Enabling Renewables and Energy Efficiency

October 2017

The better the question. The better the answer.
The better the world works.

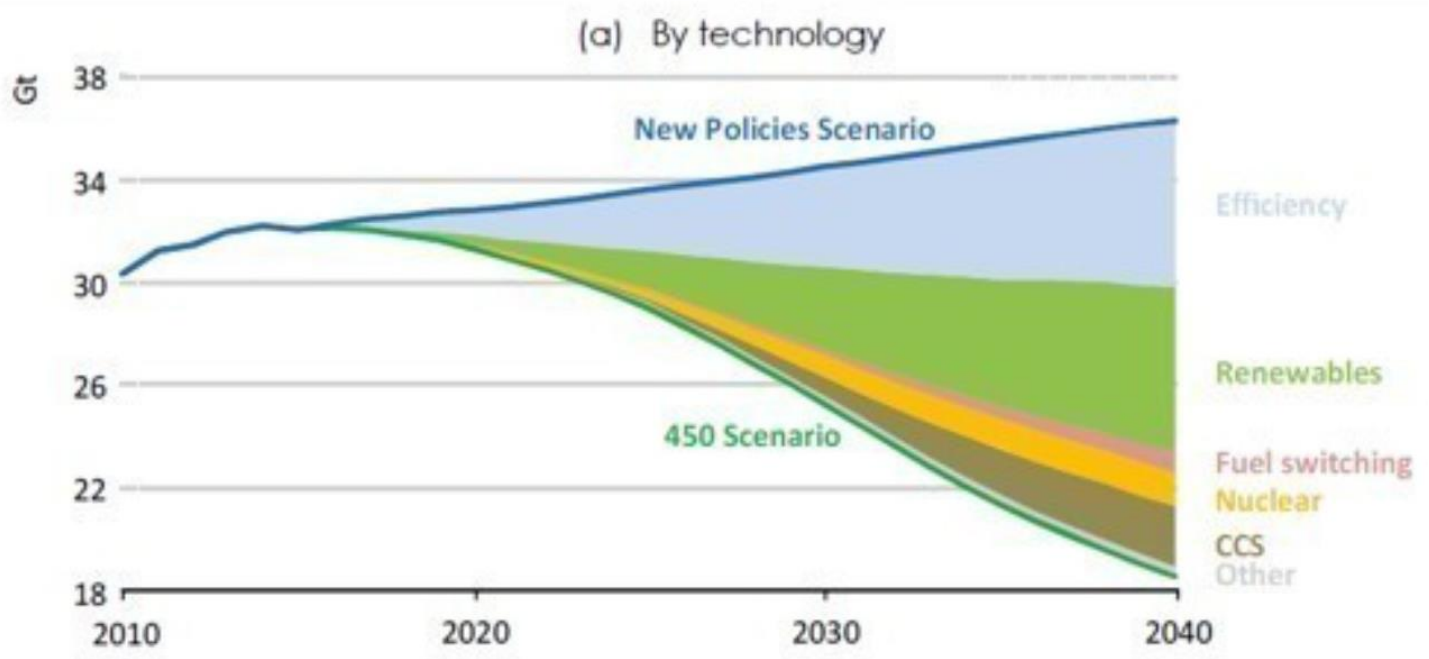
Building a better working world

Conditions for change

1. Market Drivers
2. Technology
3. Financing

1 Market Drivers: Regulatory

Figure 8.6 ▷ Global CO_2 emissions reductions in the New Policies and 450 Scenarios

