



Annual Utility Decarbonization Report 2023

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The **Annual Utility Decarbonization Report is a deep dive into the state of decarbonization across the top 47 investor-owned utilities (IOUs) in the United States based on their electricity generation.**

The report utilizes a ranking system that focuses on six key metrics related to each utility's 2021* fuel mix, CO₂ emissions, decarbonization goals, and low-carbon investments.



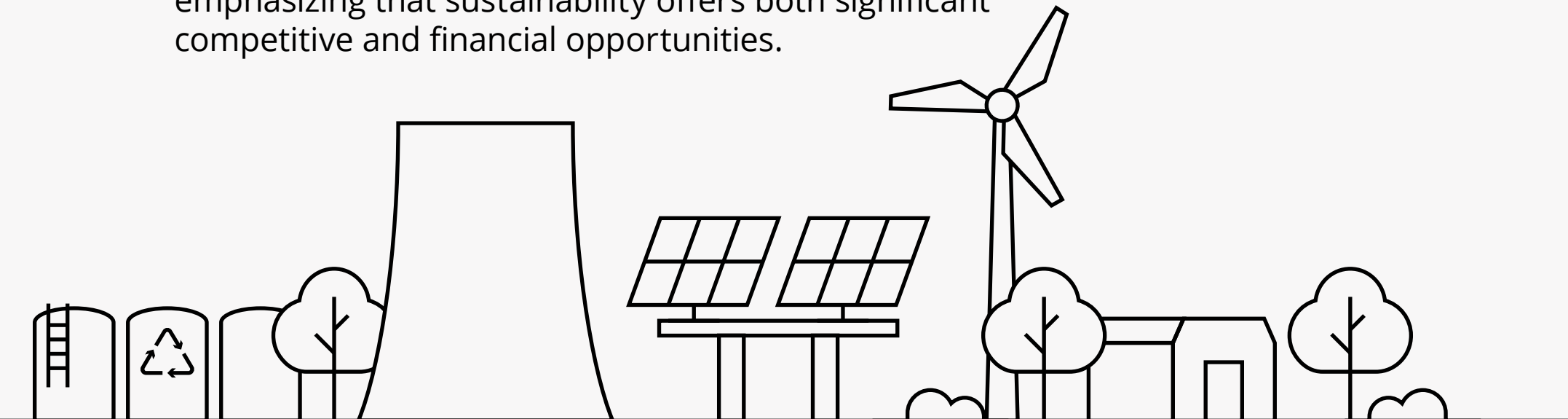
* Date of data collection: April 2023

CHANGE AND OPPORTUNITY

This year's report emphasizes **change and **opportunity** in the utility sector.**

It discusses the urgent need for change, industry progress since the release of the last report, and strategies for accelerated change in the race to net-zero.

Also highlighted are the advantages of decarbonization, emphasizing that sustainability offers both significant competitive and financial opportunities.



Electric power is a vital component for every facet of the economy.

This report aims to inform, support, and encourage the rapid decarbonization of the electricity sector using data-informed analysis.

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01

6 REASONS FOR DECARBONIZING UTILITIES

THE GROUNDS FOR CHANGE



Power generation is the second largest source of greenhouse gas (GHG) emissions in the U.S.¹ behind transportation.

Here are six reasons why utilities need to decarbonize and make the shift toward cleaner energy sources and operational practices.

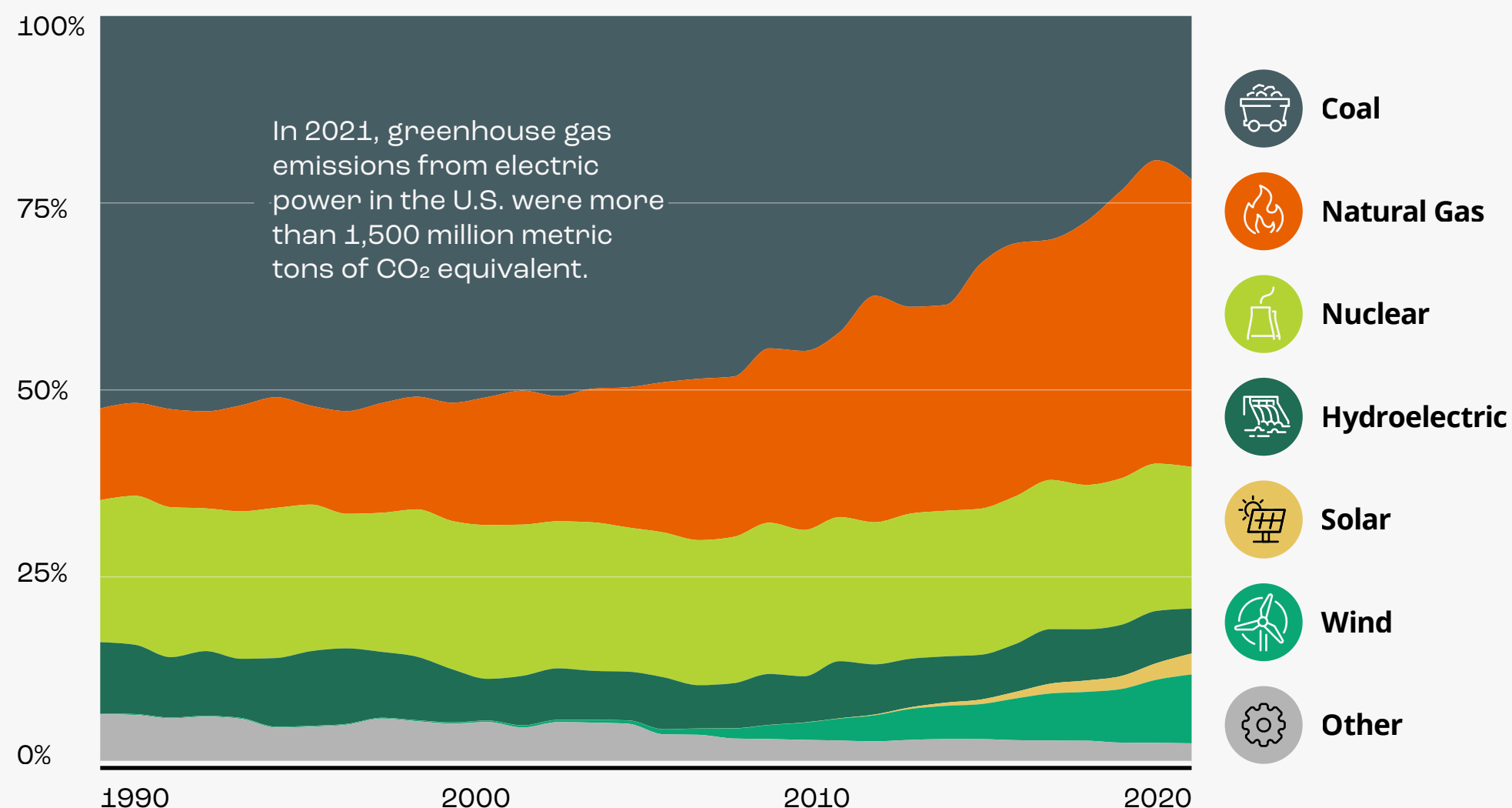
REASON 01

MOUNTING LEVELS OF CO₂

The 2023 IPCC* report² warns that human-caused climate change is already affecting global climate and weather extremes.

As CO₂ concentrations and global temperatures continue to rise, there is a more pressing need for immediate action toward decarbonization across all sectors. Specifically for utilities, shifting away from emission-intensive electricity sources is more important than ever before.

U.S. ELECTRICITY GENERATION BY SOURCE, 1990-2021



Source International Energy Agency³

*Intergovernmental Panel on Climate Change

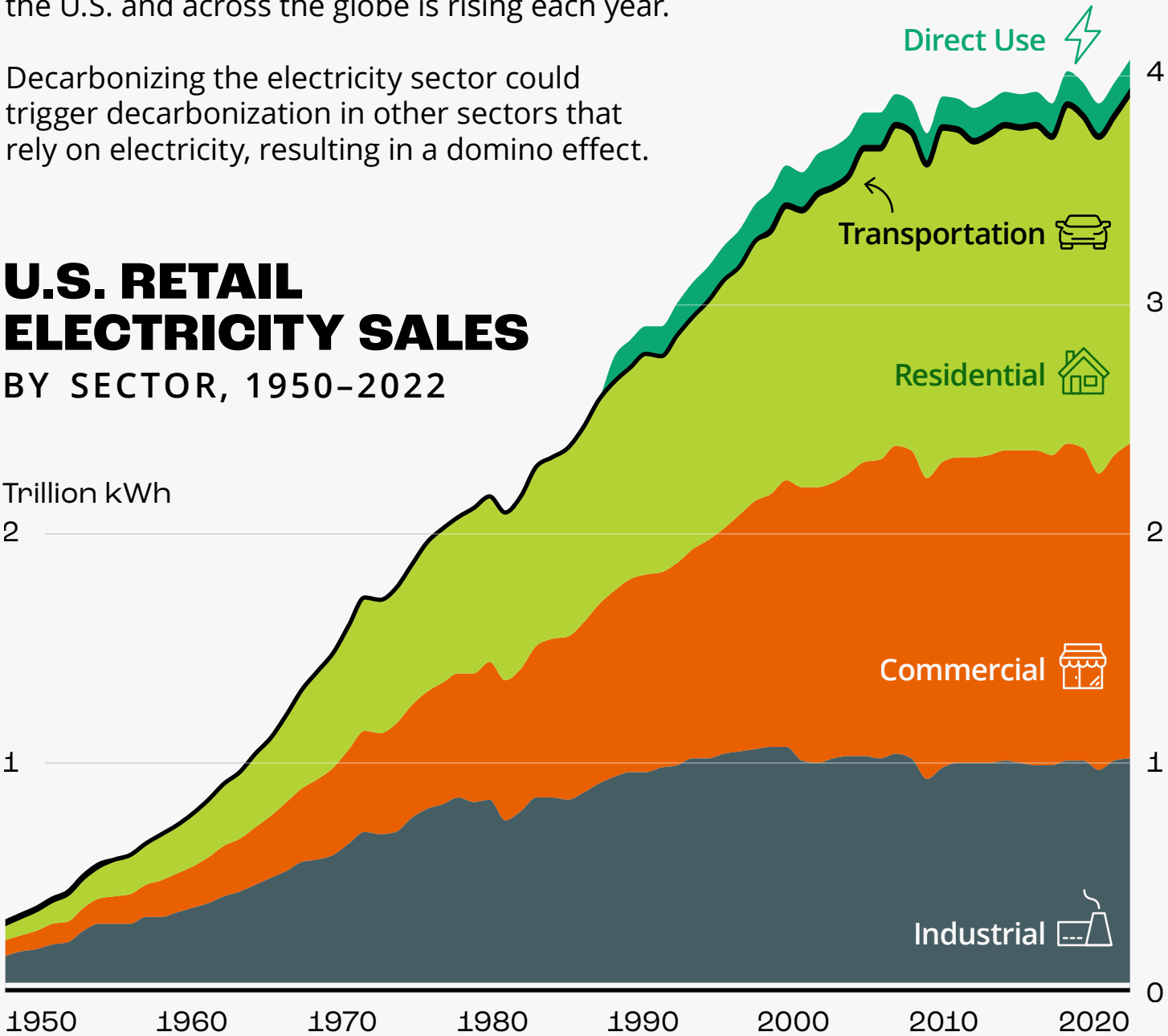
REASON 02

GROWING DEMAND

With population growth, electrification, and increased industrial activity—especially in the technology sector—electricity demand in the U.S. and across the globe is rising each year.

Decarbonizing the electricity sector could trigger decarbonization in other sectors that rely on electricity, resulting in a domino effect.

U.S. RETAIL ELECTRICITY SALES BY SECTOR, 1950–2022



Source U.S. EIA⁴
NPUC ANNUAL UTILITY DECARBONIZATION REPORT 2023

REASON 03

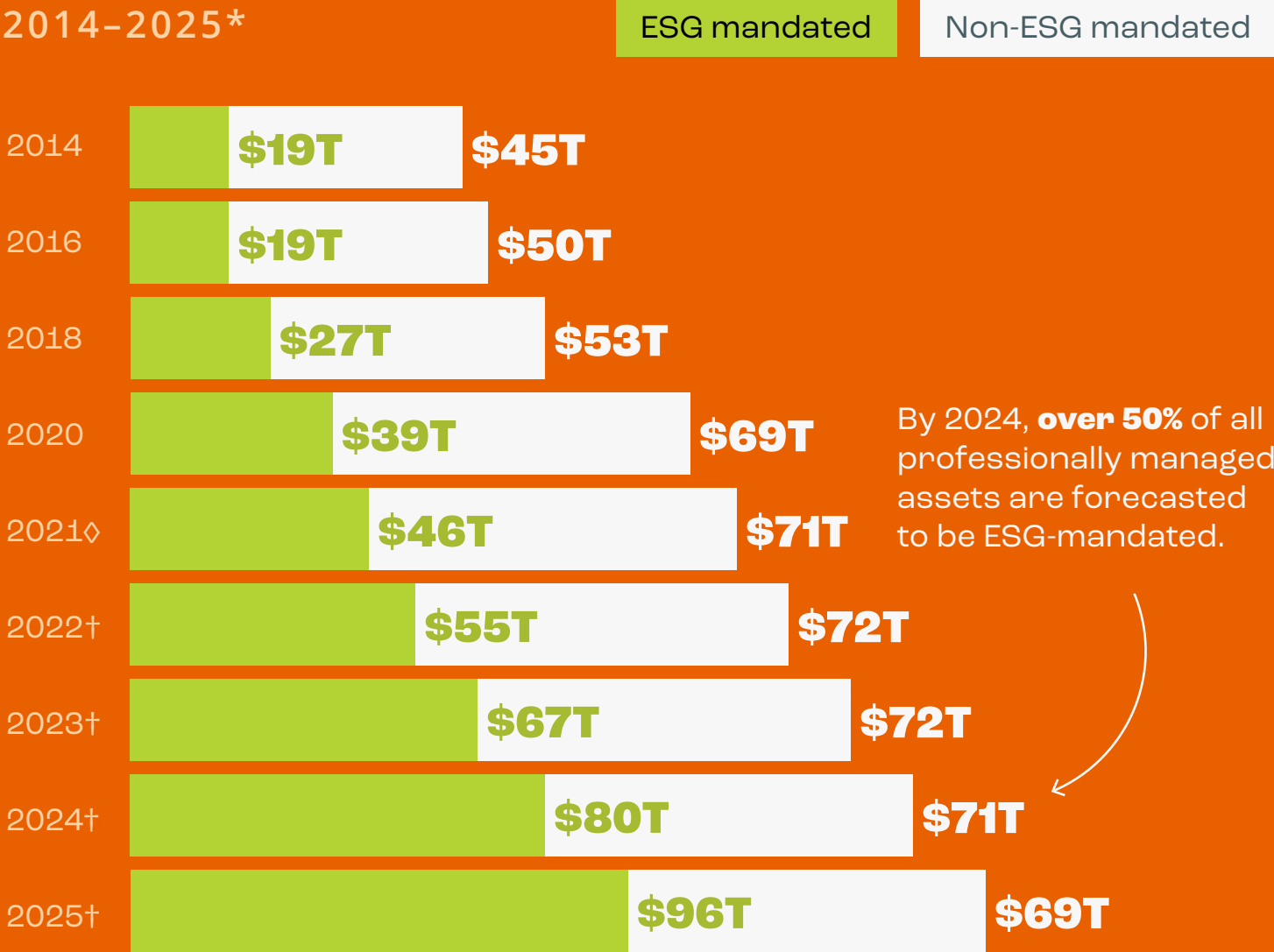
THE ESG ADVANTAGE

The adoption of sustainable practices is a competitive advantage for utilities.

It can attract climate-conscious investors, enhance brand reputation, boost investor confidence, and strengthen relationships with regulators.

GLOBAL PROFESSIONALLY MANAGED FINANCIAL ASSETS

2014–2025*



By 2024, **over 50%** of all professionally managed assets are forecasted to be ESG-mandated.

Source Deloitte⁵ *As of 2021 evaluation ◇ = Expected † = Forecast

REASON 04

MONETARY INCENTIVES

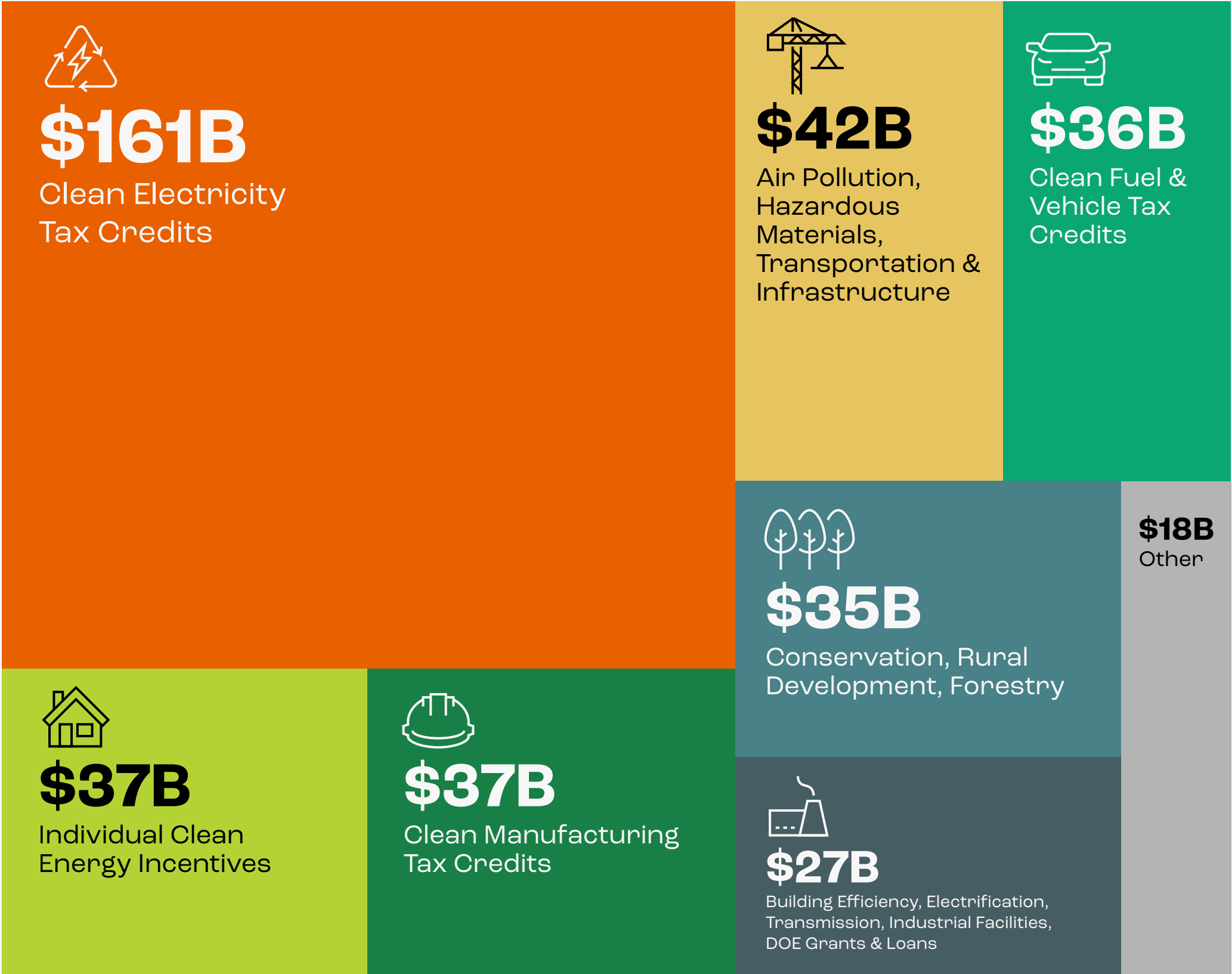
Utilities can reap significant monetary advantages from decarbonization.

Examples of such advantages include lower fuel costs, increased revenue streams (e.g., through the sale of renewable energy credits), reduced regulatory costs, and increased opportunities to obtain tax credits.

In turn, consumers also stand to benefit from lower costs or rebates as a result of more competitive pricing.

