

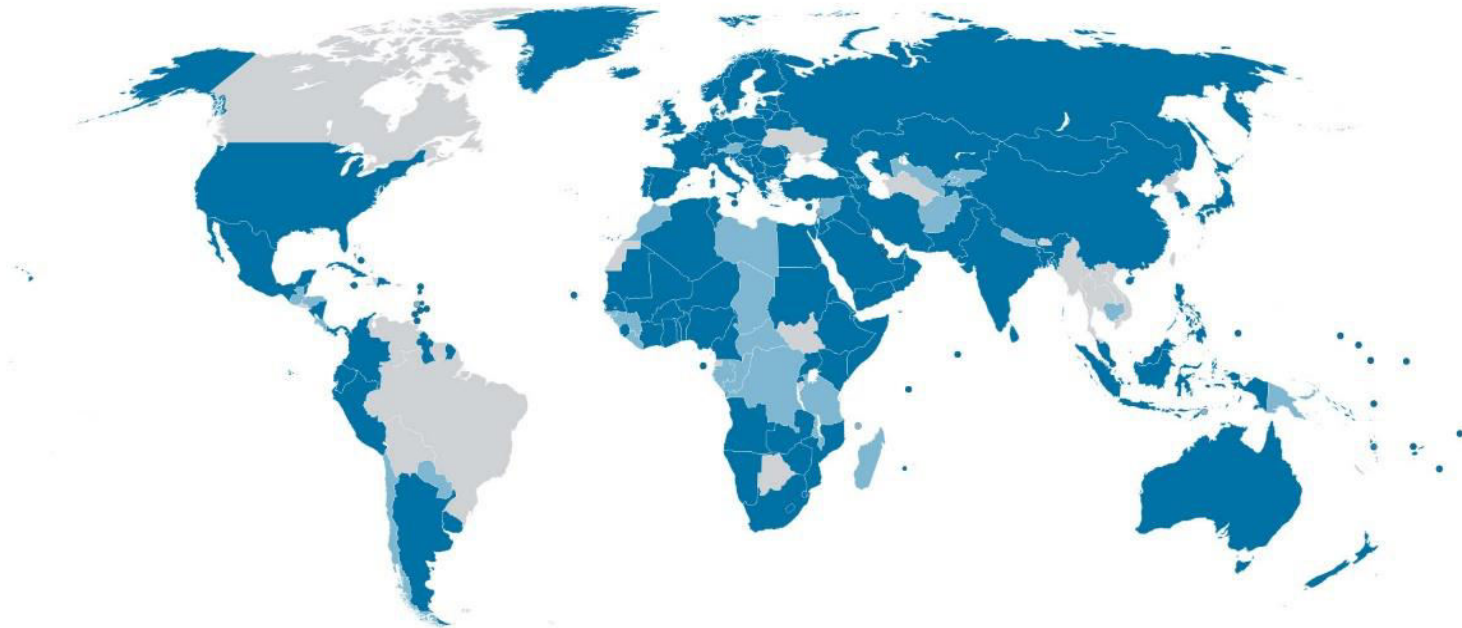
ROADMAP FOR A RENEWABLE ENERGY FUTURE



April 28, 2016, Moscow

International Renewable Energy Agency

The Voice, Advisory Resource and Knowledge Hub for 176 Governments



Renewable energy can:

Meet our goals for **secure**, **reliable** and **sustainable** energy

Provide **electricity access** to 1.3 billion people

Promote **economic development and Jobs**

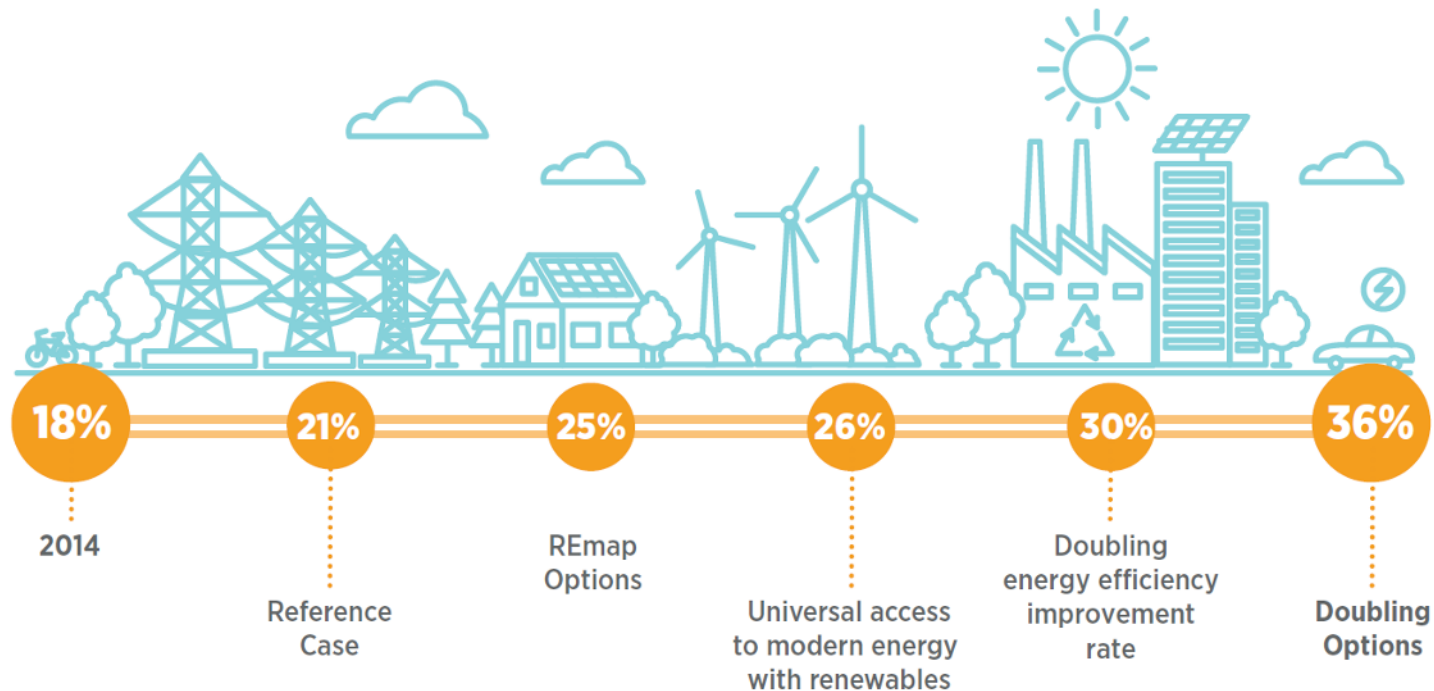
At an **affordable cost**

2015: a record year for renewables

- **47 GW PV, 64 GW wind power installed – more than 25% growth from the previous year**
 - More than half of all new power generation worldwide is renewable
 - Despite low fossil fuel prices
- USD 360 bln investments (USD 330 bln for power)
- Cost continue to fall
 - **Solar PV USD 48/MWh in Peru; wind USD 30-37.5/MWh in Morocco and Peru**
- **164 countries with RE policies in place**
- **The global energy transition is ongoing**

