Role of clean energy in the context of Paris Agreement

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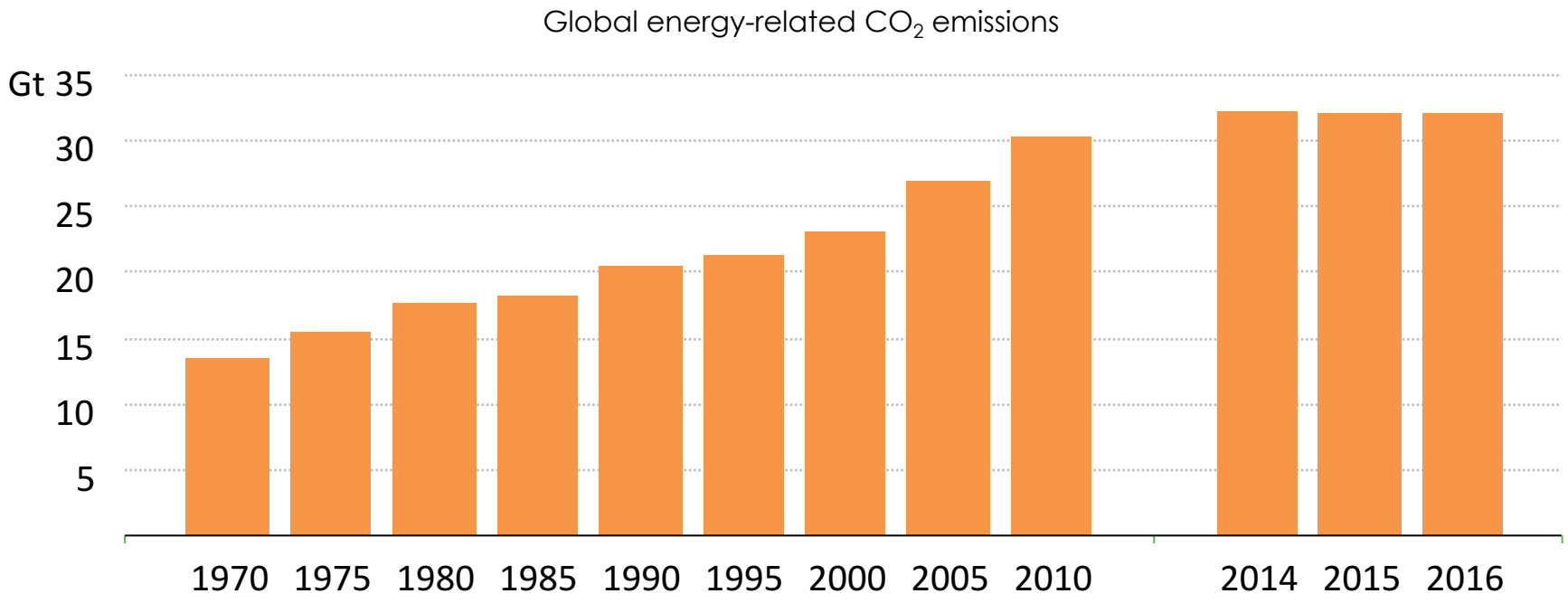
Global CO_2 emissions flat for 3 years – an emerging trend?

