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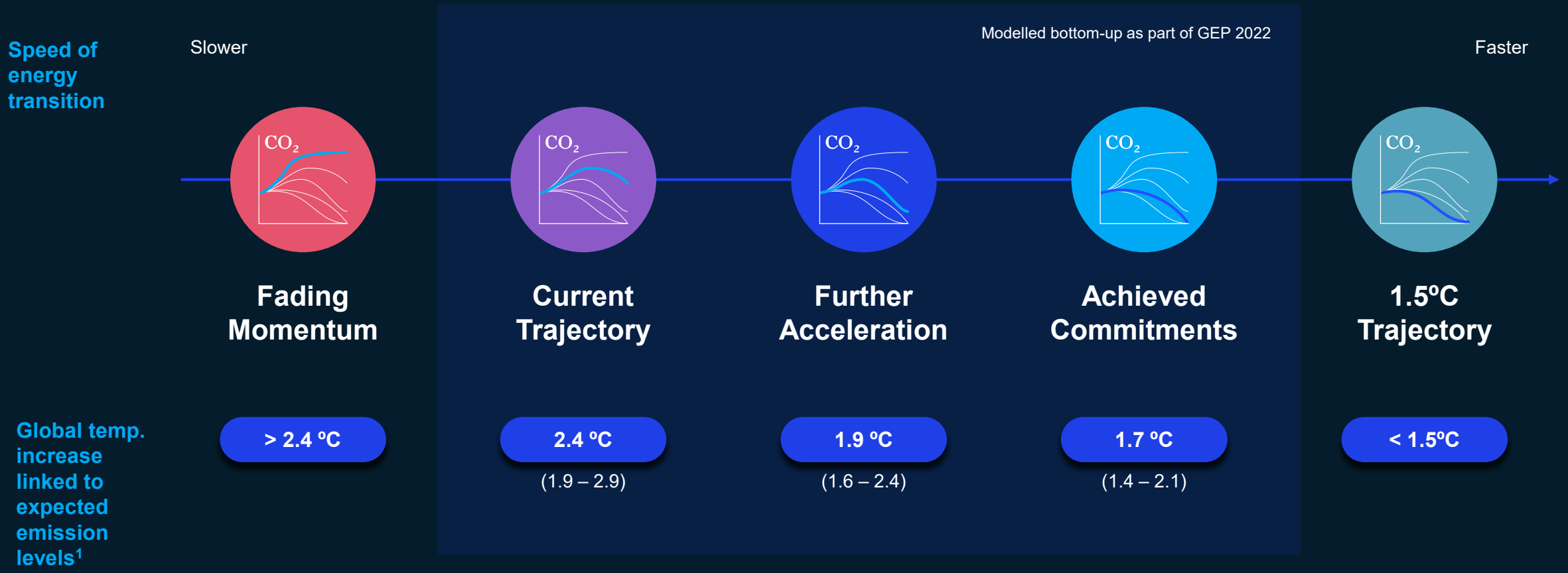
Clean Power Investment Workshop

EIA

June 23rd, 2022

In our 2022 Global Energy Perspective, we explore five scenarios around pace of technological progress and level of policy enforcement