Source U.S. Congressional Budget Office⁶

CLEAN ENERGY AND CLIMATE FUNDING IN THE INFLATION REDUCTION ACT 2022-2031 ESTIMATED SPENDING, USD



REASON 05

ELECTRIFIED TRANSPORT

LIFE-CYCLE EMISSIONS OF A BATTERY ELECTRIC VEHICLE

tCO₂ EQUIVALENT

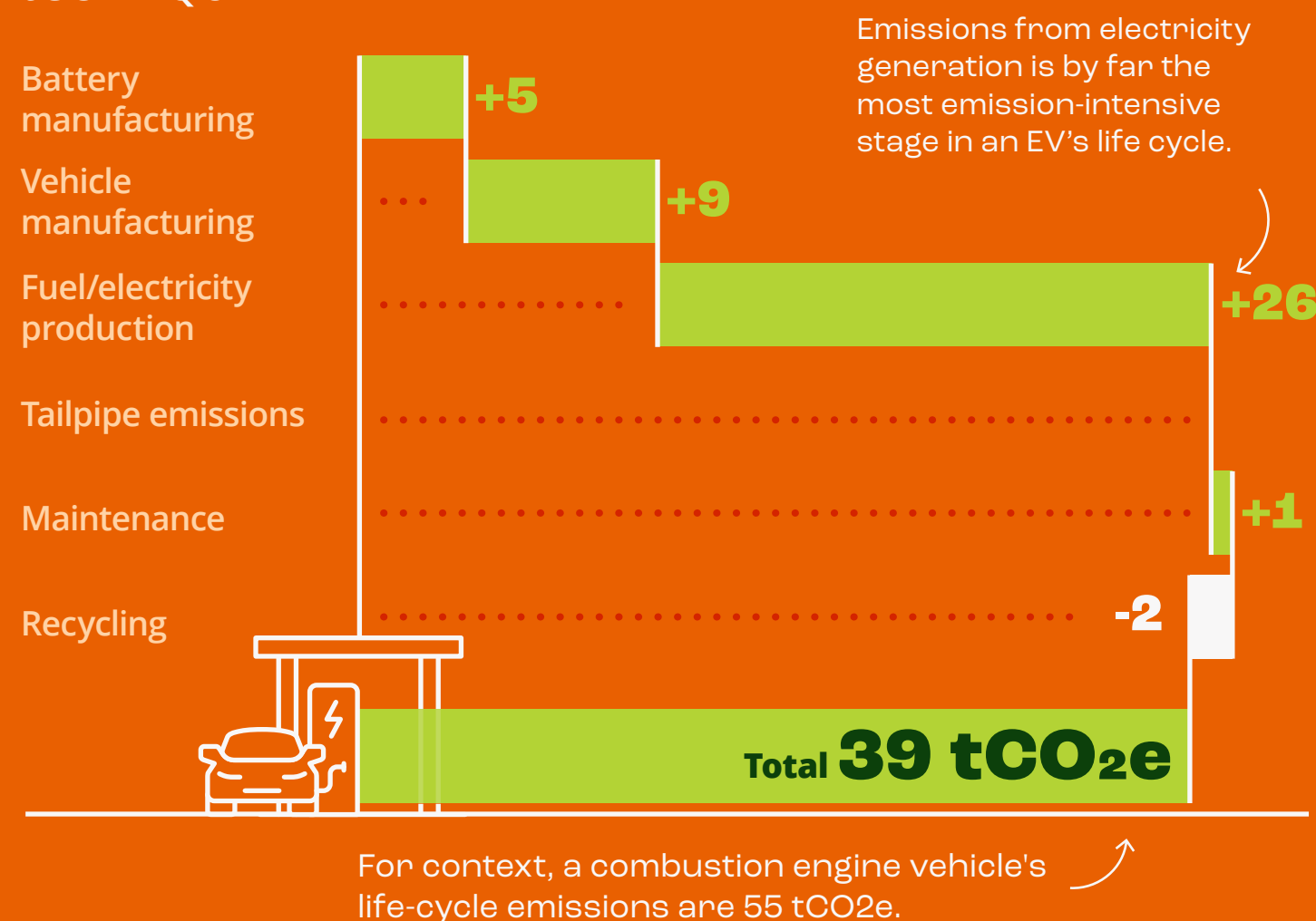


Chart displays life-cycle emissions for a medium-sized EV.

Source Polestar and Rivian Pathway Report, 2023⁷

As the transportation fleet electrifies across the world, the two sectors contributing the most to GHG emissions, electricity and transportation, are merging.

Decarbonizing electricity has the power to decarbonize the use phase emissions of all electric vehicles (EVs).

REASON 06

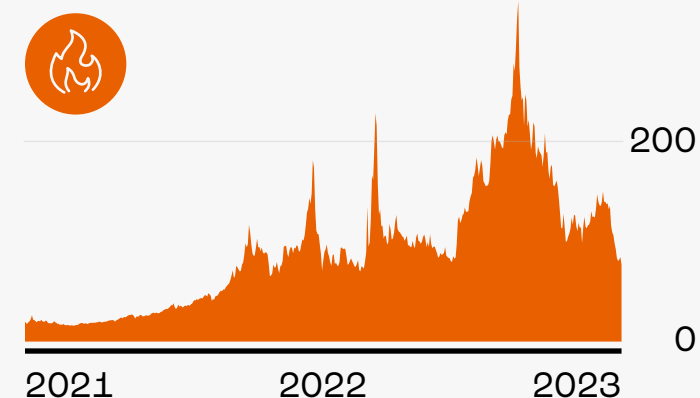
ENERGY SECURITY

As demonstrated by the Russia-Ukraine conflict in 2022, dependence on foreign oil and gas can trigger economic shockwaves.

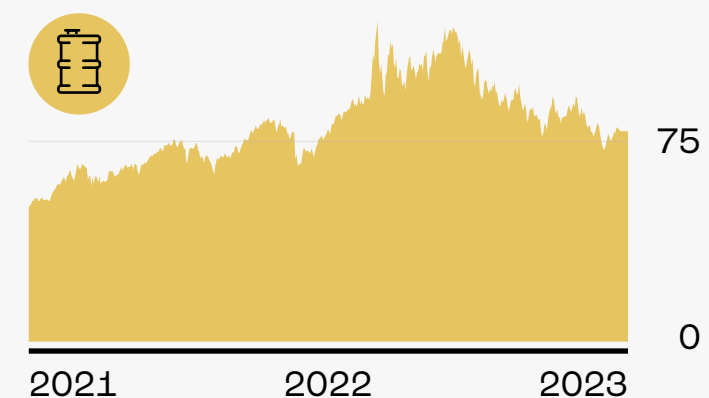
Embracing clean energy sources like wind, solar, and nuclear enhances energy security, reducing dependency on other nations and protecting against fossil fuel price volatility and supply disruptions.

FOSSIL FUEL PRICES 2021-2022

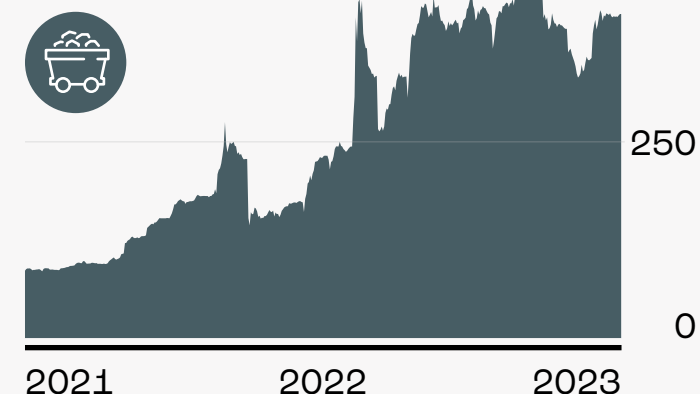
Natural Gas EU Dutch TTF
Euros/MWh 400



Crude Oil WTI
USD/barrel 150



Coal Newcastle
USD/tonne 500



Global fossil fuel prices experienced a surge in 2022, reaching some of the highest prices witnessed in the last decade.

Source Trading Economics⁸

LOOKING BACK AT 2021 - 2022

CHANGES TO CONSIDER

Highlights 07

Challenges 09

Changes in the Index 10



Here are some highlights and challenges that the utility sector faced in 2021 and 2022 within the U.S. and beyond, as well as some of the changes you can expect in this year's Decarbonization Index.

HIGHLIGHT

THE RISE OF NEW TECHNOLOGIES

There has been increased public and private focus on emerging energy technologies for decarbonization, such as:



**LONG-DURATION
ENERGY STORAGE** LDES



**SMALL MODULAR
REACTORS**



GREEN HYDROGEN

These technologies are critical to enable reliable renewable energy integration, enhance grid flexibility, and facilitate the transition to a clean energy future.

CASE STUDY



X



ENERGY VAULT

PG&E AND ENERGY VAULT'S LDES PROJECT

PG&E is partnering with Energy Vault to deploy a utility-scale battery plus green hydrogen LDES system.

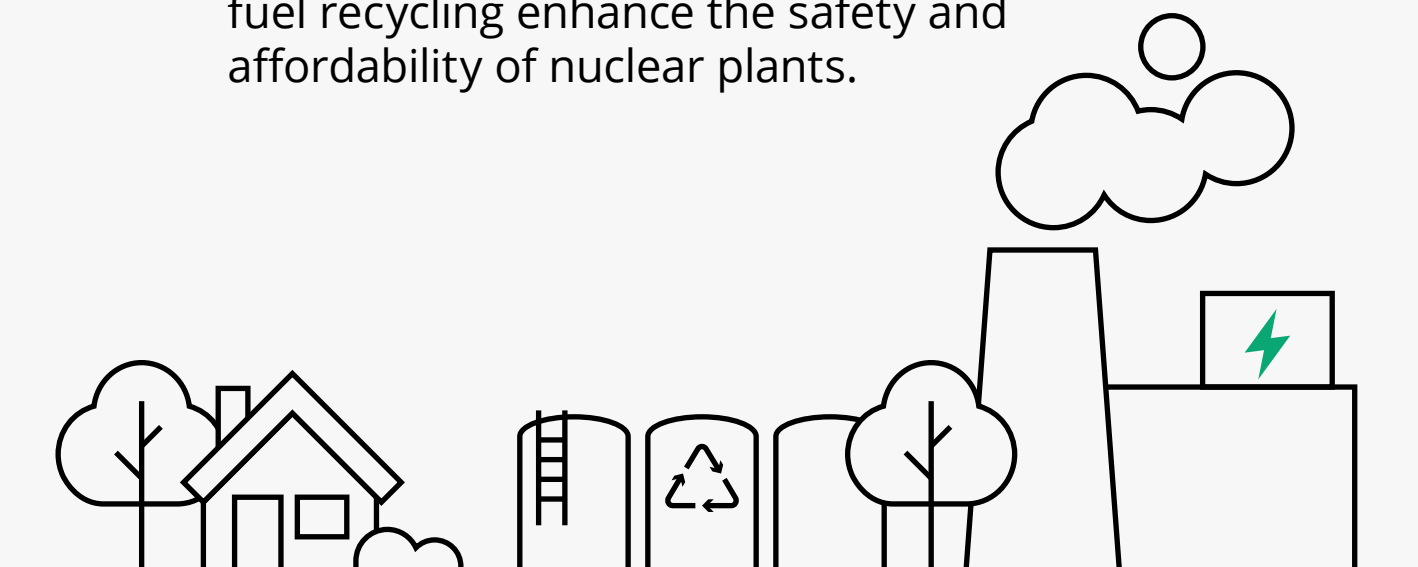
The system is designed to have a minimum of **293 MWh** of dispatchable energy to power the city of Calistoga for 48+ hours during shutoffs, replacing diesel generators.

HIGHLIGHT

NUCLEAR'S GLOBAL TURNAROUND

There is a resurgence of nuclear power across the world. Specifically because:

- 01 ENERGY SECURITY**
has become a priority post-energy crisis, and nuclear is a geopolitically secure energy source.
- 02 THE RACE TO NET-ZERO**
will be cheaper and more efficient with nuclear power complementing renewables.
- 03 TECHNOLOGICAL ADVANCEMENTS**
like small modular reactors and spent fuel recycling enhance the safety and affordability of nuclear plants.



HIGHLIGHT

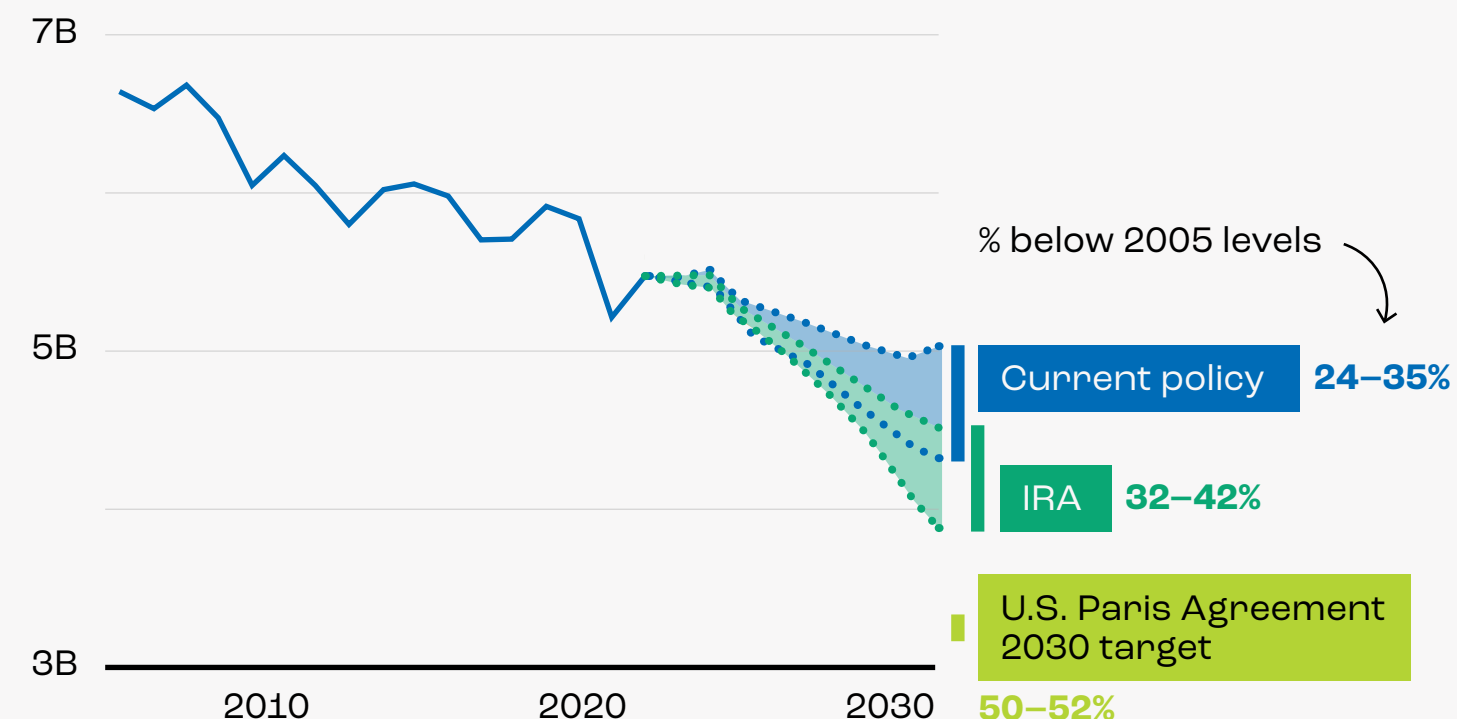
THE INFLATION REDUCTION ACT

In 2022, the Inflation Reduction Act (IRA) was signed into law.

With incentives for clean electricity production and investment, it is projected to drive down power sector emissions through 2030.

THE IRA'S PREDICTED IMPACT ON U.S. GHG EMISSIONS

Metric tons of CO₂e



Source Rhodium Group¹⁰

CHALLENGE

ALARMING CLIMATE DISASTERS

THE **COSTLIEST** EXTREME WEATHER DISASTERS OF 2022

USD

\$113B

Hurricane Ian
Cuba, U.S.
September

>\$12B

China floods
June-September

>\$20B

European drought
June-September

>\$8B

China drought
Year round

\$22B

Southwestern drought, U.S.
Year round

The impacts of climate change were felt across the world in 2022.

The increased frequency and intensity of extreme weather events related to climate change pose challenges for utilities, **necessitating resilient infrastructure and disaster preparedness measures.**

Sources UN Office for Disaster Risk Reduction,¹¹ NOAA¹²

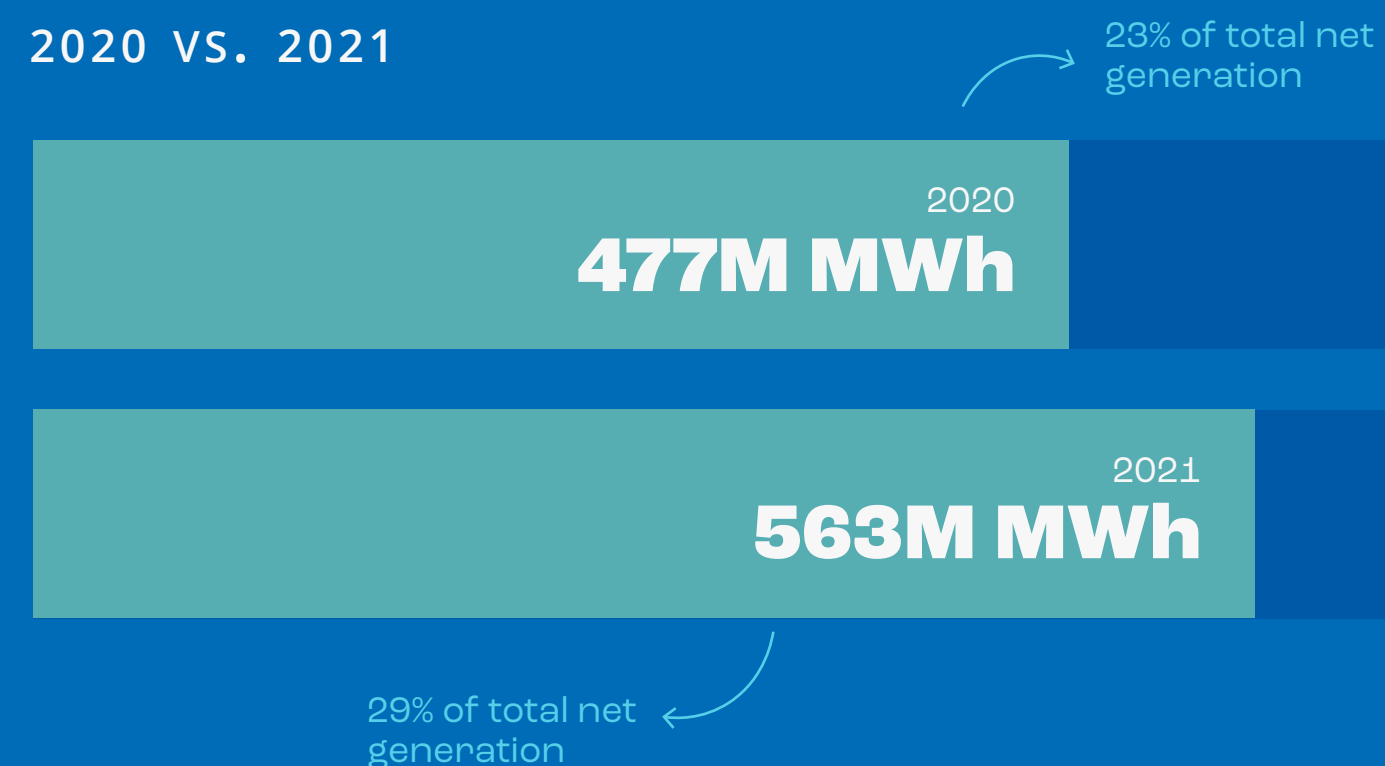
CHALLENGE

ENERGY CRISIS RESHAPES U.S. FUEL MIX

Due to rising natural gas costs after the pandemic, the power sector increased its use of coal in 2021, demonstrating the ability of market fluctuations to hinder progress toward cleaner energy sources.

COAL-FIRED NET ELECTRICITY GENERATION FROM THE TOP 30 U.S. IOUs*

2020 VS. 2021



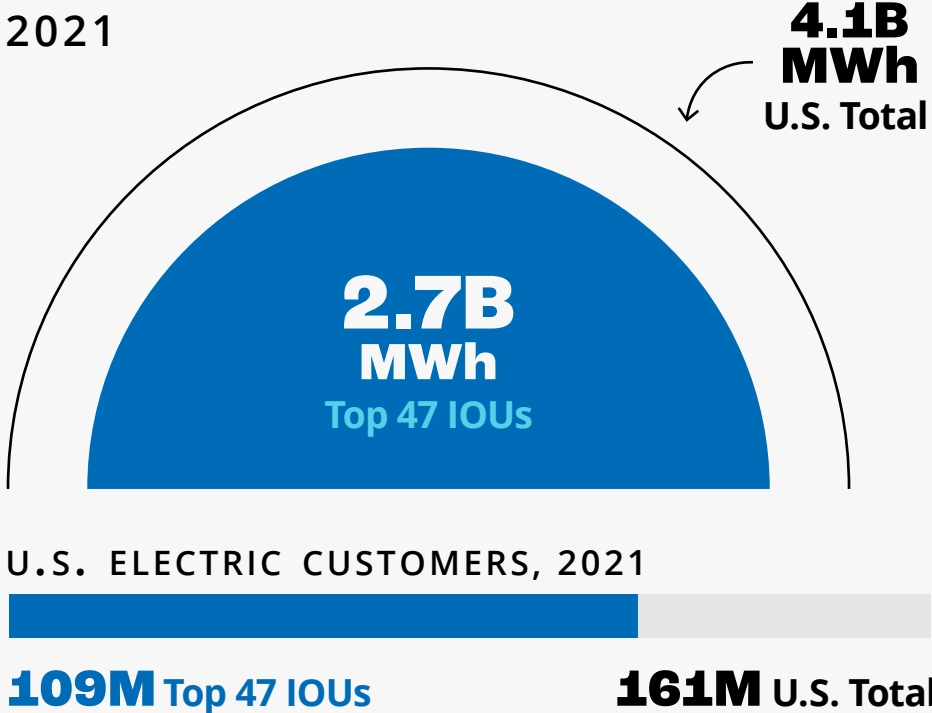
*Based on utilities included in this report.

CHANGES IN THE DECARBONIZATION INDEX

This year, we’ve expanded and upgraded the Decarbonization Report to include more utilities. Here are some of the changes you’ll see as a result.

