

Renewable Energy Benefits

Regional Workshop on Renewable Energy
in Central Asia, 26th Apr, 2017



Benefits of Renewable Energy

Introduction

ENVIRONMENT

Climate change
Local pollution



HUMAN DEVELOPMENT

Poverty alleviation
Access



ENERGY SECURITY

Trade balance improvement
Risk reduction



ECONOMIC GROWTH

GDP
Industrial development
Jobs



Benefits of Renewable Energy

IRENA's knowledge base

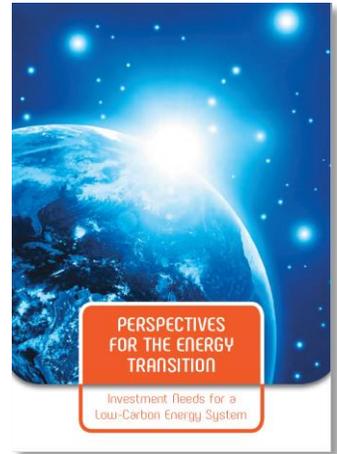
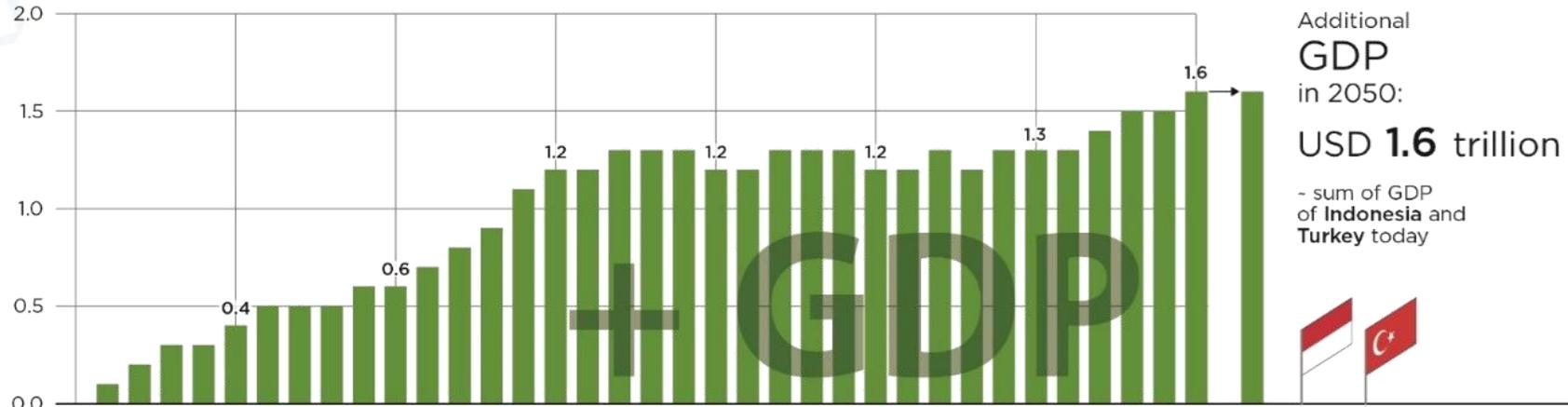


Increase in global GDP

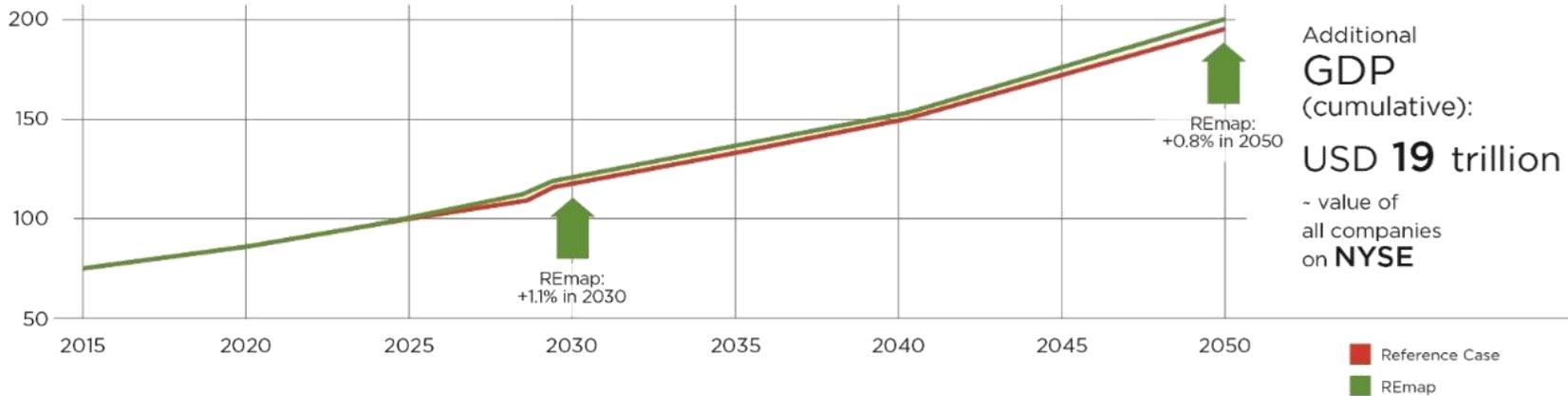
Global GDP in 2050 is boosted by around 0.8% compared to the Reference Case.



Additional GDP in REmap (trillion USD)



Global GDP in Reference Case and REmap (trillion USD)



Welfare improvements

Renewables improve welfare in ways that GDP fails to capture.



