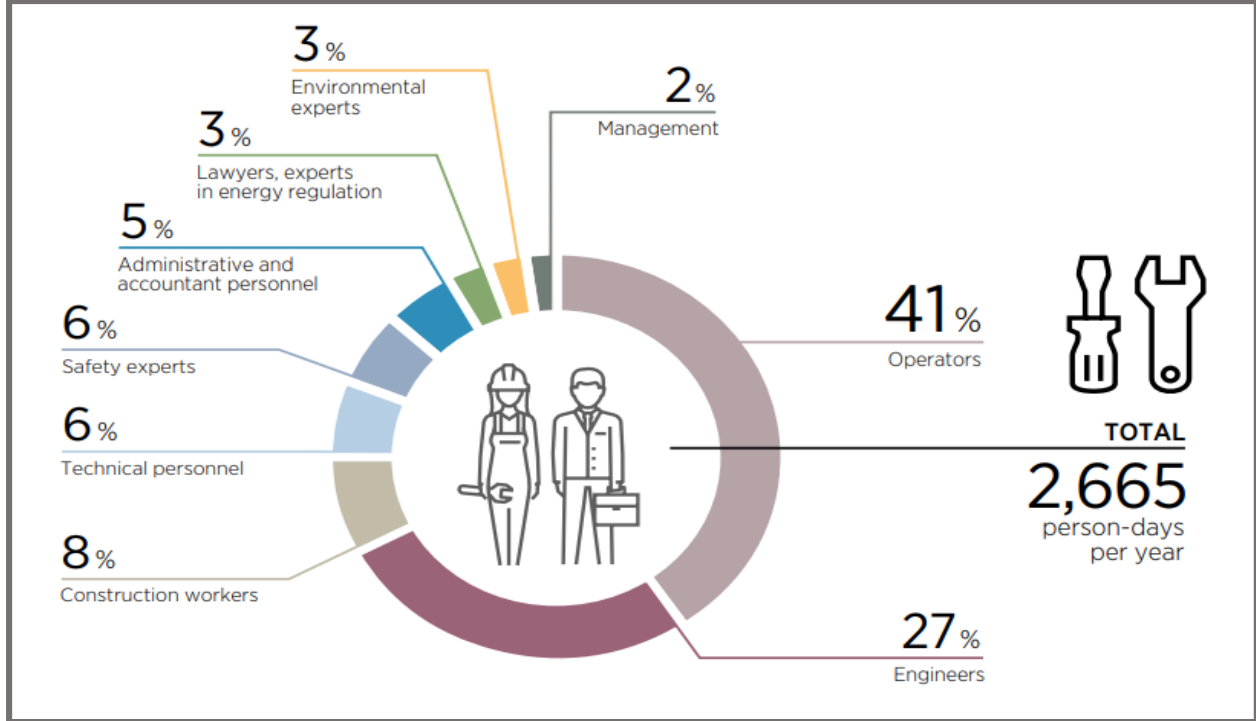
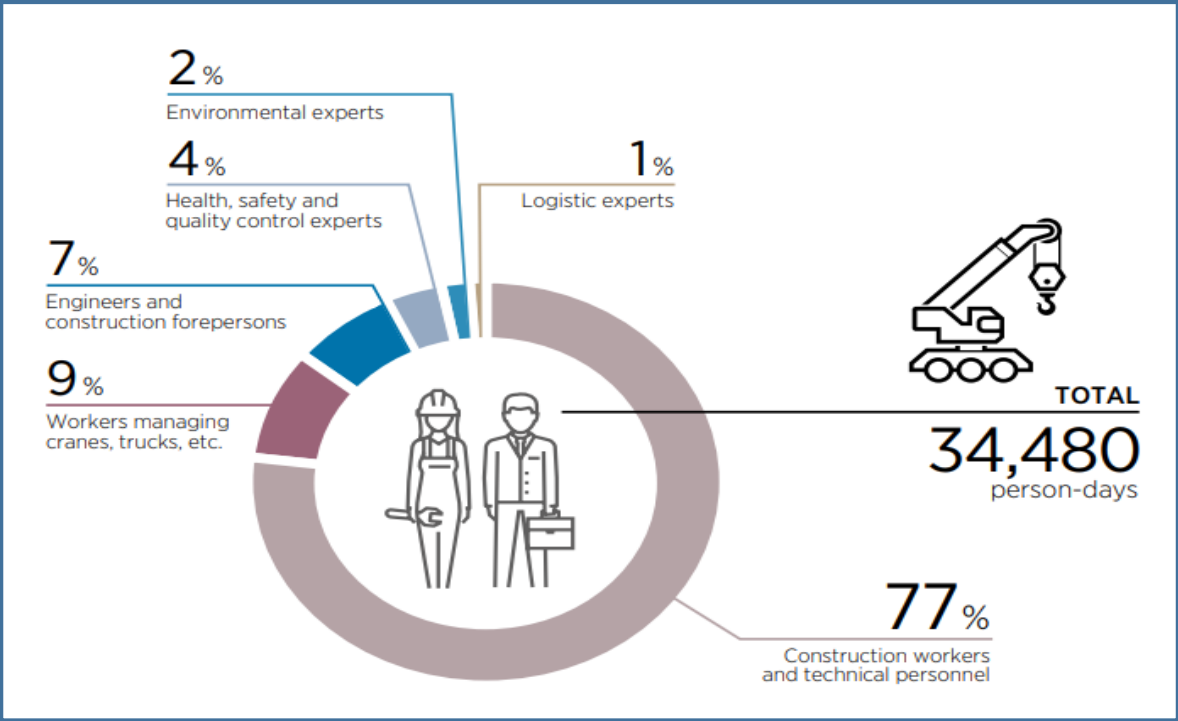


