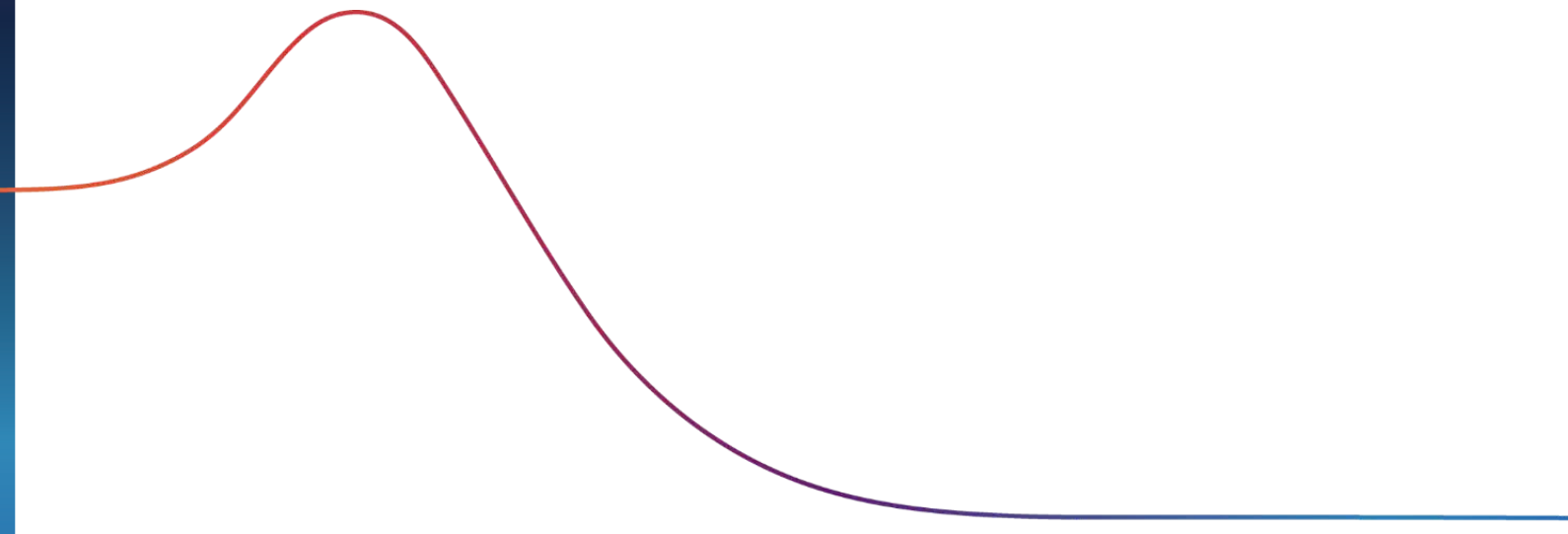
SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

# SBTi QUICK START GUIDE FOR ELECTRIC UTILITIES

Version 1.1

September 2026



# ABOUT SBTi

The Science Based Targets initiative (SBTi) is a corporate climate action organization that enables companies and financial institutions worldwide to play their part in combating the climate crisis.

We develop standards, tools and guidance which allow companies to set greenhouse gas (GHG) emissions reductions targets in line with what is needed to keep global heating below catastrophic levels and reach net-zero by 2050 at latest.

The SBTi is incorporated as a UK charity, with a subsidiary SBTi Services Limited, which hosts our target validation services. Partner organizations who facilitated SBTi's growth and development are CDP, the United Nations Global Compact, the We Mean Business Coalition, the World Resources Institute (WRI), and the World Wide Fund for Nature (WWF).

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The SBTi reserves the right to revise this document according to a set revision schedule or as advisable to reflect the most recent emissions scenarios, regulatory, legal or scientific developments, or changes to GHG accounting best practices.



# ACKNOWLEDGMENTS

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During the development of this work, we also had the advice of the SBTi Scientific Advisory Group and stakeholders participating in a public consultation webinar in March 2020.

# VERSION HISTORY

| Version | Change/update description | Release date | Effective dates |
|---|---|---|---|
| Version 1.0 | • N/A | June, 2020 | June, 2020 |
| Version 1.1 | • Minor revisions to reflect new SBTi target validation process (e.g. reference to SBTi tool and submission form replaced by SBTi Services Validation portal)<br>• Updated references to SBTi Corporate Net-Zero Standard V1.3<br>• Reference to Criteria Assessment Indicators | September 18, 2027 | September 18, 2027 |

