



RAISING CLIMATE AMBITIONS  
THROUGH RENEWABLES

# RENEWABLE ENERGY OFFERS...



**1.** Key climate  
solution



**2.** Readily  
available tool



**3.** Climate-safe  
energy



**4.** Cost-competitive  
power generation




**5.** Transformed  
economies  
and societies

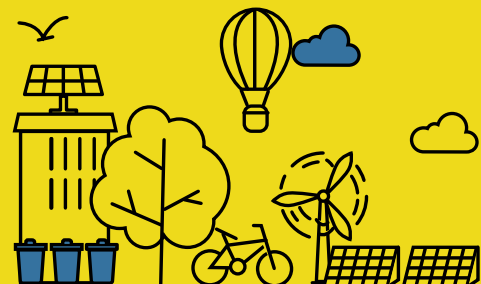


**6.** New jobs,  
new industries  
and sustainable  
livelihoods



**7.** Effective  climate action

**8.** Channel  
for sustainable  
investment



# 1

## KEY CLIMATE SOLUTION

Thirty years from now, our world will be hard to recognise. Its population will approach 10 billion. Cities will be larger than ever. Energy systems will become increasingly connected, empowering people and communities in still unimagined ways.

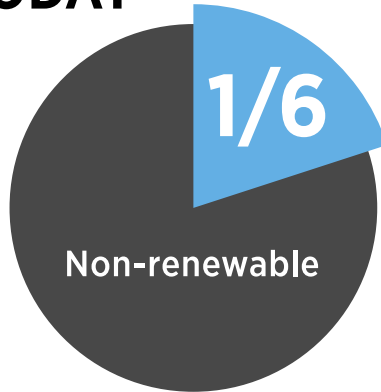
Through a combination of cost-competitive renewable energy, energy efficiency and digital systems, carbon-dioxide (CO<sub>2</sub>) emissions could be far lower than today.

Fulfilling the Paris Agreement means deploying renewables six times faster.

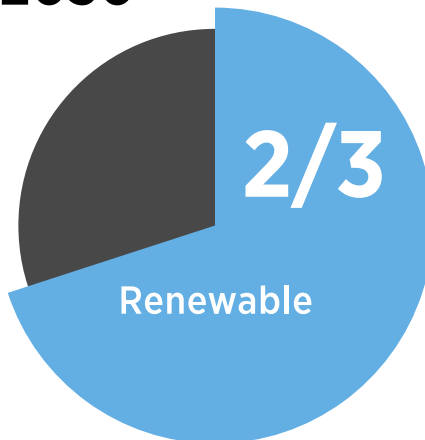
**By 2050, two-thirds  
of the world's energy  
should be renewable**

