



THE BUSINESS END OF CLIMATE CHANGE

How bold corporate action supported by smart policy can keep temperature rise below 2°C

2016 | FIRST EDITION

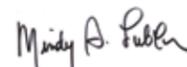



ARON CRAMER,
 President & CEO




PAUL SIMPSON,
 CEO




MINDY LUBBER,
 President




KEITH TUFFLEY,
 Managing Partner & CEO




MARK KENBER,
 CEO




JILL DUGGAN,
 Director



PETER BAKKER,
 President & CEO



*A We Mean Business report, produced in partnership with CDP,
 with analysis from the NewClimate Institute.*



NewClimate Institute is an independent research institute founded in 2014. It supports research and implementation of action against climate change around the globe. It generates and shares knowledge on international climate negotiations, tracking climate action, climate and development, climate finance, carbon market mechanisms and sustainable energy policy. It connects up-to-date research with real world decision making processes, making it possible to increase ambition in acting against climate change and contribute to finding sustainable and equitable solutions.

The analysis presented in this report was conducted by Niklas Höhne, Takeshi Kuramochi, Sebastian Sterl and Sofia Gonzales-Zuñiga.

www.newclimate.org | info@newclimate.org | T +49 221 999 833-02

TABLE OF CONTENTS

FOREWORDS	ii
INTRODUCTION	1
OUR HEADLINE FINDINGS	2
HOW WE DID THE STUDY	6
Quantifying impact.....	8
Overlaps between initiatives	9
POTENTIAL EMISSIONS REDUCTIONS, BARRIERS AND POLICY INTERVENTIONS	10
Science Based Targets.....	11
EP100.....	12
RE100.....	13
Zero Deforestation	14
Low Carbon Technology Partnership initiative (LCPTi).....	15
The total reductions – a big step towards 2°C.....	17
WHAT'S NEXT?	18
ENDNOTES	19
REFERENCES	20



FOREWORD BY CHRISTIANA FIGUERES

The Paris Climate Change Agreement rode in on the crest of an unprecedented set of climate action pledges from governments, cities, business and civil society. Only the rapid and properly incentivized effort of all these players together will allow the world to limit an average temperature rise to 1.5 degrees Celsius, as it must.

I very much welcome this report, because it focuses attention on immediate and significant gains that can be made through proven policies in defined areas of action, based on a clear grasp of the mutual opportunities and benefits to be had.

The almost universal set of national climate action plans on which Paris is founded stand witness to the fact that it is in the real world of innovation, investment and infrastructure, of policies, price points and profits that the transformation to a low-carbon, sustainable future for all will be achieved.

It is important that the business determined contribution in emission reductions which the report has identified lock in

to both international and national-driven political agendas. I believe it is essential the private sector help inform these agendas.

In the international, post-Paris process, governments will complete the "rulebook" of the climate regime, including for a global stocktaking of progress. It is most important that the rulebook and transparency of action, including through regular reviews, is understandable and relevant to investment decisions.

Second, governments are supporting ambitious pre-2020 climate action and policies and incentives, including through the program of the high-level French and Moroccan "climate champions" who are determined to align further private and public action.

At national level, full implementation of the climate plans indicate a temperature rise of around 3 degrees Celsius, not nearly enough yet but a serious risk to the majority of companies and investment institutions whose valuations still rest on previous business-as-usual scenarios. Your determination to address this is most welcome.

The national climate plans also assume a major private sector contribution that, on a practical level is not under state control except through much more ambitious policy incentives. Moreover, it will need to become clear what business emission reductions are being counted under the plans and which are not. Therein lies truth of progress.

I commend this report because it recognizes that climate change and sustainable development are twinned through cause and effect and require an extremely demanding timetable of action right now and towards 2030. Success means all new investment and business be directed at priorities which target both climate and sustainability and we must achieve a balance of action over time.

But the overwhelming reality is that emissions must peak quickly and be driven down very rapidly, if we are to have a chance of keeping Paris's temperature goals in sight, and it is the immediate and huge mitigation potential of business which is so compelling and which this report so clearly sets out.

CHRISTIANA FIGUERES
Executive Secretary,
UN Framework Convention on Climate Change



FOREWORD BY LAURENCE TUBIANA

Last December, the time came when governments were able to set ambitious goals on climate, giving a clear signal to the world that climate action is no longer optional. One hundred and ninety six countries adopted the 2°C to 1.5°C objective, the carbon emissions neutrality for the second half of this century and the enhancement of climate resilience and adaptation capacities.

Now, six months after COP21, we are experiencing the powerful effects of what was born in Paris. As a great sense of hope is now giving a pulse to global climate action, we face a new challenge: successfully implementing this plan.

To set a trajectory consistent with the goals of Paris, both immediate action and non-state stakeholders' action are paramount; the private sector has a chance to bring a greater level of ambition to action on climate. The Paris Agreement provided elements of what companies and investors need to make the right decisions, and the work of We Mean Business and its partners takes this effort one step forward. Private actors are finding new ways to transform investment strategies, production processes, servicing modalities and consumption patterns. To ensure that these new ways of working effectively move us towards a low-carbon economy, reports such as this one are a valuable asset.

We Mean Business has worked with more than 400 companies, representing US\$ 8.1 trillion total revenue and 180 investors, representing US\$ 20.7 trillion assets under management to make ambitious climate commitments. "What are the opportunities to contribute to our shared goals?" To this question, all of us must answer, and this report will bring some keys to understanding.

The current report analyses the level of emission reductions that can be achieved by 2030, focusing on 5 initiatives coming from non-state actors and provides insights on how and where to scale up some of the initiatives to maximize impact. Scaling up the strongest and most ambitious actions will help build coherence among stakeholders and yield massive emission reductions. Moreover, private sector action is also strengthened by an innovative tool from policymakers: Nationally Determined Contributions - NDCs. These national plans are becoming the framework through which all stakeholders can work collectively to implement the strategies, policies and investments plans necessary to transition to a low-carbon economy. Going from strategies to implementation will require both insights and robust data which are key elements provided by the initiatives contained in this report.

We know that companies will keep deploying concrete, cutting edge solutions and that they will spread technological innovations. These solutions must multiply and accelerate, and this report will facilitate acceleration though analyzing the impact of the business determined contribution. From now on, BDCs will play an increasingly important role: annual reports will follow, and Business Determined Contributions should be developed company by company.

I envision this report as a key contribution to the Action Agenda that was launched on the road to Paris and that is now being consolidated overtime. We saw and encouraged private sector mobilization before and during COP21 in this collective project. Many companies took part in the coalitions and alliances showcased in Paris. Visionary CEOs are taking the lead and ambitious investors have already started to integrate long term climate risks, to their strategies. The shift doesn't end here, and on the road to COP 22 in Marrakech, we see in this report that the commitments are still strong and the opportunities numerous.

Paris will be a success only if we collectively reach our common goals in order to "transition to the low-carbon economy that is inevitable, irreversible and irresistible."

LAURENCE TUBIANA
French Ambassador for climate change negotiations,
Special representative for COP21



FIVE GLOBAL BUSINESS INITIATIVES:

- Science Based Targets
- EP100
- RE100
- Zero Deforestation
- Low Carbon Technology Partnership initiative (LCTPi)

INTRODUCTION

A 'business-determined contribution' to curbing climate change

The Paris Agreement was a turning point for global action to limit climate change. On April 22, 2016—Earth Day—174 governments and the EU signed the treaty, binding themselves to keeping climate change 'well below 2°C', and working towards bending the curve to 1.5°C. More have signed since then; as of June 14, 2016, 17 governments have ratified the agreement and the numbers will continue to increase. Signing the agreement commits each government to take definite and ambitious actions on climate change, spelled out in each country's Nationally Determined Contribution (NDC).

In addition to national and sub-national governments taking action, civil society and businesses are on board too. In fact, some companies have already signed up to initiatives that support the Paris Agreement, going beyond and taking action sooner than their government's commitments. In fact, it's starting to make sense to talk about a 'business-determined contribution.'

But how big will that business contribution be? And how much bigger could it be with a supportive policy environment? Those are the questions we've set out to answer in this study. It will become an annual report showing what business has committed to, what its ambitions are, and what it could achieve with the right government policies in place.

We're starting with five global business initiatives – we want to add more

In this first edition of our study, we look at five initiatives that companies have joined to limit climate change: Science Based Targets, EP100, RE100, Zero Deforestation and the Low Carbon Technology Partnership initiative (LCTPi).

Our initial analysis focuses on We Mean Business coalition commitments for pragmatic and data access purposes. We want to include a broader set of initiatives in the future so get in touch with us through info@BusinessEndofClimate.org to suggest one or work with us in other ways. To learn more about We Mean Business and its expanding set of climate actions, visit www.wemeanbusinesscoalition.org/take-action

WE'LL CHOOSE FUTURE INITIATIVES, AS WE'VE CHOSEN THE FIRST FIVE, IF THEY:

- ▶ work on a potentially global scale
- ▶ are underway, with companies already signed up
- ▶ are run by an institution which drives recruitment and action
- ▶ set specific and coherent targets towards defined objectives, and commit to a plan for the impact they'll make in 2030
- ▶ ask companies, or groups of them, to make public commitments and share plans
- ▶ report on progress by sharing data through CDP or another public platform
- ▶ are on the NAZCA portal (NAZCA is a UNFCCC led online platform to capture the commitments to climate action by companies, cities, subnational, regions, investors, and civil society organizations.)

We've estimated how big the business-determined contribution could be by 2030 using these first five initiatives. That's meant looking at what would happen if these five initiatives achieved their most ambitious plans for signing up companies to reduce emissions. We've also estimated what the impact on reducing emissions would be if all relevant companies¹ that could join the initiatives actually signed up. And finally, we assessed the overlap in impact across the analyzed initiatives.

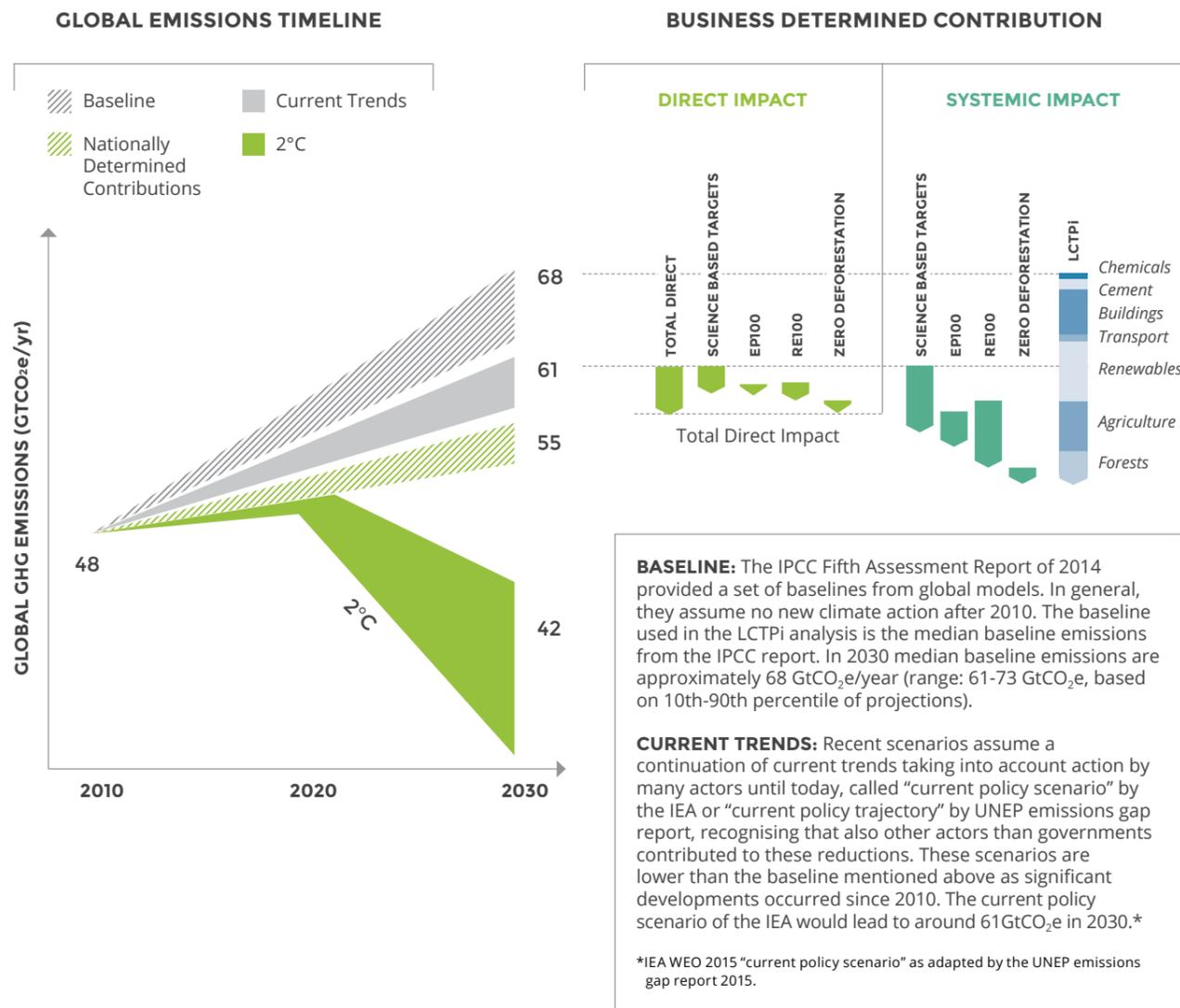
OUR HEADLINE FINDINGS

By 2030, business could cut its greenhouse gas emissions by 3.2-4.2 billion tonnes per year below current trends, by joining climate change initiatives. That's equivalent to up to 7-9% of the world's 2010 emissions.²

In 2010 the world pumped 48 billion tonnes of carbon dioxide equivalent³ into the atmosphere. Without the Paris Agreement, that would reach 61 billion tonnes by 2030. The NDCs agreed in Paris knock 6 billion tonnes off that total. But that's still a long way from the 42 billion tonnes required for an emissions reduction pathway that scientists believe will keep the global average temperature rise below 2°C.⁴

Figure 1

Actual 2010 emissions compared with two sets of projections for 2030 emissions, and the 2030 emissions needed to keep global warming below 2°C



KEEPING GLOBAL WARMING BELOW 2°C



We estimate that if the initiatives we've analyzed achieve their most ambitious plans, the business-determined contributions will equal 3.2-4.2 billion tonnes. That in turn would encourage governments to set more ambitious targets to cut emissions with policies to match.