Doubling the share of renewables

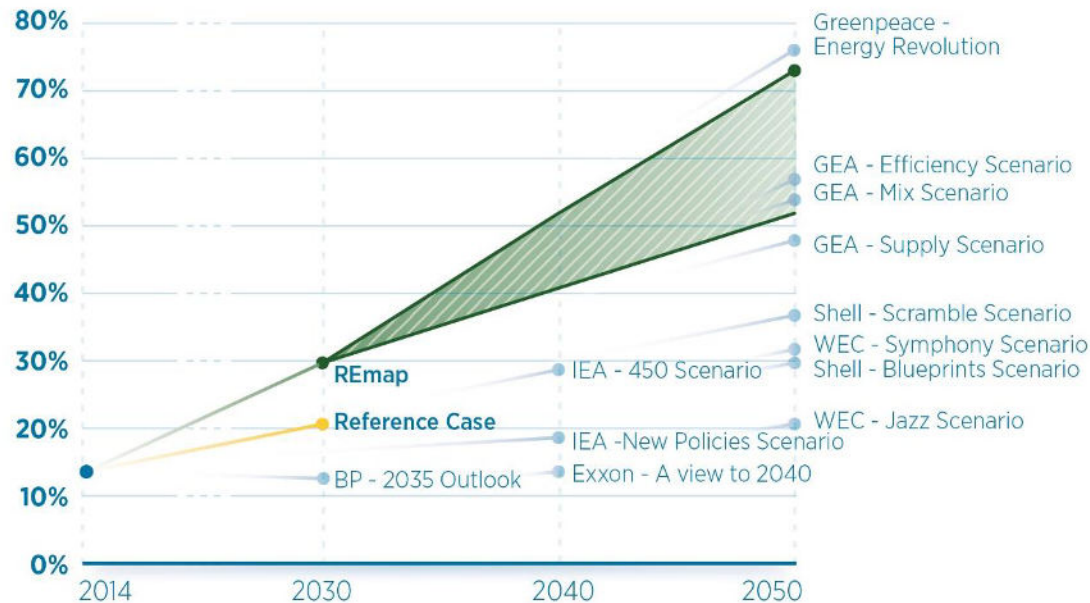
Roadmap to doubling the global share of renewable energy by 2030



Doubling the world's renewable energy share requires concerted action, reinforcing growth in renewables with energy efficiency and universal access – the three pillars of SDG 7