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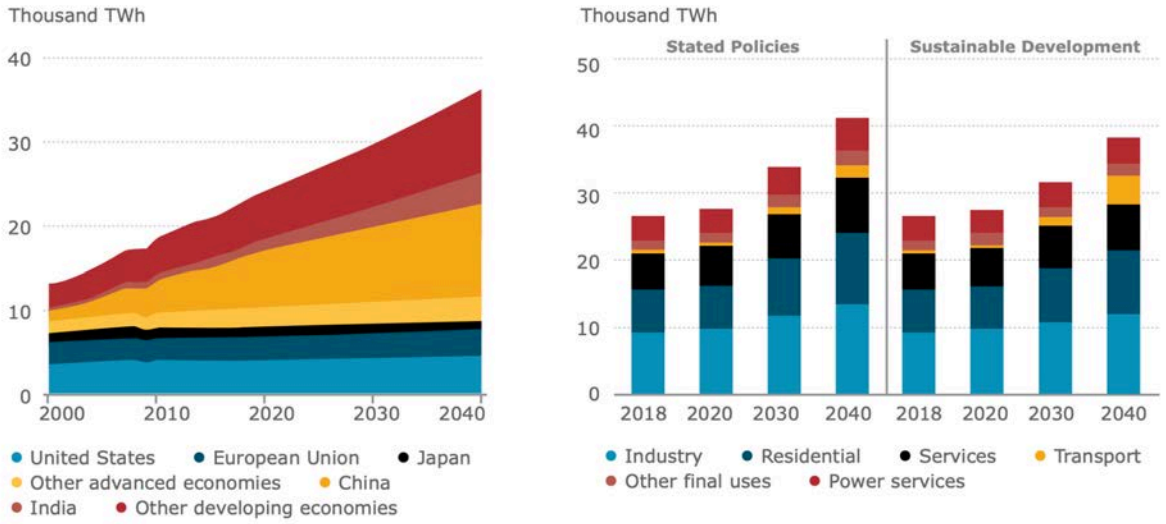
# INTRODUCTION

The Intergovernmental Panel on Climate Change's (IPCC's) *Special Report on Global Warming of 1.5°C* laid out a stark obligation: we must pursue "rapid, far-reaching, and unprecedented changes in all aspects of society" to hold temperature rise to 1.5°C above preindustrial levels or face irreversible damage to our societies, economies, and the natural world (IPCC, 2018). In response to this urgency, the Science Based Targets initiative (SBTi) introduced technical resources that enable companies to set greenhouse gas (GHG) emissions reduction targets in line with the flagship goal of the Paris Agreement, limiting warming to 1.5°C. This guidance accompanies the SBTi's 1.5°C pathways for the power sector and specifies how these pathways may be used to establish emissions reduction targets that demonstrate the highest level of climate leadership.

**Electric utilities play a crucial role in a decarbonized society**

In all climate scenarios that limit warming to 1.5°C, the share of electricity in final energy consumption grows steadily between 2020 and 2050 (Rogelj, et al., 2018). Reasons for this trend are multifaceted but primarily reflect the potential for electricity to decarbonize at a much faster rate than alternative energy carriers. Trends in projected electricity growth are shown in Figure 1.

*Figure 1. Projected increase of global electricity use in the IEA's Stated Policies Scenario (left) and the increase of electricity use in several economic sectors in the IEA's Stated Policies Scenario and Sustainable Development Scenario (right) (International Energy Agency, 2019a).*



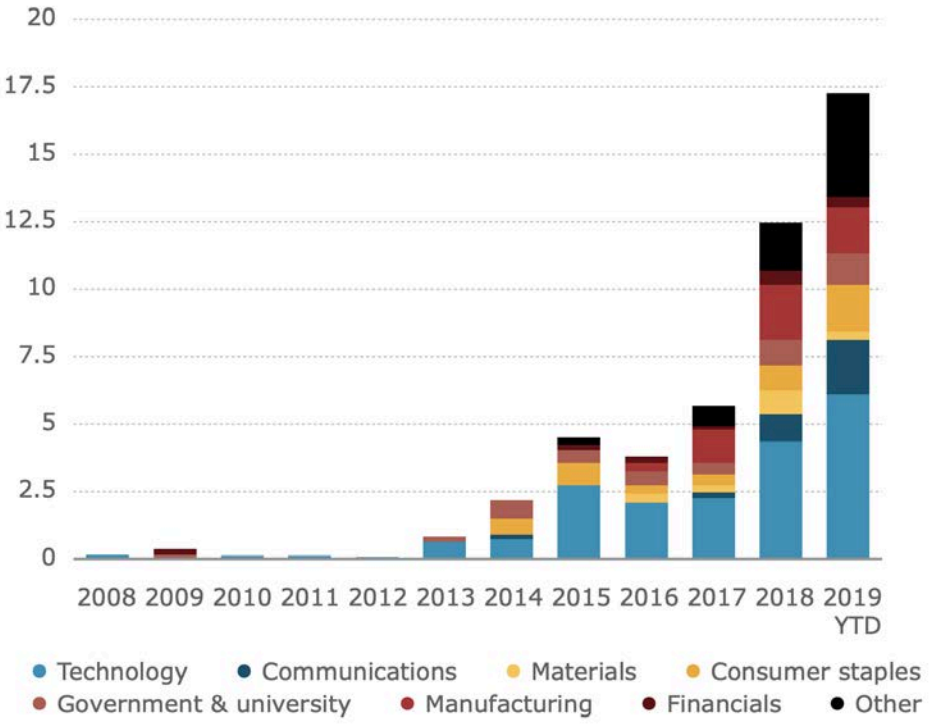

Companies and utilities are recognizing the business benefits of taking climate action, finding that it helps to improve brand reputation, increases investor confidence, boosts resilience against regulations, and achieves cost reductions. Corporate leadership can also advocate for strong climate policy, as current policies are insufficient for meeting the global goal of limiting warming to 1.5°C. The debate has quickly shifted from what is practical or

easy – the incremental changes and quick wins – to action that is grounded in the latest science.

### Decarbonization options for electric utilities

The power sector can establish steep emissions reductions due to rapid technology cost reductions for solar, wind, and storage; expansion of enabling conditions that arise from national and subnational goals; and growing demand for renewable electricity. Figure 2 shows the increase in volume of power purchase agreements (PPAs), a trend that is likely to continue in coming years as many companies outside the power sector incorporate purchased renewable energy through bundled PPAs into their climate action strategies. Nonetheless, electric utilities also need to establish innovative business models around smart grids, demand management, and energy storage to be consistent with a net-zero economy. The next section examines scenarios for the power sector and the following section reviews science-based target-setting methods and provides practical guidance.