Businesses could cut emissions by around 10 billion tonnes – but only with the right government policies in place.

We've also estimated what would happen if every relevant business that could join in these initiatives actually did so. The result could be emissions cuts of around 10 billion tonnes of greenhouse gases. That would go considerably closer to closing the gap in 2030, between the 61 billion tonnes projected without the Paris Agreement, and the 42 billion tonne limit for keeping global warming below 2°C.

But that can only happen if governments create the right policy environment. That means acting as a catalyst and also removing barriers that currently stop companies from fighting climate change.

The table below breaks down the reductions in greenhouse gases that each initiative could produce in 2030. It shows two scenarios. The first looks at what would happen if the initiatives achieved their most ambitious goals for membership and action. The second looks at what would happen if all relevant companies joined these initiatives.

Table 1

Reductions in greenhouse gases in billions of metric tons of carbon dioxide (GtCO₂e) that each initiative could produce in 2030

INITIATIVE	SCENARIO 1: DIRECT IMPACT	SCENARIO 2: SYSTEMIC IMPACT
 SCIENCE BASED TARGETS Companies set emission reduction targets based on keeping temperature change below 2°C.	1.9	5.0
 EP100 Companies commit, over 25 years, to doubling their economic output from each unit of energy (energy productivity).	0.3	2.4
 RE100 Companies commit to using 100% renewable electricity.	1.2-1.5	4.5 - 5.7
 ZERO DEFORESTATION Companies commit, by 2020, to using no commodities that cause deforestation.	0.5-1.2	0.7 - 1.5
 LOW CARBON TECHNOLOGY PARTNERSHIP INITIATIVE (LCTPi) Companies work to develop and use more low carbon technology in their industry. The industries analyzed here are: <i>Renewables</i> <i>Chemicals</i> <i>Cement</i> <i>Energy efficiency in buildings</i> <i>Low carbon transport fuels</i> <i>Climate smart agriculture</i> <i>Forests and forest products as carbon sinks</i>	N/A	9-10*
TOTAL (Taking into account overlaps)	3.2-4.2	APPROX. 10**

* Please note that this is an estimation based on the impact analysis developed when compared to current trends. More detail can be found in table 4 at page 16.

** Overlaps between initiatives mean the impact is smaller than the sum of the individual initiatives, and not estimated in detail. Initiatives are complementary to each other.

All the figures are for billions of metric tons of carbon dioxide equivalent emissions saved per year by 2030, compared with current trends, a projection for what would have happened without the Paris Agreement.

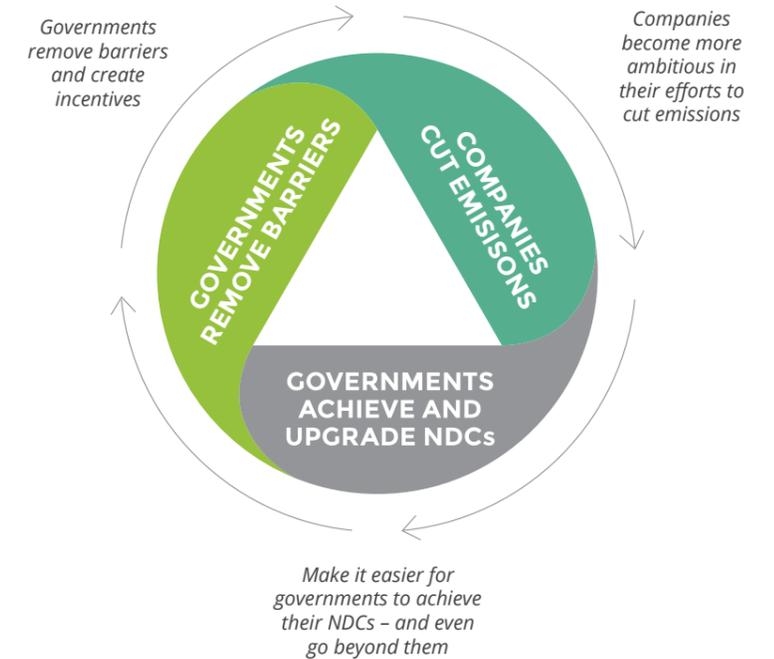
By 2030, the number of companies in these initiatives could rise from 300 to around 4,500.

Over the past year, around 300 companies have signed up to these initiatives—some to multiple at a time—working to limit the temperature rise to the Paris goal of well below 2°C. If the five initiatives meet their most ambitious plans, that number will rise to somewhere between 3,000 and 6,000 companies.

Government and business action could create a virtuous circle.

More and more companies are joining these initiatives. But their impact will be limited without more active policy intervention. Companies may be highly motivated to take action on climate change but run into obstacles. For example, they could find regulation prevents them from shifting to a lower-emissions supply chain or infrastructure.

Once governments create policy that favors a low-carbon economy, introduce carbon pricing signals and create incentives, companies could be even more ambitious in their efforts to cut emissions. That will, in turn, make it easier for governments to achieve their NDCs – and even go beyond them.



SO WE CALL ON GOVERNMENTS TO:

- ▶ encourage utilities to offer renewable energy contracts and make it easier for businesses to commit to them
- ▶ help companies build their own renewable electricity installations
- ▶ support R&D for low carbon technologies
- ▶ offer grants and capital depreciation to make energy efficiency investments more attractive
- ▶ create incentives for buyers and sellers of sustainable products
- ▶ reduce the administrative and cost burden of certification for producers, so it's easier for them to produce commodities without deforestation

In the rest of this report, we briefly explain our work on the study, and then go on to look at each initiative in more detail, ending with a more in-depth examination of the total reduction in emissions. As we've said, this is just the start. We'll keep updating this work, so if you're part of an initiative or if you'd like to help us refine our calculations, please get in touch.

HOW WE DID THE STUDY

To work out what impact business' contributions could have, we've used a method that's:

Open and transparent

We've included all of our assumptions in this report



Pragmatic

We can't attribute a reduction in CO₂ emissions to specific companies, and we can't say for sure which ones will join the initiatives. So we have had to make assumptions to get round these methodological issues

Open to change

This is just the start of what we see as an evolving project. We're open to any ideas for how we could develop our methods



We've done our analysis in three steps:

1. Choose the initiatives
2. Estimate the cut in emissions for each one, based on how many companies are signed up now; the most ambitious plan for 2030; and the overall impact
3. Estimate the cut in emissions for all the initiatives put together, taking overlaps between them into account

We've explained our calculations in more detail in the Appendix available in the full report PDF online at [BusinessEndofClimate.org](https://www.businessendofclimate.org)

Choosing the initiatives:

CRITERIA FOR INITIATIVES:

- ▶ work on a potentially global scale
- ▶ be underway, with companies already signed up
- ▶ be run by an institution that drives recruitment and action
- ▶ set specific and coherent targets towards defined objectives, and commit to a plan for the impact they'll make in 2030
- ▶ ask companies, or groups of them, to make public commitments and share plans
- ▶ report on progress by sharing data through CDP or another public platform
- ▶ be on the NAZCA portal

FIVE INITIATIVES ANALYZED IN THIS FIRST EDITION:

- ▶ Science Based Targets
- ▶ EP100
- ▶ RE100
- ▶ Zero Deforestation
- ▶ Low Carbon Technology Partnership initiative (LCTPi), which includes work on renewables, chemicals, cement, energy efficiency in buildings, low carbon transport fuels, climate smart agriculture, forests and forest products as carbon sinks

In this first version, we didn't include some initiatives that have a lot of potential because they're either not quite underway (like EV100) or currently being scoped (like LCTPi's Low Carbon Freight).

To put other initiatives forward for the study, send a message to info@BusinessEndofClimate.org

QUANTIFYING IMPACT

First, we've estimated the cut in emissions each initiative could achieve. We asked initiative leads to share their 'most ambitious plan for 2030' with us. Then we used that to scale up the impact. We also estimated the impact if the whole sector actually signed up.

Table 2

Main assumptions for the quantification of the impact of the initiatives

INITIATIVE	CURRENT COMMITMENTS (As of June 14, 2016)	DIRECT IMPACT	POSSIBLE SYSTEMIC IMPACT
 SCIENCE BASED TARGETS	163 companies committed 15 companies with targets	2,000 companies by 2030	All companies (100% sector coverage) set science based targets on direct and electricity related emissions
 EP100	4 companies (initiative only just starting)	1,000 companies by 2020	All companies (100% sector coverage) achieve the doubling of energy productivity in 25 years
 RE100	65 companies	3,000 companies by 2030	All electricity that is consumed by companies (i.e. 40%-50% of total electricity consumption)
 ZERO DEFORESTATION	51 companies	500 companies by 2020, 750-850 by 2030	Total global production of commodities
 LCTPI	158 companies engaged, 84 companies endorsed	Economy wide implementation at an ambitious rate of deployment	Full transformation of the sectors (full impact of the initiative, as this is the aim of the initiative)

Calculating emissions reductions always requires a reference to compare to. Such a future scenario is always uncertain and several options exist:

BASELINE:

The IPCC Fifth Assessment Report of 2014 provided a set of baselines from global models. In general, they assume no new climate action after 2010. The baseline used in the LCTPI analysis is the median baseline emissions from the IPCC report, approximately 68 GtCO₂e/year (range: 61-73 GtCO₂e, based on 10th-90th percentile of projections).

CURRENT TRENDS:

Recent scenarios assume a continuation of current trends, taking action by many actors into account--called "current policy scenario" by the International Energy Agency or "current policy trajectory" by UNEP's emissions gap report. Recognizing that additional actors beyond governments contributed to these reductions, these scenarios are lower than the baseline mentioned above, as significant developments occurred since 2010. The "current policy scenario" of the IEA would lead to around 61GtCO₂e in 2030.⁵ But it doesn't include new policies suggested in the NDCs from the Paris Agreement.

In this analysis we have used the current trends scenario, except for LCTPI, where external analysis by PricewaterhouseCoopers was used. Consequently, the impact of the initiatives are shown relative to current trends, recognizing that the initiatives already contribute to achieving this current trend. For energy-related emissions, we've used the IEA's Energy Technology Perspectives 2015 report.⁶ It's a respected source, and the data gives us the sector detail we need.

OVERLAPS BETWEEN INITIATIVES

To work out the effect of overlaps between the initiatives, first we looked at the sectors that each one covers, and what proportion it could cover. Then we estimated the proportion of companies that could sign up to more than one initiative.

This table shows how much of each sector the initiatives could cover if they achieve their most ambitious plan for 2030.

Table 3

Overview of coverage rates per initiative and sector for the direct impact (the most ambitious plan for 2030)

INDUSTRY	 SCIENCE BASED TARGETS	 EP100	 RE100	 ZERO DEFORESTATION**	 LCTPI
Electricity	36%		12%		X
Cement	19%	10%			X
Iron & Steel	23%	12%			
Pulp & Paper	13%	6%			
Aluminium	22%	11%			
Chemicals	28%	14%			X
Other Industries	23%	12%			X
Transport	76%	38%*			X
Service Sector	17%	8%			X
Agriculture & Forestry				X	X

* For EP100, Scope 1 and 2 GHG emissions from car manufacturing industry was assessed.

** The charts show where direct emissions are impacted. E.g. some of the drivers for deforestation may come from industry sectors, but the emissions are counted under agriculture and forestry.

The overlap for multiple sign-ups is negligible up to 2020. As the number of companies making commitments grows, so does the overlap. So we've looked at the targets of the overlapping share for each theme – energy efficiency or renewable energy, for example – and assumed that the more ambitious target is the most important.

