

South Korea

A Closer Look



Key Findings

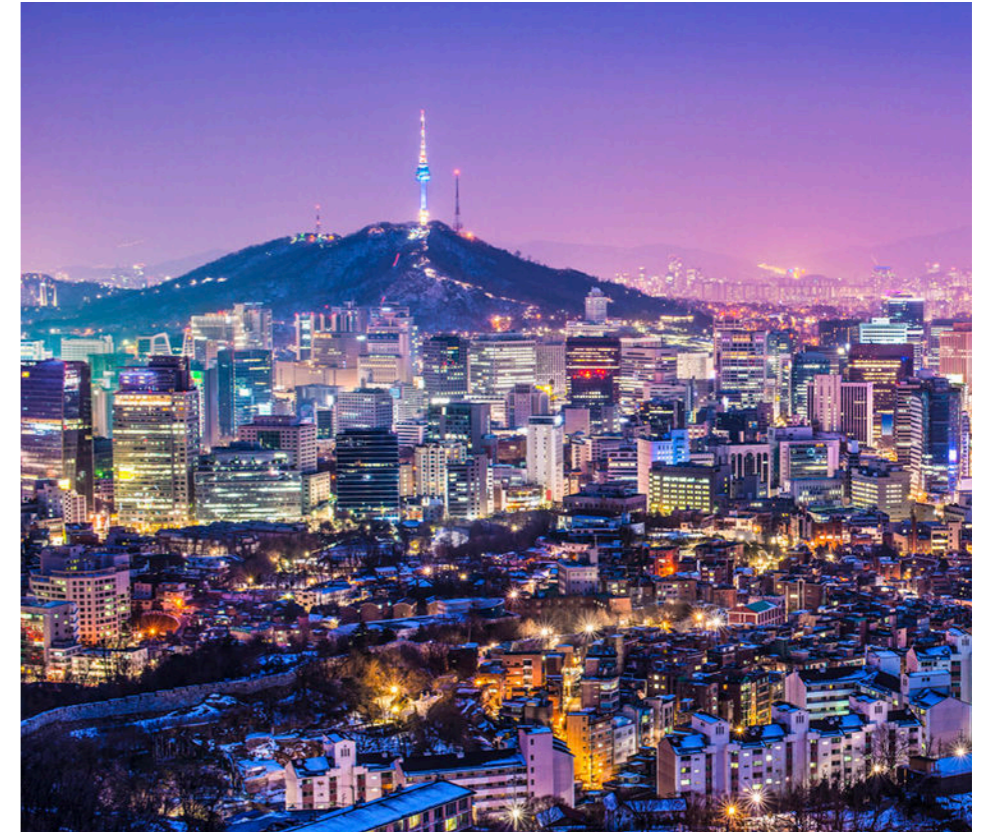
Minimum cost of replacing nuclear plants is \$20 billion per year

Coal, oil, natural gas likely alternative given scarcity of land for wind and solar

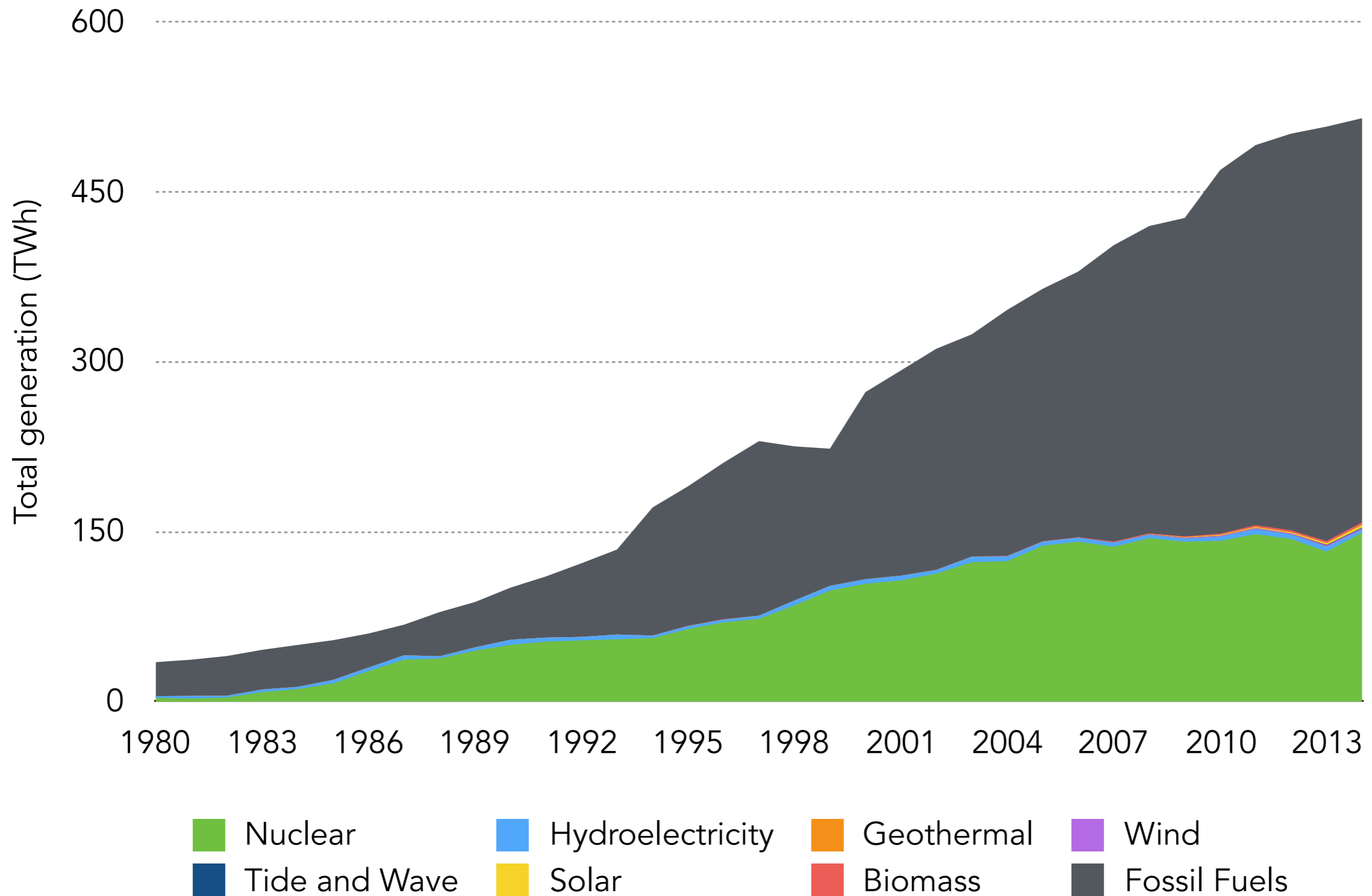
Wind & solar would require natural gas as back-up