*Figure 2. Global PPA volumes by sector, 2009-2019 (International Energy Agency, 2019b).*

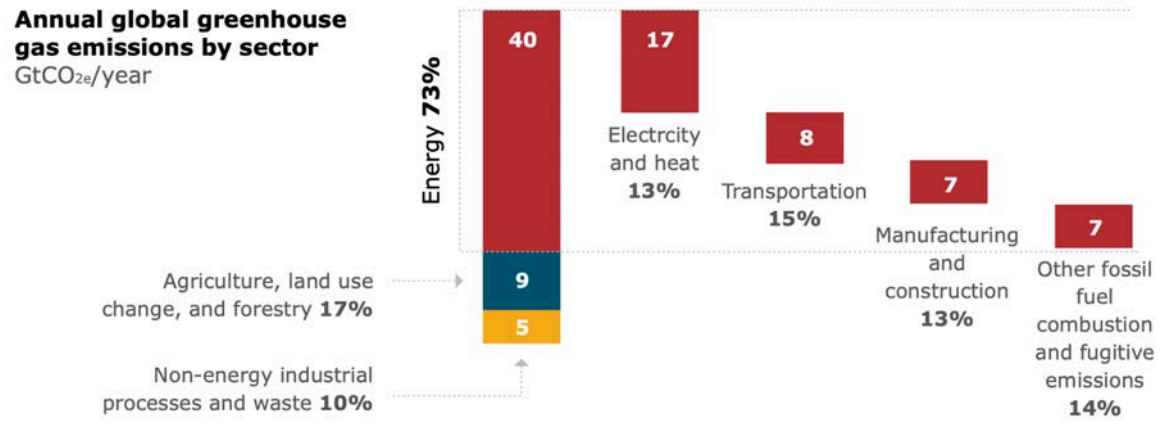


# WHAT THE SCIENCE TELLS US IS NECESSARY

Limiting warming to 1.5°C means that global GHG emissions need to be reduced by half by 2030 and to approach net-zero by 2050 (Johan Rockstrom, 2017; UNEP, 2019). This requires a comprehensive transformation across virtually all economic sectors. The energy system will play a central role in this transformation, as nearly three-quarters of today's emissions are energy-related – mainly the combustion of fossil fuels (Figure 3).

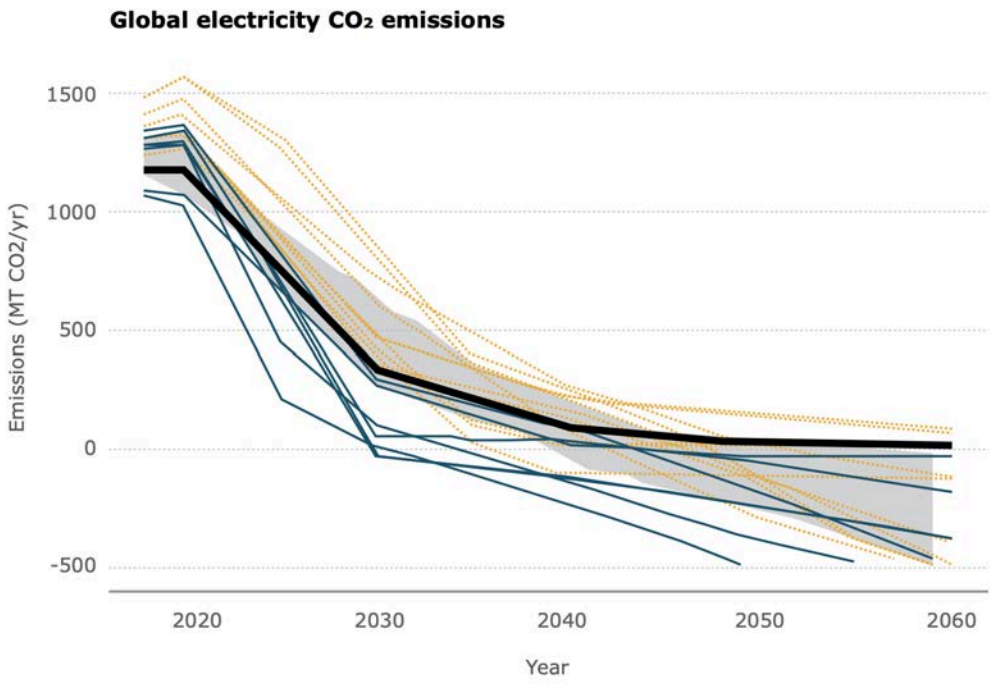
Decarbonizing the power sector is key to the energy system transition. If increasingly grave risks are to be avoided, decarbonizing the power sector will require the sustained rapid growth of renewable electricity and significant reductions in coal-fired and gas-fired generation at a global level over the next ten years (Grant & Coffin, 2019, pp. 38-41; Chang, 2020).

*Figure 3. Annual global GHG emissions by sector based on recent historical data (Ørsted, 2020).*




The deep decarbonization of the power sector is a robust outcome of all modeled scenarios that limit warming to 1.5°C in the IPCC's Special Report on 1.5°C. Sector emissions are reduced by 70-92% between 2020 and 2035, approaching zero by around 2040-2045 (Figure 4). Other characteristics of the power sector transition show more variation across scenarios, like growth in electricity generation, the sector's mix of primary energy sources, and the sector's deployment of bioenergy carbon capture and storage (BECCS).