For more details on the methods behind our calculations, see the Appendix in the full report PDF online at: www.BusinessEndofClimate.org



POTENTIAL EMISSIONS REDUCTIONS, BARRIERS AND POLICY INTERVENTIONS

Here we look at each initiative to show what contribution it could make if it achieves its most ambitious plan. In every case where we can make an estimate, the cut in emissions would be sizable.

We also estimate what the contribution would be when even more companies join. And we examine the barriers, discussing what governments could do to remove them and create incentives for business.

SCIENCE BASED TARGETS

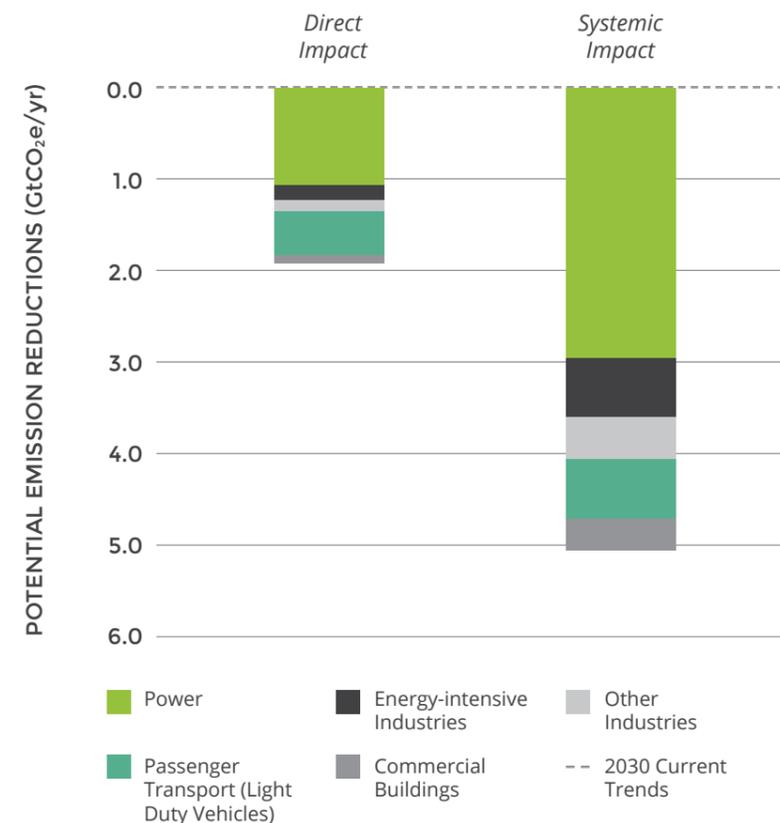
Science Based Targets is an initiative run by UN Global Compact, the World Resources Institute, WWF, and CDP that asks companies to set emissions targets in line with keeping climate change well below 2°C. We've assumed that 2,000 companies will be setting Science Based Targets by 2030.

As of June 14, 2016, 163 companies are committed to doing this and 15 have had their targets reviewed and approved. So far, we have data to estimate the impact of seven of the 15 approved companies reaching their SBTs. It would mean a reduction of about 0.10 GtCO₂e by 2030. We don't think that's a comprehensive enough estimate to currently include in the figure below.

The reduction from SBTs doesn't bridge the gap between emissions under the baseline and the cut needed to keep temperature change under 2°C. That's because some sources of emissions, like heat and power for homes, aren't related to business. Also, we're assuming companies will create ratcheting targets up to 2050 in phases and that they aren't on course to cut emissions in line with 2°C until they set these targets. So for those joining later, the impact by 2030 will be relatively small.

Figure 2

Reductions from Science Based Targets initiative below current trends in 2030 (GtCO₂e)



What are the barriers?

Committing to emissions reductions often means significant change for companies. It could mean new long-term investments, or changes to how they source raw materials, or who they do business with.

Many companies are ready to make these changes because they see economic opportunity in taking action on climate; it could boost their reputation and cut their long-term costs, for instance. Clear, simple and consistent policy greatly encourages business to do more, especially when there are ambitious long-term targets in place.

As an example, European train company Thalys has committed to reduce corporate scope 1, 2 and 3 GHG emissions per passenger kilometer by 41.4% by 2020, compared to a 2008 base-year. They see this as necessary for them to be prepared for more demanding environmental laws and aligned with the Paris Climate Agreement. They also see decarbonizing as key to remaining attractive and relevant to customers.

A company in a country with a target to cut emissions by 95% by 2050 will have a bigger incentive for action than one in a country with a lower target.

How policy can help

To help companies make long-term commitments, governments need to create stable long-term policies. That includes:

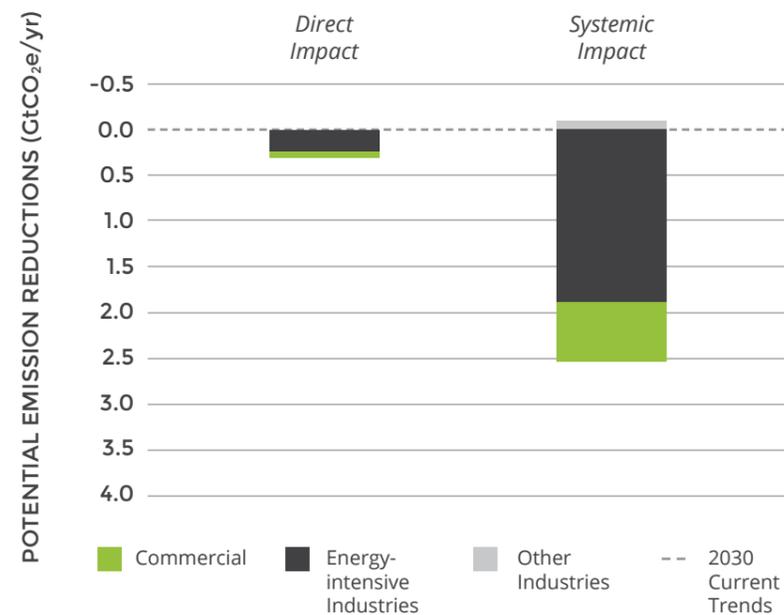
- ▶ keeping carbon pricing consistent across sectors, with revenues used to fund low-carbon initiatives
- ▶ developing a policy framework based on fundamental principles and ambitious goals that don't change
- ▶ backing innovation and R&D aimed at developing low-carbon technologies
- ▶ encouraging companies to bring their research to market and facilitate further investment and scaling
- ▶ increasing the supply of cost-effective renewable energy products with credible mechanisms for tracking emissions

EP100

In EP100, run by The Climate Group, companies commit to doubling their energy productivity (economic output from each unit of energy) within 25 years. Under its most ambitious plan, 1,000 companies will be committed by 2020. The first companies announced their EP100 pledges in the second quarter of 2016. EP100 also works with with The Global Alliance for Energy Productivity and Sustainable Energy for All.

Figure 3

Reductions from EP100 below current trends in 2030 (GtCO₂e)



What are the barriers?

The biggest hurdle to progress is overcoming the status quo. Even though energy is a big variable cost for most companies, few see it as a route to competitive advantage or profitability. To do that, they need experts who can demonstrate the impact of energy efficiency. They also need incentives to help make the case for investing in new equipment or infrastructure.

How policy can help

Governments can help boost energy productivity by publicizing the benefits. For example, the US government has endorsed the goal of doubling energy productivity. At the same time, they can also act as catalysts encouraging companies to invest in energy productivity. This is already happening globally:

- ▶ Singapore lets businesses make a bigger proportion of their energy efficiency investments tax deductible, so they get payback earlier
- ▶ Australia gives grants for investment in energy-efficient equipment and low emission processes and products
- ▶ India lets companies write off 80% of investment against tax in the first year for a long list of energy-efficient equipment like boilers, furnaces and heat pumps

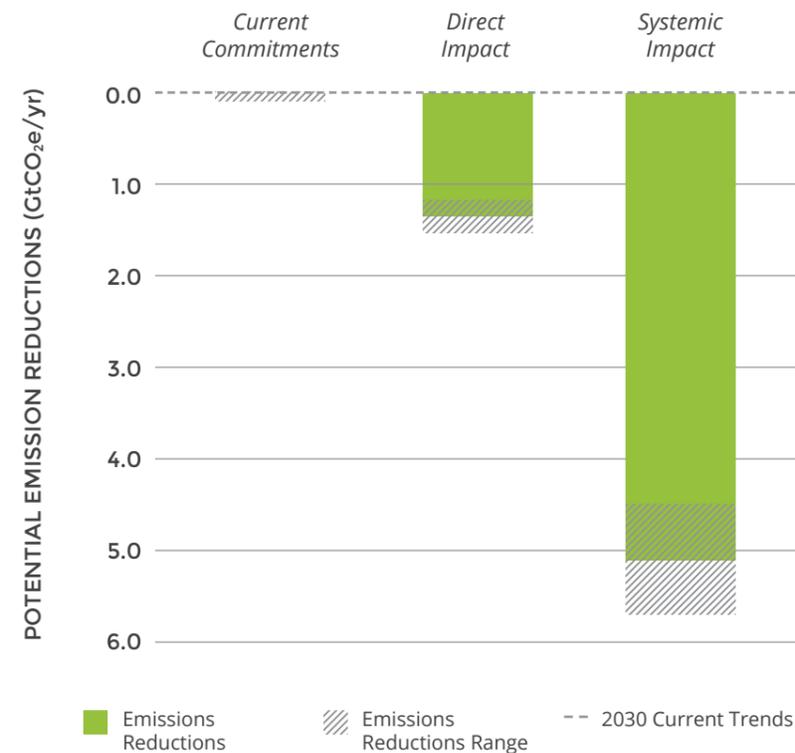
Other countries could easily adopt similar schemes.

RE100

RE100, run by The Climate Group and CDP since 2014, asks companies to commit to using only renewable electricity, and aims to have 1,000 companies committed by 2020. For the purposes of this report, we've estimated that 3,000 companies will have set a renewable electricity target by 2030. As of June 14, 2016, RE100 had 65 companies on board.

Figure 4

Reductions from RE100 below current trends in 2030 (GtCO₂e)



What are the barriers?

Switching to renewable power is a big move for businesses. It isn't always clear that renewable power can: 1) help manage fluctuating energy costs and 2) create a more secure energy supply 3) provide a consistent energy supply.

Businesses also sometimes need guidance on supply and creating a management plan for accessing renewable power, whether that's buying it from utilities, generating it from their own installations or a combination of the two.

In some countries renewable electricity isn't yet widely available on a utility scale. That's often because utilities don't have a commercial incentive or policy in place to offer anything beyond the standard energy mix.

How policy can help

Governments can encourage businesses to take up renewable electricity by:

- ▶ creating clear and transparent systems for certifying renewable power, so companies can be confident in what they're buying
- ▶ having the right frameworks in place for a renewable electricity market that works well for suppliers and customers
- ▶ requiring utilities to offer companies renewable energy options
- ▶ promoting the business benefits of renewable power
- ▶ making it easier for companies to produce renewable power from their own installations by offering subsidies and tax incentives, giving guidance, streamlining the planning process and making existing infrastructure compatible

ZERO DEFORESTATION

Zero deforestation asks companies to commit to using only commodities produced without deforestation by 2020. As of June 14, 2016, 51 companies have made the commitment. Under its most ambitious plan the initiative would cover 750-850 companies by 2030.

To estimate the impact on emissions, we've focused on timber, palm oil, soy and cattle products (like beef and leather). If 800 companies in 2030 have implemented the commitment (including the 24 whose commodity use we have currently analyzed) then we think emissions from deforestation in palm oil, timber and beef exports could be wiped out (and halved for soy products).⁷

*So far, we only have data for 24 of the 51 committed companies.

What are the barriers?

A global market in zero-deforestation commodities calls for regulations, both in countries that produce and consumer countries. Regulations only work if producers follow them and authorities enforce them. If rules aren't policed, some sustainable producers will lose out because they're competing with less scrupulous businesses.

Standards and regulations can be hard to follow for producers because they're often both complicated and inconsistent from one country to the next. That puts a bigger burden of time, effort and cost on smallholders, medium-sized farms and plantations as well as companies trying to adhere to zero-deforestation practices.

