Utility Metrics

Date: 21 July 2025

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Reframing the Sustainability Dialogue

- Recent political and business sentiment have shifted away from active support of sustainability efforts
- The need to spell out concrete business benefits of sustainable investments has never been greater given accumulating climate risk
- To resonate with Boards of Directors and investors, the benefits of managing climate change must be expressed in economic returns that are realized within tangible timelines

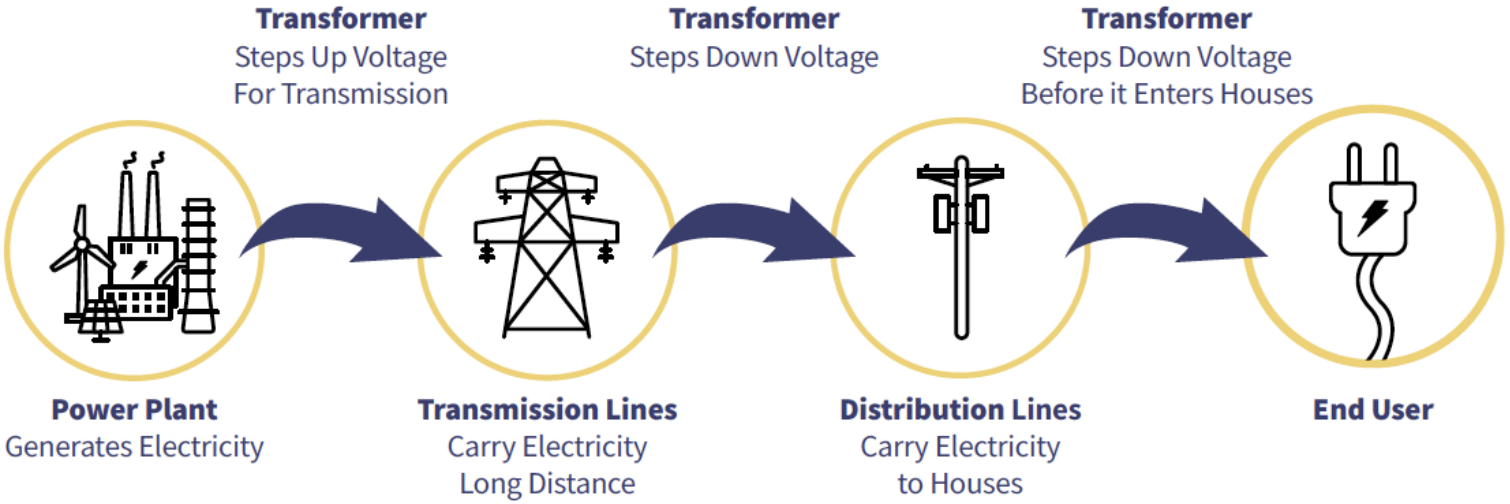
1. Utility Sector Attributes

- The Utility Sector is comprised of different types of providers
- Metrics that are meaningful vary by industry participant
- There is no single source of data for firm specific climate performance metrics

Electricity Supply and Delivery[1]

- 72% of Utilities are investor owned (168 entities) and tend to be large
  - The remainder are Cooperatives or Publicly owned (2,770 entities)[2]
- Utility industry players generate power, transmit power, and distribute power to end users
- Residential (39%), Commercial (35%), Industrial (26%), Transportation (1%))

Figure 2-3: Electricity Supply and Delivery

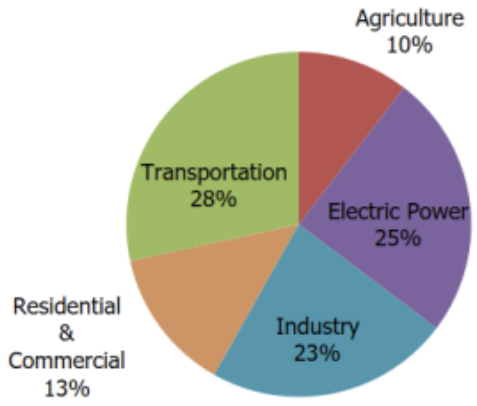


1. Energy Primer, 2024, Federal Energy Regulatory Commission
2. EIA, 2019, Annual Electric Power Report

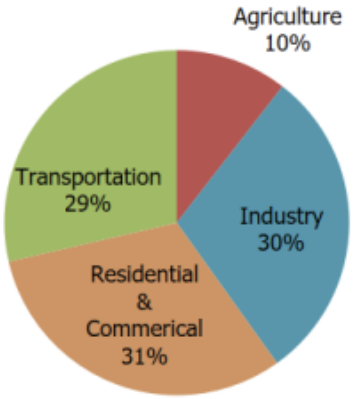
Power Generation Contribution to Emissions