*Figure 4. Global emissions from electricity generation. Interquartile range of all 1.5°C low/no-overshoot scenarios (gray shaded area), SBTi 1.5°C power pathways (blue), and excluded pathways (orange). Black line is MESSAGE-GLOBIOM Low Energy Demand scenario*



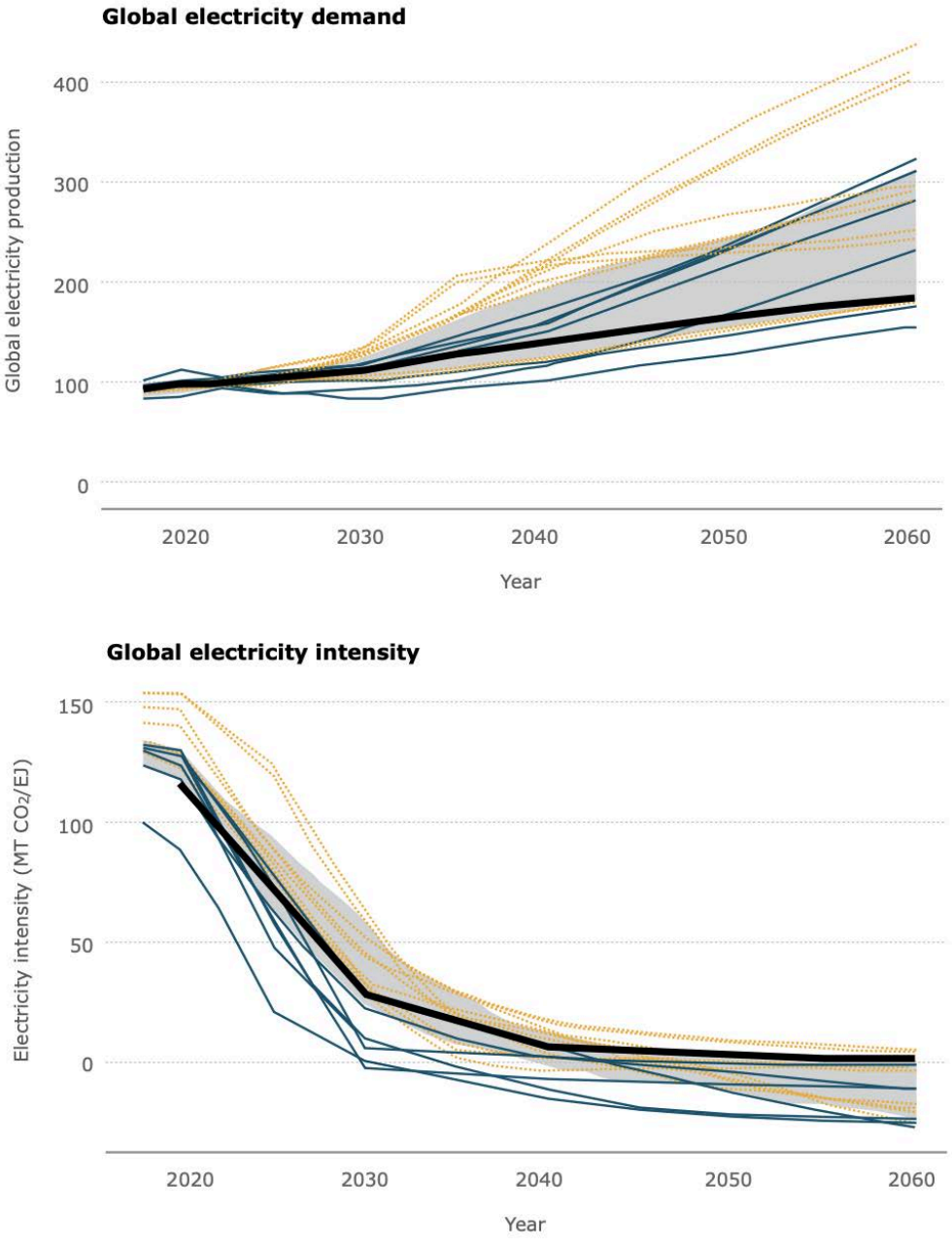

## Guiding near-term action

To determine minimum ambition, modeled scenarios used by the SBTi should be plausible, consistent, responsible, and objective relative to the desired goal of limiting warming to 1.5°C or well-below 2°C (SBTi, 2019). Not all scenarios meet these criteria, some show limited near-term GHG emissions reductions due to the assumed future deployment of $CO_2$ removal (CDR) technologies, which are associated with significant risks and uncertainties. These scenarios should not be used for science-based target-setting purposes. Ultimately, a set of 20 pathways for the power sector are found to comply with SBTi principles (see Supplementary Material on scenario selection) and are considered valid for target setting with the Sectoral Decarbonization Approach (Krabbe, et al., 2015).

