



The 3% Solution

2013

The background of the cover is a low-angle shot of a modern glass skyscraper. The glass panels reflect a bright blue sky with scattered white clouds. Overlaid on the image are several semi-transparent blue circles of varying sizes. In the center, there is a large white circle containing the text "3%".

The 3% Solution

Driving Profits Through
Carbon Reduction

Acknowledgements

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Foreword – WWF



When something is good for the planet and good for your business, the only question is how soon you can get started.

Marcia Marsh
Chief Operations Officer
WWF-US

Life is full of difficult choices, particularly for corporate CFOs and COOs. But choosing between increasing profits and protecting the planet doesn't have to be one of them. Whether your company has been on the climate journey for years or has just begun, this report will change the way you think about climate change.

The 3% Solution turns the current climate debate on its head. Perceived climate *problems* become major business *opportunities*. Fighting over how to allocate the burden of a science-based target shifts to *grabbing your share of savings worth hundreds of billions of dollars*. In these pages are stories about companies already making a beeline toward these savings. You'll also find innovative tools for setting targets to drive toward these opportunities.

At WWF, we've been working with corporate partners to tackle climate change for over a decade. During that time, under WWF's Climate Savers program, some of the world's best companies have achieved more than 100 million tonnes of emissions reductions. By setting targets, companies pushed themselves to look harder at energy waste and found money lying on their factory floors. These were success stories we all celebrated.

But in the meantime, the world's best scientists demonstrated that climate change-driven extreme weather was coming faster and hitting harder than expected. We cannot rest on past successes. We need to think bigger and move faster.

So like our corporate partners setting targets to drive innovation, we have set a goal to remain true to the best climate science. Working in places where climate impacts are already biting communities and nature – the disappearing Arctic, the dying Pacific coral reefs, the melting Himalayas – we don't have any other choice. A 2020 science-based emissions target for the U.S.

economy breaks down to about a 3% average annual reduction by all U.S. companies. The key question posed in this report is: How far can a business case take us toward that goal? *The 3% Solution* shows that we can reach this entire 2020 goal, profitably.

The opportunities here are real, but also constitute a limited time offer. If we wait until 2020, the path toward a safer future will be much steeper. And if we wait until 2030, it may be unachievable, leading to insecure supply chains, climate tipping points and major business and societal risk. Also, as attractive as these savings are, policy changes – like pricing carbon emissions – are needed if we are to efficiently see change across the entire economy by 2020 and stay on course thereafter. Those companies that step confidently into this future will reap great near-term rewards and help shape the future of business.

The 3% Solution opens new possibilities and will help release latent cost-savings potential in your organization. At the same time, you'll be showing that science-based corporate ambition makes basic business sense.

There are no difficult choices here. When something is good for the planet and good for your business, the only question is how soon you can get started.

Let's get to it.

Marcia Marsh
Chief Operations Officer, WWF-US

Foreword – CDP



With the increasing frequency and severity of extreme weather events, and a growing understanding of the long term economic costs of climate change and fluctuating energy costs, business leaders and government are recognizing the imperative to mitigate climate change. Last year America witnessed a year of record-breaking weather events, from widespread droughts to Superstorm Sandy, which is estimated to have cost the state of New York US\$42 billion¹, causing more damage in financial terms than the infamous Hurricane Katrina. Analysis of the last 30 years shows that extreme weather events account for over 78 percent of the disasters recorded, with US\$2.6 trillion of associated costs. The high point was 2011, when the world experienced the highest disaster losses ever recorded in a 12 month period.

We must factor the costs of future environmental damage into today's decisions by putting an effective price on carbon. If we don't nature will do it for us, and it will be far more expensive and harder to plan for that way. Regulation is developing slowly, but some jurisdictions around the world have introduced carbon pricing through carbon taxes or cap-and-trade schemes. The most established is the EU Emissions Trading Scheme, but significant moves have also been made in Australia, California, China and South Korea, among others. The overall patchwork of regulation, however, currently remains insufficient to address the scale of the challenge of climate change and long-term resource costs.

CDP pioneered the global system for corporations to disclose their climate change and carbon emissions strategies over 10 years ago. Since then we have been driving corporations to reduce emissions and natural resource consumption. We now hold the largest collection of primary data on corporate impacts on carbon, energy, climate change, water and forests. In 2012 over 4,100 companies globally submitted vital environmental data to CDP, detailing over 6,000 actions taken to reduce emissions. The average payback period was less than 3 years.

This report makes clear that taking action to increase efficiency and reduce energy consumption is a profitable endeavor in its own right. It points to specific financial opportunities that US corporations can seize. But senior management need to devote much more attention to the issue if they are to drive the necessary near-term increase in capital expenditure required for companies to capture the full economic benefit of greenhouse gas emissions reductions.

It calls on corporations not only to address environmental risk, but also to aid economic recovery in the United States and build resilience. Investing in energy efficiency and renewable energy saves cost, stimulates innovation, creates jobs and builds energy independence and security.

CDP is giving attention to this issue through our Carbon Action program, in which 190 investors with US\$18 trillion in assets under management ask 260 of the world's highest emitting companies to reduce emissions year on year, set public targets and make investments in ROI positive projects to reduce emissions. Companies reported reductions of 497 million tonnes² of CO₂e as a result of emissions reduction activities totaling US\$11 billion in 2012.

The opportunity is here to be taken and in a rapidly changing world it is the early movers who will aid the future success of their corporations and national economies.

Paul Simpson
CEO, CDP

1. New York State Hurricane Sandy Damage Assessment; Governor Andrew Cuomo; November 12, 2012 <http://www.governor.ny.gov/press/11262012-damageassessment>
2. Note: 497 million metric tonnes CO₂e (MtCO₂e) represents the sum total of 860 emissions reduction activities reported in question 3.3b of CDP's 2012 climate change questionnaire by 257 companies in heavy emitting industries. The 238 reported projects with complete financial information analyzed in this report total 110 million metric tonnes CO₂e. CO₂e is a measure that aggregates different green house gases into a single measure, using global warming potentials. One unit of carbon is equivalent to 3.664 units of carbon dioxide.

Executive Summary

Businesses face increasing risks to growth, productivity and supply chains from climate change, as the frequency and severity of extreme weather events such as droughts, floods, and storms increases.

Those risks are expected to grow. Increasing the global average temperature more than 2°C above pre-industrial levels – a path we are now on – would cross a threshold beyond which climate change is expected to have long-term, irreversible, and dangerous effects. Scientists say we need to substantially reduce emissions to have a fair chance of achieving the goal of not crossing the 2°C increase threshold.³

But this is not a report about the potentially crippling business and societal risks of exceeding 2°C. The purpose of this report is to explore if the US corporate sector can profitably reduce emissions between now and 2020 in line with this science-based goal.

World Wildlife Fund (WWF) and CDP commissioned this research to address three key questions:

1. How big is the gap between the level of emissions the US corporate sector is likely to reach by 2020 and the level of emissions required to avoid the 2°C increase threshold?
2. How much of that gap can be closed profitably by the US corporate sector?
3. What other actions are needed for the US corporate sector to help stabilize the climate in the longer term?

In short, this report shows that business today can meet this goal profitably. Rather than focusing on threats, this report identifies novel approaches for the private sector to capture hundreds of billions of dollars in savings and create business opportunities by addressing climate change.

It builds on more than a decade of experience from leading companies that have begun the journey to address the challenge of climate change. From early efforts to measure and track emissions or improve internal efficiency, to more recent efforts to tackle emissions and efficiency in products and supply chains,

these initiatives have flourished because they have yielded significant returns on investment and important reputational benefits.

The report reaches two main conclusions:

Business Faces a Gigatonne Challenge

To be on track to stay below 2°C, the US corporate sector must reduce total annual greenhouse gas emissions in 2020 by 1.2 gigatonnes of CO₂e from 2010 levels.⁴ This is equivalent to annual reductions of approximately 3 percent per year across the US corporate sector.

The 3% Solution Can Drive \$190 Billion of Net Savings in 2020

Based on this analysis, The 3% Solution can create a present value (PV) of net savings up to US\$190 billion in 2020 for the US corporate sector⁵, excluding utilities. Between 2010 and 2020, the net present value (NPV) could be as high as \$780 billion.

Companies can capture these unrealized savings from three primary categories of activities: (1) improved energy efficiency through behavioral or management changes, (2) energy efficiency through technology improvements, and (3) the deployment of low-carbon energy, particularly rooftop solar photovoltaics (solar PV). *The 3% Solution* is entirely profitable, with profitable opportunities that vary across sectors (see exhibit on following page).

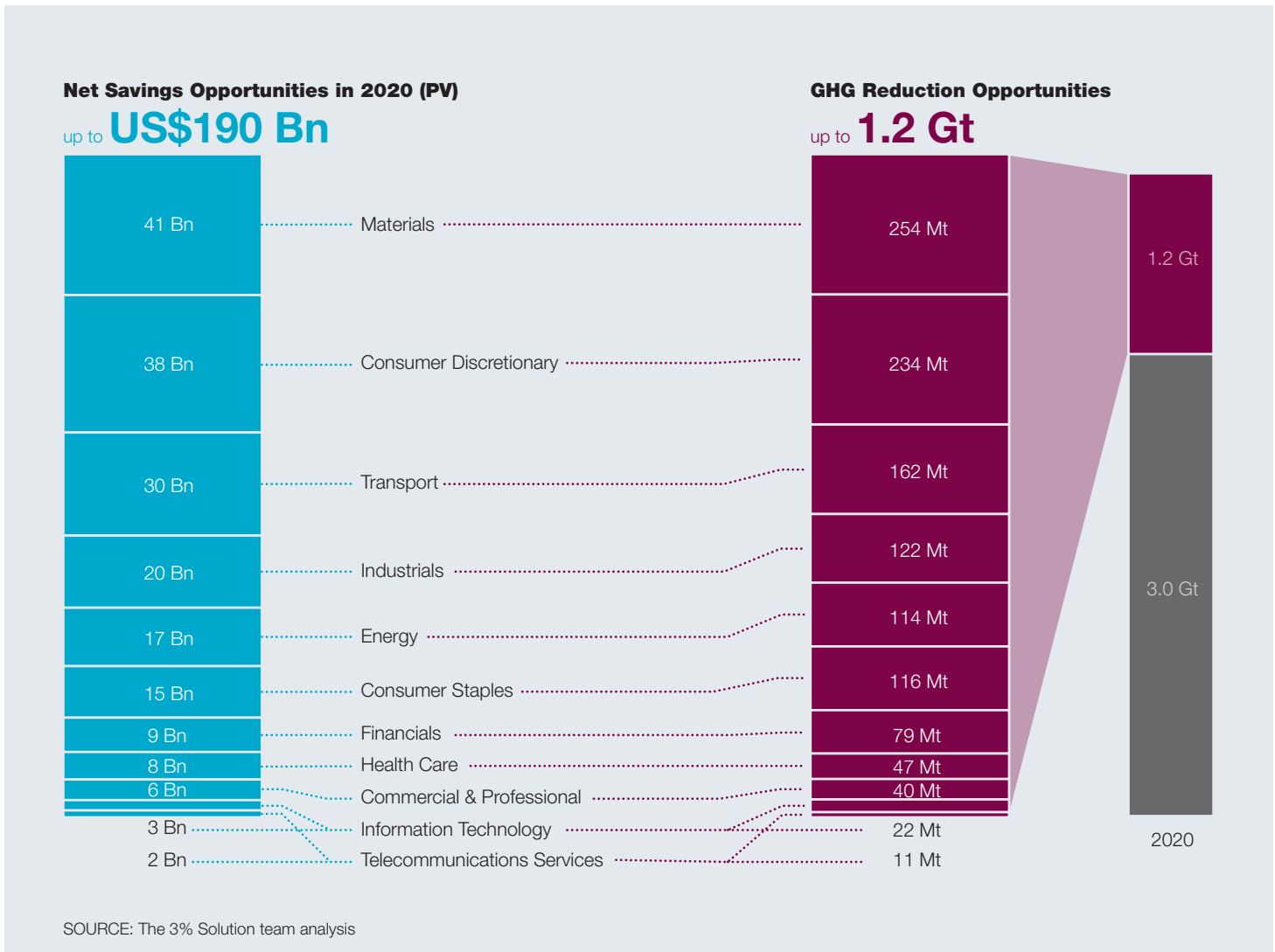
In addition to the cost savings opportunities in 2020, there is another gigatonne in emission reduction opportunities from utilities, consumers and supply chains.