25 % of US GhG emissions come from Utilities[3]

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2022



Total U.S. Greenhouse Gas Emissions by Economic Sector



Total U.S. Greenhouse Gas Emissions by Economic Sector Including Electricity End-Use Indirect Emissions

3. https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

Power Producer Energy Sources[4]

- Fossil fuels dominate share of energy sources for utilities
  - Nat Gas: 43%
  - Coal: 16%
  - Renewables: 21%
  - Nuclear: 19%

What is U.S. electricity generation by energy source?

In 2023, about 4,178 billion kilowatthours (kWh) (or about 4.18 trillion kWh) of electricity were generated at utility-scale electricity generation facilities in the United States.[1] About 60% of this electricity generation was from fossil fuels—coal, natural gas, petroleum, and other gases. About 19% was from nuclear energy, and about 21% was from renewable energy sources.

The U.S. Energy Information Administration estimates that an additional 73.62 billion kWh of electricity generation was from small-scale solar photovoltaic systems in 2023.[2]

U.S. utility-scale electricity generation by source, amount, and share of total in 2023

Energy source	Billion kWh	Share of total
Total - all sources	4,178	
Fossil fuels (total)	2,505	60.0%
Natural gas	1,802	43.1%
Coal	675	16.2%
Petroleum (total)	16	0.4%
Petroleum liquids	12	0.3%
Petroleum coke	5	0.1%
Other gases[3]	11	0.3%
Nuclear	775	18.6%
Renewables (total)	894	21.4%
Wind	425	10.2%
Hydropower	240	5.7%
Solar (total)	165	3.9%
Photovoltaic	162	3.9%
Solar thermal	3	0.1%
Biomass (total)	47	1.1%
Wood	31	0.8%
Landfill gas	8	0.2%
Municipal solid waste (biogenic)	6	0.1%
Other biomass waste	2	0.1%
Geothermal	16	0.4%
Pumped storage hydropower[4]	-6	-0.1%
Other sources[5]	10	0.2%

Data source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2024; preliminary data

[1] Utility-scale electricity generation is electricity generation from power plants with at least one megawatt (or 1,000 kilowatts) of total electricity generating capacity. Data are for net electricity generation.

[2] Small-scale solar photovoltaic (PV) systems are electricity generators with less than one megawatt (MW) of electricity generating capacity, which are not connected at a power plant that has a combined capacity of one MW or larger. Most small-scale PV systems are at or near the location where the electricity is consumed and many are net metered systems. Smaller PV systems are usually installed on building rooftops.

[3] Other gases includes blast furnace gas and other manufactured and waste gases derived from fossil fuels.

[4] Pumped storage hydroelectricity generation is negative because most pumped storage electricity generation facilities use more electricity than they produce on an annual basis. Most pumped storage systems use electricity from an electric power grid for pumping water to the storage component of the system.

4. EIA Report on Electricity Generation, 2024

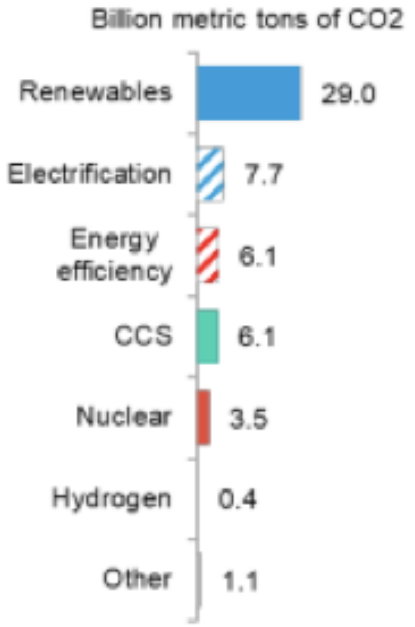
2. Energy Contributions to Emission Reduction