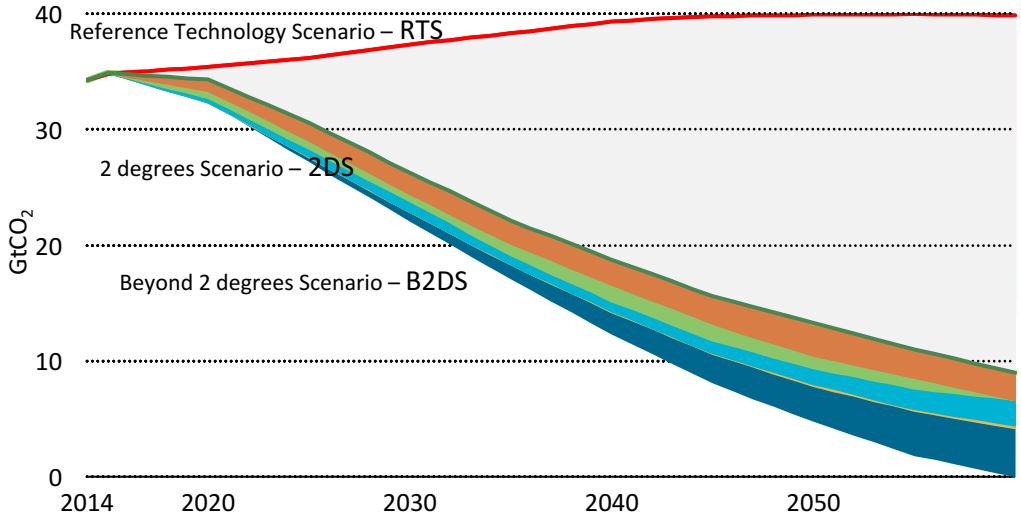


IEA analysis shows that global CO_2 emissions remained flat in 2016 for the third year in a row, even though the global economy grew, led by emission declines in the US and China.

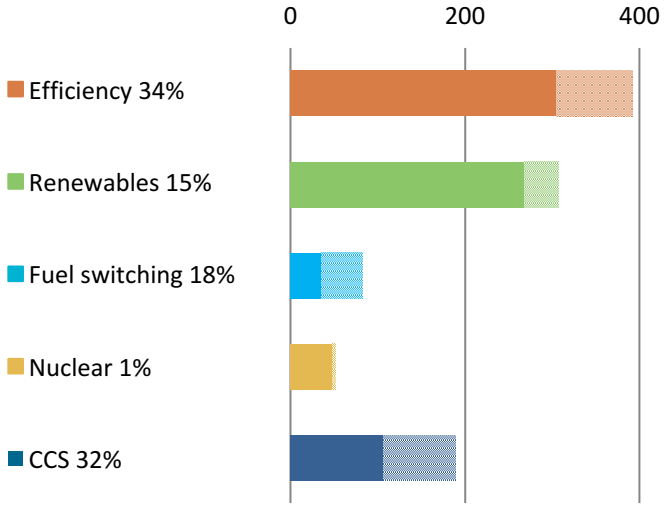
How far can technology take us?