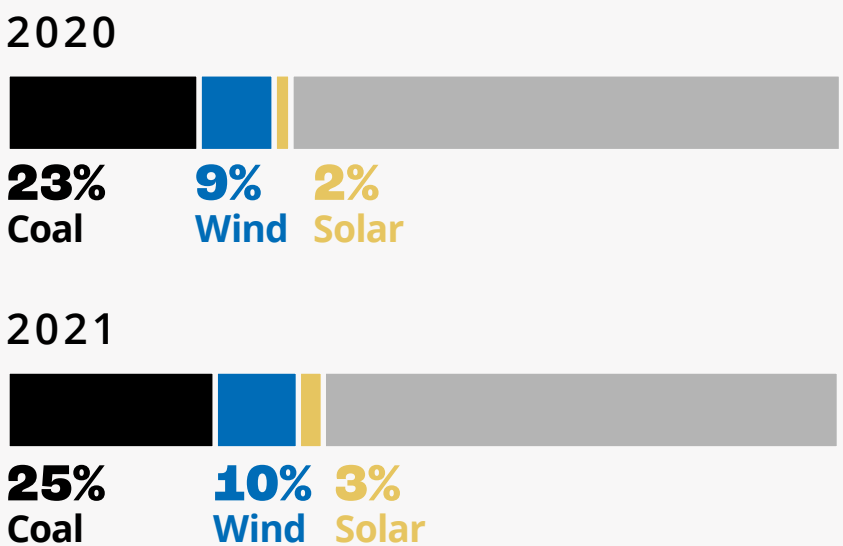
01 The top 47s U.S. IOUs are included in this year’s Decarbonization Index, compared to 30 last year. As such, the report has a wider scope and portrays a more accurate picture of decarbonization in the power sector.

U.S. NET ELECTRICITY GENERATION



02 This year, the share of coal, wind, and solar increased in the overall electricity mix of the IOUs included in the index.*

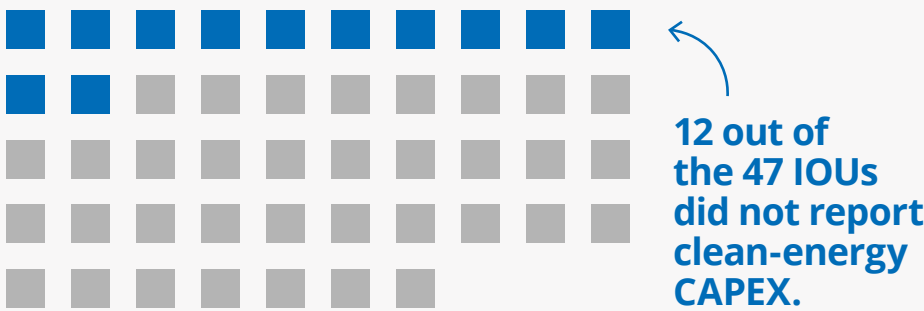
TOTAL ELECTRICITY GENERATION BY SOURCE



*The 47 IOUs included in the 2023 Index compared to the 30 IOUs in the 2022 Index.¹³

03 26% of IOUs did not report their capital expenditures (CAPEX) dedicated to low-carbon sources (metric 6), up from 13% last year.

CAPEX REPORTING



While fewer IOUs reported low-carbon expenditure compared to last year's report, it's important to note that the industry is witnessing other notable trends, such as investments in:

Smart Grids

Charging Networks

Battery Storage

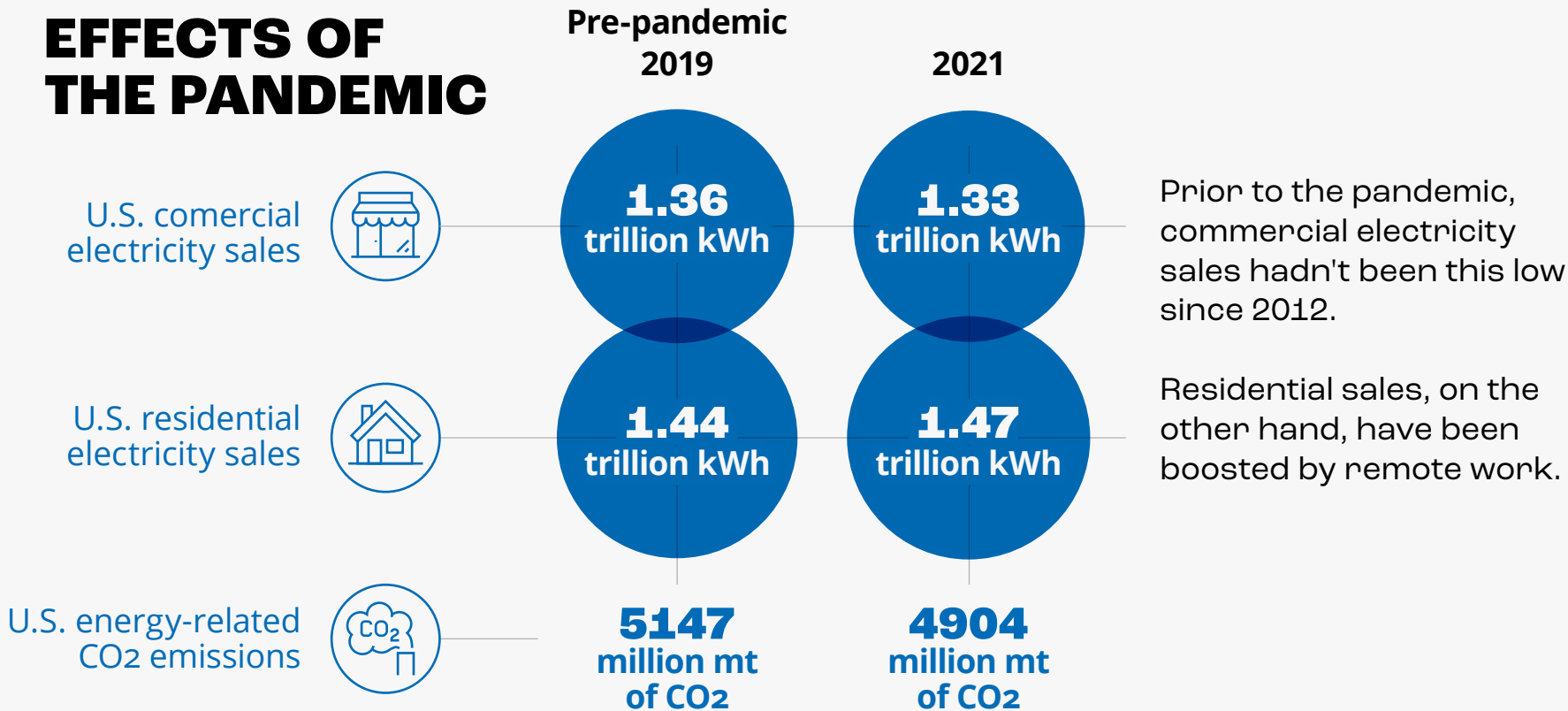
Energy Efficiency

CHANGES IN THE DECARBONIZATION INDEX

CONTINUED

04 The 2023 Decarbonization Index depicts 2021 data. As such, the effects of the COVID-19 pandemic are still in play in this year's rankings, albeit not as drastic as 2020.

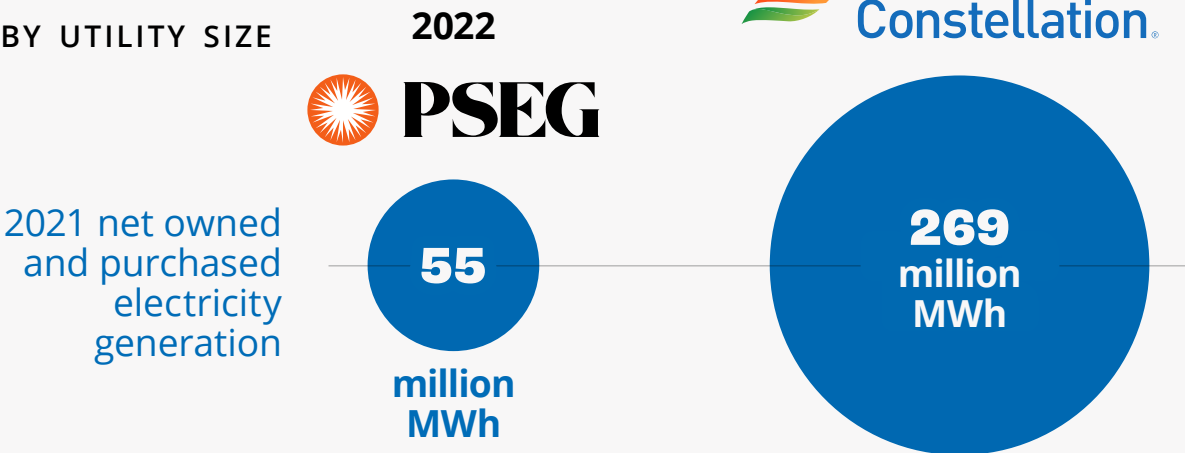
EFFECTS OF THE PANDEMIC



Source U.S. Energy Information Administration¹⁴

05 Mid-size IOUs dominated the top 4 positions in last year's index. This year, however, Constellation Energy (formerly Exelon and the largest IOU in the U.S. by total net generation), claimed the #1 spot thanks to its improvements in total CO2 emissions, decarbonization goals and low-carbon investment.

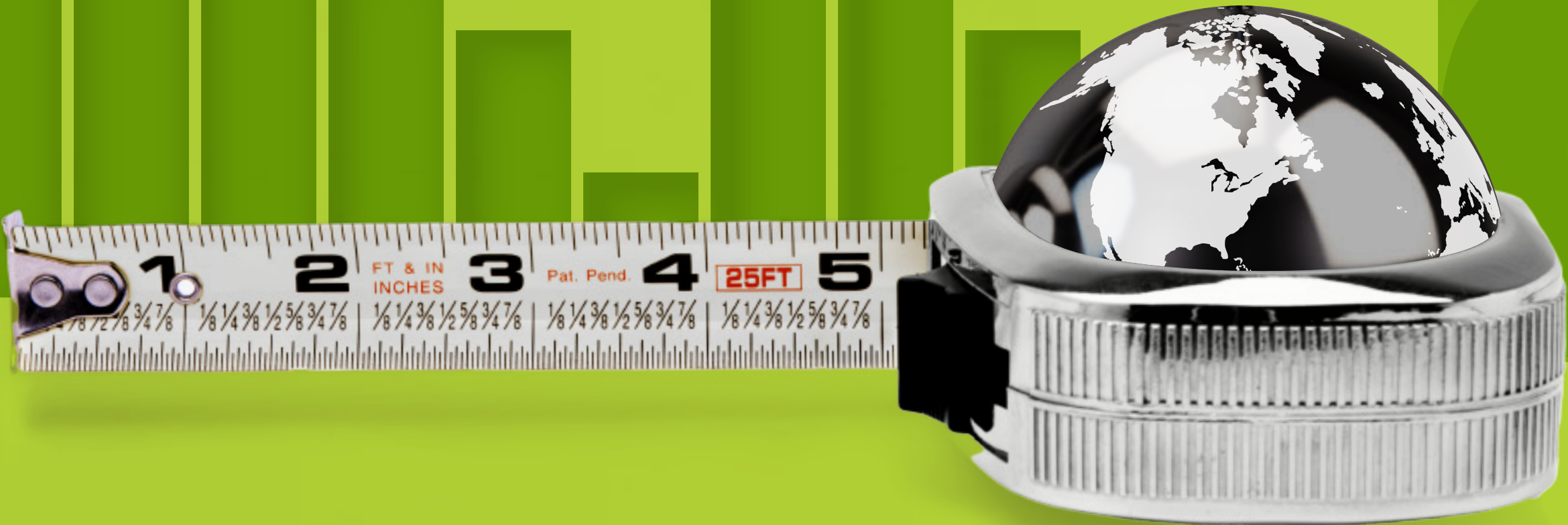
TOP RANKED UTILITY



The lowest rankings remain a blend of small, medium, and large IOUs in both years, underscoring that utility size, while significant, isn't the foremost hurdle in the decarbonization race.


THE 2023 U.S. UTILITIES DECARBONIZATION INDEX

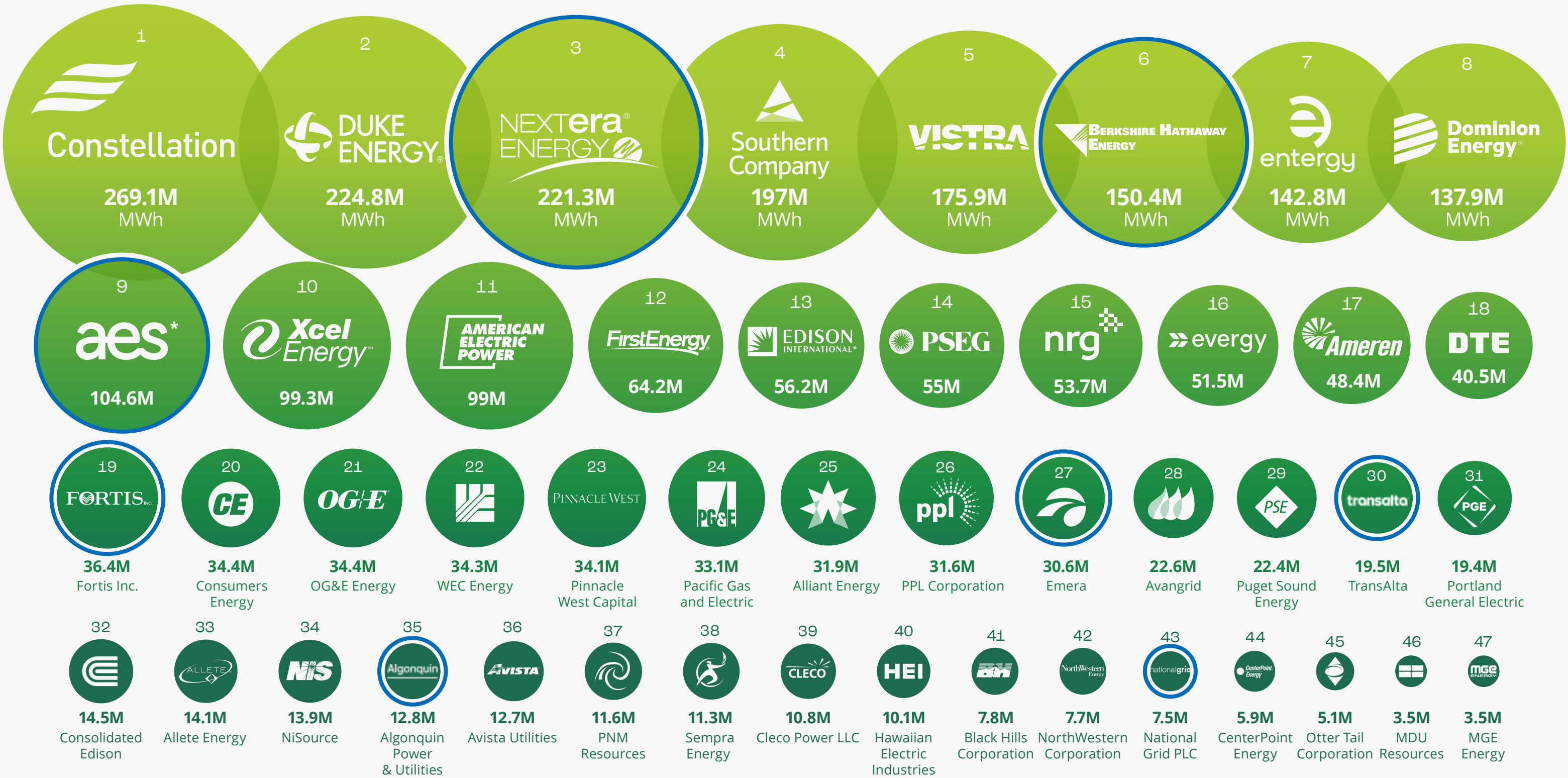
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INTRODUCING THE 47 LARGEST INVESTOR-OWNED UTILITIES

BY 2021 NET OWNED AND PURCHASED ELECTRICITY GENERATION, MWh

 IOUs with international operations (in addition to the U.S.)



*AES reports gross (not net) generation numbers.

METHODOLOGY

HOW THE UTILITY DECARBONIZATION INDEX IS SCORED







The 2023 Annual Utility Decarbonization Index uses the latest available data (2021) at the time of data collection (April 2023) to track the decarbonization progress of the 47 largest U.S. IOUs* using the following six metrics.

The first four metrics assess the fuel mix and CO₂ emissions of each utility as of their latest reports (2021).

Metrics 2-4 exclusively focus on CO₂ as this gas constitutes over 97% of emissions from the power sector.¹⁵

Conversely, the last two evaluate their future direction based on reported goals and capital investments supporting their transition.

* The sizes of IOUs were ranked based on total owned and purchased generation. Utilities with less than 2 million MWh of owned generation were excluded from the report.

01		FUEL MIX The share of low-carbon sources in the company's owned generation mix.	$\frac{\text{Owned net generation from low-carbon sources}}{\text{Total owned net generation}}$
02		CO₂ EMISSIONS INTENSITY The amount of CO ₂ emitted per megawatt-hour of electricity generated and purchased.	$\frac{\text{Total CO}_2 \text{ emissions from owned and purchased generation}}{\text{Total owned and purchased net generation}}$
03		TOTAL CO₂ EMISSIONS The absolute CO ₂ emissions from owned and purchased electricity generation of each company.	$\frac{\text{Sum of CO}_2 \text{ emissions from owned and purchased generation}}{\text{Total owned and purchased net generation}}$
04		CO₂ EMISSIONS PER CUSTOMER CO ₂ emissions from owned and purchased electricity generation per customer.	$\frac{\text{Total CO}_2 \text{ emissions from owned and purchased generation}}{\text{Total number of retail, commercial and industrial customers}}$
05		DECARBONIZATION GOALS An evaluation of the company's interim greenhouse gas reduction and net-zero targets.	$\frac{\text{Comparison of the company's climate goals against a baseline of 50\% GHG emissions reduction by 2030 and net-zero by 2050}}{\text{Total number of retail, commercial and industrial customers}}$
06		LOW-CARBON INVESTMENT The share of planned capital expenditure (CAPEX) for electricity generation dedicated to low-carbon sources.	$\frac{\text{Planned CAPEX for low-carbon generation}}{\text{Total planned CAPEX for generation}}$

THE 2023 UTILITY DECARBONIZATION INDEX

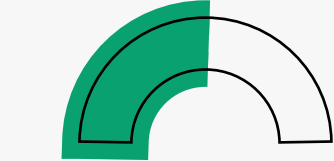
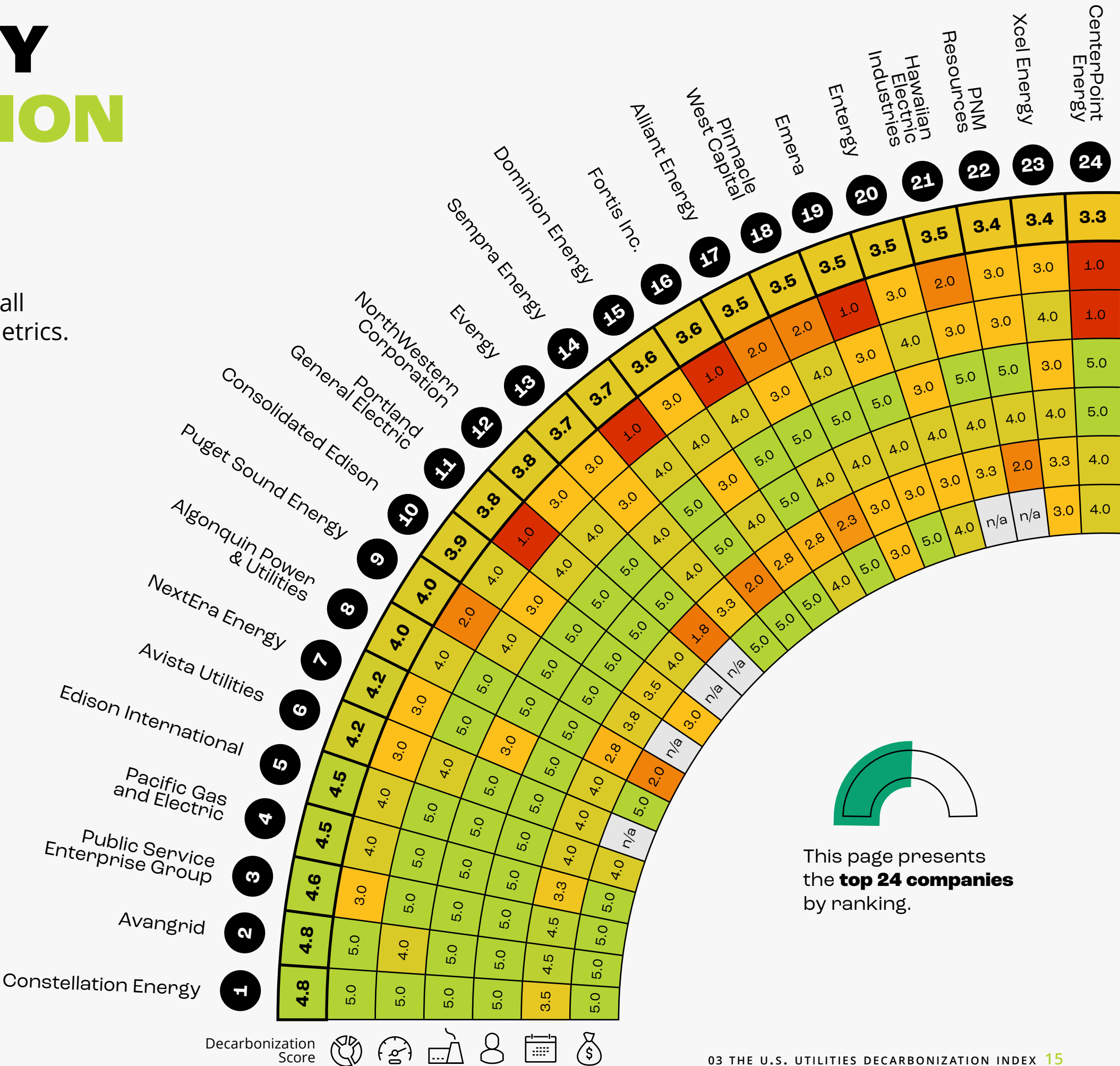
Companies are scored on a scale for each metric based on their 2021 reports, and their overall decarbonization score is an average of these six metrics.