At a minimum, SBTi power sector pathways aligned with 1.5°C approach zero emissions around 2040. These pathways are characterized by 2020-2035 reductions greater than the median of all low and no-overshoot scenarios in the IPCC's Special Report on Global Warming of 1.5°C. Higher near-term ambitions reflects that many excluded scenarios rely on CDR beyond what is known to be feasible to balance unmitigated emissions and reduce atmospheric $CO_2$ from 2040 onward. Regardless, the SBTi's power sector pathways are consistent with a range of electricity growth trajectories (Figure 5). The MESSAGE-GLOBIOM Low Energy Demand scenario is well-documented and establishes the minimum ambition emissions reduction pathway for the sector. The scenario depicts about 30% growth in electricity generation between 2020 and 2035. Combined with the emissions pathway, this is equivalent to an 85% reduction in emissions intensity between

2020 and 2035. After 2035, the MESSAGE-GLOBIOM Low Energy Demand scenario leads to an emissions intensity of approximately zero by 2050 (the convergence year for the SBTi's Sectoral Decarbonization Approach [SDA] method). Some other scenarios continue downward emissions trends, resulting in negative emissions for the sector in the second half of the century.

*Figure 5. Global electricity generation (top) and emissions intensity of electricity (bottom). Interquartile range of all 1.5°C low/no-overshoot scenarios (gray shaded area), SBTi 1.5°C power pathways (blue), and excluded pathways (orange). Black line is MESSAGE-GLOBIOM Low Energy Demand scenario.*



### The role of carbon dioxide removal

Even if all countries' GHG emissions targets pledged under the Paris Agreement (i.e., Nationally Determined Contributions) were met five years early, CDR would still be needed to limit warming to 1.5°C in 2100 (Holz, Siegel, Johnston, Jones, & Sterman, 2018). Therefore, CDR technologies should be further developed in parallel with the rapid transformation of power generation. In the energy sector, CDR technologies may include BECCS and direct air capture; nature-based solutions such as afforestation and reforestation also can be used. At this time, no science-based targets are expected to result in negative emissions.

# HOW TO SET A SCIENCE-BASED TARGET

This section provides step-by-step, practical guidance for electric utilities on setting SBTs. Four steps are described:

1. **Calculate emissions inventory**. Calculate base year and most recent year emissions inventories and activity (e.g., electricity generated) following guidance provided by the GHG Protocol.
2. **Determine target scope and approach**. Review the SBTi criteria and use the Power Generation SDA Applicability Matrix (Table 1) to determine how to set SDA target(s) across relevant activities and scopes.
3. **Construct targets**. Model SDA target(s) within SBTi Services' Validation Portal. Additional targets may also be needed to address emissions not applicable to the Power Generation SDA to meet SBTi criteria and can be modeled within the SBTi Services' Validation Portal or other sector tools.
4. **Submit targets to SBTi**. Submit through the SBTi Services' Validation Portal.

### Step 1: Calculate emissions inventory

Before a company sets a target, it should develop a comprehensive GHG emissions inventory for its target base year following GHG Protocol guidelines. In addition to ensuring general alignment with the GHG Protocol Corporate Accounting and Reporting Standard, companies are instructed to review "Appendix A: Accounting for Indirect Emissions from Electricity" and the GHG Protocol Technical Guidance for Calculating Scope 3 Emissions, with a focus on "Category 3: Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2." Companies with combined heat and power (CHP) activities should also refer to the guidance "Allocation of GHG Emissions from a Combined Heat and Power (CHP) Plant."

### Step 2: Determine target scope and approach

As a company's carbon footprint can be extensive, companies should focus efforts on key categories within their footprints. The SBTi offers recommendations for defining the target scope and has a detailed set of criteria that it uses for assessment. See Box 1 for more information.

**BOX 1: KEY SBTI CRITERIA**

The company should develop its science-based target using the SBTi Corporate Net-Zero Standard Version 1.3.1 and SBTi Corporate Near-Term Criteria Version 5.3.1 or most recent applicable version.

The most relevant criteria from SBTi Corporate Net-Zero Standard Version 1.3.1 for electric utilities are shared in the following list, but this is not exhaustive. For complete criteria wording please refer to the complete Standard.

***C5 – SIGNIFICANCE THRESHOLDS:*** *Companies shall not exclude more than 5% of total combined scope 1 and scope 2 emissions from either the boundary of the GHG inventory or the target boundary. Companies shall not exclude more than 5% of emissions from their*

*total scope 3 GHG inventory. 22*

***C11 – BIOENERGY ACCOUNTING:** Companies that use bioenergy or have biogenic emissions within their operations or value chain shall report CO2 emissions and removals in line with GHG Protocol guidance.*

***C16 – BASE YEAR:** The base year shall be no earlier than 2015. The company shall use the same base year for its long-term science-based targets as its near-term science-based targets. Scope 1 and scope 2 targets shall use the same base year.*

***C19 – LEVEL OF AMBITION FOR SCOPE 1 AND SCOPE 2:** At a minimum, scope 1 and scope 2 near-term targets shall be consistent with the level of decarbonization required to keep global temperature increase to 1.5°C compared to pre-industrial temperatures. This applies to both near-term and long-term targets.*[1]

***C4 – REQUIREMENT TO HAVE A SCOPE 3 TARGET:** If a company's relevant scope 3 emissions are 40% or more of total scope 1, 2, and 3 emissions a Scope 3 target is required [...].*

***C6 – BOUNDARY:** Companies shall set one or more emission reduction near-term targets and/or supplier or customer engagement targets that collectively cover(s) at least 67% of total reported and excluded scope 3 emissions [...]*

***C37 – FOSSIL FUEL SALE, TRANSMISSION AND DISTRIBUTION:** Companies that sell, transmit, or distribute natural gas or other fossil fuel products shall set absolute or intensity percentage-based emissions reduction scope 3 targets for the use of sold products [irrespective of the share of these emissions compared to the total scope 1, 2, and 3 emissions of the company. […]*

There are a variety of target-setting approaches endorsed by the SBTi, but the applicability of each approach is subject to sector, scope, and activity-specific requirements. These approaches are described for electric utilities in the following section.

