NEW YORK STATE TEACHERS' RETIREMENT SYSTEM

LONG-TERM OUTLOOK FOR THERMAL COAL

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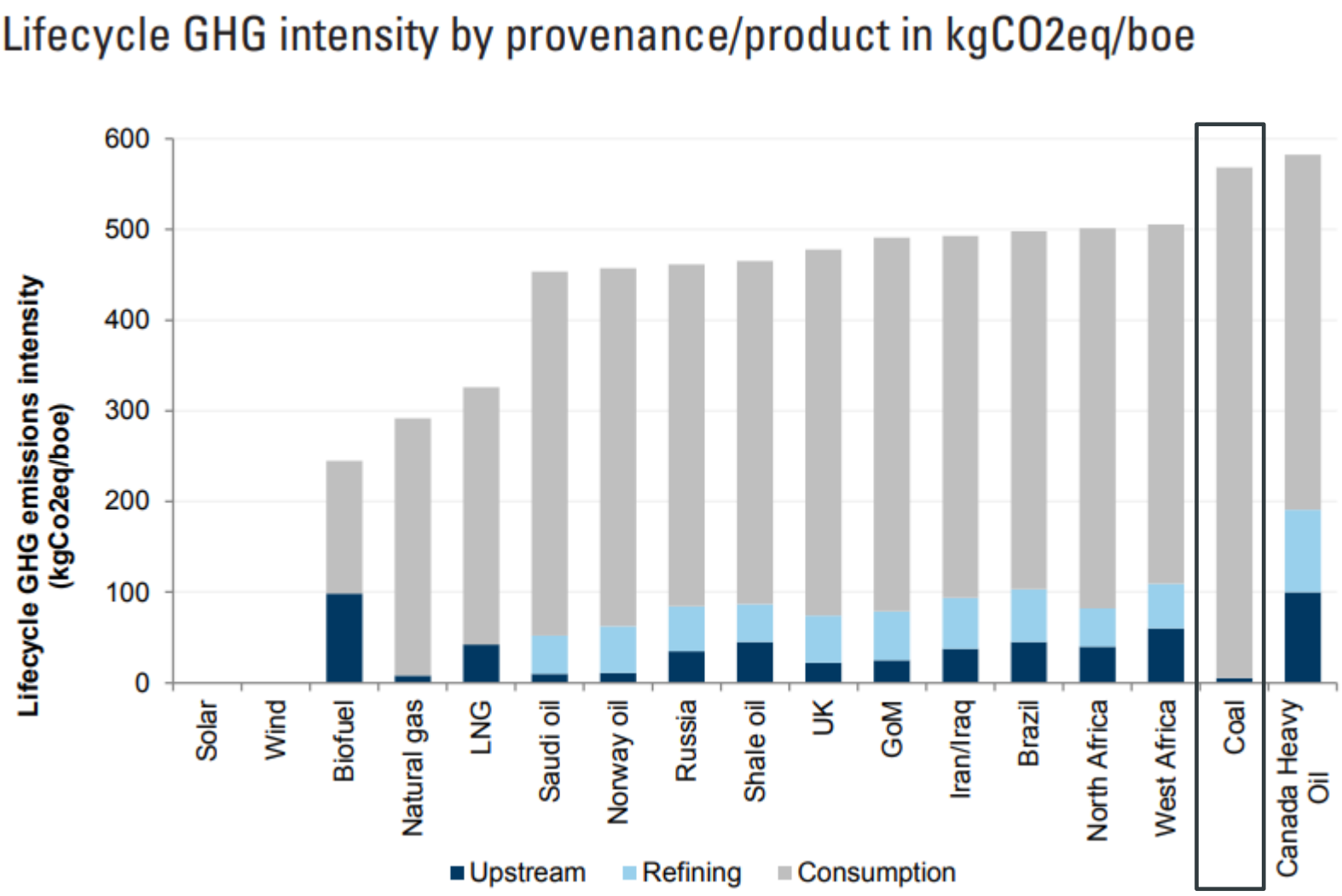
EMISSIONS