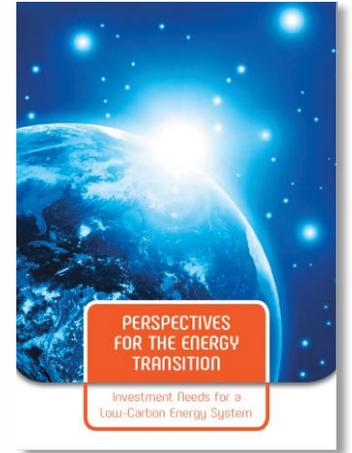
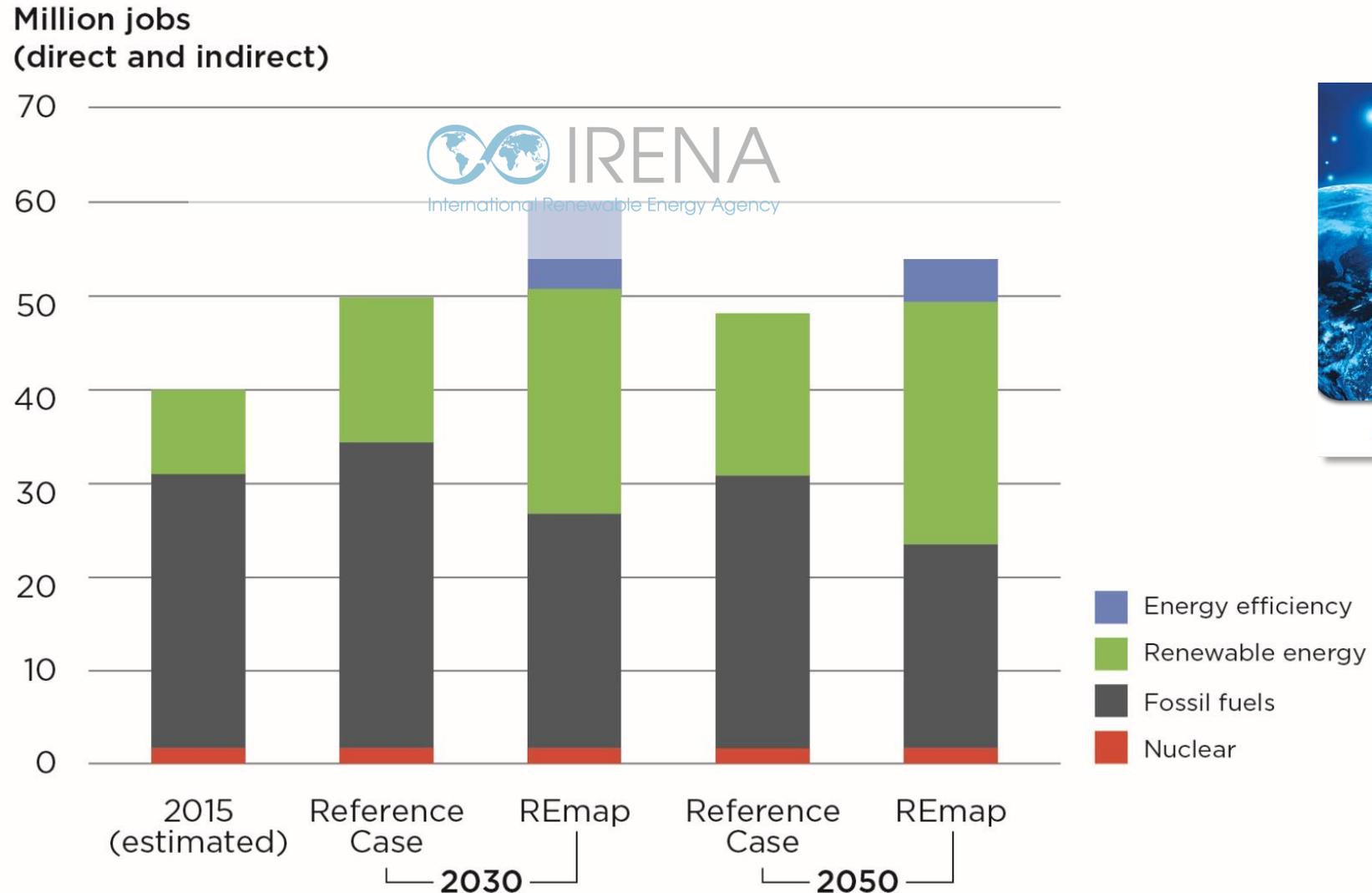
Welfare

- **Improvements in welfare** would go far beyond gains in GDP.
- Our analysis shows that the increase in welfare is close to 4%, compared to 0.8% improvement in GDP.



Jobs in the overall energy sector

New jobs in renewables and energy efficiency more than offset job losses in fossil fuels