### Science-based target approaches for the power sector

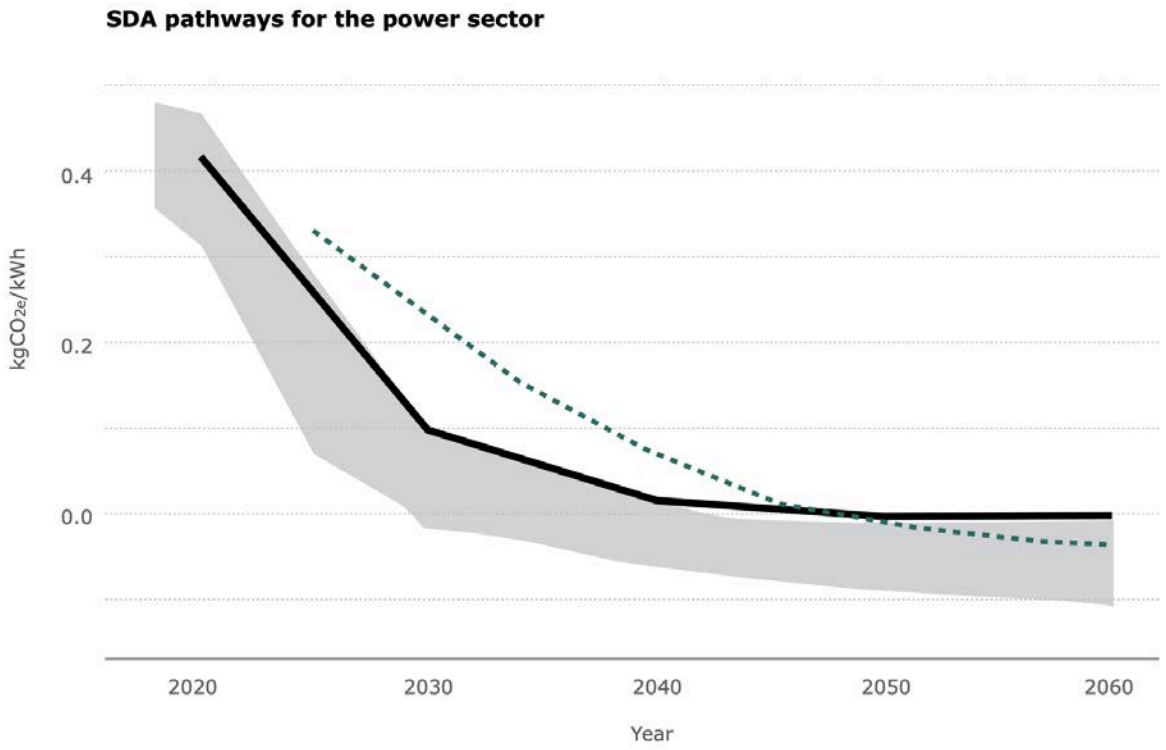
The SDA is a method for setting physical intensity GHG reduction targets that align with the sectoral pathway of an underlying climate change mitigation scenario. Emissions intensity targets are defined by a reduction in emissions relative to a specific business metric, such as production output of the company (in this case, kg CO2e per kWh). A central principle of the SDA is that all companies in a sector must converge to a certain emissions intensity by a chosen year, specified to be 2050.

As Figure 6 shows, emissions converge to zero or a negative intensity in the power sector; however, the SBTi does not currently prescribe any negative targets and defers its assessment of targets that include CO2 removals to its forthcoming net-zero criteria and guidance. Because the path to 1.5°C is not linear, companies that apply the Power Generation SDA pathway need to reduce emissions most rapidly over the next decade relative to historic emissions intensity levels. Companies that generate power must use the SDA to model targets on emissions from power generation.

[1] When a company uses fiscal years in its GHG accounting, the SBTi assesses minimum ambition based on the calendar year (CY) where the majority of the months occur. E.g. FY2022 with a date range of April 2021 - March 2022 it would be assessed as CY2021. In the case where a FY is evenly split across a CY (i.e., a FY ends on June, 30), ambition is assessed using the later year in the date range. This approach is applicable to all targets.

The absolute contraction approach is used to set targets on emissions that cannot be addressed using the SDA. Absolute contraction targets are expressed as a percentage emissions reduction achieved between a base year and a future target year, without directly incorporating changes in a company's production output. Companies should use the SBTi's Services Validation Portal to model SDA and absolute contraction targets at any of the ambition levels accepted by the SBTi.

*Figure 6. SDA pathways for the power sector aligned with 1.5°C (black line and shaded area) and well-below 2°C (dashed green line) based on IEA ETP B2DS with GHG emissions intensity on the y-axis.*




## Applicability of pathway and method

Because electricity generation is the primary source of emissions in the power sector, this guidance focuses on 1.5°C-aligned options for electricity generation expressed in terms of $CO_2e$ emissions per kWh. Commercial heat generation, including CHP, is also addressed. The resulting pathway is directly applicable to companies that generate electricity or electricity and commercial heat and is a starting point for exploring 1.5°C-aligned pathways across other sectors.