Together, 2.2 GtCO₂e of annual emissions reductions are achievable in 2020, almost double what is required to meet the Intergovernmental Panel on Climate Change (IPCC)'s 2020 minimum target of reducing emissions by 25% from 1990 levels.

3. According to the Intergovernmental Panel on Climate Change (IPCC), Annex 1 (developed) countries need to reduce GHG emissions by 25-40% below 1990 levels by 2020, and 80-95% below 1990 levels by 2050. Such a stabilization pathway was said to provide a "reasonable chance" of averting warming beyond 2°C above pre-industrial temperature that would lead to catastrophic consequences on human and ecological systems. Source: IPCC's 2007 Fourth Assessment Report.

4. A GtCO₂e, is equivalent to one billion metric tonnes of carbon dioxide equivalent. Also referenced in this report is the term MtCO₂e, or megatonne of CO₂e, which equals one million metric tonnes of carbon dioxide equivalent. These measures aggregate different greenhouse gases into a single measure, using global warming potentials. 1.2 gigatonnes of CO₂e constitutes a reduction from 4.2 GtCO₂e in 2010 to 3.0 GtCO₂e in 2020. Sources: IPCC Fourth Assessment Report (AR4), Working Group III, Summary for Policymakers, 2007, UNFCCC GHG emissions time series datasheets for Annex I parties to the convention, the US Energy Information Administration (EIA) Annual Energy Outlook 2012, the US Environmental Protection Agency Greenhouse Gas Inventory, the US Bureau of Economic Analysis and the US Bureau of Labor Statistics (BLS).

5. Includes corporate emissions reductions from internal operations and reduced energy consumption.



The analysis produced three key findings about the potential financial opportunity:

Low-Carbon Investments Produce Higher Returns.

Seventy-nine percent of US companies in the S&P 500 that report to CDP earn a higher return on their carbon-reduction investments than on their overall corporate capital investments.

The 3% Solution Allocates Financial Benefits, Not Environmental Burdens. The analysis shows that some sectors will have an opportunity to reap greater savings based on their share of the potential US\$190 billion of NPV positive investment opportunities. Sectors with higher reduction targets have greater potential profits than sectors with lower targets.

Increased Capital Expenditures Are Needed. While the opportunities are significant, most companies are not

investing enough to capture them. These savings could be fully realized if the corporate sector, excluding utilities, devoted 3 to 4 percent of its capital expenditures to emission reduction investments.

Between 2010 and 2020, the US corporate sector can unlock up to \$1.26 trillion (PV) in savings. Unlocking those savings would require capital expenditures of approximately \$480 billion (PV), resulting in a net present value (NPV) savings of up to \$780 billion.

Though there is uncertainty around the rate of capital deployment, this analysis finds that the US corporate sector can meet a meaningful target that results in up to \$190 billion of present value net savings in 2020. This report focuses on the results in 2020 in order to guide company managers and other stakeholders towards a common goal.

THE CARBON PRODUCTIVITY PORTFOLIO

The Carbon Productivity Portfolio is a set of five actions that together create a practical pathway to capturing the full 2.2 GtCO₂e opportunity in 2020. It is built upon the experiences and successes of leading companies. Its five components create a new strategic approach to maximizing carbon reduction and simultaneously creating business value (see exhibit below).

These components are:

- ▼ **Set ambitious targets.** The research suggests that those companies that set “stretch” targets often reach and exceed them because the targets spur innovation and more profitable reductions than anticipated. This report describes some of the best practices in setting carbon reduction targets, and introduces a **Carbon Target and Profit Calculator**⁶ that
- enables companies to identify their own 2020 targets and estimated financial savings based on their own particular industrial sectors.
- ▼ **Improve energy management, increase investment and overcome barriers.** Although each company faces its own particular challenges, most come up against a common set of barriers: capital constraints, low management priority, and lack of expertise. Companies interviewed for this report show these barriers can be overcome.
- ▼ **Increase low-carbon energy supplies.** Companies can switch to low-carbon energy supplies and earn positive returns, but to accomplish even more the utility sector must increase low-carbon energy supplies as well. This report discusses the role energy utilities can play and the most cost-effective approaches to “cleaning” the energy mix.

Carbon Productivity Portfolio



SOURCE: The 3% Solution team analysis

6. Visit www.the3percentsolution.org to access an online version of this calculator.

▼ **Develop low-carbon products and supply chains.** Companies interviewed for this report are not only reducing emissions from their own operations, but also influencing their entire supply chain. These actions include: (1) developing products and services to reduce customers' costs and emissions; (2) encouraging supply chain partners to implement NPV-positive measures in their operations; and (3) working with suppliers to develop low-carbon products.

▼ **Engage with stakeholders and government.** To capture the full reduction potential and lay the foundation for meeting the IPCC's 2050 target, wider collaboration will be needed with a range of stakeholders to enable innovation and policy changes to speed the transition to a low-carbon future. Key partners include local and national governments, NGOs, industry associations, cross-industry groups, and research entities.

THE URGENCY OF ACTING NOW

Timing is critical. If US businesses act now to reduce emissions 3 percent annually through 2020, they can collectively capture present value cost-savings up to US\$190 billion in 2020 alone and put us on the pathway to curbing climate change. Waiting until 2020 to start the journey would be costly for companies and the climate, requiring a 9.7 percent reduction annually to meet the minimum 2050 target. Waiting until 2030 is not an option; the 2°C target would be out of reach.

LET'S GO FOR IT.

Whether your company has seized hundreds of millions of dollars from carbon reductions already or is just beginning the journey, *The 3% Solution* will open new possibilities and help to discover latent cost-savings waiting to be harvested. The report shows businesses can profit and protect the planet. Let's go for it.

Chapter 1. Introduction

Over the past few years, corporate America has witnessed with alarm the increasing frequency and severity of climate shocks such as droughts, floods, and storms. Beyond the damaging consequences to communities, these events undermine corporate productivity and growth by disrupting supply chains, increasing crop prices, and creating periodic water shortages. US companies need the climate to be stable and predictable to continue to grow and deliver business value.

Starting more than a decade ago, a number of leading businesses embarked on a journey to address climate change. First, they began to measure, track and verify carbon emissions. Then they set carbon reduction goals, developed action plans, invested in energy saving measures and communicated preliminary results. More recently, some of them have turned to reducing emissions throughout their supply chains and taking into account the growing demand from consumers for sustainable products and services. These initiatives have flourished because they have yielded significant returns on investment and important reputational benefits.

To understand the effect of these efforts by US companies to reduce carbon emissions, as well as build the strongest possible business case for all companies to implement carbon reduction programs, the World Wildlife Fund (WWF) and CDP commissioned research to address three key questions:

1. How big is the gap between the level of emissions the US corporate sector is likely to reach by 2020 and the level to which the scientific community says emissions must be reduced to avert the worst impacts of climate change?
2. How much of that gap can be closed profitably by the US corporate sector?
3. What other actions are needed for the US corporate sector to help stabilize the climate in the longer term?

To answer these questions, the research team adopted targets for climate stabilization from the Intergovernmental Panel on Climate Change (IPCC) and used the data on past and projected emissions from US government sources.⁷ To understand the companies' carbon reduction goals, investments and returns, the report relies on CDP's 2012 dataset for US corporations in the S&P 500.⁸

To assess the corporate opportunity for reducing emissions⁹, the analysis drew on published reports on carbon reduction through improved energy management, energy efficiency, and renewable energy.¹⁰ The analysis looked at all possible abatement opportunities from those three listed areas using current, commercial technologies and narrowed the opportunities to those with positive net present value (NPV) that could also be broadly adopted. The team also interviewed more than 20 large US companies across a variety of industry sectors to understand how they set targets, the returns they achieve, and how they overcome common barriers to making carbon reduction investments.

7. Sources for the gap analysis in this report include: IPCC Fourth Assessment Report (AR4), Working Group III, Summary for Policymakers, 2007; United Nations Framework Convention on Climate Change (UNFCCC) GHG emissions time series datasheets for Annex I parties to the convention; the US Energy Information Administration (EIA) Annual Energy Outlook 2012; the US Environmental Protection Agency (EPA) Greenhouse Gas Inventory; the US Bureau of Economic Analysis; and the US Bureau of Labor Statistics (BLS). Based on these sources, the US trajectory for GHG emissions is not expected to increase significantly, mainly due to the expected low economic growth following the financial crisis and the increasing production and use of shale gas in place of higher emissions fuels. This does not take into account increases in methane from shale gas that are incorporated into the EIA 2013 projections.

8. The data set used for this report included 386 companies in the S&P 500 which report data to CDP.

9. The corporate opportunity includes reductions that go beyond the business as usual base case, which includes projections of shifts from coal to gas and increased renewable energy.

10. Key sources for the corporate opportunity assessment include: "Unlocking Energy Efficiency in the US economy", McKinsey and Company 2009; "Solar, Darkest before dawn", McKinsey and Company 2012; "Pathways to a Low-Carbon Economy", McKinsey & Company 2009; "Reducing US GHG Emissions: How Much at What Cost", McKinsey 2009; Impact of the Financial Crisis on Carbon Economics", McKinsey 2010.

Chapter 2. The Gigatonne Challenge

The vast majority of scientists and governments around the world agree on the need to keep the rise in the global average temperature below 2°C compared with temperatures during pre-industrial times – a threshold at which the implications of climate change become especially dangerous. According to the IPCC, to meet this goal developed countries need to reduce GHG emissions by 25 to 40 percent below 1990 levels by 2020, and 80 to 95 percent below 1990 levels by 2050.¹¹

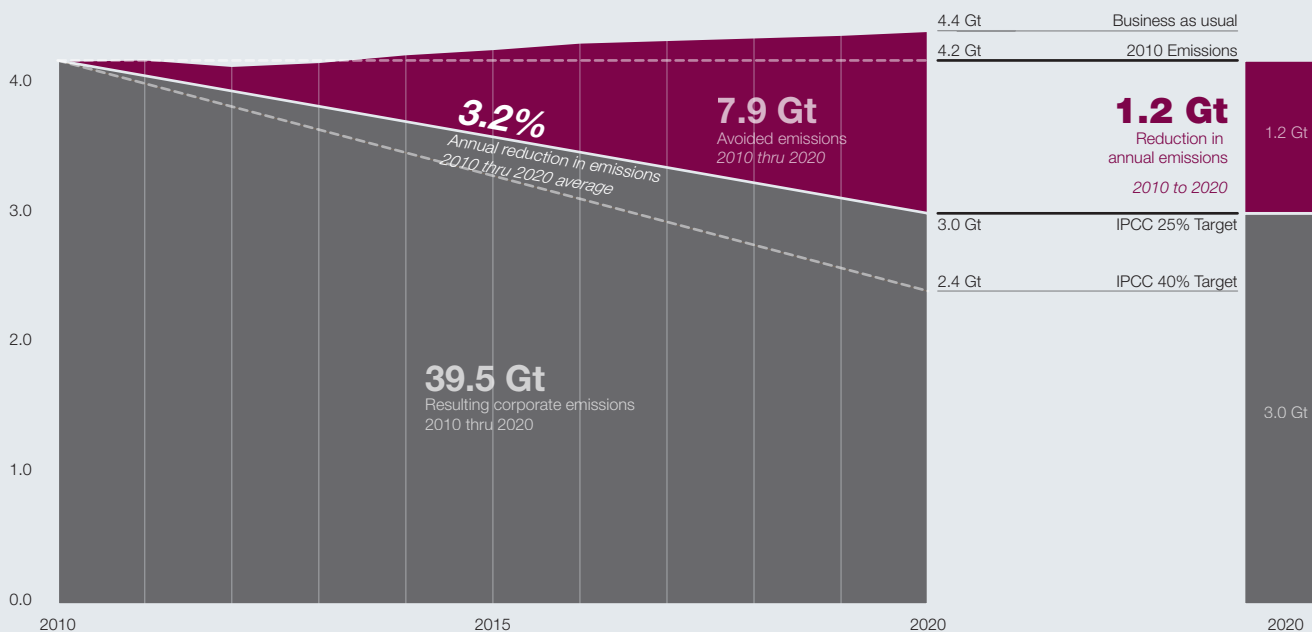
Exhibit 1 adapts these science-based goals to the US corporate sector. It shows the US corporate sector would need to reduce emissions 25 to 40 percent below 1990 levels to be aligned with the IPCC's science-based emissions targets. The US corporate sector's emissions from operations and energy purchases from utilities accounted for almost two-thirds of US emissions in 2010.¹² These are expected to rise slightly from 4.2 GtCO₂e in 2010 to 4.4 GtCO₂e in 2020.¹³ Therefore, the gap between 2010 emissions and IPCC's minimum reduction target for 2020 would be at least 1.2 GtCO₂e.