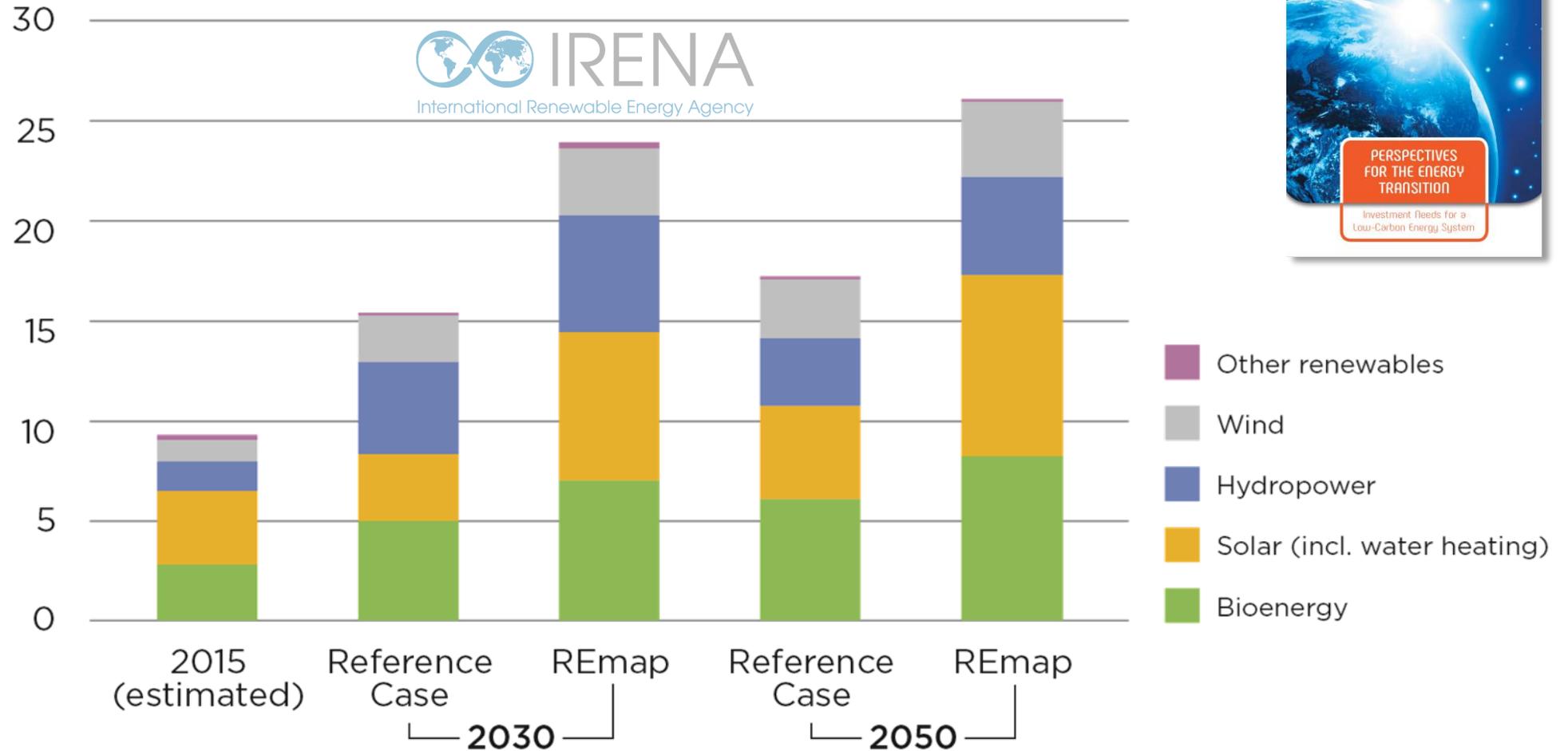


Source: IRENA (2017), *Perspectives for the energy transition: investment needs for a low-carbon energy system*.

Renewable energy will create more jobs

Renewable energy could support around 25 million jobs in 2050

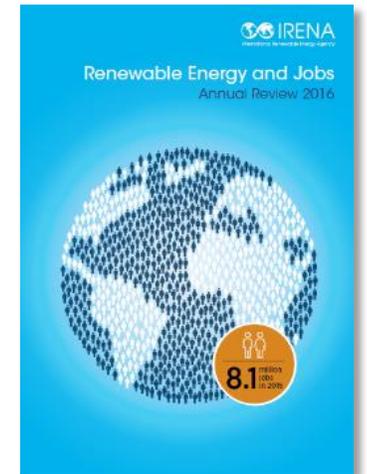
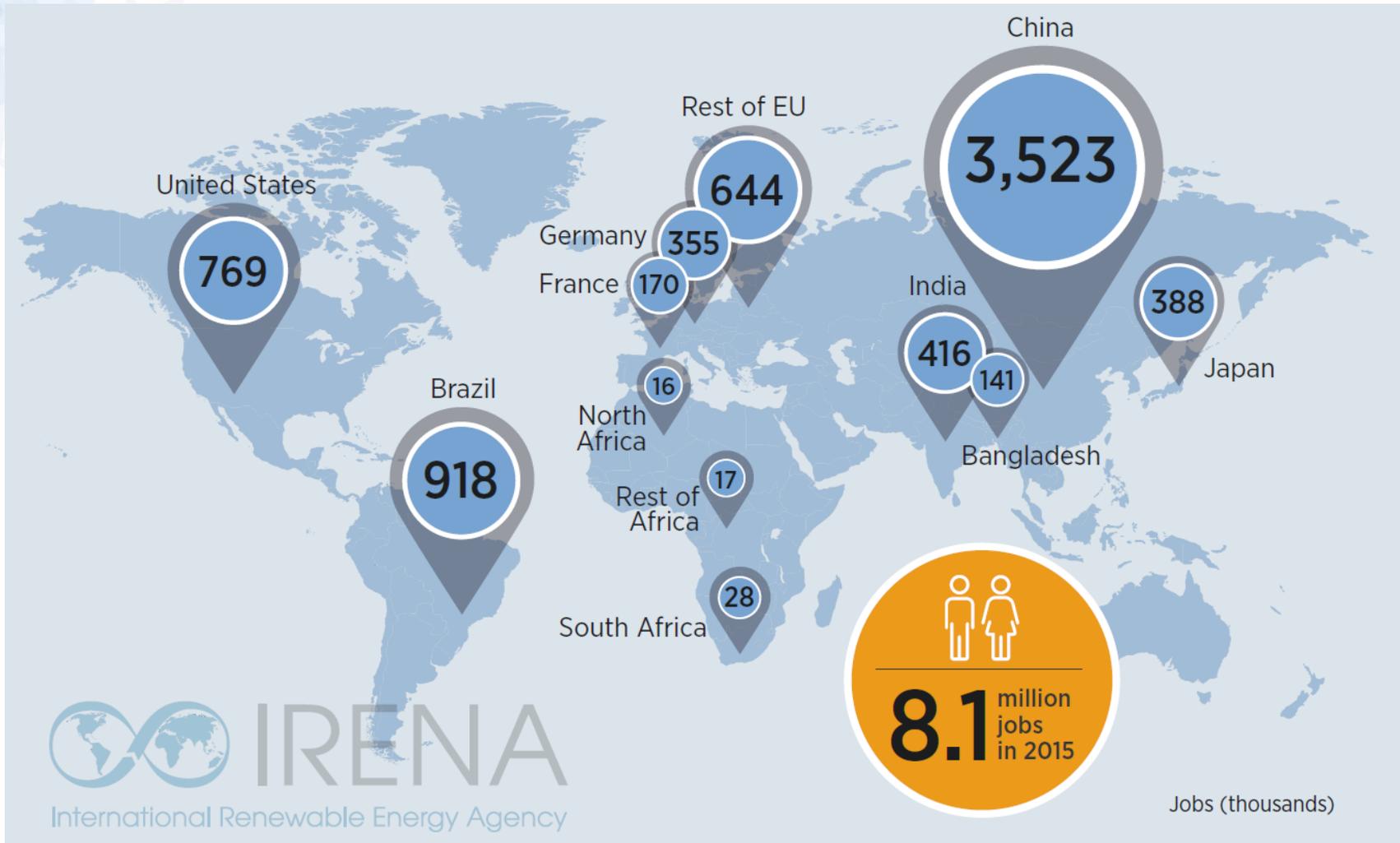
Million jobs
(direct and indirect)