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**TODAY**



**2050**



# 2

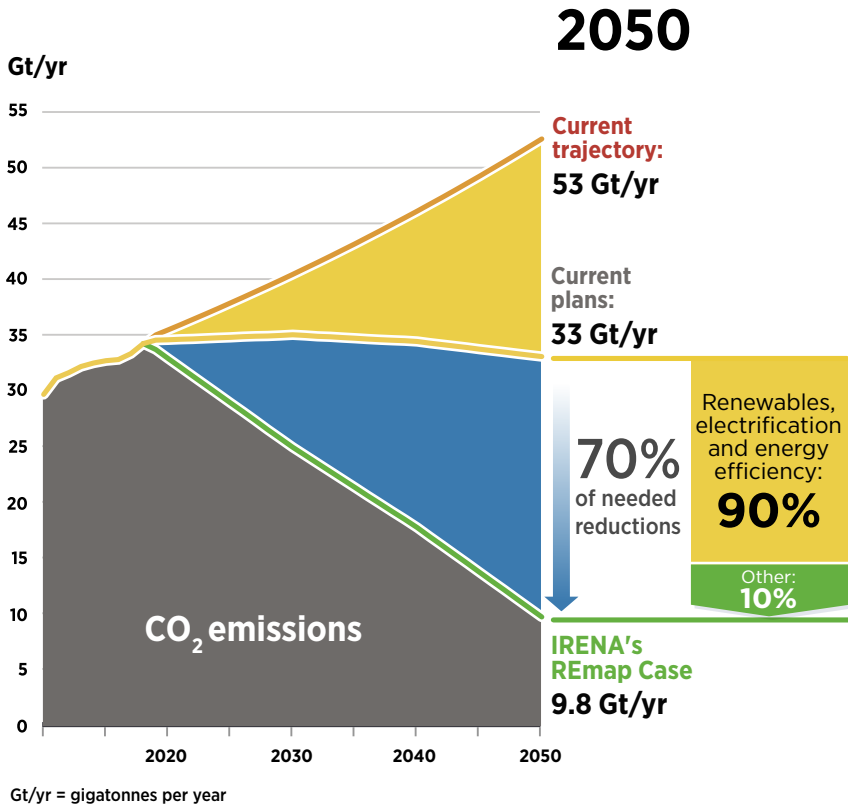
## **READILY AVAILABLE TOOL**

We need to set the course for a sustainable energy future based on existing technologies and realistic policies.

Renewable energy is a key solution to address climate change and our most practical climate action tool.

Now is the time for decisive action.

## Renewables can cut energy-related CO<sub>2</sub> emissions by about 70%



» **Energy-related CO<sub>2</sub> emissions:**  
**Roadmap for faster reduction**

# 3

## CLIMATE-SAFE ENERGY

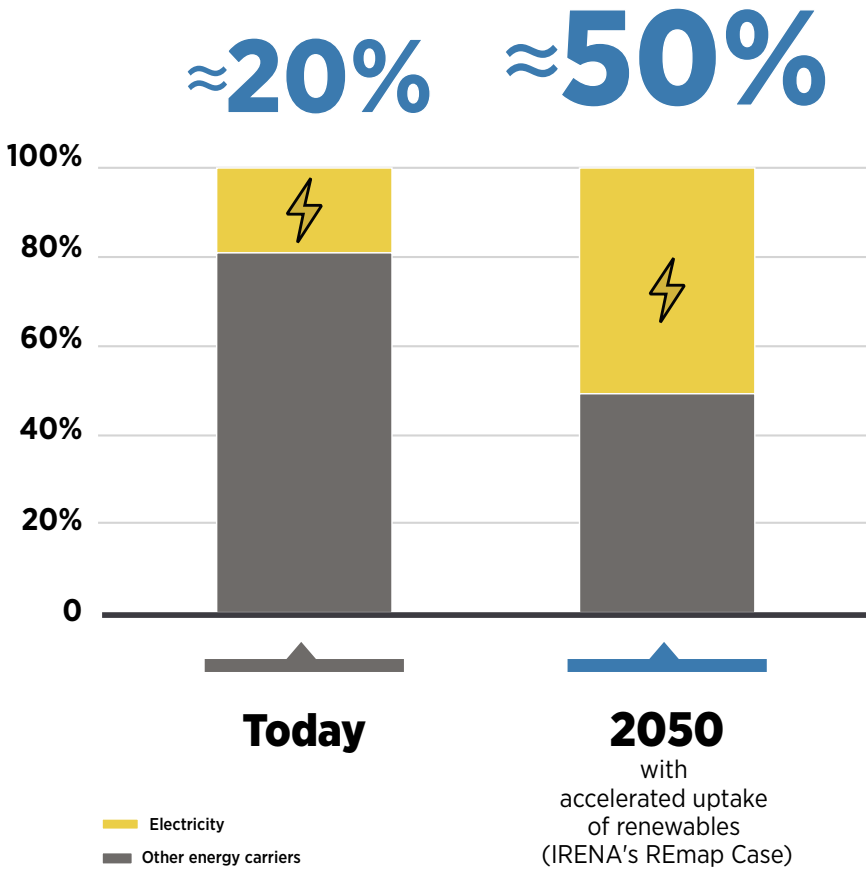
Renewables and electrification technologies could achieve 90% of the emission reductions needed to fulfil Paris Agreement decarbonisation aims.

Today's plans and policies, including Paris-related pledges, would leave annual emissions in 2050 close to current levels.