Energy Transition

- Investments in renewables have the largest impact on emissions, followed by energy efficiency projects[5]
  - Renewables investments will need to triple by 2030 to meet NZ50 targets
  - Nuclear energy will also play a role as a non-renewable energy source
  - But nuclear energy plant projects are subject to long timelines and cost over-runs, making them a less viable solution to meeting interim 2030 Net Zero goals

Mitigation

- Carbon Capture and Storage systems are material to mitigating emissions impacts



Source: BloombergNEF

Note: Reductions from fuel combustion by measure. CCS is carbon capture and storage.

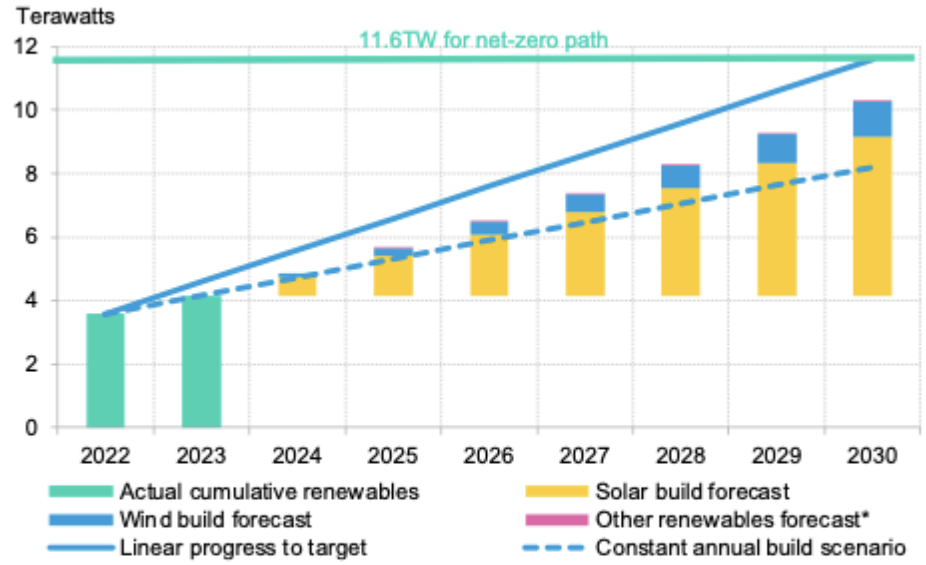
Bloomberg Foundation Net Zero Scenario requires $12.7 trillion of investment from 2024 to 2030 across renewables, battery storage, pumped hydro and power grids, including asset replacement, system reinforcement and new connections. This translates to annual investment nearly doubling relative to today's levels.

5. https://assets.bbhub.io/professional/sites/24/Unlocking-Investment-to-Triple-Renewables-by-2030.pdf

Pace of Renewables Growth

- At the current annual rate of investment, global installed renewables will reach 8.2TW by 2030, *well short of the 11.6T needed to achieve NZ by 2050*[6]
  - Highlights the need for measures beyond renewables to address global warming

Figure 6: Pathways to reach tripling-renewables target at constant compound annual growth rate, and forecasts



6. *Source: BloombergNEF. Note: 'Constant annual build' shows the result of annual additions holding constant at 2022-23 levels. The 11.6TW line shows the 2030 capacity under BNEF's Net Zero Scenario. BNEF's forecasts for wind and solar are based on detailed country-level analysis of project pipelines, asset financing, renewable energy demand, economics and enabling policies. The forecast for 'other renewables' is based on project pipelines only and is aligned with BNEF's Economic Transition Scenario.*

Headwinds & Tailwinds

Headwinds

- Accelerating growth in energy usage driven by AI, cryptocurrencies
- US focus on LNG as the solution to energy needs
- Increased energy rates and public backlash
- Withdrawal of Federal and State subsidy programs
  - $200MM budget cut to $80MM in NYS to subsidize renewable and efficiency by low income hhlds and small businesses
  - Slowed growth in Wind and EV markets