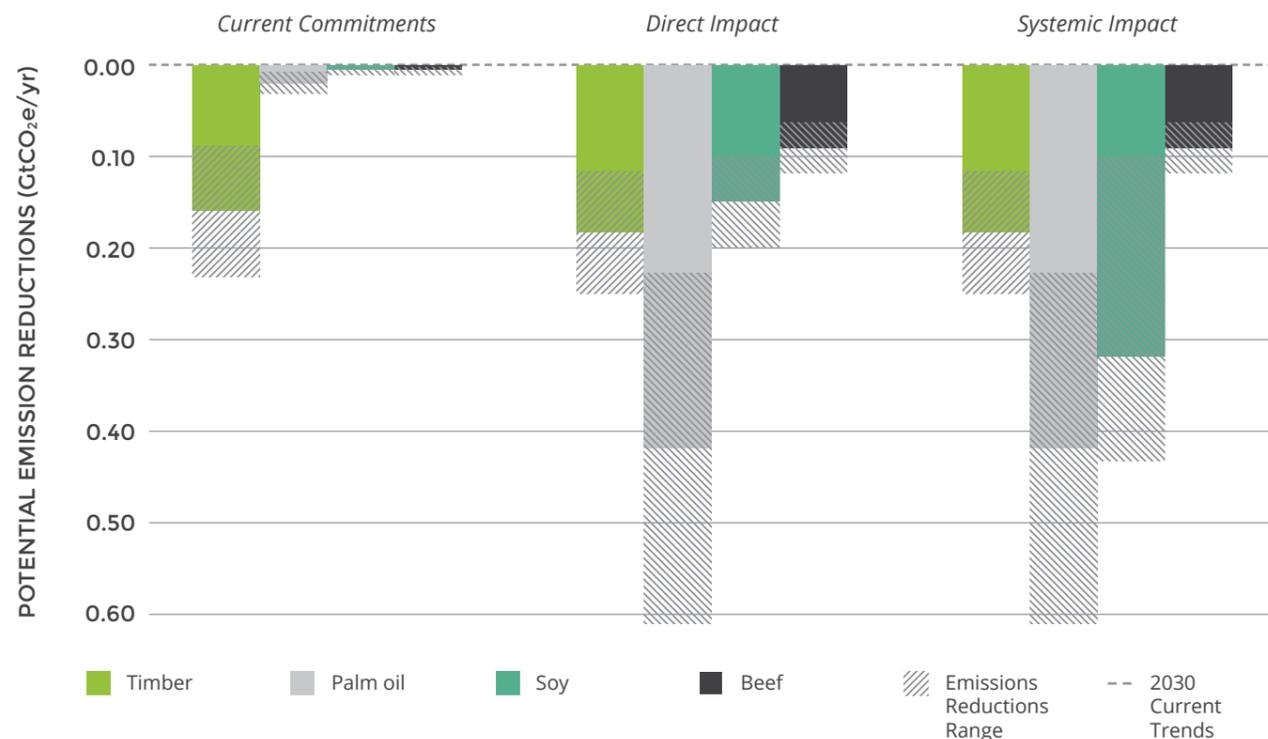
How policy can help

Governments in producer and consumer countries can make zero deforestation happen faster by:

- ▶ coming together to promote sustainable practice in countries where producers are breaking the law, and lobbying countries to tighten up compliance
- ▶ banning products from unsustainable and illegal sources
- ▶ streamlining and consolidating regulations and standards to encourage sustainable producers, especially for palm oil, soy and cattle products
- ▶ supporting good governance of land rights in producer countries to avoid confusion over competing claims
- ▶ setting procurement standards in consumer countries to rule out commodities that come from deforestation
- ▶ joining businesses and NGOs to combat deforestation with initiatives like the Tropical Forest Alliance 2020

Figure 5

Reductions from zero deforestation below current trends in 2030 (GtCO₂e)



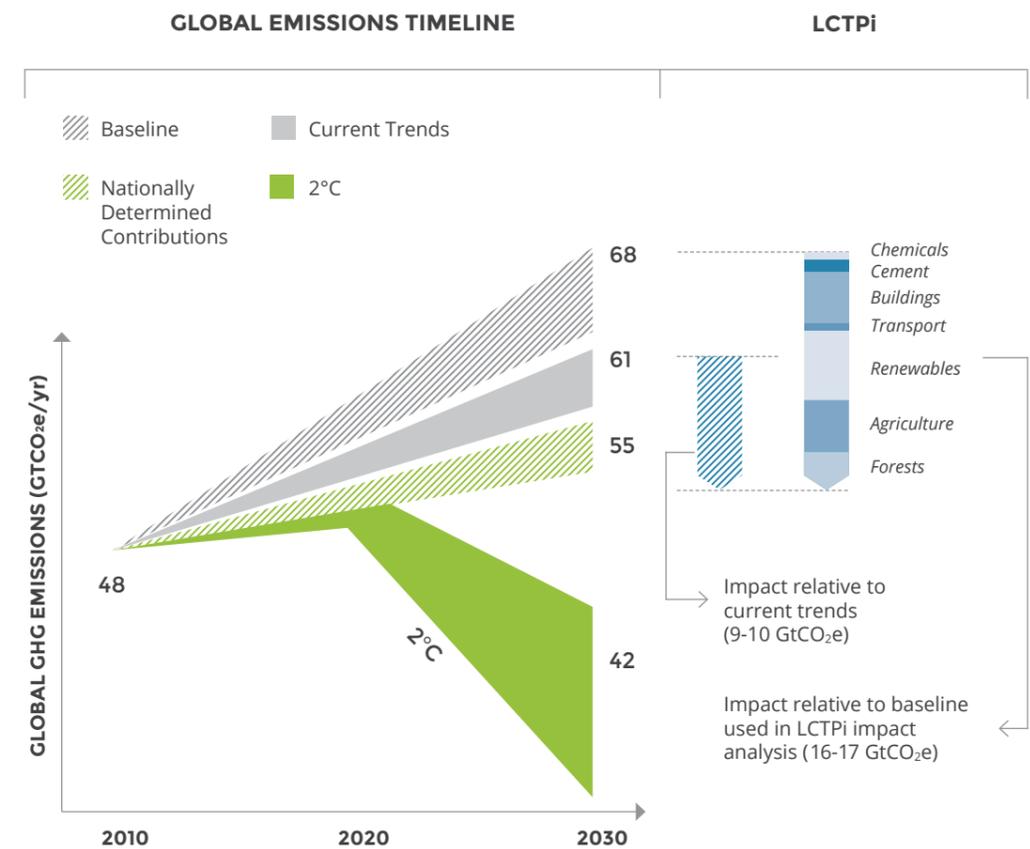
LOW CARBON TECHNOLOGY PARTNERSHIP INITIATIVE (LCPTi)

The Low Carbon Technology Partnership initiative (LCPTi) is led by the World Business Council for Sustainable Development. Through eight current collaborative initiatives in specific areas, 158 companies have agreed on a shared vision of what each area can contribute to keeping global temperature change under 2°C. They've identified the barriers, and agreed action plans to remove them and scale up business solutions to realize the vision.

In the figure and table below, we summarize the impact that the collective ambition of these companies would have in terms of emission reductions. Recognizing that companies involved are already investing in their different areas and making progress, LCPTi aims to facilitate more investment from more companies towards the vision.

Figure 6

Impact of LCPTi using different references



What are the barriers?

This initiative looks across a whole range of measures to limit emissions in multiple sectors from agriculture to cement production. Each initiative has described the financial, regulatory and behavioral barriers to achieving its ambition. Each LCPTi is now implementing its own action plan (for more detail, see the LCPTi's reports). Those activities include, for example, encouraging more companies to procure renewable energy through forward power purchase agreements to decrease future risk for renewable energy projects. Other activities involve addressing the skills gap in the deployment of low carbon, sustainable solutions in key applications like buildings, automotive, food and packaging.

Table 4

Impact of LCTPi on GHG emissions using different references

	POSSIBLE SYSTEMIC IMPACT	
	BELOW CURRENT TRENDS (GtCO ₂ e)	BELOW THE BASELINE USED IN THE LCTPi IMPACT ANALYSIS (GtCO ₂ e)
TOTAL IMPACT	9-10	16-17
Renewables		5
Chemicals		0.2 -0.4
Cement		0.6-0.9
Energy efficiency in buildings		3-3.5
Low carbon transport fuels		0.5
Climate smart agriculture		3.7
Forests and forest products as carbon sinks		2.7

[Note to tables]: The figures come from the impact analysis of LCTPi⁸ (November 2015) which used a different reference to this report.⁹ We haven't calculated how much each of the eight LCTPi initiatives is contributing compared to the current trends used in this report. The impact analysis notes that the actions lead to global GHG emissions of 51-52 GtCO₂e/year by 2030.¹⁰ This is 9-10GtCO₂e below the current trends.

How policy can help

Governments can help scale up business solutions in LCTP initiatives by:

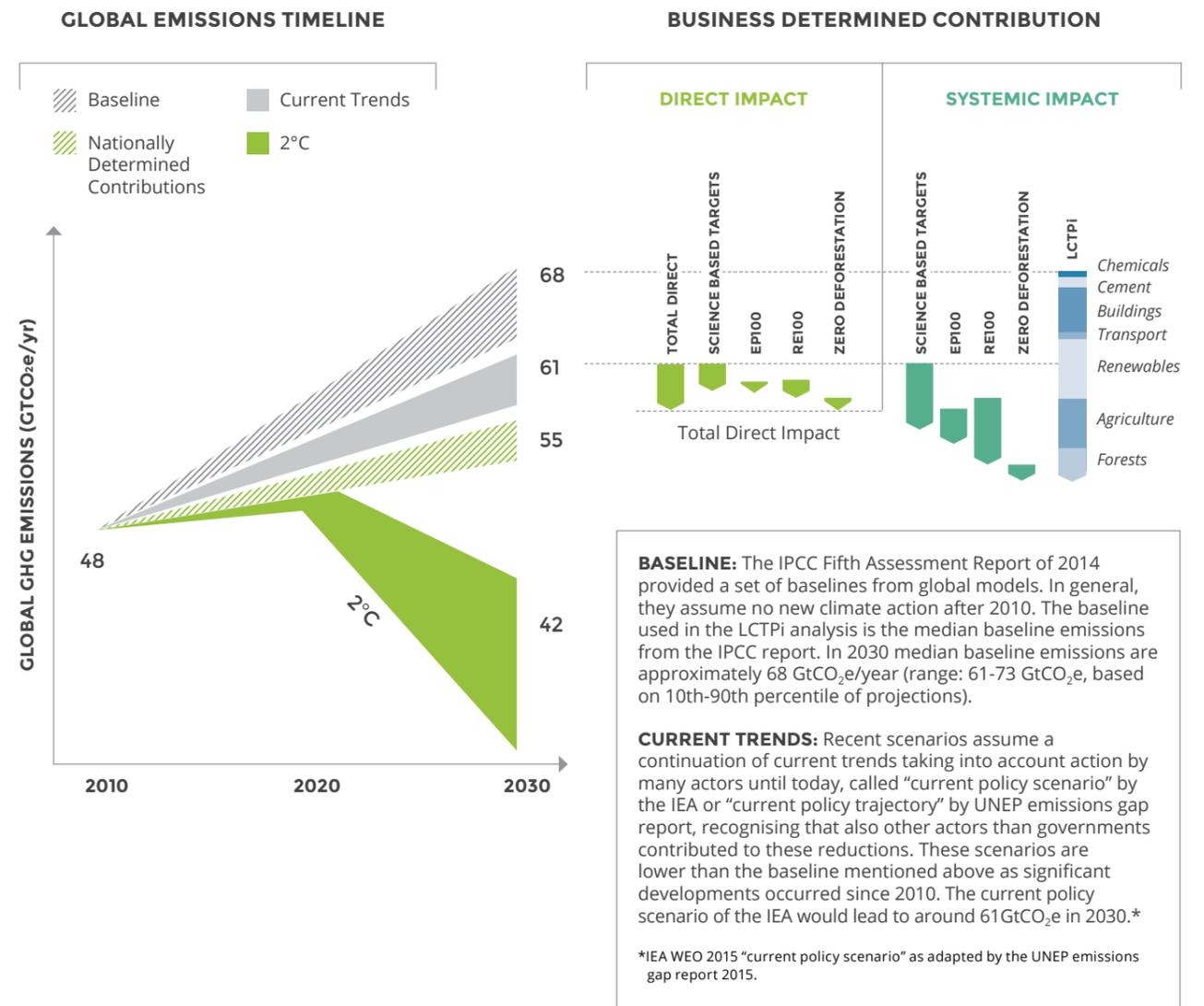
- ▶ having a stable and robust carbon pricing system across all sectors of the economy, dedicating the revenue to low carbon initiatives and removing fossil fuel subsidies
- ▶ adopting market-based approaches that allow the market to pick the best low carbon technologies in all sectors
- ▶ supporting innovation and R&D across a wide range of proven and promising technologies
- ▶ creating a stable and reliable policy framework for renewable energy that sends a clear signal to investors, while being flexible to evolving technical, economic and social circumstances
- ▶ promoting transparency on energy consumption for residential and commercial buildings (through energy audits, benchmarking and labelling)
- ▶ and establishing national/local strategies to achieve an energy-efficient building stock (including strengthening and enforcing building energy codes)
- ▶ strengthening international cooperation to gather reliable, industry-level energy and emissions data, because what gets measured gets managed
- ▶ recognizing that forest-based products, grown and harvested according to sustainable forest management principles, are a source of carbon storage
- ▶ recognizing that we must scale the coverage and implementation of sustainable procurement practices across all forest products
- ▶ ensuring technology and feedstock neutrality on biofuel policies and incentives

THE TOTAL REDUCTIONS - A BIG STEP TOWARDS 2°C

Altogether, the business determined contributions of the initiatives we've looked at for this study add up to a cut in emissions of between 3.2 and 4.2 GtCO₂e below current trends. That's if the initiatives achieve their most ambitious plans. As this table shows, if they go further and the whole sector commits, we believe the reduction will be nearer 10 GtCO₂e below current trends.