Depending on the utility, emissions associated with power generation may be accounted for in scopes 1, 2, or 3. For companies generating power, the SDA must be used to model targets covering electricity generation-related emissions within the organizational boundary, as well as generation-related emissions associated with all sold electricity. Emissions not associated with electricity should be addressed by the company's science-based target (if applicable) but may be modeled using a different target-setting method. Transmission and distribution (T&D) companies that do not generate electricity are not required to fulfill power sector-specific criteria and should defer primarily to the SBTi's general requirements.

Table 1 summarizes how the Power Generation SDA should be applied by electric utilities involved with different activities. The table should be used after an emissions inventory has been calculated and criteria C2 and C17 have been observed. Step 3 (below) provides several examples to demonstrate how the Power Generation SDA pathway can be applied.

*Table 1: Power Generation SDA Applicability Matrix.*

| Activity | | Emissions Scope | SDA Numerator (Emissions) | SDA Denominator (Activity) | Applicability to Organizational Boundary SDA Target | Applicability to All Sold Electricity SDA Target |
|---|---|---|---|---|---|---|
| Power generation in organizational boundary | Electricity | Scope 1 | GHG emissions generated | MWh electricity generated | Required | Required |
| | CHP-derived heat | Scope 1 | GHG emissions generated | GJ heat sold | Optional | Optional |
| | Other heat | Scope 1 | GHG emissions generated | GJ heat sold | Optional | Optional |
| Purchased electricity | Own use | Scope 2 | GHG emissions calculated with location or market-based factor | MWh electricity purchased | Optional | Optional |
| | Electricity that is purchased and sold | Scope 3 category 3 | GHG emissions calculated with location or market-based factor | MWh electricity purchased | N/A | Required |

The company should only report one SDA target covering power generation in the organizational boundary and, if applicable, one SDA target covering all sold electricity. The emissions intensity associated with each target is calculated based on the sum of relevant emissions in the SDA numerator column divided by the sum of relevant activity in the SDA denominator column. For purchased electricity, emissions must be calculated using the location-based or market-based approach.[2] Companies that generate heat have the option of including heat-related emissions in SDA target(s) with electricity or in a separate absolute contraction target.

For further information on the Criteria Assessment Indicators assessed during the validation of submitted Power SDA targets, please refer to Table 10 of the SBTi Services Criteria Assessment Indicators document.

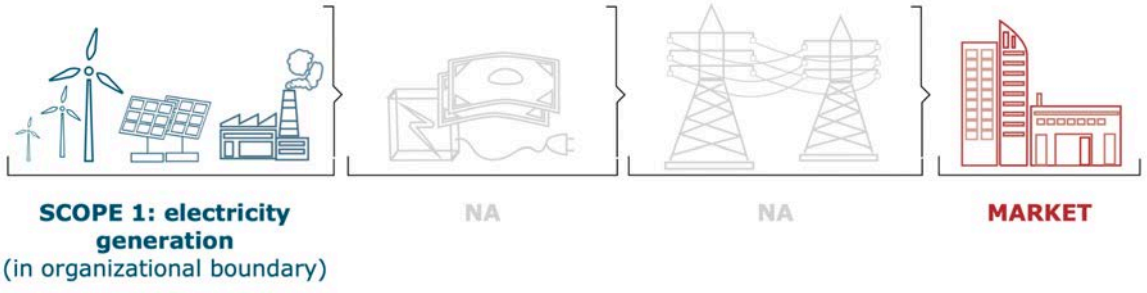
### Step 3: Construct targets

SDA targets should be modelled within the SBTi Services' Validation Portal. This section provides four examples that demonstrate how different types of electric utilities can model targets using the portal.

[2] GHG Protocol, Scope 2 Guidance: The location-based method reflects the average emissions intensity of grids on which energy consumption occurs (using mostly grid average emissions factor data). The market-based method reflects emissions from electricity that companies have purposefully chosen (or their lack of choice). It derives emission factors from contractual instruments, which include any type of contract between two parties for the sale and purchase of energy bundled with attributes about the energy generation, or for unbundled attribute claims.

### Example 1: Company generating electricity

*A power utility with no cogeneration/CHP capacity, no sale or distribution of thermal energy.*



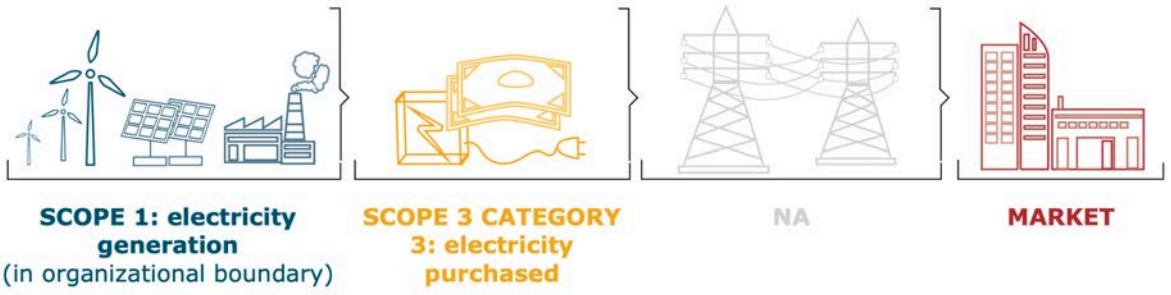

An SDA target must be constructed that covers scope 1 emissions from fuel combustion for electricity generation. Scope 2 emissions associated with electricity for the company's own use must either be included in the SDA target boundary or addressed separately using absolute contraction. If other scope 1 or 2 emissions are significant (e.g., combustion of fuel for transportation) it is best for them to be addressed separately using absolute contraction; however, because the Power Generation SDA typically results in more ambitious emissions reduction targets (in aggregate) than absolute contraction, companies may include all scope 1 and 2 emissions in the SDA target if desired.

