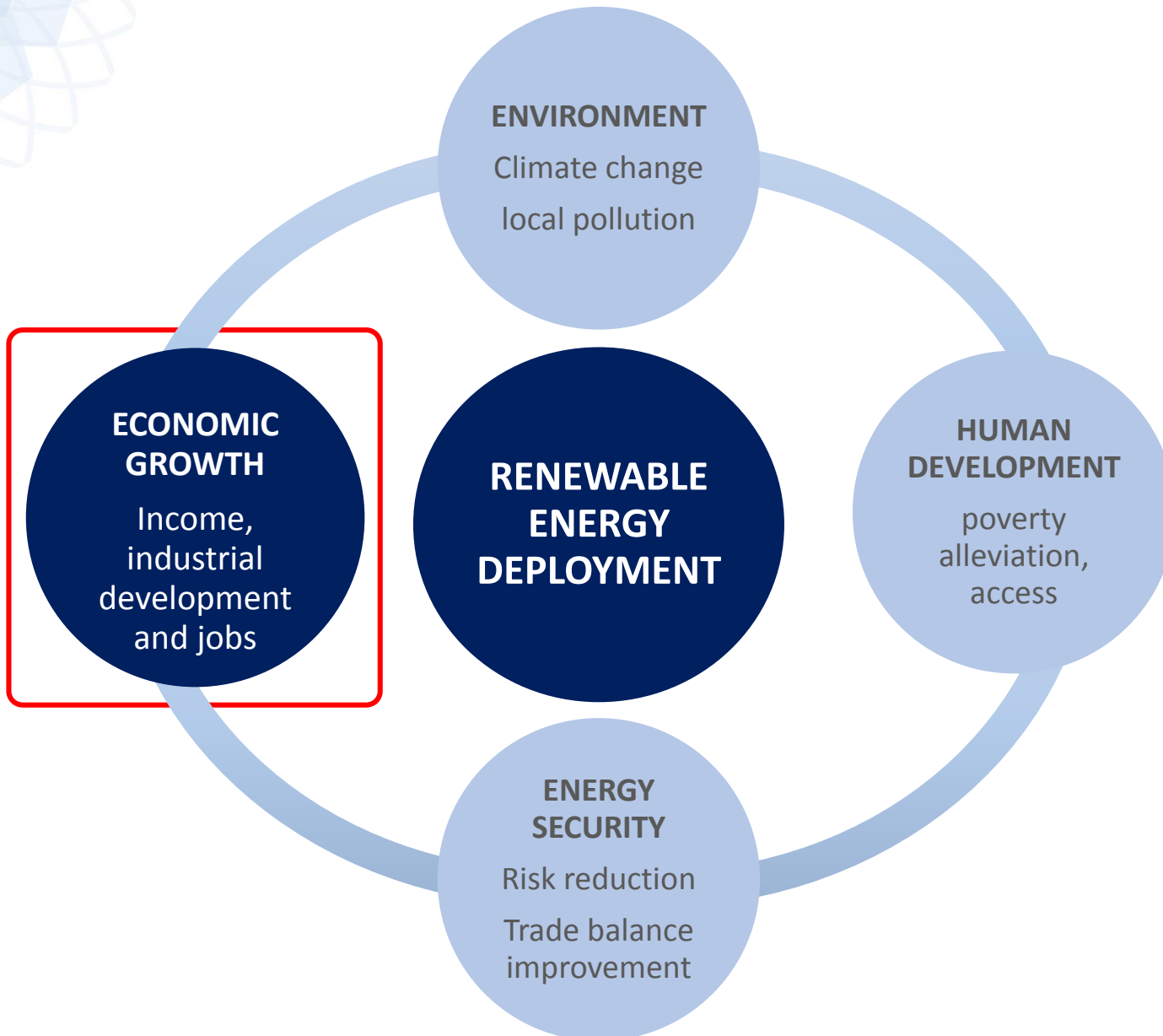


Socio-economic benefits of renewable energy



Benefits of Renewable Energy



IRENA's efforts to bridge the knowledge gap

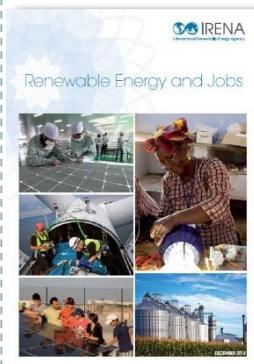
- Specific analytical work and empirical evidence remain relatively limited.
- IRENA has been leading the work on jobs since 2011, recently adding analysis of broader socio-economic benefits.