Source: IRENA (2017), Perspectives for the energy transition: investment needs for a low-carbon energy system.

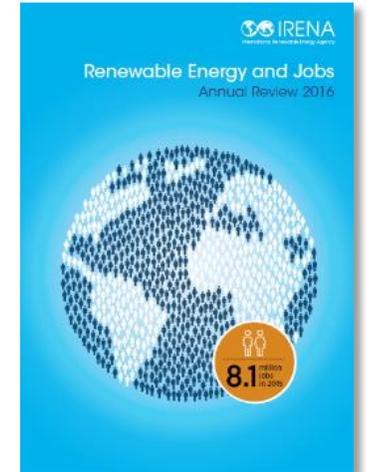
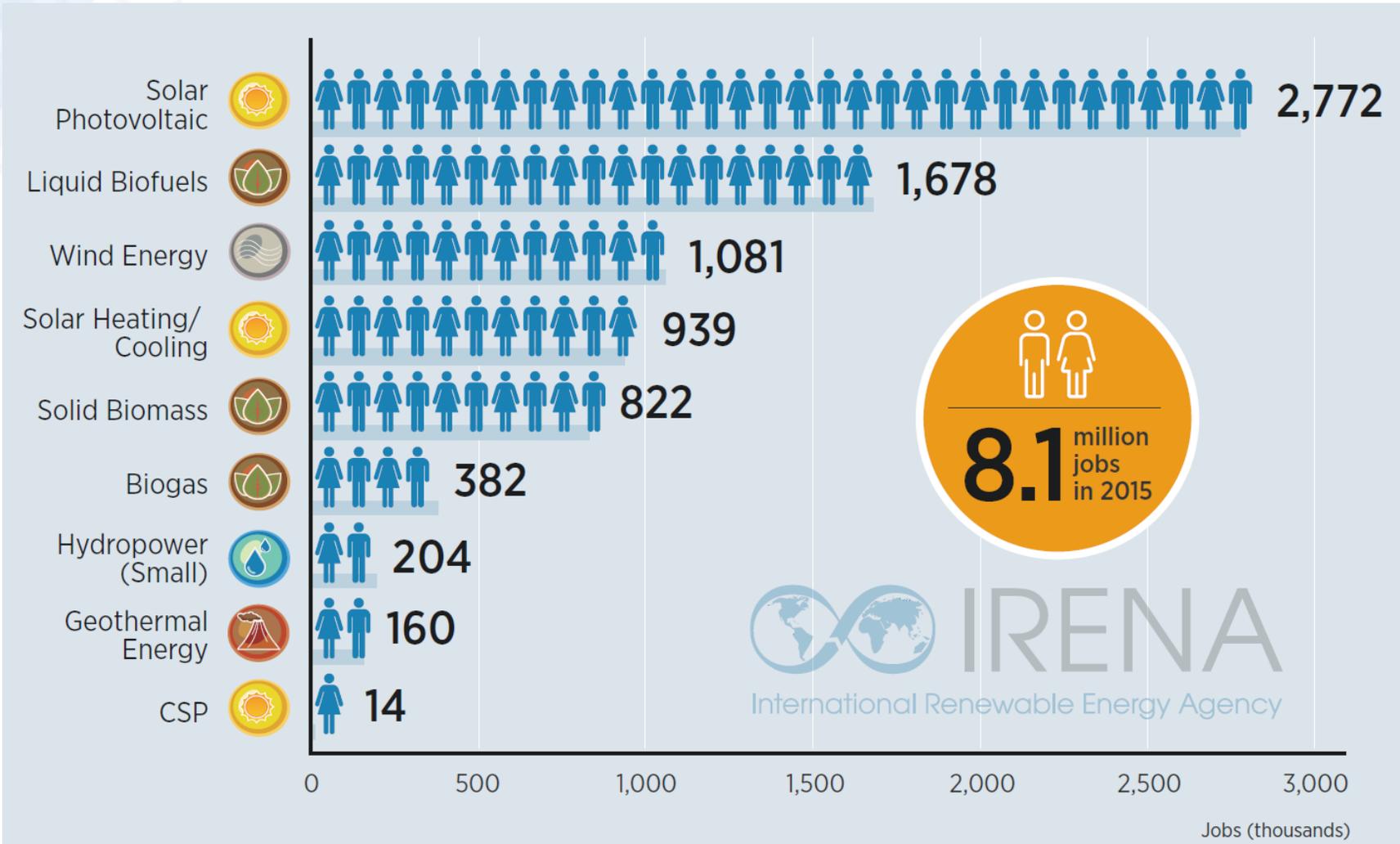
Renewable Energy Jobs