Figure 7

Actual 2010 emissions compared with two sets of projections for 2030 emissions, and the 2030 emissions needed to keep global warming below 2°C



The initiatives we've focused on here stand to play a significant part in reaching the NDCs that countries signed up to in Paris. They also have the potential to help to overachieve them. Overall, they could substantially narrow the gap between the emissions we're producing now, and the 42 billion metric ton limit for keeping temperature change below 2°C.¹¹

For this study, we've set a reference for global greenhouse gas emissions that assumes current trends continue. That puts the planet on course to produce around 61 GtCO₂e by 2030.¹² As with any projection of the future, there is uncertainty in this reference.

WHAT'S NEXT?

We see this study as a start. We want to evolve our approach and bring in more initiatives to deepen our analysis of what business – and government – can do to keep tracking towards well below 2°C and limiting dangerous climate change. We'll publish the results in an annual report. To speak with us about our work and methods or to learn more about how and when initiatives are reviewed for inclusion, get in touch with us at info@BusinessEndofClimate.org.



To help build on what the pioneering businesses in these initiatives have started, we think it's essential to:

Bring in more sectors

So far, some business sectors have more climate change initiatives than others. While electricity generation and deforestation are well covered, transport and heating and cooling of buildings lag behind. Various initiatives—including LCPTi's work on low-carbon freight—are starting to reach these sectors. But we need more.

Bring in the southern hemisphere

To create massive change at the speed and scale required to limit dangerous temperature increases, we need a global effort. We believe that there is ample opportunity for business in the southern hemisphere to benefit from the low-carbon economy. And, currently, the southern hemisphere is under-represented in the initiatives we've focused on. Governments, as well as business, must come together to bring all regions behind the same goal.

Get government and business to keep working together to raise the level of ambition

As more businesses commit to action, they'll make governments' NDCs more attainable. That, in turn, will make governments more ambitious when it comes to setting national targets. So the pledges businesses make now, coupled with a firm policy lead, can create a virtuous circle of action. Clear policy leadership from the center will become more important as city and regional governments, as well as sector organizations, become more active.

As we've seen here, that policy lead starts with consistency and clarity about objectives and the route to achieving them. The more governments do to set the tone, the more they'll inspire confidence from businesses and investors and go a long way to bending the curve back below 2°C.

ENDNOTES

- 1 All relevant companies means all companies that could fall under the type of commitments the initiatives require. In some cases, this is extremely general, as with RE100, which covers all companies using electricity. But for Zero Deforestation, it applies only to companies buying commodities that can cause deforestation.
- 2 Up to 6.9% against the baseline value of 61GtCO₂e in 2030.
- 3 GHG emissions and reductions are measured in carbon dioxide equivalent – so a tonne of, e.g., nitrous oxide would be measured in the number of tonnes of carbon dioxide that would cause the same level of greenhouse effect.
- 4 UNEP Emissions Gap Report, 2015.
- 5 IEA WEO 2015 “current policy scenario” as adapted by the UNEP emissions gap report 2015.
- 6 IEA, 2015a Energy Technology Perspectives 2015: Mobilizing Innovation to Accelerate Climate Action, Paris, France: International Energy Agency, the 6DS scenario. This includes all policies in force when we publish the report and assumes no additional or planned policies. It also excludes NDCs agreed at Paris.
- 7 Based on the supply chains of companies that have made the commitment to date and been analyzed, plus the fact that stopping deforestation caused by soy would require a particularly high degree of effort from the private sector, we have estimated a lower impact than for the other commodities.
- 8 LCPTi Impact Analysis, PwC, 2015. <http://lctpi.wbcsd.org/wp-content/uploads/2015/11/LCPTi-PWC-Impact-Analysis.pdf>.
- 9 The LCPTi impact analysis used the median baseline emissions from the IPCC's most recent review of climate change mitigation. In 2030 median baseline emissions are approximately 68 GtCO₂e/year (range: 61-73 GtCO₂e, based on 10th-90th percentile of projections. More on methods can be found in the methodological annex.
- 10 This excludes the initiative on CCS.
- 11 UNEP emissions gap report 2015.
- 12 IEA WEO 2015 “current policy scenario” as adapted by the UNEP emissions gap report 2015.

REFERENCES

CISL, & Ecofys. (2015). Better Partnerships: Understanding and increasing the impact of private sector cooperative initiatives. Retrieved from <http://www.ecofys.com/files/files/ecofys-cisl-2015-wtg-better-partnerships.pdf>

Hsu, A., Moffat, A. S., Weinfurter, A. J., & Schwartz, J. D. (2015). Towards a new climate diplomacy. *Nature Climate Change* (Vol. 5). Nature Publishing Group. doi:10.1038/nclimate2594

IEA, 2015a. *Energy Technology Perspectives 2015: Mobilising Innovation to Accelerate Climate Action*, Paris, France: International Energy Agency.

IEA, 2015b. *World Energy Outlook 2015*, International Energy Agency.

Graichen, J., Healy, S., Siemons, A., Höhne, N., Kuramochi, T., Gonzales-Zuñiga, S., Sterl, S., Kersting, J. and Wachsmuth, J. (2016). Climate initiatives, national contributions and the Paris Agreement. Berlin, Germany. Retrieved from <https://newclimate.org/2016/05/23/climate-initiatives-national-contributions-and-the-paris-agreement/>

LCPTi Impact Analysis, PwC, 2015. Retrieved from <http://lctpi.wbcsd.org/wp-content/uploads/2015/11/LCTPI-PWC-Impact-Analysis.pdf>

Roelfsema, M., Harmsen, M., Olivier, J., & Hof, A. (2015). Climate Action Outside the UNFCCC - Assessment of the impact of international cooperative initiatives on greenhouse gas emissions. The Hague. Retrieved from http://www.pbl.nl/sites/default/files/cms/pbl-2015-climate-action-outside-the-unfccc_01188.pdf

UNEP (2015) Climate commitments of subnational actors and businesses. A quantitative assessment of their emission reduction impact: United Nations Environment Programme. Available online at http://apps.unep.org/publications/pmtdocuments/-Climate_Commitments_of_Subnational_Actors_and_Business-2015CCSA_2015.pdf

UNEP, 2015. *The Emissions Gap Report 2015: A UNEP Synthesis Report*.

APPENDIX: BUSINESS END OF CLIMATE METHODOLOGY

INTRODUCTION

The methodology presented below is used to quantify the impact of the business determined contributions. It complies with the following principles:

1. **Transparency:** all underlying assumptions should be presented and clearly stated.
2. **Pragmatism:** pragmatic assumptions are sometimes done, but should be transparently noted as per principle 1. Several methodological difficulties prevent exact determination of the impact of business initiatives. For example, a reduction cannot be unambiguously attributed only to one actor if more than one actor has worked towards its implementation. Similarly, we cannot determine, which exact companies will join the initiatives.
3. **Continuous improvement:** this is a first attempt to quantify the impact. The objective is to improve the methodology and robustness of the results in the future.
4. **Openness:** we invite readers to make comments on the methodology so that together we can improve the robustness of future analysis.

The methodological steps include the following:

1. Selection and characterization of the initiatives for analysis, namely:
 - a. Type of commitments and impact;
 - b. Current coverage of companies;
 - c. Future plans for company coverage;
 - d. Sectoral coverage of emissions.
2. Estimation of the mitigation potential for;
 - a. Current and most ambitious plans by 2030;
 - b. Systemic impact.
3. Assessment of overlaps between initiatives to determine business determined contribution.

The criteria for inclusion of collaborative initiatives in this and future editions of the Business Determined Contribution report is detailed below. The 2015 edition will include several of the initiatives promoted by the WMB coalition, but our wish is to include all significantly impactful collaborative business plans in future annual editions, subject on capacity. We welcome early suggestions for initiatives to be included in the 2016 report as well as any comments on the criteria explained below. You can contact us at info@BusinessEndofClimate.org.

SELECTION AND CHARACTERIZATION OF INITIATIVES

For the selection of business initiatives to be considered in the Business Determined Contribution analysis they need to:

- A. Be significant in global scale:¹
 - a. the initiative is global and partners have global or multi-national reach;
 - b. aims to engage a significant number (hundreds at minimum) of companies;
 - c. the majority of companies have a global or multi-national reach.
- B. Have an institutional home and significant current activity: there should be a clear organization driving the initiative forward or a number of organizations with a clear governance structure leading it. It should be possible to demonstrate that the initiative has been active during the previous year, either building its constituency or in the delivery of climate actions.
- C. Be coherent, this is, commitments of the same type not just a collection of random commitments by different companies;
- D. Require from participating companies to achieve commitments that are:
 - a. Specific – they should clearly articulate what is the nature of the commitment, e.g. reduction of scope 1 emissions or consumption of renewable energy;
 - b. Measurable – Commitments and targets should be capable of being tracked and verified in a quantifiable way, for example, achieving direct emissions for the entire consolidated company of 1.000.000 tCO₂e by year X;
 - c. Ambitious – Commitments should be significant deviations from business as usual, for example 100% consumption of renewable energy by 2020;
 - d. Time-bound – Commitments should specify baselines (or base years) as well the time-frame within which they will be achieved and any steps, for example 50% reduction of Scope 1 emissions by 2020 compared with a 2015 base year.
- E. Include reporting/monitoring of the commitments;
- F. Provide their “most ambitious plan for 2030”;
- G. All initiatives should plan to be included on the NAZCA portal.

Initiatives wishing to be included in future editions of the BDC should make an initial self-assessment against the above criteria and submit a proposal to bdc@cdp.net. For this initial report we included the following initiatives, focussing on those supported by the We Mean Business coalition²: RE100; Science Based Targets; EP100; Low Carbon Technology Partnership Initiative (LCTPi; which includes, Low Carbon Freight, Renewables, Energy Efficiency in Buildings, Cement, Low Carbon Transport Fuels, Climate Smart Agriculture, Forests, Chemicals); and Zero deforestation supply chains.

The characteristics and assumptions taken on the assessment of each initiative for this report are detailed in next sections.

ESTIMATION OF THE MITIGATION POTENTIAL OF BUSINESS INITIATIVES

Baseline scenario

This study used the 6DS Scenario from the IEA Energy Technology Perspectives (ETP) 2015 as the baseline scenario for the analysis. In this section, we provide a brief comparative overview of different scenarios published in the World Energy Outlook (WEO) and ETP reports, which is summarised in Table 1. Both the WEO and the ETP reports investigate three scenarios. The IEA explains that always two are comparable: the WEO “Current Policies Scenario” (CPS) and the ETP “6DS Scenario”; the WEO “New Policies Scenario” (NPS) and the ETP “4DS Scenario”; and the WEO “450 Scenario” and the ETP “2DS Scenario”. As described by the IEA, the WEO CPS and the ETP 6DS scenarios assume no additional policy implementation after the year of publication.

Table 10

Comparative overview of IEA WEO and ETP scenarios. Source: (IEA 2015c; IEA 2015b), unless otherwise noted.

SCENARIO	ETP DESCRIPTION	WEO DESCRIPTION
WEO “Current Policies Scenario” / ETP “6DS Scenario”	<p>The 6DS scenario “is largely an extension of current trends” and “is broadly consistent with the WEO Current Policy Scenario through 2035.”</p> <p>The 6DS scenario “assumes no GHG mitigation efforts beyond policy measures already implemented”.</p>	<p>The Current Policies Scenario “takes into consideration only those policies for which implementing measures had been formally adopted as of” mid-publication year (i.e. mid-2015 for WEO 2015).</p> <p>“This scenario, though clearly extremely unlikely to be realised, offers a picture of how global energy markets would evolve without new policy intervention”.</p>
WEO “New Policies Scenario” / ETP “4DS Scenario”	<p>The 4DS scenario “reflects actions that have been proposed but not yet implemented”, taking “into account recent pledges made by countries to limit emissions and step up efforts to improve energy efficiency” and “is broadly consistent with the WEO New Policies Scenario through 2035.”</p>	<p>The New Policies Scenario, the central scenario of the WEO, incorporates “the policies and measures that affect energy markets and that had been adopted as of” mid-publication year and also “includes all policies announced but yet to be implemented and we take a generally cautious view in the New Policies Scenario of the extent and timing of their implementation, given the institutional, political and economic circumstances that could stand in the way.”</p> <p>The NPS in WEO 2015 “includes the energy-related components of the Intended Nationally Determined Contributions (INDCs), submitted by national governments by 1 October”.</p>
WEO “450 Scenario” / ETP “2DS Scenario”	<p>The 2DS “describes an energy system consistent with an emissions trajectory that recent climate science research indicates would give at least a 50% chance of limiting average global temperature increase to 2 °C”.</p> <p>“The 2DS is broadly consistent with the WEO 450 Scenario through 2035.”</p>	<p>This 450 scenario “assumes a set of policies that bring about a trajectory of greenhouse-gas (GHG) emissions from the energy sector that is consistent with” the 2°C goal.</p>