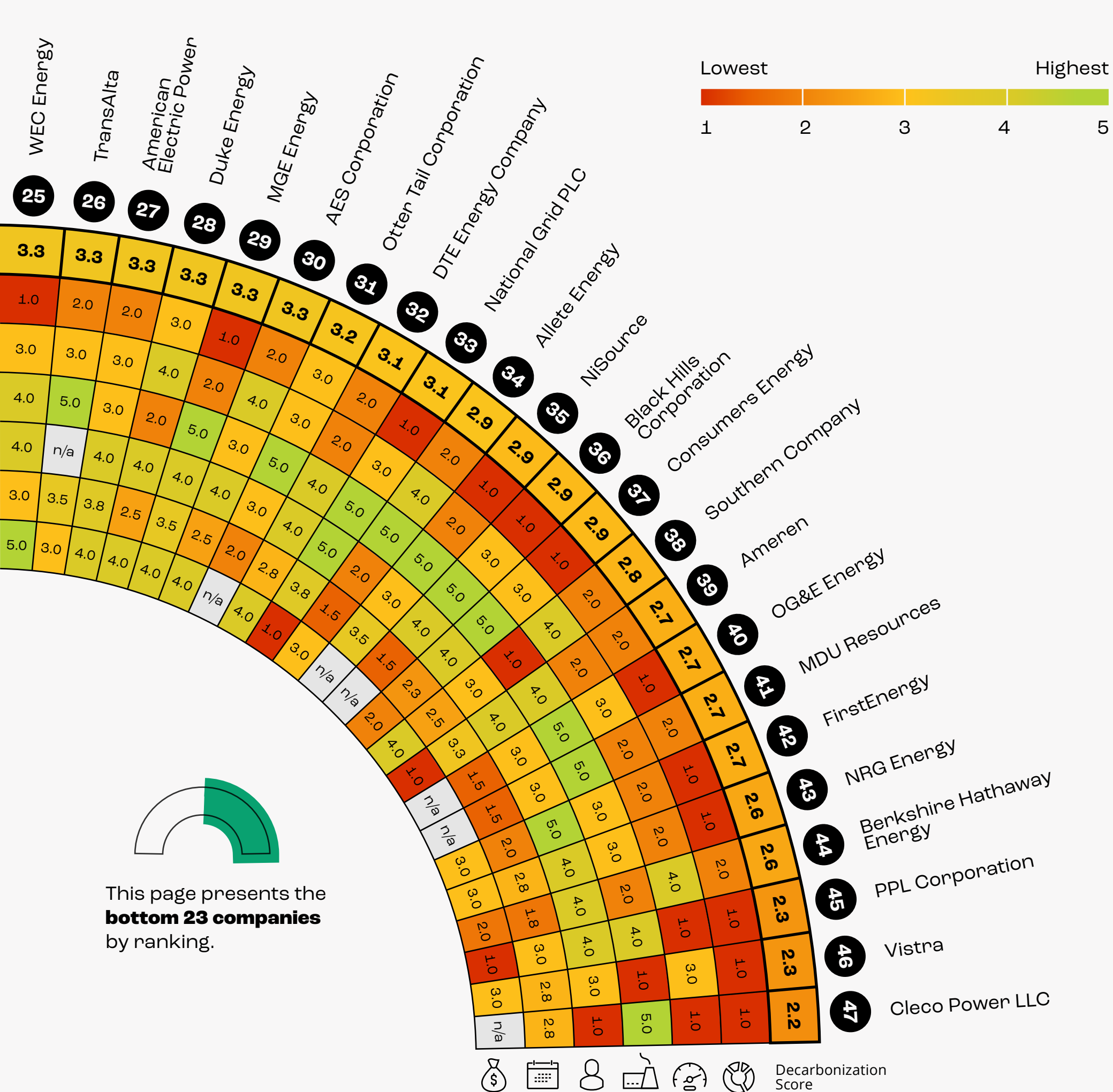
METRICS

- Fuel Mix
- CO2 Emissions Intensity
- Total CO2 Emissions
- CO2 Emissions Per Customer
- Decarbonization Goals
- Low-carbon Investment

Index includes parent companies only. Companies that haven't reported data for a metric have been denoted with n/a and have been excluded from scoring for the metric.



This page presents the **top 24 companies** by ranking.



This page presents the **bottom 23 companies** by ranking.

METRICS

- Fuel Mix
- CO2 Emissions Intensity
- Total CO2 Emissions
- CO2 Emissions Per Customer
- Decarbonization Goals
- Low-carbon Investment

The considered metrics are not all-inclusive in terms of companies' net-zero progress. Rather, they offer trackable insights and highlight general trends in the U.S. IOU landscape.

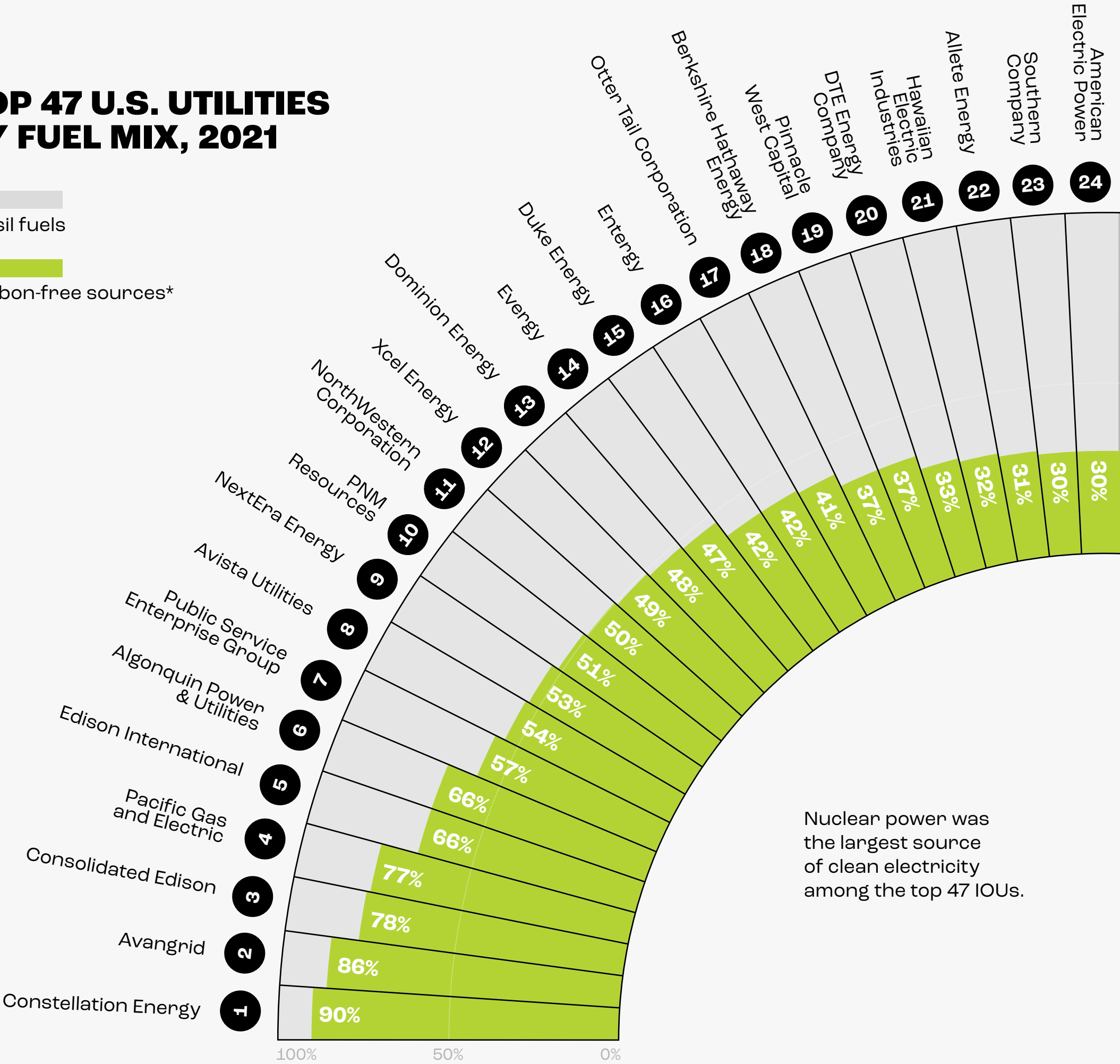
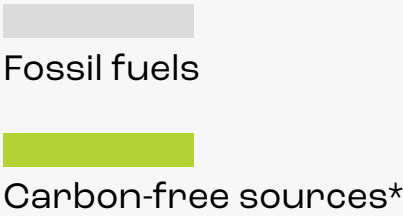
Using this comparative analysis, we simply highlight what is possible when serious time and resources are allotted to decarbonization.

METRIC 01

FUEL MIX

This metric measures the share of low-carbon sources in each utility's owned electricity generation.

TOP 47 U.S. UTILITIES BY FUEL MIX, 2021

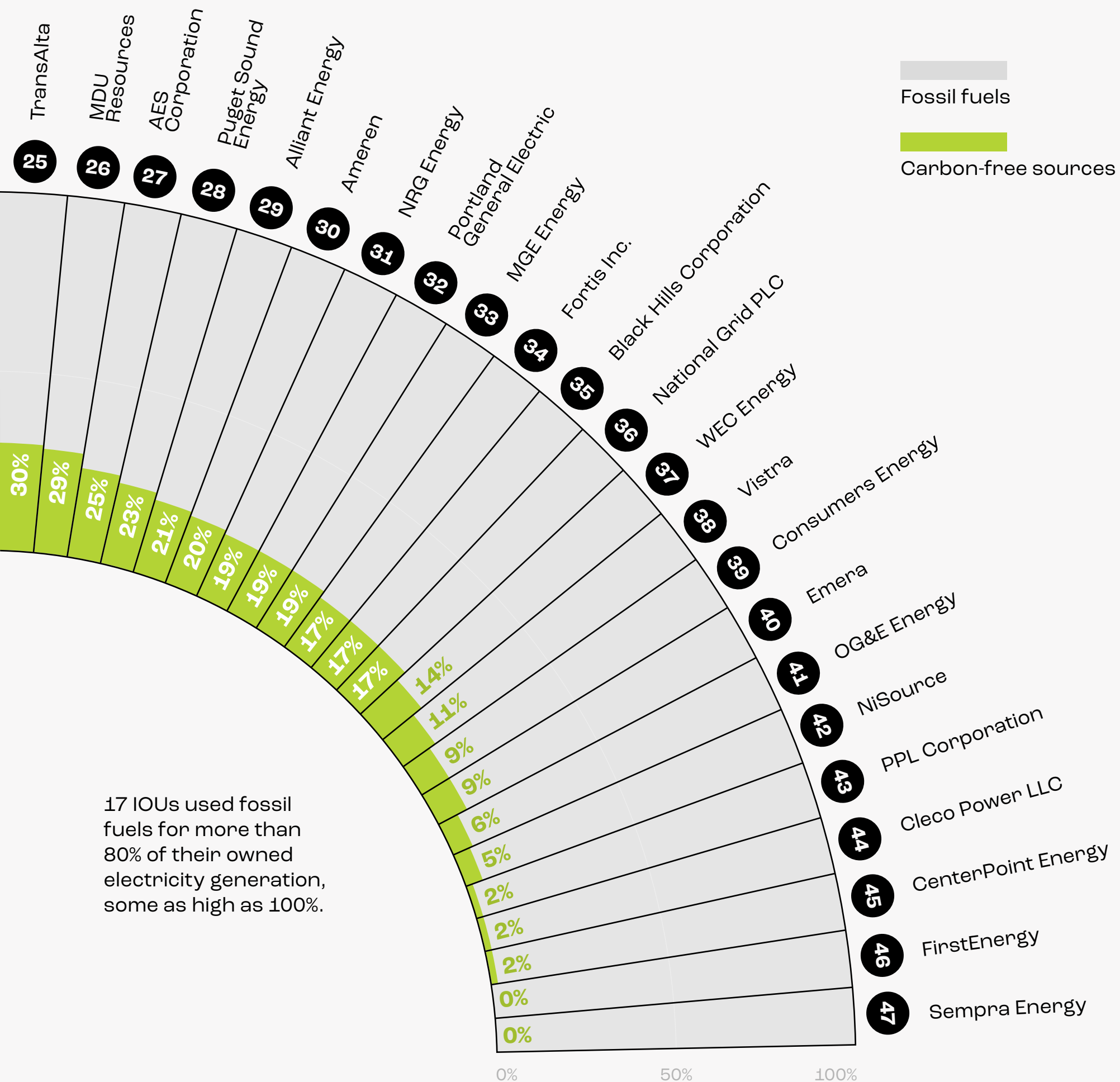


Nuclear power was the largest source of clean electricity among the top 47 IOUs.

SCORE CRITERIA

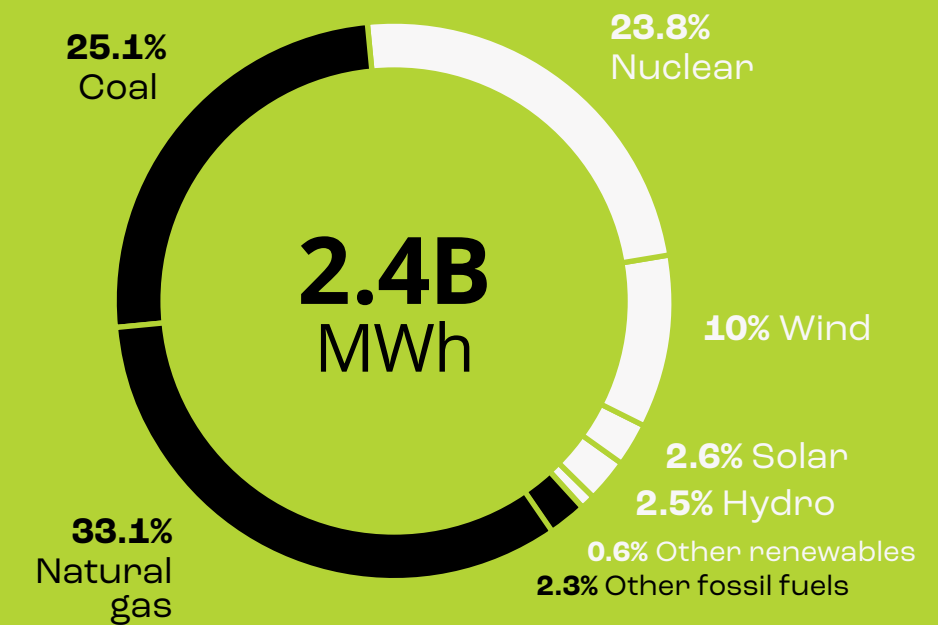
Share of low-carbon sources in owned electricity generation	Score
More than 80%	5
60 – 80%	4
40 – 60%	3
20 – 40%	2
Less than 20%	1

*Includes renewables and nuclear.
Where owned generation was not reported separately, the fuel mix of a utility's combined owned and purchased generation was used.



KEY TAKEAWAYS

► Total Electricity Generation by Source (all 47 IOUs)



Compared to last year's Decarbonization Index,¹³ the share of natural gas and nuclear decreased in total electricity generation, while coal, wind, and solar increased.

► This metric solely considers **owned generation**, which can reflect a utility's direct emissions.

However, purchased power agreements (PPAs) can also aid decarbonization.

METRIC 02

EMISSIONS INTENSITY

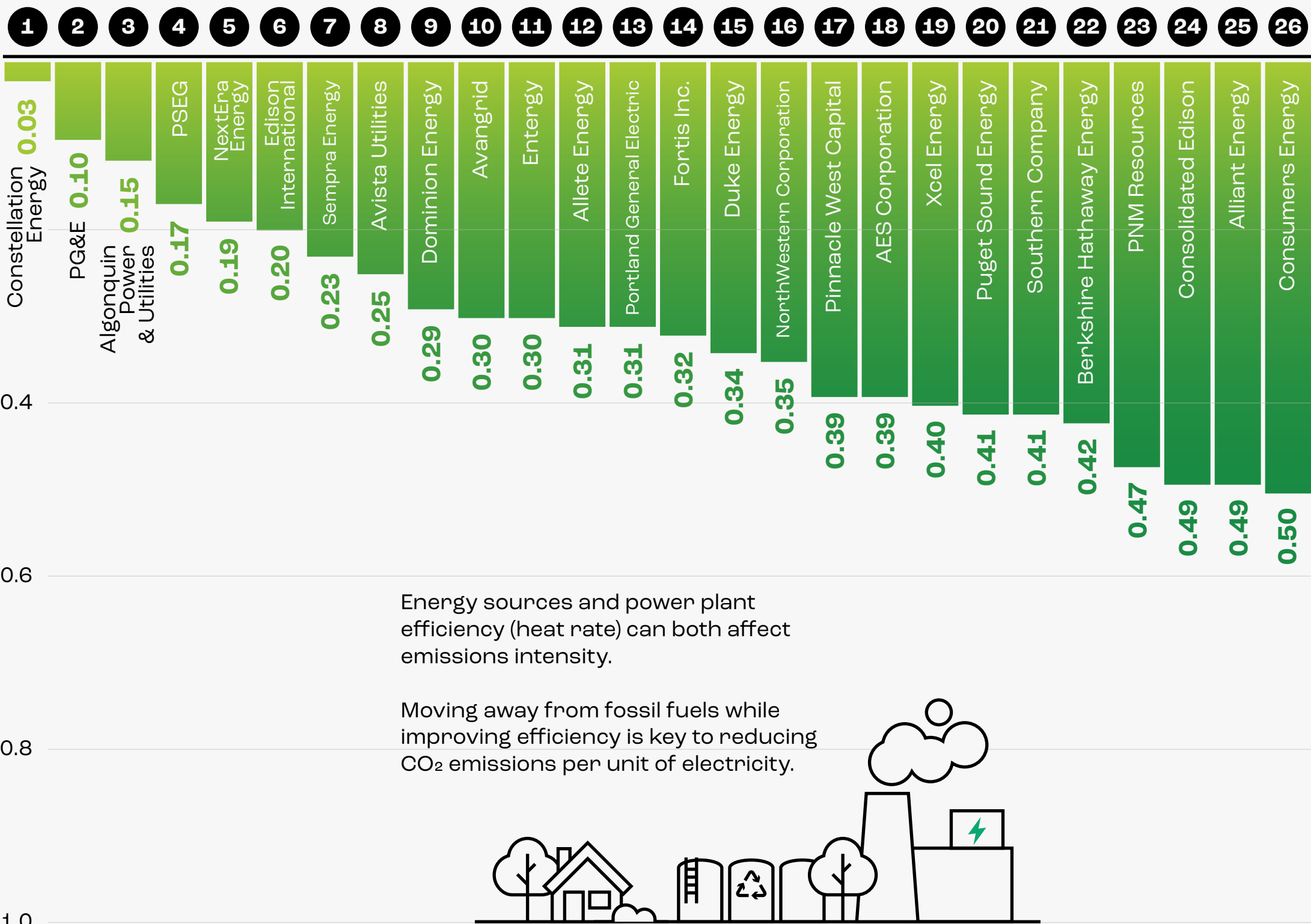
This metric measures how many metric tons of CO2 each utility emits per MWh of owned and purchased electricity generation.