## Renewable electricity has to become the world's main energy source



» Growing share of electricity in final energy consumption

# 4

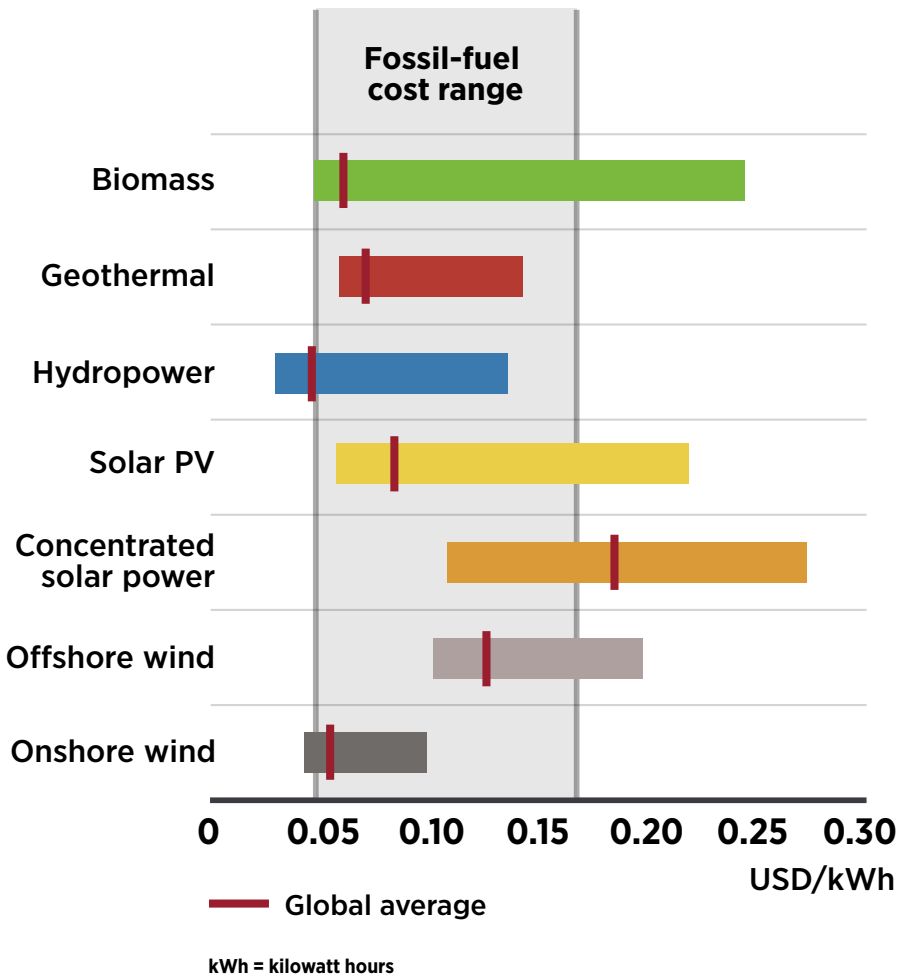
## **COST-COMPETITIVE POWER GENERATION**

Renewables have become the least-cost source of new power generation for locations and markets worldwide. Falling technology costs have made renewable-based systems the competitive backbone of energy decarbonisation.

Costs from all commercially available renewable power technologies continue to fall. Bioenergy, hydropower, onshore wind and solar PV projects now commonly undercut new fossil fuel-fired power generation.

Governments are setting increasingly ambitious targets to harness this clean, sustainable and cost-competitive energy potential.

## Renewable power generation has reached a competitive tipping point



» Renewable power generation costs in 2018

# 5

## TRANSFORMED ECONOMIES AND SOCIETIES

Renewables and energy efficiency can boost global GDP by 2.5% or even 5% with increased emissions mitigation, analysis by the International Renewable Energy Agency (IRENA) shows.