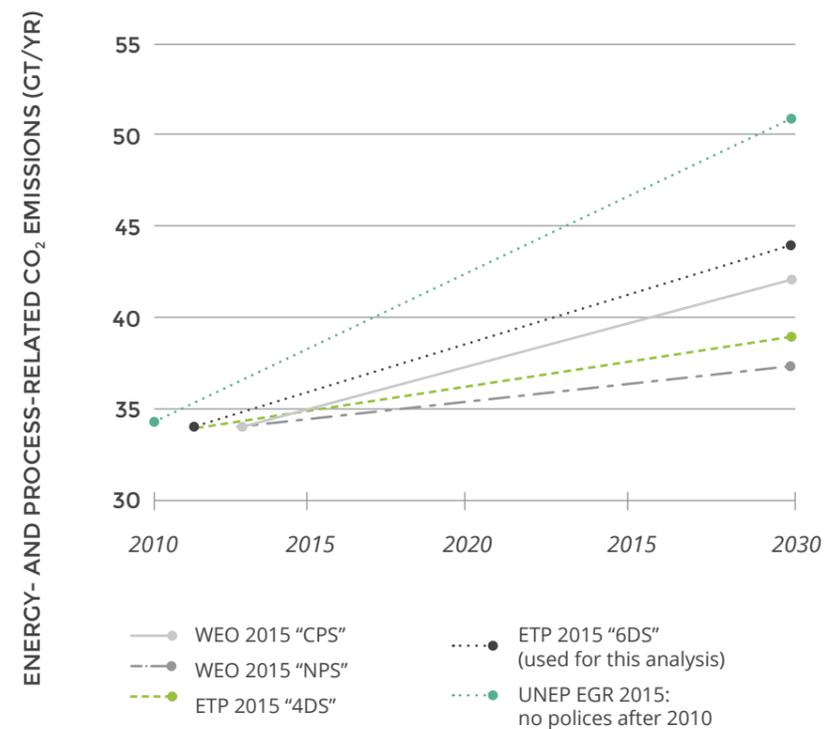
Figure 8 compares the 2030 emissions projections for the ETP 2015 “6DS” scenario, the baseline in this study, with those for a few other scenarios from ETP 2015 and WEO 2015 as well as the median emission levels estimated for the baseline scenario (assuming no new policy implementation after 2010) in the UNEP Emissions Gap Report 2015 that was taken from the IPCC scenario database (UNEP 2015). The CO₂ emissions projections from the scenarios are not directly comparable; WEO only covers energy-related emissions whereas ETP also covers process-related CO₂ emissions (e.g. cement production and iron and steel production). For the WEO 2015 scenarios, the process-related CO₂ emissions for 2030 were estimated from the 2013 historical emissions and the NPS projection for 2040 provided in the main text of the WEO 2015 report. As the process-related CO₂ emissions projections for

NPS was found to be roughly proportional to the final energy use in the industrial sector, CPS was assumed to increase proportionally to the sector final energy consumption. The same process-related CO₂ emissions projection was also applied to the Emissions Gap Report projection.

The results show that the 2030 emissions projection under the ETP 2015 “6DS”, our baseline, is slightly higher than that under the WEO 2015 CPS – given the future uncertainties and some differences in assumptions, we consider them to be comparable. The ETP 2015 “6DS” projection for 2030 is about 7 GtCO₂ lower than the Baseline Scenario projection in the UNEP Gap Report and about 5-6 GtCO₂ higher than the scenarios that take into account the planned and proposed policies.

Figure 8

Comparison of energy- and process-related CO₂ emissions projections under different scenarios published in ETP 2015 and WEO 2015 and the UNEP Emissions Gap Report 2015.



Quantification

For each initiative we started from the “most ambitious plan for 2030” provided by the initiative. This includes ideally:

- The number of companies aimed to cover by 2030 and their characteristics, for example the sectoral split (e.g. 1000 companies, 50% in the industrial sector);
- The commitments these companies will take on (e.g. apply 100% electricity from renewable sources);
- The implementation rate of these commitments by 2030 (e.g. they will have reached this target to 90% in 2030).

We translate this information into variables that are covered by our calculation tool, e.g. coverage of production in sectors or improvements in emissions per activity. To estimate the expected coverage of GHG emissions per sector under each initiative, we used a range of information sources (see below for each initiative).

Finally, we estimate the maximum potential effect for the whole sector, assuming all potential companies were to take on such targets.

Figure 9

Steps in quantification of the impact



The following sections present the key variables and assumptions for each initiative analysed.

RE100

Table 11.

Translation of most ambition plan for 2030 for RE100

	INFORMATION PROVIDED BY THE INITIATIVE	TRANSLATION INTO PARAMETERS OF THE CALCULATION TOOL
NUMBER OF COMPANIES AND SECTORAL DISTRIBUTION	3000 companies by 2030	3000 companies with the same average reductions per company as those that are already committed
TARGET	100% electricity from renewable sources (target year not specified)	90% electricity from renewable sources in 2030
IMPLEMENTATION RATE	Not available	All committing companies together reach 90% share of renewables in 2030. In January 2016 RE100 companies were on average 50% of the way toward their 100% renewable electricity goals, according to information received from RE100. These companies are thus ahead by roughly 28 percentage points of the global share of renewables in electricity generation. As a baseline scenario, we assume that these companies would stay ahead by the same percentage points, i.e. reach 58% renewables in 2030, where the global average is 31%. In the reduction scenario they reach 90%.

The electricity demand of the 3000 companies is scaled up from the average electricity use of the already committed 57 companies.

We convert the electricity from renewable energy to saved emissions using the emissions factor from the 6DS scenario of the ETP 2015. The maximum of the range is the global average for coal, the minimum is the aggregate over all fossil fuels.

The results are in line with the calculations previously published by RE100/CDP.³ This analysis mentions that RE100 covers 0.4% of global electricity supply with current commitments, about 8% if 1000 companies join and 40-50% if all companies would use renewable electricity, resulting in a reduction of 10%-15% of global CO₂ emissions. This is comparable to our results in this report.

Science Based Targets

Table 12.

Translation of the most ambitious plan up to 2030 for the Science Based Targets initiative

	INFORMATION PROVIDED BY THE INITIATIVE	TRANSLATION INTO PARAMETERS OF THE CALCULATION TOOL
NUMBER OF COMPANIES AND SECTORAL DISTRIBUTION	2000 companies by 2030; Composition based on MSCI ACWI ⁴	Percentage share of coverage per sector by production in 2030 <ul style="list-style-type: none"> • Power: 36% • Cement: 19% • Iron and steel: 23% • Pulp and paper: 13% • Aluminium: 22% • Chemicals: 28% • Other industries: 23% • Transport (light duty passenger vehicles): 76%* • Service sector: 17%
TARGET	Science based target in line with a "well below 2°C" decarbonisation trajectory	Companies signed up for the SBT will linearly decrease its carbon intensity per unit output towards 2050 to the level consistent with the 2°C pathway, while production develops as under the baseline. The 2050 targets were calculated based on IEA ETP 2015 as done with ETP 2014 in Krabbe et al. (2015). Direct and electricity related emissions only, plus emissions from car use were covered. For Scope 2 emissions, the decarbonisation targets were recalculated with baseline electricity CO ₂ emission factors to avoid double-counting of emissions reductions in the power sector. It only accounts for energy efficiency effects. We used the sectoral decarbonisation approach (one of the available methods) as it fits best the quantification approach
IMPLEMENTATION RATE	Not available	Decarbonisation from sign-up-year to 2050. Sign up rate increases linearly from zero in 2014 to given percentage in 2030

* For the transport sector, we considered that the products from the automobile manufacturers signed up to the SBTi also follow the science based targets trajectory.

Table 13.

Carbon intensity pathways from the sectoral decarbonisation approach. Source: Own calculations based on the IEA ETP 2015 applying the methodology from Krabbe et al. (2015).

SECTOR	UNIT	SCOPE	2012	2050
POWER	gCO ₂ per kWh	1	589	38
CEMENT	tCO ₂ per tonne cement	1	0.60	0.38
		2 ¹⁾	0.057	0.055
IRON AND STEEL	tCO ₂ per tonne crude steel	1	1.65	0.64
		2 ¹⁾	0.40	0.34
PULP AND PAPER	tCO ₂ per tonne paper and cardboard	1	0.57	0.22
		2 ¹⁾	0.72	0.45
ALUMINIUM	tCO ₂ per tonne aluminium	1	1.68	1.42
		2 ¹⁾	4.42	2.65
CHEMICALS AND PETROCHEMICALS	tCO ₂ per US\$ ₂₀₁₂ (index: 2012 level = 1)	1	1.00	0.50
		2 ¹⁾	1.00	0.38
OTHER INDUSTRIES	tCO ₂ per 2012 US\$ (index: 2012 level = 1)	1	1.00	0.14
		2 ¹⁾	1.00	0.39
LIGHT ROAD PASSENGER TRANSPORT 2)	tCO ₂ per 2012 US\$ (index: 2012 level = 1)	1 and 2	137	37
SERVICE SECTOR BUILDINGS	tCO ₂ per 2012 US\$ (index: 2012 level = 1)	1	23	10
		2 ¹⁾	66	36

1) Scope 2 emission intensity targets for 2050 are recalculated with the electricity CO₂ emission factors for the baseline scenario to avoid double counting of emissions reductions from decarbonization of electricity supply.

2) Recalculated from the publicly available IEA ETP 2015 datasets. Because the approach taken by Krabbe et al. could not be replicated due to the lack data, we could not distinguish Scope 1 and 2 emissions. However, the scale of Scope 2 emissions in 2030 for the passenger vehicles is expected to still be limited compared to Scope 1 emissions.

The values reported here are not strictly comparable to those reported in the summary recommendation published by the New Climate Economy in their 2015 report due to different methodologies.⁵ First, the baseline we used is significantly lower (5 GtCO₂e) than the baseline used in the New Climate Economy report. Second, the companies listed in the MSCI

All-Country World, on which we based our analysis, does not necessarily cover the world's largest 500 companies. Third, we assume here an increasing signup rate from now to 2030 (mostly after 2020), while the New Climate Economy report assumed immediate target setting and action.

EP100

For the EP100 initiative, we applied the assumptions detailed in Table 14. In the results, the emissions reductions for “Other industries” appear as slightly negative (i.e. a small emissions increase) because of the sector’s energy use shifts from fuels to electricity, for which baseline CO₂ emission factors were used to avoid double-counting of emissions reductions in the power sector.

Table 14.
Translation of the most ambitious plan for 2030 for EP100

	INFORMATION PROVIDED BY THE INITIATIVE	TRANSLATION INTO PARAMETERS OF THE CALCULATION TOOL
NUMBER OF COMPANIES AND SECTORAL DISTRIBUTION	1000 companies commit by 2020 focusing on <ul style="list-style-type: none"> • Construction Materials (incl. Cement) • Chemicals • Automobile manufacturing • Retail • Consumer Goods • Energy Service Companies 	Percentage share of coverage per sector in 2020-2030 based on 1000 companies (assuming half of what is covered under Science Based Targets / 2000 companies) <ul style="list-style-type: none"> • Cement*: 10% • Iron & steel*: 12% • Pulp and paper*: 6% • Aluminium*: 11% • Chemicals: 14% • Other industries (includes automobile manufacturing and various consumer goods production): 12% • Service sector (incl. retail): 8%
TARGET	Companies commit to doubling energy productivity in 25 years, which equals to increasing energy productivity by 2.8% per year	<ul style="list-style-type: none"> • Doubling energy productivity in 25 years • Energy productivity defined as economic output divided by final energy, which includes fuels and electricity • Sectoral economic activity assumed to grow with GDP of the baseline scenario • Companies in sectors with “*” follow the decarbonisation path of Science Based Targets, because EP100 targets are difficult to reach with these technologies 1)
IMPLEMENTATION RATE	Not available	Sign-up rate increases linearly from zero in 2014 to given percentage in 2020 and stays constant from 2020 to 2030

1) For energy-intensive industries, it has been suggested that energy intensity per physical output can only be doubled by 2050 from 1995 levels at the largest due to the thermodynamic limitations (Groenenberg et al. 2004). It should also be noted that the economic output (e.g. value added) per physical product output could increase towards 2030, which “will have a large impact on the economic energy productivity increase of these sectors” (Ecofys 2016).

Zero Deforestation

For the Zero deforestation initiative, we applied the assumptions detailed in Table 15.

Table 15.
Translation of the most ambitious plan for 2030 for Zero deforestation

	INFORMATION PROVIDED BY THE INITIATIVE	TRANSLATION INTO PARAMETERS OF THE CALCULATION TOOL
NUMBER OF COMPANIES AND SECTORAL DISTRIBUTION	500 companies by 2020, 750-850 by 2030	800 by 2030 with the same production level per company as the already participating companies.
TARGET	Companies commit to zero deforestation from the commodities they use by 2020	The forest-related commodities that the companies are producing or sourcing (palm oil, soy, timber and cattle) stop causing deforestation by 2030 at the latest.
IMPLEMENTATION RATE	Majority of companies subscribed as of 2015 pledge to zero deforestation by 2020.	We assume companies reach zero deforestation five years after they participate (reflecting the current commitments).

The calculations involved a number of parameter values from literature in order to convert company activity data (in unit of commodity) to emission reductions. This was done in a number of steps, as indicated schematically in Figure 10.