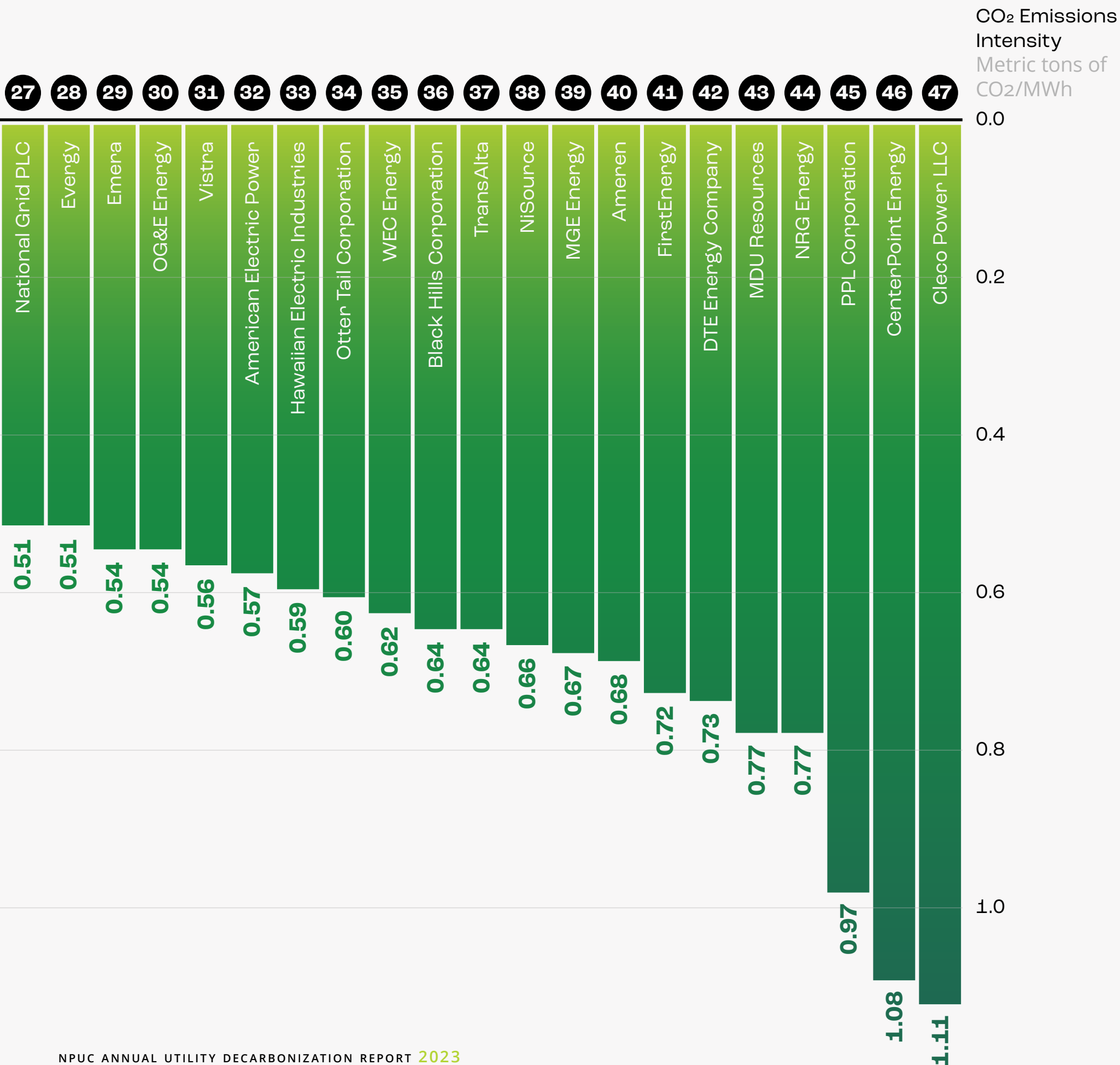
Metric tons of CO ₂ per MWh of owned and purchased generation	Score
Less than 0.22 tonnes/MWh	5
0.22 – 0.43 tonnes/MWh	4
0.43 – 0.65 tonnes/MWh	3
0.65 – 0.87 tonnes/MWh	2
More than 0.87 tonnes/MWh	1

Metrics that consider both owned and purchased generation may result in double counting of emissions in instances where an IOU purchases the owned generation of a neighboring IOU.

TOP 47 U.S. UTILITIES BY EMISSIONS INTENSITY

METRIC TONS OF CO₂/MWh, 2021





KEY TAKEAWAYS

- **Constellation Energy** and **Pacific Gas and Electric**, the utilities with the lowest emissions intensity, rely significantly on nuclear power for their owned generation, with nuclear accounting for 80% and 60% of their net generation, respectively.
- Emissions from purchased electricity is **just as relevant** as emissions from owned generation on the path to net-zero.

As such, utilities are encouraged to take both into consideration while calculating their emissions intensity, just as we have in this metric.

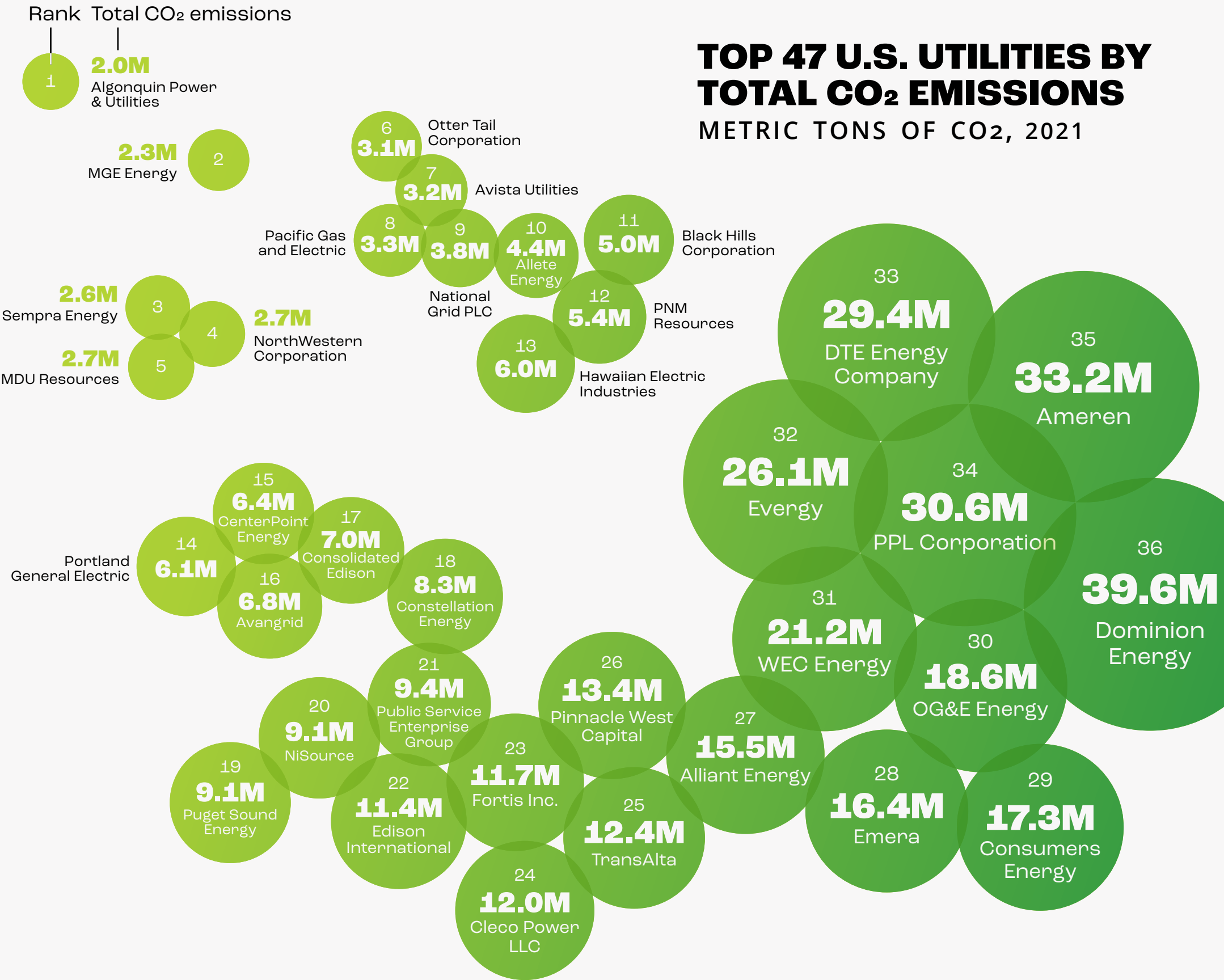
METRIC 03

TOTAL CO₂ EMISSIONS

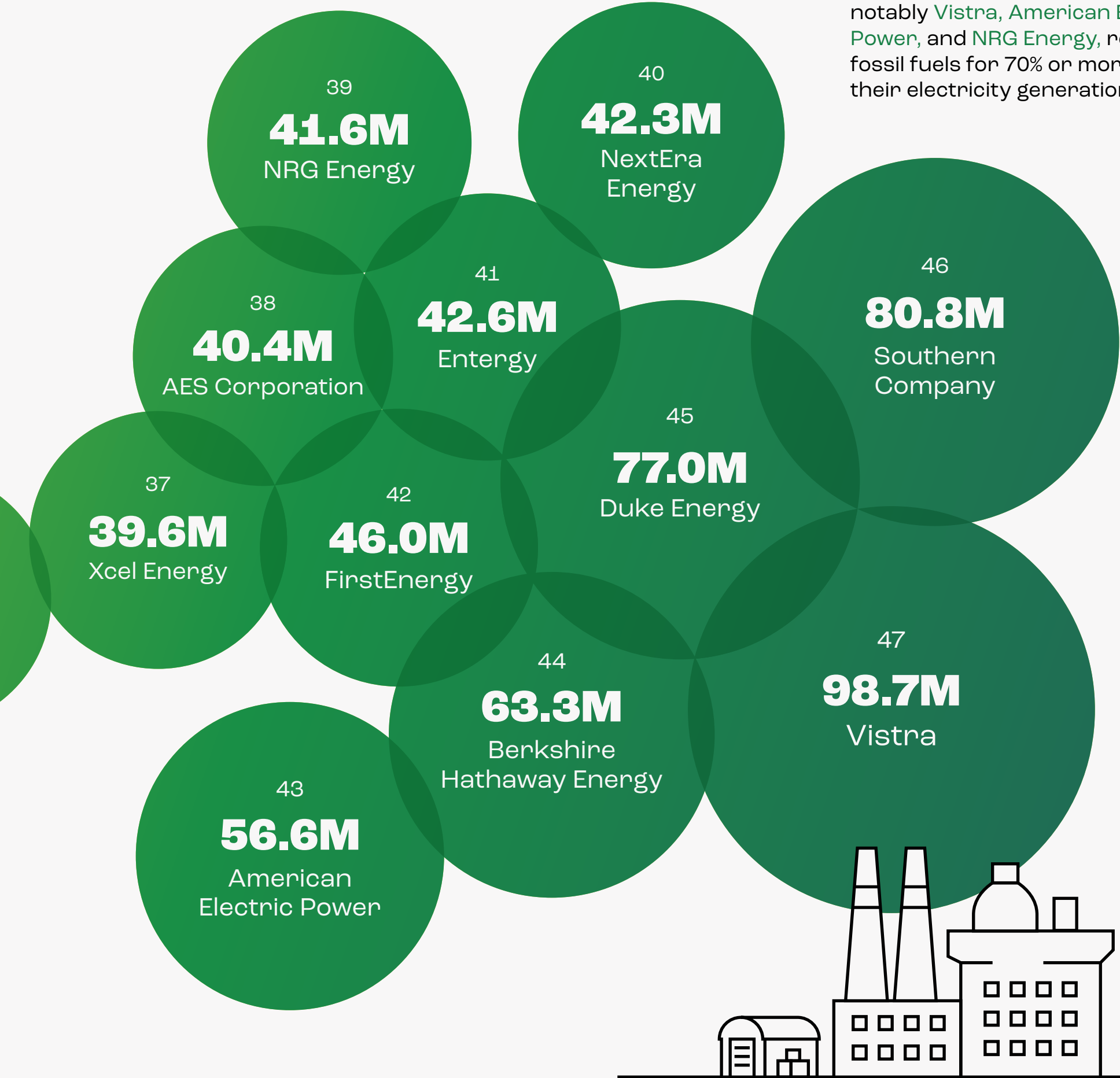
This metric measures each utility's absolute CO₂ emissions from owned and purchased electricity generation.

Metric tons of total CO ₂ emissions from owned and purchased generation	Score
Less than 19.7M tonnes	5
19.7 – 39.4M tonnes	4
39.4 – 59.1M tonnes	3
59.1 – 78.8M tonnes	2
More than 78.8M tonnes	1

Represents CO₂-equivalent emissions for companies that didn't report CO₂ emissions separately.



Some of the highest emitters, notably **Vistra**, **American Electric Power**, and **NRG Energy**, rely on fossil fuels for 70% or more of their electricity generation.



KEY TAKEAWAYS

- ▶ The scores of this metric are significantly influenced by variations in **utility size and fuel mix**.

The range between the lowest and highest emitters differs by an astonishing **5,000%**, with utilities serving the most customers generally being the largest emitters.
- ▶ Utilities are under pressure to meet the growing electricity demand resulting from **rapid electrification**. As such, emissions are likely to rise temporarily as the industry leans away from fossil fuels and toward clean sources.
- ▶ While this is the only metric in the index that takes **absolute numbers** into consideration, it's important to highlight who is putting the most carbon in the atmosphere, as these utilities have the most room to improve.

METRIC 04

CO₂ EMISSIONS PER CUSTOMER

This metric measures how many metric tons of CO₂ each IOU emits per customer from their owned and purchased generation. It includes retail, commercial, and industrial customers.

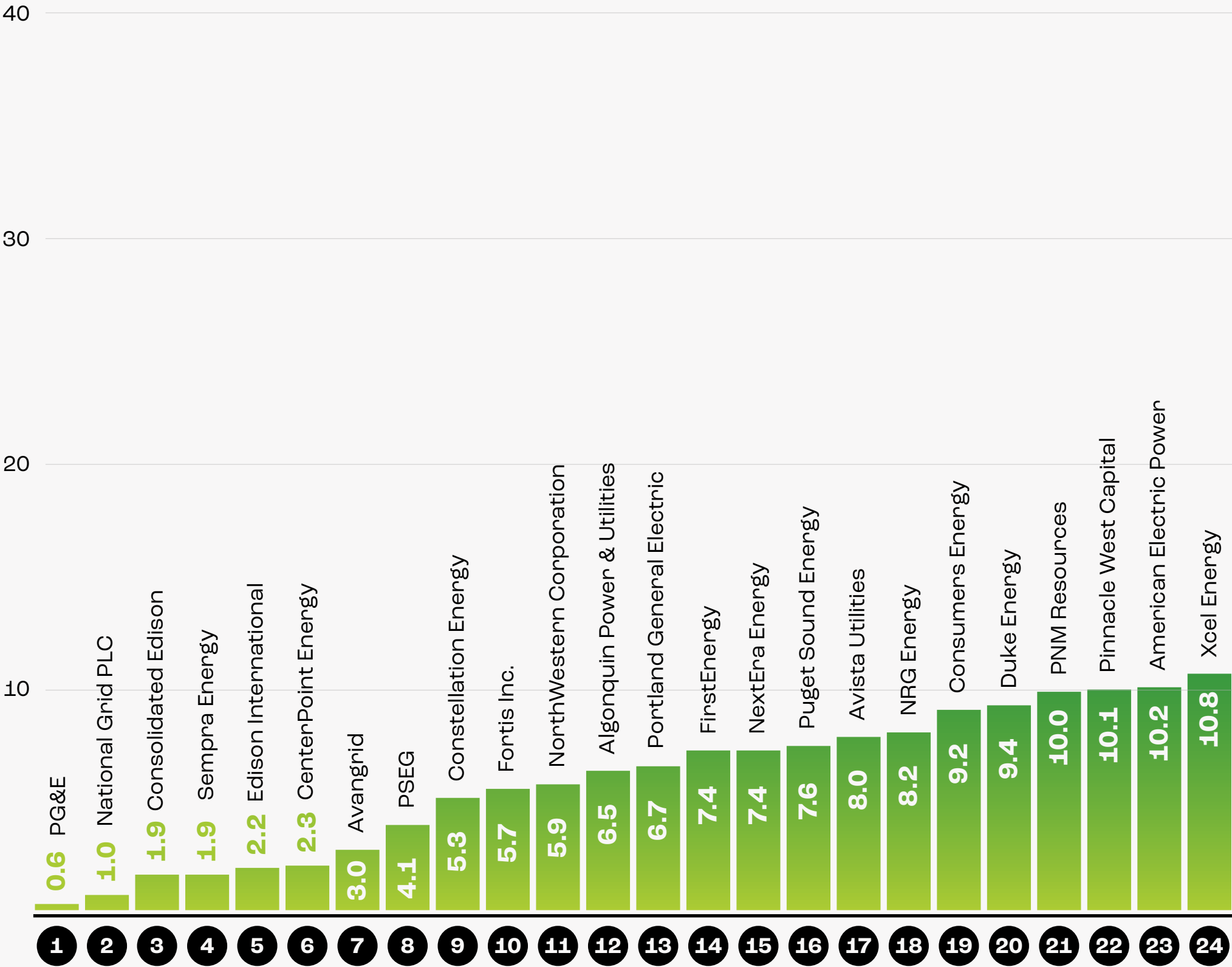
SCORE CRITERIA

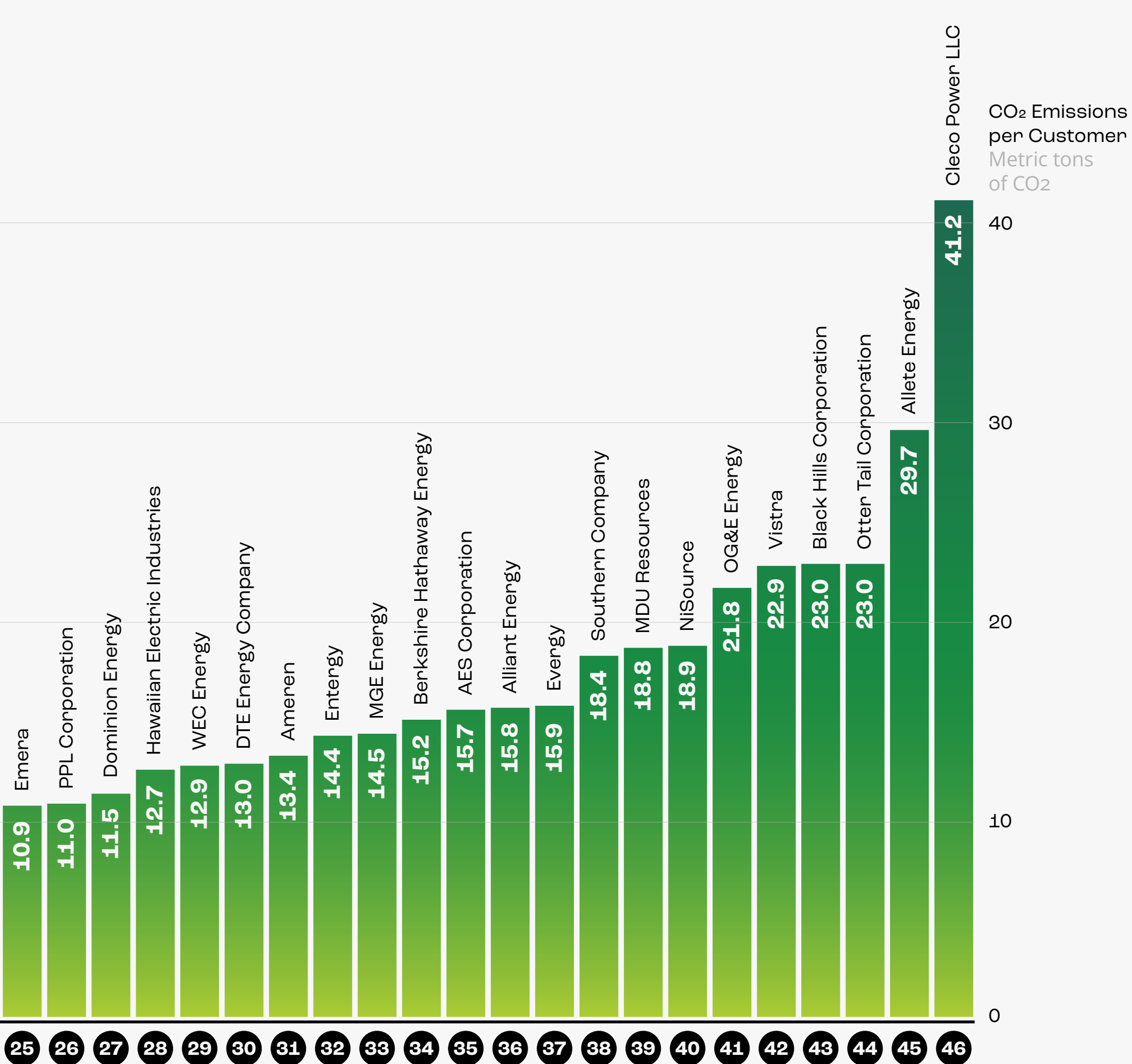
Metric tons of CO ₂ emissions per customer	Score
Less than 8.1 tonnes	5
8.1 – 16.2 tonnes	4
16.2 – 24.4 tonnes	3
24.4 – 32.5 tonnes	2
More than 32.5 tonnes	1

Represents CO₂-equivalent emissions for companies that didn't report CO₂ emissions separately. Due to their international reach and being considered an independent power producer in Canada, TransAlta does not report a customer count and is thus excluded from this metric.