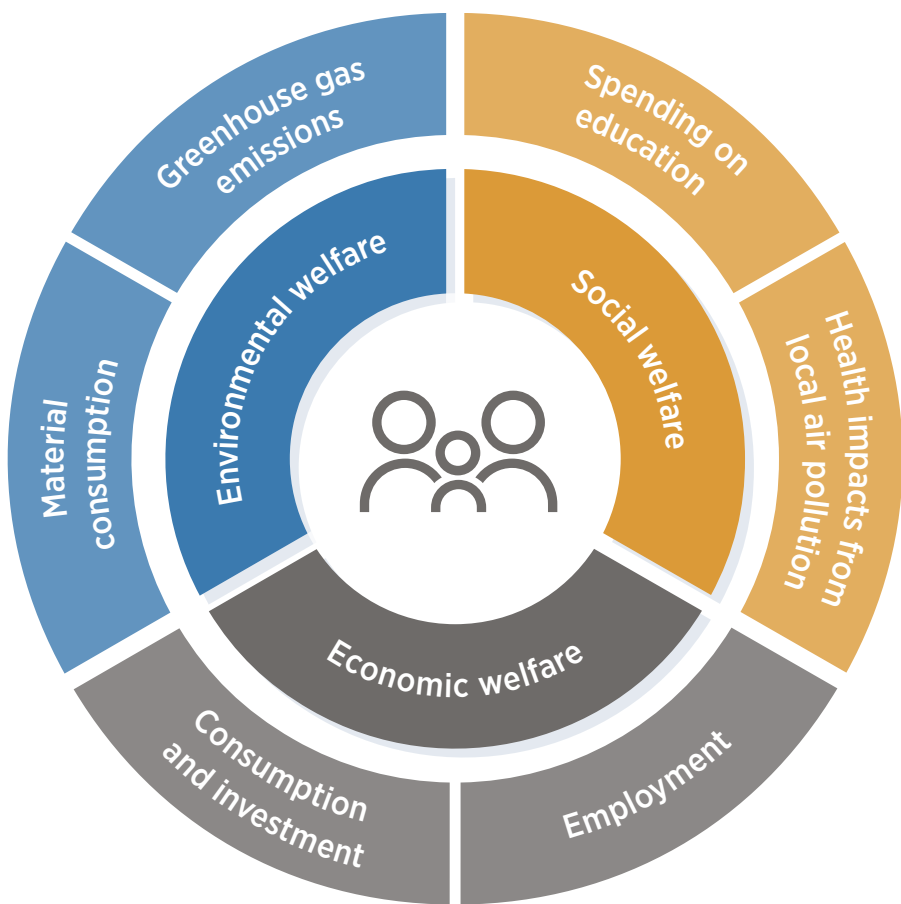
Today's energy system is heavily subsidised, with inefficient fossil-fuel subsidies accounting for a large share. Renewables, energy efficiency and more flexible power systems could reduce the total annual subsidies by USD 10 billion.

The transformation would reduce climate and environmental damage, strengthen economies and improve people's welfare.



# Renewable energy improves welfare and saves lives

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# 6

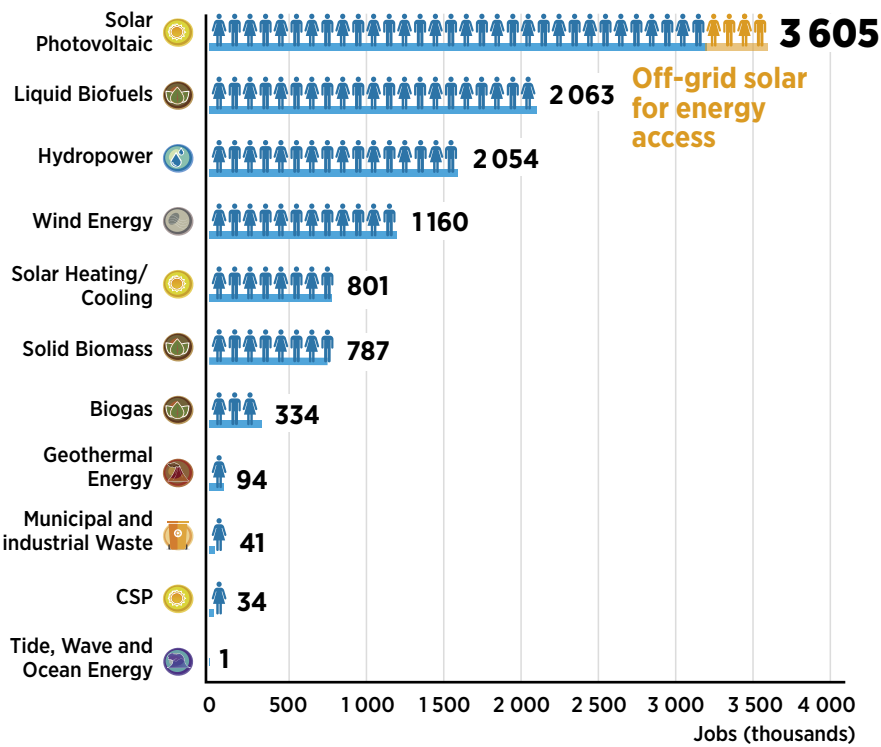
## **NEW JOBS, NEW INDUSTRIES AND SUSTAINABLE LIVELIHOODS**

The global shift to renewables is creating job opportunities. The sector now employs at least 11 million people worldwide, including over 100 000 through off-grid solar deployment in Sub-Saharan Africa.

Renewables are helping to expand energy access across Africa and Asia. Everywhere, renewable energy can drive low-carbon economic growth.

More countries manufacture, trade and install renewable energy technologies every year, as policy makers increasingly recognise the job creation opportunity.