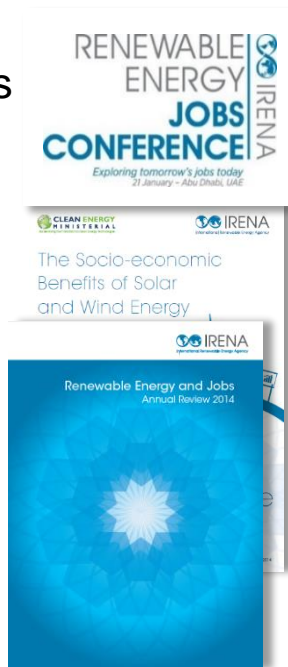
2011



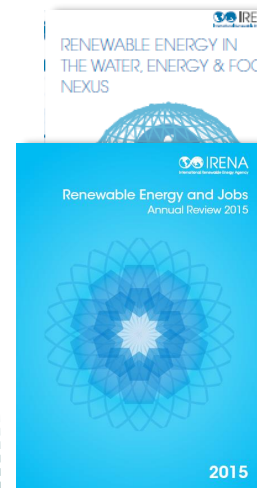
2012



2013



2014



2015



Just released

...and others coming

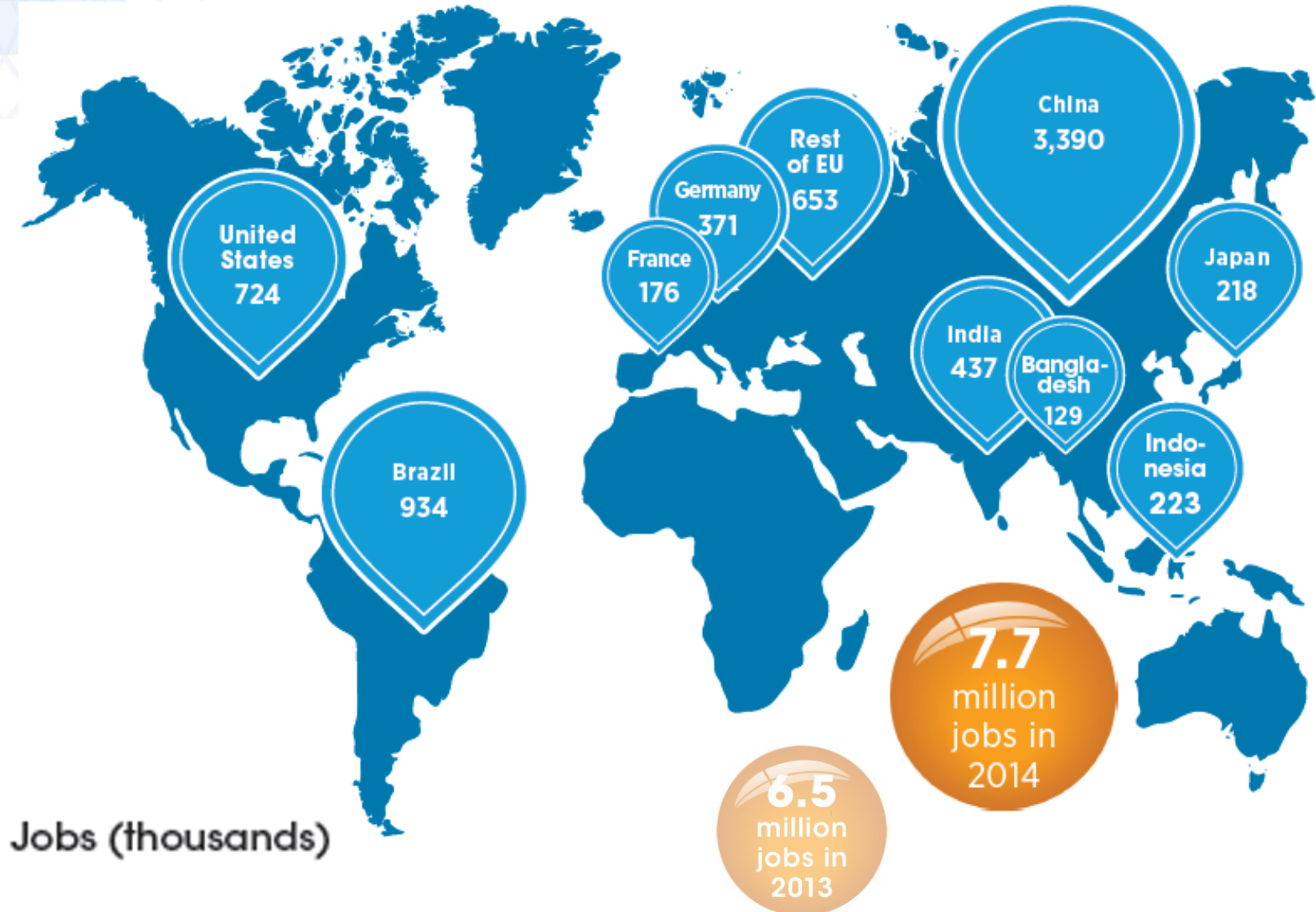


Jobs Sidebar in the *Global Status Report*