TOP 47 U.S. UTILITIES BY EMISSIONS PER CUSTOMER

METRIC TONS OF CO₂, 2021





KEY TAKEAWAYS

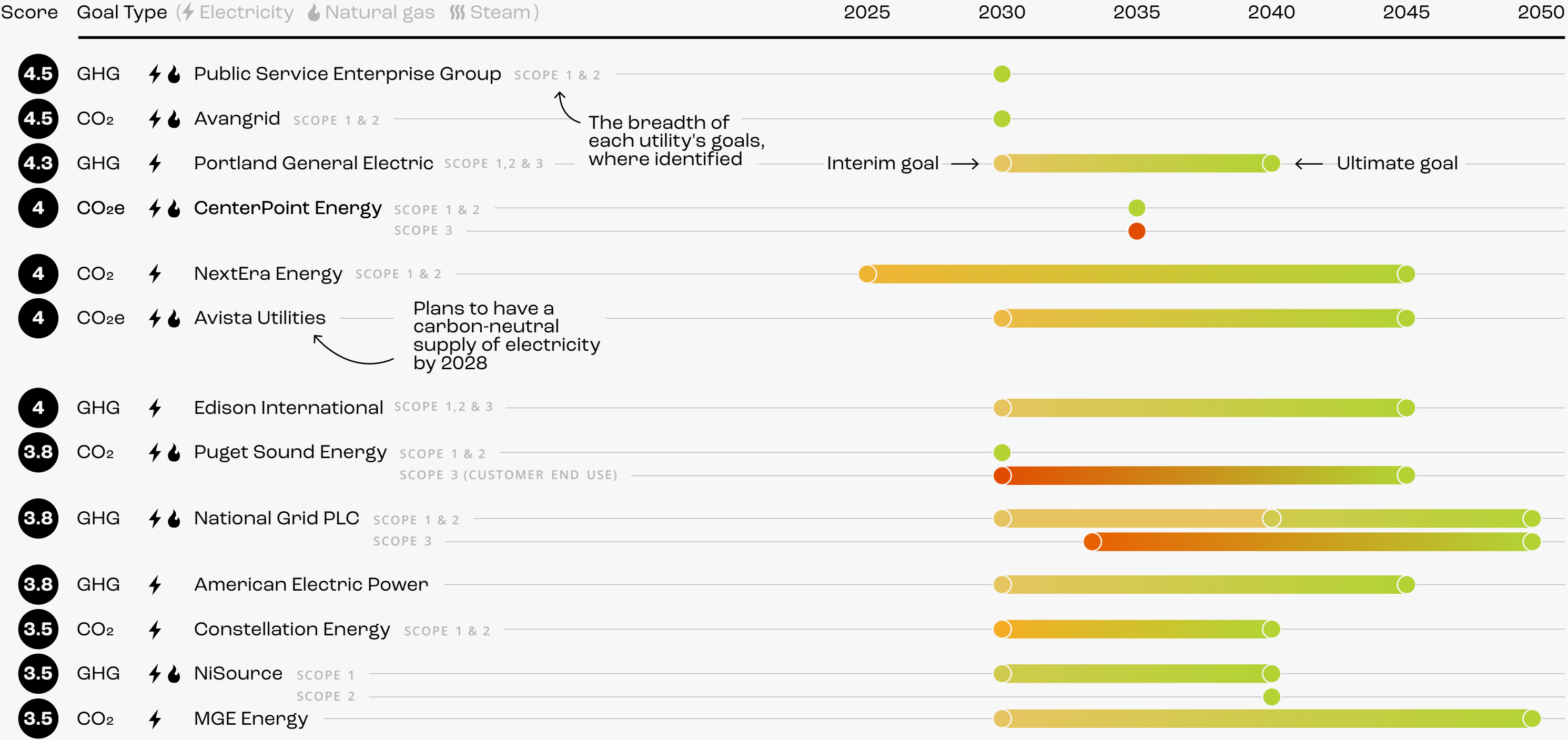
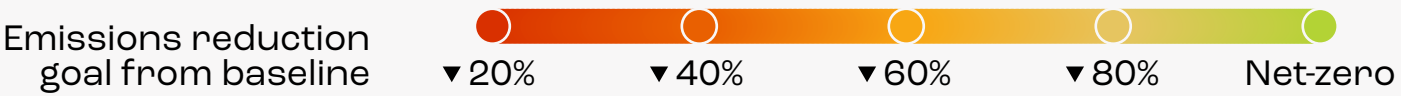
- ▶ On average, the top 47 IOUs emitted **11.7 metric tons** of CO2 per customer.
- ▶ IOUs serving more **commercial/ industrial customers** might score lower for this metric.

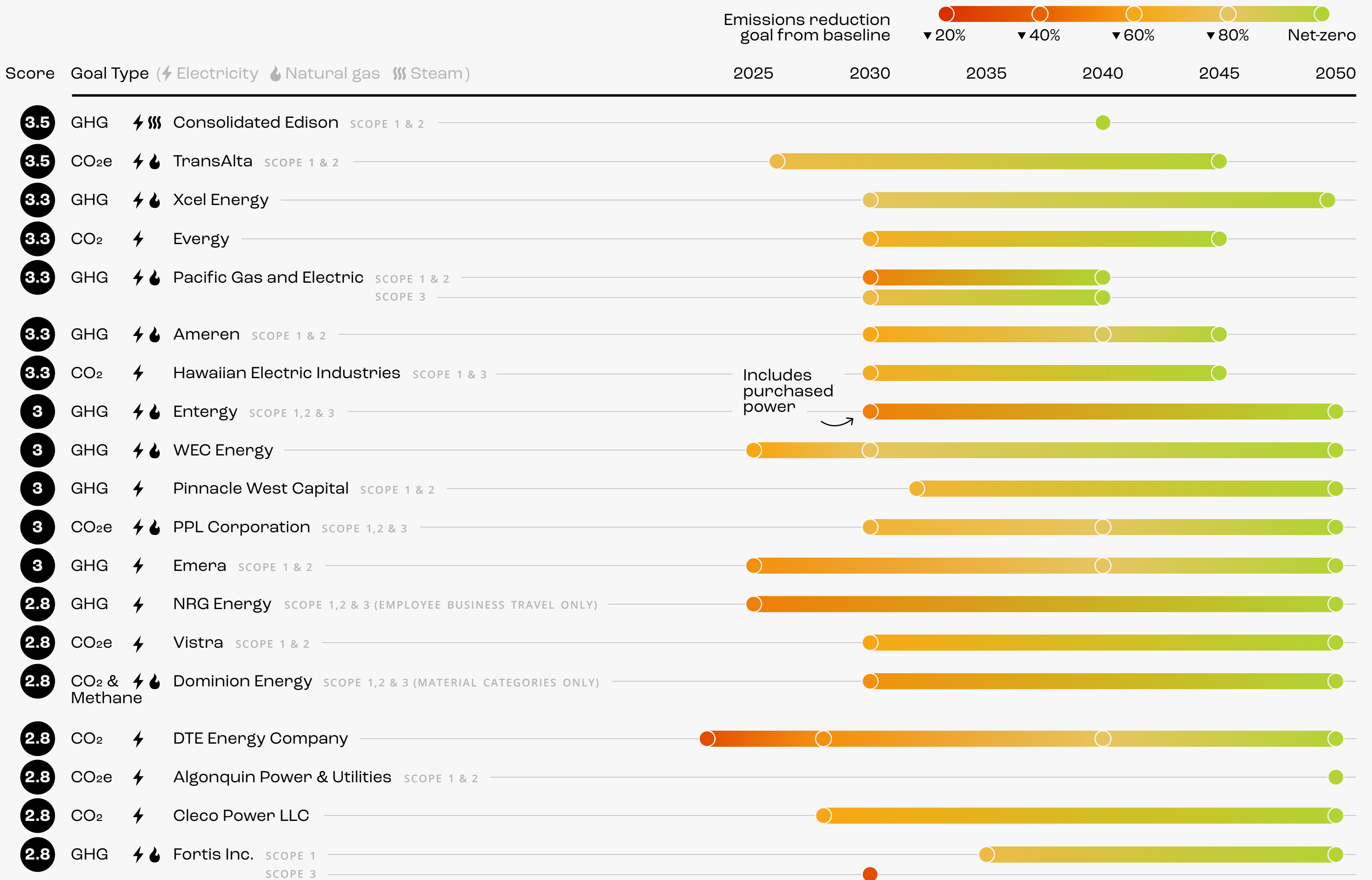
Other factors to consider are their non-retail customer sizes, wholesale sales, and whether their customer base is primarily tied to their generation business or transmission business.
- ▶ In general, however, companies with the **cleanest fuel mixes** are among the highest rankers for this metric.

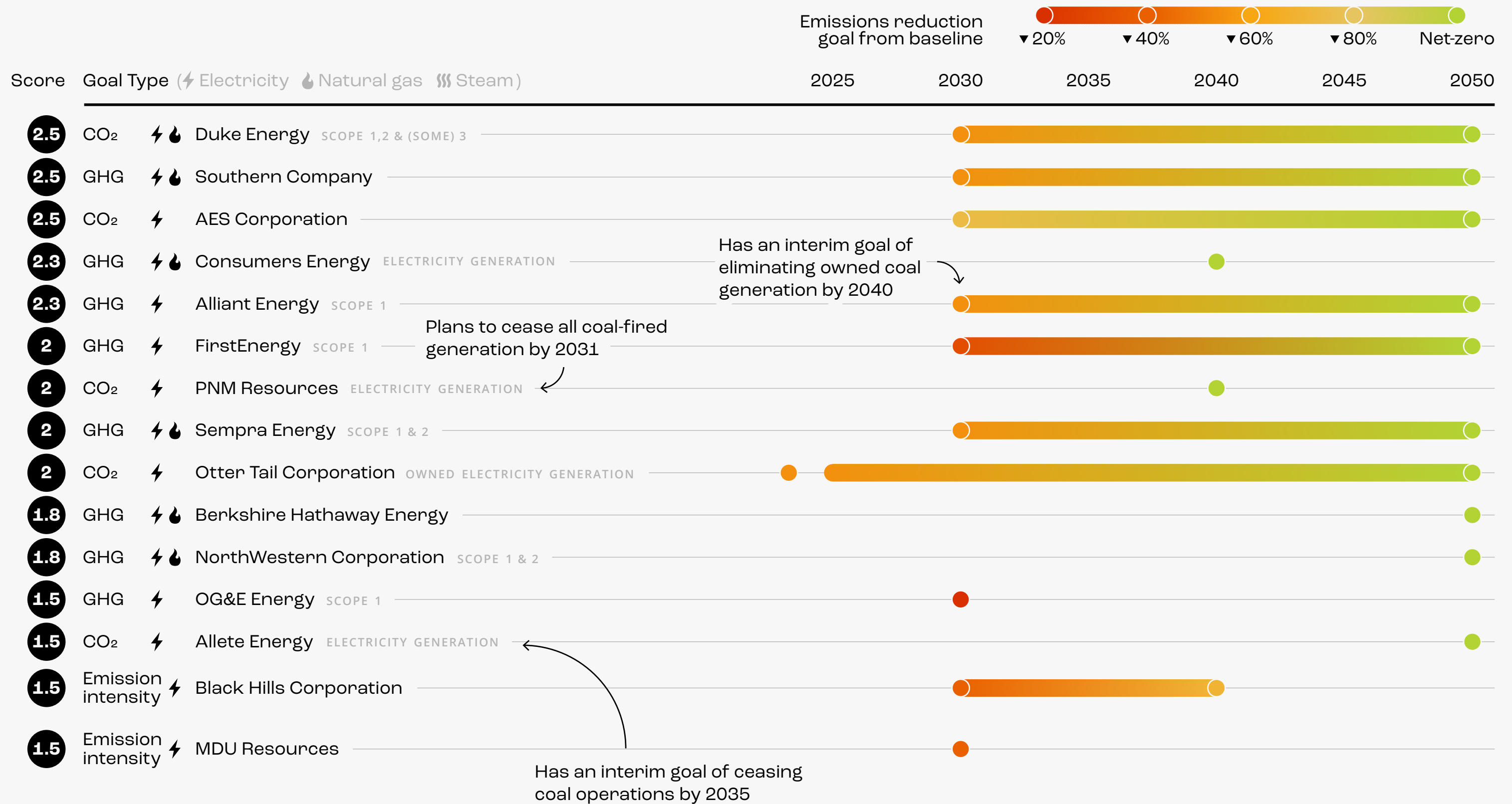
METRIC 05

DECARBONIZATION GOALS

This metric tracks each utility's interim and long-term emissions reduction goals. The baseline targets of 50% emissions reduction by 2030 and net-zero by 2050 are given a score of 2.5. The rest are comparatively scored based on their ambition.







METRIC 06

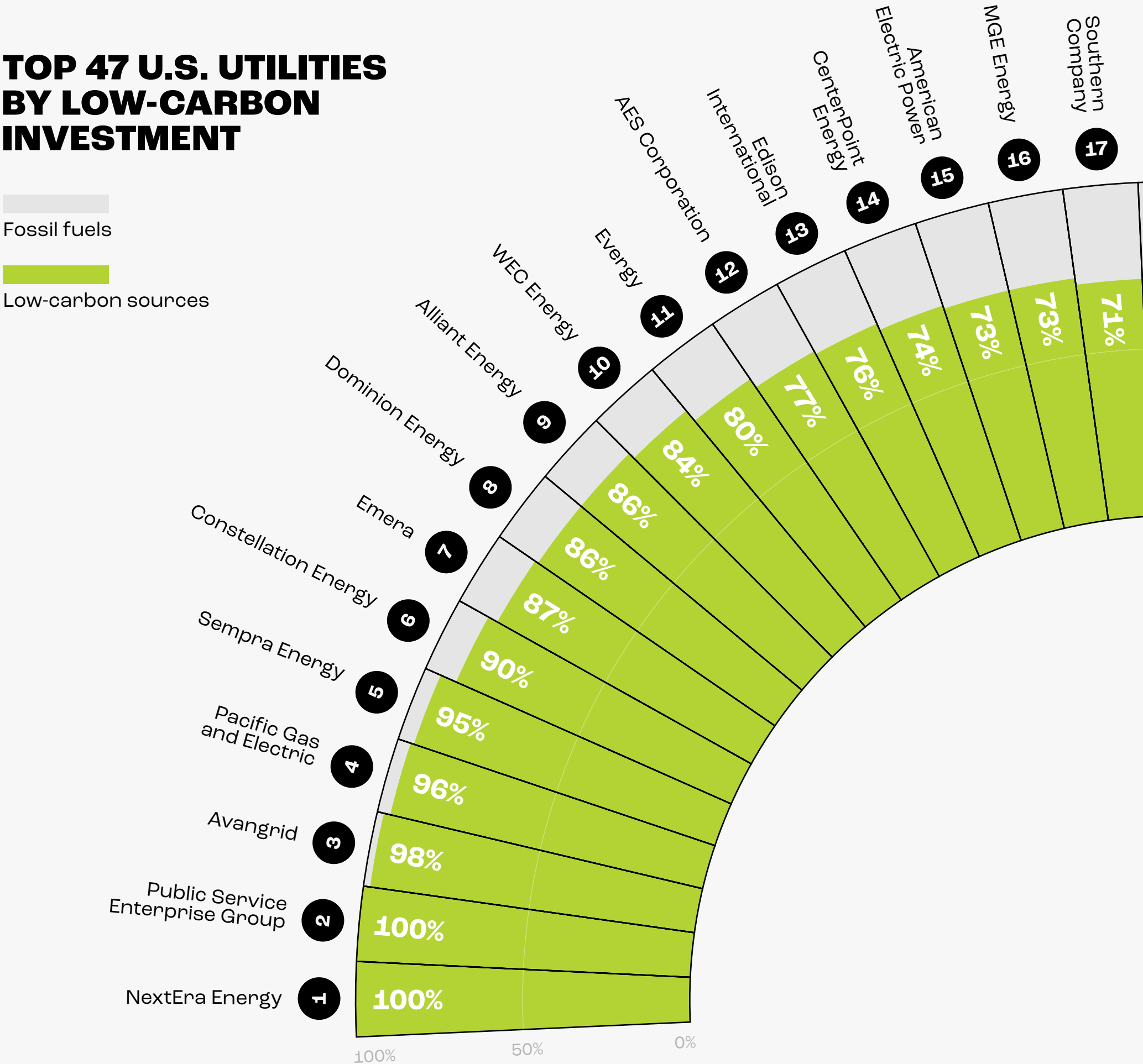
LOW-CARBON INVESTMENT

This metric measures the share of each utility’s realized or planned capital expenditure (CAPEX) for electricity generation dedicated to low-carbon sources.

TOP 47 U.S. UTILITIES BY LOW-CARBON INVESTMENT

Fossil fuels

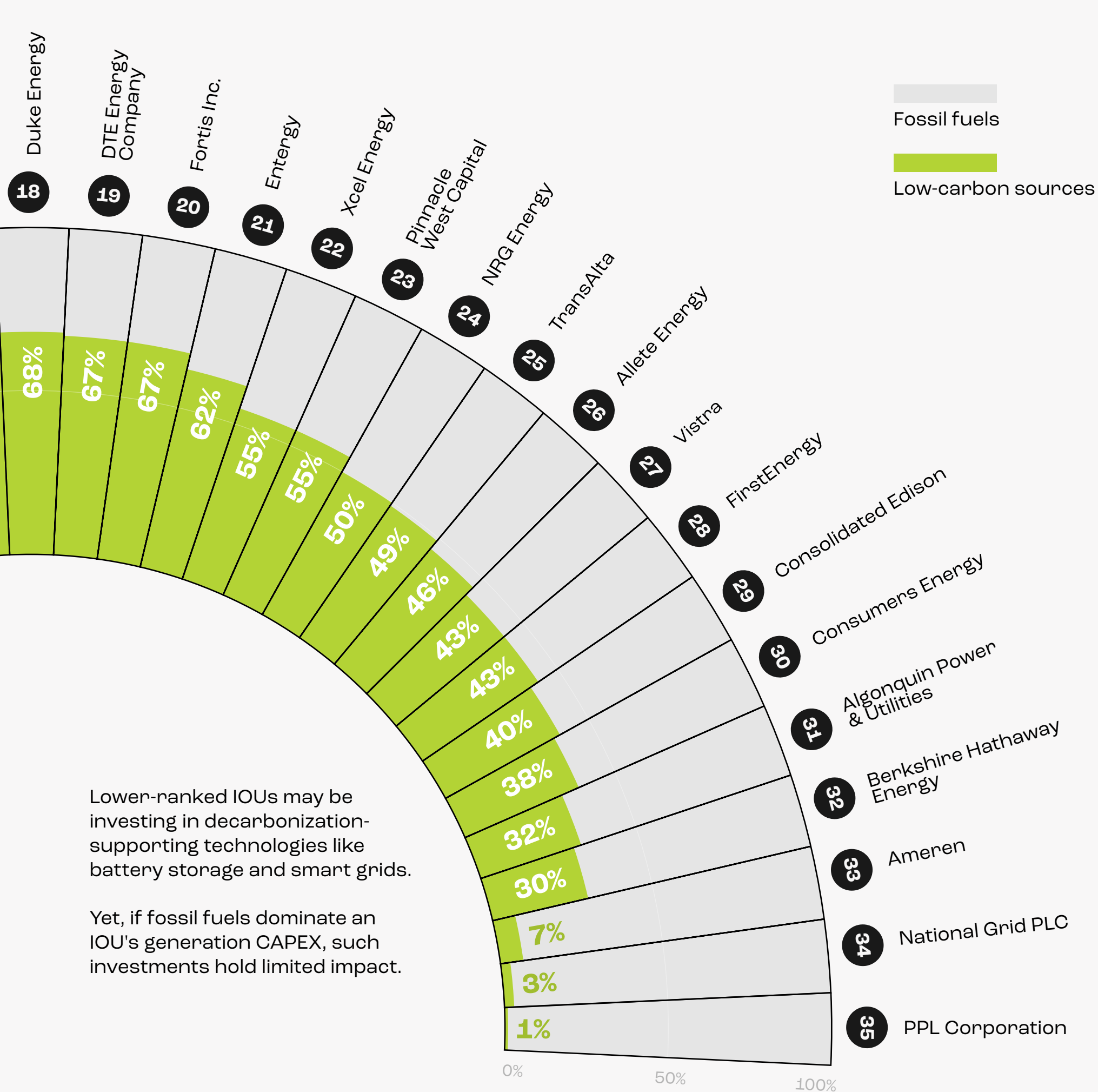
Low-carbon sources



SCORE CRITERIA

Share of planned generation CAPEX for low-carbon sources	Score
More than 80%	5
60 – 80%	4
40 – 60%	3
20 – 40%	2
Less than 20%	1

The 12 IOUs that did not report their CAPEX figures were excluded from this metric.



KEY TAKEAWAYS

► Some IOUs that lag in other metrics rank high in this one, namely **Sempra Energy, CenterPoint Energy** and **Southern Company**, who are demonstrating their meaningful actions for the future.

► Reporting detailed CAPEX data for generation is important for transparency, accountability, and investor confidence.

There is a need for increased industry-wide efforts in this regard, as over **25% of IOUs** included in this report currently do not disclose these figures.

YEAR-TO-YEAR PROGRESSION

The 2023 Utility Decarbonization Index analyzed more companies than in 2022, and considered parent companies only.

Here is a look at how the rankings have changed between the two years.

- Rank Increase
- Rank Decrease
- Newly Added in 2023



*NextEra Energy Resources and Florida Power and Light are subsidiaries of NextEra Energy.

2022 Rankings (2020 Data)

Public Service Enterprise Group	1
NextEra Energy Resources*	2
Pacific Gas and Electric	3
Avangrid	4
Exelon	5
Portland General Electric	6
Dominion Energy	7
Florida Power and Light*	8
PNM Resources	9
Alliant Energy	10
Consolidated Edison	11
Fortis Inc.	12
American Electric Power	13
Consumers Energy	14
Evergy	15
NRG Energy	16
AES Corporation	17
Xcel Energy	18
WEC Energy	19
DTE Energy	20
Duke Energy	21
Entergy	22
TransAlta	23
Emera	24
Ameren	25
Berkshire Hathaway Energy	26
Oklahoma Gas & Electric Company	27
Southern Company	28
PPL Corporation	29
Vistra	30

2023 Rankings (2021 Data)

1	Constellation Energy <small>Previously Exelon</small>
2	Avangrid
3	Public Service Enterprise Group
4	Pacific Gas and Electric
5	Edison International
6	Avista Utilities
7	NextEra Energy
8	Algonquin Power & Utilities
9	Puget Sound Energy
10	Consolidated Edison
11	Portland General Electric
12	NorthWestern Corporation
13	Evergy
14	Sempra Energy
15	Dominion Energy
16	Fortis Inc.
17	Alliant Energy
18	Pinnacle West Capital
19	Emera
20	Entergy
21	Hawaiian Electric Industries
22	PNM Resources
23	Xcel Energy
24	CenterPoint Energy
25	WEC Energy
26	TransAlta
27	American Electric Power
28	Duke Energy
29	MGE Energy
30	AES Corporation
31	Otter Tail Corporation
32	DTE Energy Company
33	National Grid PLC
34	Allete Energy
35	NiSource
36	Black Hills Corporation
37	Consumers Energy
38	Southern Company
39	Ameren
40	Oklahoma Gas & Electric Company
41	MDU Resources
42	FirstEnergy
43	NRG Energy
44	Berkshire Hathaway Energy
45	PPL Corporation
46	Vistra
47	Cleco Power LLC

04

THE U.S. UTILITIES ESG REPORT CARD

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METHODOLOGY

HOW THE ESG REPORT CARD IS SCORED

Environmental, social and governance (ESG) accounting and transparency goes hand in hand with decarbonization, brand value, reputation, and risk management for electric utilities.

