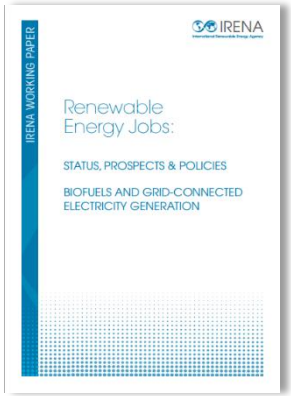
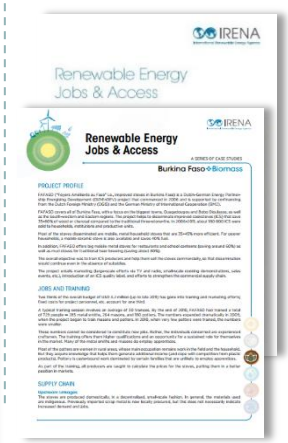
Socio-economic benefits of renewable energy deployment

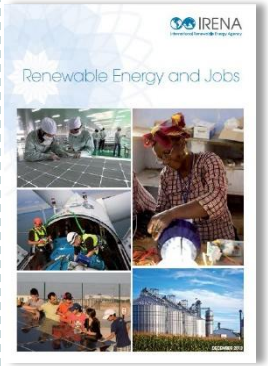
Overcoming Critical Bottlenecks to Accelerate Renewable Energy Deployment in ASEAN+6 Countries

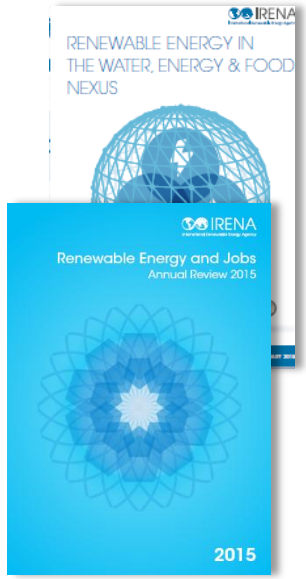
15 June, 2016

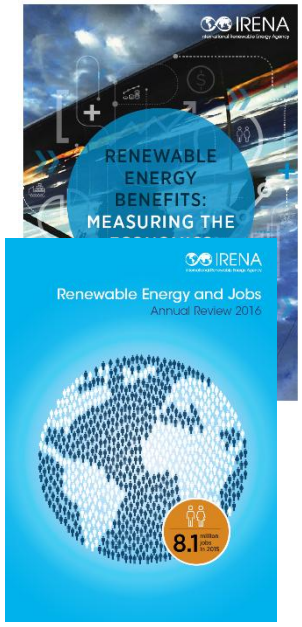
IRENA's efforts to bridge the knowledge gap











Just released

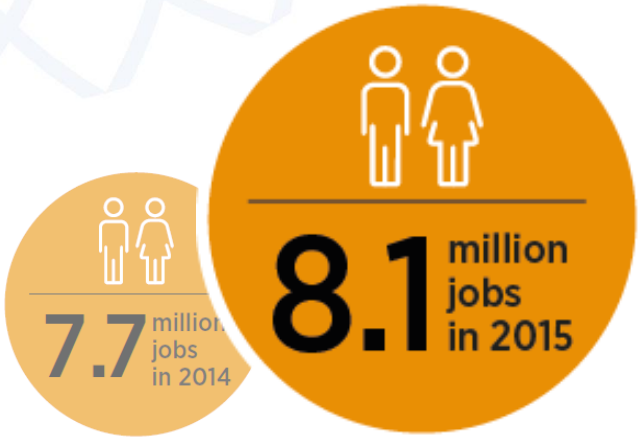
…and others coming

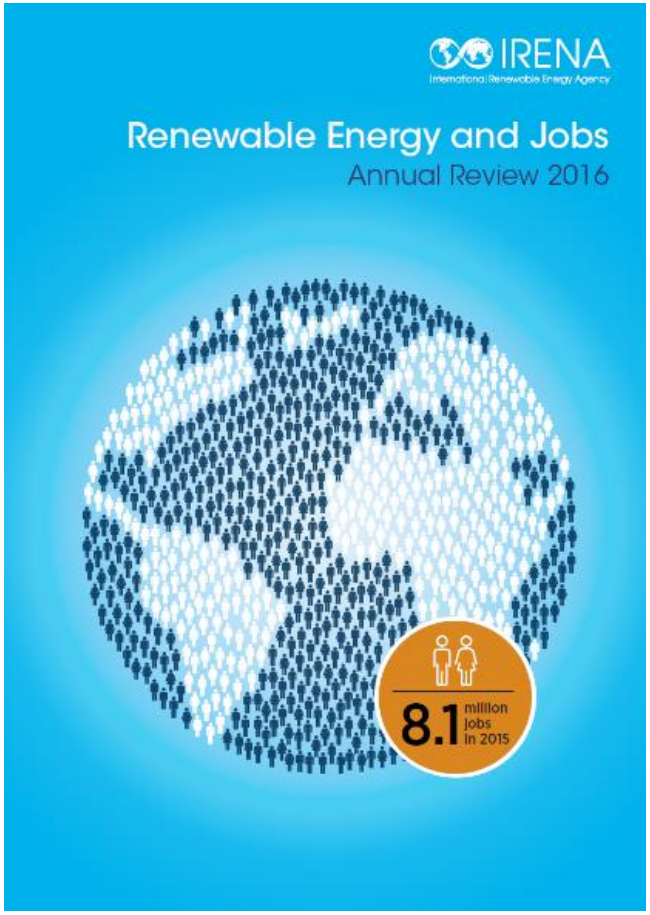
REN21 Renewable Energy Policy Network for the 21st Century

Jobs Sidebar in the *Global Status Report*

2011 2012 2013 2014 2015 2016

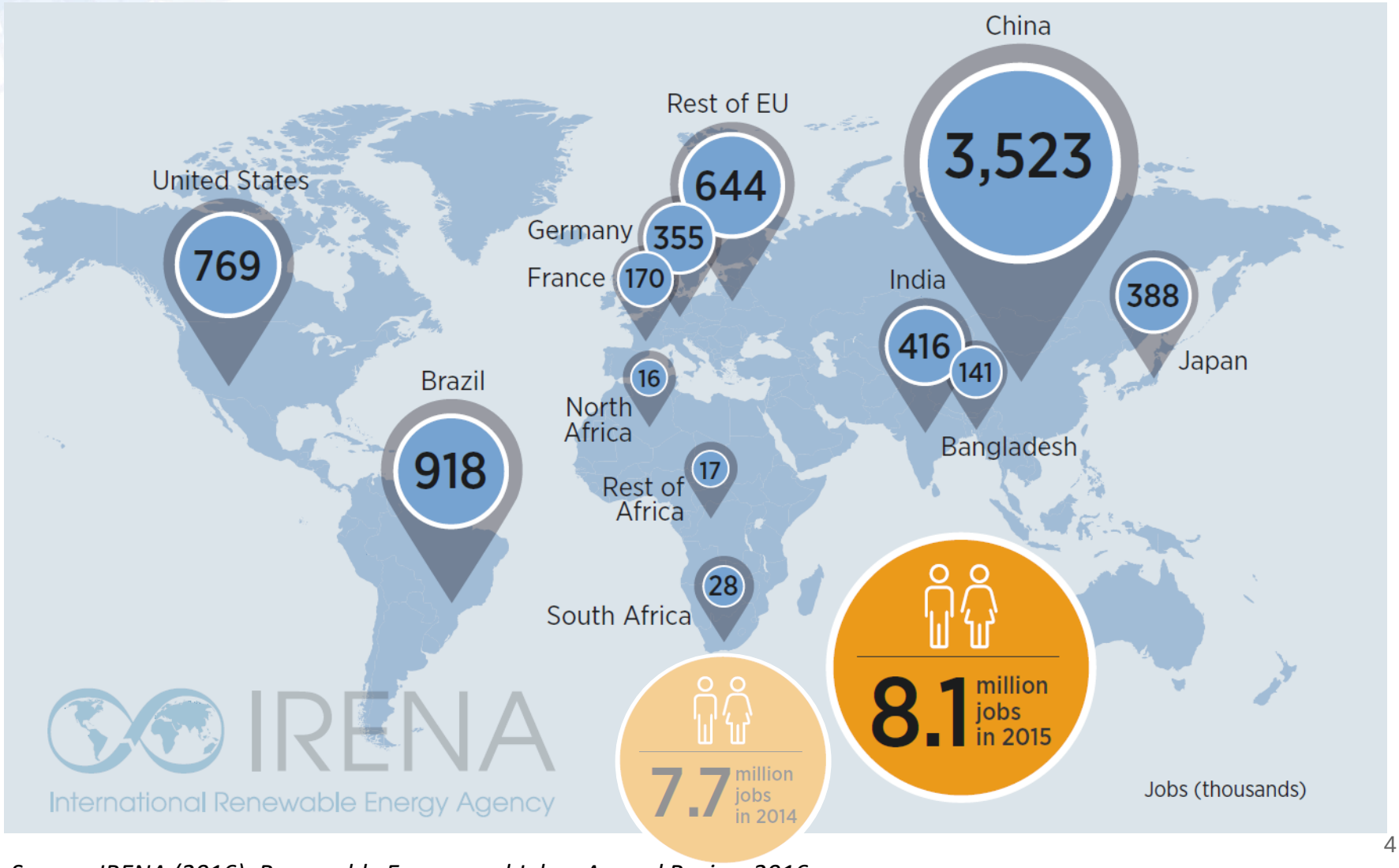
Renewable energy and jobs: Annual Review 2016





Renewable Energy Jobs

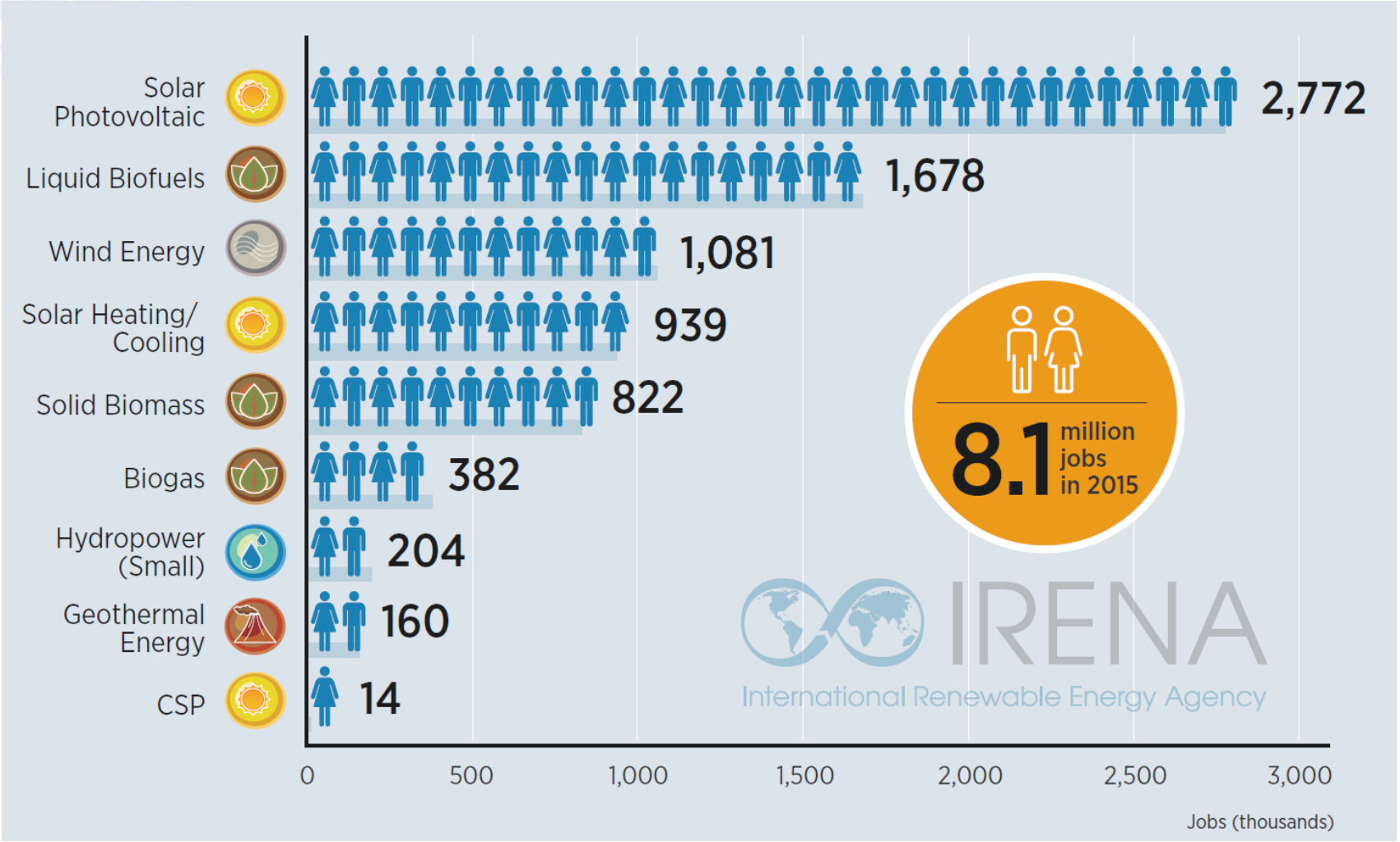
Employment in Selected Countries



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

Renewable Energy Jobs

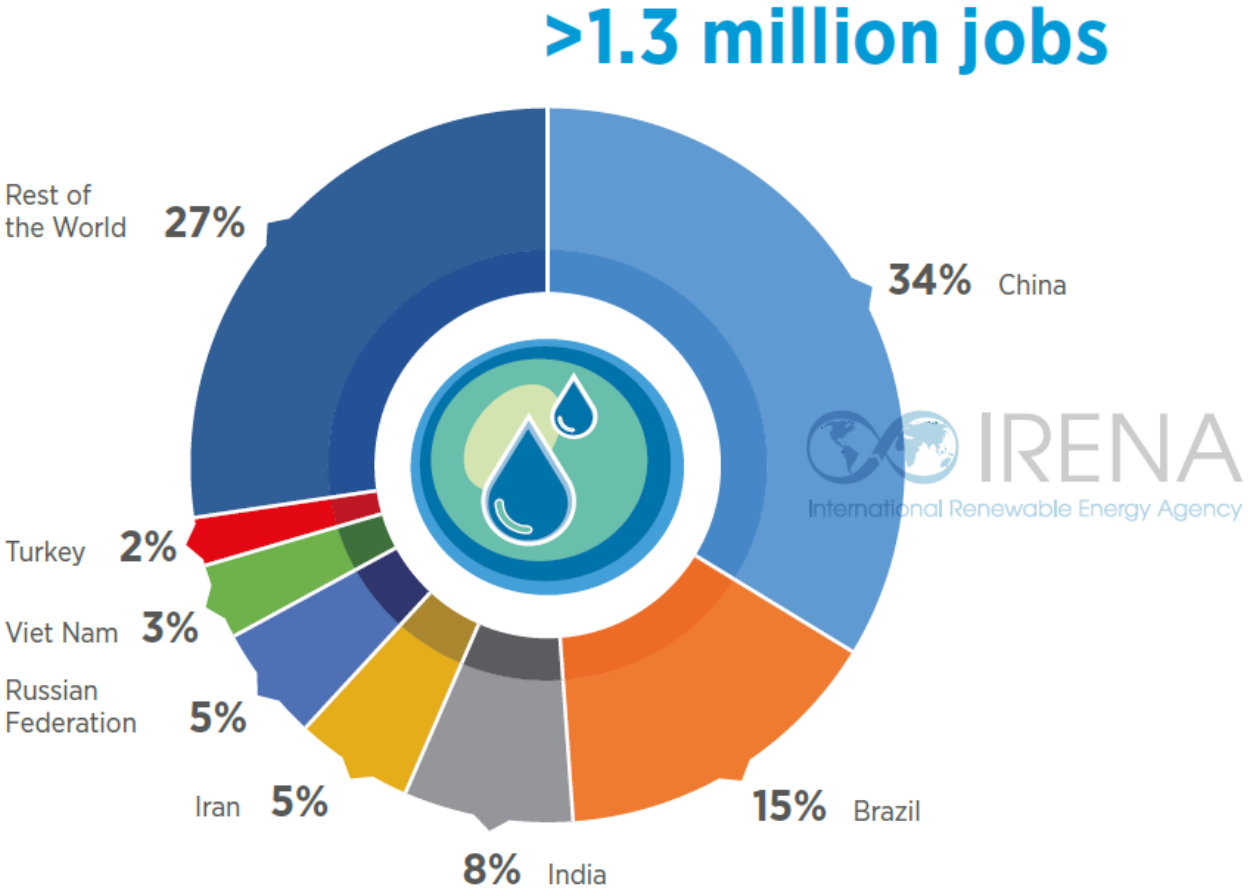
Employment by technology



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

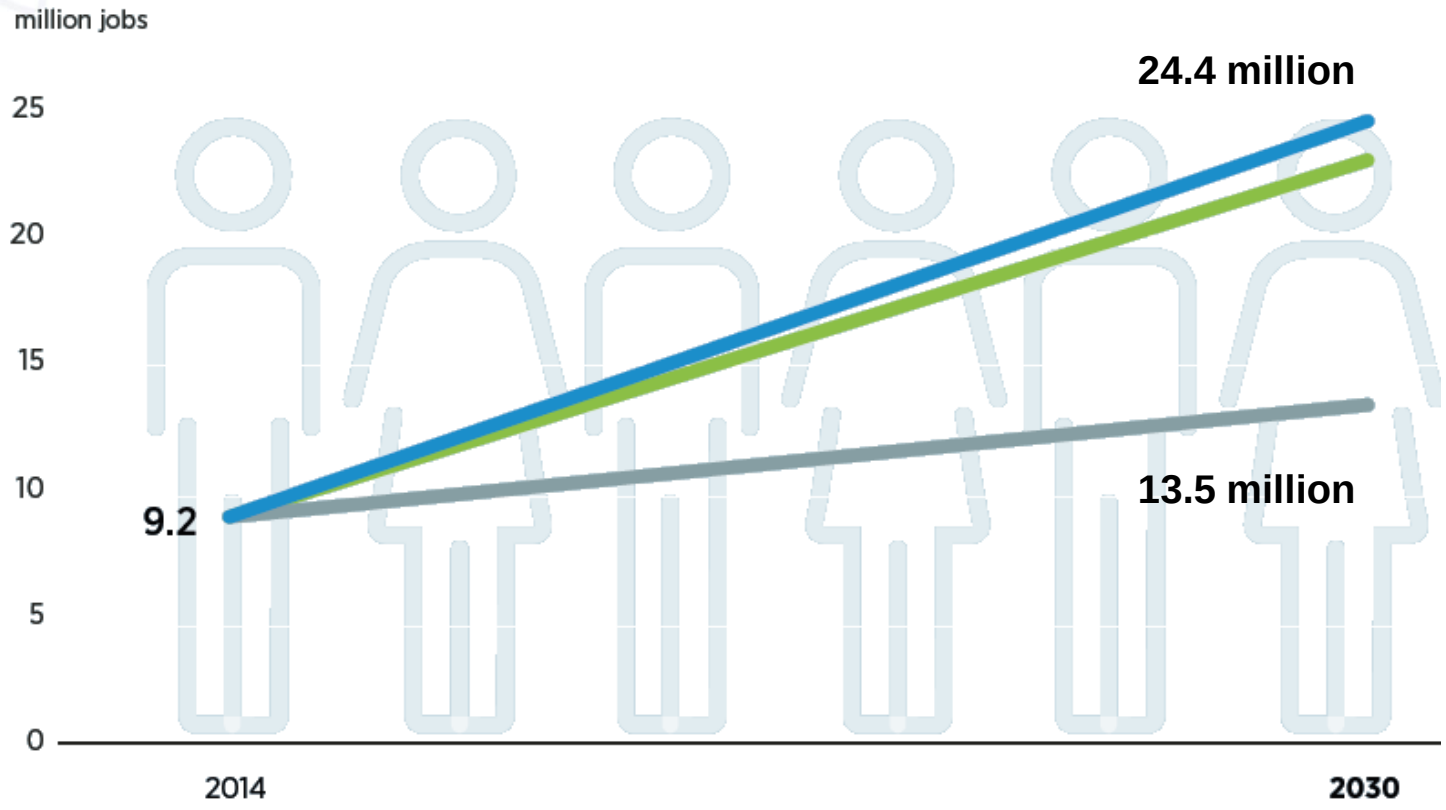
Technology Focus

Renewable Energy Jobs – Large Hydropower



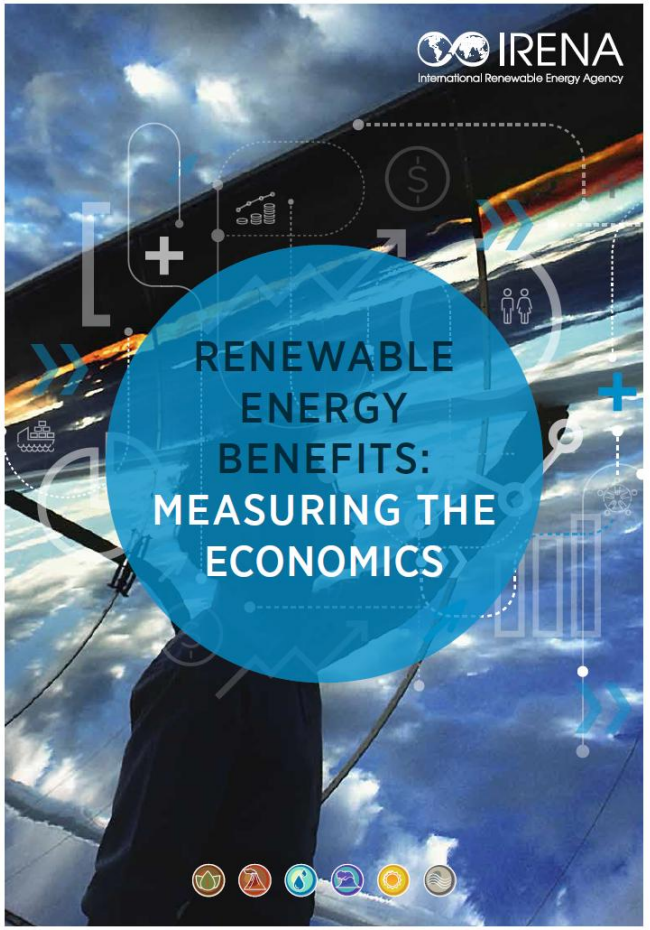
Source: IRENA (2016), Renewable Energy and Jobs - Annual Review 2016

Renewable energy will create more jobs



The renewable energy sector could support up to 24 million jobs in 2030

Renewable Energy Benefits: Measuring the economics



Renewable energy boosts global GDP and improves welfare

+1.1%

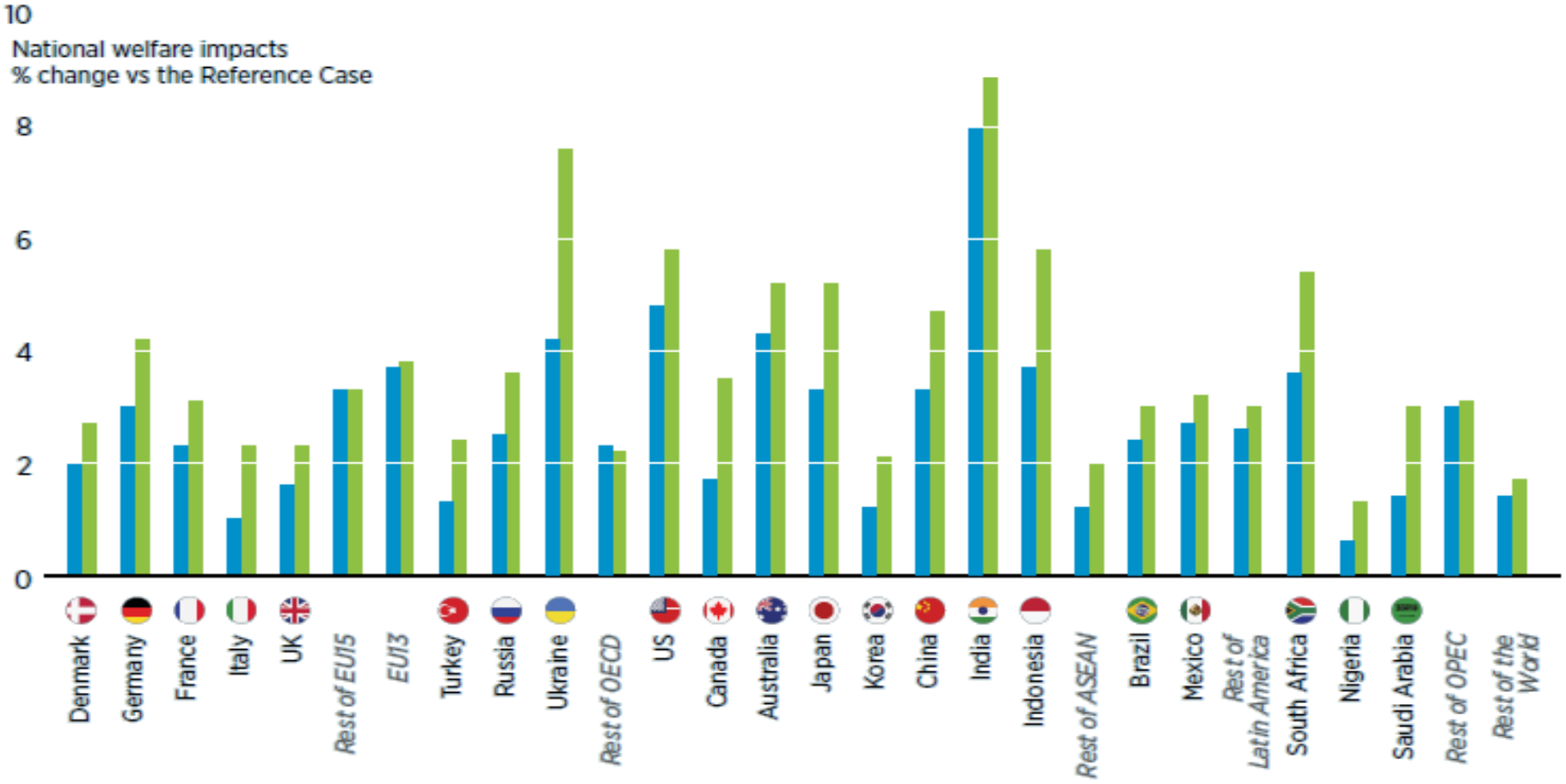
+1.3 trillion USD

- Doubling the share of renewables by 2030 would increase **global GDP by up to 1.1% or USD 1.3 trillion**
- The increased investment in renewable energy deployment triggers ripple effects throughout the economy.

+3.7%

- **Improvements in welfare** would go far beyond gains in GDP.
- Doubling the share of renewables by 2030 increases global welfare by up to 3.7% (1.1% improvement in GDP).

Welfare improves in all countries

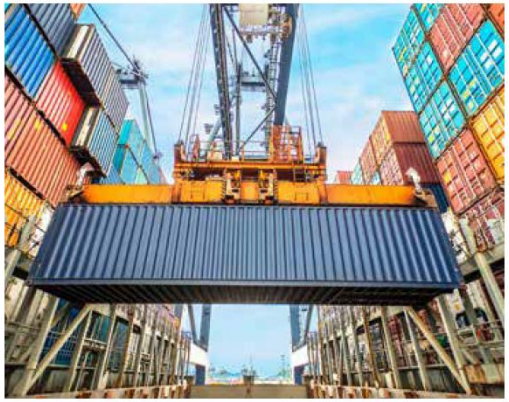


Shifting trade patterns

- As economies expand and become more interconnected, **volume of global trade will increase by 2030**.

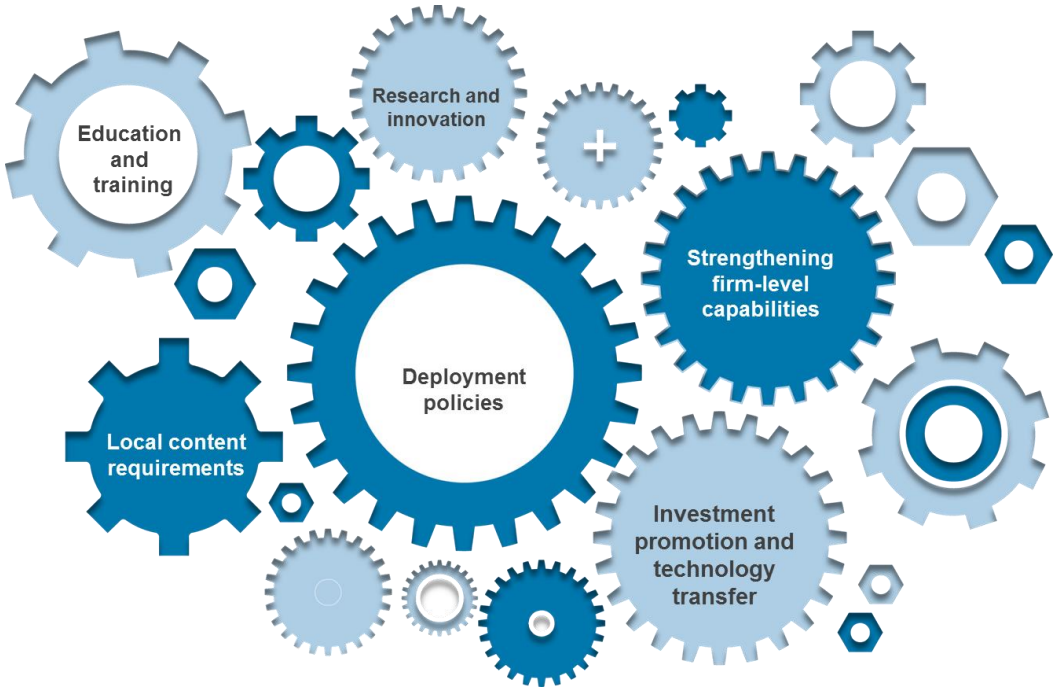
- Doubling the share of renewables will reduce fossil fuel trade and increase trade in renewables equipment and other investment goods and services.

- This brings new market opportunities, including for today's fossil fuel exporters.



The role of enabling frameworks

The right policy mix can maximise value creation



GDP
Up 1.1%
by 2030

Welfare
Up 3%
by 2030

Jobs
24 million jobs
in renewables
by 2030

Trade
New markets,
new opportunities

Recent activities and the way forward

- *Renewable Energy Benefits: Leveraging Local Industries*
- *Quantitative assessment of the socio-economic impacts of renewable energy deployment*
- *Solar pumping for irrigation: Improving livelihoods and sustainability across*
- *Renewable Energy Benefits: Decentralised Solutions in Agriculture*

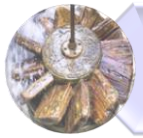
Assessing socio-economic benefits

- Socio-economic impacts
  - Economic impacts
  - Health impacts
  - Environmental impacts
  - Impact on wellbeing
  - Impact on education


Water pumping for irrigation


Drying produce

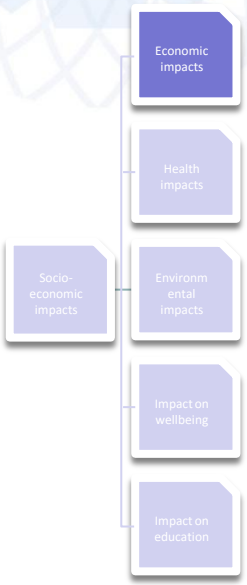

Refrigeration


Agro-processing


Cooking and water heating


Lighting and communication

Economic benefits



Savings on energy spending

- Savings of USD 132 million from 614 thousand solar lights in Africa
- In India, 4,500 solar pumps saved around USD 360,000/yr on diesel subsidies
- Almost USD 4,000 savings on community in Nepal from IWM/E
- Tea curing in Sri Lanka saves 1.38 kg of fuel per1 kg of tea

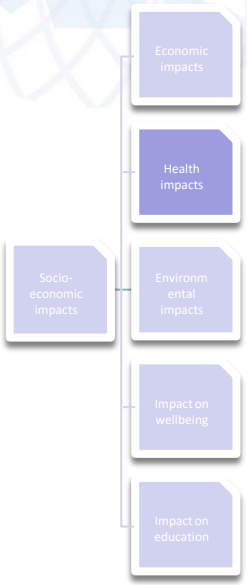
Job creation

- 76,000 jobs in the Global Alliance for Clean Cookstoves worldwide
- 7,572 people employed in operating 8,493 IWMs in Nepal
- Biogas programme in Nepal employs total 1,083 FTEs on an annual basis
- Pico PV systems employ 30 more time more people than kerosene

Income generation

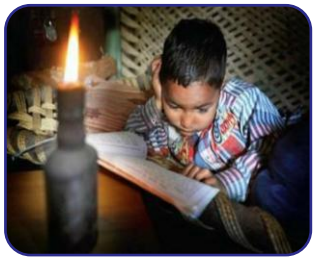
- The community in Nepal generates USD 400 per year from electricity and agro processing services from IWM/E
- In Benin, Solar Market Gardens farmed by women generated USD 40,000 from cultivating 27.7 tons of produce in 2013-14

Health benefits



Prevention of diseases and malnutrition

- Almost 4.3 million people die every year from exposure to household air pollution
- Potential to reduce respiratory infection by 25% among children
- Polluted water consumption causes 4% of all deaths in rural areas
- Food losses as high as 40-50% for root crops, fruits and vegetables, 30% for cereals and fish, and 20% for oilseeds



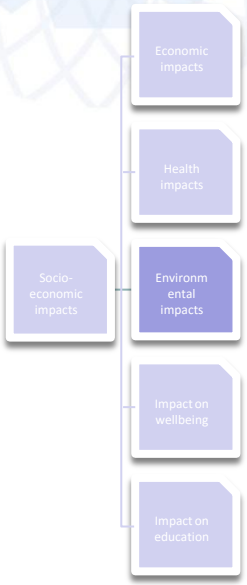
Prevention of accidents

- 76,000 jobs in the Global Alliance for Clean Cookstoves
- 8,493 IWMs has created employment for around 7,572 people
- Biogas programme in Nepal the total FTEs on an annual basis can be estimated to be 1,083

Health improvement through medical facilities

- In 2013, 15% and 43% of hospitals in Uganda and Sierra Leone respectively used PV to complement grid electricity access
- In Liberia, solar electrification surpassed that of other sources

Environmental benefits



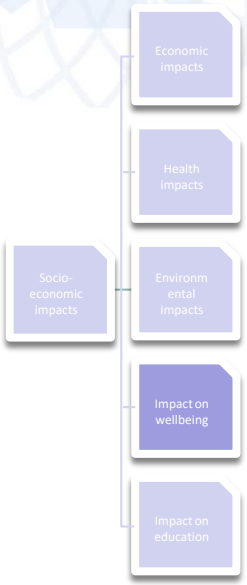
Reduced deforestation and emissions

- Globally, 5 million solar pumps can save 10 billion litres of diesel, and nearly 26 million tonnes of CO_2 (equivalent to annual emission from 5.5 million vehicles)
- 50,000 solar pumps in Bangladesh saved 450 million litres of diesel and reduced emissions by a million tonnes of CO_2 per year (IDCOL, 2015).
- In Rajasthan, 4,500 solar pumps saved 3,482 kg of avoided CO_2 emissions and saved around 48 million cubic meter water per year

Waste management

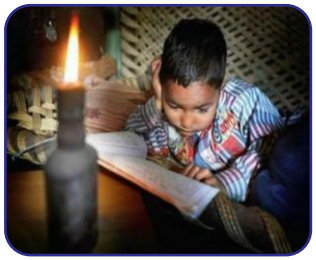
- Runs on animal manure and agriculture waste
- 9 biogas digesters in Vietnam can treat 8,500 tons of manure and avoid the emission of 2,200 tons of CO2 equivalent per year

Impact on wellbeing



Gender empowerment

- Solar Sister: over 2,198 women entrepreneurs
- Global Alliance for Clean Cookstoves: 76,000 women
- Grameen Shakti: almost 23,000 women technicians
- ENERGIA: strengthened 3,000 women in Africa and Asia



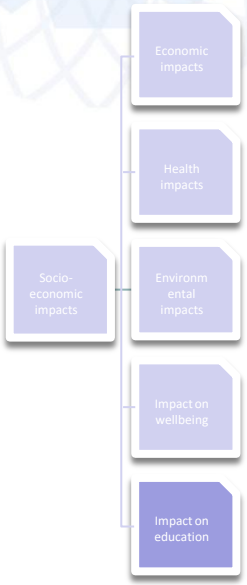
Increased safety

- Lighting reduces the risk of safety hazards such as harassment, robberies and animal attacks
- Lighting increases the perceived dimension of safety, or reducing 'feeling uneasy after nightfall'

Improved quality of life

- Entertainment, comfort, etc.
- 40% of men spend extra time on leisure
- 19% of women spend time on leisure (35% on farm-related activities, 3% other income generating activities outside farm, 26% domestic responsibilities 16% on taking care of the children)

Impact on education



Increased school enrolment and performance

- 614 thousand solar lights in Africa is estimated to have enabled 765 million extra study hours for children in 2014
- 28% of solar light users use the annual savings on kerosene, reported to be close to USD 70 per year, on school materials and tuition fees
- In Vietnam, school enrolment rose up to 11% for boys and a 4% for girls and the number of school years increased for the children of electrified households

Increased knowledge in the sector

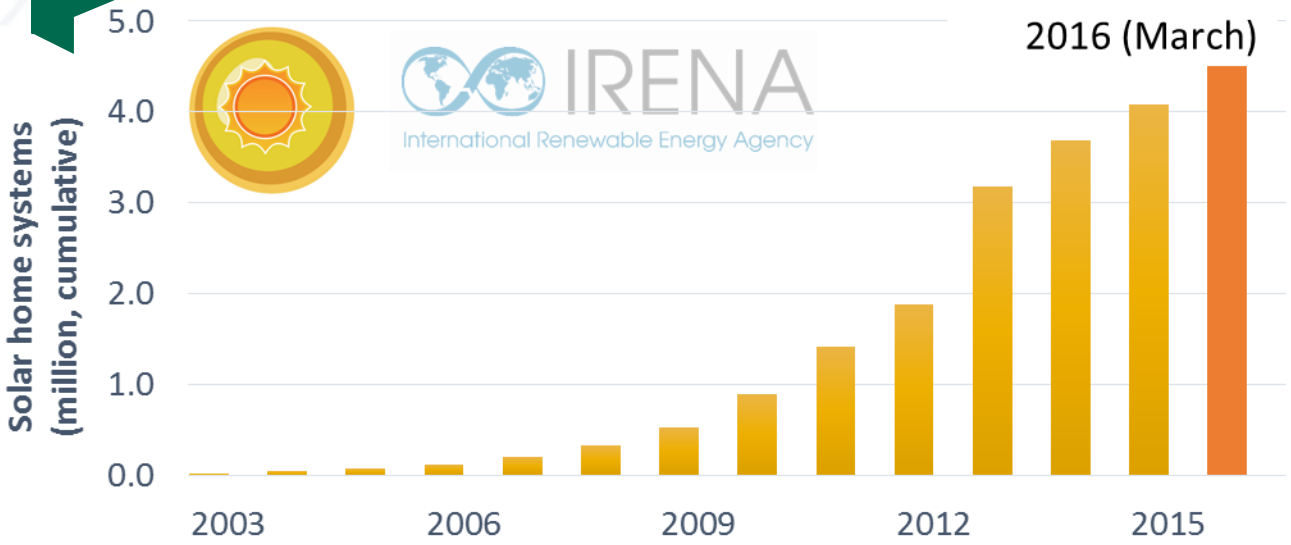
- General skills acquired that can contribute to reducing inefficiencies in production
- Increased adoption of new technologies, which further increase output

Thank you!

Thematic Focus

Employment in off-grid applications

Energy Access: 4.5 million solar home systems – 127,000 jobs



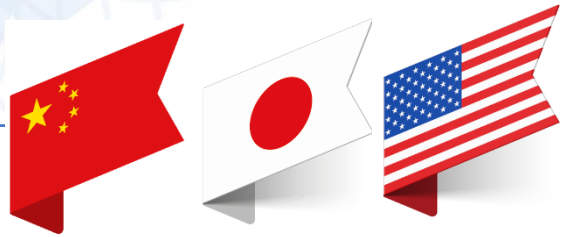
73,000 jobs in off-grid solar PV

Renewable energy creates employment opportunities in applications for cooking and motive power

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

Technology Focus

Renewable energy jobs in solar PV



China is the global leader followed by **Japan** and **US**
Rapid increase in **Japan (20%)** and **US (20%)**

BREAKDOWN OF EMPLOYMENT BY SEGMENTS OF THE VALUE CHAIN

1.6 Million Jobs in Solar PV

Manufacturing	Installation & Construction
79%	20%

208,000 Jobs in Solar

Manufacturing	Installation & project develop
15%	68%

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

Thematic Focus

Women in modern renewable energy jobs

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

35%

Average share of women working at 90 renewable energy companies surveyed

Women representation:

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

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

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 will create more jobs

By Country

	Reference	Doubling RE
China	3.5	5.9
India	1.5	3.5
Brazil	1.1	2.2
United States	0.4	1.4
Indonesia	0.2	1.3
Japan	0.5	1.1
Russia	0.6	1.1
Mexico	0.1	0.3
Germany	0.2	0.3
Rest of the World	5.4	7.3
World total	**13.5**	**24.4**

Benefits of Renewable Energy

ENVIRONMENT
Climate change
Local pollution

HUMAN DEVELOPMENT
Poverty alleviation
Access

ENERGY SECURITY
Trade balance improvement
Risk reduction

ECONOMIC GROWTH
GDP
Industrial development
Jobs