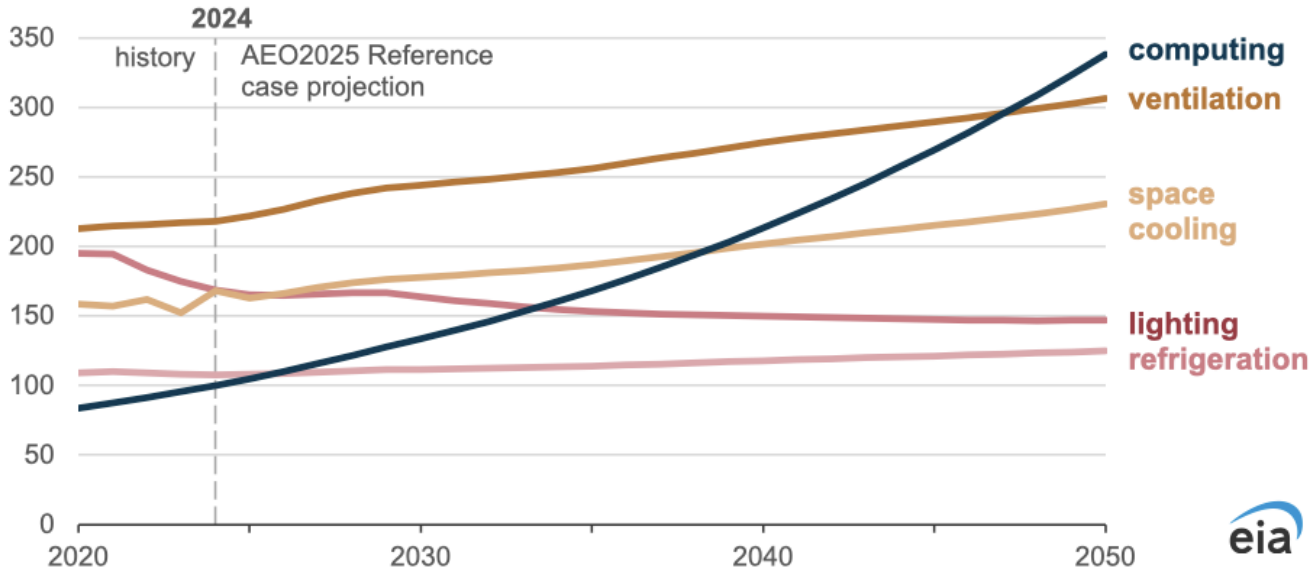
Tailwinds

- US Grid Planning has viable business case while supporting transition
  - May 2024 FERC Rule on Energy Transmission – reforms grid planning to enable clean energy projects to be integrated into the US electricity grid
  - Reduces relative costs of connecting renewables
  - Benefits go beyond renewables in preventing reducing risks of blackouts due to rising energy usage and extreme weather
- Multiyear projects entail looking past current political regime
  - Renewed investments in nuclear (Microsoft, Google, Amazon)
  - Advancements in battery technology
  - Continued growth in Solar

JUN 25, 2025

Electricity use for commercial computing could surpass space cooling, ventilation

Electricity consumption of selected end uses in the U.S. commercial sector (2020–2050)
billion kilowatthours



Data source: U.S. Energy Information Administration, *Annual Energy Outlook 2025* Reference case
Data values: Commercial Sector Key Indicators and Consumption

In our *Annual Energy Outlook 2025* (AEO2025) Reference case, we project the electricity consumed for commercial computing will increase faster than any other end use in buildings. Computing accounted for an estimated 8% of commercial sector electricity consumption in 2024 and grows to 20% by 2050. Ultimately, more electricity could be consumed by computing than for any other end use in the commercial sector, including lighting, space cooling, and ventilation.

https://www.eia.gov/todayinenergy/detail.php?id=65564

CLIMATE ACTION
DRIVERS OF BUSINESS IMPACTS

From the perspective of the Utility industry, a successful energy transition would meet the following business criteria:

- Power supply is adequate, reliable and stable on a consistent basis
- Price increases for the energy transition are contained, making energy affordable to the households and businesses
- Energy projects generate a return on investment within a reasonable timeline