2016

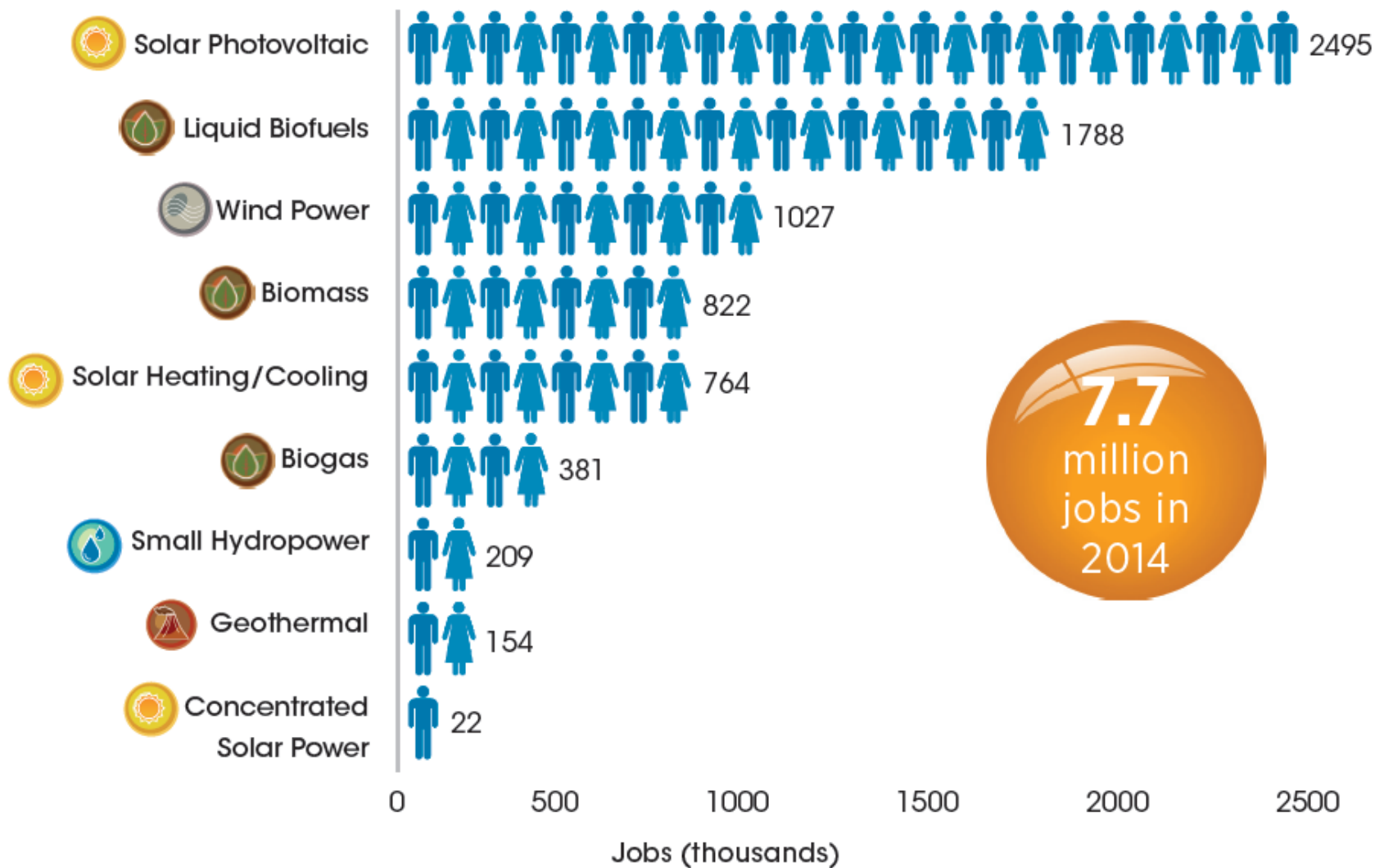
Renewable Energy Jobs

Employment in Selected Countries

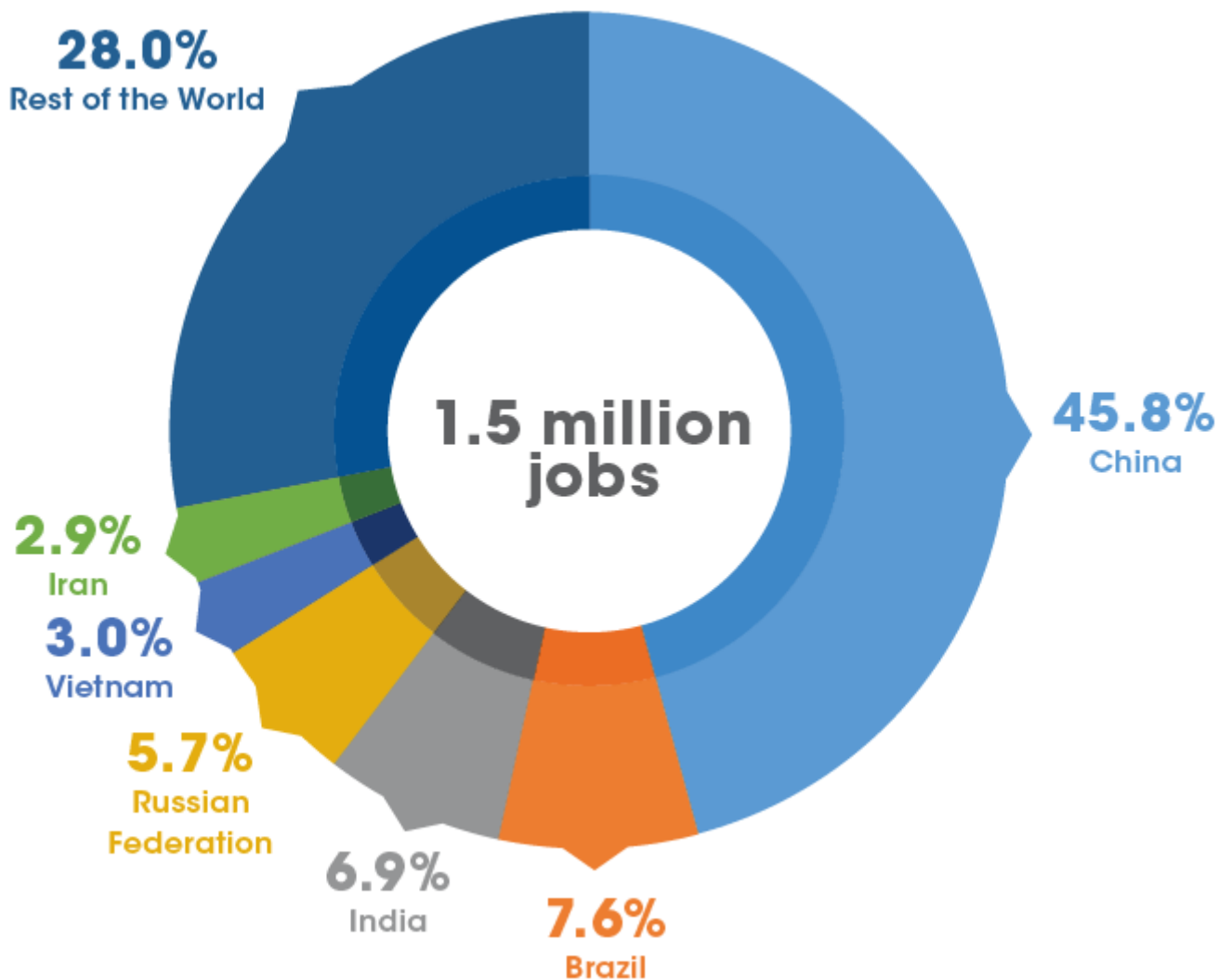


Renewable Energy Jobs

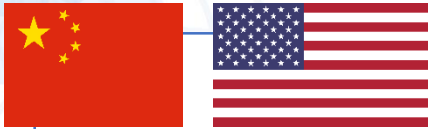