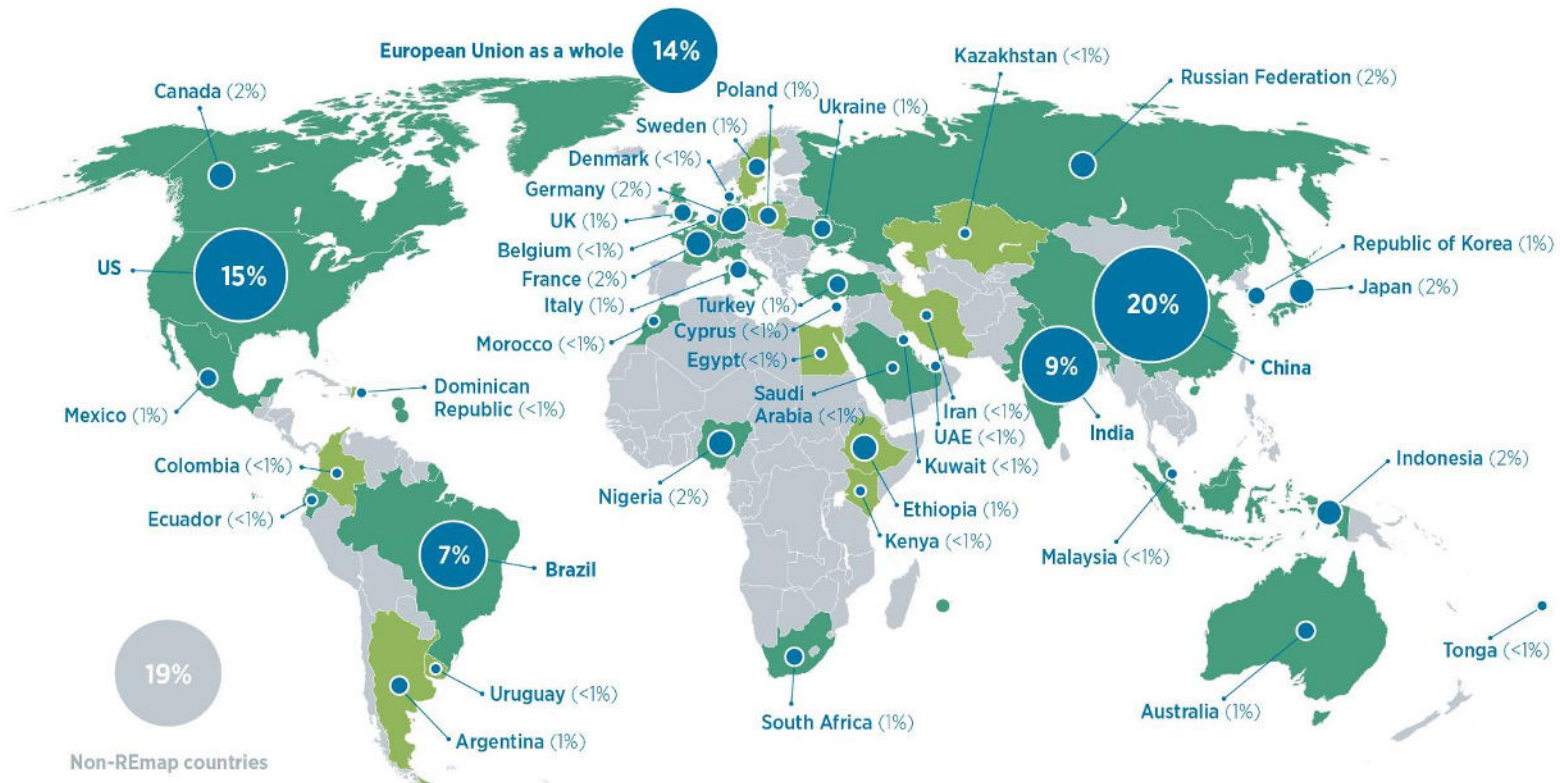
Towards a carbon-free energy system

Renewable energy share in total primary energy supply



The range in projections shows a large uncertainty in how much renewables could grow until 2050, but also highlights the opportunities with deployment in the timeframe

Top 5 countries account for more than half



Note: Percentages indicate how much renewable energy each country consumes of the global total in 2030 if the REmap Options are deployed.

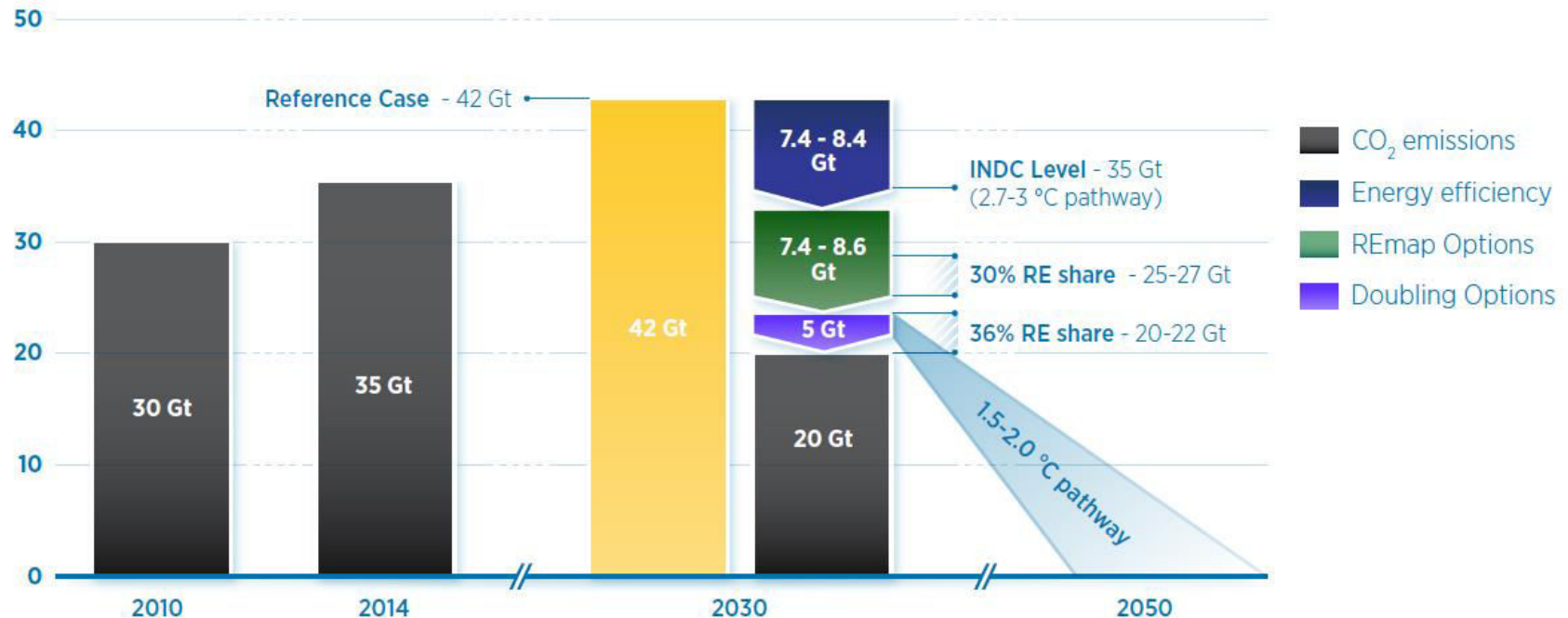
The top five countries make up more than half of renewable energy use in 2030; the next five bring this to nearly two-thirds

