

Scaling up renewable energy in line with the 2C target

The role of renewable energy in Sustainable Energy Pathways

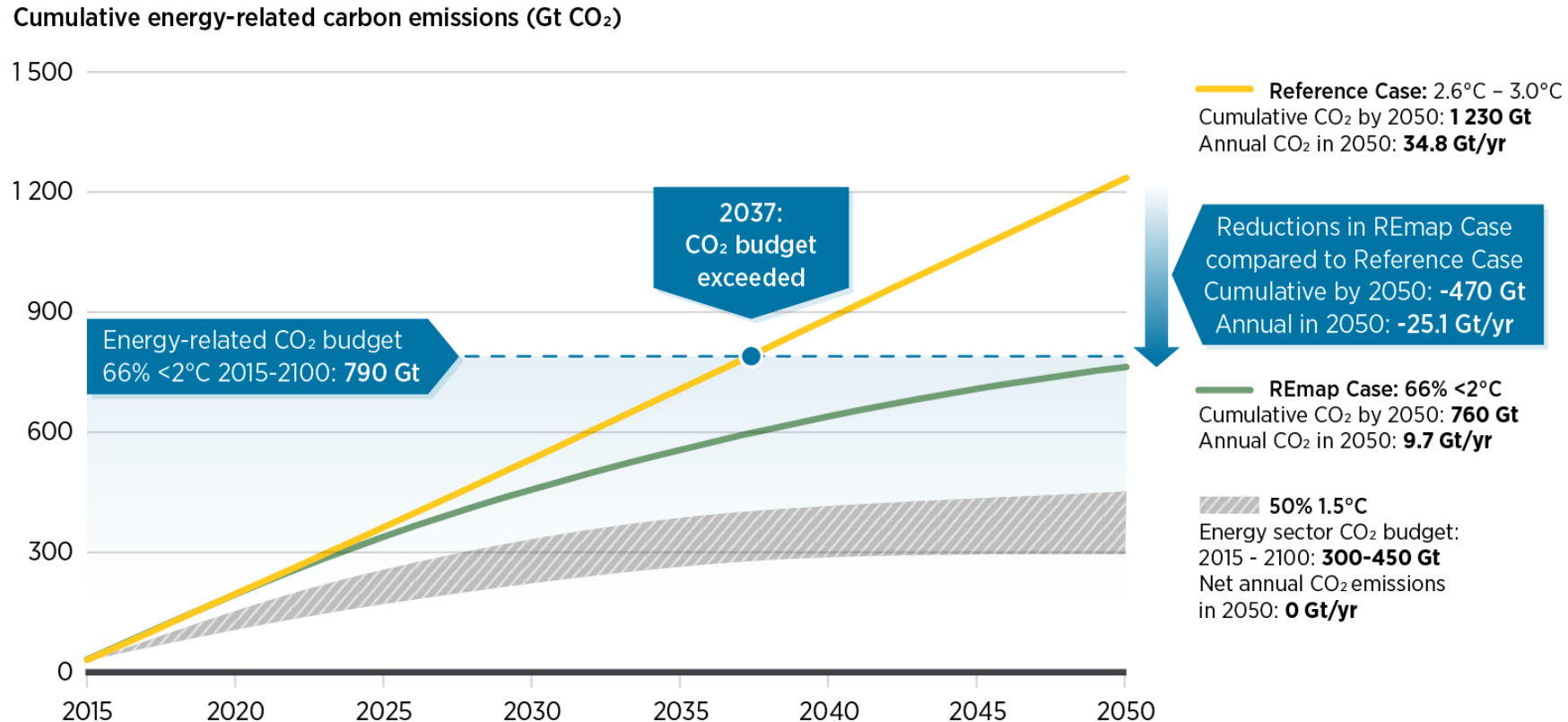
9th International Forum on Energy for Sustainable Development
Kiev, November 14, 2018