Employment by technology



Renewable Energy Jobs – Large Hydro



Renewable Energy Jobs - Solar PV



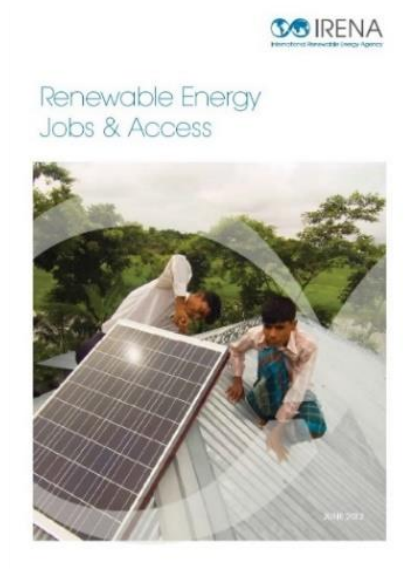
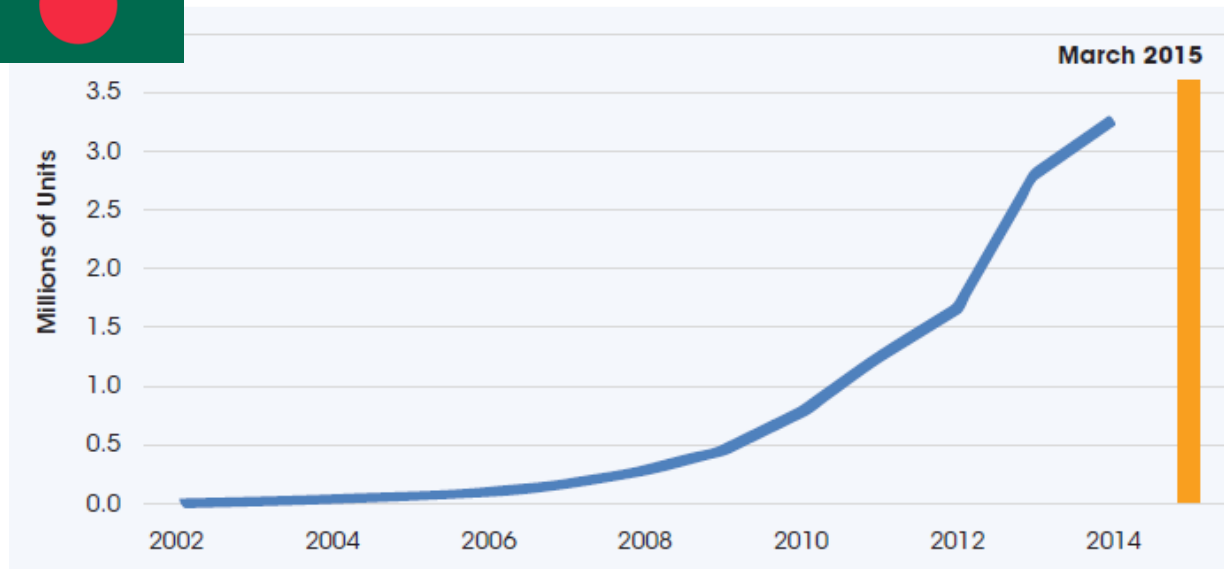
China is the global leader
US employment in solar up by 20%