Employment in selected countries



Renewable Energy Jobs

Employment by technology

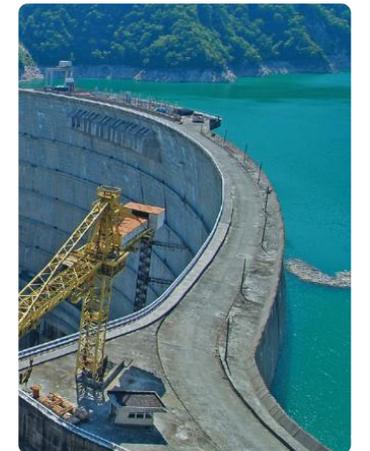
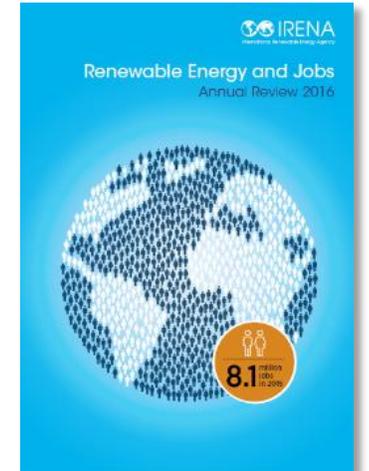
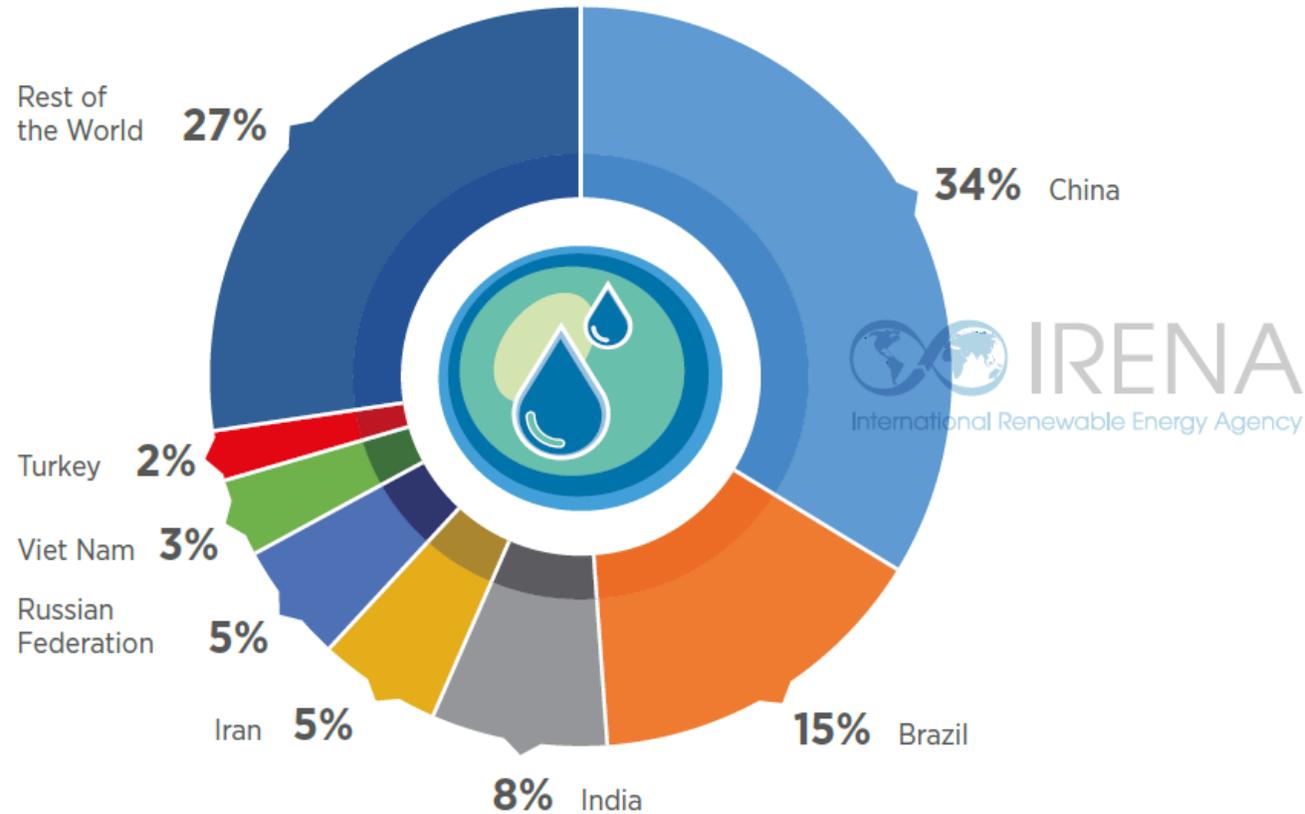