To shed light on the level of transparency among the top U.S. IOUs, with an emphasis on the "E" in ESG, the ESG report card evaluates whether each utility publicly disclosed the following metrics in 2021.

01 SCOPE 1 EMISSIONS

Direct emissions resulting from owned or controlled sources.

02 SCOPE 2 EMISSIONS

Indirect emissions resulting from the consumption of purchased electricity, heat, or steam.

03 SCOPE 3 EMISSIONS

Indirect value chain emissions from upstream and downstream operations, including how many they've reported out of the 17 categories identified by the Climate Disclosure Project.

04 CURRENT ENERGY MIX

The current share of each energy source in a utility's owned generation mix.

05 PROJECTED ENERGY MIX

The projected share of each energy source in a utility's owned generation mix.

06 INTERNAL ENERGY CONSUMPTION

The amount of energy used for electricity generation and other operations.

07 WATER WITHDRAWAL

The amount of fresh water withdrawn for electricity generation and other operations.

08 WASTE GENERATION

The amount of waste generated during electricity generation and other operations.

09 VEHICLE ELECTRIFICATION

Utilities' vehicle fleet electrification plans and initiatives that support electrification for customers.

10 POLITICAL CONTRIBUTIONS

The specifics of any financial donations made by the company to political candidates, parties, or advocacy groups.

THE U.S. UTILITIES ESG REPORT CARD

Reported

Not reported

IOUs are in the order of net electricity generation (MWh)

Number of metrics reported

Companies		Scope 1 emissions	Scope 2 emissions	Scope 3 emissions	Current energy mix	Projected energy mix	Internal energy consumption	Water withdrawal	Waste generation	Vehicle electrification	Political contributions
Constellation Energy	1			5							
Duke Energy	2			3							
NextEra Energy	3			3							
Southern Company	4			10							
Vistra	5			5							
Berkshire Hathaway Energy	6										
Entergy	7			4							
Dominion Energy	8			3							
AES Corporation	9			4							
Xcel Energy	10			7							
American Electric Power	11			6							
FirstEnergy	12			3							
Edison International	13			4							
Public Service Enterprise Group	14			3							
NRG Energy	15			1							
Evergy	16			2							
Ameren	17			8							
DTE Energy Company	18			4							
Fortis Inc.	19			3							
Consumers Energy	20			6							
OG&E Energy	21			1							
WEC Energy	22			4							
Pinnacle West Capital	23			6							

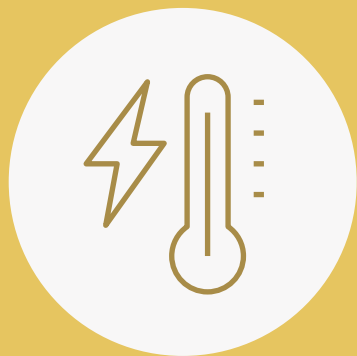
							<div><div></div> Reported</div> <div><div></div> Not reported</div>				
Companies		Scope 1 emissions	Scope 2 emissions	Scope 3 emissions	Current energy mix	Projected energy mix	Internal energy consumption	Water withdrawal	Waste generation	Vehicle electrification	Political contributions
Alliant Energy	24			2							
PPL Corporation	25			1							
Emera	26			2							
Pacific Gas and Electric	27			6							
Avangrid	28			5							
Puget Sound Energy	29			2							
TransAlta	30			10							
Portland General Electric	31			1							
Consolidated Edison	32			2							
Allete Energy	33			1							
NiSource	34			2							
Algonquin Power & Utilities	35			9							
Avista Utilities	36			1							
PNM Resources	37										
Sempra Energy	38			3							
Cleco Power LLC	39										
Hawaiian Electric Industries	40			5							
Black Hills Corporation	41			2							
NorthWestern Corporation	42			1							
National Grid PLC	43			6							
CenterPoint Energy	44			1							
Otter Tail Corporation	45			1							
MDU Resources	46			1							
MGE Energy	47			2							
Unitil*	48			4							

KEY TAKEAWAYS FROM THE ESG REPORT CARD

While scope 1 emissions, current energy mix, water withdrawal, and waste generation are broadly reported within the industry, **more efforts are needed in the reporting of:**



Projected Energy Mix



Internal Energy Consumption



Political Contributions

This is especially relevant for IOUs that are smaller in size in terms of net generation.

Compared to last year's Annual Utility Decarbonization Report,¹³ there are also fewer gaps in scope 3 emissions reporting across the board.

Nonetheless, IOUs are encouraged to benchmark their scope 3 reporting practices against each other and collaborate to **promote even more consistent ESG reporting across the industry.**

WHAT ARE THE MOST REPORTED SCOPE 3 METRICS BY U.S. IOUs?

- ▶ Purchased goods and services
- ▶ Employee commuting
- ▶ Business travel
- ▶ Fuel and energy-related activities (not included in scope 1 or 2)
Generally includes purchased power
- ▶ Use of sold products
Especially relevant for companies that also sell natural gas

DIVING DEEPER

ESG REPORTING STANDARDS

With pressure from regulators, investors and the general public, ESG reporting standards are constantly evolving to become more robust.

Here are some recent changes to keep in mind.

CARBON DISCLOSURE PROJECT

Updated its scoring methodology, with an increased focus on sector-specific performance, Scope 3 emissions, water security and science-based targets aligned to the Paris Climate Agreement.

U.S. SECURITIES AND EXCHANGE COMMISSION SEC

Created a Climate and ESG Task Force to identify ESG-related misconduct.¹⁷

Proposed new rules to enhance climate-related disclosures, potentially leading to mandatory reporting.¹⁸

Note: Mandatory ESG reporting has recently been scheduled in the EU, setting precedent.¹⁹

SUSTAINABILITY ACCOUNTING STANDARDS BOARD SASB

Is refining its materiality framework to provide more clarity on how companies should identify and prioritize sustainability issues.

DECARBONIZATION STRATEGIES FOR U.S. UTILITIES

OPPORTUNITIES AND
SOLUTIONS FOR CHANGE

Obstacles 38

Strategies 39

05

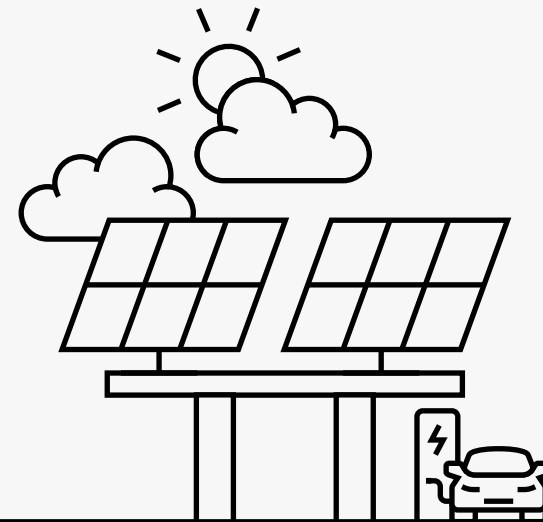


THE OBSTACLES TO DECARBONIZATION

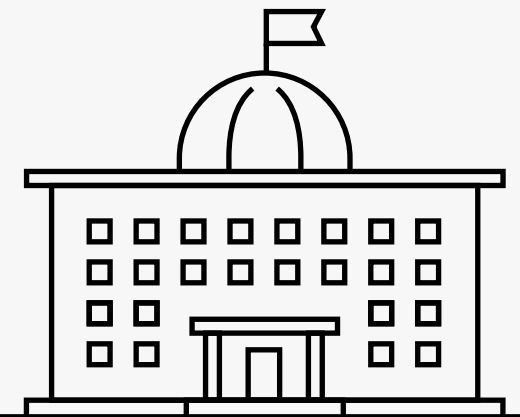
Before diving into the strategies, here's a brief overview of the **6 main obstacles** to the net-zero transition that were covered in last year's **Annual Utility Decarbonization Report**.¹³



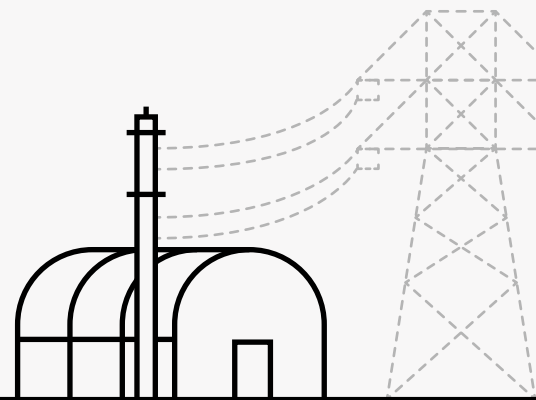
01 Technological Costs and Availability



02 Intermittency of Renewables



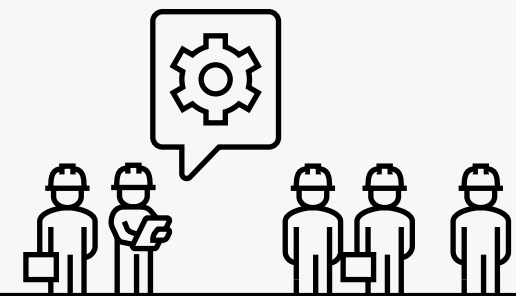
03 Funding and Regulatory Needs



04 Lack of Transmission Infrastructure



05 Socio-economic Divide



06 Workforce Development

Based on the 2023 Utility Decarbonization Index, the obstacles to decarbonization, and the themes of change and opportunity, here are five strategies to accelerate decarbonization for electric utilities.

STRATEGY 01

LEADING RESEARCH ON EMERGING TECHNOLOGIES

Addressing Obstacles 01, 02, 04, and 06

Emerging technologies that improve grid flexibility, enhance energy efficiency, and support the advancement of clean energy and electrification are instrumental in transforming the power sector toward a low-carbon future.

There are ample opportunities to collaborate across the industry, such as through revenue sharing models to help bring technologies to the market quicker and more effectively. In the long run, early investments in new technologies can cut costs, increase revenue streams and lead to higher investor confidence.

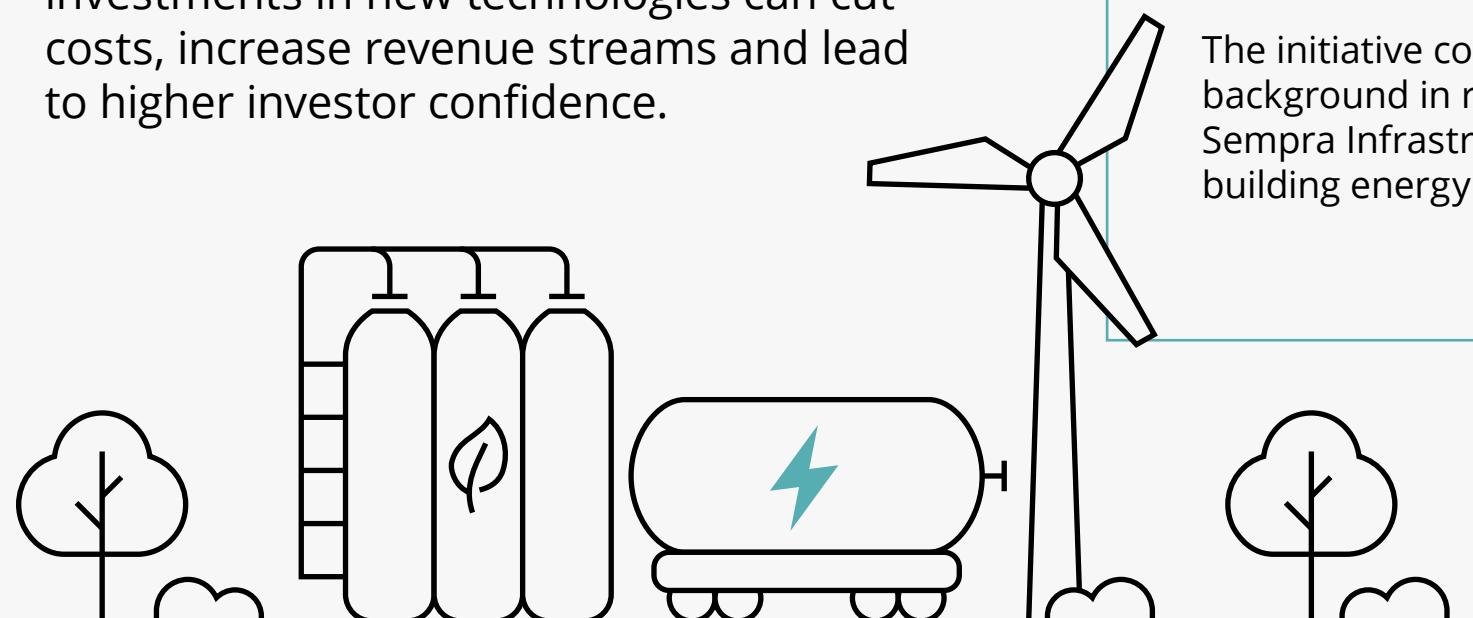
CASE STUDY



AVANGRID & SEMPRA COLLABORATE ON CLEAN HYDROGEN AND AMMONIA²⁰

In 2022, Avangrid and Sempra Infrastructure signed a heads of agreement to jointly develop large-scale green hydrogen and ammonia projects powered by renewable energy.

The initiative combines Avangrid's background in renewable energy with Sempra Infrastructure's expertise in building energy projects.



STRATEGY 02

LEVERAGING GOVERNMENT FUNDING

Addressing Obstacles 01, 03, and 04

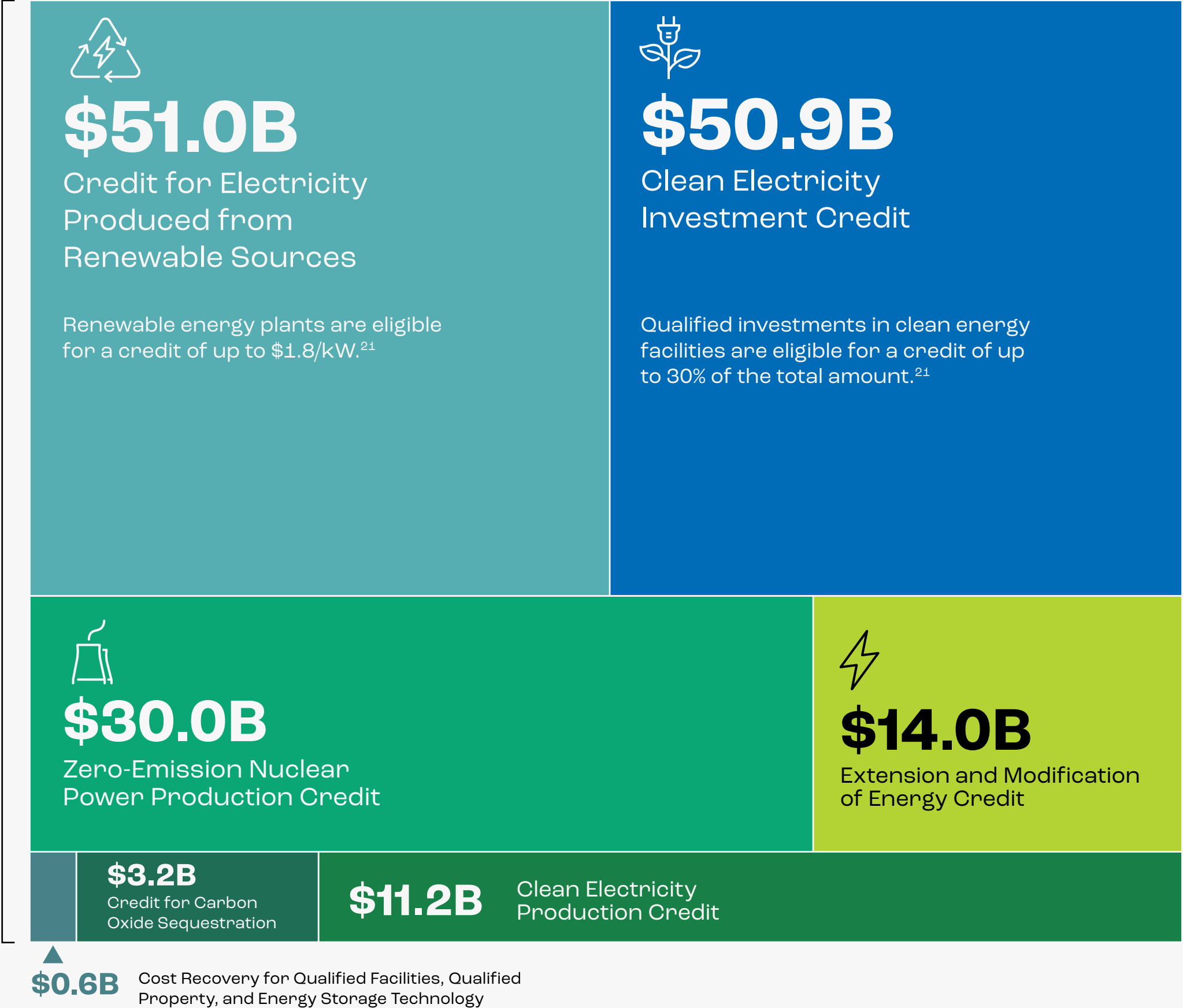
Utilities have access to billions in funding through the Inflation Reduction Act and Bipartisan Infrastructure Law.

The IRA's **Clean Electricity Tax Credits** alone offer **\$161B** for clean power generation and investment, in addition to funds for technologies like green hydrogen, carbon capture, and energy storage.

GOVERNMENT FUNDING CHECKLIST

- ☒ Clear Net Zero Strategy
- ☒ Long-Term Planning
- ☒ Metrics & Reporting
- ☒ Partnerships & Collaboration
- ☒ Technological Innovation
- ☒ Economic & Social Benefits
- ☒ Regulatory Compliance

CLEAN ELECTRICTY TAX CREDITS IN THE IRA USD

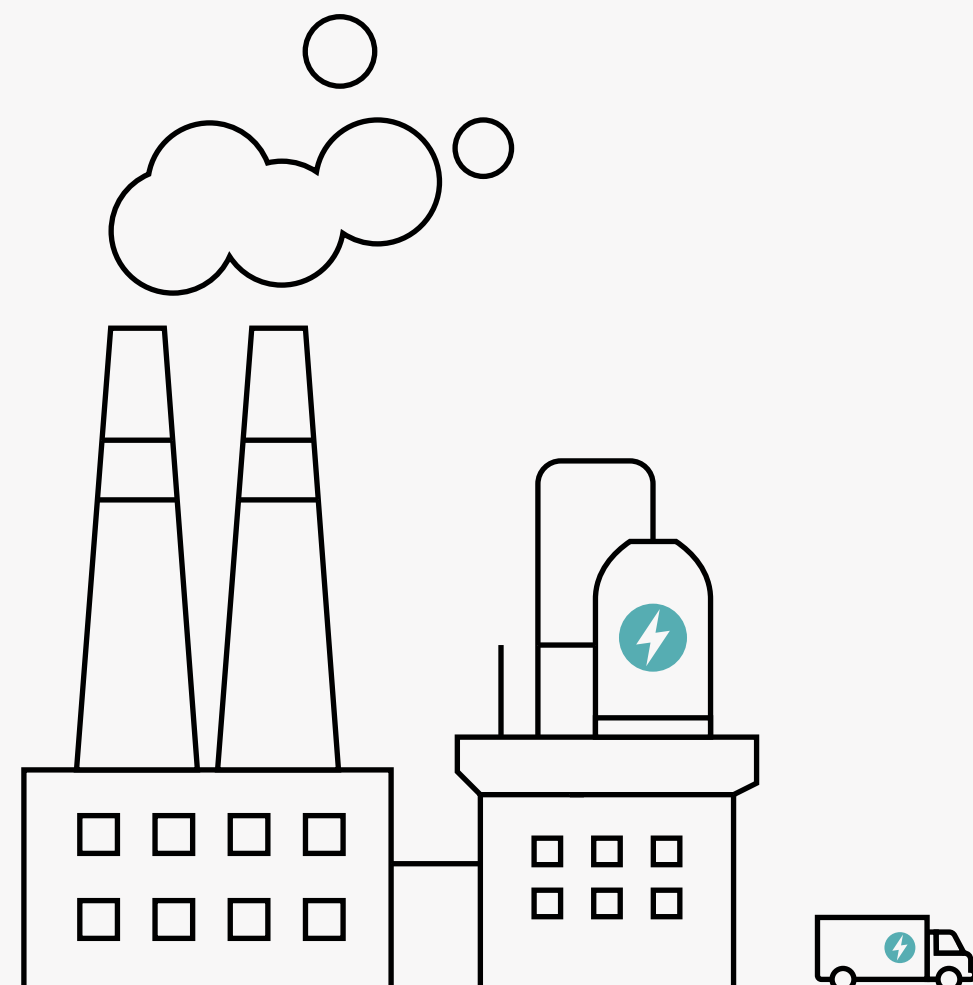


STRATEGY 03

LEANING INTO SMALL UTILITY MODELS

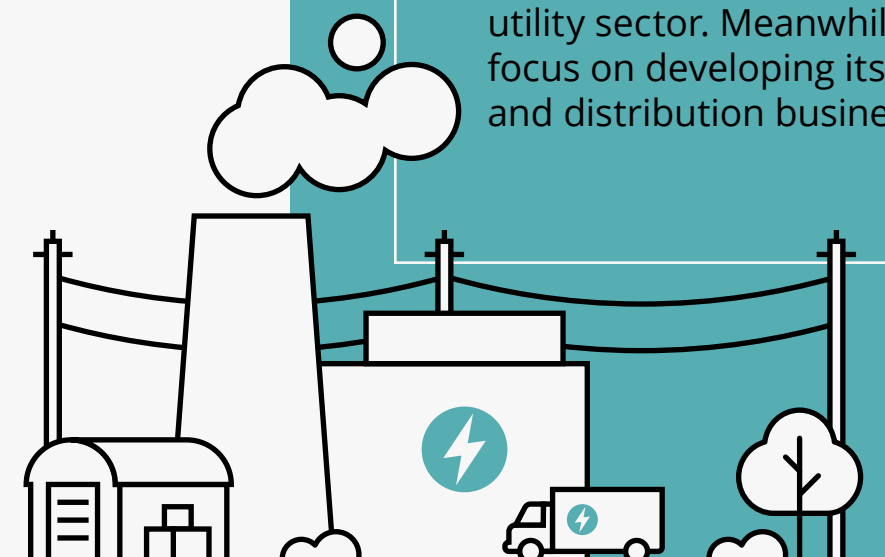
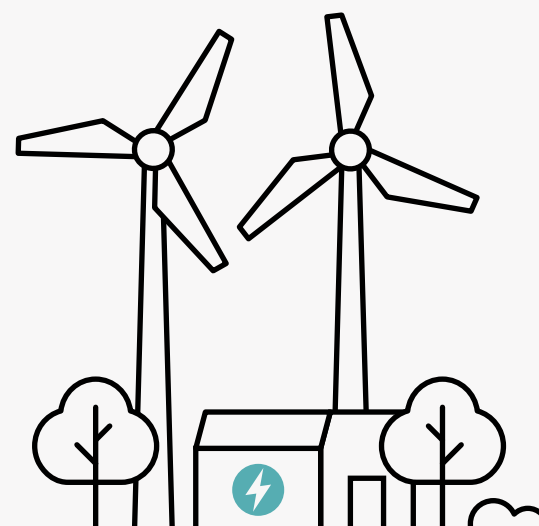
Addressing Obstacles 03 and 06

When it comes to company size, there are advantages to being large enough to have ample resources but small enough to be nimble in the face of necessary changes.