2.1 THE 3% SOLUTION

Closing this gap would require the US corporate sector to reduce its absolute emissions by 3.2 percent a year on average from 2010 to 2020. This is challenging, but not impossible; as the analysis in this report shows the US corporate sector can both close this gap and drive hundreds of billions in *cost savings* by implementing carbon reduction activities. It is the solution that the business community and sustainability stakeholders have been looking for.

Exhibit 1

US Corporate Sector GHG Emissions Gt CO₂e



SOURCE: UNFCCC, IPCC, EIA Annual Energy Outlook 2012, EPA US GHG inventory 2012, US BEA, US BLS, The 3% Solution team analysis

11. IPCC's 2007 Fourth Assessment Report- Working Group III asserted that Annex I (developed) countries need to reduce GHG emissions by 25-40% below 1990 levels by 2020, and 80-95% below 1990 levels by 2050. Such a stabilization pathway was said to provide a "reasonable chance" of averting warming beyond 2°C above pre-industrial temperature that would lead to catastrophic consequences on human and ecological systems.
12. According to EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks, total US Emissions in 2010 were approximately 6.8 GtCO₂e. The corporate sector accounted for 62 percent of total US emissions when emissions from utilities are only allocated to the corporate sector as an end-user of energy. If all utility emissions (including residential end-users) are included in the corporate sector, total emissions for the corporate sector were approximately 5.2 GtCO₂e, representing 77 percent of all US emissions.
13. See footnote 7 for sources for the gap analysis.

Chapter 3. \$190 Billion in Unrealized Savings in 2020

The US corporate sector, excluding utilities¹⁴, could capture up to US\$190 billion (PV) in net savings in 2020 alone by reducing energy-related emissions by 3.2 percent each year on average. Between 2010 and 2020, the US corporate sector can unlock up to \$1.26 trillion (PV) in savings. Unlocking those savings would require capital expenditures of approximately \$480 billion (PV), resulting in a net present value (NPV) savings of up to \$780 billion.

This can be done with current technologies and policies by implementing initiatives in three areas: energy efficiency technology; energy efficiency management and behavioral change; and low-carbon energy, particularly solar PV. The behavioral changes require little capital expenditure, while the technology and the low-carbon energy solutions will require more (see Section 3.2 for full discussion).

3.1 GOING BEYOND 3 PERCENT

In addition to these NPV-positive opportunities, specific actions by utilities, customers and suppliers could add up to another gigatonne in reductions in 2020. Utilities could reduce their emissions by 0.4 GtCO₂e in 2020 just by focusing on the lowest cost activities with significant carbon reduction potential, including the use of geothermal power, wind, and shifting from coal to natural gas.

Utilities and the rest of the corporate sector can influence the energy consumption of their consumers. By helping consumers to reduce home energy use, add residential solar power and avoid transportation emissions from commuting, utilities and the corporate sector could further accelerate emissions reductions by an additional 0.6 GtCO₂e in 2020.¹⁵

Together, the corporate, utility, and consumer emission reduction opportunities add up to a potential 2.2 GtCO₂e in 2020. If achieved, these actions would be almost double what is required to deliver the 3.2 percent annual reductions necessary to meet the IPCC's minimum 2020 target (Exhibit 2).

3.2 CARBON INVESTMENTS PRODUCE HIGHER RETURNS

Analysis of investment data showed that 79 percent of US companies in the S&P 500 that report to CDP earn more on average from investments aimed at reducing carbon emissions than on their overall capital expenditures.¹⁶ The highest returns were from improving energy efficiency. These earned an average ROI of 196 percent, with an average payback period between 2 and 3 years.¹⁷

If all US companies, including utilities, achieved the average emission reduction target of those reporting to CDP, US emissions could fall by 0.5 GtCO₂e in 2020, delivering between a quarter and a half of the 3 percent annual emission reduction needed.¹⁸ The interviews conducted for this report found that companies with ambitious goals tended to innovate and achieve more than they would have without them. This suggests that more can be done profitably (see also Section 4.1, which benchmarks why and how companies should set emission reduction goals).

79%

of US companies in the S&P 500 that report to CDP earn more on average from investments aimed at reducing carbon emissions than on their overall capital expenditures.

14. This analysis covers scope 1 and 2 emissions from US corporations that are not utilities.

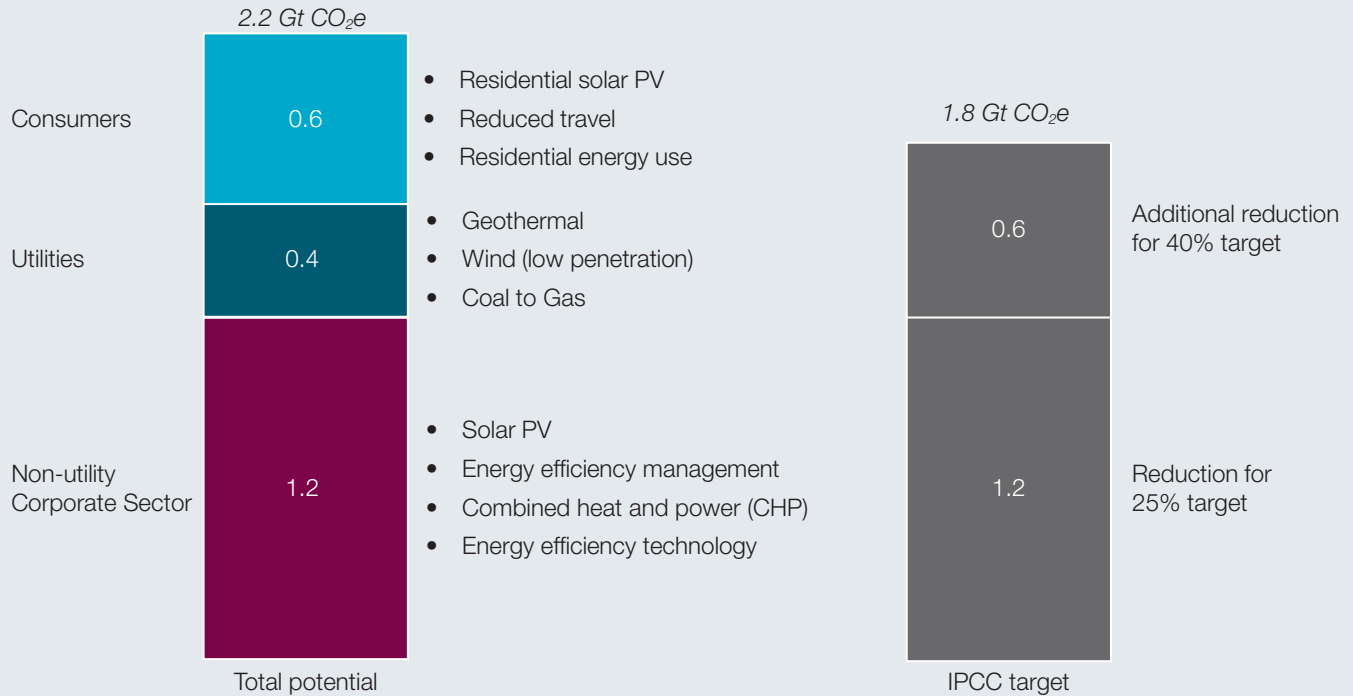
15. The report does not estimate the financial savings that could accrue for consumers from these actions.

16. Based on analysis of \$8.2 billion in investments planned or under way by S&P 500 companies that publicly reported to CDP in 2012. Carbon investment return is calculated as annual saving as a percentage of initial investment (ROI). Return on capital employed (ROCE) metric was chosen for the comparison with investment ROI because it provided a comparison across industries that enables comparison of carbon investment against company returns from all activities (versus operating activities only). Carbon investment data from 2012 CDP data; financial information on companies for comparison from Research Insight. Due to the structure of the data, the analysis required the following simplifications that likely increase its value: tax and depreciation are not included and lifetime of the assets is not assumed. Further analysis suggests that even if the data were available, adjusting for these factors would not significantly change the overall message.

17. Based on analysis of \$8.3 billion in investments planned or underway by S&P 500 companies that publicly reported to CDP in 2012. The overall ROI was 106% with an average payback period of 4.2 years. Energy efficiency investments totaled \$3 billion representing 36% of the total. This figure does not include CHP, which is defined as 'low-carbon installation' in CDP dataset, but is included in the opportunity analysis in this report as an energy efficiency measure.

18. CDP targets were applied to 2011 global emissions to derive total emissions reductions by 2020. Note: The target year for achieving the reductions for the companies varies. The emissions reduction is translated into an annual percentage reduction and applied to the emissions covered by CDP companies with targets, as well as to total US emissions. Analysis of S&P 500 companies that publicly report to CDP. Comparison assumes the low end of the IPCC AR4-WGIII range.

Exhibit 2

Total US Emission Reduction Potential in 2020 and IPCC Target

SOURCE: The 3% Solution team analysis

3.3 INCREASING CAPITAL EXPENDITURES TO SEIZE PROFITABLE REDUCTION OPPORTUNITIES

Although some opportunities to reduce emissions require relatively small capital investments, the analysis suggests that companies in the US corporate sector, excluding utilities, would need to invest between 3 to 4 percent of their capital expenditure in carbon reduction projects each year to capture net savings up to \$190 billion (PV) in 2020 alone.¹⁹ Today, however, the companies that report to CDP spend an average of only 2.2 percent (Exhibit 3). Section 4.2 addresses how companies can overcome barriers to increasing capital expenditures.

3.4 SECTOR BREAKDOWN OF THE OPPORTUNITY

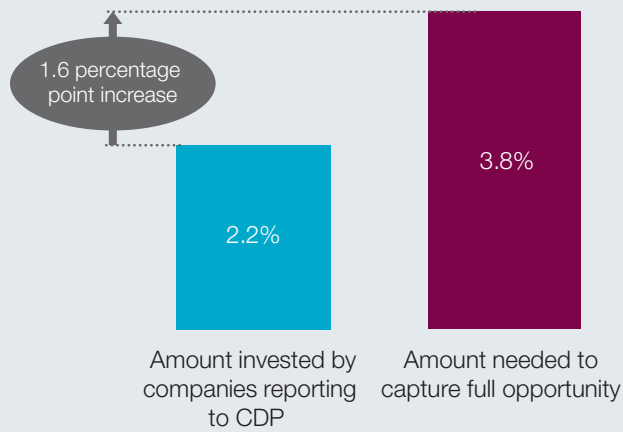
To bridge the gap described in Chapter 2, the average annual absolute reduction in carbon emissions across the corporate sector is 3 percent, but some sectors have greater potential than others for NPV-positive emissions-reductions, and may therefore reap greater savings (Exhibit 4 and Table 1). This analysis offers a novel approach by allocating NPV-positive emissions reduction potential by industry sector.²⁰

19. Calculation based on the full opportunity analysis described in chapter 2. Capital expenditure is divided by the investment period to establish annual amount required. Percent shown is the average annual amount (this is an approximate average of what needs to be spent each year, although actual expenditures will differ by year based on the scheduled roll-out of carbon investments between 2010-2020). Company capital expenditure figures from Research Insight. Investment data from CDP. Total capital expenditure data (across industries in US) from World Industry Service Navigator.

20. The long-term EIA projections for emissions in 2020 were used to determine both the expected growth for the sector in addition to what can be termed the "natural decarbonization rate" which essentially captures industries' expected continuous improvement. The analysis therefore accounts for expected improvements in the carbon intensity of each sector between 2010-2020 in the business as usual base case. The corporate opportunity discussed in this report is the amount of reductions over and above the business as usual base case. More details on sector opportunities are available upon request.

Exhibit 3

Capital Expenditure Required to Capture Opportunities
Percent



SOURCE: CDP; WIS; The 3% Solution team analysis

Table 1

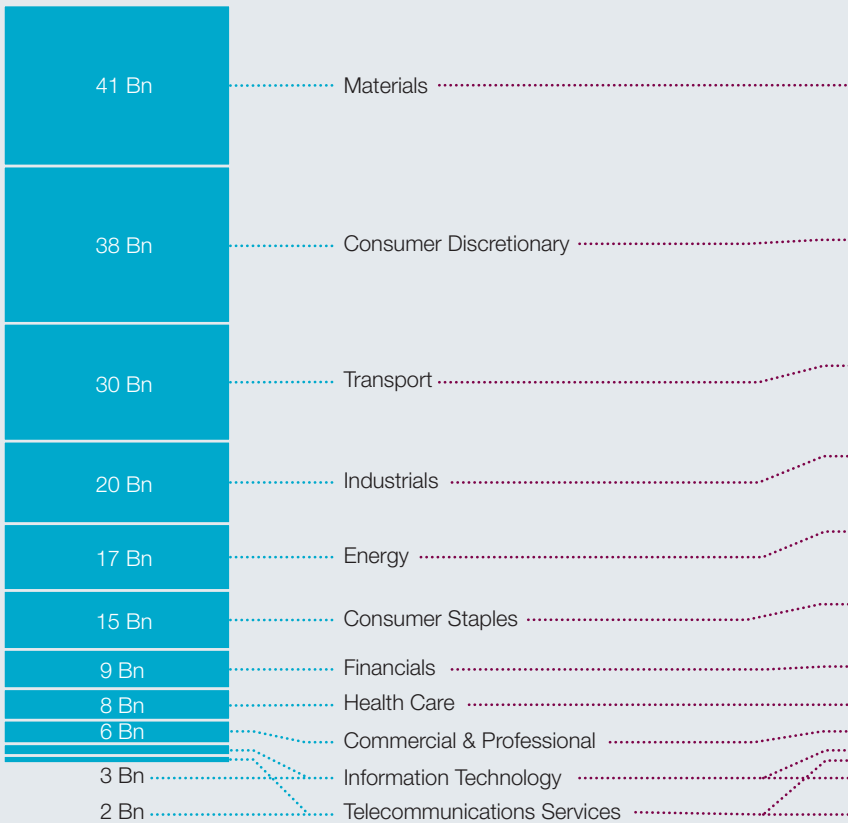
Sector Reduction Opportunity

	Reduction as a Percent of 2010 Emissions	Annual Percent Reduction 2010-2020
Materials	41–43%	5–6%
Consumer Discretionary	35–44%	4–6%
Transport	10–13%	1–1%
Industrials	19–24%	2–3%
Consumer Staples	16–17%	2–2%
Energy	11–12%	1–1%
Financials	18–24%	2–3%
Health Care	44–48%	6–6%
Commercial and Professional	42–46%	5–6%
Information Technology	18–24%	2–3%
Telecommunications Services	23–27%	3–3%

Exhibit 4

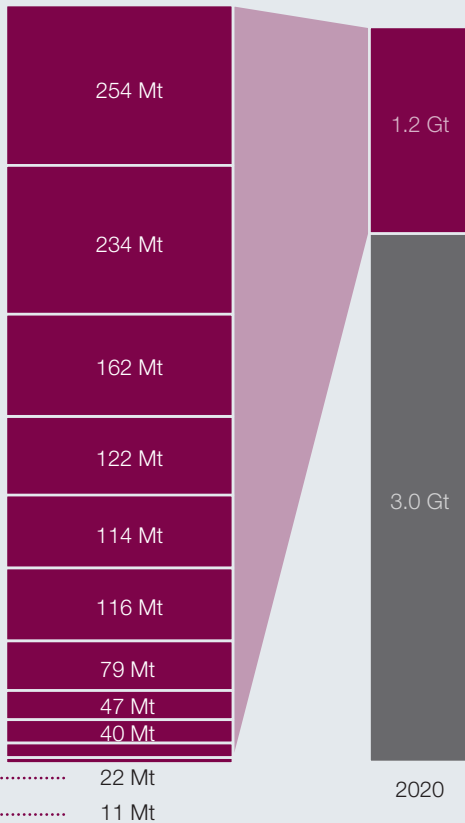
Net Savings Opportunities in 2020 (PV)

up to **US\$190 Bn**



GHG Reduction Opportunities

up to **1.2 Gt**



2020

3.5 MAJOR LEVERS TO DELIVER THE OPPORTUNITY

Specific steps necessary to achieve these energy efficiencies and cost savings vary from one industry (or even company) to the next. However, the profitable carbon reduction opportunities for the US corporate sector (excluding utilities) fall into three categories:

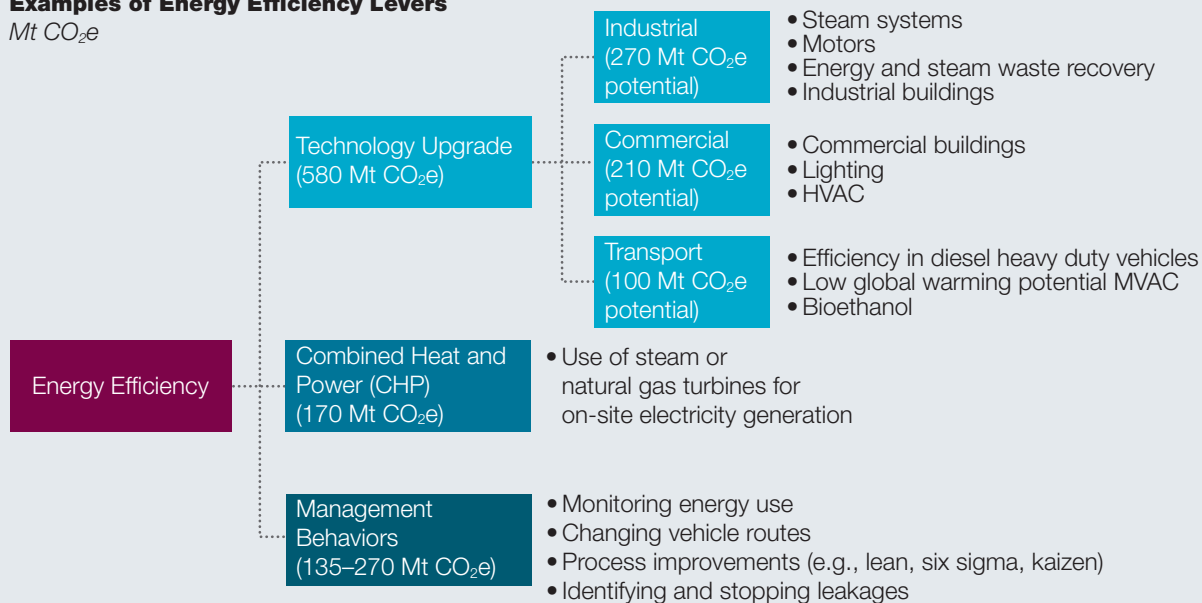
1. Energy efficiency through technology improvements.
2. Energy efficiency through management or behavioral changes.
3. Increased use of low-carbon energy.²¹

Exhibit 5 provides examples of the kinds of energy efficiency actions that make up the technology improvement opportunities, and management or behavior change opportunities.

1. **Energy efficiency through technology improvements.** Examples of these improvements include upgrading buildings with energy-efficient lighting and heating, ventilation and air-conditioning (HVAC) systems. Improvements to data centers, motors and vehicles, and recovery of waste heat are further examples. Numerous companies have achieved significant savings by taking such measures (see sidebar: Improved Energy Efficiency on next page), and several have deployed combined heat and power (CHP), a technology that captures the waste heat from power generation and puts it to productive use, thus lowering overall energy consumption.
2. **Energy efficiency through management and behavior changes.** Simply changing basic operational practices can make a difference, be it switching off lights, monitoring energy use, or identifying and stopping leaks (e.g. steam or compressed air leaks in manufacturing facilities). Just as companies use Lean manufacturing principles to improve productivity, some have applied “Lean energy” principles to embed efficient practices—a systematic approach that has proven to be one of the most effective and low-cost ways of reducing emissions.

Exhibit 5

Examples of Energy Efficiency Levers Mt CO₂e



SOURCE: AEO2012, “Unlocking Energy Efficiency in the US economy” McKinsey July 2009, McKinsey GHG cost curve, The 3% Solution team analysis

21. Given that a large part of emissions are derived from the conversion of an energy source to electricity, companies that supply some or all of their own energy directly can avoid these emissions from conversion losses.

3. **Increased use of low-carbon energy.** Companies that participated in this research have invested in a range of measures to reduce their use of fossil fuels for power (see sidebar: Low-carbon Energy). Some replaced equipment running on diesel or fuel oil with electric or natural gas appliances; others invested in wind energy or bought renewable electricity certificates (RECs). While such measures can create significant business value, cost-effectiveness is market and project specific. This report focuses on solar PV because prices are expected to keep falling; consequently, solar PV will become an increasingly financially viable alternative through 2020.²²

Exhibit 6 shows what each carbon-reduction measure could deliver in terms of emissions reductions and cost savings. Scaling up the investment needed and capturing a share of the profitable reductions will require innovation and persistence. (Chapter 4 examines how companies overcome barriers to scaling up investments.)

Low-carbon Energy

- **Walmart**, a global retailer, is pursuing its goal of being powered by 100 percent renewable energy through onsite renewable energy projects, power purchasing agreements with offsite wind farms, and participating in utilities' green power purchasing programs. The company is testing a range of onsite installations, including solar panels on store rooftops, micro-wind turbines on parking lots, biodiesel generators, and fuel cells
- **Johnson & Johnson**, a multinational pharmaceuticals, medical devices and diagnostics, and consumer products company, made a recent commitment to increase on-site renewable and clean technology energy capacity to 50 megawatts by 2015, as part of its Healthy Future 2015 Citizenship & Sustainability goals

Improved Energy Efficiency

- **Raytheon**, a technology and innovation company specializing in defense, homeland security, and other government markets worldwide, saved over US\$100 million while reducing its energy use by 19 percent between 2002 and 2012. They enhanced the energy efficiency of their buildings, by upgrading the heating, ventilation and air conditioning (HVAC) systems, switching to high-efficiency and motion-sensitive lighting, installing variable speed drives for motors, pumps and fans, and investing in state of the art automated building energy management systems
- **Kimco Realty**, which owns and manages US shopping centers, designed a lighting control system that reduced the average electricity consumption of lights in their

facilities by between 20 and 25 percent with a payback period of between 1 and 3 years

- **The Volvo Group**, a global manufacturer of trucks, buses, construction equipment, and marine and industrial engines, operates truck manufacturing plants in the US that initially partnered with an energy services provider to pursue energy and CO₂ reduction goals. Through performance based contracts, the plants first focused on "low hanging fruit" opportunities such as fixing compressed air leaks, lowering building temperatures, and then made capital investments in energy saving technologies such as upgrading to more efficient lighting and HVAC equipment, installing infrared radiant heating to improve heat transfer, installing large fans to improve air flow, and installing building automation systems

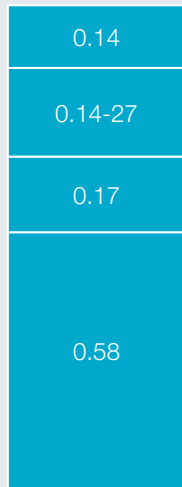
22. Rooftop solar photovoltaic (solar PV) was identified as the key NPV positive low-carbon energy measure that non-utility companies could undertake broadly. It is particularly cost-effective where electricity rates are high and there is high solar insolation. Given the expected price decreases, additional incentives were not required to create NPV-positive investment. Wind turbines were not found to be consistently NPV positive and introduced difficulties for the analysis so it was not included here in the list of top NPV positive opportunities. Companies are investing in NPV-positive utility scale wind projects, but the economics are project specific and policy barriers exist that prevent companies from pursuing utility scale wind in every state. For more information on solar PV please see: "Solar PV: Darkest Before Dawn", McKinsey & Company, 2012.

Exhibit 6

Savings and Emissions Reduction Potential in 2020

Emissions Reductions in 2020
Gt CO₂e

1.0-1.2



Solar PV

Management/behavior change

Combined Heat and Power (CHP)

Upgraded technology

Net Savings in 2020
US\$ Billion (PV)

160-190



ROI
Percent

16%

233%

76%

325%

SOURCE: AEO2012, "Unlocking Energy Efficiency in the US economy" McKinsey July 2009, McKinsey GHG cost curve, The 3% Solution team analysis

Chapter 4. The Carbon Productivity Portfolio

The Carbon Productivity Portfolio is a set of five actions that together create a new strategic approach to capturing the full carbon reduction opportunity and creating business value. It is built upon the experiences and successes of leading companies inside their own operations and working externally within their value chain and beyond. As Six Sigma and Lean manufacturing principles were used by business to boost productivity, the Carbon Productivity Portfolio can be used to structure a comprehensive program for maximizing profitable carbon reductions.

The portfolio describes five actions (see Exhibit 7):

1. Set ambitious carbon reduction targets.
2. Capture the NPV-positive opportunities in internal operations and overcome common barriers that deter companies from investing in emissions reductions opportunities.
3. Increase the supply of renewable energy, which targets the role of utilities.
4. Develop low-carbon products and services, for business and for consumers, and work with suppliers to do the same.
5. Collaborate with policy makers and a broader set of stakeholders, recognizing that some barriers to emissions reduction cannot be removed by the efforts of a single company and its supply chain.

Exhibit 7

Carbon Productivity Portfolio



SOURCE: The 3% Solution team analysis

4.1 SET AMBITIOUS CARBON REDUCTION TARGETS

Setting a clear and ambitious carbon reduction target can trigger a cascade of positive results. A target provides an important internal signal of a company's commitment to doing its part. Companies that set ambitious carbon reduction targets deliver larger emission reductions with *higher* financial returns than companies without such targets (Exhibit 8). Many of the companies interviewed for this report said that aggressive targets helped them to be more innovative and to engage more of the organization, and this is borne out by the data (see sidebar: Setting Targets).

External pressure from consumers, customers, government, NGOs and investors can sometimes provide an incentive to set goals, but most of the companies interviewed said they set aggressive targets because of the potential financial rewards. Several companies found that the experience of positive initial cost savings subsequently enabled them to set even higher targets. Senior management, encouraged by positive results, pushed for more aggressive efficiency goals to capture further financial returns.

While it is key to set targets grounded in a business case, some leaders warned against being constrained by too much analysis. They favored aggressive top-down goals coupled with strong accountability. This approach helps to unlock creative approaches and innovation to reduce emissions.

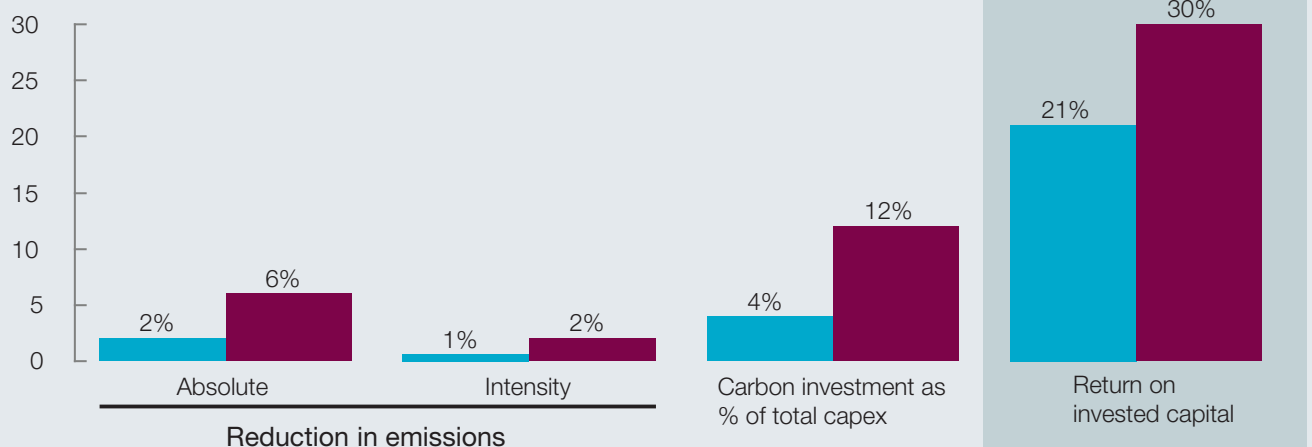
Setting Targets

- **General Electric (GE)**, a broad-reaching technology and financial services company, set out to improve the energy efficiency of its own operations and dramatically exceeded its initial target of 1 percent emissions reduction per year. Realizing the opportunities in front of them, GE reset the goal in 2010 to a 25 percent absolute reduction against the same 2004 emissions baseline
- At **Sprint**, a wireless communication company, a proposed reduction goal of 12 percent was bumped up to 15 percent by the CEO – which helped them to be more innovative in finding attractive opportunities
- **Catalyst Paper**, western North America's largest mechanical paper producer, set the ambitious goal of reducing its greenhouse gas emissions by 70 percent by 2010 relative to its 1990 levels. Catalyst beat its target ahead of schedule in 2005 through a combination of fuel switching from fossil fuels to biomass, energy efficiency and recycling

Exhibit 8

Targets, Investment, Emission Reduction and Return on Capital

US S&P 500 companies reporting publicly to CDP
%



SOURCE: The 3% Solution team analysis

Carbon Target and Profit Calculator

The average annual absolute reduction in carbon emissions across the corporate sector is 3 percent but some sectors have a greater opportunity to reduce emissions profitably than others (see Exhibit 4 in Chapter 3). The sector opportunity can be translated into an emission reduction target that both fully captures profitable emissions reductions in the sector, and helps to meet the IPCC's minimum 2020 goal (Exhibit 9).²³

To calculate the target, companies start with their 2010 baseline emissions and then adjust that number up or down, based on their expected change in market share between 2010 and 2020. If a company believes they will be a bigger part of the sector in 2020, the formula will attribute a larger share of that sector's profitable emissions reductions to it.²⁴

For companies that have supply chain and transportation related emissions in the US, the formula can also be applied to each using the appropriate sector. For example, a retailer might use the Consumer Discretionary target for its own emissions, the Consumer Staples target

for its suppliers' emissions and the Transport sector target for its transportation related emissions.

The last part of the emissions target formula is the sector's reduction opportunity, which is the data shown in Exhibit 4 – sectors with more profitable reduction opportunities are assigned higher improvement rates than those with lower opportunities. Exhibit 10 illustrates an example using the formula for a hypothetical industrial company.

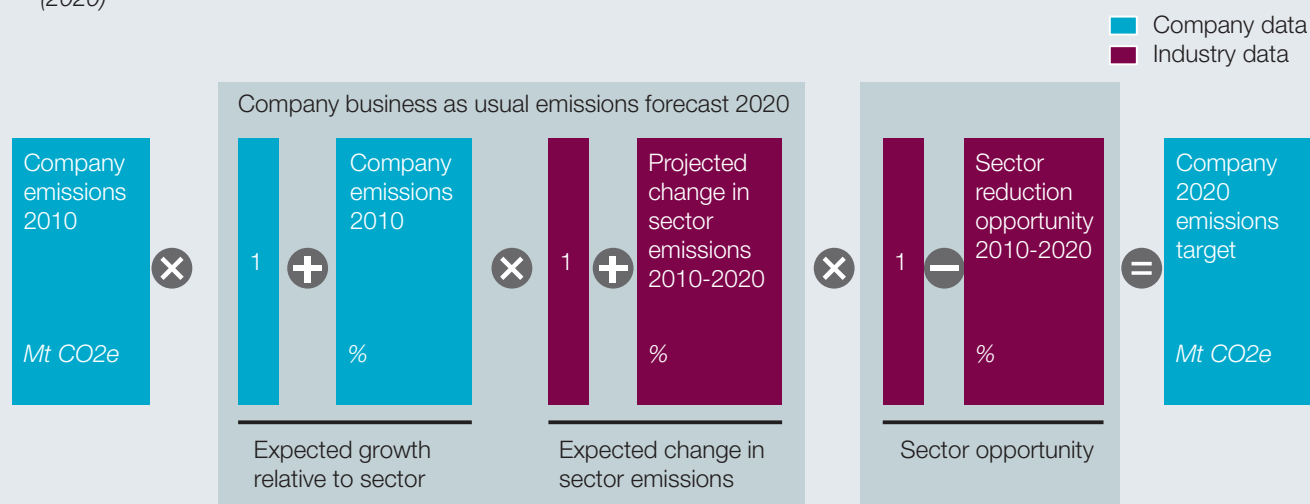
Visit

www.the3percentsolution.org to use the Carbon Target and Profit Calculator and calculate how much money your company can save through profitable carbon reduction opportunities.

Exhibit 9

Setting a 2020 Carbon Target: Equation Behind the Online Carbon Target and Profit Calculator

(2020)



SOURCE: The 3% Solution team analysis

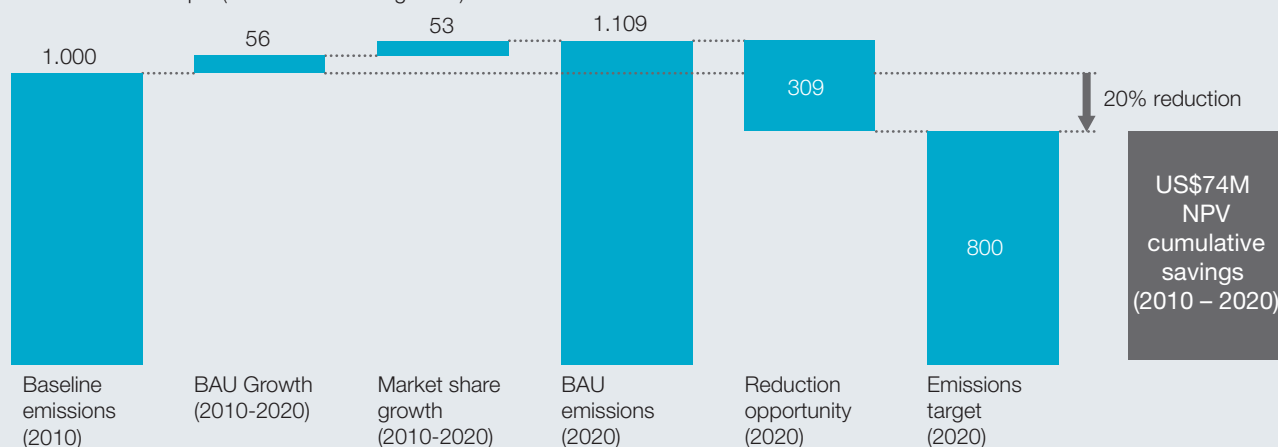
23. The same calculation can be made by multiplying company emissions in 2010 by the data in the first column of Table 1 titled 'Reduction as a Percent of 2010 Emissions' for the relevant sector.

24. Projected change in sector emissions 2010-2020 takes into account the reduction in emission intensity that will happen under normal circumstances (without specific emission reduction effort), for example in the steel sector moving over time from blast to electric-arc furnaces, and the adoption of renewable energy in the power sector under current mandates.

Exhibit 10

Example Emissions Target*Thousand Tonnes CO₂e*

Industrials sector example (5% market share growth)



SOURCE: The 3% Solution team analysis

While this tool can be extremely helpful in setting a good emission reduction goal, it can only serve as a rough guide, because each company's starting point in terms of energy use, efficiency and other important factors needs to be taken into account.

If more companies set targets, and if those targets were in line with the potential opportunity represented in the target-setting formula described above, not only could the US corporate sector reduce emissions by an average of 3.2 percent per year until 2020, but it could generate net savings up to \$190 billion (PV) in 2020.

4.2 IMPROVE ENERGY MANAGEMENT AND INVESTMENT

Although every company will encounter its own unique challenges, those interviewed for this report cited three barriers that were most likely to slow progress toward carbon reduction goals: (1) capital constraints, (2) low management priority, and (3) inadequate expertise.²⁵ These barriers are real, but they can be overcome.

1. **Capital constraints.** Capital is scarce in many companies and competition for it is intense. Companies deliberately set up high internal hurdle rates to select the best investments. There are strong arguments for investing capital in carbon reduction, however. For one thing, companies can start by going for the low-hanging fruit – that is, those investments that offer the fastest payback and require only limited capital:

- ▶ One common approach to overcoming capital constraints is to bundle projects into a portfolio that combines these very high return investments with those that have lower rates of return or longer time horizons.²⁶ In this way, companies can still achieve a very attractive overall return rate on the portfolio.²⁷
- ▶ Another common approach is to incorporate energy efficiency investments into ongoing operational improvement programs, thus using existing capital allocations.

25. Agency issues and pricing distortions are not specifically addressed in this report. For more information and a discussion of barriers specific to energy efficiency, please see "Unlocking Energy Efficiency in the US economy", McKinsey and Company 2009.

26. For another example of bundling, see also the work that EDF is doing with KKR: <http://green.kkr.com/partnership>, <http://business.edf.org/projects/geen-returns/our-work-kkr-and-carlyle-group>.

27. Although capex is needed for many of the technology levers, there are thousands of small process or behavior changes that require little or no capital investment. For a further discussion of common myths related to energy efficiency, please see: Hammer, Somers, "A COO's Energy Efficiency Primer: Response to Five Common Myths", McKinsey & Company Operations Extranet.

Overcoming Capital Constraints

- For **Volvo**, it was easier to obtain additional capital after showing the initial returns – they were able to get buy-in from upper-level management and drive towards a 30 percent reduction in energy intensity over 10 years in their New River Valley plant because savings were very well documented
- **Johnson & Johnson** created its Carbon Dioxide Reduction Capital Funding Program – a US\$40 million per year capital fund – to provide affiliate companies capital relief for implementing CO₂ reduction projects
- **Staples**, which operates office supply superstores, applies a portfolio approach to balance investments across more and less profitable projects. It also uses energy efficiency savings to help fund renewable energy supplies, which now account for 78 percent of its electricity
- **Sprint** increased the fuel efficiency of its car fleet when vehicles needed replacing
- At **DuPont**, a global science and technology company, they combine energy efficiency and company growth by embedding sustainability thinking into R&D and product development

Companies often leave attractive opportunities on the table due to high internal hurdle rates.

Companies often leave attractive opportunities on the table due to high internal hurdle rates. Given that carbon reduction investments have a much lower risk profile and high probability of regular positive cash flow, companies might consider evaluating such investments using a hurdle rate closer to their cost of capital instead of higher internal hurdle rates typical for business growth investments (see sidebar: Overcoming Capital Constraints).

2. **Low management priority.** Carbon reduction opportunities will not be a priority unless senior management makes it one. Many managers may not be aware of how setting aggressive targets can unleash innovation, profit and carbon reduction. It is common to underestimate the financial potential and to overestimate the capital investment required.

Making a sound business case is vital to securing management commitment, but so is breaking through a common tendency of leadership teams to focus more on investments that will drive growth versus investments in efficiency, even when the efficiency investments have competitive financial returns.

Leading companies get the right information into the hands of management that helps reveal these profitable opportunities. That information can come from many sources – from inside the company, from benchmarking against competitors or across sectors, and from pressure from shareholders and customers (customers are discussed in Section 4.4 on products and supply chains).

3. **Lack of expertise.** Many companies may also lack the technical expertise or management capacity to run an enterprise-wide emissions reduction program. To help overcome this, interviews revealed three useful strategies:

- ▼ **Create a central management function:** A central function can help local units identify and execute projects. These are similar to Lean management and Six Sigma initiatives in the way they identify and spread best practices and benchmark company achievements against it.
- ▼ **Leverage external providers:** Large companies, particularly in energy-intensive industries, are those most likely to have successful emissions reductions programs in place. Others can be less motivated to acquire the necessary know-how. Third-party service providers can help by conducting energy audits, developing project plans, creating incentives, arranging financing, coordinating contractors, and verifying results. An energy services partner can help to identify energy savings opportunities and fund capital improvements in return for utility savings. The partner is also able to bundle different opportunities together to get an overall favorable package, which can help overcome internal capital constraints in some cases. The cost of external providers is a concern but it is likely that the cost will be recouped by the added cost-savings the provider can help identify.
- ▼ **Leverage front line employee engagement:** Companies should not overlook the contributions the front line can make if senior management

makes the importance of emission reductions clear. Almost all the companies interviewed noted the importance of combining a top-down and bottom-up approaches to improve energy management (see sidebar: Employee Engagement).

4.3 INCREASE LOW-CARBON ENERGY SUPPLIES

To increase the overall supply of low-carbon energy to the grid, utilities are critical because they have a huge influence on the carbon intensity of the energy that is available to downstream users. There are three key roles that the utilities can play in reducing their own emissions and the emissions of their customers. These are particularly important for small- and medium-sized businesses, which may lack the resources to aggressively pursue carbon reductions:

1. Decrease the carbon intensity of the energy supply by pursuing cost-saving energy efficiency in their own operations.
2. Increase the supply of low-carbon energy at low cost for all end-users.
3. Shape the energy use of all their customers (commercial, industrial and residential) to reduce overall energy demand (Exhibit 11).

By using existing technology to change the energy supply mix, utilities could reduce emissions substantially (see sidebar: Utilities – Increasing the Supply of Renewables on next page). Although the lowest-cost levers with significant carbon reduction potential – geothermal power, wind energy²⁸, and shifting from coal to natural gas supplies – are not all NPV-positive, they could contribute 0.4 GtCO₂e emissions reductions in 2020.²⁹ Section 4.5 briefly discusses the regulatory barriers utilities face in pursuing these kinds of investments.

In addition to developing low-carbon energy portfolios, utilities can work with consumers and corporate customers to manage demand (see next section).

Employee Engagement

- Inspired by Toyota's Lean manufacturing approach, **GE's** energy "treasure hunts" are a bottom-up approach to identify energy waste. The program is voluntary within the company and pursued by managers and cross-functional teams who assess the potential for savings in their own plants, tracking down waste caused by things like compressed air leaks, pumps running needlessly, or lights that do not turn off automatically, for example. As news of the savings potential has spread, GE has gone on to benchmark buildings, transportation, and processes, and achieved over US\$200 million in energy savings
- **IBM**, a diversified technology and consulting company, emphasized the importance of identifying and collaborating with advocates within business units who "make the stuff happen". Meaningful energy efficiency projects affect core business operations and results; the most successful projects have a solid technical and economic foundation and deliver intrinsic value to the business beyond the energy efficiency benefits. The complexity of semiconductor manufacturing and data center operations makes it inadvisable to dictate results; they must be generated through extensive collaboration among the teams responsible for the operations. IBM empowers its employees across business units and levels of responsibility to find ways to improve performance and achieve the company's energy efficiency goals.
- **Raytheon** has "energy champions" who play a big role in identifying energy efficiency opportunities, embracing the philosophy that the best ideas often come from those closest to the equipment. Identifying employees as champions encourages them and recognizes their efforts amongst their peers.

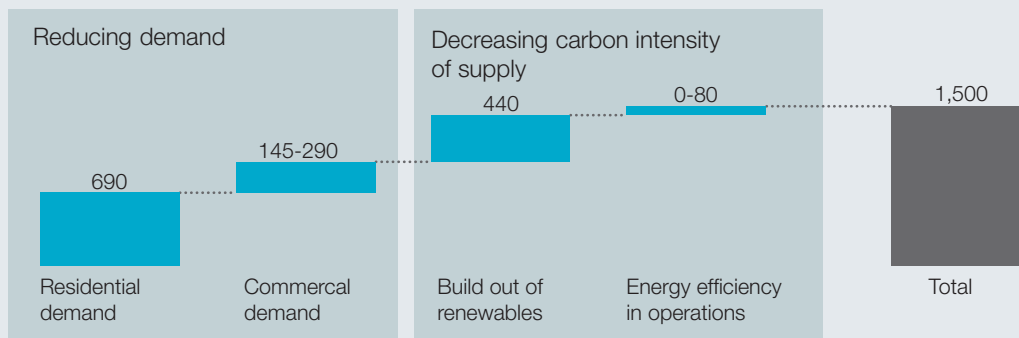
28. Assumes wind penetration up to 20%.

29. Reductions referenced in this report are drawn from the McKinsey US GHG cost curve and represent those that have a marginal abatement cost by 2020 of US\$35 per tonne or less. Using these assumptions, the reductions outlined would require an incremental capital expenditure of approximately \$80 billion and would generate an IRR of less than 8%, making them challenging and highlighting the need for technology and policy innovations that can drive down the costs of the emissions reduction technology. Additional reductions are possible with today's technologies, but implementing them would require even more significant capital expenditures. Given the recent drop in the price of gas in the US, the assumptions of the costs associated with a shift from coal to gas are high compared to current calculations, making a greater proportion of these investments NPV-positive.

Exhibit 11

Opportunities for the Utilities Sector

2020 Emission reductions
Mt CO₂e



SOURCE: McKinsey Global GHG abatement curve v3.0; DOE; Electrolux; Lawrence Berkeley National Laboratory; ACEEE; The 3% Solution team analysis

Utilities – Increasing the Supply of Renewables

- **Xcel Energy**, a large utility company, is the number one wind energy provider in the United States and has been for the past 8 years, currently delivering over 4,900MW of wind generation to customers. The company also has deployed over 200MW of solar energy and

is now the fifth-largest distributed solar utility in the United States. When Xcel Energy purchased wind generating capacity beyond the requirements of its renewable portfolio standard, it did so at competitive pricing that will protect its customers from increases in natural gas prices and potential future carbon regulations.

4.4 DEVELOP LOW-CARBON PRODUCTS AND VALUE CHAINS

Besides improving their own operations, companies of all types have considerable opportunity to reduce total emissions by influencing others in the value chain – their suppliers and customers – in ways that create benefit for all parties. In today's highly global and often outsourced business models, creating a mutually reinforcing web of reduction commitments to meet *The 3% Solution* is critical. There are two main approaches: developing new products and services that reduce customers' costs and emissions and encouraging partners in the value chain to implement NPV-positive reduction measures in their operations. This section looks at the potential for both of these approaches, first with consumers, and second in the corporate sector – which focuses on encouraging suppliers and customers to reduce emissions.

Driving reduction in consumer emissions

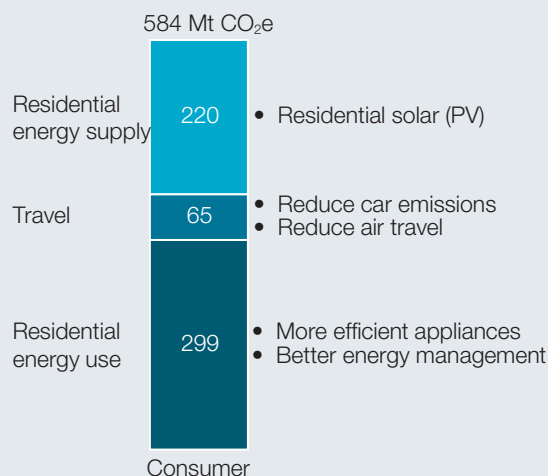
There are countless ways in which utilities and other corporations can help to reduce consumers' carbon footprints. The emissions reductions for consumers that are outlined in Chapter 3 and shown in Exhibit 12 include only those measures that companies have some influence over, and consumers are most likely to embrace because they save money in the long run. These include measures to encourage energy efficiency in the home and to reduce transport emissions. If the build-out of residential solar PV generation is included, the reduction opportunity is nearly 0.6 GtCO₂e in 2020 (see sidebar: Products and Services to Reduce Consumer Emissions on next page).

Residential energy use: There is significant opportunity for the US corporate sector to encourage better home energy management. Utilities can install smart meters and energy information systems to monitor and control heating and cooling systems and electronic appliances. This involves a relatively inexpensive, one-time capital

Exhibit 12

Potential to Reduce Consumer Emissions

Mt CO₂e emission reduction in 2020



SOURCE: The 3% Solution team analysis

Products and Services to Reduce Consumer Emissions

- Customers tend to consume less energy if it is clear how much they are using. That's one reason why **Pacific Gas & Electric Company (PG&E)** installs smart meters – more than any other US utility. PG&E also provides home energy reports that compare a customer's energy use with that of a similar set of neighbors and suggests low-cost steps to help reduce usage. The utility administers training and education for architects and engineers on energy-efficient buildings – one part of a broader portfolio of energy efficiency initiatives. PG&E has also helped more than 80,000 customers install solar PV panels at their homes that tie back to the grid, representing roughly one-third of all grid-tied PV installations in the US and resulting in a more diverse energy supply to meet rising demand.
- Procter & Gamble**, a global consumer packaged goods company, has reformulated its Tide laundry detergent for cold water washing, allowing for significant energy savings as most of the energy used in clothes washing traditionally involves heating water. In 2012, they announced a partnership with the Alliance to Save Energy that will help consumers understand the benefits of cold water washing.

outlay, but can add up to significant savings over time for consumers (in the order of US\$50 billion a year) and can reduce close to 0.2 GtCO₂e in 2020.

Already, many manufacturers offer appliances that consume significantly less energy while in use and do not consume power while on standby. In some cases, these cost more upfront, but consumers recoup their savings quickly. All told, energy savings by consumers could total up to US\$30 billion a year while concurrently reducing emissions by 0.1 GtCO₂e in 2020.³⁰

Employee transportation and travel. Companies can encourage their employees to travel less by car and plane. Flexible working, car-pooling services, and investments in video- and teleconferencing can help. The carbon reduction impact and cost savings that accrue to consumers and businesses from reducing car use by

7 percent (assuming employees work from home one day a week) and air travel by 10 percent could be as much as 65 MtCO₂e and up to US\$25 billion (PV) in 2020.³¹

Residential solar power. Distributed residential solar power could cut emissions in the United States by 0.2 GtCO₂e in 2020. Innovative financing that covers the upfront costs in exchange for a share of the subsequent energy savings enables consumers to deploy this technology without the capital costs that are traditionally a barrier.³²

Encourage suppliers and customers to reduce emissions

For many companies, the carbon emissions from their direct operations are less than the emissions from their products and their supply chains.³³ NPV-positive emissions reduction opportunities therefore exist throughout the value chain. Leading companies

30. Assumes, for example, appliance manufacturers do not supply a standby option, increase in-use energy efficiency and install energy usage monitors on appliances. For energy management assumes utilities or ESCOs install smart meters and remote controls, appliance makers inform householders about efficient usage and manufacturers develop new products to reduce energy use, e.g. cold water detergents (requires consumer action).

31. Assumes employers increase scope for employee home-working, car sharing, support EV charging on-site and increase use of high definition video conferencing and teleconferencing. Calculations based on data from the 2009 National Household Travel Survey for share of trips to/from work and average length of trips.

32. Assumes utilities allow householders to sell excess power into the grid and have clear tariffs to highlight savings and manufacturers of solar panels develop easy to install, easy to use and economical modules for residential use.

33. Many of these emissions are commonly referred to as 'Scope 3' emissions using WRI and WBCSD's GHG Protocol definition. Given that one company's Scope 3 emissions are another Company's Scope 1 emissions, these emissions reductions are included in the 1.2 GtCO₂e corporate opportunity detailed in chapter 2.

are developing products and services to reduce their corporate customers' emissions (see sidebar: Products to Reduce Corporate Emissions).

To help suppliers capture emissions reduction opportunities, leading companies require transparency from their suppliers, establish supplier performance standards, and create opportunities for suppliers to build knowledge. Some companies are working to develop standardized approaches across supply chains. Others help build suppliers' capabilities and support them in developing products and technologies that will reduce emissions (see sidebar: Reducing Emissions in the Supply Chain). By demanding efficient products, business customers have helped create significant markets for greener industrial and transport equipment and products.

Companies can also encourage their energy suppliers to shift their energy mix toward renewable energy as this allows them to reduce their emissions more quickly and in greater volumes than their own operations' energy efficiency and low-carbon power generation projects will. The demand for cost-neutral renewable energy is already significant. As more companies seek to source renewable energy, utilities may find themselves under increasing pressure to meet this demand.³⁴

Products to Reduce Corporate Emissions

- **Boeing** has improved the fuel efficiency of its planes for customers such as the 787, which is 20 percent more fuel efficient than planes of comparable size
- **Hewlett Packard** achieved a 50 percent reduction in energy consumption of its products by 2011 compared with 2005 levels. Among recent innovations is a new Net-Zero Energy Data Center design that would allow organizations to cut total power use by 30 percent

Reducing Emissions in the Supply Chain

- The **Coca-Cola Company**, a global beverage company, works with its bottlers to see the financial benefit of reducing their emissions. Coca-Cola held Greenhouse Gas mitigation workshops for each of its major bottlers in order to identify climate protection interventions. From 2004 to 2011 Coca-Cola achieved close to US\$900 million in savings, mostly from energy efficiency but also from clean energy
- **NIKE, Inc.**, a global athletic footwear, apparel and equipment company, has been a leader in managing climate and energy impacts across its value chain. Nike's holistic, value-driven approach includes industry-leading indexes that guide the design of sustainable products, working with contract manufacturers for factory efficiency, optimized transportation and distribution, and a demonstrated commitment to LEED design in Nike Retail. The Nike Manufacturing Energy and Carbon Program achieved a 6 percent absolute reduction in CO₂e by contract footwear manufacturers from 2008 to 2011, all during a 20 percent increase in overall production
- **Texas Instruments**, a semiconductor manufacturing company, knew that almost 50 percent of its energy consumption was related to purchased manufacturing tools. TI worked with an industry consortium (ISMI), tool manufacturers, and purchasing teams to boost the efficiency of that equipment, reaping significant savings on energy costs
- Global beverage company, **PepsiCo's** Tropicana brand worked with farmers to develop carbon-neutral fertilizers using the orange rinds that are a byproduct of the orange juice manufacturing process. PepsiCo provided the seed capital and testing ground to develop the new fertilizers, and collaborated with farmers to field test the improved process

34. This report does not quantify the potential reductions from these supply chain measures so these activities would be above and beyond the 2.2 GtCO₂e reduction in 2020 already identified.

4.5 ENGAGE WITH STAKEHOLDERS AND GOVERNMENT

For US companies to capture the full potential of emissions reduction wider collaboration will be needed, including with local and national governments, NGOs, industry associations, cross-industry groups and research partners. The aim is to engage in policy development, improve reporting, and encourage cross-sector collaboration.

Engage in policy development

Public policy is key to reducing carbon emissions. Companies may encounter regulatory barriers to pursuing energy efficiency and solar PV, such as difficulties with net-metering³⁵ or bans on third-party Power Purchase Agreements.³⁶ Solving these external barriers will require companies to engage relevant stakeholders and federal, state or local governments.

Policy development is particularly important for utilities. In states with renewable portfolio standards and programs that encourage and fund implementation of energy efficiency (e.g., decoupling or state benefit funds), utilities can drive carbon reduction investments for their customers.³⁷ In many states its far more challenging because the regulation prioritizes providing affordable and reliable energy without permitting utilities to profit from decoupling or engage in other businesses (such as energy services). Without this authority, utilities face disincentives as the costs and/or revenue losses that most would incur from pursuing demand-side management and investing more in renewable energy are not offset by other sources of revenue.

If carbon emission reduction becomes increasingly important, or utility regulation raises the priority of emission reductions, it is possible to envision the role of utilities becoming less that of a commodity provider and more that of a service provider working with customers to help them manage emissions. To play such a role, many utilities will need not only new capabilities in customer relationship management and marketing and sales, but they will also need to work collaboratively with their customers and public utility commissions to build this future.

Improve reporting

The managerial axiom, “you can’t manage what you don’t measure” holds as true for managing carbon emissions as it does for any other important goal. Organizations that

encourage reporting standards therefore play a critical role in driving companies to understand and manage their emissions. There are many organizations involved in initiatives that aim to create better reporting guidelines and companies should play an active role in these efforts (see sidebar: Collaborate with Stakeholders and Policymakers).

Together, these five actions of the Carbon Productivity Portfolio redefine what it means to be a corporate actor on climate change and provide business with a new strategic approach to maximizing profitable carbon reduction out to 2020 and beyond.

Collaborate with Stakeholders and Policy Makers

- The **Coca-Cola Company** was a leading voice of The Consumer Goods Forum to remove hydrofluorocarbons (a potent class of emissions) from refrigeration starting in 2015. Coca-Cola made its own commitment to transition completely to hydrofluorocarbon-free refrigeration by 2015
- Food waste contributes significantly to GHG emissions, due to the loss of resources used during the growing cycle as well as the production of methane gas as wasted food decomposes in landfills. Recognizing this issue, **ConAgra Foods**, a packaged food company, has implemented a rigorous program to reduce food waste generated in their manufacturing facilities and works closely with the Food Waste Reduction Alliance to develop and implement best practices to keep food out of landfills
- **PepsiCo** worked with the World Resources Institute and many other stakeholder groups to lobby the Federal Trade Commission to change accounting policies relating to renewable energy supplies to better encourage investments in them
- The **Sustainability Consortium** is working in conjunction with over 100 companies, NGOs, and academic institutions to design science-based solutions and help disseminate harmonized lifecycle and “hot spot” information throughout supply chains
- **WWF Climate Savers** program has 30 global members, 13 of which are US companies. The latest progress review in May 2012 shows that, with the support of WWF, Climate Savers partner companies have cut their CO₂ emissions by over 100 million tonnes since the program began in 1999, while creating competitive advantage and increasing shareholder value
- **CDP** has become *the* de facto repository for companies to report their carbon emissions and has become a catalyst for market forces. The companies mentioned in this report all report to CDP

35. Net metering allows electric customers who generate their own electricity using solar or other forms of renewable energy to bank excess electricity supply to the grid.

36. A Power Purchase Agreement (PPA) is an energy-procurement contract between the owner of property and a third party that operates equipment to generate electricity on that property.

37. These include providing direct funding for administration of energy efficiency programs, decoupling permitted utility revenues from the volume of energy delivered, and/or allowing utilities to earn additional revenue from the implementation of energy efficiency.