Source: IRENA (2016), Renewable Energy and Jobs - Annual Review 2016

Technology focus

Renewable energy jobs – large hydropower supports 1.3 million jobs

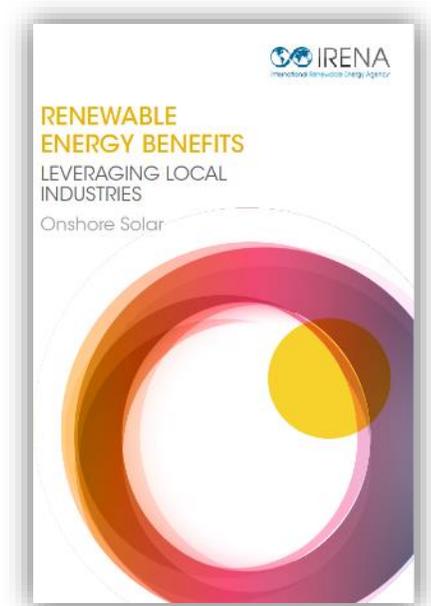
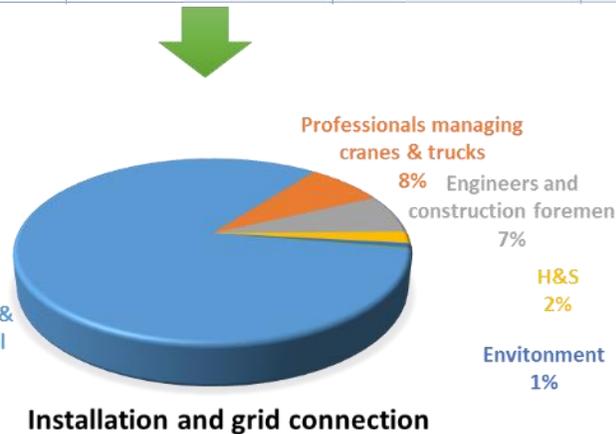
>1.3 million jobs



Source: IRENA (2016), Renewable Energy and Jobs - Annual Review 2016

Solar PV value chain: Jobs requirements

	Project planning	Manufacturing and procurement	Transport	Installation and Grid connection	Operation and maintenance	Decommissioning
						
Workforce for 50 MW	2,100 person-days	21,500 person-days	3,500 person-days per 1000 miles	39,400 person-days	20,500 person-days per year	5,200 person-days



Solar PV value chain:

Installation and grid connection

Site preparation and civil works



50% labour requirements

Assembling equipment



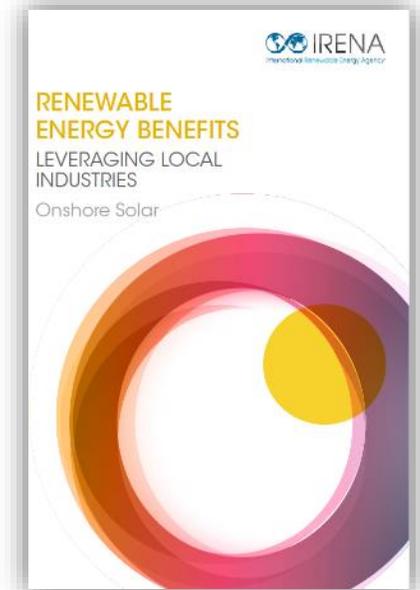
Cabling and grid connection



Commissioning



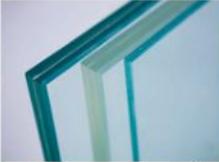
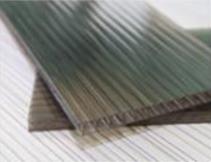
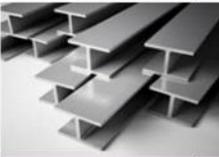
40 000 human-days required for the installation and grid connection of a **50 MW PV plant**

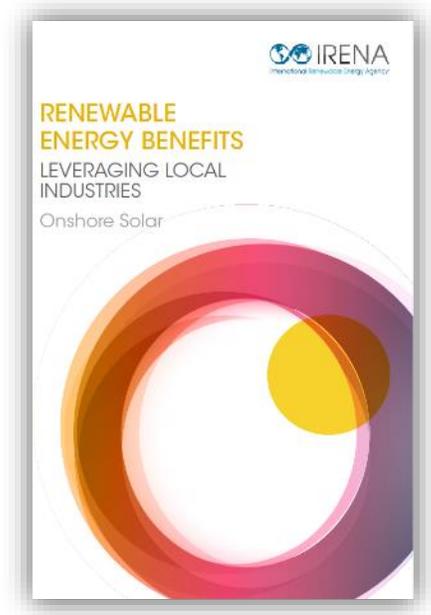


Equipment can be found in the construction sector

Equipment used in solar PV installation phase				
	Excavators		Cranes	 Personal protection equipment
	Trucks		Asphalt paving machines	
			Tools	

Solar PV value chain: Material requirements

Materials used in solar PV value chain (kg/MW)					
	Silicon	7,000		Copper	7,000
	Glass	70,000		Plastic	6,000
	Steel	56,000		Concrete	47,000
	Aluminium	19,000			