Opportunities for renewables in Russia

- ⊙ Creation of technology and knowledge, local employment, economic activity
- ⊙ Role of bioenergy
 - ⊙ Forestry residues (briquettes, pellets) for power/heating and exports
 - ⊙ Biomass for district heating + efficiency improvements
 - ⊙ Other agriculture & organic waste & peat for power generation and heating (+ industrial cogeneration)
 - ⊙ Liquid biofuels and electric mobility (not fully developed today)
- ⊙ Power generation sector
 - ⊙ Low cost domestic wind onshore, geothermal (only in some areas)
 - ⊙ Large hydro for RE export
 - ⊙ Special attention for mining industry
 - ⊙ Decentralized generation (eg mini grids) for rural communities (wind/diesel)
- ⊙ Grid investment needs for transformation, interconnector capacity
- ⊙ New coal + new gas + new nuclear – integration with RE? – must run/flexible fossil

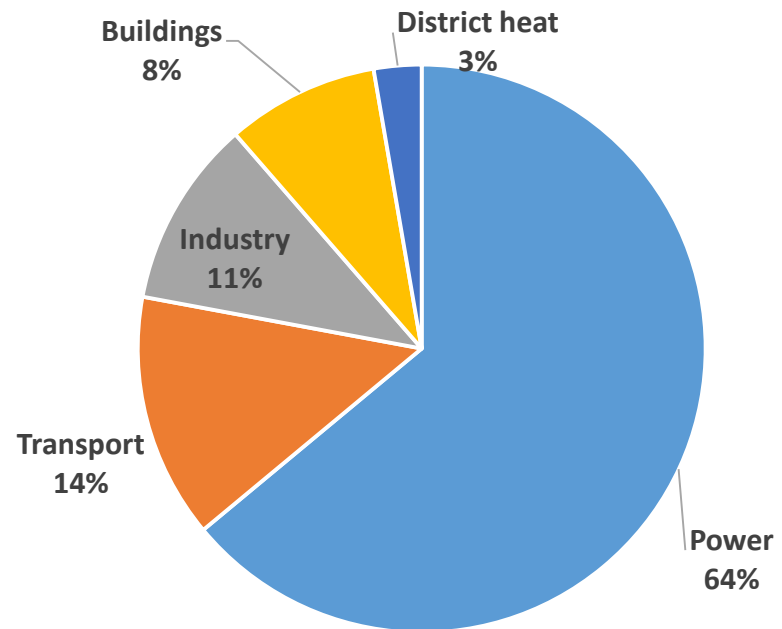
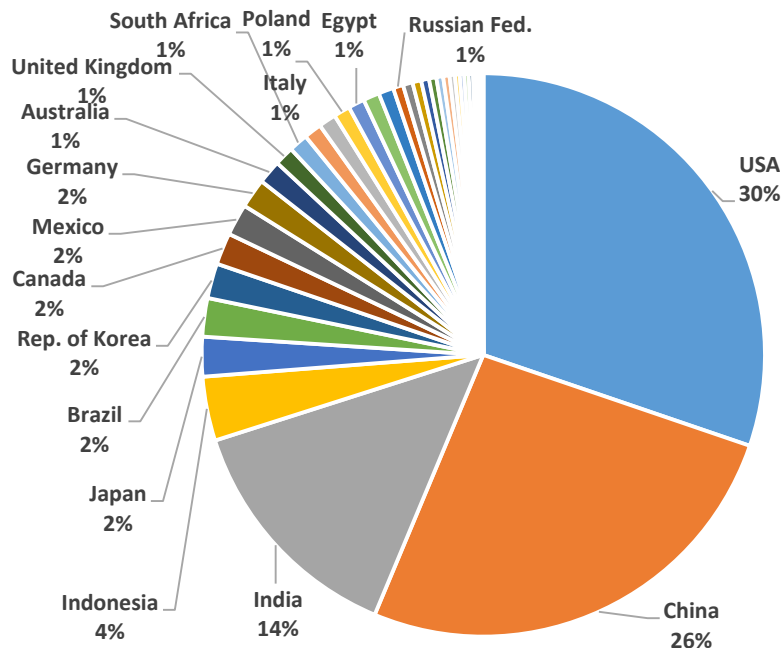
Doubling renewables critical to achieve 1.5-2.0 degrees limit

CO₂ emissions from energy (Gt/year)



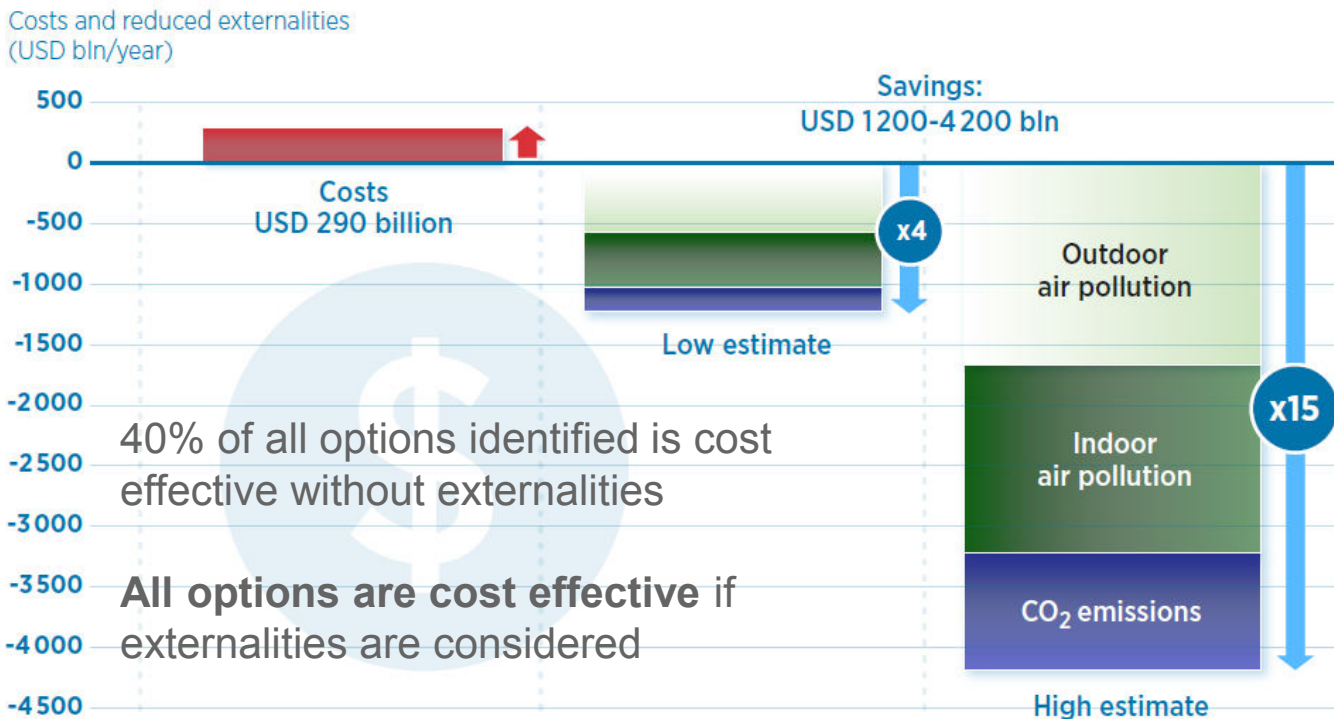
Doubling the share of renewables by 2030 would put the world on a pathway to limiting global warming to 1.5-2.0 degrees

Power sector has the largest potential for CO₂ emission reductions by 2030



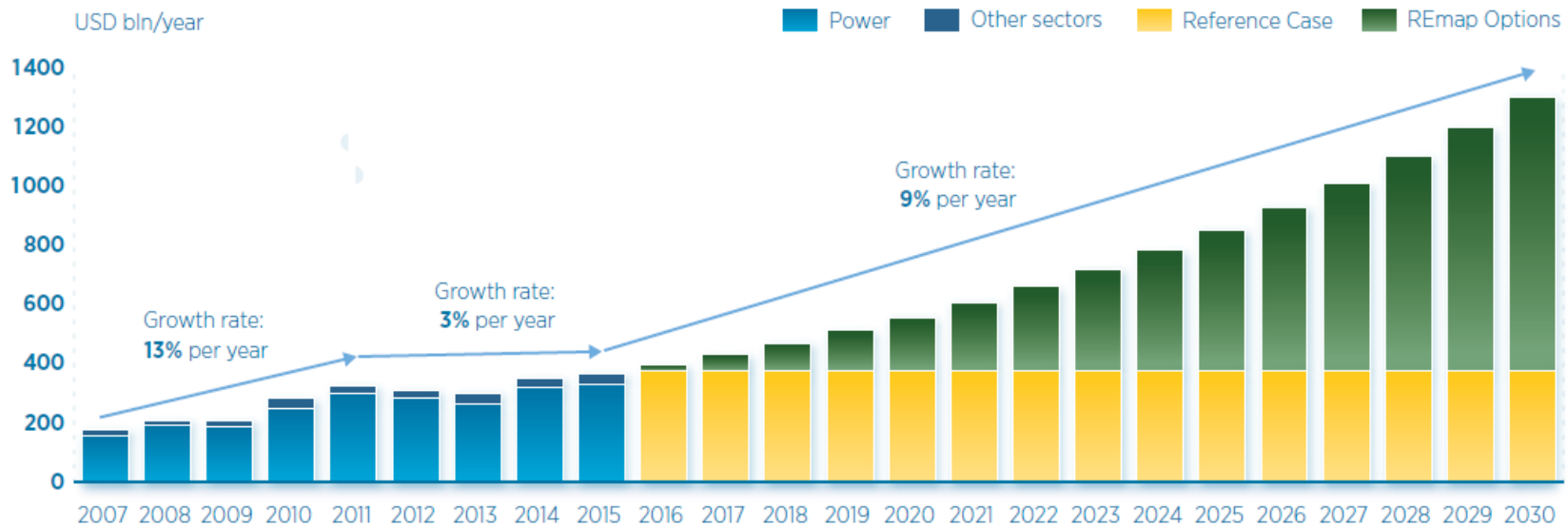
Power sector would account for two-thirds of the total global potential in limiting the global warming to 1.5-2.0 degrees

Savings greatly exceed costs



Reducing human health damage and CO₂ emissions would save at least four times more than the cost of doubling renewable share

Accelerating investments in renewables



Investments in renewable energy capacity have to return to a steady growth path that can create an important business opportunity

Key Action Areas



Correct
for market
distortions to
create a level
playing field
and reform
power markets



Introduce
greater flexibility
into energy
systems and
accommodate
the variability of
key renewable
energy sources
and increase
sector coupling



**Develop and
deploy**
renewable
heating and
cooling solutions
for urban
development
projects and
industry



Promote
transport based on
renewable power
and biofuels



Ensure
the sustainable,
affordable and
reliable supply of
bioenergy feedstock

THANK YOU

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