Technology area contribution to global cumulative CO_2 reductions

Global CO_2 reductions by technology area

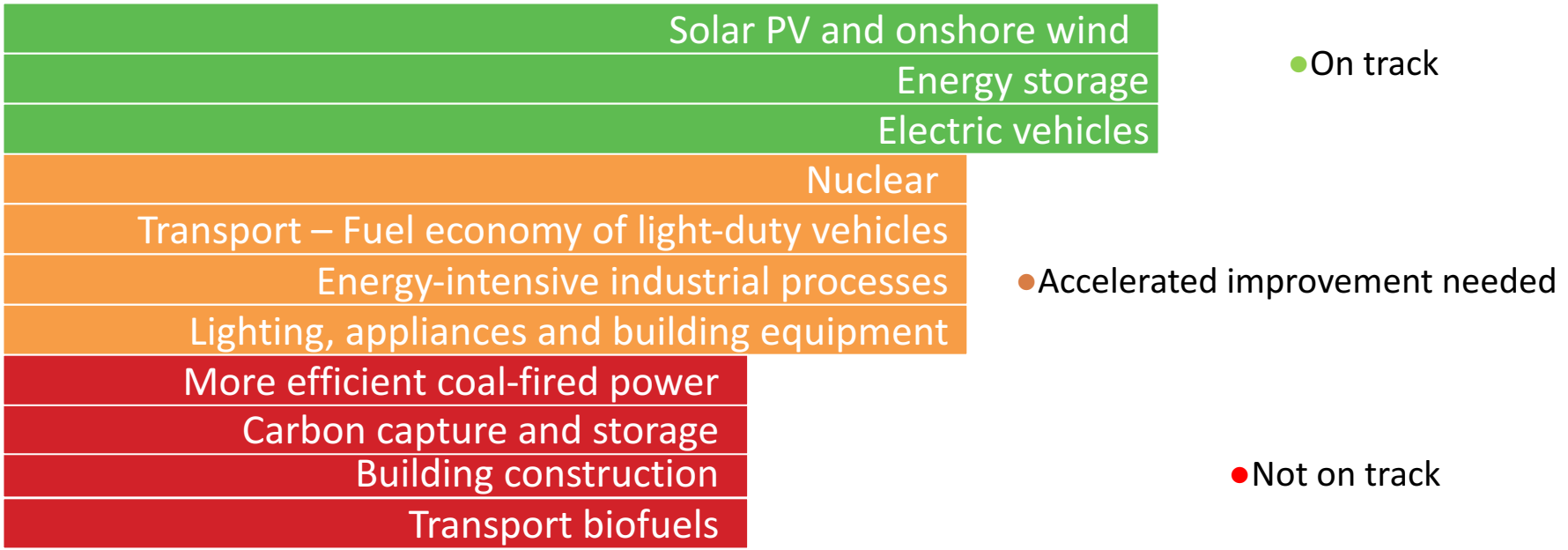


Gt CO_2 cumulative reductions in 2060



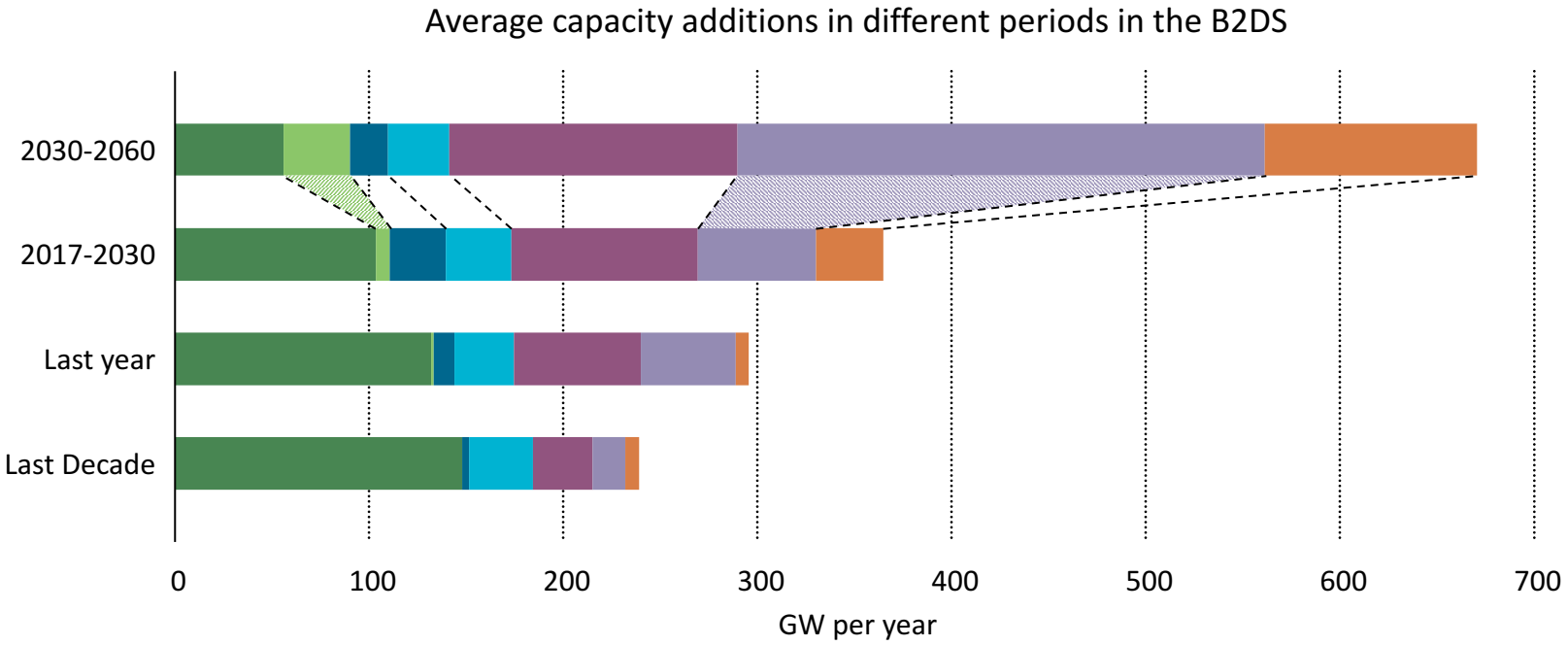
Pushing energy technology to achieve carbon neutrality by 2060 could meet the mid-point of the range of ambitions expressed in Paris

The potential of clean energy technology remains under-utilised



Recent progress in some clean energy areas is promising, but many technologies still need a strong push to achieve their full potential and deliver a sustainable energy future.

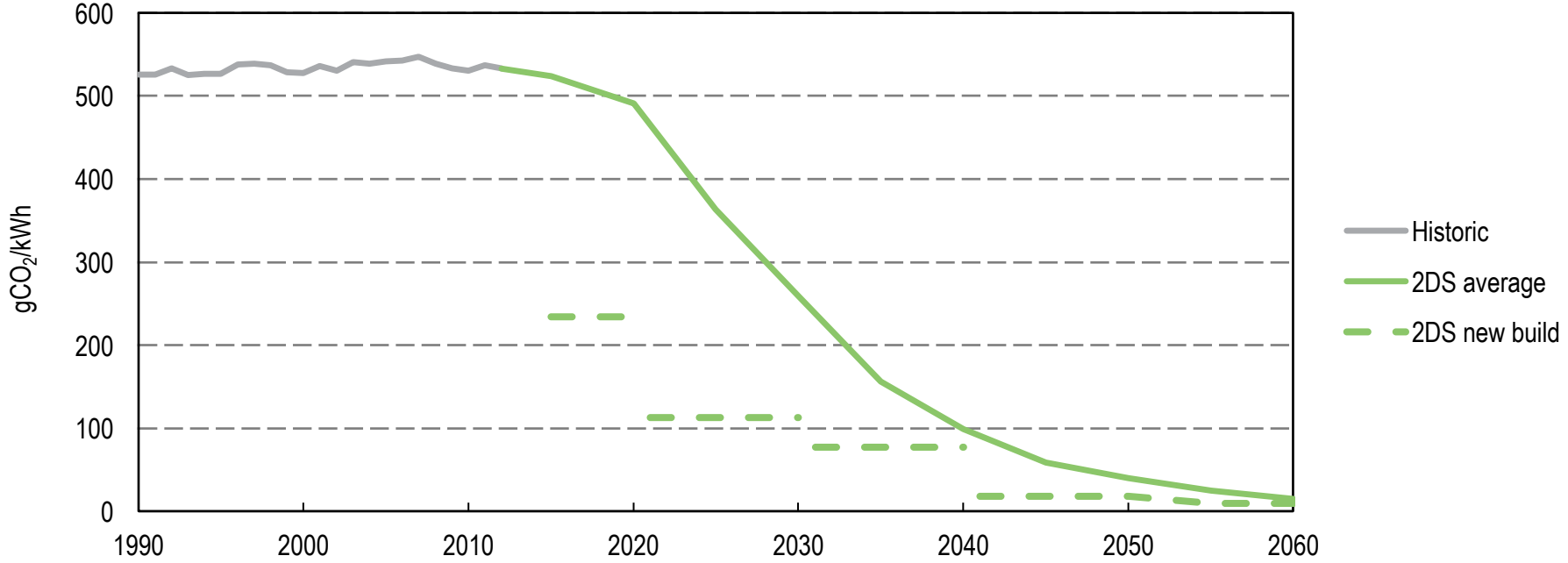
Can we push up the low-carbon power deployment pace?



Recent successes in solar and wind
will have to be extended to all low-carbon solutions, and brought to a scale never experienced before.

Indicators of energy system transformation: Power sector example

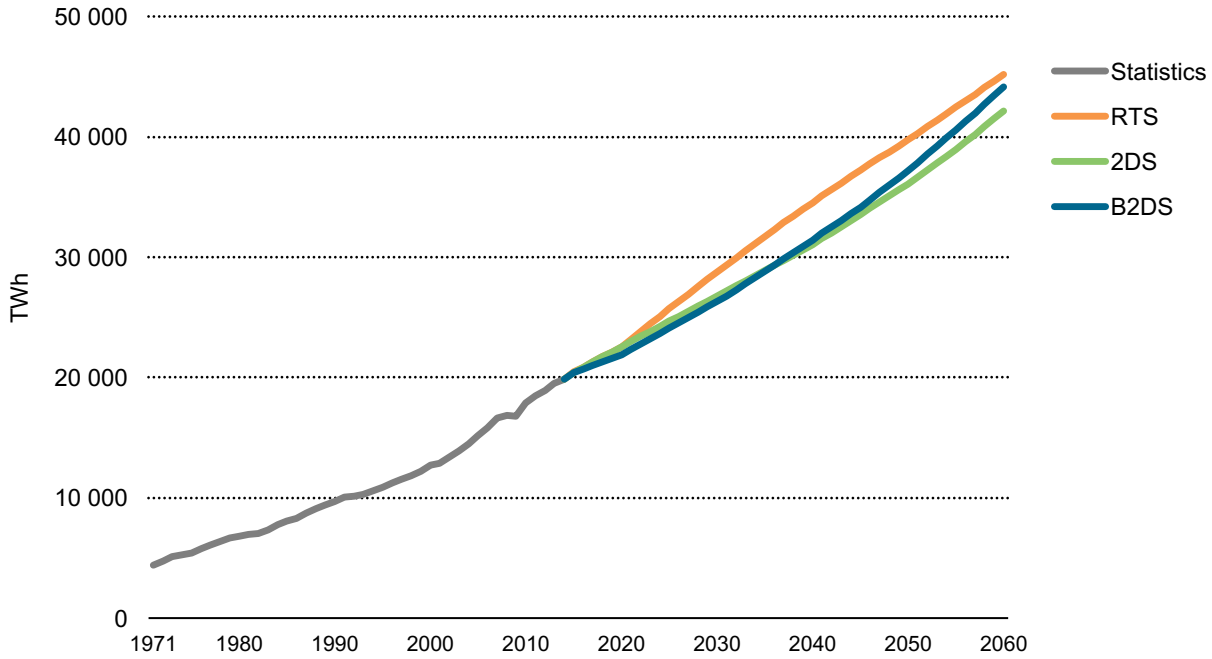
Global fleet average and new-build plants emissions intensity of power generation in IEA scenarios



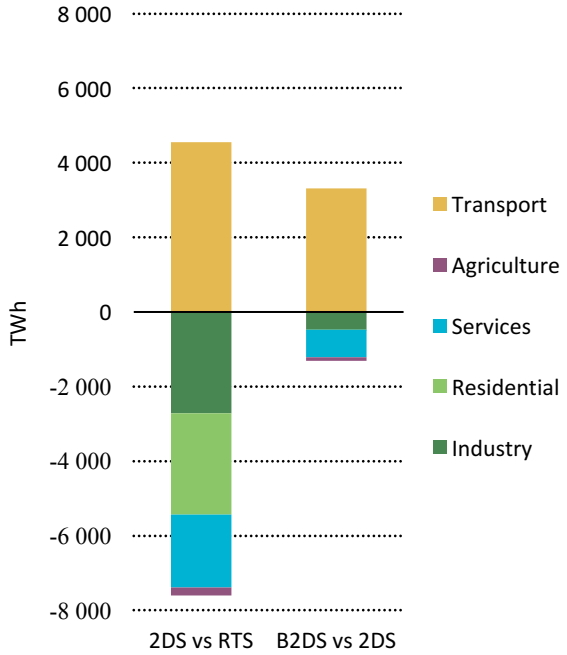
The average carbon intensity of new power capacity needs be at around 100 grammes of CO_2 per kilowatt hour (gCO_2/kWh) in 2025 and close to zero gCO_2/kWh by 2050, requiring further steep reduction.

The future is electric

Global final electricity demand

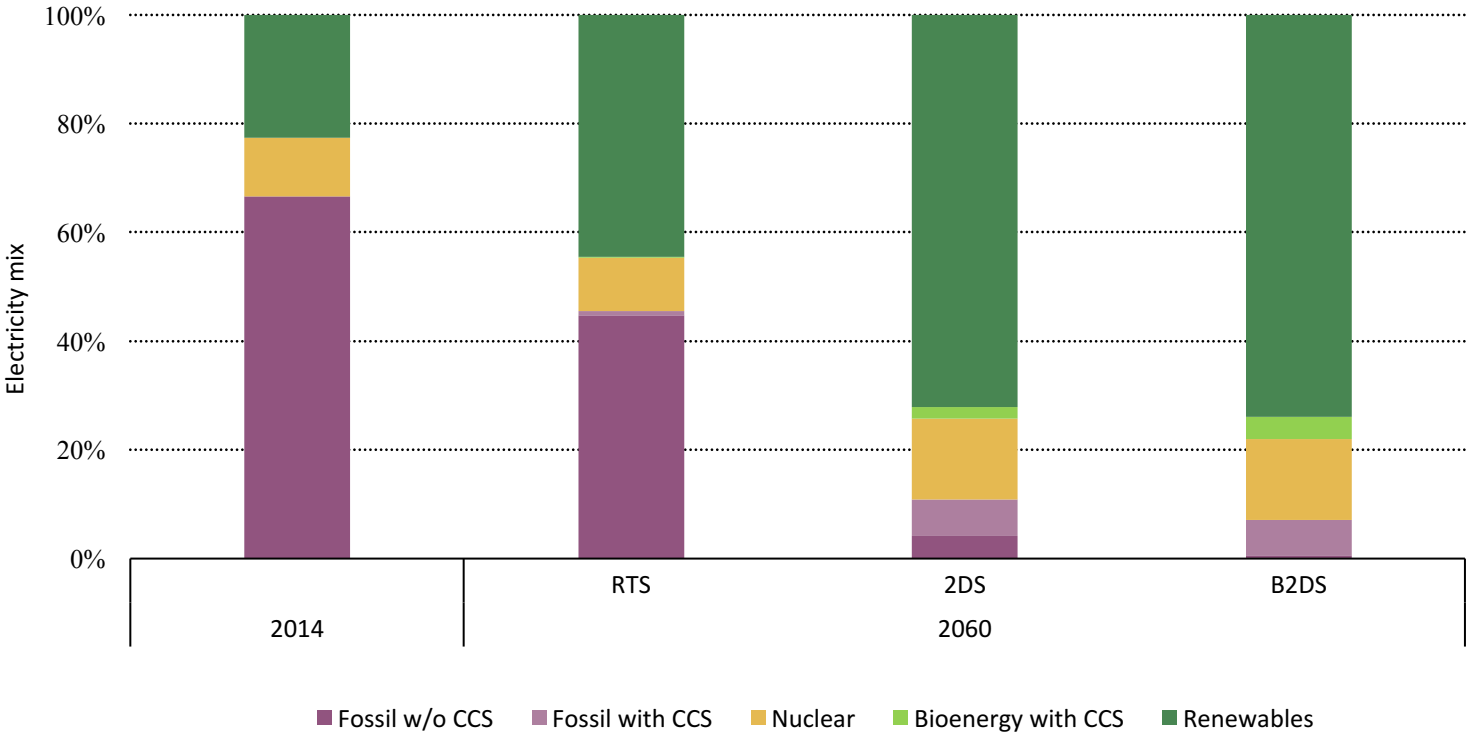


Change in final electricity demand in 2060



Electricity becomes on a global level the largest final energy carrier in the 2DS and B2DS, with the electricity share in final energy use more than doubling compared to today, up to 41% in the B2DS in 2060.

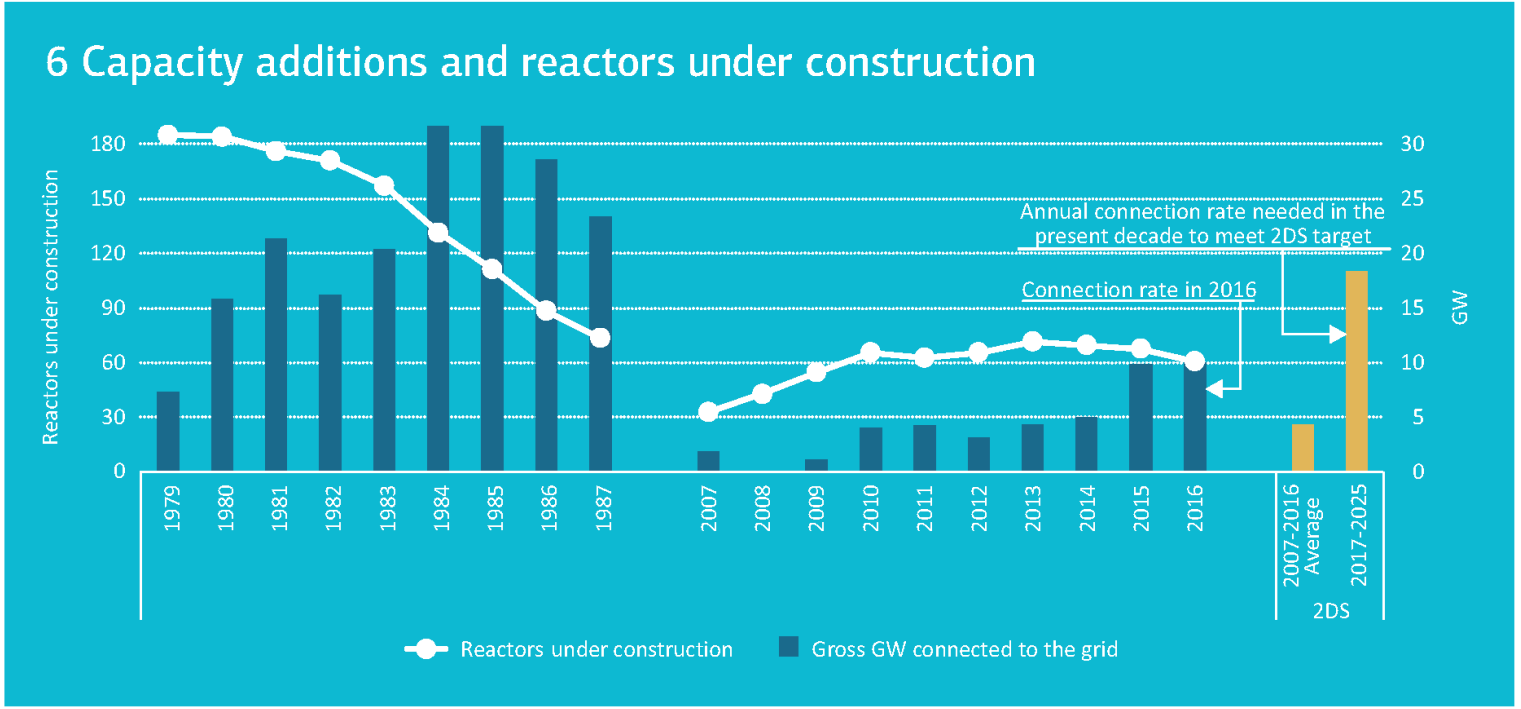
The fuel mix to generate electricity is vastly different to today



The average carbon intensity of power generation falls from around 520 gCO_2/kWh today to Below zero in the B2DS

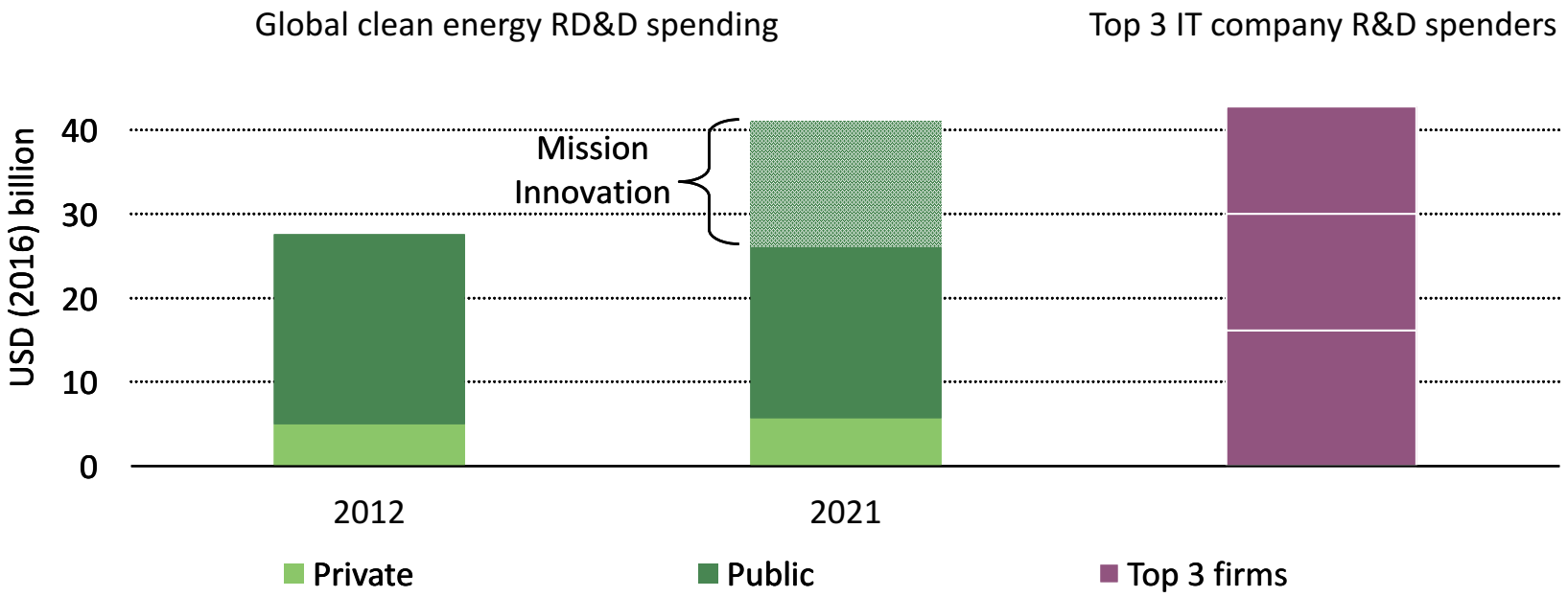
Nuclear additions need to double current rate to meet 2DS contributions