Nuclear phase-out means South Korea could not meet Paris climate agreement

Nuclear phase-out domestically would result in loss of nuclear export market



South Korea's electricity mix, 1980 - 2014



Replacing Korea's nuclear electricity would require either:

~13,000 wind turbines*



~4,400 solar farms†



or

Replacing Korea's nuclear electricity would require either:

~ 13,000 wind turbines*



~ 23.5 million solar roofs†



or

2016 Korean total solar and wind capacities are equivalent to:



or



Replacing Korea's 2016 fossil fuel electricity *and* nuclear electricity would require either:

~40,000 wind turbines*



Image source: Korea Institute of Energy Research

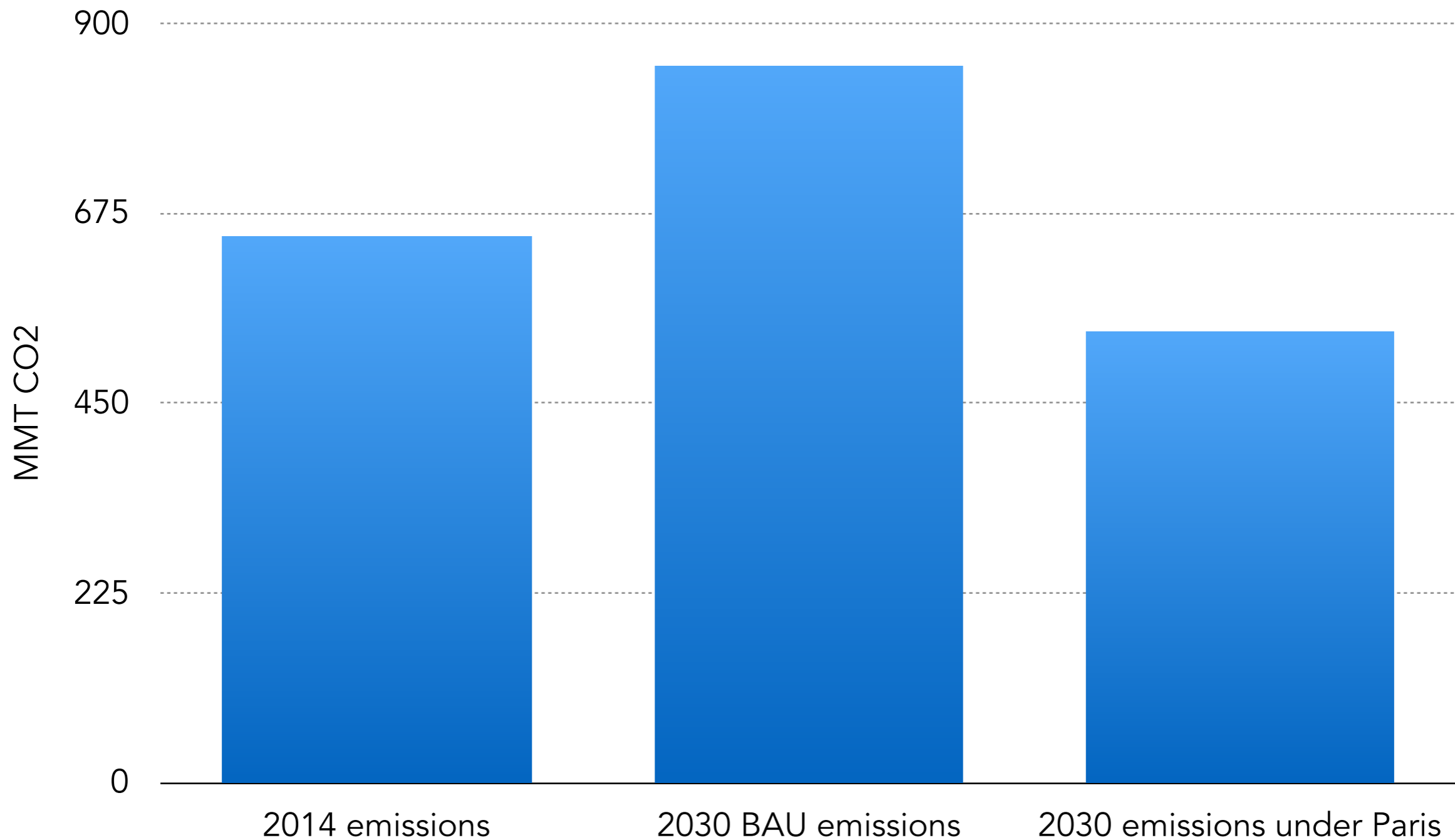
~14,000 solar farms†



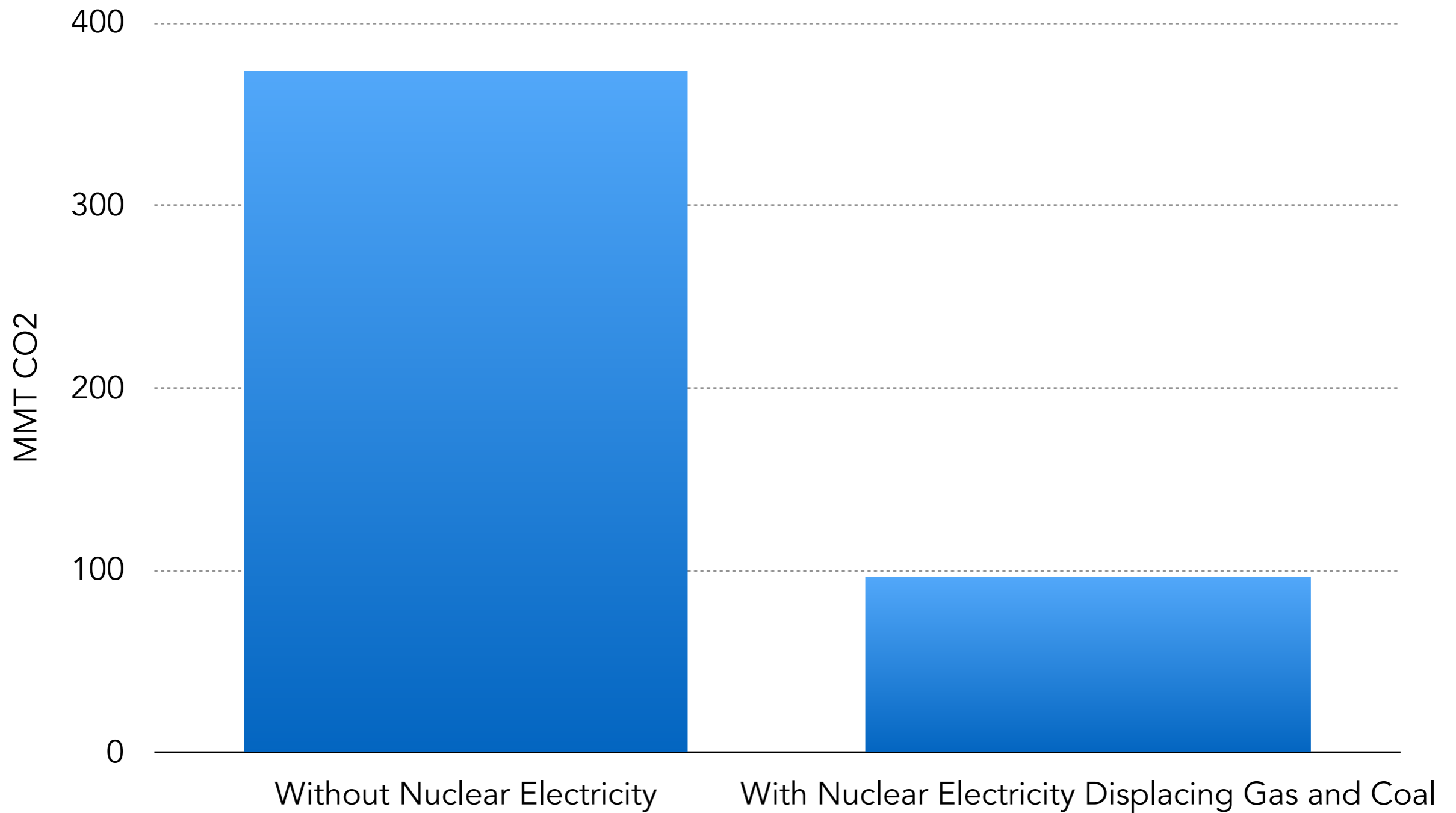
Image source: Conergy

or

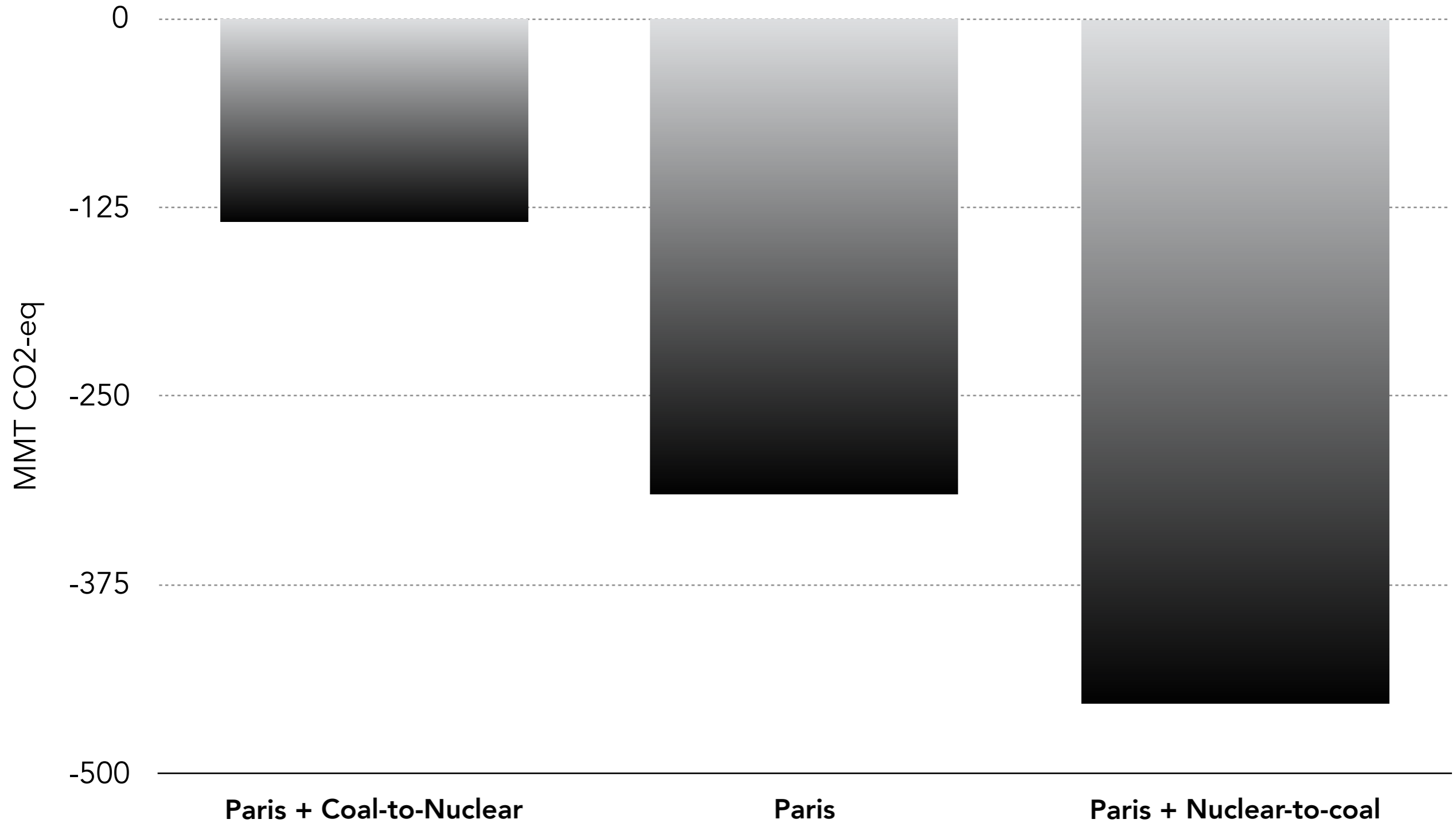
South Korean emissions, business-as-usual, and Paris commitment



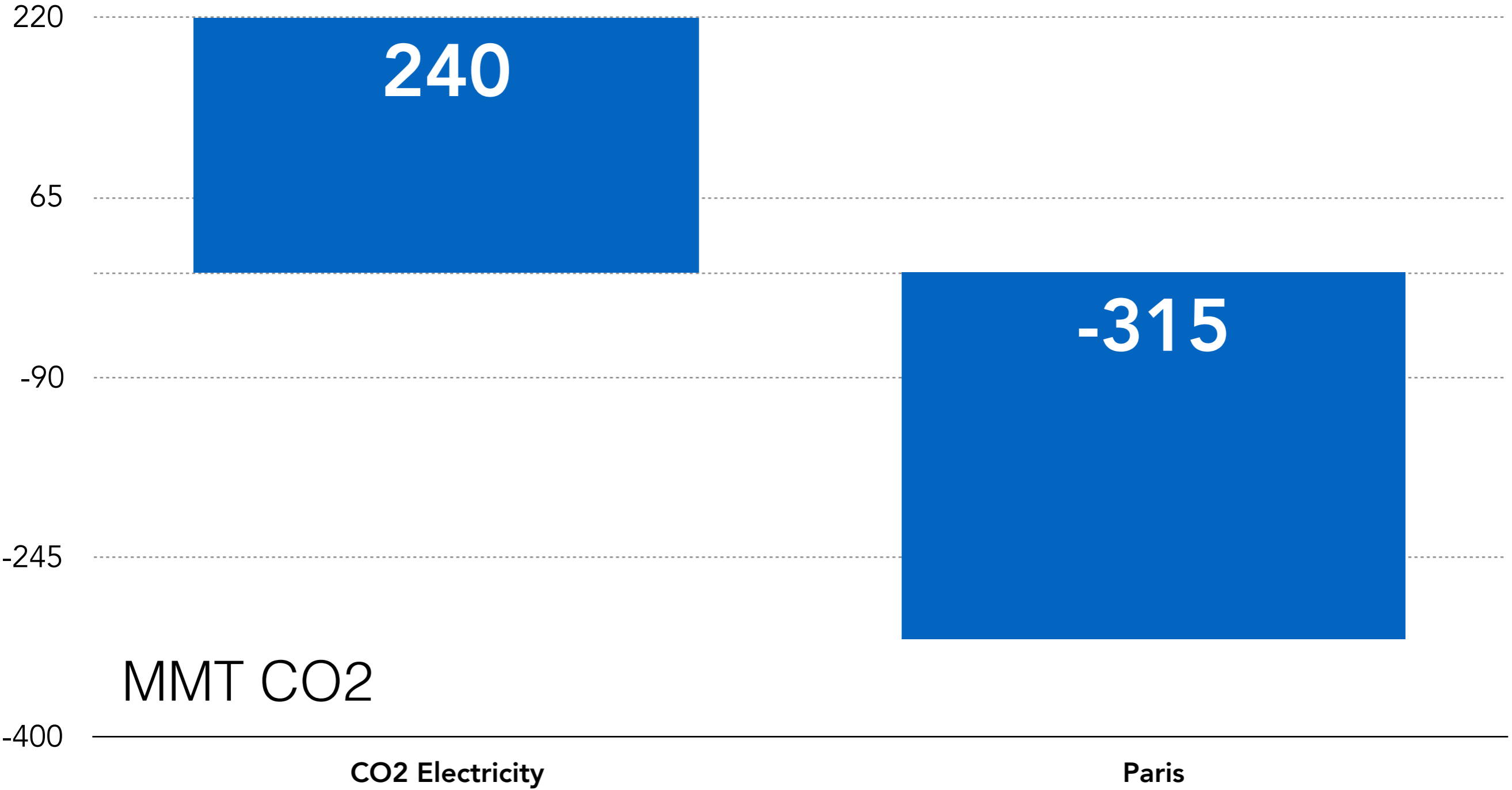
Paris climate agreement emissions goals



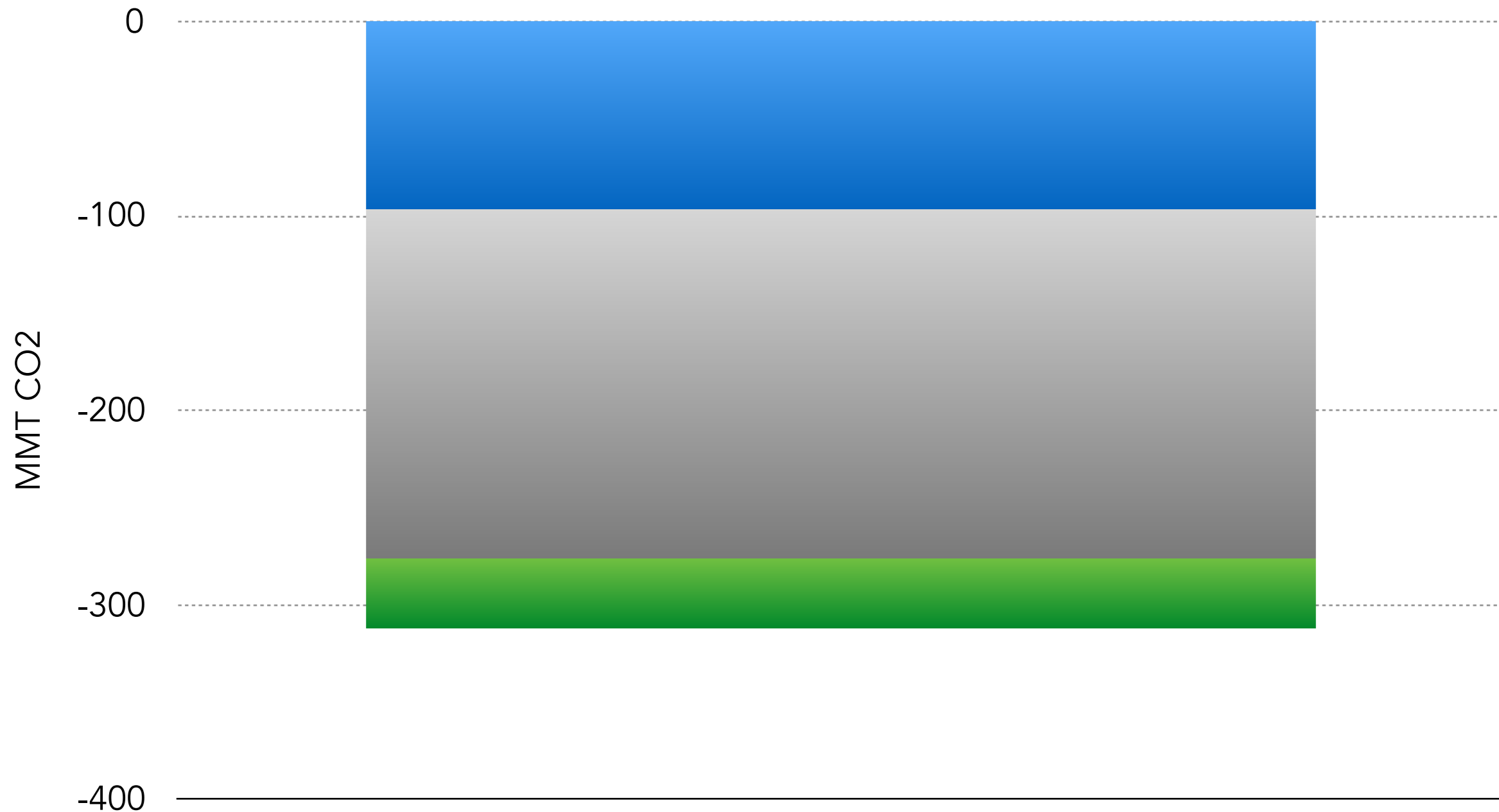
Nuclear closures increase Paris emissions burden 19 - 45%