Solar PV employment in **Japan**
tripled between 2012 and 2013



Energy Access: 3.8 million solar home systems – 115,000 jobs in Bangladesh



Renewable energy jobs and the segments of the value chain



BREAKDOWN OF EMPLOYMENT BY SEGMENTS OF THE VALUE CHAIN



1.6 Million Jobs in Solar PV

Manufacturing

79%

**Installation &
Construction**

20%



174,000 Jobs in Solar

Manufacturing

24%

**Installation &
Construction**

70%

Socio-economic benefits from renewable energy deployment

7.7 million



In 2014, 7.7 million people worked in renewables (excl. large-hydro) worldwide

€ 9.1 bn



Germany avoided € 9.1 billion in fossil fuel imports in 2013

\$31 bn








In China, solar PV manufacturing output reached \$ 31 billion in Q1 2015

29 million



29 million people utilize off-grid solar lighting solutions to meet basic electricity needs

Estimations on economic impacts

| | Target analysed | Impact in 2030 |
|---|--|--|
|  | European Union: -40% GHG in 2030 with renewables and efficiency | + 0.5 % GDP, +1.25 million jobs |
|  | Germany: different targets of renewable energy deployment | Up to + 3% GDP and + 1% net employment |
|  | Mexico: 21 GW of renewable energy | +0.2% GDP, +134,000 jobs in the sector |
|  | Japan: adding 23 GW of solar PV by 2030 | +0.9% GDP |
|  | USA: renewable energy driven de-carbonisation | +0.6% GDP, +0.5 to + 1 million net additional jobs |

Knowledge gap: Little empirical evidence at national and global-level

Measuring the economics



- *Renewable Energy Benefits: Measuring the Economics* is the first global quantification of the macroeconomic impact of renewable energy deployment.
- The assessment uses a macro-econometric tool to estimate the impact of a doubling in the share of renewables in the global energy mix on:
 - GDP
 - Welfare
 - Employment
 - Trade
- The analysis builds on IRENA's work on the socio-economic benefits of renewable energy, as well as on REmap 2030.