As such, smaller utilities and subsidiaries of larger IOUs show greater potential for making significant progress in the decarbonization effort.

Creating divisions that focus on decarbonization can allow utilities to pursue independent goals that could otherwise be conflicting with other parts of business, while targeting a more focused group of investors.



CASE STUDY



exelon™



Constellation

EXELON COMPLETES THE SEPARATION OF ITS POWER GENERATION BUSINESS²²

U.S.'s largest electric utility, Exelon Corporation, has separated its new subsidiary, Constellation Energy Corporation, into a standalone company focused on power generation solutions.

This move allows Constellation to independently pursue its renewable energy goals and contribute to the decarbonization efforts within the utility sector. Meanwhile, Exelon will focus on developing its transmission and distribution business.

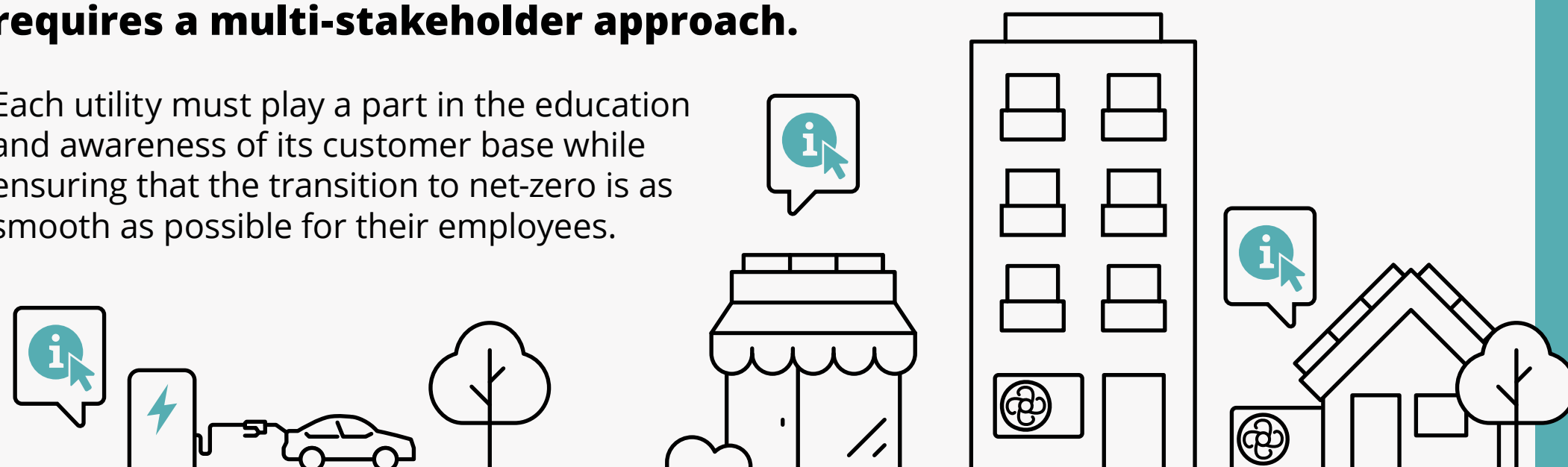
STRATEGY 04

SUPPORTING TECHNOLOGY TRANSITIONS

Addressing Obstacles 05 and 06

Decarbonizing the utilities sector requires a multi-stakeholder approach.

Each utility must play a part in the education and awareness of its customer base while ensuring that the transition to net-zero is as smooth as possible for their employees.



THREE MUST-HAVES FOR A GREEN WORKFORCE DEVELOPMENT PROGRAM

- ▶ Launch retraining programs
- ▶ Attract younger talent
- ▶ Involve minority populations

Supporting customers is especially important as the transportation sector electrifies and energy efficiency measures become necessary.

Additionally, utilities can help households in taking advantage of the individual clean energy incentives in the IRA.

CASE STUDY 

nationalgrid

NATIONAL GRID USES PERSONALIZED VIDEOS TO EDUCATE CUSTOMERS ON HEAT PUMPS²³

In collaboration with Opower, National Grid used personalized videos to educate customers about the benefits of installing heat pumps.

In the videos sent via email, customers saw how much they were spending on heating and cooling, learned about heat pump technology, and were encouraged to participate in National Grid's heat pump rebate program. The campaign led to thousands of customers ultimately purchasing heat pumps.

ENCOURAGING DEMAND RESPONSE MANAGEMENT SYSTEMS DRMS

Addressing Obstacles 02 and 05

Demand response is a strategy that allows electricity consumers to adjust their energy usage based on grid conditions and price signals.



WHY DRMS?

- ▶ Increased Grid Stability & Reliability
- ▶ Cost & Energy Savings
- ▶ Renewable Energy Integration
- ▶ Empowering the Customer
- ▶ Grid Flexibility

Demand response can help achieve decarbonization by incentivizing consumers to reduce their electricity consumption during peak demand periods.

This reduces the need for fossil fuel-based peaking power plants and promotes the integration of intermittent energy sources, such as wind and solar.

CASE STUDY



CONSOLIDATED EDISON'S ONGOING PARTNERSHIP WITH THE CITY OF NEW YORK²⁴

Since 2013, the *Demand Response* program put forth by Consolidated Edison and the City of New York has been in place to protect the city's electricity grid in times of high demand, such as during heatwaves.

To balance the grid, create additional revenue for participants, and avoid the use of high-emission electricity sources like coal, 555 facilities participate in the program to reduce electricity use during peak times.

EMBRACING A FUTURE OF CHANGE AND OPPORTUNITIES

In this transformative era of energy, U.S. utilities are presented with a significant chance to challenge the existing norms and lead the way in achieving net-zero emissions.

By revolutionizing the customer and workforce experience and pioneering effective solutions for achieving net-zero emissions, utilities can not only contribute to a brighter future but also serve as a guiding light for other sectors to emulate.



07

ABOUT US

About NPUC 46

Collaborators 48



ABOUT NPUC

The National Public Utilities Council (NPUC)
is a leading research organization dedicated to driving progress in the decarbonization of the clean energy transition.

NPUC'S GOALS



**BRING TOGETHER
INDUSTRY LEADERS**
to discuss bottlenecks and best practices on the road to decarbonization.



**IDENTIFY EMERGING
INDUSTRY TRENDS**
Share knowledge, reveal opportunities, and expedite solutions through benchmarking and interactive dialogue.



WORK WITH PARTNERS
to create a valuable learning experience for all stakeholders to drive collaboration in achieving net-zero.



From championing practical solution-based roundtable discussions to being a repository of knowledge and research for utilities, NPUC is pioneering the decarbonization movement and forging new paths for utility decarbonization efforts.



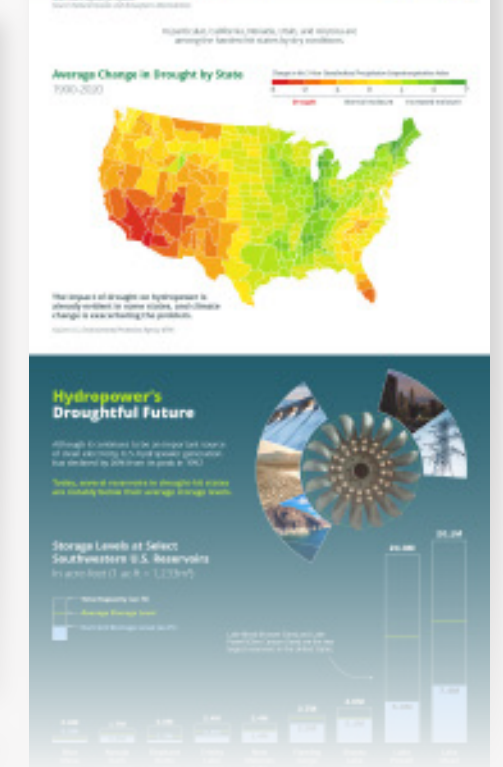
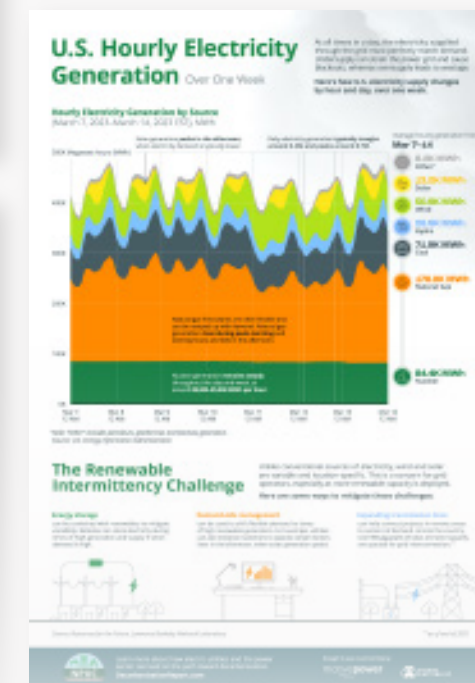
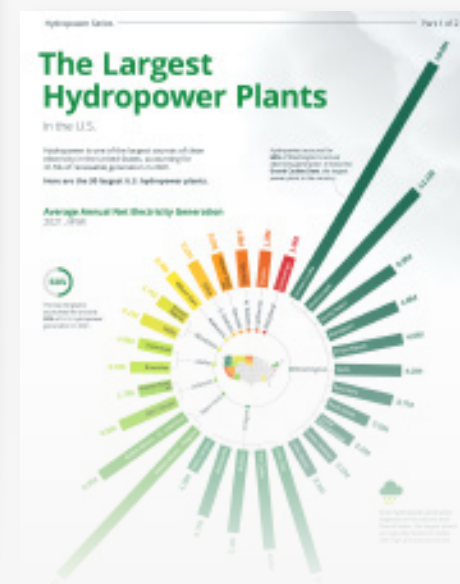
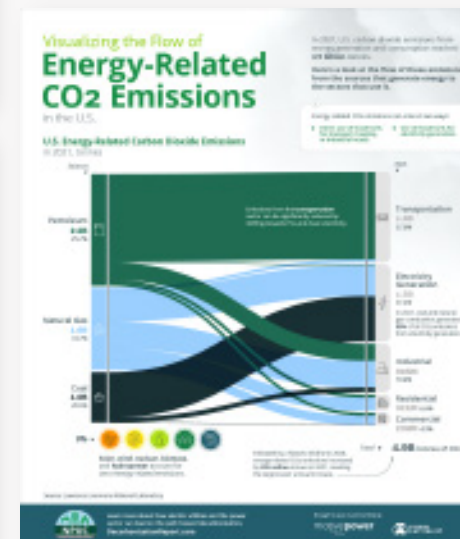
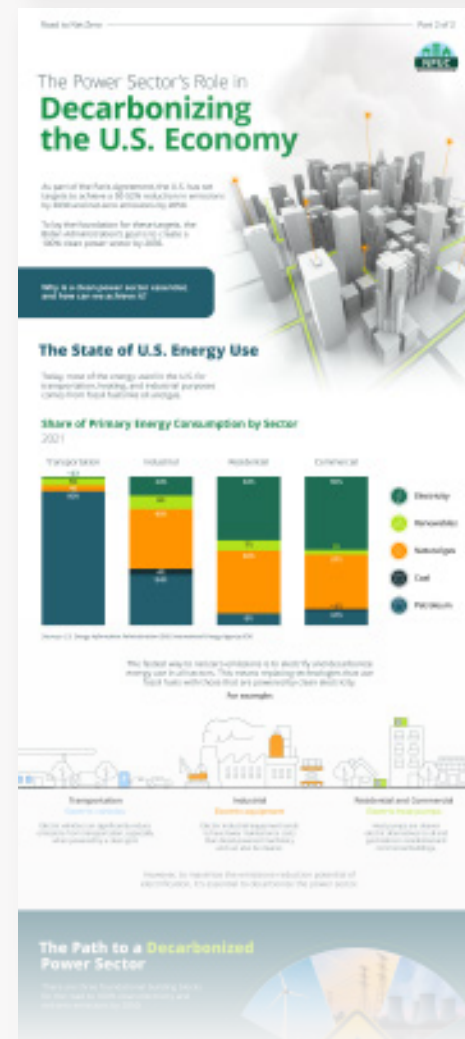
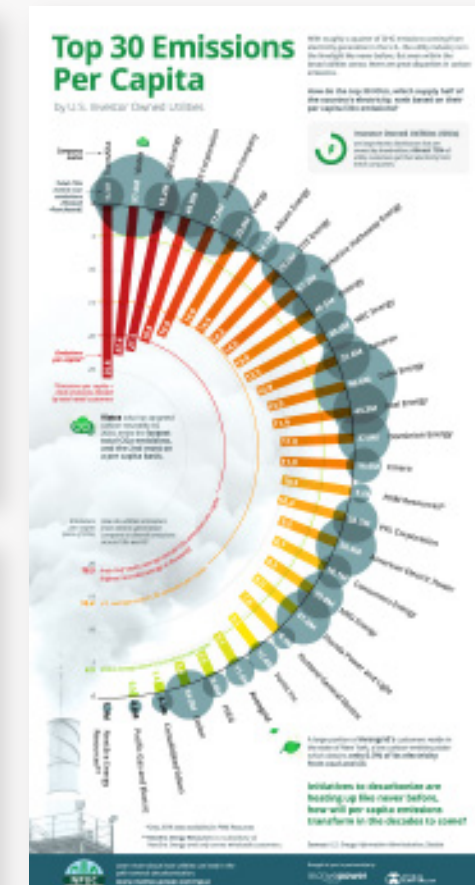
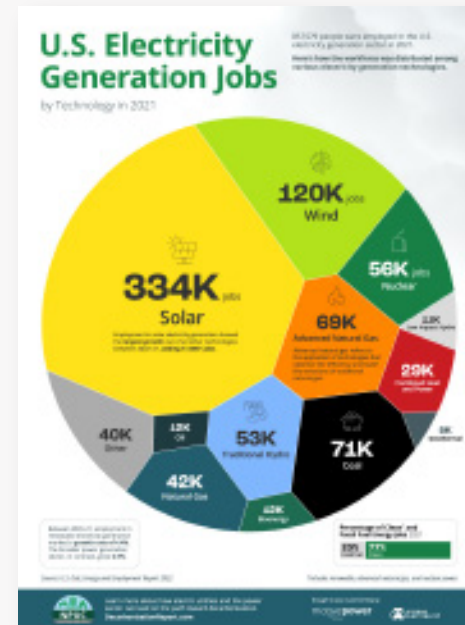
To keep up to date with NPUC's roundtables, conferences and general conversation around utility decarbonization, visit:
decarbonizationreport.com

ABOUT THE DECARBONIZATION CHANNEL

In partnership with NPUC and Visual Capitalist, the **Decarbonization Channel** hosts content that shines a light on the progress toward net-zero goals in the U.S. and drives the utility decarbonization conversation forward.

The website provides utilities, administrators, investors, and utility customers a data-driven look at all things decarbonization with a focus on the U.S. energy sector.

Check out the content now at:
decarbonization.visualcapitalist.com



COLLABORATORS

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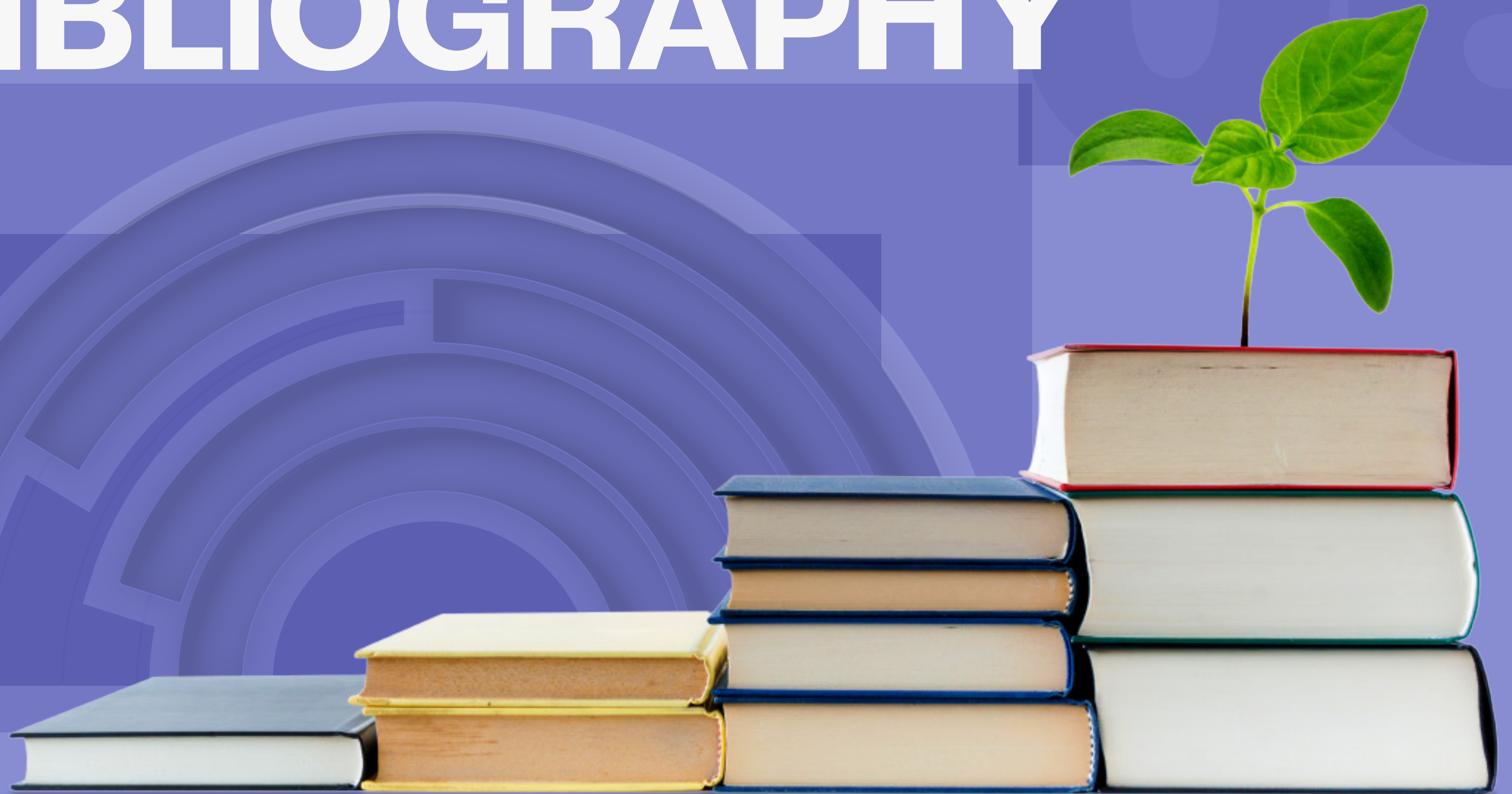
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