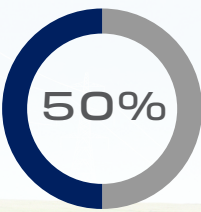


ENERGY TRANSITION OUTLOOK 2019: POWER SUPPLY AND USE

A global and regional forecast to 2050

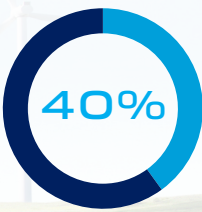
The energy transition we forecast is fast...

By 2032:



50% of light vehicles sold worldwide will be electric

By 2050:



Electricity's share in energy use doubles from 19% today to 40% in 2050



Renewables will provide almost 80% of the electricity mix



Generation from solar PV and wind will be more than 20 times today's output



Installed capacity for solar PV and wind will generate 63% of the world's electricity

...but not fast enough



Carbon emissions will not fall sufficiently by 2050 to reach the Paris Agreement goal of 2°C global warming, let alone 1.5°C – we estimate a rise in average global temperatures of 2.4°C by the end of the century



Technology has the power to close the emissions gap to well below 2°C. At DNV GL, we believe a combination of measures can get us there:



Grow solar power by more than 10 times to 5 TW and wind by 5 times to 3 TW by 2030, which would meet 50% of the global electricity use per year



50-fold increase in production of batteries for the 50 million electric vehicles needed per year by 2030, plus investments in more storage and balancing solutions to accommodate the growth of solar and wind power



Invest more than \$1.5 trn annually in the expansion and reinforcement of power grids by 2030, including ultra-high voltage transmission networks and extensive demand-response solutions



Increase global energy efficiency improvements by 3.5% per year within the next decade



Create new infrastructure for charging electric vehicles on a large scale



Improved and cheaper heat-pump technologies and improved insulation



Rapid and wide deployment of carbon capture, utilization and storage installations



Green hydrogen to heat buildings and industry, fuel transport and make use of excess renewable energy in the power grid



For the heavy industry sector: increased electrification of manufacturing processes, including electrical heating. Onsite renewable sources combined with storage solutions



Massive rail expansion both for city commuting and long-distance passenger and cargo transport

Time is against us

Governments need to take extraordinary policy actions now, and work with businesses and citizens. DNV GL calls for:



More tax incentives for electric cars



Government policies to improve and expand our power grid



Economic stimulus for energy efficiency measures

By 2020, all 197 countries that signed the Paris Agreement must raise and realize increased ambitions for their updated Nationally Determined Contributions (NDC's) and move to faster implementation.

With the first NDCs submitted to the United Nations Framework Convention on Climate Change secretariat, 75% currently refer to renewable energy, and 58% to energy efficiency. DNV GL appeals to political leaders that both these percentages need to be 100% in the second NDCs.

The transition is affordable

The world will spend an ever-smaller share of GDP on energy, allowing for greater investment to accelerate the transition

“ We need to change the mindset from ‘business-as-usual’ to ‘business-as-unusual’ to fast-track the energy transition
Ditlev Engel
CEO DNV GL - Energy ”