Luis Janeiro – Programme Officer Renewable Energy Roadmaps



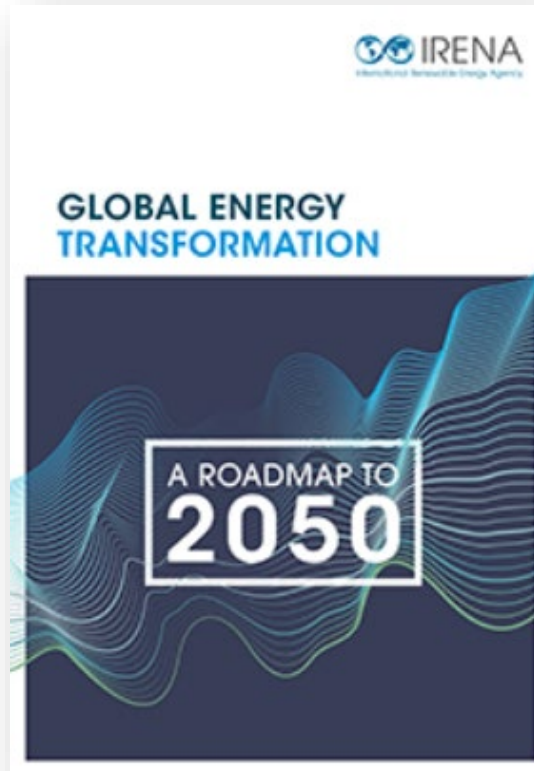
Energy-related CO₂ emissions: Bridging the gap with IRENA's REmap Case

Cumulative energy-related CO₂ emissions and emissions gap



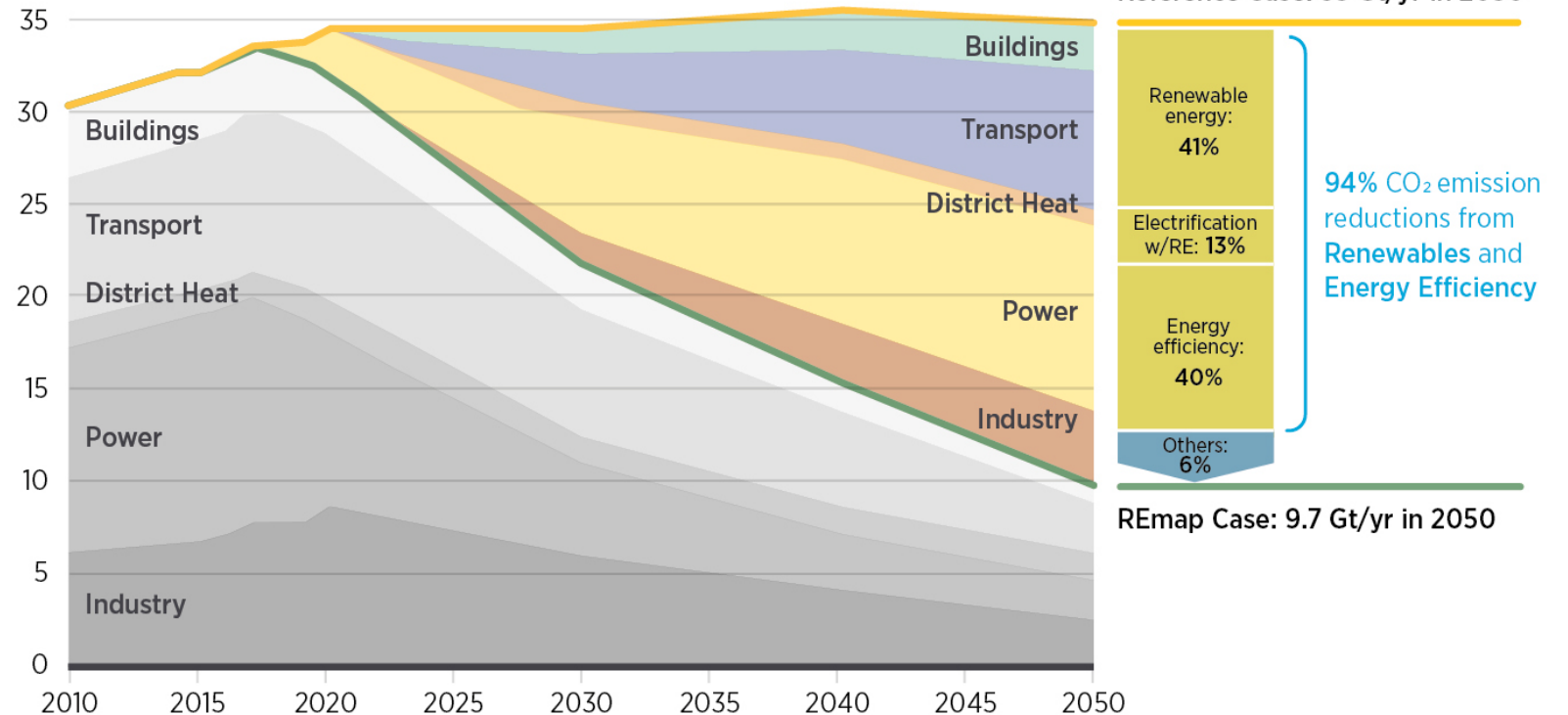
Based on current policies (set out in the Reference Case), in under 20 years, cumulative energy-related emissions will exceed the carbon budget required to hold temperature increases below 2°C. Emission reductions of 470 Gt will be needed by 2050 to reduce warming to 2°C

Renewable energy and energy efficiency can provide over 90% of the reduction in energy-related CO₂



Annual energy-related CO₂ emissions and reductions, 2015-2050

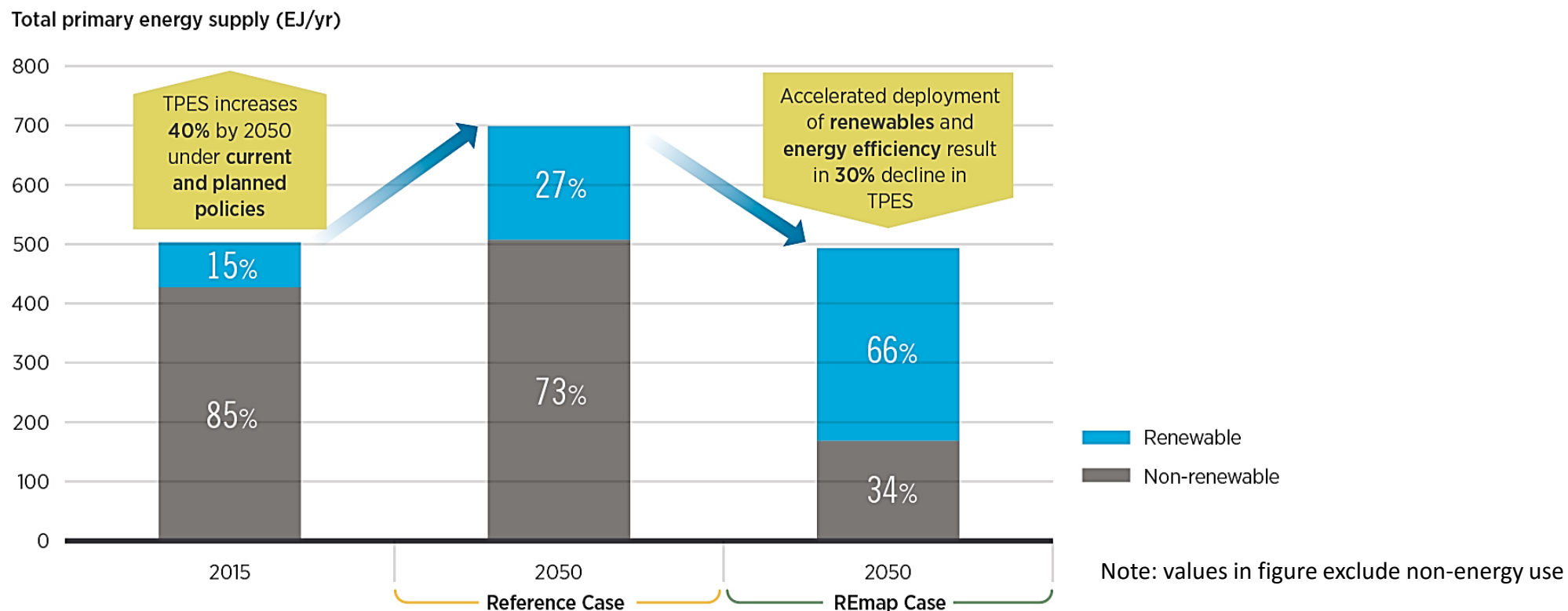
Energy-related CO₂ emissions (Gt/yr)



Annual energy-related emissions are expected to remain flat (under current policies in the Reference Case) but must be reduced by over 70% to bring temperature rise to below the 2°C goal. Renewable energy and energy efficiency measures provide over 90% of the reduction required

The global share of renewable energy in energy supply would need to increase to two-thirds

TPES and the share of renewable and non-renewable energy under the Reference and REmap cases

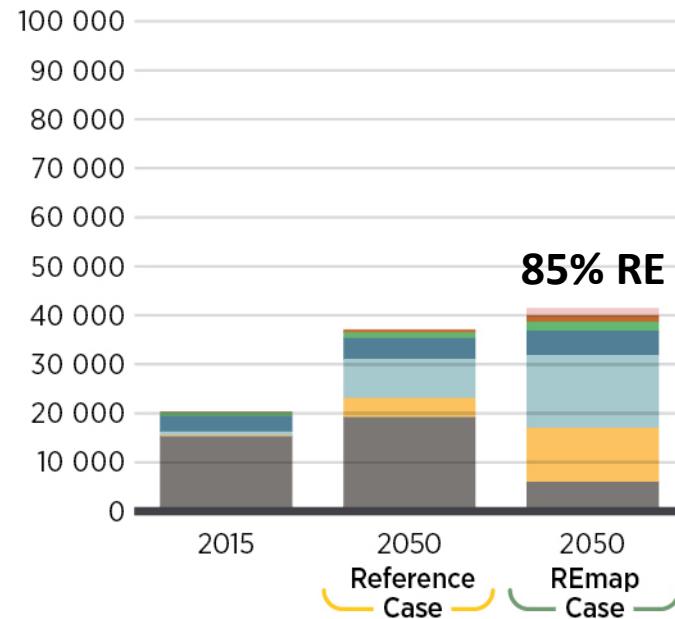


Under current and planned policies (the Reference Case) TPES is expected to increase almost 40% by 2050. To achieve a pathway to energy transition (the REmap Case), energy efficiency would need to reduce TPES slightly below 2015 levels, and renewable energy would need to provide two-thirds of the energy supply.

RE should scale up to meet power, heat and transport needs

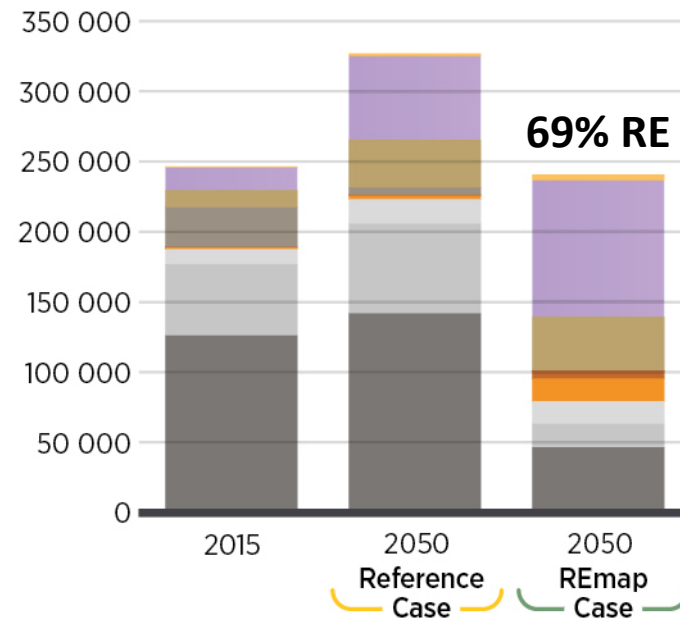
40% electrification of end use

Electricity consumption (TWh)



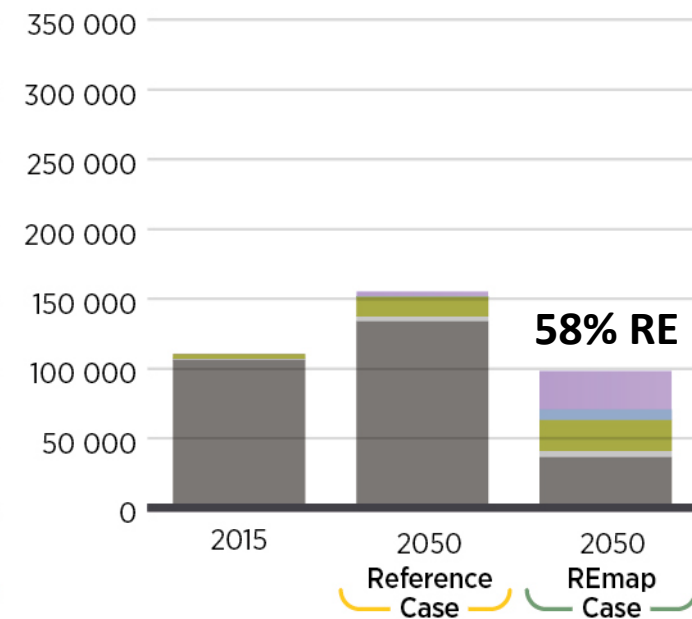
- Others (incl. marine and hybrid)
- Geothermal
- Bioenergy
- Hydro power
- Wind
- Solar PV (incl. CSP)
- Non-Renewables

Industry and buildings final energy consumption (PJ/yr)



- District heat: Renewables
- Electricity: Renewables
- Modern biomass
- Traditional biomass
- Geothermal heat
- Solar thermal

Transport final energy consumption (PJ/yr)

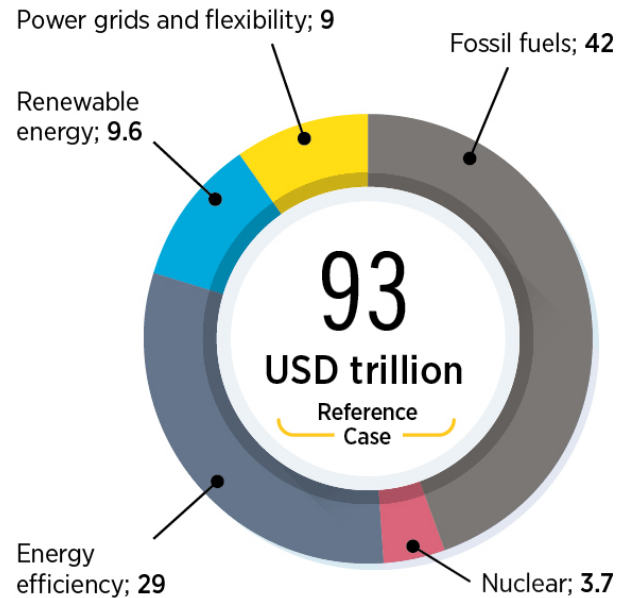


- Hydrogen
- Liquid biofuels/biogas
- Non-Renewables
- District heat: Non-Renewables
- Electricity: Non-Renewables

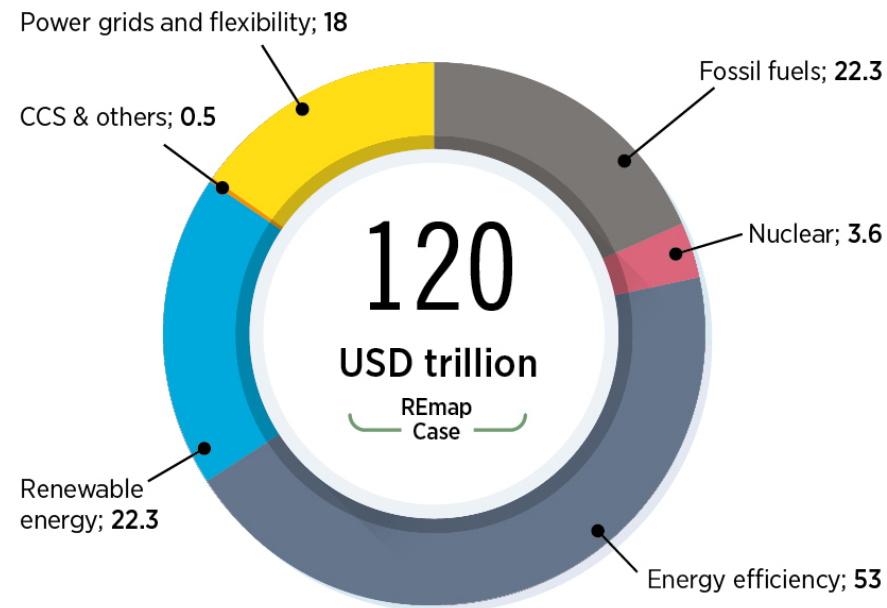
Investment will need to shift to renewable energy and energy efficiency

Cumulative investment - Reference and REmap cases, 2015-2050

Reference Case energy sector investments between 2015-50 (USD trillion)



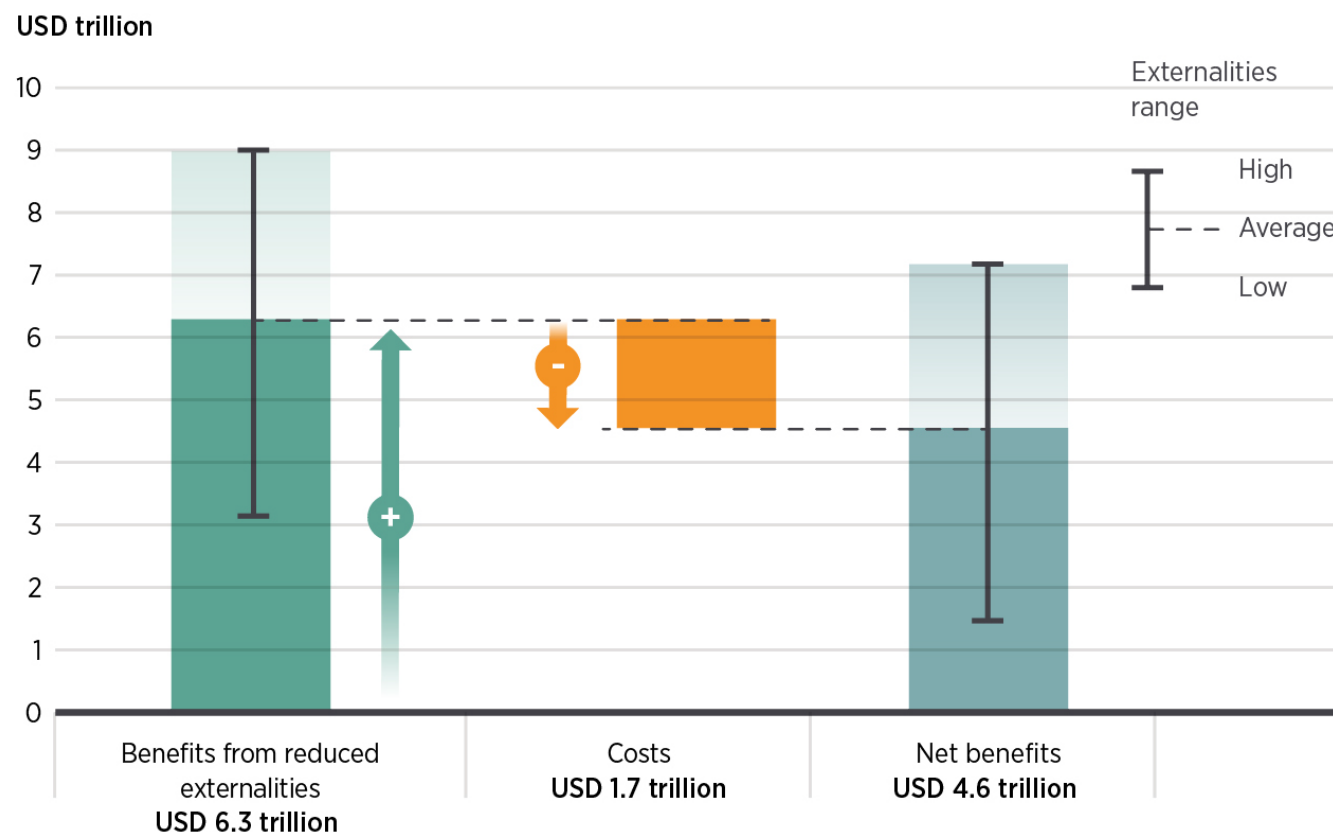
REmap Case energy sector investments between 2015-50 (USD trillion)



Under the REmap Case, cumulative investment of USD 120 trillion must be made between 2015 and 2050 in low-carbon technologies, averaging around 2% of the period average global GDP per year. This is USD 27 trillion more than the Reference Case.

Reduced negative externalities far outweigh the costs needed to achieve a global energy transformation

Annual costs of the energy transition set against reduced externalities (air pollution and CO₂ damages) - REmap Case compared to the Reference Case in 2050



Under the REmap Case, annual health and CO₂ benefits associated with the energy transition outweigh incremental costs by a factor of 2 to 5 in 2050.



To know more about the Global Energy Transformation, this and other IRENA publications are available for download from www.irena.org/publications

For further information or to provide feedback, please contact IRENA at info@irena.org

For further information or to provide feedback on the socio-economic analysis please contact the Policy team at policy@irena.org, on the REmap analysis please contact the REmap team at remap@irena.org.



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Key focus areas to foster the Global Energy Transformation

1. Tap into the strong synergies between energy efficiency and renewables
2. Plan a power system with high shares of renewable energy
3. Increase the use of electricity in transport, buildings and industry
4. Foster system-wide innovation
5. Align socio-economic structures and investment with the transition
6. Ensure that transition costs and benefits are fairly distributed