Paris agreement requires larger emissions reductions than all total emissions from electricity

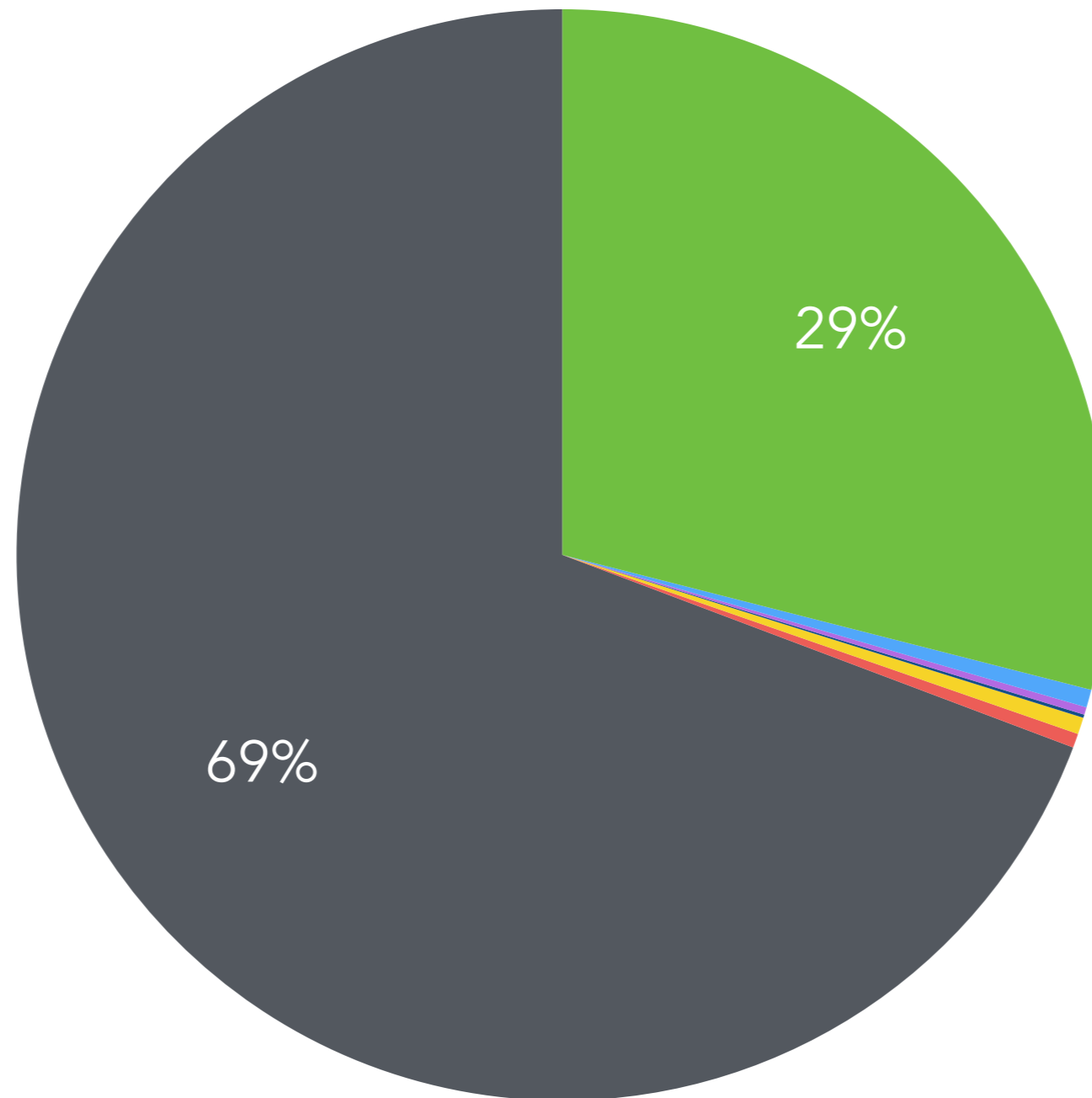


Meeting Paris requires replacing all coal and natural gas with zero-carbon electricity + more



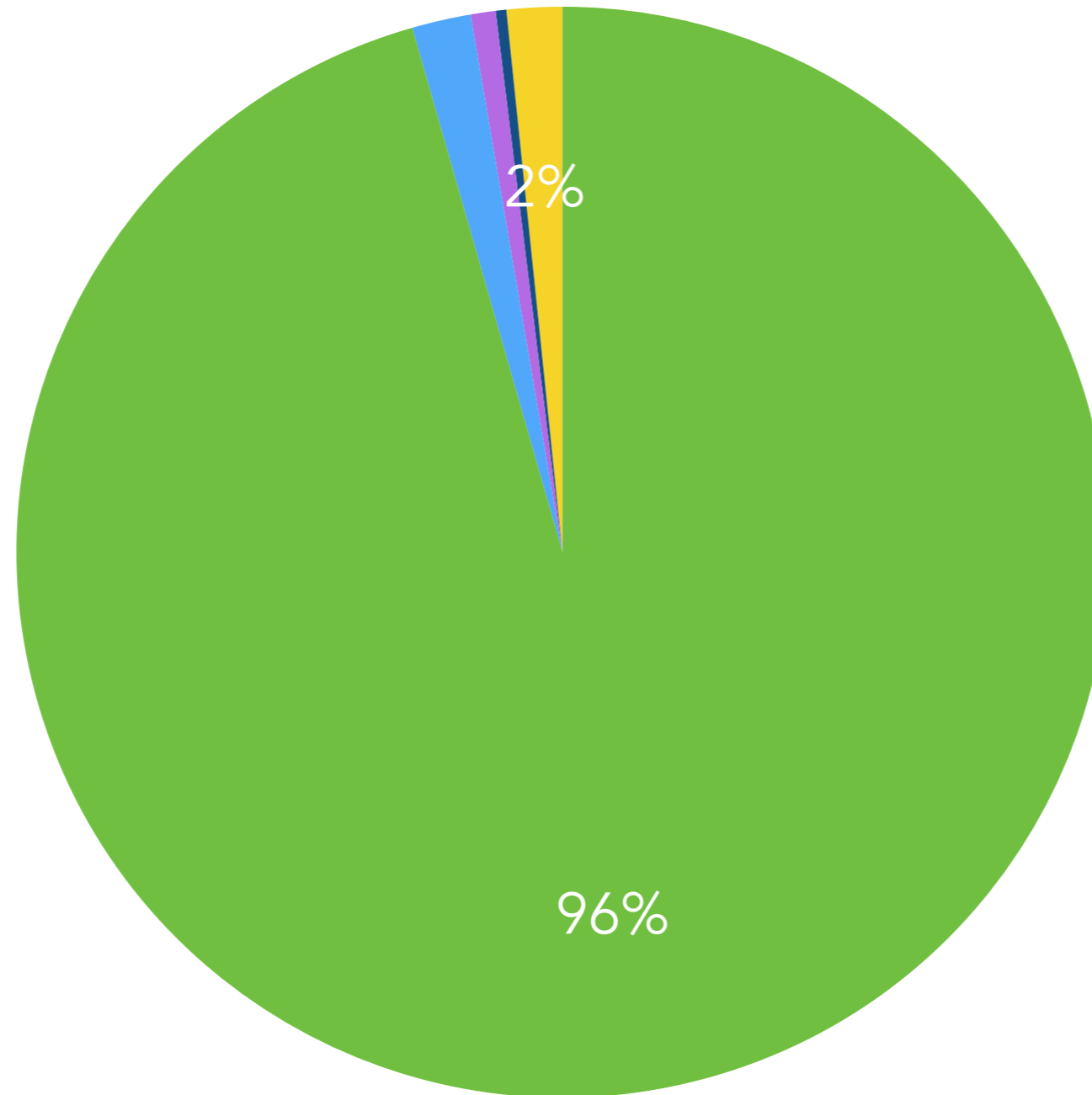
-  Natural gas-to-nuclear emissions reductions
-  Coal-to-nuclear emissions reductions
-  Remaining reductions under Paris

South Korea's electricity mix, 2014



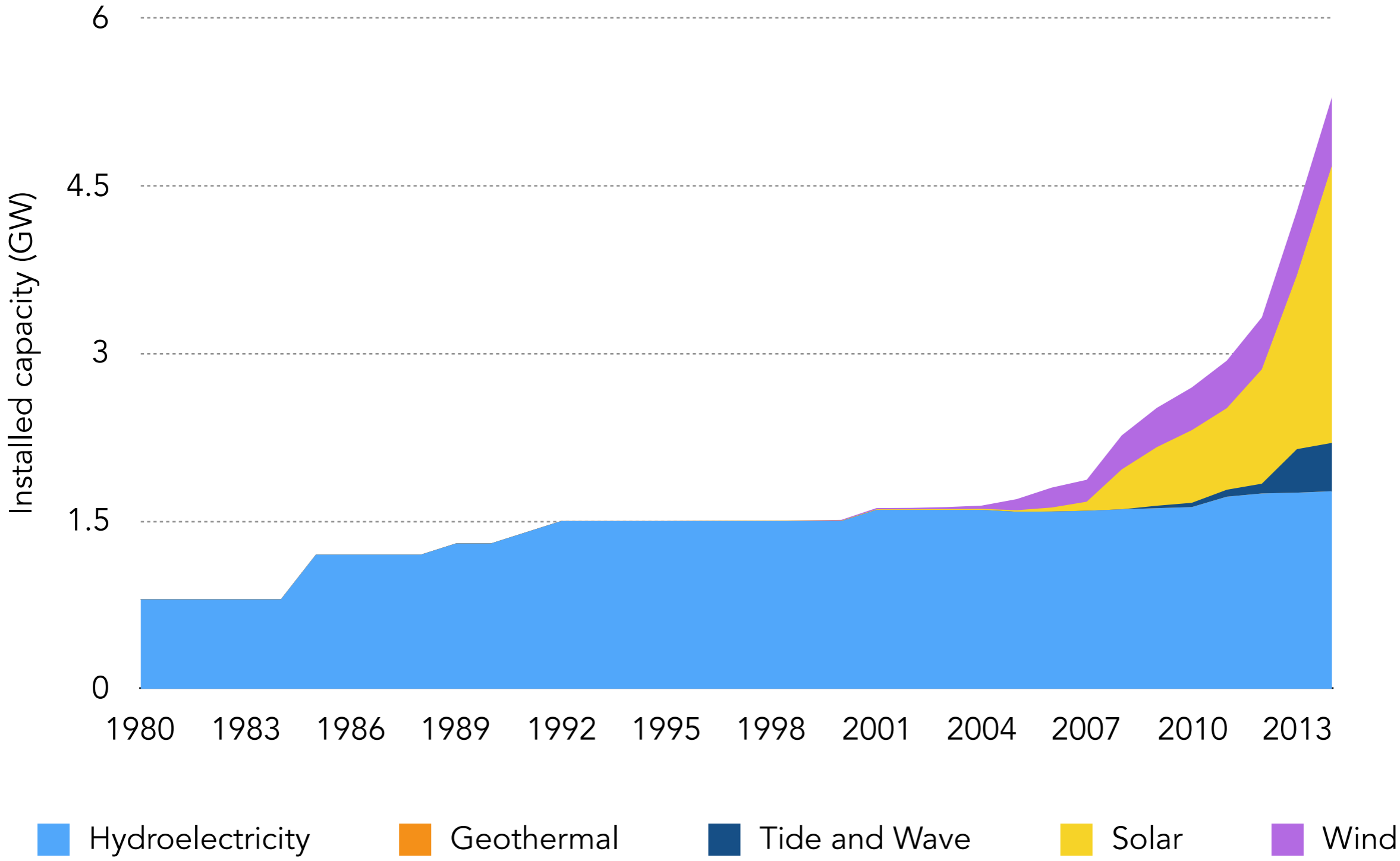
- Nuclear
- Hydroelectricity
- Geothermal
- Wind
- Tide and Wind
- Solar
- Biomass
- Fossil Fuels