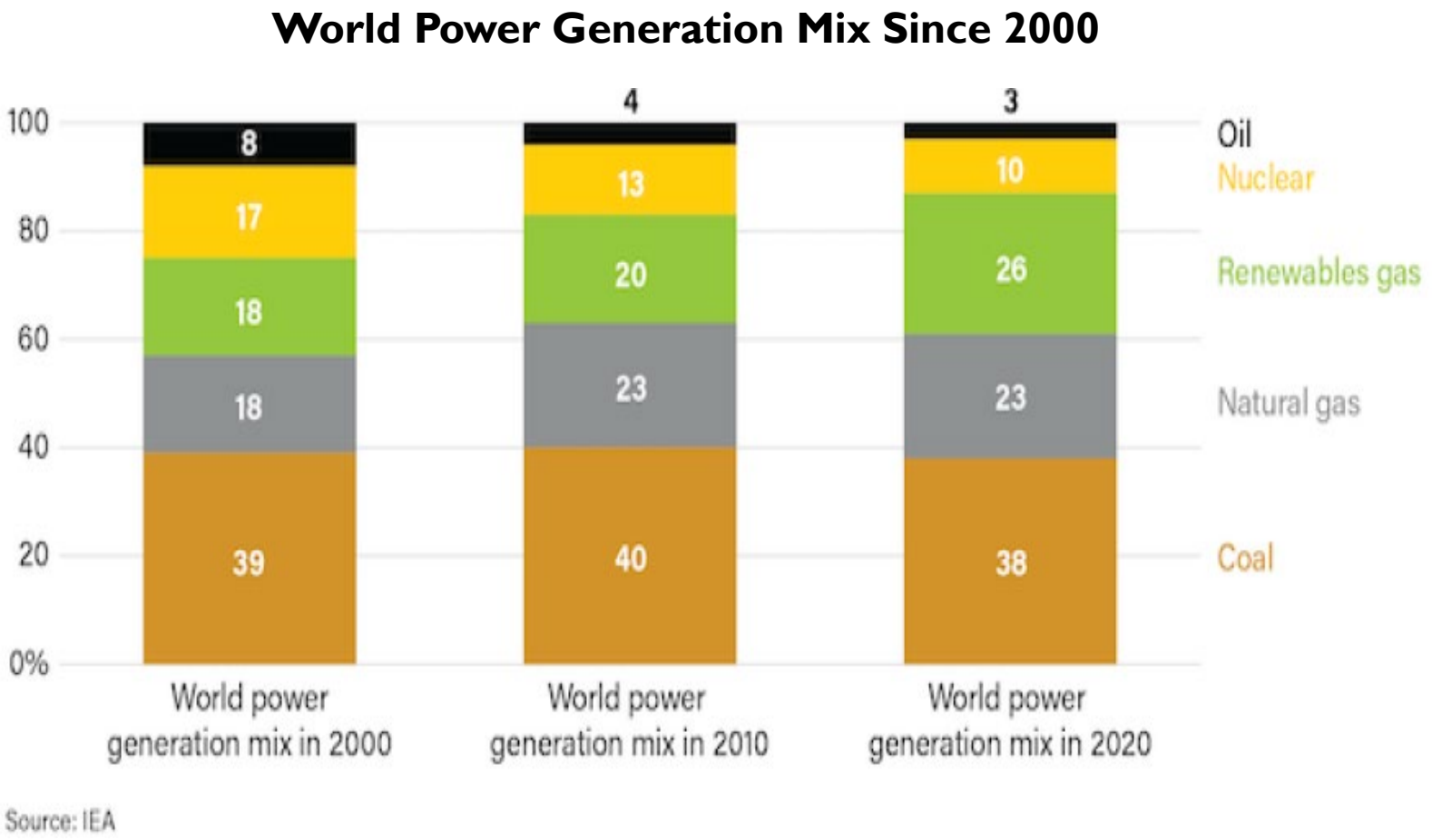
- Thermal Coal has a higher life-cycle Greenhouse Gas (GHG) intensity than other types of fossil fuels.
  - For Thermal Coal, Consumption of the fuel type is the largest GHG emitter, despite having relatively low Emissions from Upstream and Refining.
  - Due to its high GHG intensity, a reduction in Thermal Coal use is critical to achieving global climate goals.



Source: https://www.goldmansachs.com/insights/pages/reports/re-imagining-big-oils-f/re-imagining-big-oils-report-pdf.pdf

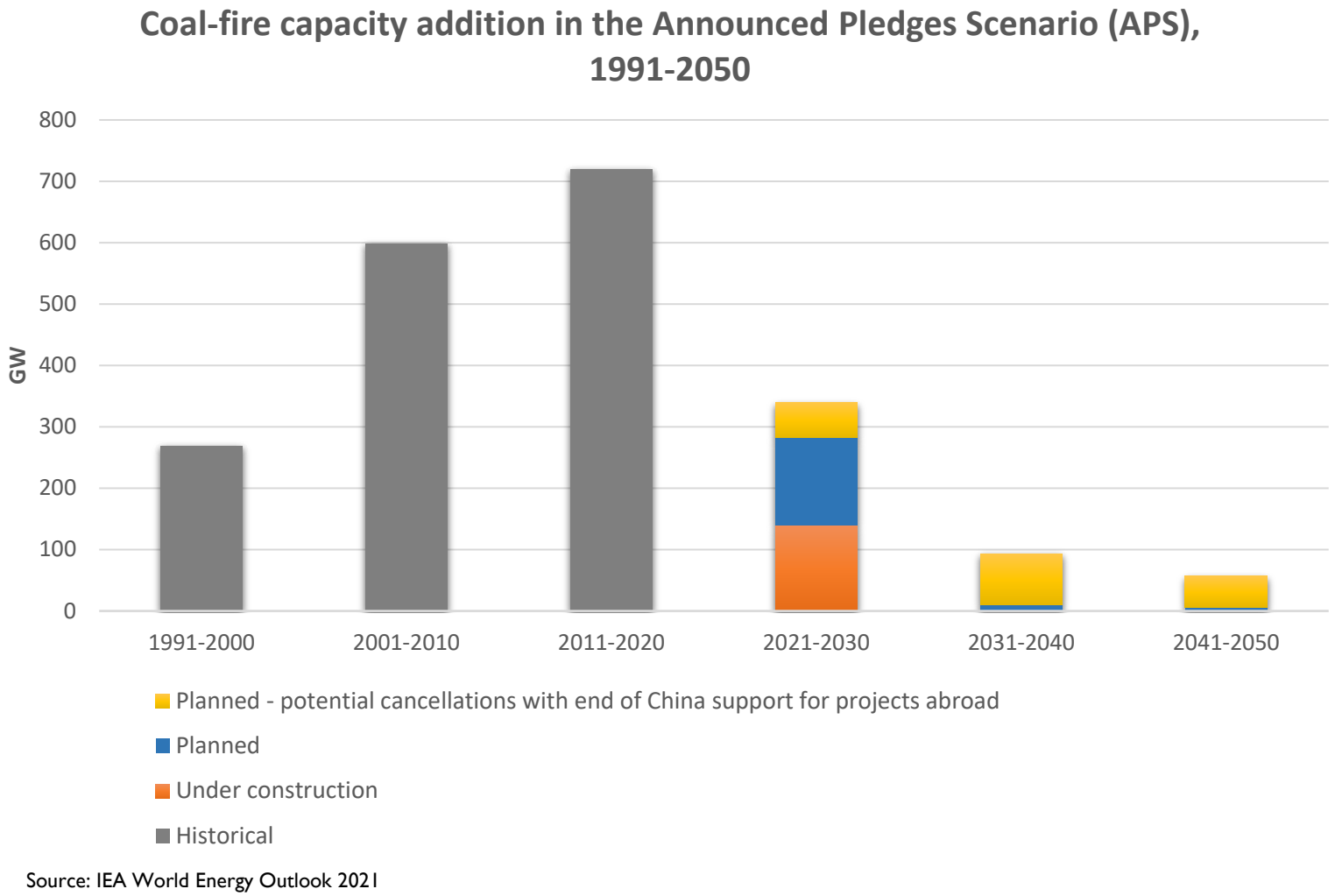
BACKGROUND

- Thermal Coal accounts for ≈38% of Global Power Generation as of 2020.
  - Despite many developed nations reducing their Thermal Coal usage, demand for Thermal Coal has remained fairly steady over the past decade.
  - Emerging Countries such as China and India have had increased power consumption, and still rely heavily on Thermal Coal.



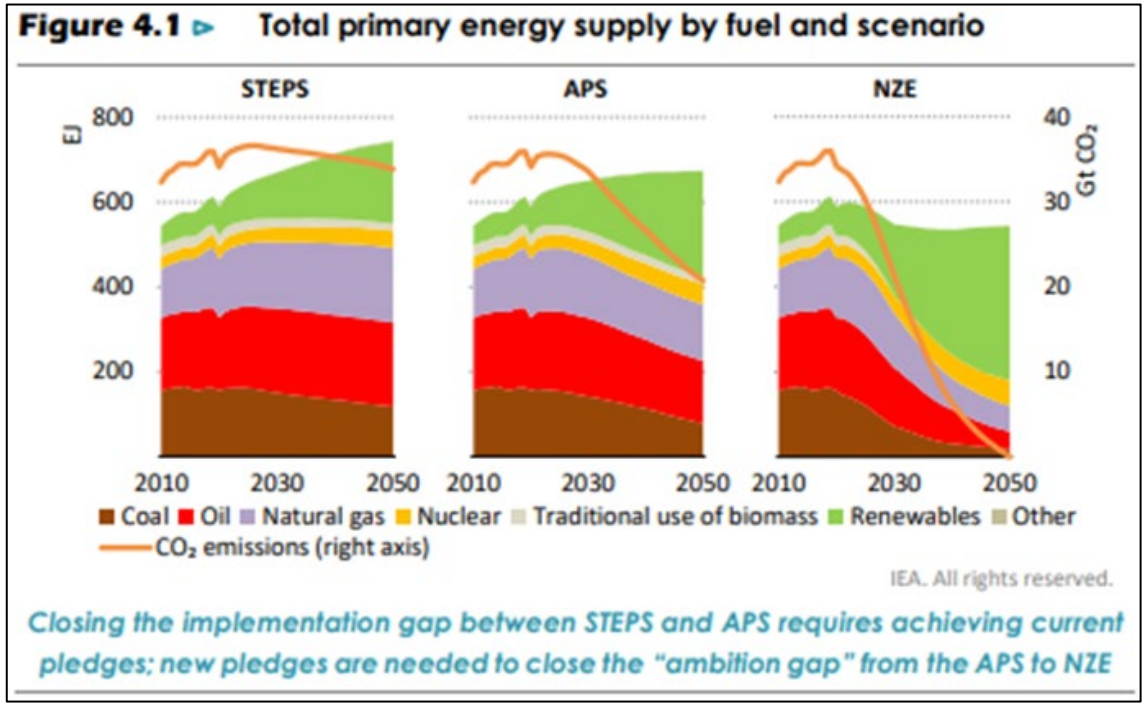
LONG-TERM CAPACITY REDUCTIONS

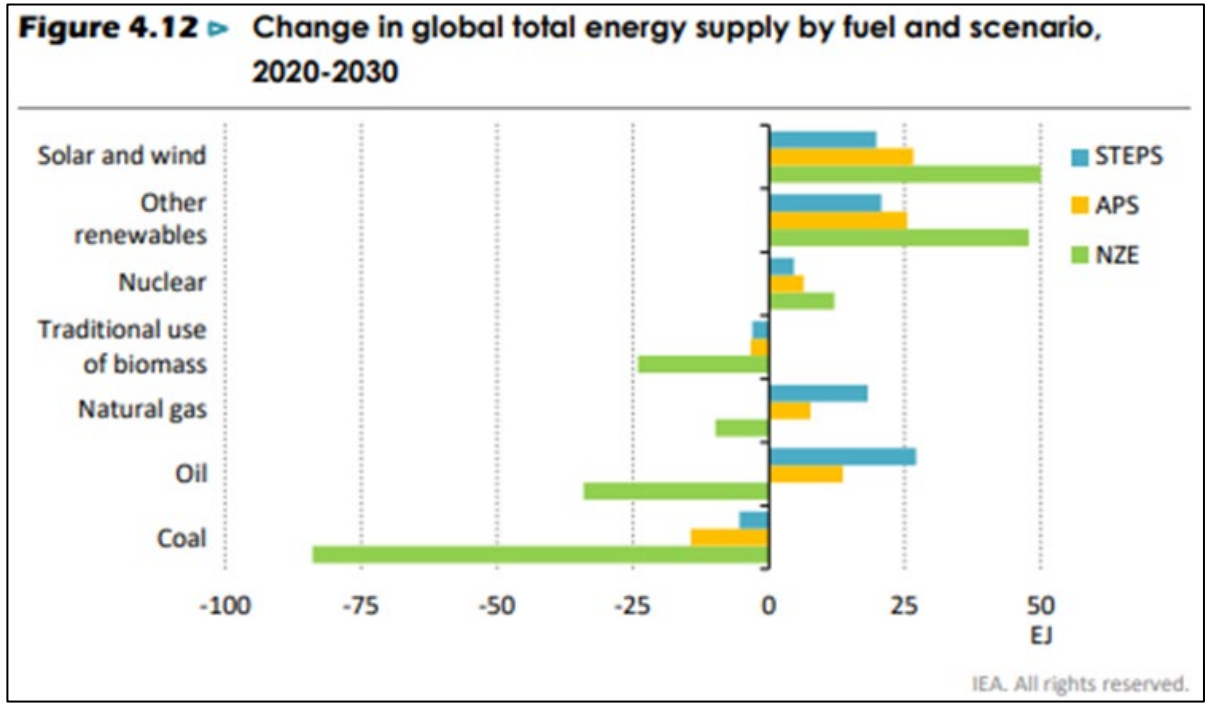
- Many lenders have withdrawn from financing the Coal Industry in response to public and investor pressures.
  - In June 2021, the G7 pledged to end direct government support for new Thermal Coal power generation by the end of 2021.
  - Under the APS, Global unabated coal use declines by 10% by 2030.
  - Under the Net Zero Emissions Scenario (NZE), Global unabated coal use declines by 55% by 2030, and stops completely by 2040.



Source: IEA World Energy Outlook 2021

RISK OF STRANDED ASSETS





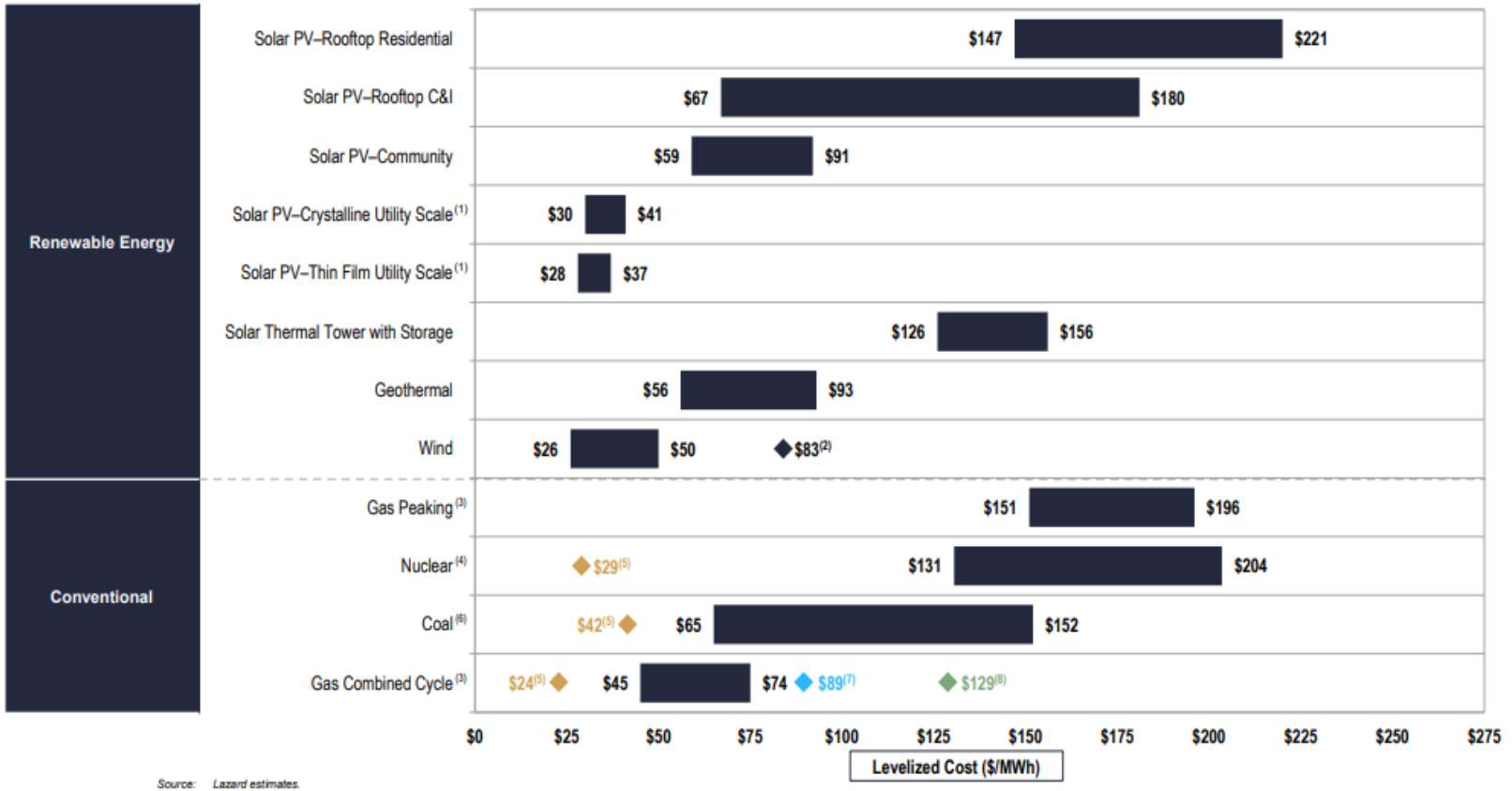
- In order to achieve the Net Zero Emissions (NZE) by 2050 scenario, there must be significant reductions to Thermal Coal use beyond what has already been Pledged in the Announced Pledges Scenario (APS).
  - There will have to be an unforeseen factor that reduces Thermal Coal use far beyond what is currently being expected, or else we risk not even coming close to achieving NZE by 2050.
  - The potential for an unforeseen rapid phase out of Coal risks creating stranded assets in the Coal Industry.

OUTLOOK

- Looking forward it appears likely that the supply of Thermal Coal will further deteriorate.
  - The cost of new supply for Alternative Energy sources has become comparable to new supply for Thermal Coal.
  - Lazard estimates the midpoint cost of a new Thermal Coal facility is ≈$108 per MWh, which is higher than the cost of Utility Scale Solar, and both on-shore and off-shore Wind.

Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances



Source: *Lazard estimates.*

Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at 8% interest rate and 40% equity at 12% cost. Please see page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities. These results are not intended to represent any particular geography. Please see page titled "Solar PV versus Gas Peaking and Wind versus CCGT—Global Markets" for regional sensitivities to selected technologies.

(1) Unless otherwise indicated herein, the low case represents a single-axis tracking system and the high case represents a fixed-tilt system.

(2) Represents the estimated implied midpoint of the LCOE of offshore wind, assuming a capital cost range of approximately $2,500 – $3,600/kW.

(3) The fuel cost assumption for Lazard's global, unsubsidized analysis for gas-fired generation resources is $3.45/MMBTU.

(4) Unless otherwise indicated, the analysis herein does not reflect decommissioning costs, ongoing maintenance-related capital expenditures or the potential economic impacts of federal loan guarantees or other subsidies.

(5) Represents the midpoint of the marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper- and lower-quartile estimates derived from Lazard's research. Please see page titled "Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation" for additional details.

(6) High end incorporates 90% carbon capture and storage. Does not include cost of transportation and storage.

(7) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Blue" hydrogen, (i.e., hydrogen produced from a steam-methane reformer, using natural gas as a feedstock, and sequestering the resulting CO_2 in a nearby saline aquifer). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $5.20/MMBTU, assuming ~$1.40/kg for Blue hydrogen.

(8) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Green" hydrogen, (i.e., hydrogen produced from an electrolyzer powered by a mix of wind and solar generation and stored in a nearby salt cavern). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $10.05/MMBTU, assuming ~$4.15/kg for Green hydrogen.

LAZARD

LONG-TERM PERFORMANCE

Coal & Consumable fuels Sub-industry Performance Contribution to Respective Benchmarks since 2001

	Annualized Return			Avg. Weight in Index	Cumulative Return		
	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021	Jul 2011 - Jul 2021	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021
MSCI ACWI Ex-USA	**5.81%**	**5.54%**	**5.53%**	100.00%	**80.92%**	**71.46%**	**202.73%**

	Annualized Return			Avg. Weight in Index	Contribution to Benchmark Cumulative Return		
GICS Sector & Industry:	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021	Jul 2011 - Jul 2021	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021
Energy Sector	10.62%	-1.89%	4.23%	7.50%	14.37%	-4.06%	19.69%
Coal & Consumable Fuels	**36.07%**	**-6.32%**	**13.67%**	**0.19%**	**0.31%**	**-0.51%**	**0.05%**

	Annualized Return			Avg. Weight in Index	Cumulative Return		
	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021	Jul 2011 - Jul 2021	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021
S&P Composite 1500	**2.36%**	**15.21%**	**8.39%**	100.00%	**28.02%**	**311.64%**	**424.63%**

	Annualized Return			Avg. Weight in Index	Contribution to Benchmark Cumulative Return		
GICS Sector & Industry:	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021	Jul 2011 - Jul 2021	Jan 2001 - Jul 2011	Jul 2011 - Jul 2021	Jan 2001 - Jul 2021
Energy Sector	10.87%	-1.60%	4.62%	6.99%	28.02%	0.08%	35.79%
Coal & Consumable Fuels	**15.68%**	**-40.89%**	**-19.46%**	**0.02%**	**0.08%**	**-0.51%**	**-0.19%**