# The renewable energy sector now employs at least 11 million people worldwide



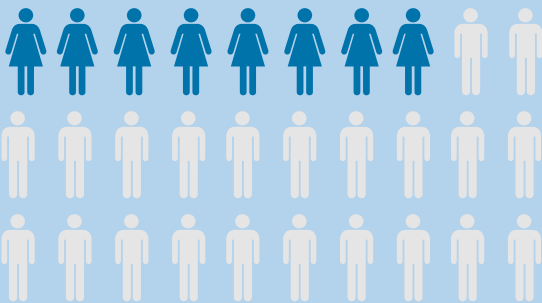
» Renewable energy jobs by technology

Percentages of women in STEM, other technical and administrative jobs in renewable energy\*

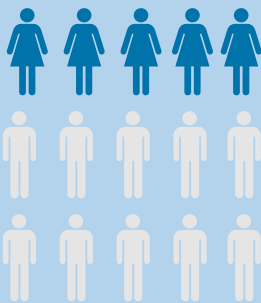
Women in renewable energy

32%

28% STEM jobs



35%





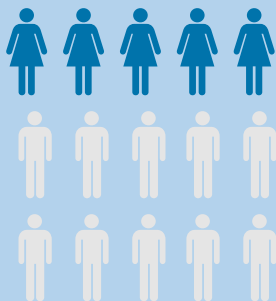
**Women hold 32%  
of jobs in renewables  
compared to 22%  
in oil and gas**

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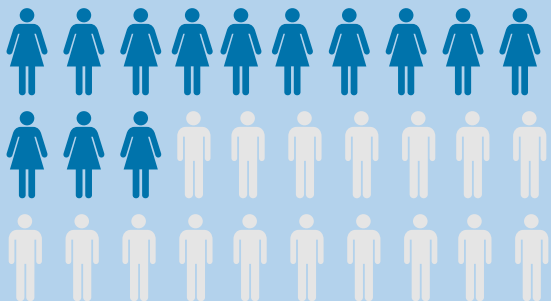
**Women in  
oil and gas**

**22%**

**Other  
technical jobs**



**45%** **Administrative  
jobs**



\* STEM = science, technology, engineering and mathematics

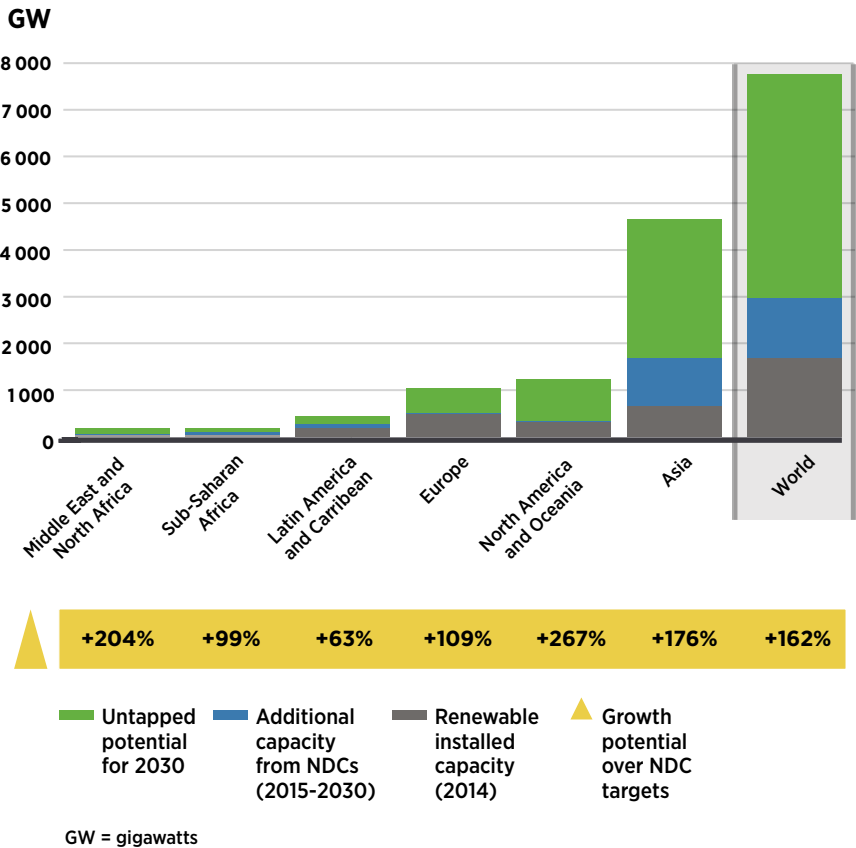
# 7

## **EFFECTIVE CLIMATE ACTION**

Nationally Determined Contributions (NDCs) under the Paris Agreement provide a strong framework to reduce emissions and create resilient economies and societies for the future.