Capacity additions and reactors under construction



2016 saw the highest nuclear capacity additions since 1990, but new construction starts down sharply

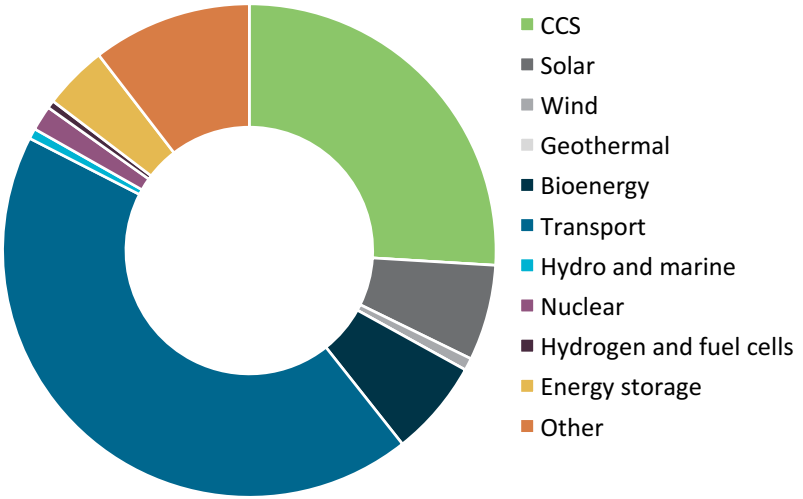
Global clean energy RD&D spending needs a strong boost



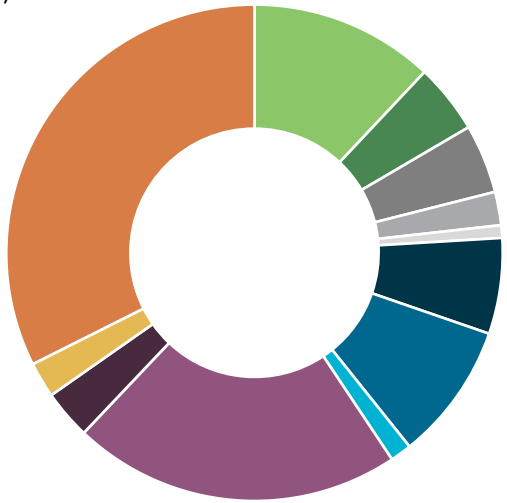
Global RD&D spending in efficiency, renewables, nuclear and CCS plateaued at $26 billion annually, coming mostly from governments.
Mission Innovation could provide a much needed boost.

Tap all the potential: Complementary public and private RD&D is needed

Venture Capital investment breakdown for 2016



IEA member country spending in 2016



Public and private sector invest in different type of innovation.
Public spending supports technologies that are further from the market or have high development and demonstration costs, including nuclear, CCS and ocean energy.

Conclusions

- Early signs point to changes in energy trajectories, helped by policies and technologies, but progress is too slow
- An integrated systems approach considering all technology options must be implemented now to accelerate progress
- Each country should define its own transition path and scale-up its RD&D and deployment support accordingly
- Achieving carbon neutrality by 2060 would require unprecedented technology policies and investments
- Innovation can deliver, but needs long term technology investment prioritisation across both public and private sectors

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