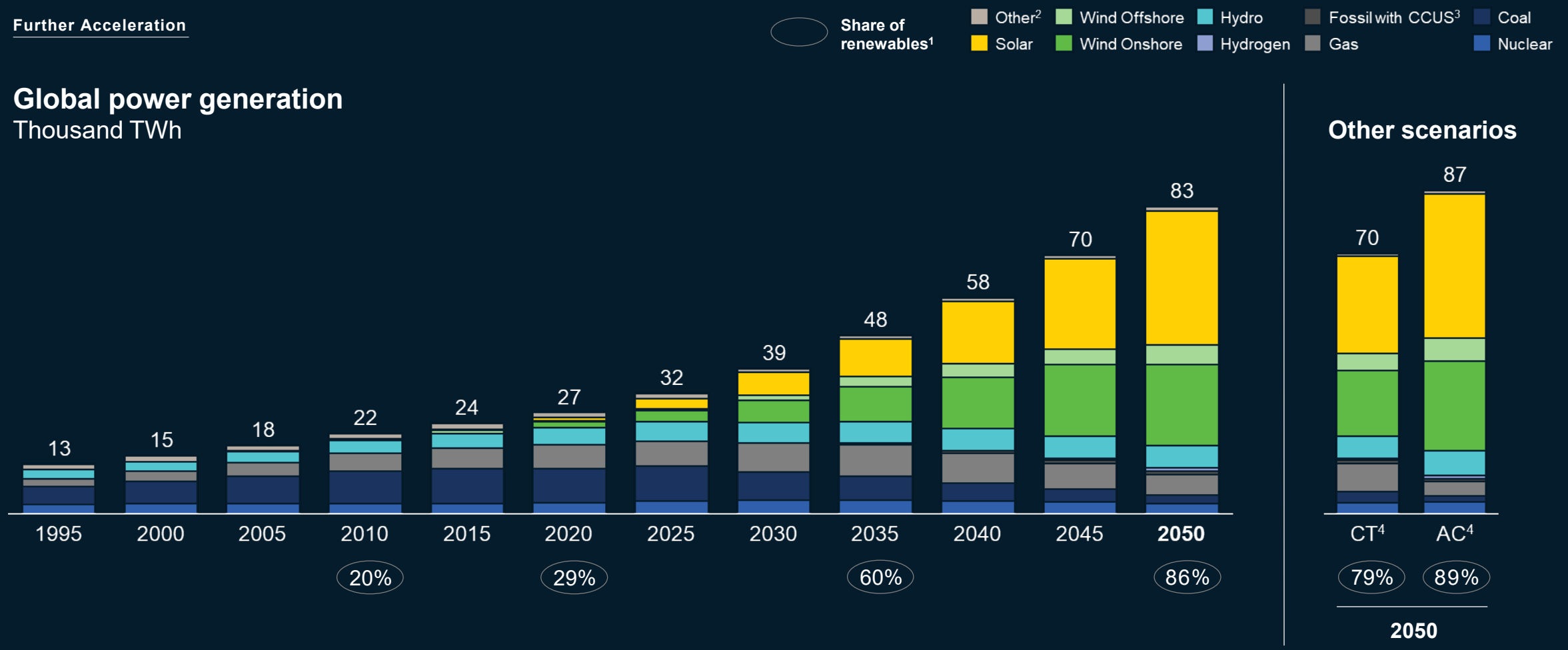


1. Warming estimate is an indication of global rise in temperature by 2100 versus pre-industrial levels (range 17-83rd percentile), based on IPCC assessments given the respective emission levels and assuming continuation of trends after 2050 but no net-negative emissions

Source: McKinsey Energy Insights Global Energy Perspective 2022

Renewables are expected to account for 80-90% of power generation globally by 2050