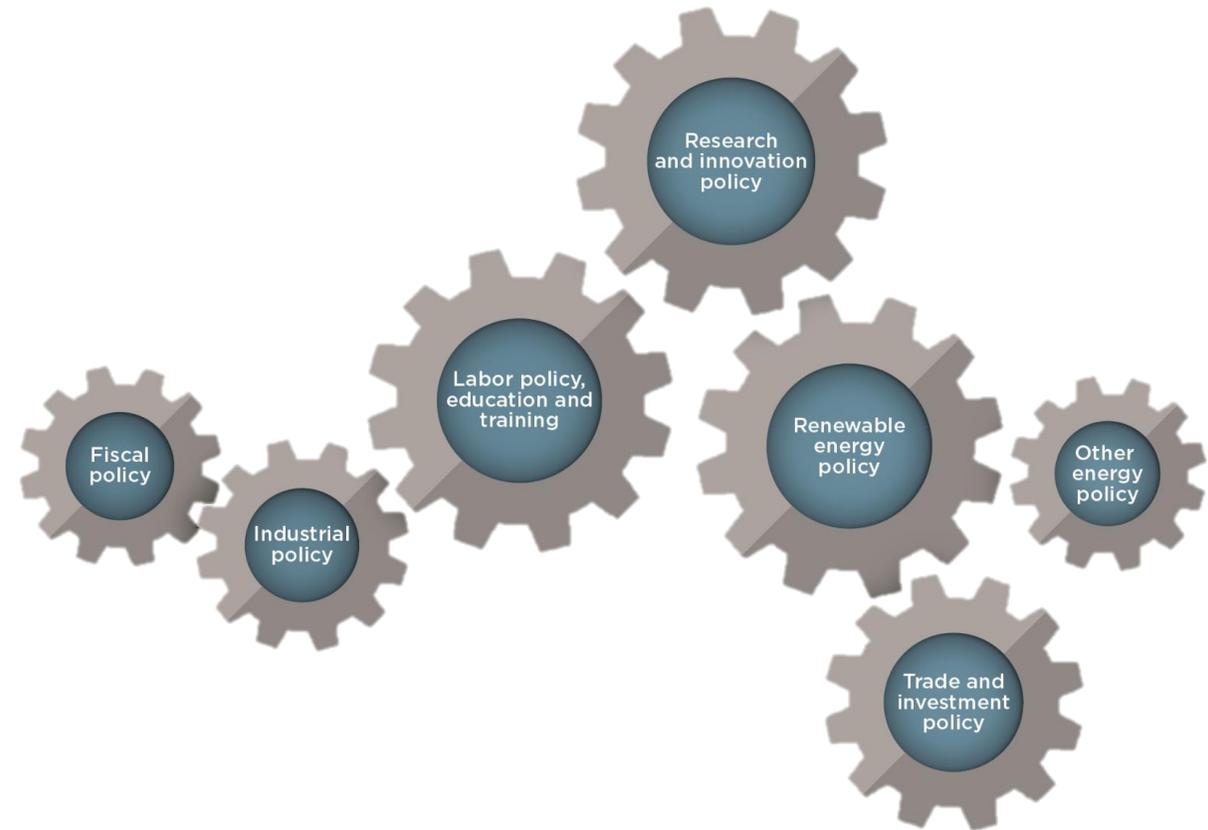


Conclusions

Benefits of renewables extend far beyond energy...



...but their realization requires enabling policy environments



Source: IRENA (2017), *REthinking Energy 2017: Accelerating the global energy transition*

Source: IRENA (2017), *Perspectives for the energy transition: investment needs for a low-carbon energy system.*

Thank you!



Thematic focus

Women in modern renewable energy employment

Early research indicates that renewable energy has more gender parity than the broader energy sector.



Women representation:

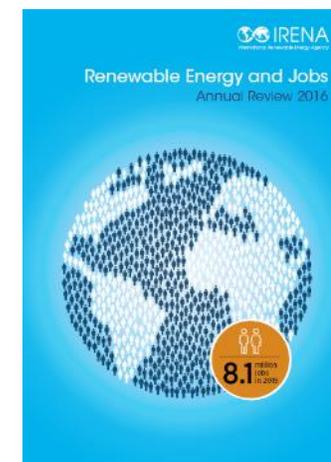
- **46%** in administrative
- **32%** in management
- **28%** in technical workforce

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

In comparison: 25% of senior-level management positions were held by women in Fortune 500 companies in 2015

Data

- Survey of 90 companies



The share of women in the U.S. solar workforce increased from for **19% in 2013 to 24% in 2015**. In Germany and Spain they account for **24%** and **26%** of the renewable energy workforce.