	DRIVERS			
REVENUES	SCALABILITY	INNOVATION	COMPETITION	
COSTS	EFFICIENCY	AUTOMATION		
RISKS	REPUTATIONAL	LEGAL/COMPLIANCE	LOSSES	REGULATORY

Approach to Common Metrics

Define a structure for metrics that is universal to the Utilities sector

Structure should distinguish business goals that are Transition vs. Mitigation based

For Investor-Owned companies, leverage public information through SEC filings, Annual Reports

Key Advantage: Goals and their benefits are self reported by the companies themselves and expressed in their own business terminology

Develop a database of the universe of these companies that may be easily refreshed

Universe covers investment positions that may be traded in and out of the portfolio over time

Benchmark statistics may be calculated, placing the performance of a company against common metrics against its peers

Engage companies that are currently being invested in on the adequacy of their goals and progress towards meeting them

Sweet Spot in Utility Dialogue

Universal categories may be applied to the business goals of utilities companies with heterogenous characteristics. Allows for comparisons within & across companies over time

Universal Categories vs. Business Goals	Efficiency	Return on Investment	Power Supply (Reliability, Capacity, Energy Sourcing)	Energy Source (Renewables, Alternative Energy)	Affordability	Transition Risk (Regulatory, Reputational, Losses)
Number of Projects Planned vs Completed or on Schedule to be completed	x		x	x	x	x
Source Share of energy (fossil, alternative, renewable)			x	x		
Transition Investment vs. Total Budget	x	x	x	x	x	x
Mitigation Budget vs Total budget		x	x		x	x

Company Goals from 2024 Annual Report Mapped to universal categories

Case Study: Power Distributor

Category	Market	Description	Value	Target/Commentary
Power Supply	UK	Construction of 6 ASTI projects incl. HVDC subsea cables	£4 billion+	Enhancing UK grid transmission capacity
Power Supply	UK	Ofgem plan to nearly double transmission capacity		Supports UK net zero goals
Efficiency	UK	Transformative approach to electricity distribution		Align with UK's 2050 net zero target
Power Supply	UK	Enables more renewable capacity connections		Reduces cost of renewable integration
Power Supply	UK	Infrastructure to connect UK's largest EV battery plant		Expected to supply 50% of UK EV battery needs by 2030s
Efficiency	US	$2B investment in MA grid upgrade	$2 billion	Clean energy readiness
Power Supply	US	$4B program to upgrade grid capacity	$4 billion	Supports 4 GW of additional clean energy
Power Supply	US	Increases existing line capacity by 15-30%		Efficiency improvement in NY grid
Affordability	US	Provides real-time appliance-level energy insights		Supports customer energy savings
Affordability	US	Multilingual, energy affordability programs		Ensures equitable access to efficiency measures
Transition Risk	Global	Capital supporting sustainable practices	£7.7 billion	£51 billion planned (2024–2029)
Return on Investment	Global	Overall infrastructure investment	£9.85 billion	£60 billion planned (2024–2029)
Power Supply	Global	Availability and stability of energy network	99.90%	Maintain high reliability
Transition Risk	Global	Direct emissions from operations	7.4 $MtCO_2e$	Target: Net zero by 2050
Transition Risk	Global	Indirect emissions from supply chain	28.4 $MtCO_2e$	5.8% increase from 2018/19 due to increased capex
Affordability	Global	Fund to support vulnerable customers	£13.8 million	3-year initiative

Summary of Key Metrics (NGG)

CATEGORY	# Projects	Comments
Capacity & Reliability	9	1 Reliability
Efficiency	3	Reduce cost of renewables access to grid
Energy Source	2	Renewables, EV Charging
Affordability	3	Real time energy usage meters promote efficiency
Transition Risk	3	Emissions Reductions (Scopes 1, 2, 3)
ROI	1	General Infrastructure
Mitigation	0	Reflects Transmission Focus of NGG

Extensions

- Many companies have transition plan scenarios which may be assessed against business plans
- Given a collection of companies, performance metrics for a given company may be benchmarked against the average (e.g., total spend on transition vs. industry)
- Platforms for dashboarding and reporting metrics on a regular basis may be leveraged to keep stakeholders informed
- Threshold criteria may be established for buy/hold/sell may be established based on the performance metrics