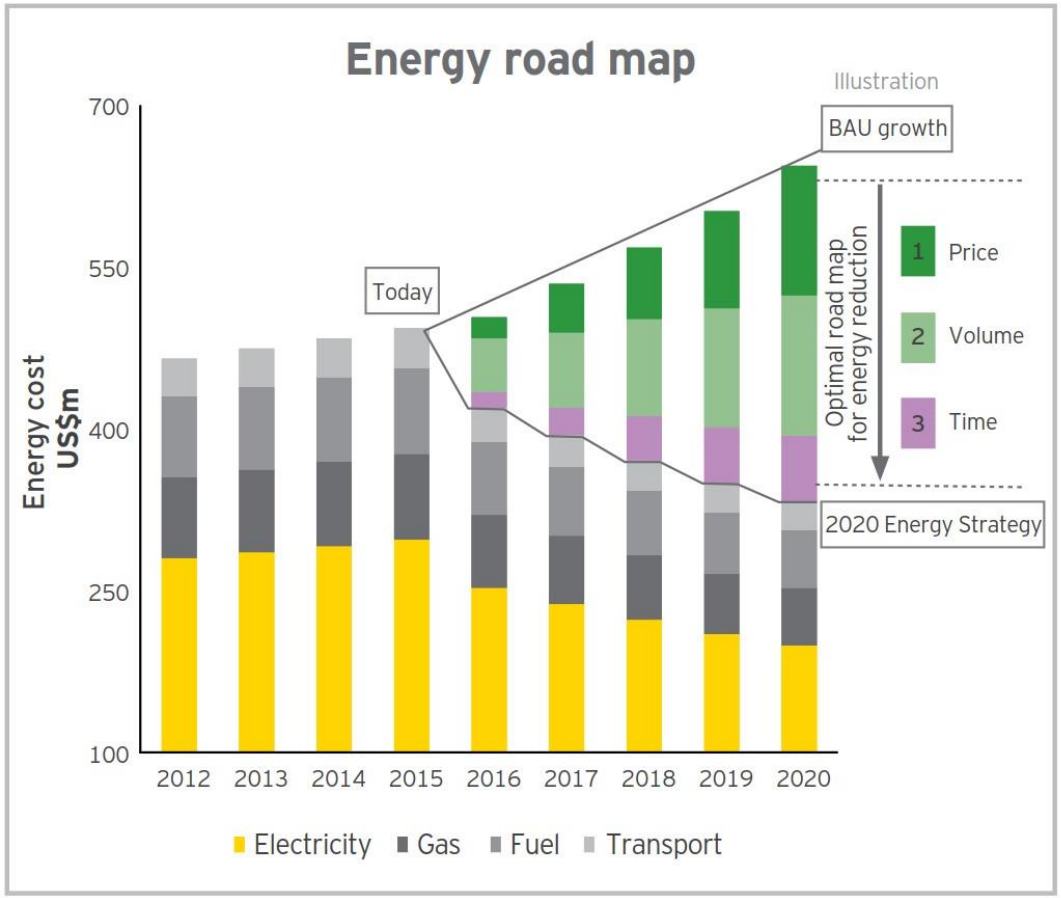


1 Market Drivers: Regulatory

Cumulative global energy supply investment by type and scenario, 2016–2040 (US$ billion, in 2015 terms)[2]

	NPS	450 scenario	Difference (%)
Fossil fuels	26,626	17,263	-35%
Renewables	7,478	12,582	68%
Electricity networks	8,059	7,204	-11%
Other low-carbon	1,446	2,842	97%
Total supply	**43,609**	**39,891**	**-9%**
Energy efficiency	22,980	35,042	52%

1 Market Drivers: Business

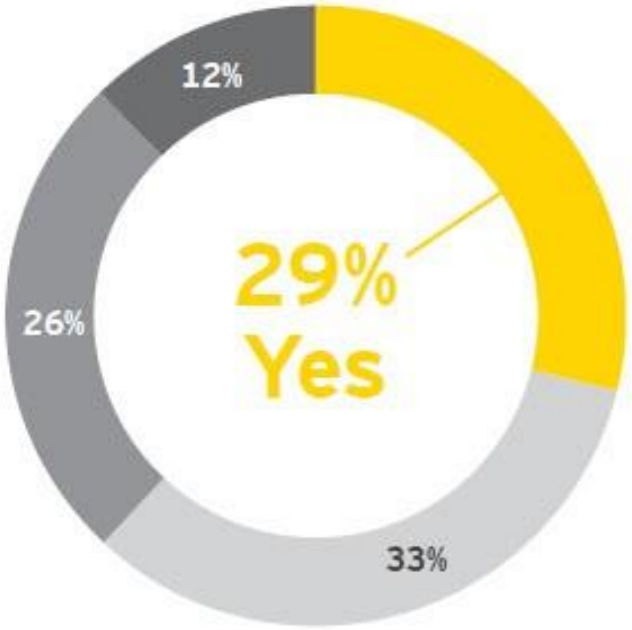


1 Market Drivers: Business

Stranded assets remain a concern for a majority of investors

In the last 12 months, has your fund decreased its holdings of a company's shares due to the risk of stranded assets (e.g., due to changes in regulation, social expectations, disruptive technology or environmental conditions)?

