

About the Better Plants Program

The US Department of Energy's (DOE's) Better Buildings, Better Plants Program is a voluntary initiative that works with leading manufacturers to showcase leadership and drive deep energy savings in the U.S. industrial sector. Partners agree to set ambitious sustainability goals and in return receive robust technical assistance, national recognition, facilitated peer-to-peer learning opportunities, and access to innovation. As of Fall 2020, the Better Plants Program has nearly 250 partners that have collectively saved more than \$8.2 billion and 1.7 quadrillion BTUs of energy^[1].

Many Better Plants partners are looking to translate their energy intensity progress towards carbon reduction goals and exploring if setting a Science-Based Target (SBT) is right for their organization.

What is the Science-Based Targets Initiative?

The Science-Based Targets (SBTs) initiative is a collaboration between CDP, the World Resources Institute, the World Wildlife Fund for Nature, and the United Nations Global Compact which requires companies set corporate-wide goals to reduce Greenhouse Gas (GHG) emissions to keep global temperature increases under 2°C. This temperature is specified by the United Nations Intergovernmental Panel on Climate Change (IPCC) as a threshold for our planet to avoid worsening climate disasters in the coming decades. SBTs provide companies with targets for defining the amount and time frame for which they will reduce their GHG emissions.



Figure 1. Better Plants Program cumulative energy savings through 2020.



SBTs provide companies with an ambitious goal aimed at reducing emissions and ensuring transformational actions are aligned with climate science. Although over 879 companies globally have taken actions toward SBTs, only 377 companies have approved targets as of March, 2020^[2]. As part of setting an SBT, all organizations are required to set Scope 1 and 2 reduction targets and if specific thresholds are met, also set Scope 3 reduction targets. Companies can choose between three reduction targets which align with climate change models of limiting global temperature increase to 2°C, well-below 2°C, or 1.5°C. The reduction goals are more aggressive for the 1.5°C temperature scenario versus the 2°C scenario. Therefore, companies with lower temperature goals usually have much higher emissions reduction goals.

Why Energy Efficiency is Important to Reduce Greenhouse Gas Emissions

Corporate action on sustainability is surging all over the world. Over 80 percent of the world's 500 largest companies have set emission reduction or energy-specific targets^[3]. Companies set targets for a multitude of reasons; for example, setting public goals signals a commitment to get control of their energy costs and their emissions and demonstrates their responsiveness to consumer demand and investors. For the energy-intensive manufacturing sector, achieving these ambitious targets often requires investing in multiple pathways.

The most cost-effective and ready-to-implement pathway is the deployment of energy efficiency practices and technologies^[4]. Many plants can achieve significant savings by identifying leaks and other low-hanging fruits. Beyond that, specifically implementing energy management systems and smart manufacturing may increase facility energy efficiency and result in an emissions reduction of approximately 15%^[5]. Deploying new industrial process technologies and strategic electrification could further reduce carbon emissions by another 15% in a cost effective manner. Not only does energy efficiency reduce emissions, it also lowers energy costs, improves productivity, and increases companies' energy security and reliability.

Simply put, efficiency investments reduce energy waste at facilities. Industrial energy efficiency measures can include improving behavior-based operational efficiencies and/or upgrading to more energy-efficient technologies. Some of these efficient practices and technologies may include: turning off unneeded equipment, tuning boilers to make them operate efficiently, changing temperature setpoints for HVAC systems, modifying pressure setpoints and detecting leaks in compressed air systems, recovering waste heat from flue gases, or upgrading lighting fixtures such as T8 to LED.

To further reduce GHG emissions, organizations commonly opt for renewable energy pathways. With decreasing prices for renewable energy technologies, more and more projects are being considered by industrial facilities. "Green" power can be procured in several ways but usually is some in the form of renewable energy certificates. Companies can opt for power purchase agreements (PPAs), which allow them to buy renewable energy from utilities or third-party contractors to offset their carbon emissions. Even though numerous opportunities exist to generate or procure renewable energy, the first step for facilities should always be to implement energy efficiency measures to reduce their energy intensity; some of these measure include adopting energy management based on the ISO 50001 standard, identifying plant-wide energy efficiency projects, and deploying new and smart technology for manufacturing^[6]. Prioritizing energy efficiency over renewables is often the most economic and practical approach to reducing GHG emissions and increasing a facility's energy security and reliability.

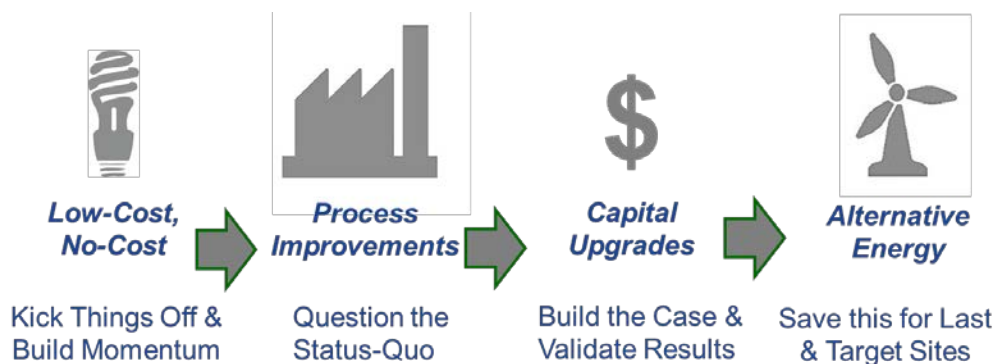
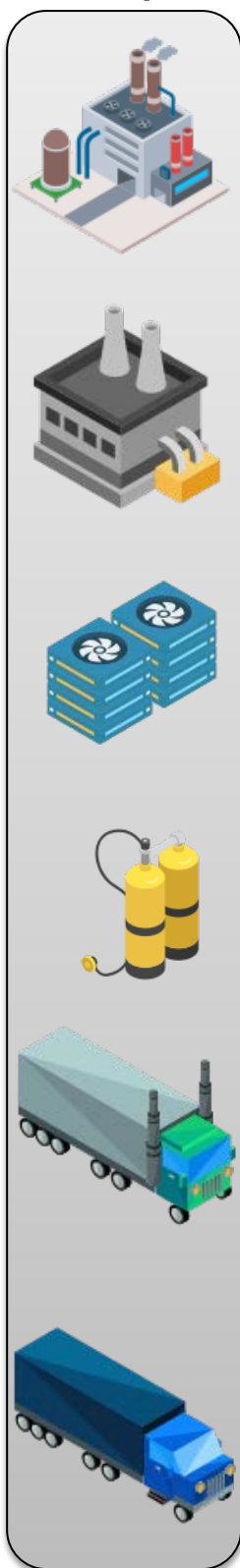


Figure 2. Steps to prioritize when implementing GHG reductions projects

How Should You Account for Your Emissions?

Scope 1



STATIONARY EMISSIONS

Stationary emissions include emissions from boilers, turbines, process heating systems and generators.

DOE RESOURCES

Manufacturing Energy Assessment Software for Utility Reduction (MEASUR):

This DOE tools suite helps analyze major energy using systems for energy efficiency opportunities. Some of the systems include: pumps, fans, process heat, steam and compressed air.

[WEB LINK](#)

Diagnostic Equipment Program:

The Better Plants Program developed a loan program to equip partners with tools like ultrasonic leak detector, power logger, combustion analyzer, infrared camera and many more enabling in assessing their systems and tracking progress.

[WEB LINK](#)

In-Plant Trainings:

These are workshops hosted at Better Plants partner sites to train employees in identifying and implementing energy-saving projects found in common systems, such as: compressed air, fans, motor-driven system, steam, process heating and pumping system.

[WEB LINK](#)

FUGITIVE EMISSIONS

Any industrial gas leaking from a process into atmosphere is considered a fugitive emission; examples include leaks from refrigeration systems, natural gas leaks in welding process and labs.

MOBILE EMISSIONS

Mobile emissions occur from organization-owned cars and heavy-duty vehicles for transportation of materials and products

DOE RESOURCES

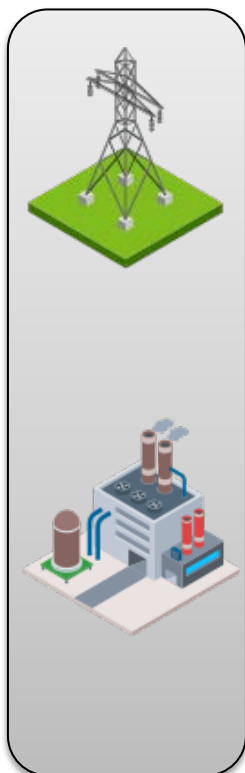
Energy Performance Indicator Tool (EnPI): This regression analysis based tool was developed to help Better Plants partner establish a normalized energy baseline, track and measure annual energy intensity improvement, calculate cost savings, and avoided CO₂ emissions at the facility and corporate levels.

[WEB LINK](#)

Alternative Fuels Data Center: This website provides information, data and tools to help decision makers evaluate the use of alternative and renewable fuels, advanced vehicles, and other fuel-saving measures.

[WEB LINK](#)

Scope 2



PURCHASED ELECTRICITY AND OTHER COMMODITIES

Electricity generated from fossil fuels, purchased steam, and purchased compressed air from a third-party are accounted for under scope 2 emissions.

DOE RESOURCES

DOE Renewable Energy Resource:

This website provides valuable resources from national lab researchers and leaders on innovative technologies for Partners interested in renewable electricity generation.

[WEB LINK](#)

Renewable Energy Integration and Optimization Tool (REopt):

This is a techno-economic analysis platform that can be used by Partners to optimize the mix of renewable energy, conventional generation, and energy storage technologies to meet cost savings, resilience, and energy performance goals.

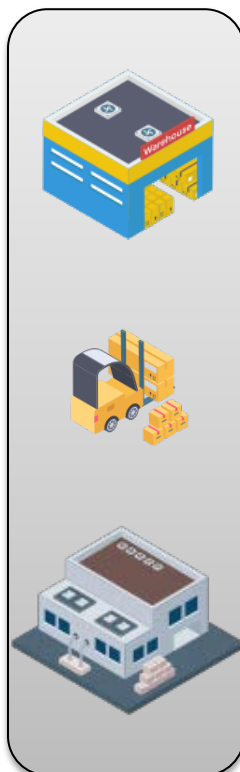
[WEB LINK](#)

Combined Heat and Power Resources:

The CHP Technical Assistance Partnerships provide resources and technical assistance for implementing CHP systems. The Packaged CHP eCatalog showcases DOE-recognized CHP packagers and solution providers.

[WEB LINK](#)

Scope 3



SUPPLY CHAIN EMISSIONS

These emissions specifically focus on the Scope 1 and 2 emissions from the supplier and any other upstream emissions, either supplier-specific or average emissions, that might have occurred in the supply chain process.

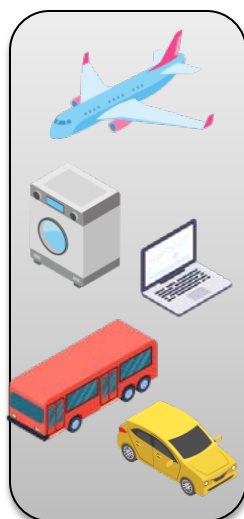
DOE RESOURCES

Supply Chain Initiative: This initiative serves as a platform for Partners to engage their suppliers to save energy. As part of the initiative, suppliers set clear goals and receive technical assistance to identify energy efficiency opportunities and enhance their energy management programs

[WEB LINK](#)

Industrial Assessment Centers (IAC): Small and medium size manufacturers are eligible to receive a no-cost assessment provided by an IAC. IACs conduct 1-day energy assessments to identify opportunities to improve productivity and competitiveness, reduce waste, and save energy.

[WEB LINK](#)



TRANSPORTATION AND DISTRIBUTION

These emissions occur when products are transported by third-parties. These include transportation by air, rail, or marine from suppliers to the company and from the company to their warehouse and distribution centers.

DURING LIFE AND AFTER LIFE PRODUCT EMISSIONS

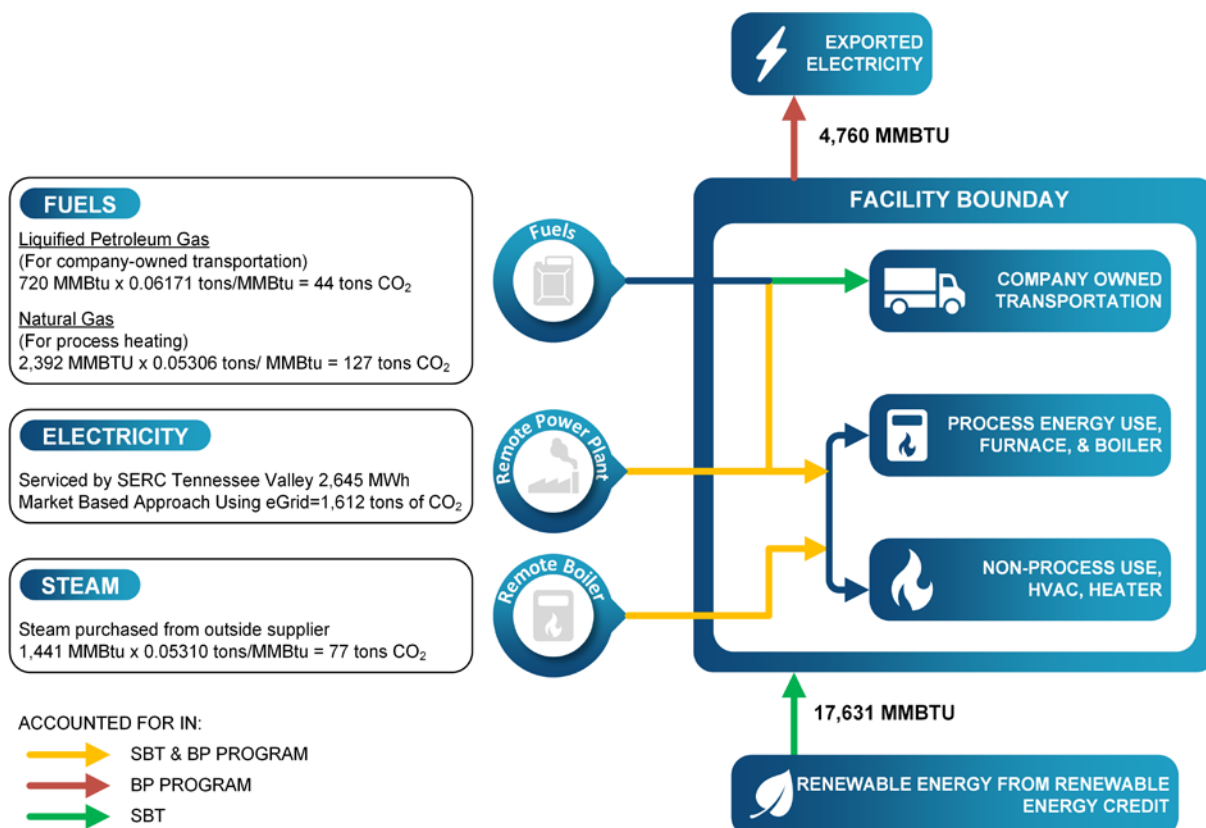
This includes emissions from the product sold from point of sale through end of its life.

COMPANY COMMUTES

Emissions from business travels along with employees' commutes to and from work is captured under this scope.

How the Better Plants Program Can Help You Account for Your GHG Emissions

Energy reductions directly result in GHG emissions reductions. The Better Plants Program emphasizes energy efficiency as the first step to reducing the energy and carbon footprint of facilities. The primary focus of the program is to help partners reduce the energy intensity of the products they produce. Partners can count GHG reduction accrued as part of the Better Plants Program toward their SBT goal. The following example shows how the Better Plants Program and SBTs account for different energy sources used inside a facility. Although the programs have a similar focus, the accounting can be slightly different in certain cases.



► **Estimation for Baseline Energy Consumption for Better Plant Program**

Energy Use from Remote Power Plant (MMBTU) = Total Electric Purchased (kWh) × Primary Energy Conversion Factor = $2,644,665 \times 3 \times 0.003412 = 27,072$ MMBTU

Baseline Energy Use (MMBTU) = Total electricity used from the remote power plant – Total electricity exported + Total liquefied petroleum gas consumption for company-owned transportation + Total natural gas consumption + Total steam consumption from the remote boiler = $27,072 - 4,760 + 720 + 2,392 + 1,441 = 26,865$ MMBTU. Better Plants program does not account for renewable energy credits.

Total CO₂ Equivalent Emission = $1,612 + 44 + 127 + 77 = 1,860$ tons of CO₂

► **Estimation for Baseline Emission for Science Based Target Initiative**

Scope 1 emissions = Total emissions from natural gas + Total emissions from liquefied petroleum gas for transportation = $44.6 + 127 = 171.6$ metric tons of CO₂

Scope 2 emissions = Total emissions from electricity from the remote power plant + Total emissions from steam consumption from the remote boiler = $1,1612 + 76.5 = 1,688.5$ metric tons of CO₂

The Better Plants Program requires all energy data to be reported in terms of primary energy units for electricity and imported/derived energy sources. For electricity, a 3.0 multiplier is commonly used to convert from site to primary energy consumption, for most other sources a default value of 1 can be used. The Better Plants Energy Intensity Baseline and Tracking Guidance document provides additional information on baselining and converting various energy sources^[7]. The SBT initiative accounts for emissions from purchased electricity using conversions factors from either a location-based database, such as the eGRID database^[8], or a market-based factor provided by the energy supplier.

The following table provides three scenarios for the aforementioned example to help understand how the accounting differs between the two programs. In a scenario where the facility reduces its electric and natural gas consumption, both programs' accounting result in the same emission reductions. Under a scenario where a company procures renewable energy, the emissions reduction would only be counted under the Better Plants program if the installation were onsite; otherwise, the Better Plant program does not account for renewable credits (VPA or RECs). The emission reduction from renewable procurement would count towards SBT reporting. Under a scenario where the company reduces Scope 1 energy use, both programs account for the associated emissions reduction.

	Accounting for the Better Plants Program	Accounting for the Science-Based Target Initiative
Scenario 1: Facility aims to reduce purchased electricity from the remote power plant by 20% to reduce their Scope 2 emissions.	The facility reduced electricity use by 5,414 MMBTU and their absolute energy use by 20% . This also results in 17% reduction in carbon emissions.	The facility reduced Scope 2 emissions by 323 metric tons of CO₂ from purchased electricity from the power plant. This results in a 17% reduction from the baseline emissions.

Scenario 2: Facility aims to increase renewable energy purchases by 20% through a PPA	Reductions in renewable energy purchased through PPAs are not accounted under the Better Plants Program. Therefore, there is no change in carbon emission.	Increases in renewable energy purchases through a PPA would decrease the emissions from purchased electricity reducing Scope 2 emissions to 1,230.2 metric tons of CO₂
Scenario 3: Facility aims to reduce purchased natural gas use by 20%	The facility reduced natural gas use for process heat by 478 MMBTU . This also results in 1% reduction in carbon emissions.	The facility reduced Scope 1 emissions from natural gas by 25 metric tons of CO₂ , resulting in a 1% reduction from the baseline emissions.

How Better Plants Program Can Help You in Achieving GHG Reduction

As a part of the Better Plants Program, partners have access to energy experts and technical account managers (TAMs) to help improve the effectiveness of their energy management programs. The TAMs routinely help partners in establishing baselines, analyzing key energy performance metrics, and evaluating existing and emerging energy-efficient technologies that are applicable to partners' operations. Partners also have opportunities to network and exchange ideas with peers. In the area of direct technical assistance, the Better Plants program offers In-Plant Trainings covering common energy support systems (steam, process heat, and motor-driven systems) which are facilitated by subject matter experts to help train partner employees on identifying and quantifying energy efficiency opportunities. In addition, Partners have access to the DOE's Industrial Assessment Centers where they can receive a no-cost energy assessment at their small and medium facilities. These technical assistance activities often result in reducing stationary emissions (Scope 1 and 2) in manufacturing operations.







TAMs can be a gateway to leveraging many of the other free resources that DOE has to offer. This includes utilizing the DOE's free software tools and resources for conducting energy analyses or for accessing the DOE's CHP Technical Assistance Partnerships which assists partners in evaluating and implementing CHP systems, waste heat to power, and district energy technologies. These measures can help to reduce emissions from purchased energy.

To help partners address Scope 3 emissions, partners can participate in the Better Plants Supply Chain Initiative where partners can leverage the Better Plants technical assistance offerings to help reduce the energy footprints at their suppliers. Through the initiative, suppliers are asked to set aggressive energy goals and are then eligible for many of the same resources to help them on their energy management journey.

Lastly, the online [Better Buildings Solution Center](http://betterbuildingssolutioncenter.energy.gov/better-plants) contains hundreds of case studies which showcase energy management best practices and innovative energy efficiency projects that have been implemented by Better Plants Partners over the years. These solutions contain useful information on the barriers that were faced, the solutions that were devised and how the practice or technology was implemented by the partner. In some cases, the partners have shared templates, tools and other resources to help companies replicate the opportunity.

Better Plants Partner Science-Based Targets Initiative Goals¹

Better Plants Partner	Goal	Target
	Ball Corporation committed to reducing its absolute Scope 1 and 2 GHG emissions by 55% and Scope 3 emissions by 16% by 2030 from a 2017 base year.	1.5°C
	Cummins committed to reducing its absolute Scope 1 and 2 GHG emissions by 50% by 2030 from a 2018 base year. Cummins also committed to reducing its absolute Scope 3 GHG emissions from the use of sold products by 25% by 2030 from a 2018 base year.	1.5°C
	Electrolux committed to reducing its absolute Scope 1 and 2 emissions by 80% between 2015 and 2025. Electrolux also committed to reducing its absolute Scope 3 emissions from the use of sold products by 25% during the same time frame, covering three-quarters of all products sold by Electrolux.	1.5°C
	L'Oréal committed to reducing its absolute Scope 1, 2, and 3 GHG emissions by 25% by 2030 from a 2016 base year. In support of this goal, they are also committed to reduce absolute Scope 1 and 2 emissions at its operated sites 100% by 2025 from a 2016 base year.	1.5°C
	Owens Corning committed to reducing its absolute Scope 1 emissions by 50% and Scope 3 emissions by 30% by 2030 from a 2018 base year.	1.5°C
	Schneider Electric committed to reducing its absolute Scope 1 and 2 GHG emissions by 100% and absolute Scope 3 emissions by 35% by 2030 from a 2017 base year. Schneider Electric also committed annual sourcing of 100% renewable electricity by 2030 from a 2017 base year.	1.5°C
	Ingersoll Rand committed to reducing absolute Scope 1 and 2 emissions (on a per unit revenue basis) by 35% by 2020 from a 2013 base year. Ingersoll Rand also committed to reducing the refrigerant footprint of its products by 50% over the same period	Well below 2°C
	Procter & Gamble (P&G) committed to reducing its emissions from operations by 50% by 2030 from a 2010 base year. Within this time frame, P&G will also address the main source of emissions across its value chain by measures including ensuring that 70% of all washing machine loads are washed in cold water.	Well below 2°C

	<p>AT&T committed to reducing its absolute Scope 1 and 2 GHG emissions by 26% by 2030 from a 2015 base year. AT&T also committed that 50% of its suppliers—by spend covering, purchased goods and services, capital goods, and downstream leased assets—will set science-based Scope 1 and 2 targets by 2024.</p>	2°C
	<p>General Mills committed to reducing its absolute emissions by 28% across its entire value chain (Scopes 1, 2, and 3) from farm to fork to landfill by 2025 from a 2010 base year.</p>	2°C
	<p>Legrand committed to reducing its Scope 1 absolute emissions by 15% and Scope 2 absolute emissions by 36% by 2030 from a 2016 base year. Legrand also committed that suppliers of raw materials will have GHG reduction targets covering 75% of total Scope 3 emissions by 2030.</p>	2°C
	<p>PepsiCo committed to reducing its absolute GHG emissions across its value chain (Scopes 1, 2, and 3) by at least 20% by 2030 from a 2015 base year.</p>	2°C
	<p>Saint-Gobain committed to reducing its absolute Scope 1, 2, and 3 emissions by 10% by 2025 from a 2017 base year.</p>	2°C
	<p>Tyson Foods committed to reducing its absolute Scope 1 and 2 emissions by 30% by 2030 from a 2016 base year. Tyson Foods also committed to reducing Scope 3 emissions from the production of poultry, pork, and beef (covering 80% of its Scope 3 inventory) by 30% per ton of finished meat within the same time frame.</p>	2°C

Better Plants Partners Committed to Science-Based Targets



References

- [1] "Better Plants Program Progress Update Fall 2020," 2020.
- [2] "Companies Taking Action," 2020. [Online].
- [3] World Resource Institute, "87 Major Companies Lead the Way Towards a 1.5°C Future at UN Climate Action Summit," 2019. [Online].
- [4] S. Creuheras, "World Resource Institute," [Online].
- [5] S. Nadel and L. Ungar, "Halfway There: Energy Efficiency Can Cut Energy Use," ACEEE, 2019.
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- [7] C. Price, S. Nimbalkar and T. Wenning, "Energy Intensity Baseline and Tracking Guidance 2020," ORNL/SPR-2020/1566, Oak Ridge, TN, 2020.
- [8] EPA, 2020. [Online]. Available: <https://www.epa.gov/egrid/emissions-generation-resource-integrated-database-egrid>.

¹ Better Plant Partner taking part in Science Based Target as of July 2020