When an electricity generation company's scope 3 emissions exceed 40% of total scope 1, 2, and 3 emissions, it must also address these emissions using an SBTi target-setting method. Otherwise, scope 3 emissions may be optionally covered with the exception of sold and distributed fossil fuels, which must be covered by a target.

To set a target using the SDA method, the amount of electricity generated must be defined in the base year and estimated in the target year. Through SBTi Services' Validation Portal companies can calculate their targets in absolute emissions and emissions intensity (kg CO2e/MWh).

### Example 2: Company generating and purchasing electricity

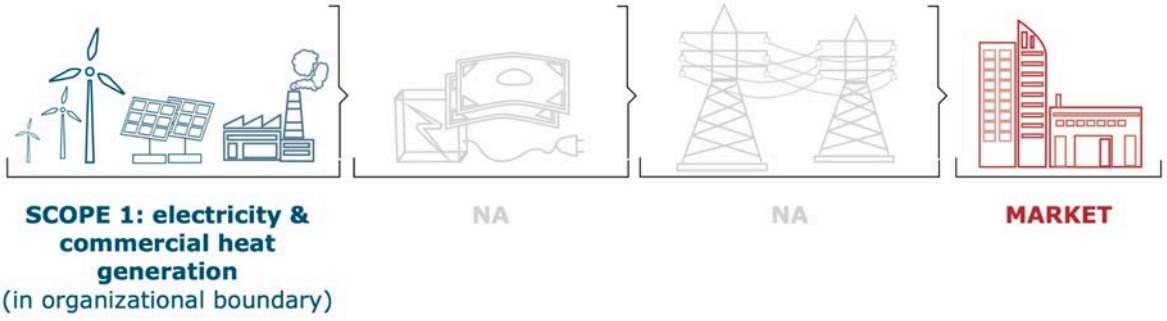
*A power utility generating and purchasing electricity with no cogeneration/CHP capacity, no sale or distribution of thermal energy*



Two SDA targets must be constructed: one target covering scope 1 emissions from fuel combustion for electricity generation (same as Example 1), and the other target covering the sum of generation-related emissions in scope 1 and scope 3 category 3 (i.e., all sold electricity). In the target covering all sold electricity, emissions intensity is calculated by dividing the sum of generation-related emissions in scope 1 and scope 3 category 3 by total electricity, which is the sum of electricity generation in the organizational boundary and electricity purchased to be sold to customers. Emissions intensity should be calculated for the base year and estimated for the target year. Companies may use the location-based or market-based approach to calculate emissions associated with purchased electricity.

### Example 3: Company generating electricity and commercial heat

*A power utility that has cogeneration capacity and/or controlling heat plants*




This example is similar to Example 1, but with a notable exception that it allows the operation of CHP or commercial heat plants. As some utilities reuse and commercialize heat from all or part of their power generation assets, this approach is designed to enable companies to set SBTs inclusive of heat and to recognize the improved efficiency of CHP.

Companies that match this example have two options for setting targets:

A. **Set separate targets on electricity generation and commercial heat**: Emissions allocated to electricity generation must be covered by an SDA target and emissions allocated to commercial heat must be addressed by absolute contraction.
B. **Develop a combined target**: The sum of emissions associated with electricity and heat generation is covered by a combined SDA target using an emissions intensity metric based on total power generation in megawatt-hours (i.e., the sum of electricity generated and commercial heat sold).

### Example 4: Vertically integrated power company (including T&D activities)

*A power utility generating and purchasing electricity with no cogeneration/CHP capacity, and with T&D activities.*


Vertically integrated electric utilities may set targets following a similar approach as Example 2. For any power generated by the company, emissions associated with electricity lost in T&D are implicitly included in scope 1. For power purchased to be sold to customers, emissions associated with electricity lost in T&D are generally included in scope 3 category 3. In the target covering all sold electricity, emissions intensity is calculated by dividing the sum of generation-related emissions in scope 1 and scope 3 category 3 by total electricity, which is the sum of electricity generation in the organizational boundary and electricity purchased to be sold to customers. Emissions associated with purchased electricity should be calculated based on location or market-based emissions factors. Similar to Example 2, an SDA target must also be set that covers scope 1 emissions from fuel combustion for electricity generation and that excludes emissions in scope 3.

It is recommended that companies that own T&D place special emphasis on reducing scope 1 emissions of the GHG sulfur hexafluoride (SF6), which is used in distribution systems, in addition to decarbonizing power generation.

### Step 4: Submit targets to SBTi Services

All targets must be submitted through SBTi Services' Validation Portal. The SBTi Services website provides access to the Validation Portal, and further information and guidance on the process for target submission and validation.

# ADDITIONAL RESOURCES

It is recommended that companies subscribe to the SBTi mailing list and regularly check the website for planned updates to SBTi resources. Companies may also find it useful to review targets that have already been validated by the SBTi, which are published on the SBTi's website. Stakeholders are encouraged to refer to third-party resources with increased geographic or sectoral resolution as practical tools to assist in target planning and implementation.

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SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION