

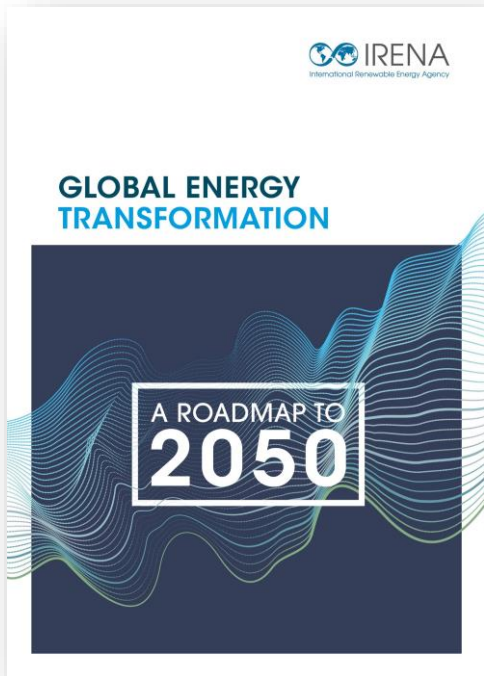
GLOBAL ENERGY TRANSFORMATION

A ROADMAP TO 2050

**A view into Stranded assets of a pathway
in line with the Paris Agreement**



This presentation has been prepared based on the analysis and results from the report:



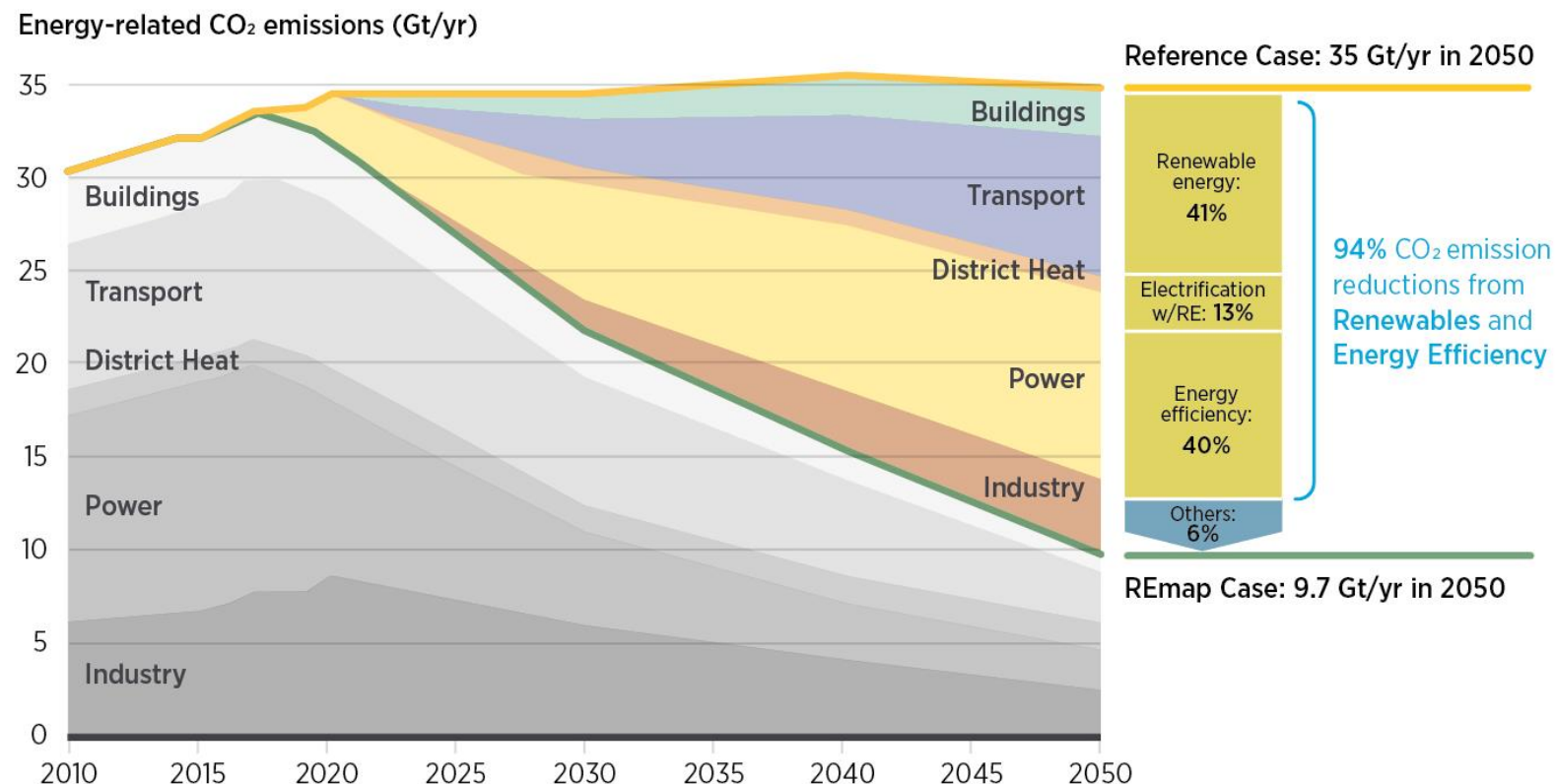
IRENA (2018), *Global Energy Transformation: A roadmap to 2050*, International Renewable Energy Agency, Abu Dhabi.

This report and further reading on the REmap work is available for download from: <http://www.irena.org/remap>

The energy scenarios are based on IRENA's
Renewable Energy Roadmap – REmap

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



Objective: limit the global temperature rise to below 2°C in the present century, with 66% chance

→ **790 Gt energy-related CO₂ emissions budget 2015-2100**

→ **Reference Case 2050: 1 230 Gt**

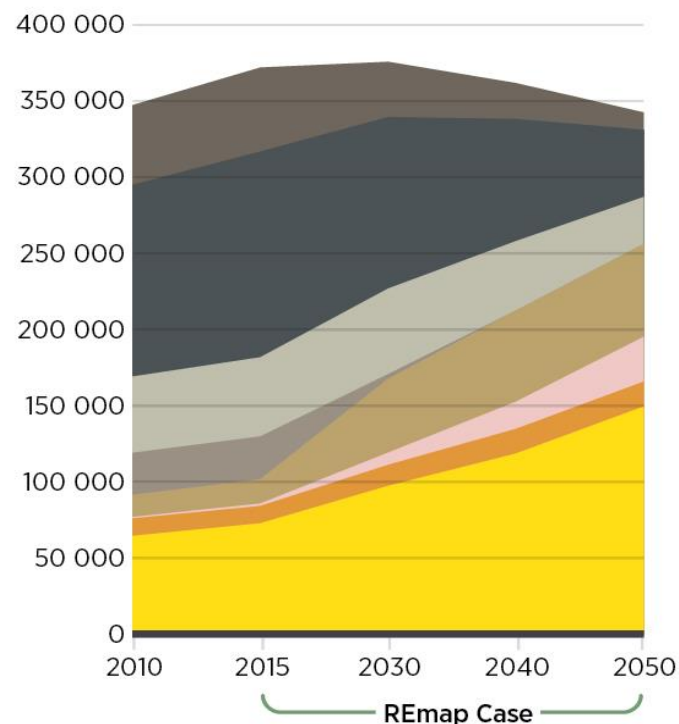
This requires a global energy transition!

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

Rising use of renewables in end-use and power and declining fossil fuel demand

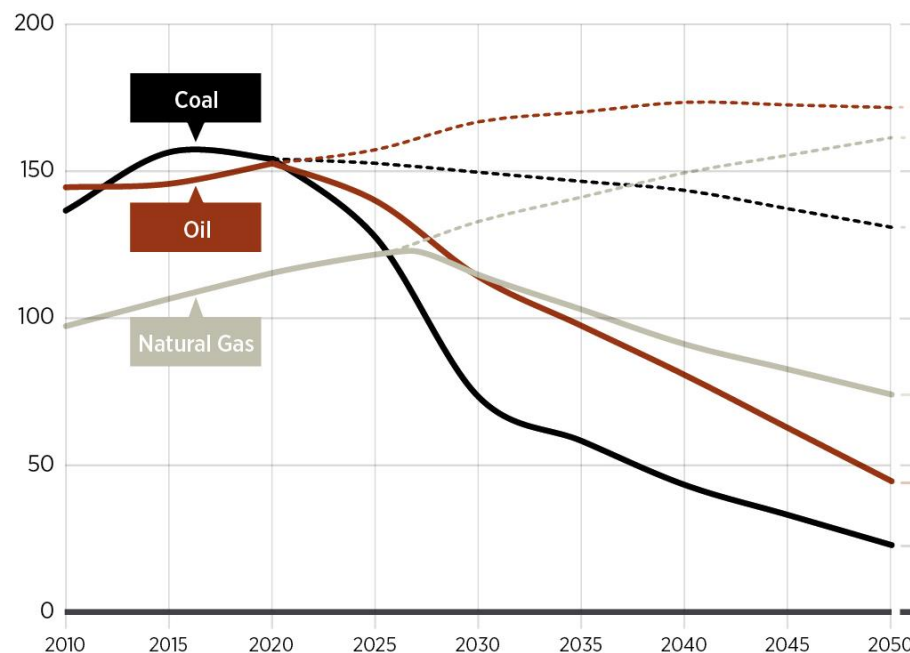
Fossil fuel use, 2015-2050; decline in fossil fuel use by sector - REmap Case relative to Reference Case

Total final energy consumption (PJ/yr)



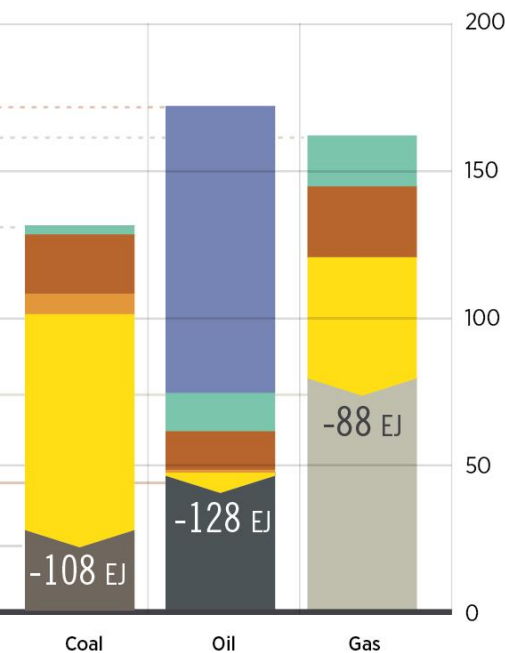
Coal Traditional biomass District heat
 Oil Modern biomass Electricity
 Gas Other renewables* *includes solar thermal, geothermal heat and hydrogen

Energy-related fossil fuel demand (EJ)



..... Reference Case
 — REmap Case

Demand decline in 2050 (EJ)

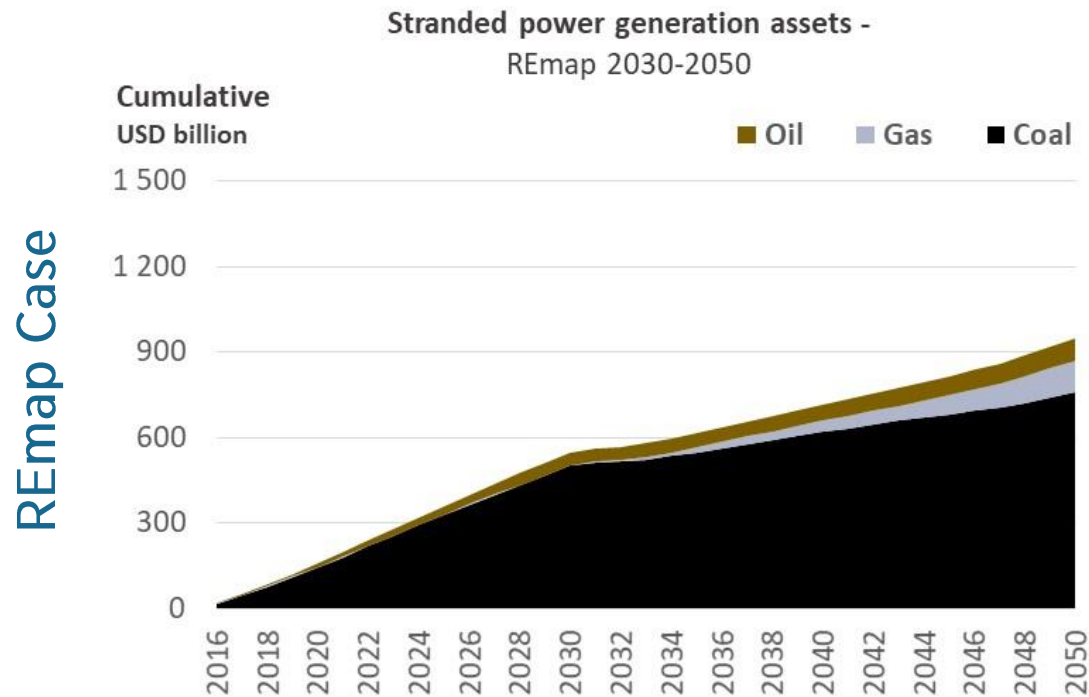


Transport District heat
 Buildings Power
 Industry Remaining in 2050

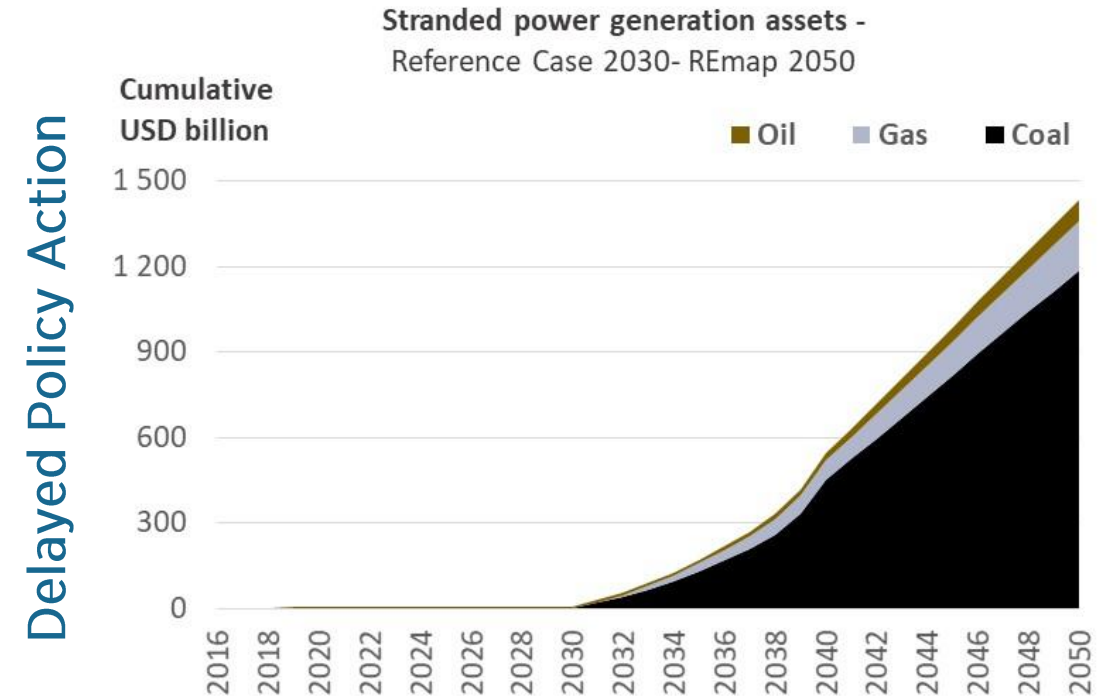
Under the REmap Case, both oil and coal demand decline significantly and continuously, and natural gas demand peaks around 2027. In 2050, natural gas is the largest source of fossil fuel.

Stranded assets in the power sector

- Stranded assets in the power sector are estimated as the non-depreciated value of early-retired power plants based on the capital stock age profile.



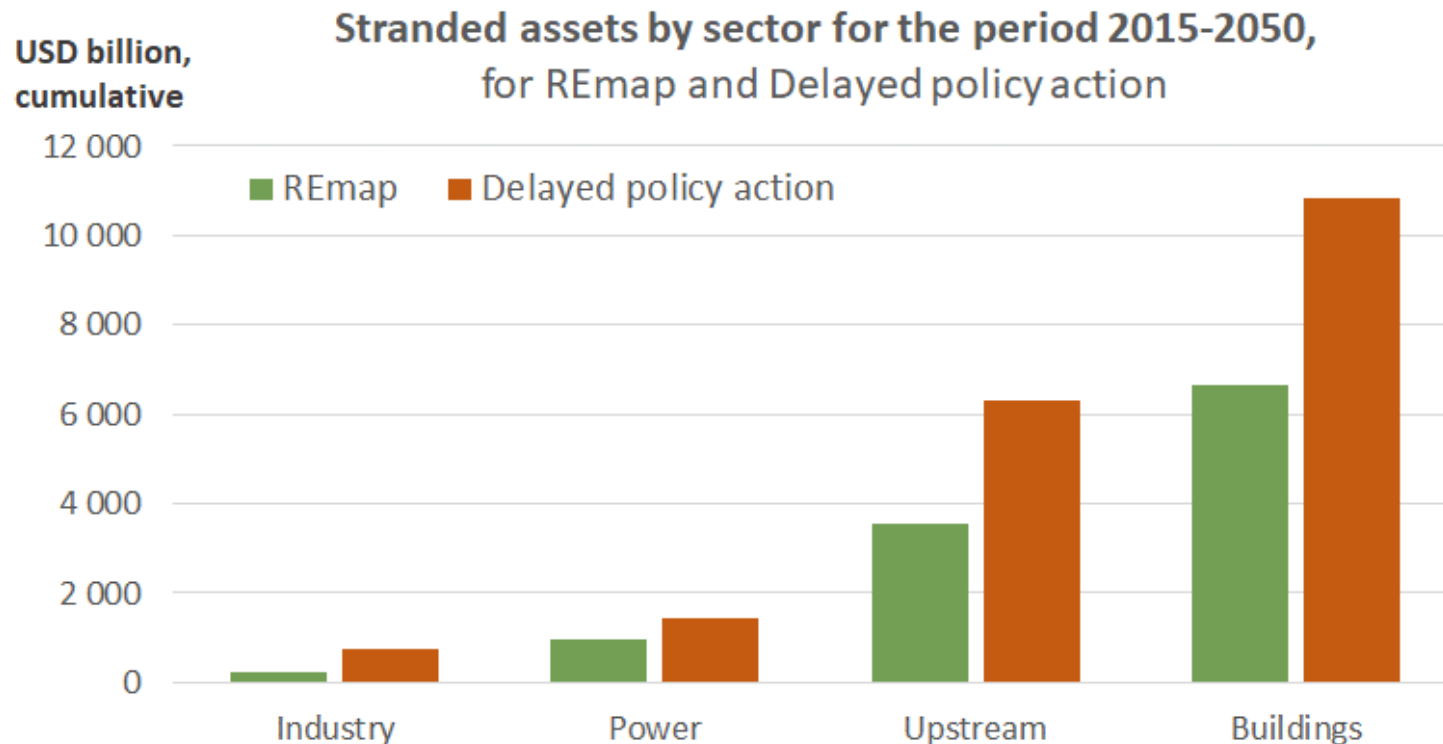
Stranded assets: USD 946 billion



Stranded assets: USD 1 435 billion

Stranded assets, as a result of climate policies, increase significantly if action is delayed

- In the REmap Case, with ambitious deployment of RE and energy efficiency, countries take early action to avoid lock-in, by deploying low/zero CO₂ emission technologies.
- In Delayed Policy Action, transition starts in 2030, while carbon budget is the same, thus almost doubling the amount of stranded assets.



Cumulative stranded assets for all sectors for the period 2015-2050:

» REmap Case: USD 11.4 trillion

» Delayed Policy Action: USD 19.3 trillion

Conclusions

- Stranded assets could be significant, if Paris agreement is enforced, USD 11.4 trillion if immediate action is taken.
- In Delayed Policy Action, emissions during up to 2030 would be higher than in the REmap Case. Thus, there will be a greater challenge to compensate these higher emissions and stranded assets double.
- Buildings sector has been ignored so far: potentially the highest asset stranding, while activities of the upstream and power sector would come next.
- There is a need to better understand and tackle the financial implications of stranded assets, including their impact on values of companies, finance and risk mitigation, risk assessment in financial markets analysis, etc.
- Avoiding carbon lock-in can create benefits that would offset the lost value derived from stranded assets (e.g. savings on energy bill, socio-economic, etc.).



Thank you!

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Further reading on the topic of stranded assets [here](#).

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



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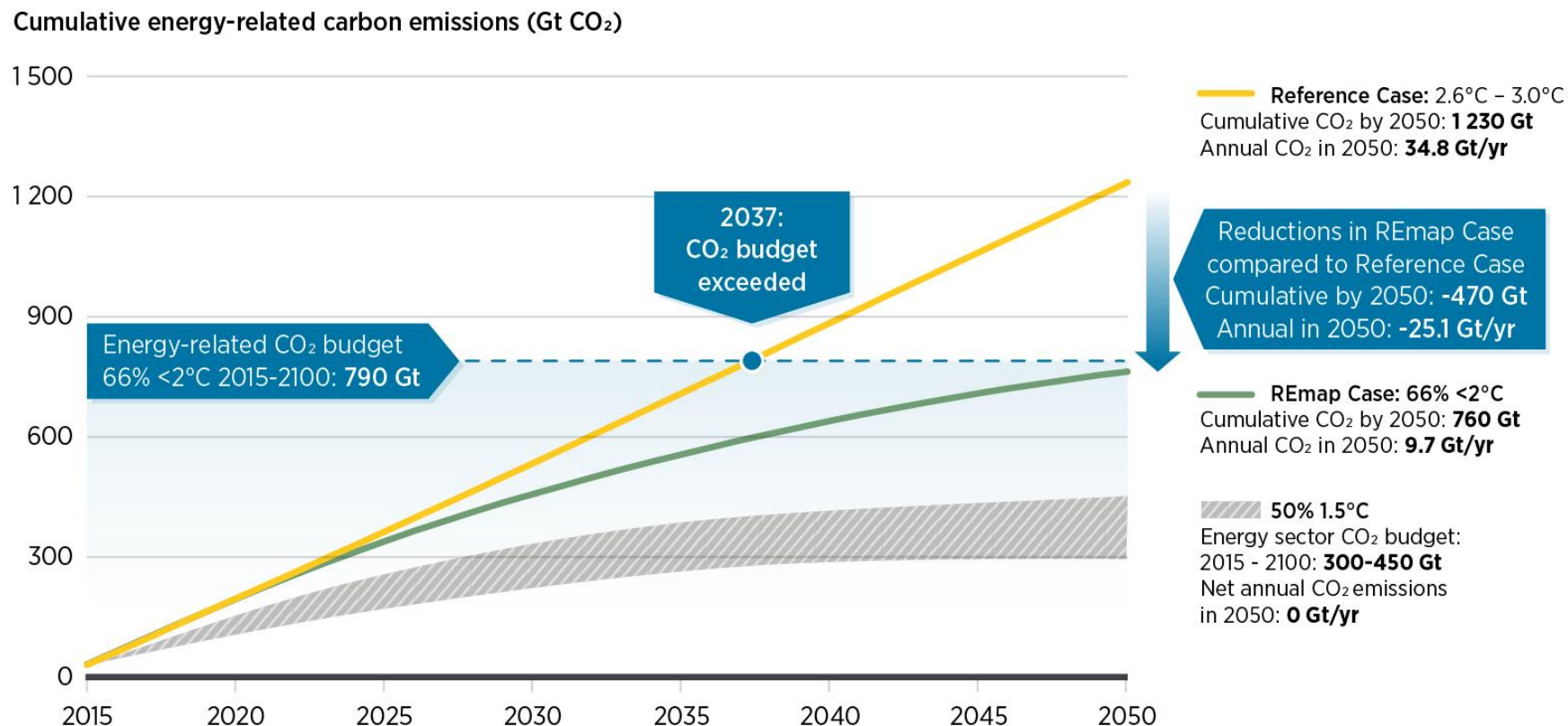
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www.youtube.com/user/irenaorg

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

The carbon budget and cumulative energy-related CO₂ emissions and emissions



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