Chapter 5. The Urgency of Acting Now

If the US corporate sector acts now to reduce emissions by 3.2 percent annually on average through 2020, it can collectively capture net savings up to \$190 billion (PV) in 2020 and put us on a pathway to curbing climate change.³⁸

Exhibit 13 shows that *The 3% Solution* is a limited time offer. If the US corporate sector waits until 2020 to start reducing emissions, it would need to reduce emissions by 9.7 percent a year for 30 years to meet the minimum 2050 target. Waiting until 2030 is not an option: at that point the US business community will have already emitted too much carbon to be able to avoid the serious consequences from increasing global average temperatures by 2°C above pre-industrial levels.³⁹

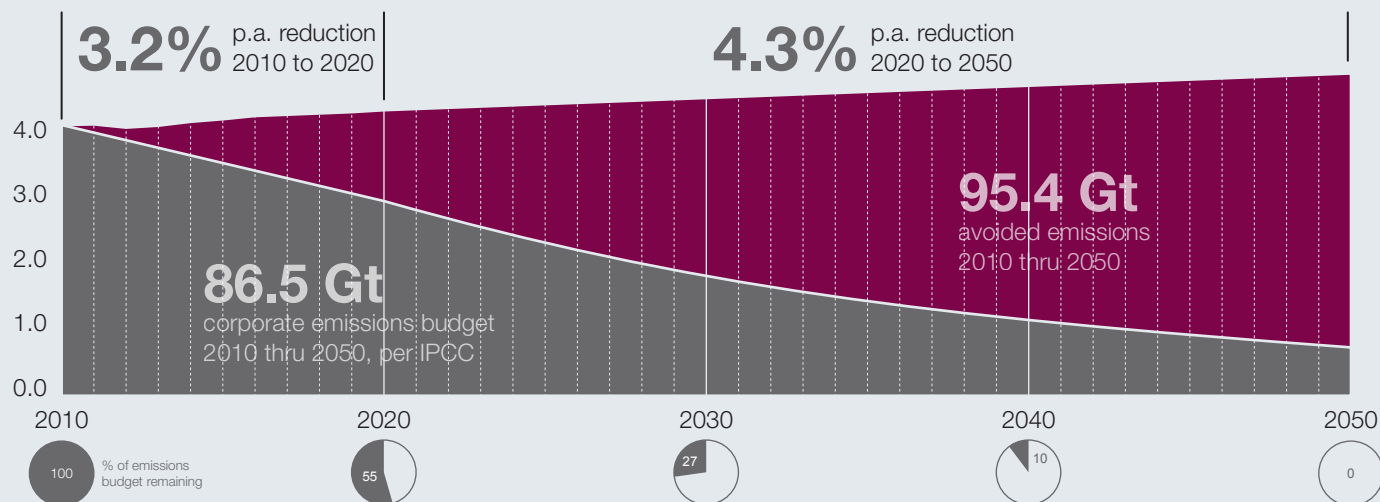
*The 3% Solution is
a limited time offer*
... waiting is not an option.

38. After 2020 emissions reductions for the following 30 years will need to increase to 4.3 percent a year on average to achieve the IPCC's minimum target for 2050.

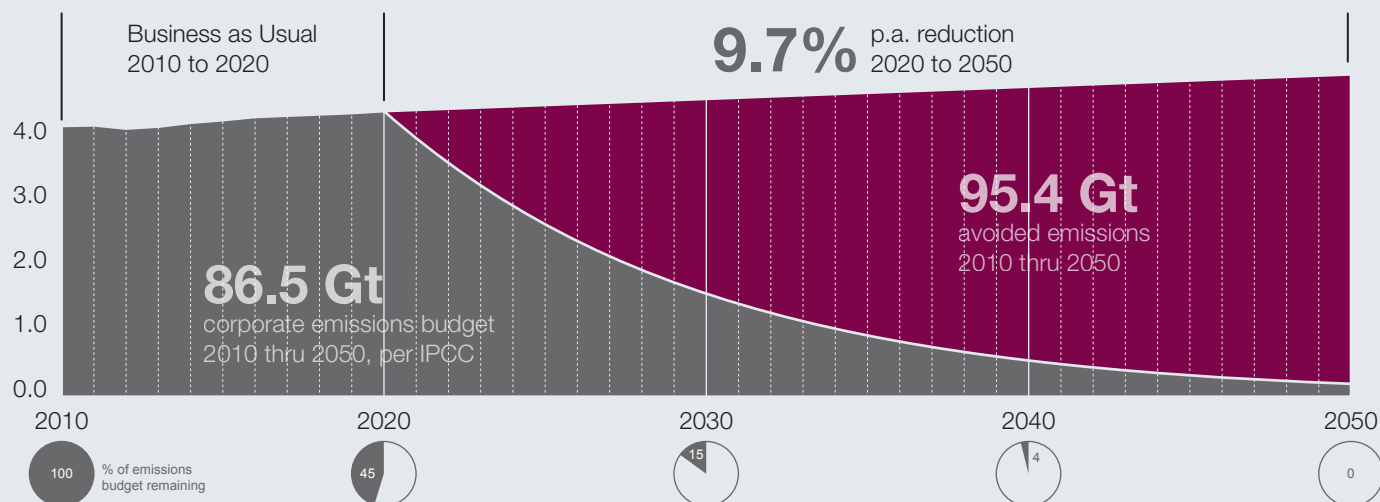
39. Budget calculations based on IPCC minimum target levels for 2020 and 2050, EIA data and gap analysis described in Chapter 2 for business as usual projections. Assumes even annual reduction for each period analyzed.

U.S. Corporate Sector GHG Emissions Scenarios 2010 to 2050

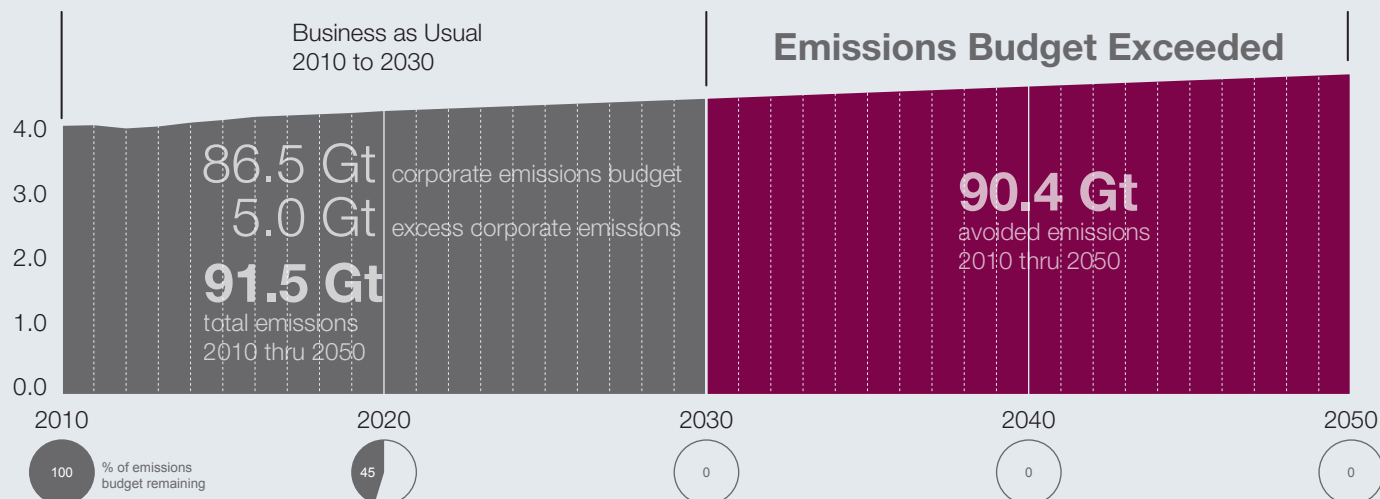
Scenario A Start in 2010 to reach IPCC 2020 target and 2050 budget



Scenario B Start in 2020 to reach IPCC 2050 budget



Scenario C Start in 2030 to reach IPCC 2050 budget



Chapter 6. Realizing *The 3% Solution*

The future will belong to companies that turn the challenge of climate change into business advantage – for profit, innovation and growth. The goal of this report is to identify opportunities for the private sector to capture savings and create business opportunity while avoiding the potentially crippling business risk of climate change.

The report presents a picture of the US corporate sector emissions gap, providing a sense of what business has already achieved and the challenge US business needs to take on to adequately address climate change. The challenge is significant: companies will have to cut emissions by approximately 3.2 percent per year from 2010 to 2020 to avoid a gap at least 1.2 GtCO₂e in 2020.

Like most challenges, this one is an opportunity – a wildly profitable one. Reducing emissions by 3.2 percent per year could deliver financial net savings up to \$190 billion (PV) in 2020, *The 3% Solution* is the solution that the business community and sustainability stakeholders have been looking for.

Beyond laying out the emissions gap and a profitable plan to close it, this report identifies further opportunities that lie beyond capturing up to \$190 billion (PV) in net savings and 1.2 GtCO₂e of reductions in 2020. Utilities can drive low-carbon energy for all of business by pursuing 0.4 GtCO₂e of emissions reductions available at relatively low cost with current technology. Companies and utilities also can influence consumers to cut another 0.6 GtCO₂e. These three opportunities add up to 2.2 GtCO₂e of potential reductions in 2020, providing ample opportunity to get on a pathway to addressing climate change.

The Carbon Productivity Portfolio is a set of five actions that together create a practical path to capturing the full 2.2 GtCO₂e opportunity. Its five components create a strategic new approach to maximizing carbon reduction and simultaneously creating business value:

1. Set Ambitious Carbon Reduction Targets

- ▼ Setting ambitious emission reduction targets is the most important first step for companies to calibrate ambition and drive innovation and competition. To help companies set the right level of ambition, the **Carbon Target and Profit Calculator** enables companies to set 2020 targets based on their emissions profile, sector,

market share and future growth. The calculator also identifies profits a company may realize if it met its carbon reduction target.⁴⁰

2. Improve Energy Management and Investment

- ▼ Focusing on NPV-positive investments, the analysis identifies up to \$190 billion (PV) in net savings opportunities in 2020 to cut emissions. If companies invest additional capital beyond current rates to capture these opportunities, the return on investment can be significant - potentially higher and more certain than capital invested in growth activities.⁴¹
- ▼ The report provides new indicators for the capital expenditures companies would need to make in efficiency and low-carbon energy to capture the financial savings and to close the emissions gap: investing 3 to 4 percent per year.
- ▼ Numerous company examples provide proof positive that some of the most common barriers to increasing investment are surmountable. Company interviews and case studies reveal that capturing savings is about shifting how management approaches climate investments and values the returns. From bundling investments, to integrating sustainability into strategy, leading companies are showing the way to capturing the full scale of the opportunity.

3. Increase Low-Carbon Energy Supplies

- ▼ Utilities are the gatekeepers to the carbon intensity of energy available to downstream users. They have a critical role to play in decreasing the carbon intensity of the energy supply using the lowest cost technologies and pursuing energy efficiency in their operations as well as reducing overall energy demand by shaping the energy use of their customers (business and residential).

40. Visit www.the3percentsolution.org to access an online version of this calculator.

41. Based on the fact 79% of US companies in the S&P 500 that report to CDP earn a higher return on their carbon-reduction investments than on their overall corporate capital investments.

4. Develop Low-Carbon Products and Supply Chains

- ▼ Large gains can be made by both companies and utilities to lower customer energy consumption, reduce travel emissions and encourage clean, distributed residential rooftop solar while producing substantial customer cost savings.

5. Engage with Stakeholders and Government

- ▼ It is squarely in a company's interest to pursue multi-stakeholder engagement to enable the innovations in technology and policy needed to speed the transition to a low-carbon future.

Altogether, the five components of the Carbon Productivity Portfolio offer new perspectives on the ambition gap, barriers, and solutions and the portfolio helps set options so the corporate sector has a comprehensive playbook for profitable emission reduction opportunities.

This report is the next step in a journey – one that many companies have already begun – to understand the challenge, scale ambition to meet it and capture opportunities toward a more efficient, competitive, and profitable private sector. Waiting to start the journey is not an option – delay not only means forgoing the significant savings outlined in the report but also missing the window for stabilizing the climate that is closing quickly.

Whether your company has seized hundreds of millions of dollars from carbon reductions already or is just beginning the journey, *The 3% Solution* will open new possibilities and help to discover latent cost-savings waiting to be harvested. At the same time, you'll be reshaping the climate conversation by showing that science-based corporate ambition makes business sense. *The 3% Solution* proves businesses can profit and protect the planet. Let's go for it.

This report and other collateral are available for download from
www.the3percentsolution.org

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