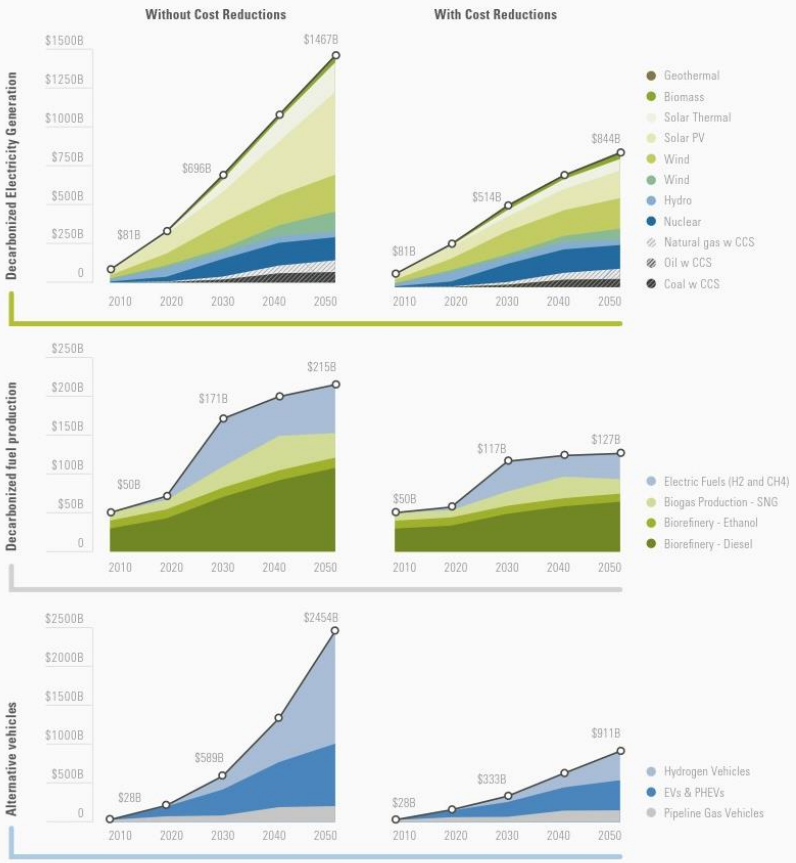
- Yes
- No, but we are likely to monitor this closely in the future
- No
- Don't know



2 Technology

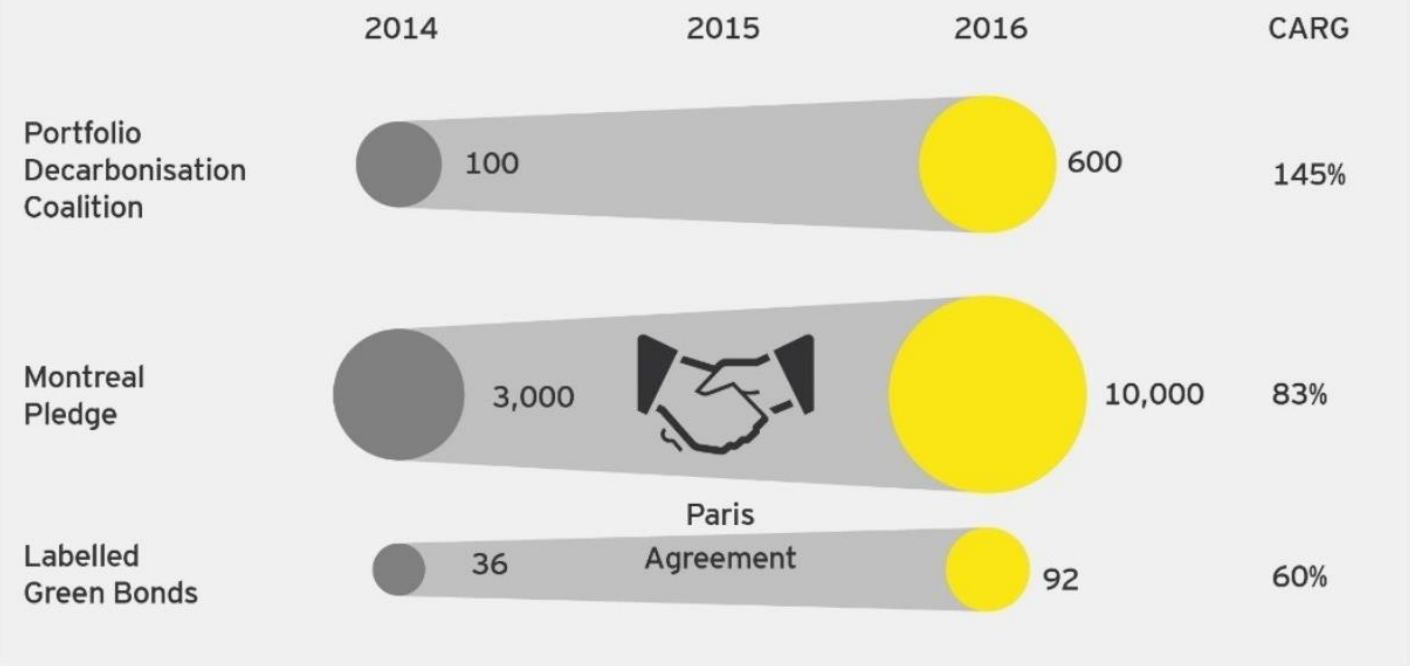
Figure 8. Annual investment requirements with vs without technological learning