# Onshore Wind



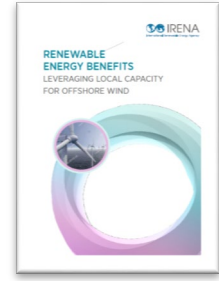
**Project Planning 2%**

50 MW Onshore Wind: 144 000 person days



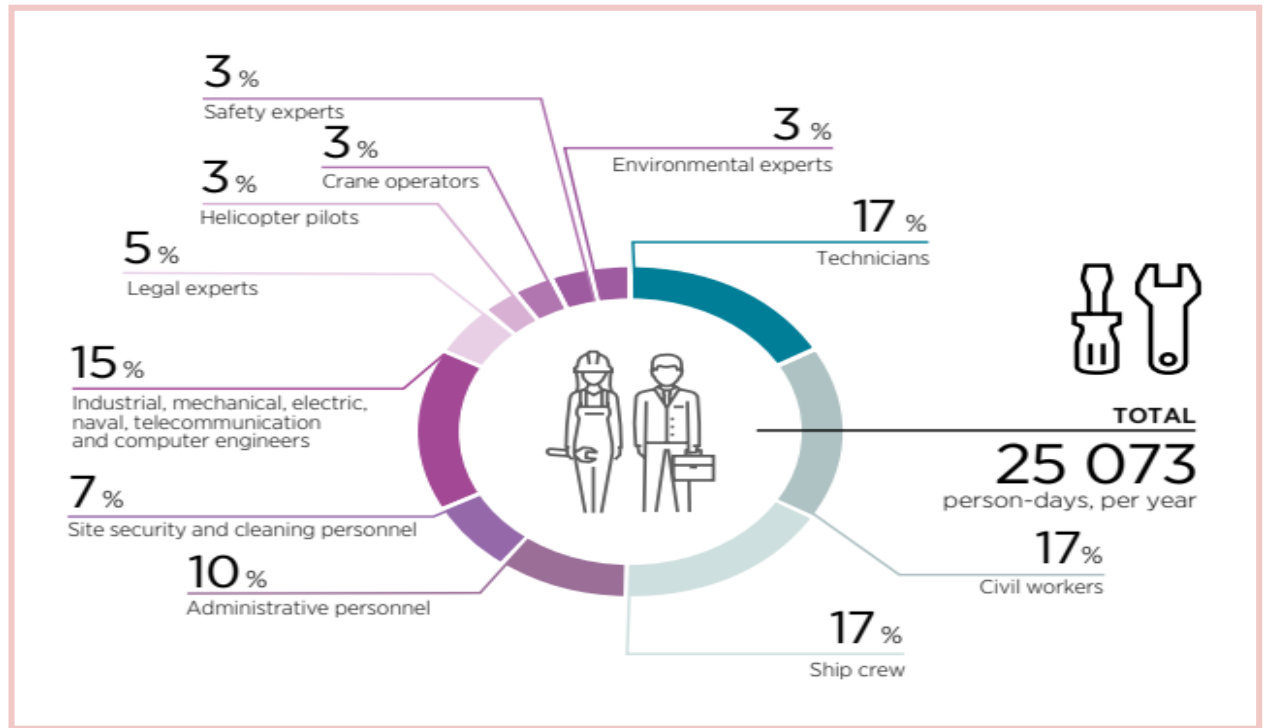
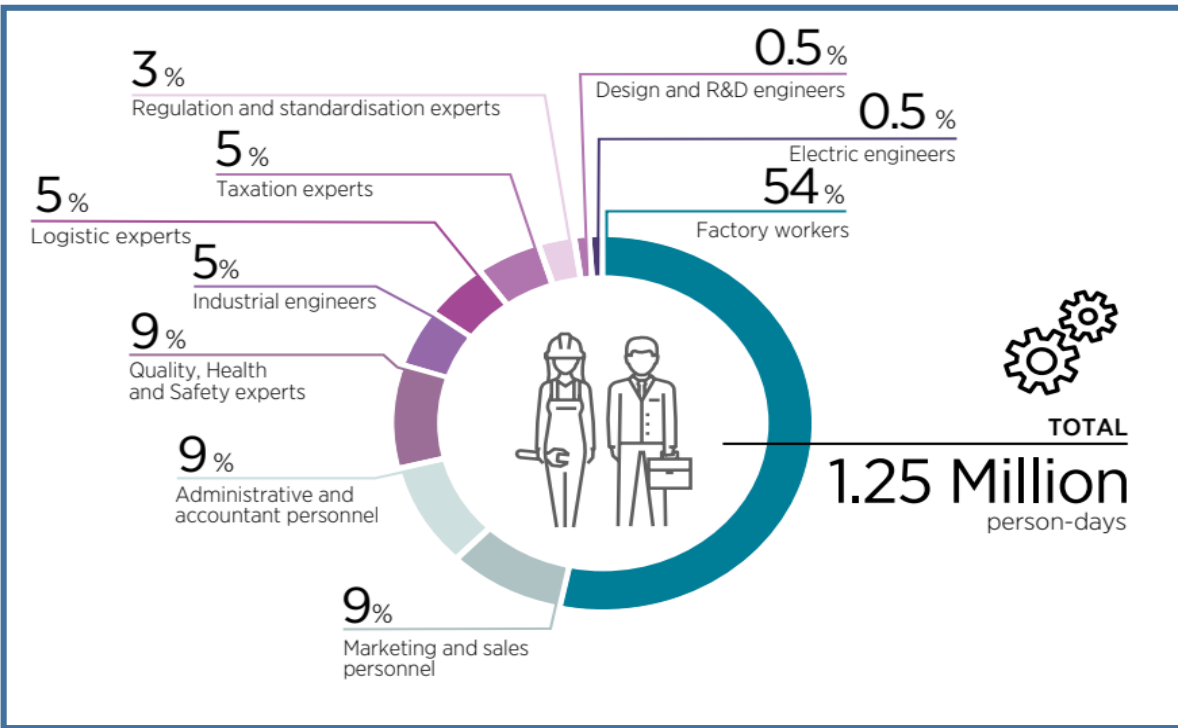
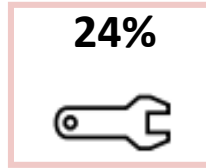