South Korea's clean electricity mix, 2014

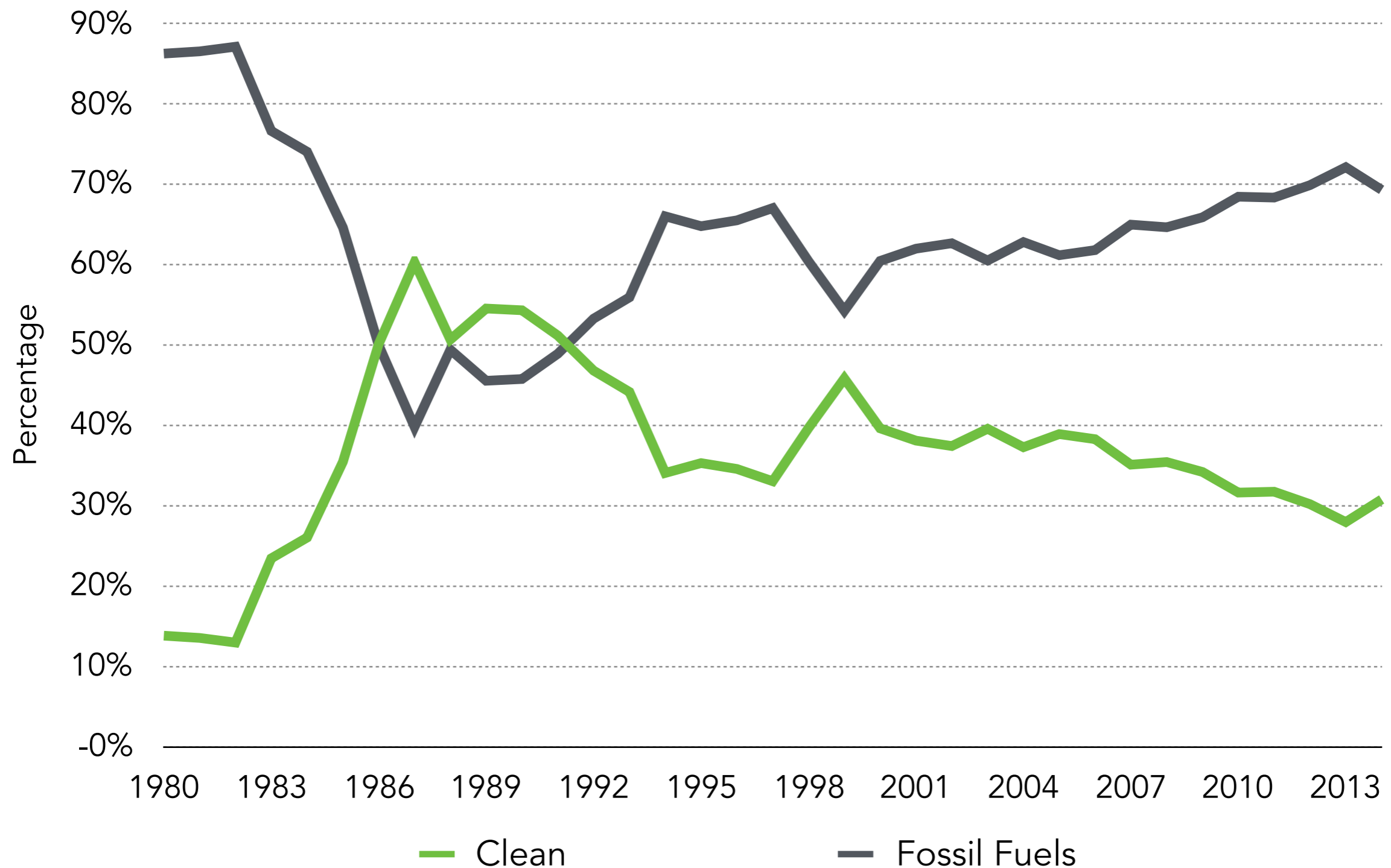


- Nuclear
- Hydroelectricity
- Geothermal
- Wind
- Tide and Wind
- Solar

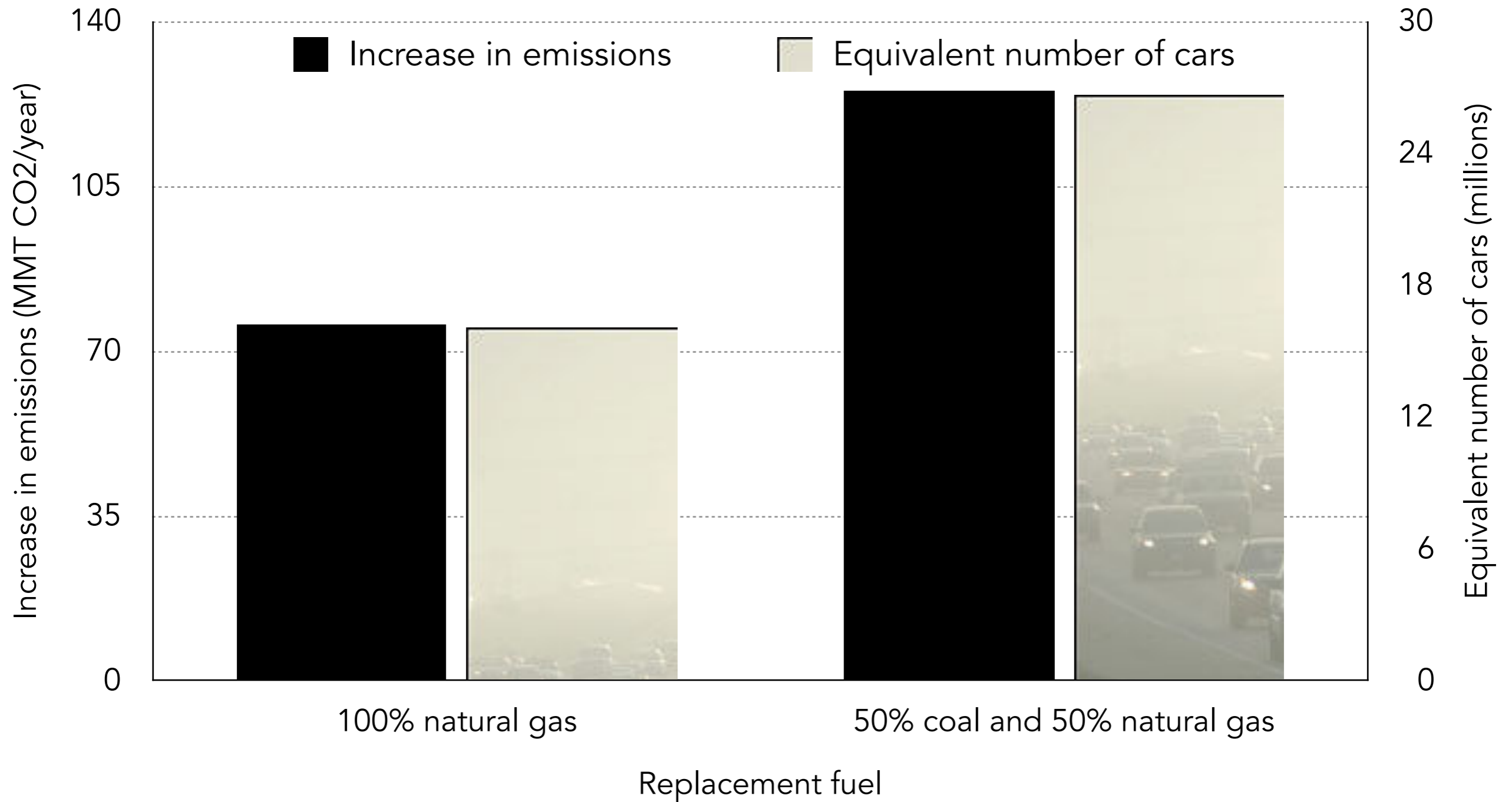
South Korea's renewable capacity, 1980 - 2014