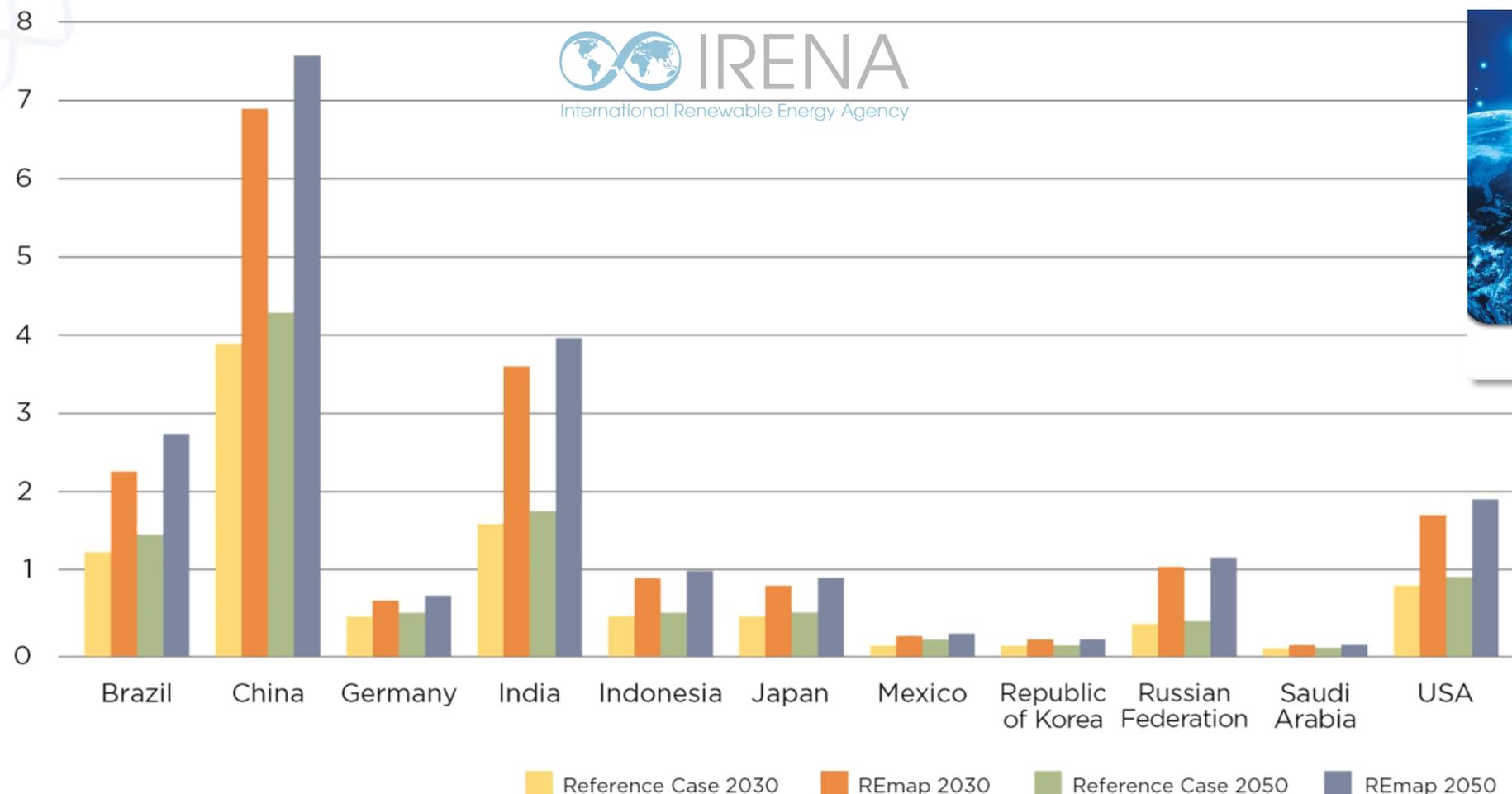


Source: IRENA (2016), Renewable Energy and Jobs - Annual Review 2016

Renewable energy jobs by country

Today's dominant renewable energy employers remain at the top

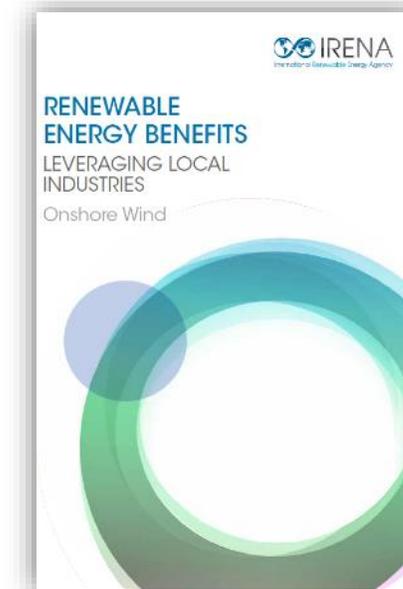
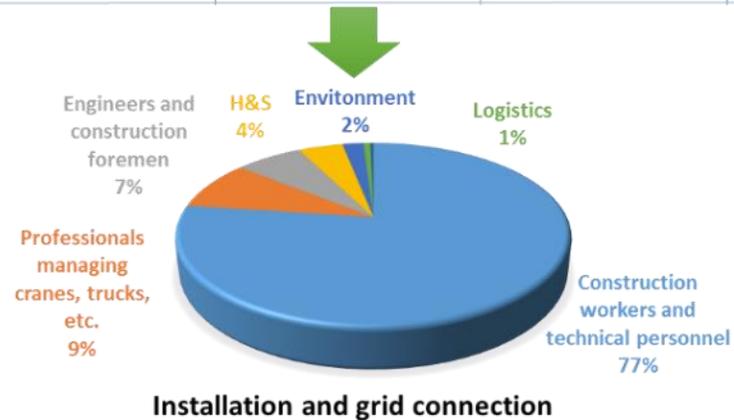
Million jobs
(direct and indirect)



Source: IRENA (2017), Perspectives for the energy transition: investment needs for a low-carbon energy system.

Wind value chain: Jobs requirements

	Project planning	Manufacturing and procurement	Transport	Installation and Grid connection	Operation and maintenance	Decommissioning
						
Workforce for 50 MW	2,580 person-days	19,000 person-days	875 person-days per 300 miles	34,500 person-days	2,665 person-days per year	8,400 person-days



Wind value chain: *Installation and grid connection*

Site preparation and civil works



50% labour requirements

Assembling equipment



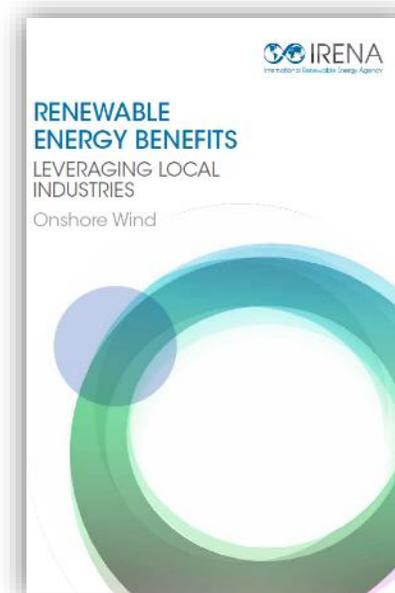
Cabling and grid connection



Commissioning



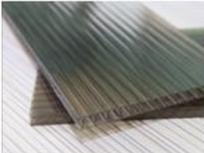
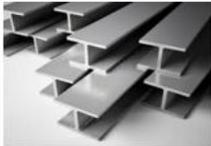
34 500 human-days required for the installation and grid connection of a **50 MW** wind farm



Equipment can be found in the construction sector

Equipment used in wind installation phase					
	Excavators		Cranes		Personal protection equipment
	Trucks		Asphalt paving machines		Tools

Wind value chain: Material requirements

Materials used in Wind value chain (kg/MW)				
	Iron	23,900		Copper 2,500
	Fiberglass	9,800		Plastic 7,000
	Steel	115,000		Concrete 600,000
	Aluminium	1,000		