Further Acceleration

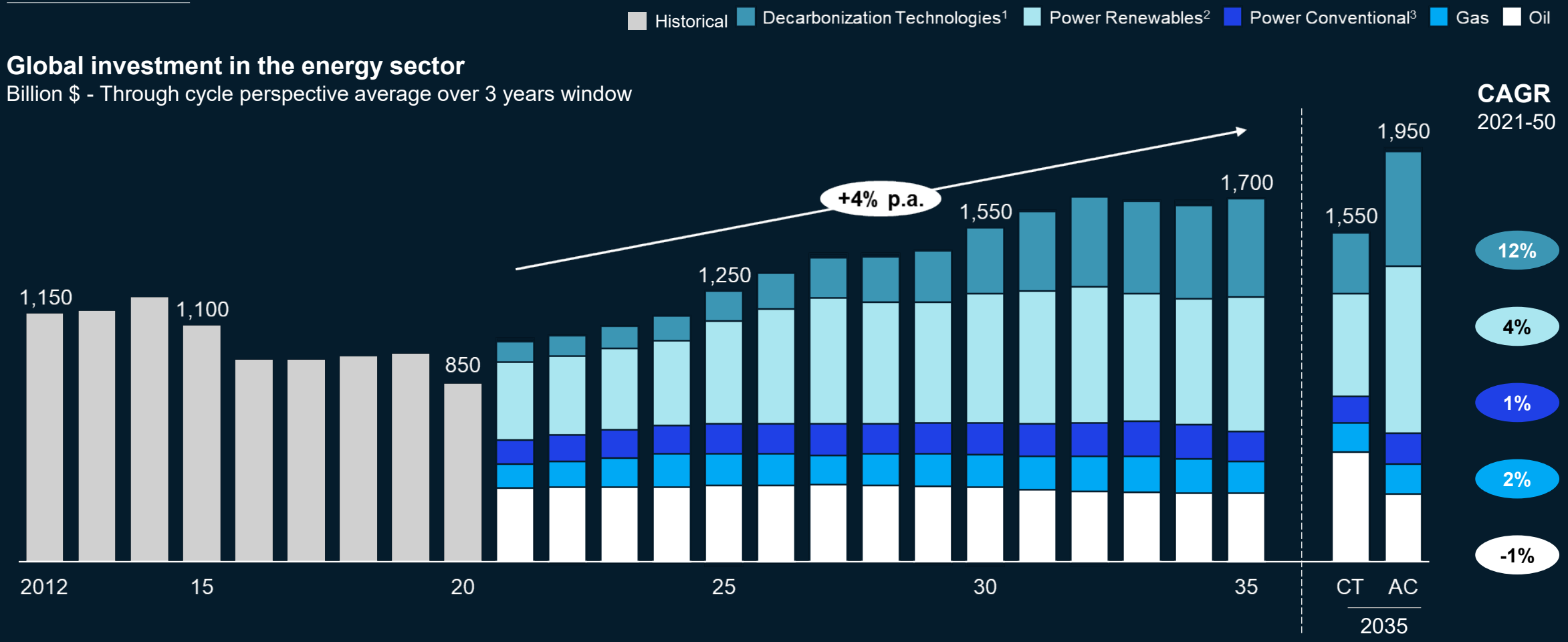


1. Includes solar, wind, hydro, biomass, BECCS, geothermal, and marine and hydrogen-fired gas turbines | 2. Other includes bioenergy (with and without CCUS), geothermal, marine, and oil | 3. Includes gas and coal plants with CCUS
4. CT refers to the Current Trajectory; AC refers to the Achieved Commitments

Source: McKinsey Energy Insights Global Energy Perspective 2022; Power Solution's McKinsey Power Model

Energy is expected to attract increasing investment, with strongest growth in RES and decarbonization technologies

Further Acceleration



1. Includes Sustainable Fuels, CCUS, Hydrogen, EV Charging | 2. Includes Solar, Onshore Wind, Offshore Wind, Hydro and other | 3. Includes Coal, Gas and Nuclear

Source: McKinsey Energy Insights Energy Value Pools Model; IEA World Energy Investments, IEA World Energy Outlook 2021

Dynamics in power systems are becoming more complex; understanding investment requires questioning canonical thinking

Canonical thinking	How that may evolve
Wind and solar will continue to decrease in cost	• Land will be costly • We underestimate grid needs • Supply chains will be strained
Technologies are known	• Technology moves fast – why would that stop? Floating wind, fusion, LDES[1], H2/NH3, NETs[2], SMRs[3]….
Typical weather gives sufficient insight	• Weather becomes more central and harder to predict — Reliability at risk — Over-/under-build are costly
The power sector can be ‘solved’ independently	• Economy-wide energy transition is all about electricity • Sector coupling will be key to flexibility

1. Long duration energy storage technologies
2. Negative Emissions Technologies, e.g., direct air capture (DAC) and biofuel with carbon capture and storage (BECCS)
3. Small Modular reactors

Source: McKinsey Power Solutions

Dynamics in power systems are becoming more complex; understanding investment requires questioning canonical thinking

Canonical thinking	How that may evolve
Wind and solar will continue to decrease in cost	• Land costs will rise, while the best sites are already taken • The grid build-out required is underestimated • Supply chains and energy security considerations will change decision-makers' approaches
Technologies are known	• Generation and storage have moved quickly – why should that stop? — Carbon capture, including NETs[1] could be scaled — Floating offshore, fusion, SMRs, H2/NH3, LDES[2], etc
Typical weather gives sufficient insight	• Weather patterns and extreme events may increase, changing the reliability equation…on supply and demand • Year-over-year variations create structural imbalances that will no longer be 'smoothed over' by fossil fuels
The power sector can be 'solved' independently	• As electricity becomes the center of the energy transition, more of the economy depends on power • Not including e.g., hydrogen, heat, transport, biogenic carbon sources, misses important considerations

1. Negative Emissions Technologies, e.g., direct air capture (DAC) and biofuel with carbon capture and storage (BECCS)
2. Long duration energy storage technologies

Source: McKinsey Power Solutions