Still, the ambition of current NDC targets could more than double. While renewable energy deployment grew by 8.5% yearly in 2015-2018, current NDCs would only increase installed capacity by 3.6% annually to 2030.

# Cost-effective renewable energy potential remains untapped



» Potential installed capacity of renewables by 2030

# 8

## CHANNEL FOR SUSTAINABLE INVESTMENT

Today's plans and policies foresee energy investments to 2050 reaching USD 95 trillion. The energy transformation based on renewables would raise this to USD 110 trillion.

The additional investment amounts, though substantial, are lower than previously estimated. This is because of continually falling renewable power costs.

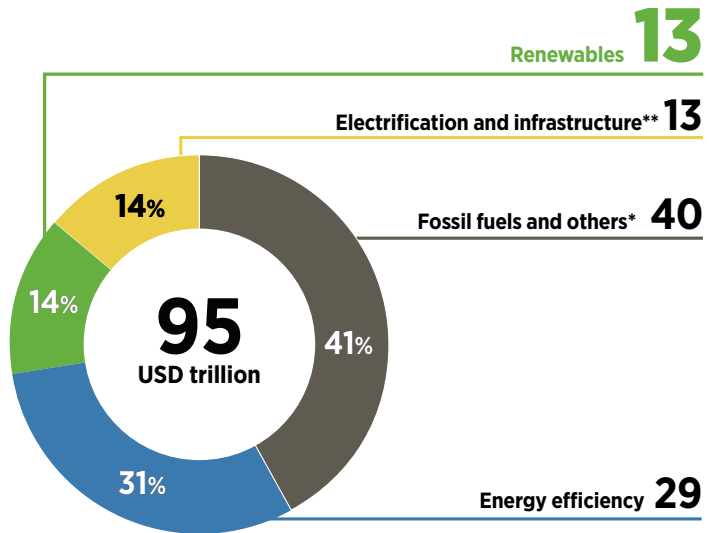
The cumulative payoff by 2050 would be worth between USD 65 trillion and USD 160 trillion, according to IRENA's analysis. Every dollar spent brings returns between three and seven dollars.



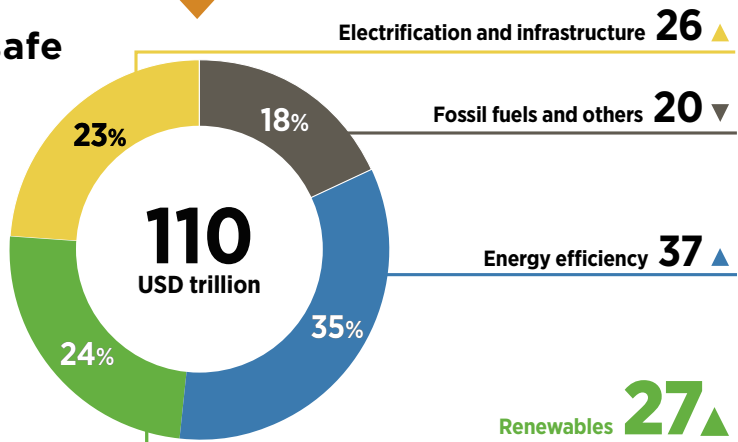
# Investments are needed to ensure a sustainable, climate-safe future

2050

Current plans



Climate-safe scenario



» Cumulative investments until 2050 for a realistic path to meet climate goals

**"Renewable energy delivers jobs, delivers on sustainable economic development and will deliver a viable climate solution. To fight climate change and its direct and related impacts on air pollution, within the IPCC's 12-year window, renewables are the only ready and available instrument we have."**

**Francesco La Camera  
Director-General, IRENA**

# FURTHER READING

- \* **Global energy transformation:  
A roadmap to 2050**
- \* **Renewable power  
generation costs in 2018**
- \* **Renewable energy and jobs:  
Annual review 2019**
- \* **Renewable energy:  
A gender perspective**
- \* **Innovation landscape for  
a renewable-powered future**

Available on [IRENA.org](https://www.irena.org)

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