South Korea's share of clean electricity, 1980-2014

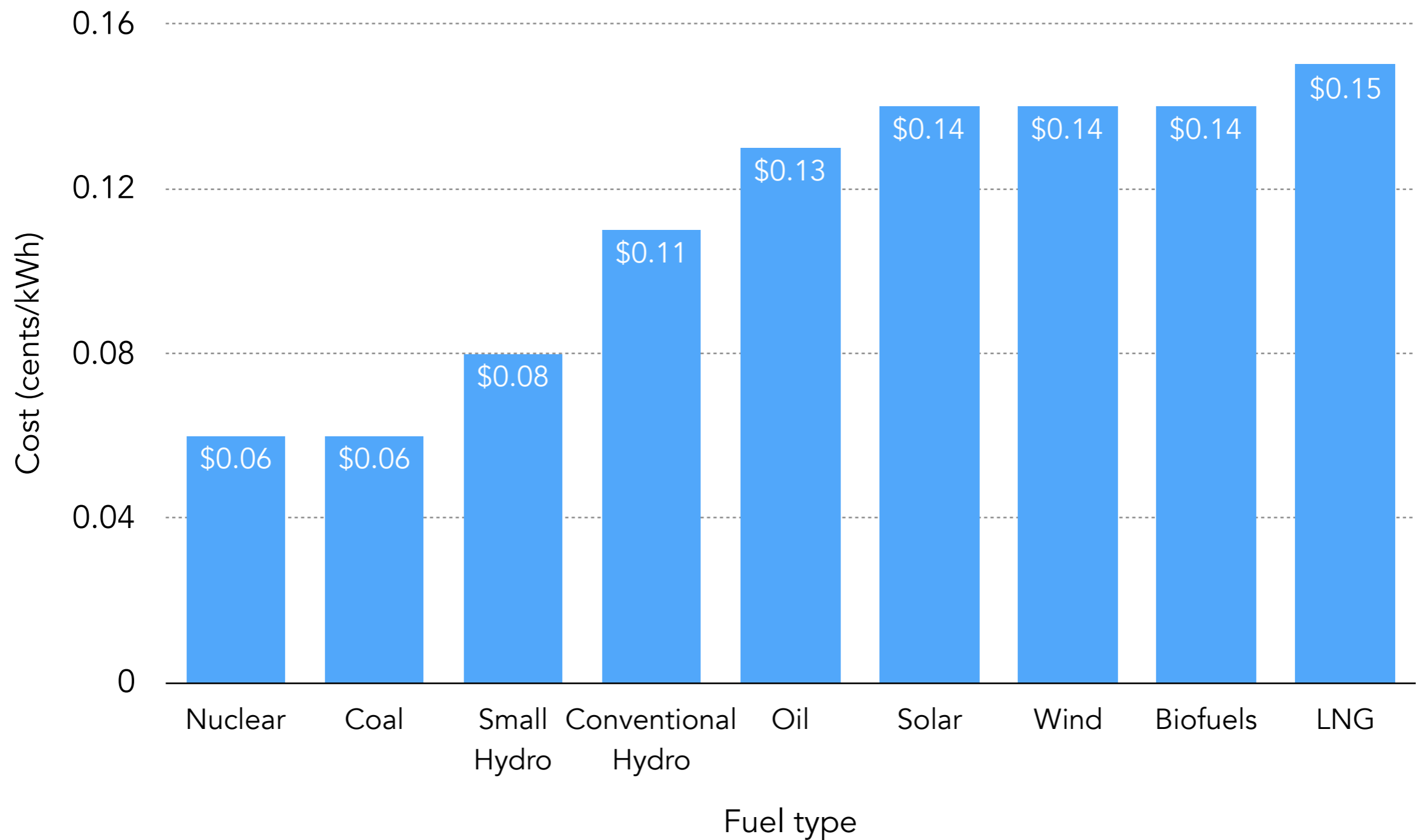


Nuclear closure would increase emissions the equivalent of adding 27 million cars to road



Sources and notes: Increase in emissions calculated based on estimated annual generation of all South Korean nuclear reactors using a capacity factor of 0.92. Emissions factors are calculated based on values from the U.S. Energy Information Administration. Calculations of cars added to the road assume an average emissions per passenger vehicle of 4.7 metric tons CO₂ per year, as per the U.S. Environmental Protection Agency. Calculations involving coal emissions factors assume all coal is bituminous.

Average Cost of Korean Electricity by Fuel Type, 2015



Source and notes: KHNP Korea Electric Power Statistics. Values converted from South Korean Wons to US Dollars using a conversion factor of 0.00089. The 2015 average includes the cost of decommissioning and spent fuel management which was not included prior to 2015.

Replacing current and near future South Korean nuclear would cost ~\$200 to \$400 billion over 20 years