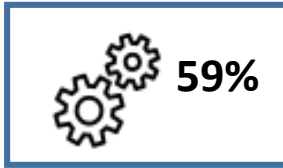
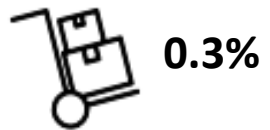


# Offshore Wind



Project Planning 1%

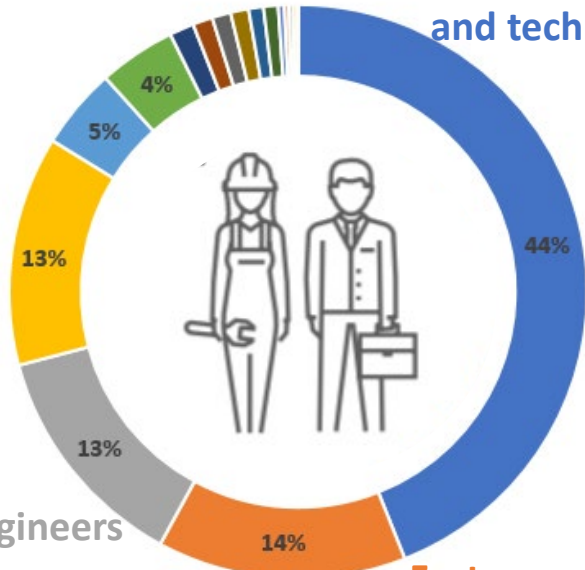
500 MW Offshore Wind: 2.1 million person days



50 MW solar PV  
229 055 person-days

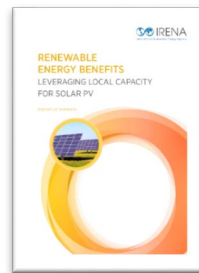


Construction workers and technicians



Factory workers

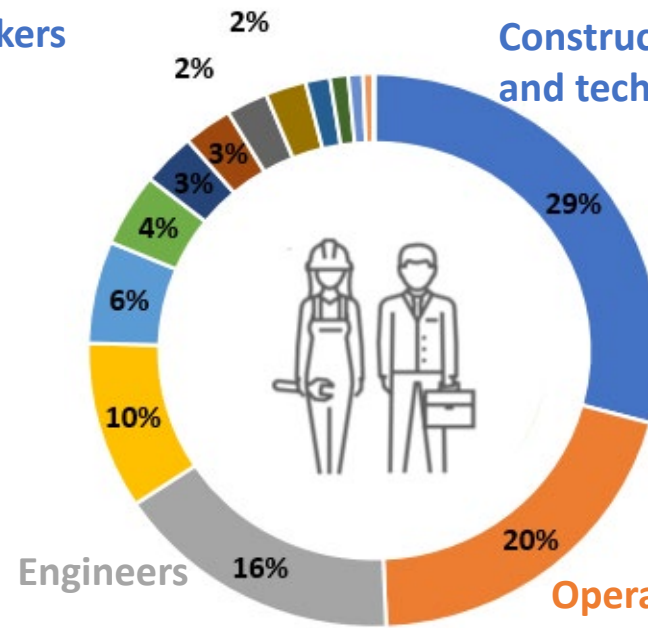
- Construction workers and technicians
- Factory workers
- Engineers
- Quality Health and Safety experts
- Operators
- Technical personnel
- Truck drivers
- Administrative personnel
- Logistic experts
- Marketing and sales personnel
- Legal, energy regulation, real estate and taxation experts
- Regulation and standardization experts
- Loading staff
- Environmental experts
- Management
- Financial analysts
- Shipping agents



50 MW onshore  
144 420 person-days

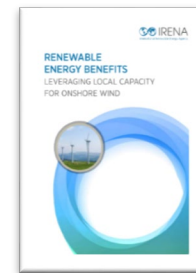


Construction workers and technicians



Operators

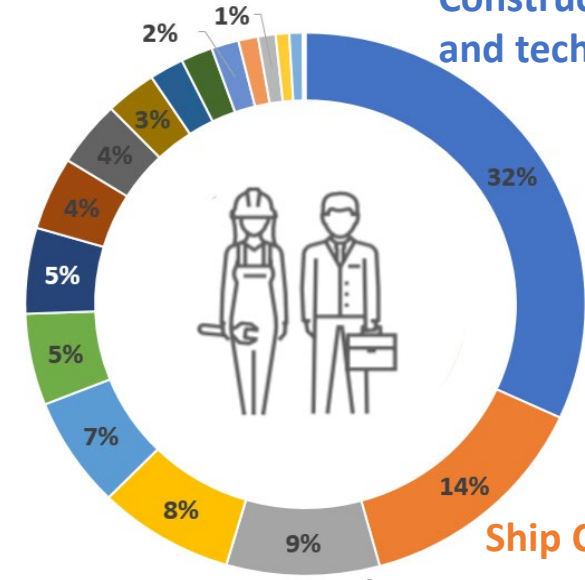
- Construction workers and technicians
- Operators
- Engineers\*
- Factory workers
- Quality Health and Safety experts
- Truck drivers, crane operators
- Administrative personnel
- Technical personnel
- Environmental experts
- Legal, energy regulation, real estate and taxation experts
- Logistic experts
- Management
- Marketing and sales personnel
- Financial analysts
- Geotechnical experts
- Regulation and standardization experts



500 MW offshore  
2.1 million person-days

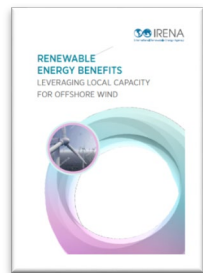


Construction workers and technicians



Engineers

- Factory workers
- Ship crew
- Engineers
- Administrative and accountant personnel
- Quality, Health and Safety experts
- Marketing and sales personnel
- Technicians
- Legal, energy regulation and taxation experts
- Civil workers
- Logistic experts
- Regulation and standardization experts
- Crane operators
- Cleaning and site security personnel
- Truck drivers
- Drilling systems, cable polough, Trenching ROV, jetting systems operators
- Helicopter pilots
- Environmental, sociological, marine/biology, physicist, weather data experts and fishers
- Financial analysts
- Geotechnical experts



## **Priority Actions**

**Leverage existing capacities in support of value chain development (labour, materials and equipment needs along the supply chain)**

**Education and training programmes to ensure well-train workforce**

**Design industrial policies to strengthen the capability of domestic value creation**

**Industrial upgrading, supplier development programs and joint ventures**

# Priority Actions

- Ensure that jobs are decent
- Undertake measures to minimise disruptions in the energy transition through social protection measures and retraining efforts
- Remove barriers to entry for women’s employment in renewable energy



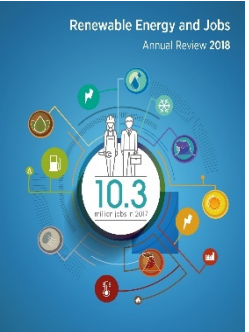
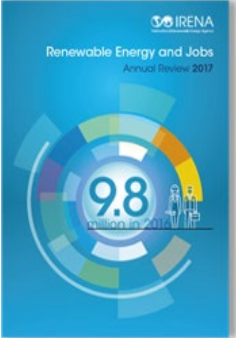
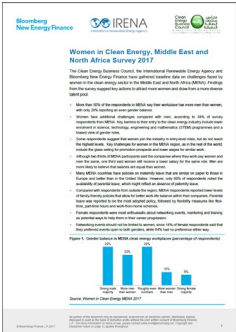
### IRENA Survey in gender:

Renewable energy has more gender parity than the broader energy sector.

**35%**  
Average share of women working at 90 renewable energy companies surveyed

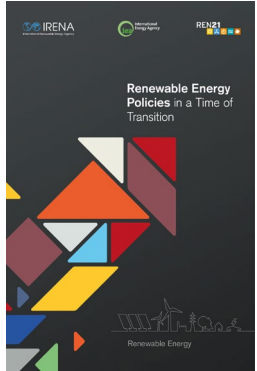
 **NEW SURVEY- 2018**

[www.irena.org/gendersurvey](http://www.irena.org/gendersurvey)



# Overarching framework for renewable energy policy

Policies to achieve the energy transition		Deployment of renewables in the general context	Deployment of renewables in the access context	Maximisation of socio-economic development from renewable energy
Direct policies	Push	<ul style="list-style-type: none"> <li>• Binding targets</li> <li>• Quotas and obligations</li> <li>• Codes and mandates</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Rural targets, strategies, programmes</li> </ul>	Deployment policies designed to maximise benefits and ensure a sustainable transition (e.g., communities, gender) including requirements, preferential treatment and financial incentives provided to installations and projects that help deliver socio-economic objectives
	Pull	<ul style="list-style-type: none"> <li>• Regulatory and pricing policies</li> <li>• Tradable certificates</li> <li>• Instruments for self-consumption</li> <li>• Support voluntary programmes</li> </ul>	<ul style="list-style-type: none"> <li>• Regulatory and pricing policies (e.g. legal provisions, price/tariff regulation)</li> </ul>	
	Fiscal and financial	<ul style="list-style-type: none"> <li>• Tax incentives</li> <li>• Subsidies</li> <li>• Grants</li> </ul>	<ul style="list-style-type: none"> <li>• Tax incentives</li> <li>• Subsidies</li> <li>• Grants</li> <li>• Concessional financing</li> <li>• Support for financial intermediaries</li> </ul>	
Integrating policies		<ul style="list-style-type: none"> <li>• Measures to enhance system flexibility</li> </ul>	<ul style="list-style-type: none"> <li>• Integration of off-grid systems with main-grid</li> <li>• Coupling with efficient appliances and services</li> </ul>	
		<ul style="list-style-type: none"> <li>• Policies for infrastructure, sector coupling and R&amp;D</li> <li>• Better alignment of energy efficiency and renewable energy policies</li> <li>• Incorporation of decarbonisation objectives into national energy plans</li> <li>• Adaptation measures of socio-economic structure to the energy transition</li> </ul>		
Enabling policies		<ul style="list-style-type: none"> <li>• Policies to level the playing field</li> <li>• Policies to ensure the reliability of technology</li> </ul>		<ul style="list-style-type: none"> <li>• Industrial, trade policy and environmental and climate policies</li> </ul>
		<ul style="list-style-type: none"> <li>• National renewable energy policy</li> <li>• Access to finance, Education, Labour, Land-use, RD&amp;D and innovation, Urban and Public health policies</li> </ul>		
Enabling and integrating policies		<ul style="list-style-type: none"> <li>• Supportive governance and institutional architecture</li> <li>• Awareness programmes</li> <li>• Social protection policies to address disruptions</li> <li>• Measures for integrated resource management</li> </ul>		





# IRENA

International Renewable Energy Agency



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