(Left side, top to bottom) Annual investment requirements for decarbonized electricity generation, decarbonized fuel production, and alternative vehicles without technological learning. (Right side, top to bottom) Annual investment requirements for the same technologies with cost reductions due to technological learning taken into account.



- In 2016 and 2017, utility scale solar was priced at a levelised cost of energy (LCOE) of below US$40/MWh in India, UAE, Chile, Dubai, Mexico and the US
- This is a 50% reduction in the cost of solar power in a year.
- Similarly, wind power auctions in Morocco, Brazil, Mexico and Chile in 2016 also produced bids below US$40/MWh.
- This compares to a cost of super-critical coal generation which is estimated at between US$40-90/MWh.
- Some price decrease is due to subsidies, but this explains only a fraction of the cost reductions

3 Financing



Size of climate change related financial Initiatives — pre- and post-COP (US$ billion)[5]

3 Financing

Asset class	Current state	Future state
Debt	1. Largely delivered through Green Bonds 2. First issued by the World Bank and the European Investment Bank in 2007 with corporates following in 2013 3. Rapid growth since that time 4. Main drivers have been reputational benefits and improved diversification in an investor base 5. Evidence of a small pricing benefit over traditional bonds in secondary market[6]	1. As cost of renewables and low-carbon technologies falls and regulation increases in the emissions-intensive sectors, green projects are now often considered as lower risk over the longer term 2. Could lead to further price advantage in the primary and secondary markets 3. Increasing likelihood that bond portfolios will include green bonds as an asset class due to the ease of identifying green credentials
Equity	1. Greater disclosure driven by the Financial Stability Board's (FSB) Task Force on Climate-related Financial Disclosures (TCFD) Recommendations[7] 2. Over 140 policymakers from around the world signaled support for the recommendations, calling on all stock markets to ensure listed firms embrace the new guidance on climate risk disclosure	1. Climate risk disclosures are likely to become standard practice to allow for better comparability between disclosures 2. Not reporting on climate risk transparently will likely mean facing divestment or increasing shareholder activism 3. Equity portfolio managers will likely report on financed emissions or may use poor disclosures as negative screening
Specialist investments — infrastructure and property	1. Infrastructure is a nuanced asset class when considering climate change risk and opportunities 2. Infrastructure investments are generally long term, require significant capital and have large physical footprints, meaning climate change risks are more likely to impair asset values 3. Growing concern about risk of stranded assets in the infrastructure sector due to physical and transition climate change risks 4. Climate risk disclosures in the sector are largely immature	1. Assets and supply chains should be periodically reviewed for possible changes in technology, regulation and consumer behavior that could impair certain parts or all of the supply chain 2. Climate scenarios mapping the physical changes from climate change should be leveraged to provide insights into the risks facing assets located in different geographies 3. New infrastructure will likely need to be built to support emerging technologies (e.g., electric car charging points, utility-scale battery storage and high-speed electric rail) creating green finance opportunities
Specialist investments — clean technology funds	1. Cleantech funds are an emerging investment area, where all funds are directed into technologies that benefit from a two-degree pathway 2. Investments have been mostly renewables but diversity of investments will increase as other technologies become cost competitive such as electric vehicles and battery storage	1. So far, this asset class has been a niche market, however, investors are likely to increase investment due to a lower risk profile or superior returns due to direct exposure to increased climate change action 2. If traditional sectors do not improve strategic understanding of impacts of climate change, then there is the potential for this asset class to grow and fill any market gaps