Figure 10.
Schematic showing the calculation steps going from production or consumption of certain agricultural commodities to the emissions attributable to deforestation connected thereto, and thus avoidable under a zero-deforestation commitment.

First, using estimations for the yield factor (in unit of commodity per hectare per year) of each commodity, we estimated the amount of hectares needed for the production of each commodity needed for the consumption of the subscribed companies.

Second, we used the worldwide share of production of each commodity that is displacing forest in that commodity’s total production to estimate how much of the consumed goods by the subscribed companies could realistically speaking be displacing forest.

Third, using historical overall rates of deforestation for each commodity, we estimated how long it would have taken to deforest the area needed to reach current rates of consumption of the subscribed companies for each commodity. This resulted in an estimate of yearly area deforested for the sake of consumption of timber, palm oil, soy beans and beef products from the subscribed companies. Under the zero-deforestation pledge, we assume that this yearly area deforested is brought down to zero within five years of subscription.

The conversion of avoided deforestation to avoided emissions is done using typical forest carbon content values for timber, beef and soybean calculations. For palm oil, we use (considerably higher) values of carbon content of peat land forests, as palm oil is often produced on produced on soil that used to support peat land forests.

The baseline is the emission levels of today, that is sourcing total production in the same share from sources displacing forests as is currently done on a global level (per commodity). Under the pledge, this deforestation would be avoided by 2020; this avoidance of deforestation results in lower emission levels below the baseline.

All numbers used in the calculation are indicated in Table 16 on the following page.

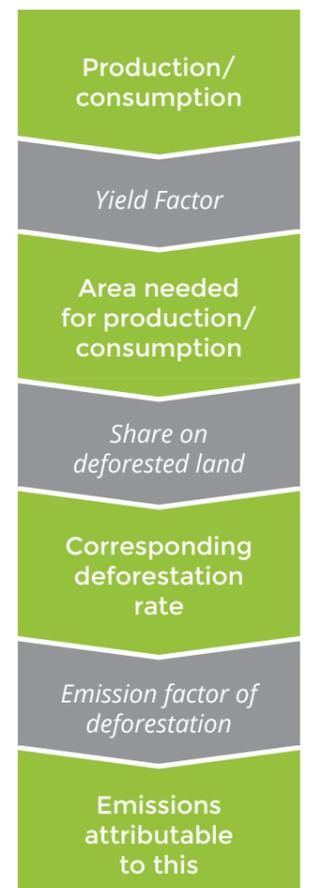


Table 16.

Parameters used for the calculation of the reductions per commodity

PARAMETER	VALUE	UNIT	SOURCE
YIELDS			
Palm oil yield	3.69	t / ha / year	https://www.forumpalmoel.org/en/ueber-palmoel.html
Soy bean yield (A1)	2.50	t / ha / year	https://apps.fas.usda.gov/psdonline/circulars/production.pdf , Table 1
Timber density (B)	900	kg/m ³	https://www.fao.org/docrep/x5328s/x5328s19.htm for dense tropical forest
Timber (volume) yield (C)	38	m ³ / ha / year	Forest Trends & UKAid (2014), "Consumer Goods and Deforestation: An Analysis of the Extent and Nature of Illegality in Forest Conversion for Agriculture and Timber Plantations", https://www.forest-trends.org/documents/files/doc_4718.pdf
Timber yield	20.9	t / ha / year	From two above values (B*C)
Beef (calorie) yield (D)	1.1*10 ⁶	calories / acre / year	https://www.waldeneffect.org/blog/Calories_per_acre_for_various_foods/
Acres to hectares (E)	0.40	ha / acre	Definition
Beef (calorie) yield (F)	2.7*10 ⁶	calories / ha / year	From two above values (D/E)
Beef calorie content (G)	250	calories / 100 g	National Nutrient Database for Standard Reference (Release 28), United States Department of Agriculture
Beef yield (A2)	1.09	t / ha / year	From two above values (F/G)
FORESTS			
Forest carbon content (min)	60	tC / ha	IPCC (2000): LULUCF (book), Table 3 (p. 12)
Forest carbon content (max)	120	tC / ha	IPCC (2000): LULUCF (book), Table 3 (p. 12)
Peat land forest carbon content (min)	227	tC / ha	IUCN (2009), "The Financial Costs of REDD: Evidence from Brazil and Indonesia", https://portals.iucn.org/library/efiles/documents/2009-047.pdf
Peat land forest carbon content (max)	600	tC / ha	IUCN (2009), "The Financial Costs of REDD: Evidence from Brazil and Indonesia", https://portals.iucn.org/library/efiles/documents/2009-047.pdf
CO ₂ / C ratio	3.67		
DEFORESTATION			
Deforestation rate in Brazil for soy plantations 1995-2005 (H1)	0.72	Mha / year	Forest Trends & UKAid (2014), Table 5
Soy exports displacing forest in Brazil (J1)	35.5	Mt / year	Forest Trends & UKAid (2014), Table C1
Area needed for this yearly soy production (K1)	14.2	Mha	From above values (J1/A)
Years needed to reach current extent of deforested land for soy production	20	years	Calculated from above values (K1/H1). Value for Brazil used as proxy for worldwide as most of the soy production displacing forests is in Brazil. This value is used to approximate the yearly deforestation necessary for the production of commodity sourced from the subscribed companies.

PARAMETER	VALUE	UNIT	SOURCE
DEFORESTATION			
Deforestation rate in Brazil for beef 1996-2005 (H2)	0.21	Mha / year	Forest Trends & UKAid (2014), Table 5 Value for Brazil used as proxy for worldwide as most of the soy production displacing forests is in Brazil.
Beef exports displacing forest in Brazil (J2)	1.2	Mt / year	Forest Trends & UKAid (2014), Table C3
Area needed for this yearly beef production (K2)	1.1	Mha	From above values (J2/A2)
Years needed to reach current extent of deforested land for beef production	5	Years	Calculated from above values (K2/H2). Value for Brazil used as proxy for worldwide as most of the soy production displacing forests is in Brazil. This value is used to approximate the yearly deforestation necessary for the production of commodity sourced from the subscribed companies.
Years needed to reach current extent of deforested land for palm oil production	25	Years	Forest Trends & UKAid (2014), Table 6: "most of Indonesia's oil palm planting has taken place since 1990"
Timber deforestation			For timber, we assume that the same area must be deforested every year in order to keep up the production levels, as opposed to the other three commodities where a deforested patch of land can support palm oil/soy plantations or cattle ranching for many years. Hence, we assume that the area needed to support the current yearly production of timber from the subscribed companies equals the yearly deforestation rate.
OTHER CONSTANTS			
Palm oil density	0.93	kg / l	http://www.dgfett.de/material/physikalische_eigenschaften.pdf
Logs	1	m ³ RWE / t	http://www.oecd.org/sd-roundtable/papersandpublications/39348796.pdf
Share of timber exports from deforestation in total timber exports	0.53	Ratio	Forest Trends & UKAid (2014), Table C5
Share of palm oil exports from deforestation in total palm oil exports	0.61	Ratio	Forest Trends & UKAid (2014), Table C2
Share of soy exports from deforestation in total soy exports	0.29	Ratio	Forest Trends & UKAid (2014), Table C1
Share of beef exports from deforestation in total beef exports	0.20	Ratio	Forest Trends & UKAid (2014), Table C3

LCTPI

No independent estimate of the impact of LCTPI was performed by the New Climate Institute team. Results were taken from the impact analysis of the LCTPI, please see the original report for the assumptions and detailed methodology (<http://lctpi.wbcsdservers.org/wp-content/uploads/2015/11/LCTPI-PWC-Impact-Analysis.pdf>).

Overview of results

In Table 17, we show an overview of the results of the methods explained above, covering the estimated impact of current endorsements, direct impact of the most ambitious plan, and the potential systemic impact of each initiative.

Table 17

Overview of all results obtained using the methodologies explained in this Appendix. Included are the impacts of the current commitments to each initiative, the potential direct impact under achievement of the initiative's most ambitious plan, and the possible systemic impact.

INITIATIVE		BUSINESS DETERMINED CONTRIBUTION (GtCO ₂ e)			
		Impact of current commitments by 2030	Direct impact by 2030: Most ambitious plan of the initiative	Possible systemic impact by 2030	
SCIENCE BASED TARGETS	Companies set targets in line with a "well below 2°C" decarbonisation trajectory	Not comprehensively estimated*	1.9	5.0	
EP100	Companies commit to doubling energy productivity in 25 years	Not estimated	0.3	2.4	
RE100	Companies commit to 100% renewable electricity	0.02 – 0.03	1.2 – 1.5	4.5- 5.7	
ZERO DEFORESTATION	Companies commit to zero deforestation from the commodities they use by 2020	0.11 – 0.27	0.5 – 1.2	0.7 – 1.5	Below different baseline scenario**
LOW CARBON TECHNOLOGY PARTNERSHIPS INITIATIVE (LCTPI)	Companies aim to transform the sector the companies are operating in	Not applicable	Not applicable	9-10	15-16
<i>Renewables</i>					5
<i>Chemicals</i>					0.2-0.4
<i>Cement</i>					0.6-0.9
<i>Energy efficiency in buildings</i>					3-3.5
<i>Low Carbon Transport fuels</i>					0.5
<i>Climate smart agriculture</i>					3.7
<i>Forests and forest products as carbon sinks</i>					2.7
TOTAL (TAKING INTO ACCOUNT OVERLAPS)			3.2-4.2	Roughly 10***	

* 14 have had their targets formally checked and approved, while the others are "in the pipeline". Out of those 14, we had enough data for 7 companies to estimate the potential impact if they reached their SBTs. This reduction is around 0.10 GtCO₂e by 2030.

** Impact of LCTPI was taken from a different report that used a different baseline. The results are not strictly comparable.

*** Not estimated in detail. The impact is smaller than the sum of each initiative due to significant overlaps.

Estimation of emission coverage rates per sector

Table 17 presents an overview of the estimated coverage of sectoral GHG emissions in 2020 and 2030 by initiative.

Table 18

Overview of the estimated coverage of sectoral GHG emissions by energy efficiency- and energy saving-related initiatives in 2020 and 2030.

SECTOR	2020		2030	
	SBTi (400 companies)	EP100 (1,000 companies)	SBTi (2,000 companies)	EP100 (1,000 companies)
CEMENT	4%	10%	19%	10%
STEEL	5%	12%	23%	12%
PULP AND PAPER	3%	6%	13%	6%
ALUMINIUM	4%	11%	22%	11%
CHEMICALS	6%	14%	28%	14%
OTHER INDUSTRIES	5%	9%	23%	9%
LIGHT ROAD PASSENGER TRANSPORT	15%	38%	76%	38%
COMMERCIAL	3%	5%	17%	5%

1) SBTi covers the GHG emissions from the use of light duty passenger vehicles, while EP100 covers the GHG emissions from manufacturing of light duty passenger vehicles (counted as part of "Other industries" sector), respectively.

For SBTi and EP100 initiatives, which aim to cover half or the whole of the commonly referenced lists of major companies, we estimated the coverage of sectoral GHG emissions by the companies listed in the MSCI All-Country World Index. Scope 1 and 2 GHG emissions data for 2014 are reported by the companies themselves or estimated by the CDP for 2372 of total 2453 companies. For the calculation of mitigation impacts, the sector coverage by the MSCI-listed companies

is scaled to the target number of companies for 2020 and 2030. For LCTPI, we took a different approach because the company coverage targets for 2020 and 2030 are much smaller than for SBTi and EP100 initiatives. We estimated the current coverage of sectoral GHG emissions for the currently endorsed companies and scaled them up to the target number of companies for 2020 and 2030.

Below the sectoral coverage estimations for SBTi and EP100 initiatives are described in detail:

POWER SECTOR

For SBTi, the coverage rate of GHG emissions was estimated by comparing the total Scope 1 GHG emissions (nearly entirely CO₂ emissions) reported for the power companies in the MSCI list (51 companies) with the total CO₂ emissions in the electricity and heat sector from the IEA CO₂ Emissions from Fuel Combustion 2015 (IEA 2015a) for the year 2013.

CEMENT SECTOR

For SBTi and EP100, the coverage rate of cement production by the MSCI-listed companies (total 21) was estimated by comparing with the top 75 producers list for 2013 in production capacity terms (Global Cement 2014) and total production data for 2013 from U.S. Geological Survey (USGS 2015). The production capacity was multiplied by a capacity utilization factor of 85% to estimate the production level.

IRON AND STEEL SECTOR

The coverage rate of crude steel production by the MSCI-listed companies (total 17) was estimated by comparing with the top 100 producers list for 2014 from the World Steel Association (World Steel Association 2016).

PULP AND PAPER SECTOR

The coverage rate of paper and board production by the MSCI-listed companies (total 10) was estimated by comparing with the top 57 paper and board producers list for 2010 (RISI 2011) and total production data for 2011 from the IEA ETP 2015 (IEA 2015b).