Renewable energy boosts global GDP and improves welfare

+1.1%

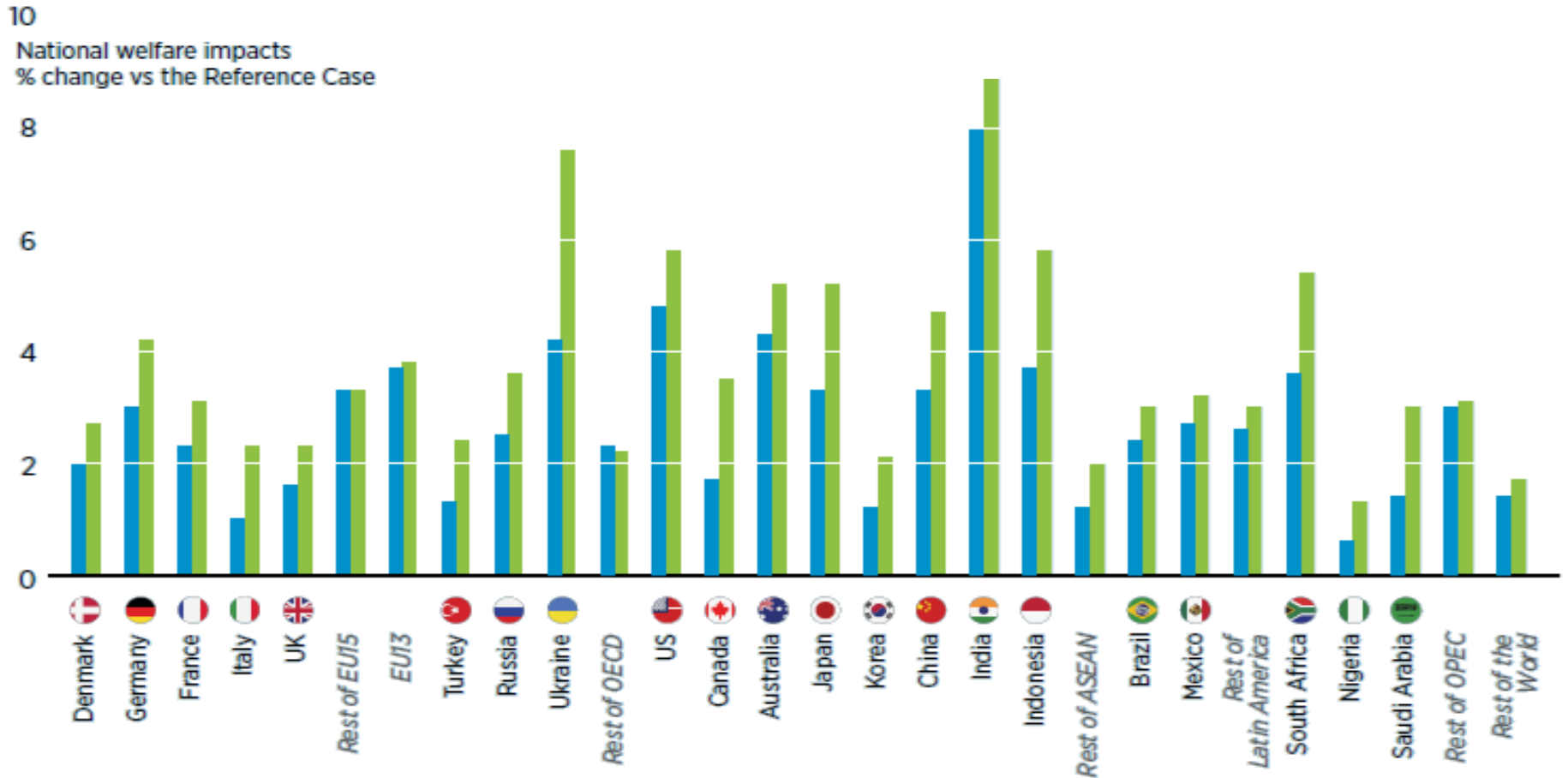
+1.3 trillion USD

- 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.

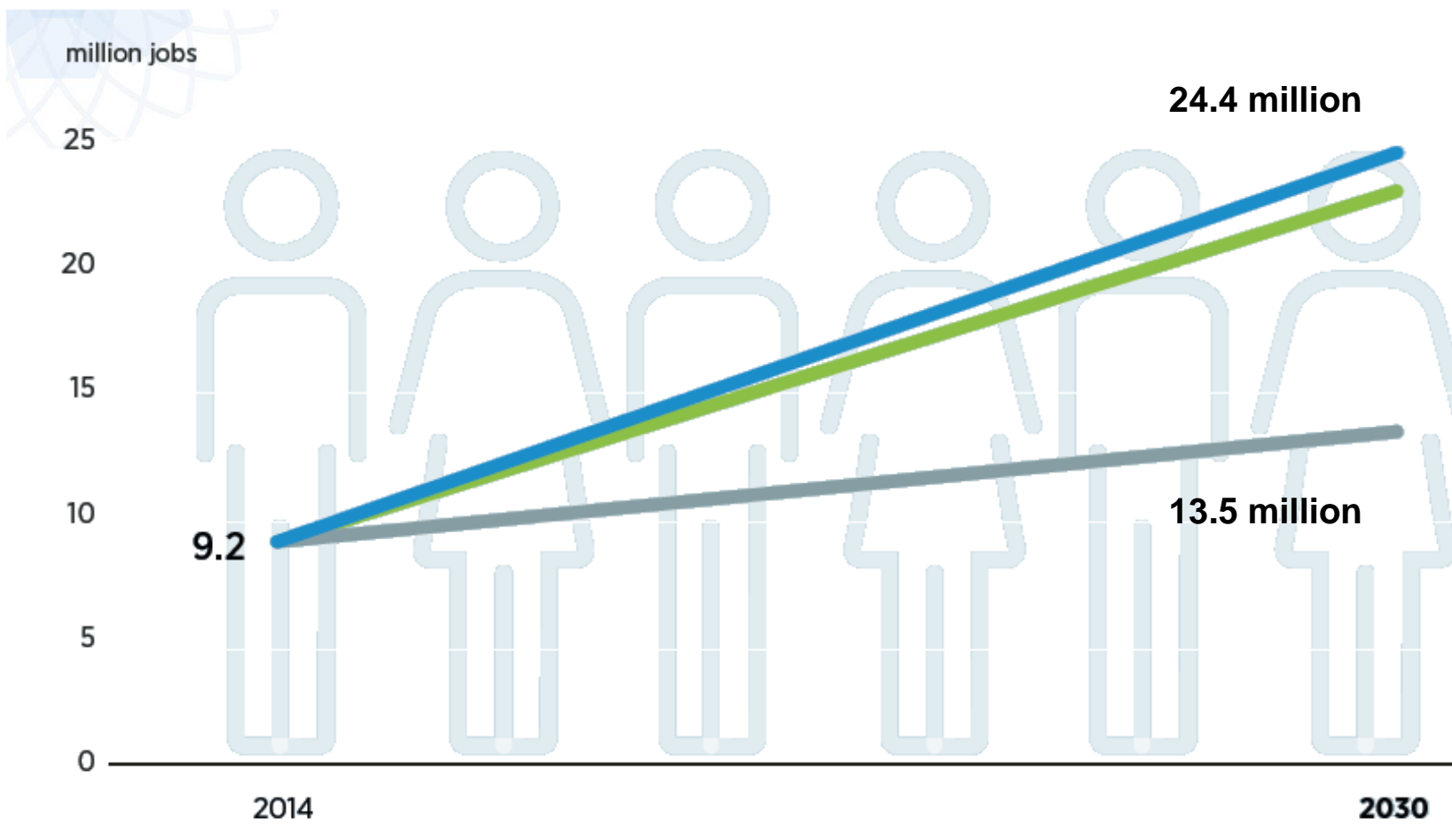
+3.7%

- **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













Renewable energy will create more jobs



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

Renewable energy will create more jobs

| | 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 |
| <i>Rest of the World</i> | 5.4 | 7.3 |
|  World total | 13.5 | 24.4 |

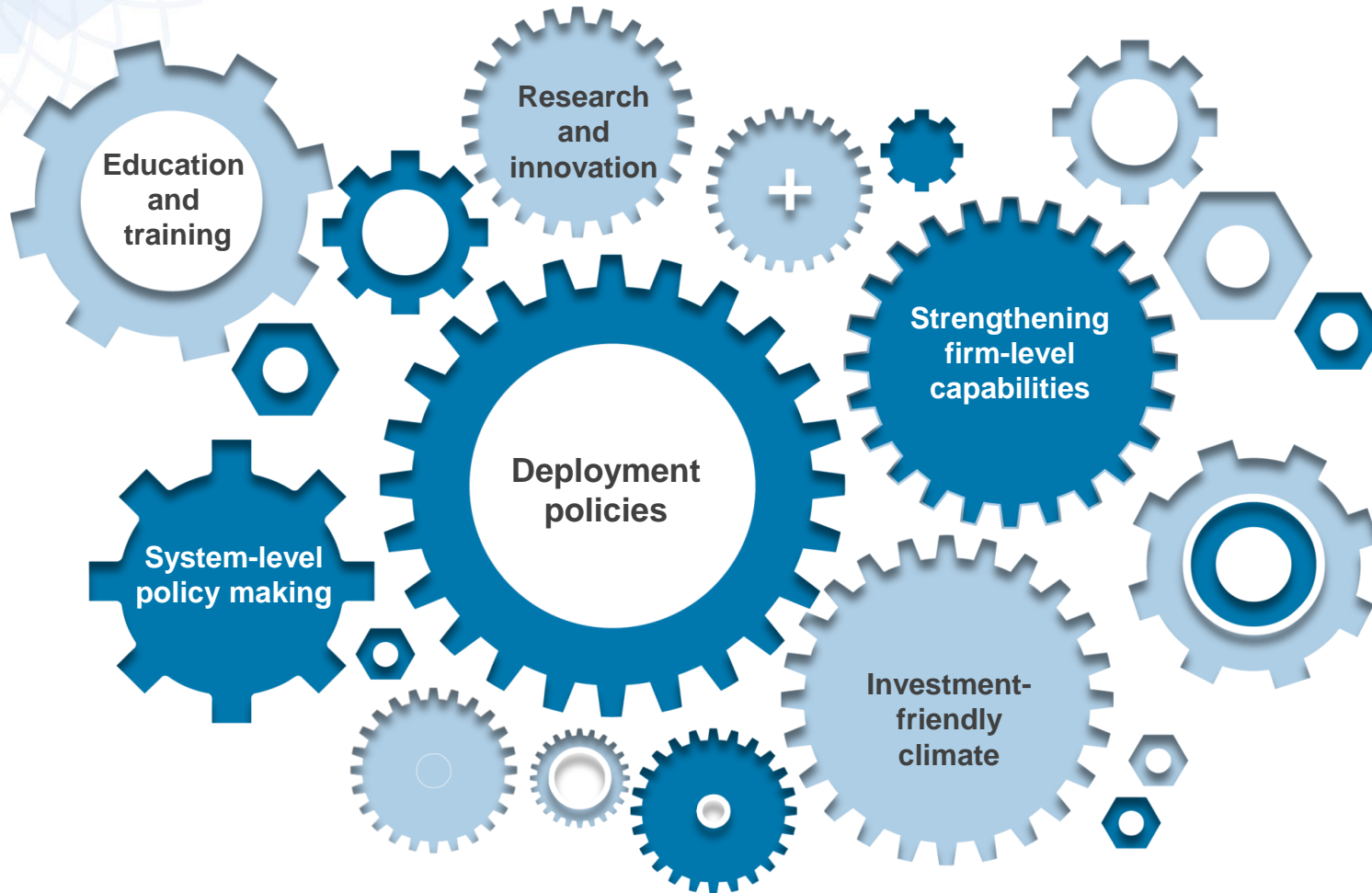


Shifting trade patterns

- 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.