ALUMINIUM SECTOR

The coverage of primary aluminium production by the MSCI list (7 companies) was estimated by comparing with the top 10 producer list for 2013 (Rusal 2016) and historical total production figures from the International Aluminium Institute (International Aluminium Institute 2016) and the IEA ETP 2015 (IEA 2015b). We excluded the secondary aluminium production from the coverage rate assessment because it accounts for less than half of total aluminium production and its specific energy consumption is only about 6% of that for primary aluminium production.

CHEMICALS SECTOR

The coverage rate of Scope 1 GHG emissions in 2010 (54 companies) by the MSCI-listed companies were estimated in the industrial sector in comparison with the IEA CO₂ Emissions from Fuel Combustion 2015 (IEA 2015a).

OTHER INDUSTRIES

The coverage rate of Scope 1 and 2 GHG emissions in 2013 (estimated from 2014 results) by the MSCI-listed companies was estimated by comparing with the IEA CO₂ Emissions from Fuel Combustion 2015 (IEA 2015a). The International Standard Industrial Classification was applied to the MSCI list for the comparison with the IEA emissions data. Scope 1 and 2 emissions reported for companies include non-CO₂ emissions, but their shares in total GHG emissions are small for this sector.

SERVICE (COMMERCIAL) SECTOR

The weighted coverage rate for Scope 1 and 2 GHG emissions for 2013 (estimated from 2014 results) by the MSCI-listed companies was calculated by comparing with sector total CO₂ emission data (IEA 2015a). The ISIC sector classification is applied to the MSCI list for the comparison. Scope 1 and 2 emissions reported for companies include non-CO₂ emissions, but their shares in total GHG emissions are small for this sector.

AUTOMOBILE MANUFACTURING

The coverage of the total number of cars manufactured was estimated by comparing the MSCI-listed car manufacturers (25 companies) with the top 50 producer list for 2014 (OICA 2015).

LIGHT DUTY VEHICLES IN THE PASSENGER TRANSPORT

There was no extended list of top car manufacturers in the world available. Nevertheless, we could estimate that about 80% of total light duty passenger vehicles are produced by the companies listed in the Forbes 2000 list.

ASSESSMENT OF OVERLAPS BETWEEN INITIATIVES

Estimation of the net mitigation impact of energy-related initiatives

This section describes the calculation of net mitigation impact of the three energy-related initiatives: RE100, SBTi and EP100. For the calculation, initiatives are categorized into two groups: (1) initiatives focused on renewable electricity, and (2) initiatives focused on energy efficiency and energy savings (EE/ES). The power sector contributions under the SBTi, and the RE100 are categorized under the first group. All other contributions under the initiatives assessed in this study are categorized under the second group.

The calculation was performed in four steps. In the first step, the net mitigation impact of EE/ES-related initiatives is calculated by assessing the overlap of companies across initiatives. In the second step, the net impact of EE/ES-related initiatives on global total electricity demand was calculated from the reductions in Scope 2 emissions calculated in the first step. In the third step, the net mitigation impact of renewable electricity-related initiatives is recalculated with the adjusted electricity demand and the overlap of accounting among renewable electricity-related initiatives. Finally, the net mitigation impact from all initiatives are derived by aggregating all the impacts calculated above.

The details of each calculation step is described below:

Step 1: Net mitigation impact of energy efficiency and energy saving initiatives

For the calculation of the net mitigation impact of EE/ES-related initiatives, we made the following assumptions:

- For SBTi and EP100, we assumed that all their future signatories are listed in a common list of 'top 2000 companies'.
- For 2020, EP100 and SBTi cover 20% and 50% of the top 2000 companies, respectively, and LCTPi covers significantly smaller number of companies. For all sectors except for the cement sector, we assumed that companies that sign up to at least one of the three initiatives would collectively emit GHGs equivalent to 60% of the sectoral emissions from the top 2000 companies.⁶ This means that about half of the SBTi signatories also sign up to EP100.
- For 2020, EP100 and SBTi cover 50% and 100% of the top 2000 companies, respectively, and LCTPi covers significantly smaller number of companies. For all sectors, we assumed that companies that sign up to at least one of the three initiatives would collectively emit GHGs equivalent to 100% of the sectoral emissions from the top 2000 companies. This means that all EP100 LCTPi signatories also sign up to SBTi.
- We compared the stringency of the targets between the SBTi and EP100 initiatives. Our calculations showed that the average emissions reduction rates in 2030 for an EP100 signatory that signed up between 2015 and 2020 were equal to or higher than those for an SBTi signatory for all sectors. For the companies that signed up to both EP100 and SBTi initiatives, the EP100 targets were assumed to be 'driving' decarbonisation.

Based on the above, the coverage rates of sectoral GHG emissions by initiatives in 2020 and 2030 per mitigation target level were assumed as presented in Table 18.

Table 19

Coverage of sectoral GHG emissions by initiatives in 2020 and 2030 by mitigation target levels estimated in this study.

SECTOR	2020			2030		
	SBTi target as 'driver'	EP100 target as 'driver'	Total (net coverage rate) ¹⁾	SBTi target as 'driver'	EP100 target as 'driver'	Total (net coverage rate) *
CEMENT	2%	10%	12%	10%	10%	19%
STEEL	2%	12%	14%	12%	12%	23%
PULP AND PAPER	1%	6%	8%	6%	6%	13%
ALUMINIUM	2%	11%	13%	22%	0%	22%
CHEMICALS	3%	14%	17%	14%	14%	28%
OTHER INDUSTRIES	2%	12%	14%	23%	0%	23%
PASSENGER TRANSPORT (technology and use of light duty vehicles)	15%	0%	15%	76%	0%	76%
SERVICE SECTOR	2%	8%	10%	8%	8%	17%

1) The values may not match the sum of the SBTi and EP100 values due to rounding.

The net mitigation impact delivered by the EE/ES-related initiatives based on Table 18 was calculated to be 0.9 GtCO₂e in 2030. In comparison, the gross total mitigation impact from the EE/ES-related initiatives estimated for 2030 was 1.1 GtCO₂e.

Step 2: Net impact of energy efficiency- and energy saving-related initiatives on global total electricity demand

Of the 0.9 GtCO₂e net mitigation impact delivered by the EE/ES-related initiatives in 2030, 0.19 GtCO₂e was attributable to electricity consumption (Scope 2 emissions). This amount equals to 1% of total CO₂ emissions in 2030 projected for the power sector in our baseline scenario. It is therefore estimated that the EE/ES-related initiatives contributed to 1% reduction of electricity demand in 2030.

Step 3: Net mitigation impact of renewable electricity-related initiatives

As a result of Step 2, the projected mitigation impacts for the RE100 and the SBTi power sector initiatives presented in Sections 3.1 and 3.3 are reduced by 1% to account for the electricity demand reduction as calculated in Step 2.

Second, the overlap of RE accounting between the RE100 and SBTi power sector initiatives were estimated. The RE100 signatories can achieve their targets through purchase from the grid or through own generation. Our analysis shows that the SBTi's power sector signatories would cover 40% of global total GHG emissions from the power sector in 2030, while the RE100 signatories would only account for less than 5%. In the absence of no other initiatives other than the two initiatives to increase renewable electricity beyond the baseline scenario, 40% of the RE100 contributions through increased renewable electricity purchase would be generated under the SBTi power sector initiative. Assuming that the majority of the additional renewable electricity under the RE100 is achieved through purchases from the grid, we assumed that roughly 30% of the mitigation impact expected from the RE100 in 2030 overlaps with the SBTi power sector initiative.

The expected gross mitigation impact from the RE100 and the SBTi power sector initiatives was together about 2.3 GtCO₂e in 2030 (median result used for RE100). Taking into account the impacts of EE/ES-related initiatives and the overlap of renewable electricity accounting, the net mitigation impact from the two renewable electricity-related initiatives is expected to be about 2.0 GtCO₂e.

The aggregation of all net mitigation impacts on energy related emissions calculated above amounts up to 2.9 GtCO₂e/yr (range: 2.7 to 3.0) compared to the baseline scenario in 2030.

What we calculated for forestry (0.5 to 1.2 GtCO₂e) is not overlapping at all with the energy related emissions, therefore the total aggregated direct impact is 3.2 to 4.2 GtCO₂e).

APPENDIX REFERENCES

Ecofys, 2016. *The EP100: Doubling Energy Productivity Vital for a 2°C World* (Confidential), Ecofys.

Global Cement, 2014. *Top 75 global cement companies*. Available at: <http://www.globalcement.com/magazine/articles/822-top-75-global-cement-companies> [Accessed May 10, 2016].

Groenenberg, H., Blok, K. & van der Sluijs, J.P., 2004. *Global Triptych: a bottom-up approach for the differentiation of commitments under the Climate Convention*, Climate Policy 4(2), pp. 153-175

IEA, 2015a. *CO₂ Emissions from Fuel Combustion (2015 edition)*, Paris, France: International Energy Agency.

IEA, 2014. *Energy Technology Perspectives 2014: Harnessing Electricity's Potential*. Available at: <http://www.iea.org/publications/freepublications/publication/EnergyTechnologyPerspectives2014.pdf>

IEA, 2015b. *Energy Technology Perspectives 2015: Mobilising Innovation to Accelerate Climate Action*, Paris, France: International Energy Agency.

IEA, 2015c. *World Energy Outlook 2015*, International Energy Agency.
International Aluminium Institute, 2016. Statistics: primary aluminium production. Available at: <http://www.world-aluminium.org/statistics/#data> [Accessed April 29, 2016].

Krabbe, O. et al., 2015. *Aligning corporate greenhouse-gas emissions targets with climate goals*. Nature Climate Change, 5(12), pp.1057-1060.

OICA, 2015. *World ranking of manufacturers Year 2014*, International Organization of Motor Vehicle Manufacturers. Available at <http://www.oica.net/wp-content/uploads/Ranking-2014-Q4-Rev.-22-July.pdf> [Accessed April 29, 2016].

PwC, 2015, *LCTPI Impact Analysis*, <http://lctpi.wbcsdservers.org/wpcontent/uploads/2015/11/LCTPI-PWC-Impact-Analysis.pdf>

RISI, 2011. *The PPI Top 100 - most companies in the black*. Published 29 August, 2011. Available at: <http://technology.risiinfo.com/mills/east-europe-west-europe-africa-asia-pacific-latin-america-middle-east-north-america/ppi-top-100-most-companies-black> [Accessed April 29, 2016].

Rusal, 2016. *Aluminium producers*. Available at: <http://www.rusal.ru/en/aluminium/manufacturers/> [Accessed April 29, 2016].

UNEP, 2015. *The Emissions Gap Report 2015: A UNEP Synthesis Report*. Available at: http://uneplive.unep.org/media/docs/theme/13/EGR_2015_301115_lores.pdf

USGS, 2015. *Cement statistics and information*. Available via <http://minerals.usgs.gov/minerals/pubs/commodity/cement/mcs-2015-cemen.pdf> [Accessed April 29, 2016].

World Steel Association, 2016. *Top Steel-Producing companies 2014* (Tonnage above 3 million tonnes), World Steel Association. Available via <https://www.worldsteel.org/dms/InternetDocumentList/downloads/statistics/Extended-listing-2014/document/Extended%20listing%202014.pdf> [Accessed April 29, 2016].

APPENDIX ENDNOTES

- 1 Due to the significant number of existing initiatives it has been pragmatically decided that the BDC will focus on initiatives with largest potential possible.
- 2 Not all listed initiatives may fully satisfy the abovementioned criteria. The entire list of We Mean Business initiatives are: Science Based Targets; Putting a price on carbon; RE100; EP100; Responsible corporate engagement in climate policy; Reporting climate change in mainstream reports; Remove short-lived climate pollutant emissions; Montreal pledge; PDC; Low carbon assets; LCTPI. As not all these initiatives are easily measurable or meet the selection criteria, we focus on a selection in this initial report.
- 3 <http://blog.cdp.net/taking-corporate-renewable-energy-use-to-the-next-level/>
- 4 <https://www.msci.com/acwi> (accessed June 10, 2016)
- 5 Quote from that text: "If 125 companies (with targets that are due to expire shortly) adopted long-term science based greenhouse gas emissions reduction targets by the end of 2015 this would lead to emissions savings of 1.247 GtCO₂e by 2030 (based on the 6°C scenario) – the equivalent of one-third of the entire EU's emissions in 2013. If the largest 500 listed companies in the world set long-term science-based greenhouse gas emissions reduction targets (based on the 6°C scenario) and implemented action plans to reduce emissions by 2020 this would lead to emissions savings of up to 13.272GtCO₂e – the equivalent to two and a half times the USA's emissions in 2013."
- 6 The share of top 2000 companies that do not sign up to any of the three initiatives is (1 - 50%) * (1 - 20%) = 40%, thus the remaining 60% is assumed to have signed up to at least one initiative.



WE MEAN BUSINESS

economic opportunity through bold climate action

We Mean Business is a coalition of organizations working with thousands of the world's most influential businesses and investors. These businesses recognize that the transition to a low carbon economy is the only way to secure sustainable economic growth and prosperity for all. To accelerate this transition, we have formed a common platform to amplify the business voice, catalyze bold climate action by all, and promote smart policy frameworks.

w: wemeanbusinesscoalition.org | twitter: @WMBtweets | #wemeanit