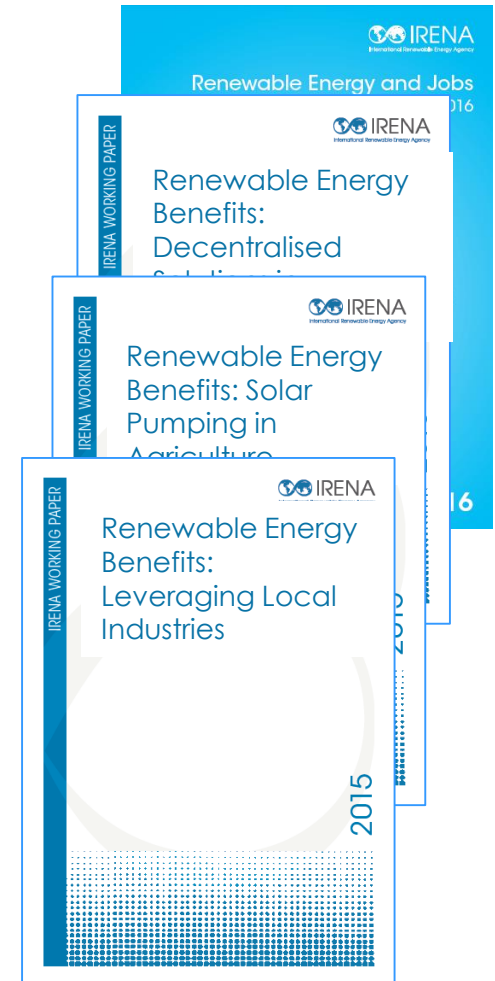


The way forward: the role of enabling frameworks



Upcoming reports

- ***Renewable Energy and Jobs: Annual Review 2016*** – will update estimates and further improve coverage and data quality
- ***Renewable Energy Benefits: Decentralised Solutions in Agriculture*** analyses how off-grid applications for heating/cooling and motive power can improve the livelihood of people that lack access to modern energy services.
- ***Renewable Energy Benefits: Solar Pumping in Agriculture*** examines best practices and lessons learnt in deploying solar pumping solutions and maximizing benefits across sectors.
- ***Renewable Energy Benefits: Leveraging Local Industries*** identifies the potential values of localising different segments of the value chain














IRENA

International Renewable Energy Agency

Thank you!

Renewable energy benefits globally

| Country/Region (Source) | Forecast year | Analysed policy Intervention | Impact on GDP | Impact on employment |
|---|---------------|--|------------------------------|--|
|  Chile (NRDC and ACERA, 2013) | 2028 | 20% renewables in electricity generation (excl. large hydro) | +0.63% (USD 2.24 billion) | 7,800 direct and indirect jobs (+0.09%) |
|  European Union (European Commission, 2014) | 2030 | -40% greenhouse gas emissions in 2030 ⁴ | + 0.46% | +1.25 million economy-wide jobs (+0.5%) |
|  Germany (Lehr et al., 2012; Blazejczak et al. 2014; Bohringer et al. 2013) | 2030 | Different targets for renewable energy deployment | Up to + 3% | From negative* to + 1% on net employment |
|  Ireland (Poyry Management Consulting and Cambridge Econometrics, 2014) | 2020 | Meeting the target for wind by 2020 | +0.2% to + 1.3% | +1,150 to + 7,450 net jobs |

| Country/Region (Source) | Forecast year | Analysed policy Intervention | Impact on GDP | Impact on employment |
|--|---------------|--|-----------------------------|-------------------------------------|
|  Japan (IRENA and CEM, 2014) | 2030 | Adding 23.3 gigawatts (GW) of solar PV | +0.9% (USD 47.5 billion) | N/A |
|  Mexico (own calculations based on PwC, 2015) | 2030 | 21 GW of additional renewable power capacity | +0.2% | +134,000 in the sector |
|  Saudi Arabia (own calculations based on K.A.CARE, 2012) | 2032 | 54 GW of renewable power capacity | +4% (USD 51 billion) | +137,000 in the sector ⁵ |
|  United Kingdom (Cambridge Econometrics, 2012) | 2030 | Larger role of off-shore wind instead of natural gas | +0.8% | +70,000 net employment |
|  USA (ICF International, 2015; Synapse Energy Economics et al. (2015)) | 2030 | Decarbonisation driven by renewable energy | +0.6%, | +0.5 to +1 million net |